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Report to Congressional Requesters

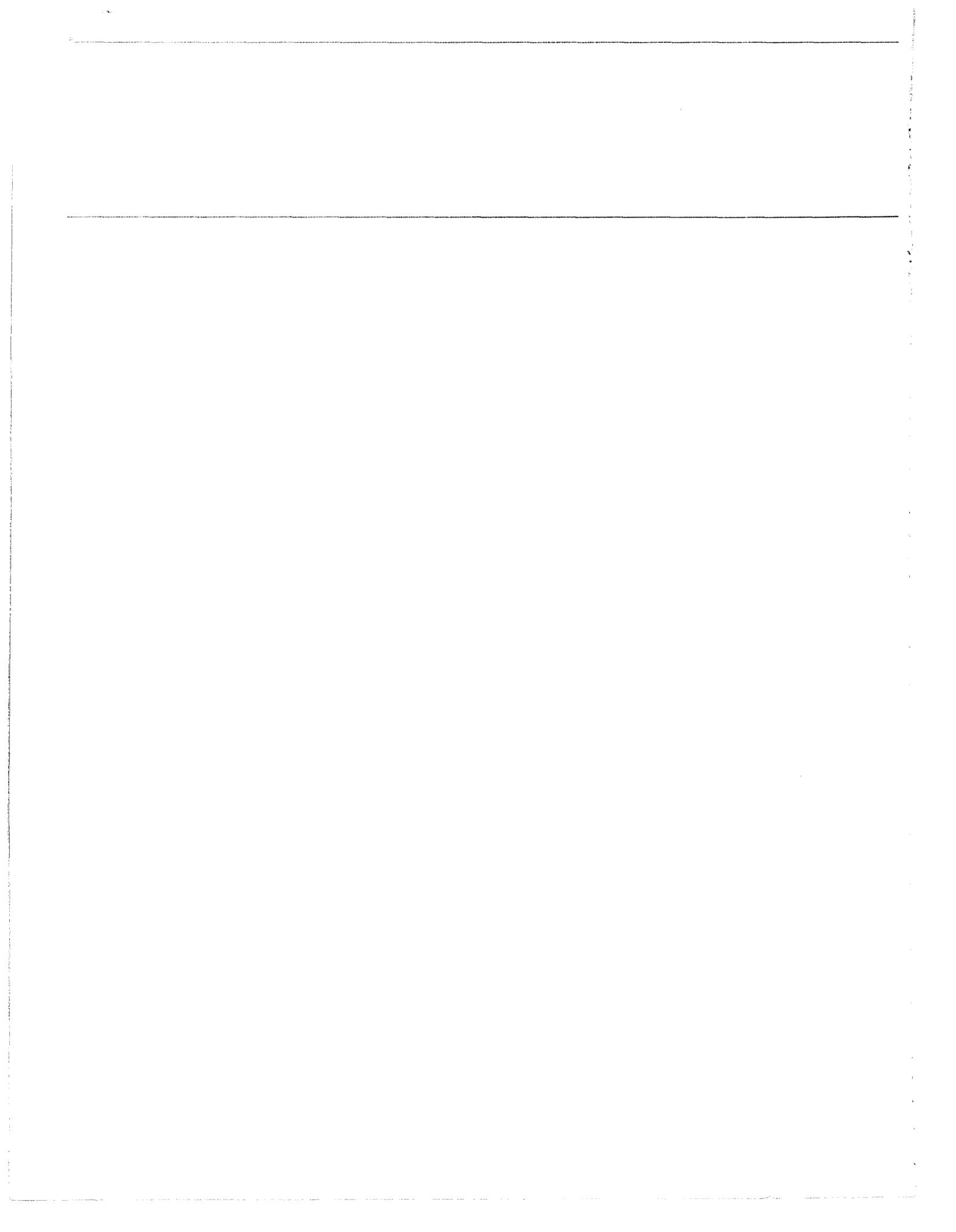
April 1991

TECHNOLOGY
TRANSFER

Federal Agencies'
Patent Licensing
Activities



143538



Resources, Community, and
Economic Development Division

B-242438

April 3, 1991

The Honorable Joseph R. Biden
Chairman, Committee on the Judiciary
United States Senate

The Honorable Jack Brooks
Chairman, Committee on the Judiciary
House of Representatives

The Honorable George E. Brown, Jr.
Chairman, Committee on Science, Space,
and Technology
House of Representatives

The Patent and Trademark Amendments of 1980 (P.L. 96-517) require us to report annually on federal agencies' implementation of section 6 of the act, which amended the law to promote the use of federally funded inventions. This report provides information on agencies' implementation of provisions that enable them to grant licenses to make, use, or sell government-owned inventions. As agreed with your offices, we are providing (1) patenting and licensing data for fiscal years 1981 through 1990 for 12 federal agencies and 16 of the Department of Energy's contractor-operated laboratories and (2) federal patent attorneys' and licensing officials' perceptions of possible ways to facilitate their agencies' patent licensing efforts. The 12 federal agencies we surveyed funded about \$16.2 billion of the estimated \$16.7 billion obligated for research and development at government laboratories in fiscal year 1990 and are the principal patenting and licensing agencies.

Results in Brief

On an annual average between fiscal years 1987 and 1990, the 12 federal agencies and 16 contractor-operated laboratories filed 1,578 patent applications, were issued 979 patents by the U.S. Patent and Trademark Office, and granted 164 licenses. In comparison, on an annual average between fiscal years 1981 and 1986, these agencies and laboratories filed 1,559 patent applications, were issued 1,193 patents, and granted 130 licenses. The agencies and laboratories increased the percentage of licenses requiring royalty payments from less than 50 percent of the licenses granted in the early 1980s to 95 percent of the licenses granted in fiscal year 1990. A royalty-bearing license generally indicates a significant commitment by the licensee to invest in commercializing a licensed invention.

The federal patent attorneys and licensing officials interviewed said that the Patent and Trademark Amendments' requirements to protect the public's interest and ensure fairness may discourage businesses from seeking to obtain licenses for government-owned inventions, in part because the requirements lengthen the time needed to negotiate a license agreement. However, these officials generally support the purpose of these requirements and, while offering a few individual views, did not uniformly suggest any changes to laws or regulations to facilitate their patent licensing efforts. The officials did note that the Federal Register, in which agencies are required to publish official notices, does not effectively get information to company managers who might be interested in commercializing an invention. The officials further noted that only three agencies make this information readily available through computerized data bases.

Background

The Patent and Trademark Amendments of 1980 were among the first of several laws enacted in the 1980s to stimulate the transfer of federally funded technology to U.S. businesses and other organizations. Section 6 of the amendments amended title 35 of the U.S. Code by (1) authorizing federal agencies to issue licenses granting exclusive, partially exclusive, or nonexclusive rights to make, use, or sell government-owned inventions¹ and (2) giving small business and nonprofit recipients of federal funding, with few exceptions, the option to retain title to their inventions. Public Law 98-620, enacted in November 1984, extended this coverage to most of the nonprofit contractors of Energy's contractor-operated laboratories. Subsequent laws, particularly the Federal Technology Transfer Act of 1986 (P.L. 99-502) and sections 3131 to 3133 of the National Defense Authorization Act for Fiscal Years 1990 and 1991 (P.L. 101-189), were intended to further stimulate the transfer of technology developed at federal government-operated and contractor-operated laboratories. These laws authorized such laboratories to enter into cooperative research and development agreements and required agencies to share royalty and other income with the federal inventor(s).

The Department of Commerce's governmentwide regulations for licensing government-owned inventions require that, before granting an exclusive license, federal agencies (1) obtain an applicant's plans for

¹Under an exclusive license, only one licensee has the right to make, use, or sell an invention during the patent's 17-year life. Under a partially exclusive license, the number of licensees, term of exclusivity, field of use, or territory of use may be restricted.

commercializing the invention,² (2) provide notice of a prospective license in the Federal Register identifying the invention and prospective licensee and allowing a 60-day period for any interested party to file written objections, and (3) justify granting an exclusive license.

The Air Force, Army, and Navy in the Department of Defense; Energy; the National Aeronautics and Space Administration (NASA); and the Tennessee Valley Authority historically have assigned a patent attorney the responsibility for licensing their patented inventions. Alternatively, several other agencies have used the Office of Federal Patent Licensing in Commerce's National Technical Information Service (NTIS) to negotiate royalty-bearing licenses for their inventions. These agencies include the Departments of Agriculture; Commerce, including the National Institute of Standards and Technology (NIST); Health and Human Services, including the National Institutes of Health (NIH); Interior; Transportation; and Veterans Affairs; and the Environmental Protection Agency (EPA).

Federal Patenting and Licensing Activities

From fiscal year 1981 through fiscal year 1990, the federal agencies and contractor-operated laboratories that we surveyed filed 15,669 patent applications, received 11,075 patents issued by the U.S. Patent and Trademark Office, granted 981 nonexclusive licenses and 455 exclusive licenses for the use of patented inventions, and received \$37.5 million in license income. (Tables III.1 to III.3 in app. III present data for each agency.)

Patent Applications and Patents Issued

The number of patent applications filed by the federal agencies and contractor-operated laboratories surveyed fluctuated considerably in the past 10 years, declining from 1,708 in fiscal year 1981 to 1,208 in fiscal year 1987 before climbing to 1,837 in fiscal year 1990. The number of patents that the Patent and Trademark Office issued to these agencies and laboratories ranged from a high of 1,321 in fiscal year 1984 to a low of 889 in fiscal year 1988 before increasing to 998 in fiscal year 1990.

Federal patent trends do not necessarily reflect agencies' and laboratories' efforts to commercialize their inventions; some agencies, particularly Defense, have other reasons for seeking patent protection.

²Federal agencies may exclude these submissions from disclosure under the Freedom of Information Act by treating them as commercial and financial information under 5 U.S.C. 552(b)(4).

According to Air Force, Army, and Navy patent attorneys, their principal objective in patenting inventions has been to protect Defense's procurement programs from a patent infringement lawsuit by another organization that might subsequently make and patent an invention used in a defense weapons system. While the Air Force, Army, and Navy filed 49 percent of the patent applications and received 57 percent of the patents issued to the agencies and laboratories surveyed between fiscal years 1981 and 1990, they granted only 8 percent of the licenses.

Patent Licensing Activities

The federal agencies and contractor-operated laboratories surveyed have modestly increased the average number of patent licenses granted per year from 130 licenses per year between fiscal years 1981 and 1986 to 164 licenses per year between fiscal years 1987 and 1990. The agencies and laboratories also increased the percentage of licenses requiring royalty payments from less than 50 percent of the licenses granted in the early 1980s to 95 percent of the licenses granted in fiscal year 1990.³ This increase in federal patent licensing activity primarily reflects implementation of provisions in (1) the Patent and Trademark Amendments of 1980, which allow federal agencies to grant exclusive licenses; (2) 1984 amendments to the Patent and Trademark Amendments of 1980, which allow nonprofit organizations that operate Energy's contractor-operated laboratories, with few exceptions, to retain title to federally funded inventions they make; and (3) the Federal Technology Transfer Act of 1986, which allows federal inventors and laboratories to share in any royalty and other income earned on licensed patents. Over the past 10 years the following changes in federal patent licensing occurred:

- The percentage of exclusive licenses granted by the agencies and laboratories surveyed increased from only 6 percent of 173 licenses granted in fiscal year 1981 to 32 percent of 114 licenses granted in fiscal year 1986 to 41 percent of 191 licenses granted in fiscal year 1990. Federal patent licensing officials said that businesses generally seek an exclusive license to protect their investment in developing an invention into a commercial product.
- In fiscal year 1981, all 28 licenses that Agriculture granted were on a nonexclusive, royalty-free basis. NTIS also granted two licenses for Agriculture patents and collected \$7,300 on Agriculture licenses. In fiscal year 1986, Agriculture granted nine nonexclusive, royalty-free licenses

³All 10 royalty-free licenses granted in fiscal year 1990 were for patents for which nonexclusive, royalty-free licenses had previously been granted.

while NTIS granted eight licenses for Agriculture patents and collected \$85,000 on Agriculture licenses. In fiscal year 1990, Agriculture granted 19 exclusive licenses; 1 nonexclusive, royalty-bearing license; and 2 nonexclusive, royalty-free licenses and collected \$146,000 in license income. NTIS also granted nine licenses for Agriculture patents and collected \$413,000 on Agriculture licenses.

- During fiscal year 1987, Energy approved modifications to the contracts for several of its contractor-operated laboratories that generally enable the contractors to retain title to and license inventions that they develop. In the 6 years before this change took effect, Energy issued an average of 19 licenses per year. Since fiscal year 1987, Energy and its contractor-operated laboratories have issued an average of 62 licenses per year. (Table III.4 shows the patenting and licensing activities of Energy's contractor-operated laboratories in fiscal year 1990.)
- In response to the royalty-sharing provisions of the Federal Technology Transfer Act, several agencies that formerly relied on NTIS to negotiate royalty-bearing licenses have expanded their own patenting and licensing activities. Between fiscal years 1981 and 1990, NTIS granted 310 licenses for NIH and other Health and Human Services patents, 93 licenses for Agriculture patents, 20 licenses for NIST and other Commerce patents, and 2 licenses for EPA patents. (See table III.5.) Agriculture and EPA have begun to negotiate royalty-bearing licenses. Similarly, in recent years NIH and NIST have filed more patent applications and, while continuing to use NTIS, are assuming more control over the licensing decisions.
- The number of licenses that NTIS granted dropped to 48 in fiscal year 1990, after growing from 20 in fiscal year 1981 to 51 in fiscal year 1986 and 70 in fiscal year 1989. According to an NTIS official, this decline reflected (1) the downturn in the U.S. economy, which discouraged businesses from seeking government licenses, and (2) other agencies' increased involvement in patent licensing.
- Licensing of Defense inventions had minimal importance until the last 2 years, when Defense began to incorporate technology transfer into its mission in response to the Federal Technology Transfer Act of 1986. In fiscal years 1989 and 1990, the Air Force, Army, and Navy granted 16 licenses per year and received \$190,000 in license income per year. During the 5 preceding fiscal years, they granted eight licenses per year and received \$31,000 per year.

License Income

The federal agencies and contractor-operated laboratories surveyed increased their patent licensing income from \$348,000 in fiscal year

1981 to \$5 million in 1986 and \$9.4 million in 1990.⁴ Nonexclusive licenses that NTIS granted for two inventions made at NIH, a hepatitis B vaccine and an Acquired Immune Deficiency Syndrome test kit, earned \$22.6 million, or 60 percent, of the \$37.5 million received from fiscal year 1981 through fiscal year 1990. Energy's contractor-operated laboratories have earned \$4.8 million since they began licensing inventions in fiscal year 1987.

Views of Federal Patent Licensing Officials

Despite only modest improvement in licensing federal patents, the patent attorneys and licensing officials interviewed at NTIS, the Air Force, the Army, the Navy, Energy, NASA, NIH, Agriculture, and NIST are generally satisfied with the procedures outlined in legislation and governmentwide regulations for licensing government-owned inventions. These agencies have granted almost all of the exclusive licenses for government inventions.

Patent attorneys and licensing officials noted that the Patent and Trademark Amendments of 1980, while encouraging the commercial use of federal inventions by granting exclusivity, also protect the public's interests by establishing procedures to ensure fairness and openness in licensing. In particular, NTIS and NASA officials believe that the requirements to ensure fairness are appropriate and have proved to be workable. Some of the federal licensing officials, however, suggested changes to address particular problems they have experienced in granting licenses and responding to requests under the Freedom of Information Act (5 U.S.C. 552) for documents submitted by licensees. In addition, several of the officials mentioned that they do not have an effective means for officially notifying businesses and other organizations of federal patents available for licensing or of other technology transfer opportunities.

Ensuring Fairness in Granting Exclusivity for Government Patents

NTIS licensing officials stated that negotiating an exclusive federal patent license, particularly with a large business, typically takes more than 1 year and may take as long as 2 years to complete. According to the NTIS officials, negotiations take so much time because of the normal internal business and legal reviews and analyses needed to determine acceptable licensing terms and conditions. For example, management for large businesses typically will enter into a licensing agreement only

⁴License income may include an initial fee payable with the execution of the license, an annual minimum fee, and royalties, which typically represent a percentage of the resulting product's sales.

after comparing the costs and benefits of commercializing a federal invention with the costs and benefits of undertaking alternative company projects.

Governmentwide regulations require that a federal agency publish a notice in the Federal Register of its intent to grant an exclusive license. This notice provides 60 days for the filing of objections, and if an outside party submits its own plans, the agency is required to consider the appropriateness of granting a license to the objecting party. The federal patent attorneys and licensing officials interviewed generally support the 60-day notice requirement, citing (1) the need to ensure fairness of opportunity, (2) the public's right to know who is getting exclusive rights to commercialize government-owned inventions, and/or (3) the opportunity to attract other licensees who were not aware of the invention's availability and who are willing to pay royalties for a license. All of these officials stated that if a company requested an exclusive license to a government-owned invention as a basis for a cooperative research and development agreement, their agencies would follow the 60-day notice procedures before signing an agreement.

Patent licensing officials stated that their agencies have handled objections to the granting of exclusive licenses differently. On the one hand, NTIS normally does not begin to negotiate until the 60-day period is complete because it interprets governmentwide regulations as requiring agencies to negotiate with the original applicant and any qualified objectors. On the other hand, Energy and the Air Force give preference to an original applicant while trying to accommodate a qualified objector by, for example, granting the objector a patent license for a specific field of use.

While the patent licensing officials interviewed generally support the current procedures, they cited a few cases in which an objection to the granting of an exclusive license constrained their licensing efforts. Air Force and Navy licensing officials stated that in at least two instances the process of handling objections resulted in no license being granted because (1) the licensing process was drawn out too long, causing the potential licensee to lose interest, and/or (2) the primary motive of the objector apparently was to block the granting of an exclusive license to a competitor, rather than any direct interest in commercializing the technology. Similarly, Energy licensing officials stated that they typically grant exclusive licenses only to small businesses because competitors would object to granting an exclusive license to a large corporation. Further, Army technology transfer officials noted that one company

applying for an exclusive license objected to the requirement that its name appear in the 60-day notice because competitors might deduce from the notice that it was planning to enter into a new market.

In addition, the director of NIH's Office of Technology Transfer cited the documentation requirement in 35 U.S.C. 209 as particularly burdensome. Under this requirement, agencies must make formal, affirmative findings before granting an exclusive license that (1) federal and public interests are best served by exclusive licensing, (2) expeditious practical application of the invention is unlikely to occur under a nonexclusive license, (3) exclusive licensing is a reasonable and necessary incentive to attract investment of risk capital, (4) the proposed terms and scope of exclusivity are not greater than reasonably necessary, and (5) exclusive licensing will not tend substantially to lessen competition or result in undue market concentration. The director suggested that federal licensing officers be able to award an exclusive license when the evidence of record reasonably favors exclusive licensing. According to the director, this kind of agency discretion would be consistent with the Federal Technology Transfer Act of 1986.

Freedom of Information Act

NTIS licensing officials also told us that in recent years their administrative burden has increased in responding to requests under the Freedom of Information Act for documents about a licensee's invention commercialization plans and progress reports. Because agencies have authority to treat these documents as commercial and financial information obtained from a person and therefore not subject to disclosure, the NTIS officials stated that their office's six licensing specialists are required to review all of the requested documents carefully, in consultation with the licensee, to determine what information should be excluded.

The NTIS licensing officials suggested that the 35 U.S.C. 209 exception might be changed to state that a licensee's invention commercialization plan and periodic progress reports "shall" be treated as commercial and financial information and not subject to disclosure. Other patent attorneys and licensing officials interviewed noted, however, that this approach would still require an agency to review documents in responding to a Freedom of Information Act request. They suggested that a more effective way to change section 209 would be specifically to exempt it from the Freedom of Information Act, as long as the licensee's identity and information about the patent, including its patent number and perhaps an abstract of the invention, were disclosed.

Public Notice for Federal Technology Transfer Opportunities

The licensing officials we interviewed stated that, in accordance with Commerce's governmentwide regulations, they use the Federal Register to announce the availability of patents for license and to provide notice of their intent to grant an exclusive license. However, these officials said that the Federal Register does not effectively get information to company managers who might be interested in the invention. In addition to the official legal notice, NTIS announces the availability of patents for license through (1) NTIS' weekly journals; (2) NTIS' computerized data base, which businesses can access through such commercial data bases as Dialog and Orbit, and (3) direct mailings, telephone contacts, and personal meetings. Agriculture also provides information about its issued patents available for licensing through its computerized system, AGRICOLA, which can be searched through Dialog and BRS Information Technologies. NIH similarly provides on-line information through its electronic bulletin board, NIH-OTTO, about patents available for licensing and collaborative research opportunities at NIH; the Alcohol, Drug Abuse and Mental Health Administration; and the Centers for Disease Control.

Scope and Methodology

We obtained patenting and licensing data for fiscal years 1981 through 1990 for the 12 principal federal agencies that patent and/or license government-owned inventions. These agencies accounted for about \$16.2 billion, or 97 percent, of the estimated \$16.7 billion obligated for research and development at government laboratories in fiscal year 1990 (see app. I). We also obtained patenting and licensing data from 16 of the Department of Energy's government-owned, contractor-operated laboratories (see app. II) because, in response to the 1984 amendments to the Patent and Trademark Amendments of 1980, Energy's contractor-operated laboratories have begun to license their patents. Before the 1984 amendments were implemented, Energy licensed inventions made at its contractor-operated laboratories, unless a contractor requested a waiver of title rights from Energy.

To obtain federal patent attorneys' and licensing officials' perceptions of possible ways to facilitate their agencies' patent licensing efforts, we interviewed patent attorneys and licensing officials at Agriculture; NIST and NTIS within Commerce; the Air Force, Army, and Navy within Defense; Energy; NASA; and NIH within Health and Human Services. These agencies have active patent licensing programs. We did not seek industry views on federal patent licensing requirements.

We conducted our review between June 1990 and November 1990 in accordance with generally accepted government auditing standards.

Agency Comments

A draft of this report was sent to the Departments of Agriculture, Commerce, Defense, Energy, and Health and Human Services and to NASA. Agriculture, Commerce, Defense, and Health and Human Services provided official comments. All generally agreed with the report's presentation of the issues; their comments appear in appendixes IV to VII. Energy and NASA chose not to provide official comments. Commerce stated that it plans to initiate a formal interagency review of its governmentwide regulations, which will include public hearings to serve as a forum for discussing such issues as those raised in this report and possible revisions to the regulations. Commerce also noted that enforcement of government-owned patents against infringers could have a major impact on the success of agencies' licensing programs. All six agencies suggested changes to improve the presentation and technical accuracy of the draft report. We incorporated appropriate changes.

As agreed with your offices, we are sending copies of this report to the Director, Office of Management and Budget, and other interested parties. Copies will be made available to others upon request. Major contributors are listed in appendix VIII.



John M. Ols, Jr.
Director, Housing and Community
Development Issues

Contents

Letter	1
Appendix I Federal Agencies Providing Patenting and Licensing Data	14
Appendix II Energy's Government- Owned, Contractor- Operated (GOCO) Laboratories Providing Patenting and Licensing Data	15
Appendix III Federal Patent and Licensing Activities for Fiscal Years 1981- 1990	16
Appendix IV Comments From the Department of Agriculture	23
Appendix V Comments From the Department of Commerce	26

Appendix VI Comments From the Department of Defense	29
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Appendix VII Comments From the Department of Health and Human Services	30
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Appendix VIII Major Contributors to This Report	31
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Related GAO Products	32
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Tables		
Table III.1: Summary of Federal Patenting and Licensing Data		16
Table III.2: Federal Agencies' Patent and Licensing Activities by Year		17
Table III.3: Licenses Granted by Federal Agencies		20
Table III.4: Patenting and Licensing Activities of Energy's GOCO Laboratories in Fiscal Year 1990		21
Table III.5: Licenses Granted by NTIS for Various Federal Agencies		22

Abbreviations

EPA	Environmental Protection Agency
GAO	General Accounting Office
GOCO	government-owned, contractor-operated
NASA	National Aeronautics and Space Administration
HHS	Health and Human Services
NIH	National Institutes of Health
NIST	National Institute of Standards and Technology
NTIS	National Technical Information Service

Federal Agencies Providing Patenting and Licensing Data

Dollars in millions	
Department or agency	Estimated Intramural R&D obligations in FY 1990 ^a
Agriculture	
Agricultural Research Service	\$ 532
Forest Service	126
Other Agriculture agencies and offices	84
Department total	\$ 742
Commerce	
National Institute of Standards and Technology	113
National Technical Information Service	^b
Defense	
Air Force	2,759
Army	2,193
Navy	3,537
Defense agencies and offices ^c	2,007
Department total	10,496
Energy	
Environmental Protection Agency	119
Health and Human Services	
Alcohol, Drug Abuse and Mental Health Administration	220
Centers for Disease Control	77
National Institutes of Health	1,241
Department total	1,538
Interior	
NASA	349
National Science Foundation	2,108
Tennessee Valley Authority	192 ^d
Transportation	26
Veterans Affairs	179
	201
Total estimated obligations	\$ 16,225

^aIncludes obligations for R&D performed at federal government-operated laboratories. Intramural R&D obligations do not include obligations for R&D performed by contractors and grantees, including contractor-operated laboratories.

^bNTIS licenses patents for other federal agencies.

^cIncludes the Defense Logistics Agency, the Defense Mapping Agency, and the National Security Agency.

^dAlthough it annually obligates substantial funds for intramural R&D, the National Science Foundation did not file any patent applications between fiscal years 1981 and 1990.

Source: National Science Foundation. Federal Funds for Research and Development: Fiscal Years 1988, 1989, and 1990 (NSF 90-306).

Energy's Government-Owned, Contractor-Operated (GOCO) Laboratories Providing Patenting and Licensing Data

Laboratory or location	Operating contractor
Ames Laboratory	Iowa State University
Argonne National Laboratory	University of Chicago
Brookhaven National Laboratory	Associated Universities, Inc.
Fermi National Accelerator Laboratory	University Research Association, Inc.
Idaho National Engineering Laboratory	EG&G Idaho, Inc.
Lawrence Berkeley National Laboratory	University of California
Lawrence Livermore National Laboratory	University of California
Los Alamos National Laboratory	University of California
Oak Ridge, Tennessee	Oak Ridge Associated Universities
Oak Ridge National Laboratory	Martin Marietta Energy Systems, Inc.
Pacific Northwest Laboratory	Battelle Memorial Institute
Princeton Plasma Physics Laboratory	Princeton University
Sandia National Laboratories	AT&T Technologies, Inc.
Solar Energy Research Institute	Midwest Research Institute
Stanford Linear Accelerator Center	Stanford University
Savannah River Laboratory	Westinghouse Savannah River Company

Note: Contractors also operate Bettis Atomic Power Laboratory and Knolls Atomic Power Laboratory for Energy. However, patenting and licensing data for these laboratories are included in Energy's totals because, as naval nuclear propulsion laboratories, they are specifically excluded by the Patent and Trademark Amendments of 1980, as amended, from retaining title to inventions they make.

Federal Patent and Licensing Activities for Fiscal Years 1981-1990

Table III.1: Summary of Federal Patenting and Licensing Data (Fiscal Years 1981-90)

Dollars in thousands

Agency	Patent applications	Patents issued	Licenses granted		License income
			Nonexclusive	Exclusive	
Agriculture ^a	506	421	166	26	\$148
Commerce					
NIST ^a	86	53	0	0	0
NTIS ^a	0	0	259	194	30,226
Defense	7,742	6,371	64	46	682
Energy ^b	4,411	2,405	239	122	5,629
Environmental Protection Agency ^a	20	11	0	1	3
Health and Human Services ^a	986	266	0	0	0
Interior ^a	215	187	32	0	0
NASA	1,559	1,275	136	65	652
National Science Foundation	0	0	0	0	0
Tennessee Valley Authority	117	68	85	1	174
Transportation ^a	22	18	0	0	0
Veterans Affairs ^a	5	^c	0	0	0
Total	15,669	11,075	981	455	\$37,514

^aNTIS licenses patents for several federal agencies including Agriculture, Commerce, the National Security Agency in Defense, EPA, Interior, the Public Health Service in Health and Human Services, and Veterans Affairs. About \$26 million, or 86 percent, of NTIS' licensing revenue was earned from nonexclusive licenses, including \$22.6 million from AIDS test kit and hepatitis B vaccine licenses.

^bIncludes data from 16 contractor-operated laboratories on patent applications filed, licenses granted, and license income. Data on patents issued to the laboratories were not available.

^cData not available.

Source: GAO compilation of agency data.

**Appendix III
Federal Patent and Licensing Activities for
Fiscal Years 1981-1990**

Table III.2: Federal Agencies' Patent and Licensing Activities by Year (Fiscal Years 1981-90)

License income in thousands of dollars

Patent/license activity by agency	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total
Agriculture^a											
Patent applications	61	71	52	44	38	42	39	45	61	53	506
Patents issued	55	45	45	46	39	34	34	28	47	48	421
Patents licensed	19	8	13	7	9	7	8	6	10	19	106
Licenses granted	28	21	40	26	16	9	12	7	11	22	192
License income	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2	\$146	\$148
Commerce											
NIST^a											
Patent applications	5	4	2	6	5	12	8	4	17	23	86
Patents issued	3	4	5	4	2	7	6	14	2	6	53
NTIS^a											
Patent applications forwarded to NTIS for licensing	^b	^b	154	97	92	109	109	224	208	195	1,188
Licenses granted	20	27	41	36	41	51	53	66	70	48	453
License income	\$69	\$155	\$907	\$868	\$1,509	\$4,831	\$4,466	\$5,683	\$5,377	\$6,361	\$30,226
Defense											
Air Force											
Patent applications	172	238	210	205	216	223	154	149	147	178	1,892
Patents issued	149	98	144	204	180	203	212	149	136	115	1,590
Patents licensed	0	0	0	1	2	5	1	1	2	8	20
Licenses granted	0	0	0	1	2	1	1	1	2	5	13
License income	\$0	\$0	\$0	\$0	\$6	\$7	\$27	\$31	\$27	\$44	\$142
Army											
Patent applications	365	315	277	287	253	227	192	246	328	254	2,744
Patents issued	257	243	237	249	223	245	268	226	243	203	2,394
Patents licensed	1	8	8	10	0	4	10	2	4	0	47
Licenses granted	1	3	3	1	0	1	5	4	7	0	25
License income	\$5	\$31	\$24	\$10	\$5	\$8	\$10	\$4	\$11	\$18	\$126
Navy											
Patent applications	514	445	373	281	288	139	117	197	278	439	3,071
Patents issued	343	344	295	313	253	199	194	101	114	202	2,358
Patents licensed	7	15	12	22	5	0	7	2	15	11	96
Licenses granted	6	15	9	11	5	0	6	2	10	8	72
License income	\$0	\$58	\$28	\$14	\$8	\$6	\$7	\$13	\$143	\$137	\$414

(continued)

**Appendix III
Federal Patent and Licensing Activities for
Fiscal Years 1981-1990**

Patent/license activity by agency	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total
National Security Agency^a											
Patent applications	5	4	4	1	3	3	2	5	4	4	35
Patents issued	1	4	3	6	1	3	1	3	5	2	29
Energy											
Patent applications ^c	327	380	321	545	440	462	425	497	555	459	4,411
Patents issued ^d	232	239	219	298	288	286	219	211	200	213	2,405
Patents licensed	17	7	16	19	20	37	17	11	4	6	154
Licenses granted	19	6	16	24	24	26	19	11	6	8	159
License income	\$262	\$208	\$82	\$54	\$31	\$42	\$49	\$49	\$50	\$50	\$877
Energy's GOCO Labs											
Patent applications ^c	b	b	b	b	b	b	b	b	b	b	b
Patents issued ^d	b	b	b	b	b	b	b	b	b	b	b
Licenses granted	b	b	b	b	b	b	14	43	57	88	202
License income	b	b	b	b	b	b	\$297	\$496	\$1,449	\$2,510	\$4,752
Environmental Protection Agency^a											
Patent applications	b	b	b	b	b	b	4	5	5	6	20
Patents issued	b	b	b	b	b	b	1	3	2	5	11
Licenses granted ^a	0	0	0	0	0	0	0	0	0	1	1
License income ^a	0	0	0	0	0	0	0	0	0	\$3	\$3
Health and Human Services^a											
Alcohol, Drug Abuse & Mental Health Administration											
Patent applications	b	b	b	b	b	b	9	17	16	14	56
Patents issued	b	b	b	b	b	b	0	1	2	2	5
Centers for Disease Control											
Patent applications	b	b	b	b	b	b	8	16	26	31	81
Patents issued	b	b	b	b	b	b	5	4	7	3	19
NIH											
Patent applications	36	46	39	44	76	95	97	127	133	156	849
Patents issued	16	12	20	30	22	26	28	32	25	31	242
Interior^a											
Patent applications	37	37	19	16	20	20	11	14	14	27	215
Patents issued	44	26	27	18	10	17	12	12	12	9	187
Licenses granted	15	12	1	1	0	1	2	0	0	0	32
License income	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

(continued)

**Appendix III
Federal Patent and Licensing Activities for
Fiscal Years 1981-1990**

Patent/license activity by agency	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total
NASA											
Patent applications	171	190	169	135	128	115	134	174	162	181	1,559
Patents issued	149	114	132	144	139	110	114	98	127	148	1,275
Patents licensed	68	34	18	25	7	10	15	7	6	6	196
Licenses granted	58	35	23	23	9	10	23	7	7	6	201
License income	\$11	\$15	\$24	\$98	\$82	\$73	\$73	\$79	\$84	\$113	\$652
Tennessee Valley Authority											
Patent applications	9	17	11	17	14	8	8	10	13	10	117
Patents issued	9	3	3	8	7	9	8	7	4	10	68
Patents licensed	6	6	0	2	8	9	0	3	4	4	42
Licenses granted	26	11	0	2	10	15	0	6	11	5	86
License income	\$1	\$1	\$0	\$0	\$1	\$1	\$0	\$0	\$163	\$7	\$174
Transportation^a											
Patent applications	4	7	6	0	0	0	0	2	1	2	22
Patents issued	1	4	2	1	6	2	1	0	0	1	18
Veterans Affairs^{a,*}											
Patent applications	2	1	0	0	2	0	0	0	0	0	5
Patents issued	^b	^b	^b	^b	^b	^b	^b	^b	^b	^b	^b
Totals											
Patent applications	1,708	1,755	1,483	1,581	1,483	1,346	1,208	1,508	1,760	1,837	15,669
Patents issued^f	1,259	1,136	1,132	1,321	1,170	1,141	1,103	889	926	998	11,075
Patents licensed^g	118	78	67	86	51	72	58	32	45	54	661
Licenses granted	173	130	133	125	107	114	135	147	181	191	1,436
License income	\$348	\$468	\$1,065	\$1,044	\$1,642	\$4,968	\$4,929	\$6,355	\$7,306	\$9,389	\$37,514

^aNTIS licenses patents for several federal agencies including Agriculture, Commerce, the National Security Agency in Defense, EPA, Interior, Health and Human Services, and Veterans Affairs. In fiscal year 1990, NTIS collected license revenue of \$5,839,000 for the Public Health Service patents, \$413,000 for Agriculture patents, \$52,000 for Commerce patents, \$41,000 for Interior patents, and \$16,000 for other agencies' patents.

^bData not available.

^cBeginning in fiscal year 1984, Energy's patent application data include totals for its GOCO laboratories. The GOCO laboratories filed about 245 patent applications in fiscal year 1987, 319 applications in fiscal year 1988, 364 applications in fiscal year 1989, and 342 applications in fiscal year 1990. These totals may include some applications filed by Energy.

^dPatents issued are for Energy's patent applications only and do not include patents issued to its GOCO laboratories, for which data were not available.

^eBecause its researchers typically also have university appointments, Veterans Affairs almost always waives its rights to inventions to its employee inventor to facilitate the licensing of the invention by the university.

^fData not available for Energy's GOCO laboratories.

^gData not available for NTIS, Energy's GOCO laboratories, or Interior.

**Appendix III
Federal Patent and Licensing Activities for
Fiscal Years 1981-1990**

Table III.3: Licenses Granted by Federal Agencies (Fiscal Years 1981-90)

Licenses by agency	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total
Agriculture											
Exclusive	0	0	0	0	0	0	0	0	7	19	26
Nonexclusive	28	21	40	26	16	9	12	7	4	3	166
Commerce											
NTIS											
Exclusive	5	9	14	14	23	25	22	36	29	17	194
Nonexclusive	15	18	27	22	18	26	31	30	41	31	259
Defense											
Air Force											
Exclusive	0	0	0	0	2	0	1	1	1	4	9
Nonexclusive	0	0	0	1	0	1	0	0	1	1	4
Army											
Exclusive	1	1	2	1	0	1	5	0	7	0	18
Nonexclusive	0	2	1	0	0	0	0	4	0	0	7
Navy											
Exclusive	1	1	0	4	2	0	4	1	3	3	19
Nonexclusive	5	14	9	7	3	0	2	1	7	5	53
Energy											
Exclusive	0	3	3	2	13	5	5	4	0	0	35
Nonexclusive	19	3	13	22	11	21	14	7	6	8	124
Energy's GOCO Labs											
Exclusive	a	a	a	a	a	a	14	18	25	30	87
Nonexclusive	a	a	a	a	a	a	a	25	32	58	115
Environmental Protection Agency											
Exclusive	0	0	0	0	0	0	0	0	0	1	1
Nonexclusive	0	0	0	0	0	0	0	0	0	0	0
Interior											
Exclusive	0	0	0	0	0	0	0	0	0	0	0
Nonexclusive	15	12	1	1	0	1	2	0	0	0	32
NASA											
Exclusive	3	8	8	10	4	5	14	4	4	5	65
Nonexclusive	55	27	15	13	5	5	9	3	3	1	136

(continued)

**Appendix III
Federal Patent and Licensing Activities for
Fiscal Years 1981-1990**

Licenses by agency	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total
Tennessee Valley Authority											
Exclusive	0	0	0	0	0	0	0	0	1	0	1
Nonexclusive	26	11	0	2	10	15	0	6	10	5	85
Total											
Exclusive	10	22	27	31	44	36	65	64	77	79	455
Nonexclusive	163	108	106	94	63	78	70	83	104	112	981

^aData not available.

**Table III.4: Patenting and Licensing
Activities of Energy's GOCO
Laboratories in Fiscal Year 1990**

License income in thousands of dollars

GOCO laboratory	Patent applications	Licenses granted		License income
		Nonexclusive	Exclusive	
Ames Laboratory	12	0	2	\$1
Argonne National Laboratory	9	5	0	45
Brookhaven National Laboratory	14	24	1	138
Fermi National Accelerator Laboratory	3	0	1	5
Idaho National Engineering Laboratory	16	0	2	73
Lawrence Berkeley National Laboratory	20	0	1	50
Lawrence Livermore National Laboratory	87	7	2	250
Los Alamos National Laboratory	42	1	6	55
Oak Ridge Associated Universities	0	0	0	7
Oak Ridge National Laboratory	51	5	5	480
Pacific Northwest Laboratory	27	13	5	1,240
Princeton Plasma Physics Laboratory	1	0	1	2
Sandia National Laboratories	36	2	3	3
Solar Energy Research Institute	11	0	1	93
Stanford Linear Accelerator Center	0	0	0	50
Savannah River Laboratory	13	1	0	18
Total	342	58	30	\$2,510

**Appendix III
Federal Patent and Licensing Activities for
Fiscal Years 1981-1990**

Table III.5: Licenses Granted by NTIS for Various Federal Agencies (Fiscal Years 1981-90)

Agency	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total
Agriculture	2	3	7	7	13	8	14	15	15	9	93
Commerce	1	6	3	2	1	0	2	2	3	0	20
EPA	0	0	0	0	0	2	0	0	0	0	2
Interior	4	1	1	1	2	0	3	5	1	1	19
Health and Human Services ^a	12.5 ^b	15	30	24	25	40.5 ^b	34	43	49	37	310
Veterans Affairs	0.5 ^b	1	0	2	0	0	0	0	0	1	4.5
Other agencies	0	1	0	0	0	0.5 ^b	0	1	2	0	4.5
Total	20	27	41	36	41	51	53	66	70	48	453

^aIncludes the Alcohol, Drug Abuse and Mental Health Administration; the Centers for Disease Control; and NIH.

^b"Half" of a license may indicate that the license was for a package of patented inventions or that the patented invention was jointly developed by researchers from the indicated agencies.

Comments From the Department of Agriculture



DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20250

FEB 13 1991

Mr. John M. Ols, Jr.
Director, Housing and
Community Development Issues
Rm. 4073, GAO Building
441 G Street, NW.
Washington, D.C. 20548

Dear Mr. Ols:

Thank you for the opportunity to review the General Accounting Office Draft Report RCED-91-80, "TECHNOLOGY TRANSFER: Federal Agencies' Patent Licensing Activities."

The Forest Service did not have any comments. I am forwarding the enclosed comments prepared by the Agricultural Research Service.

Sincerely,

A handwritten signature in cursive script that reads "Charles E. Hess".

CHARLES E. HESS
Assistant Secretary for
Science and Education

Enclosure

cc: w/enclosure
R. Plowman, ARS
J. Franks, OGC
S. Dewhurst, OBPA

February 12, 1991

ARS Comment on GAO Report RCED-91-80, "Technology Transfer, Federal Agencies' Patent Licensing Activities"

We request that the terms "royalty", "royalties", and "royalty income" where used throughout the subject report be changed to "license income". A typical license does not provide royalties until from 3 to 5 years after the grant of the license.

We recommend the first paragraph on page 6 be reworded to incorporate this request as follows:

In fiscal year 1981, Agriculture granted 28 licenses on 19 different patents. These 28 licenses were granted on a nonexclusive royalty free basis as the majority of the subject patents were being actively practiced by others under the same provisions granted previously. NTIS granted 2 licenses for Agriculture patents and collected \$7,300 in license income.

In fiscal year 1986, Agriculture granted 9 nonexclusive royalty free licenses on 7 different patents where the majority of the subject patents were actively being practiced by others under the same provisions while NTIS licensed 8 different Agriculture patents and collected \$85,000 in license income.

In fiscal year 1990, Agriculture granted 19 exclusive royalty bearing licenses, 1 nonexclusive royalty bearing license, and 2 nonexclusive royalty free licenses. Of the 19 exclusive licenses granted 14 were to joint owners (Educational Institutions) with no upfront fees charged. A total of \$146,000 license income was collected. Additionally, NTIS granted for Agriculture 5 nonexclusive licenses and 4 exclusive and collected a total of \$413,000 of which \$203,741 were royalties on previously licensed Agriculture patents.

Page 13 Public Notice for Federal Technology Transfer Opportunities. Please reword the last sentence. Although it was anticipated that patents would be available through our database and although this system is in its planning stage, it is not available yet. We suggest the following alternative sentence: Agriculture issued patents are available through AGRICOLA (AGRICultural OnLine Access) a computerized USDA system available for search through DIALOG and BRS Information Technologies. It is planned for FY91 to add pending Agriculture patent abstracts to TEKTRAN, a computerized database designed specifically as a technology transfer mechanism for ARS.

**Appendix IV
Comments From the Department
of Agriculture**

Page 2

We also suggest that, beginning in FY90, dollar figures reported from all agencies be appropriately reflected to divide license income collected from royalty income collected. This will provide Congress a true value analysis of the progress made to date under the patent license process by all Federal Agencies.

Comments From the Department of Commerce



UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Technology Policy
Washington, D.C. 20230

FEB 28 1991

John M. Ols, Jr.
Director, Housing and Community
Development Issues
United States General
Accounting Office
Washington, D.C. 20548

Re: Technology Transfer: Federal Agencies' Patent
Licensing Activities (GAO/RCED-91-80), Draft Report

Dear Mr. Ols:

This is in regard to your letter to Secretary of Commerce Robert Mosbacher, dated February 1, 1991, in which you invited the Department to review and comment on the draft report referenced above. My staff and I have reviewed the draft and found it to be a very interesting and informative report on the state of the Federal Government's role and performance in the field of Federal patent licensing.

One point that was addressed in the report is the observation that the Department's regulations pertaining to patent licensing and technology transfer were in need of review and revision. The present licensing regulations have been in effect since 1981 when they were first promulgated by the General Services Administration. I plan to initiate a formal interagency review of the regulations, and the comments contained in the report will be extremely helpful in this effort. In fact, as we have indicated in our submission to the 1991 Unified Agenda of Federal Regulations, the Technology Administration will be holding public hearings during the coming year to serve as a forum for discussing issues such as those raised in the report and possible revisions to the regulations.

Of particular concern are several issues related to patent infringement and enforcement, which were not addressed in the report. Most licenses granted by agencies permit the licensee to suspend the payment of royalties while the agency attempts to enjoin the infringement of the licensed patent. Although this is not a large problem at present, since there are only two Federal patent infringement suits pending, we anticipate that infringement and infringement litigation will increase as more and more Federal technology is licensed.

The Department of Commerce notes that the enforcement of Government-owned patents could have a major impact on the success of the Government's licensing program. For example, if the Government or its exclusive licensee do not vigorously pursue infringers, companies may not be willing to enter into licensing agreements with the Government requiring substantial royalties and/or large capital investment and risk.

Since litigation is expensive, there is a question of who is to pay for the legal costs and how. If the Government sues for infringement, these costs have been borne by the Department of Justice (DoJ), although the DoJ might seek payment or reimbursement from the licensing agency and/or inventor agency, to be extracted from royalty income, or from the licensee. On the other hand, if the exclusive licensee is maintaining the suit, the legal expenses are normally considered as an advance against future royalty payments that may be due. Under either approach, the Government's royalty income could be adversely affected by such litigation.

Finally, the National Technical Information Service and the National Institute of Standards and Technology had the following comments and observations:

National Technical Information Service (NTIS)

1. On page 9 of the Draft Report, it would more accurately read that licensing "may take as long as two years to complete," and not "typically."
2. The administrative burden that the Freedom of Information Act has created should be described as having "increased," rather than "substantially increased."
3. NTIS does believe the Federal Register to be an effective means of accomplishing legal notices, and that it is not intended as a tool for invention marketing. Companies have been accustomed since the early 70's to looking for such notices in the Federal Register. The primary function of the Register announcement is to provide legal notice.
4. NTIS also believes that the report should indicate that views attributed on page 2 to "federal patent attorneys and licensing officials" are not universally shared. NTIS' experience is that the requirements to protect public interest and ensure fairness are appropriate and have been found to be

workable. NTIS has granted the majority of the Federal Government's exclusive licenses applying such requirements. Companies prefer fairness and, if, occasionally a company is discouraged from taking a license, that does not outweigh industry's need to know when the Government intends to exclude other companies from using one of its inventions.

5. And finally, NTIS has commented that on page 13, under the section "Technology Transfer Opportunities," it should be noted that NTIS promotes inventions directly to potential industry licensees through direct mailings, telephone contacts and personal meetings.

National Institute of Standards and Technology (NIST)

1. With regard to Table III.1, Summary of Federal Patenting and Licensing Data the data with regard to licenses granted by Commerce, NIH and NSF may be misleading unless the reader understands that up until recently Commerce and NIH did all of their licensing through NTIS, while under P.L. 96-517, as amended, universities making patentable inventions with NSF funding file their own patents and conduct their own licensing.

It would be of service to the report's readers to clearly explain this, and to credit to these agencies the licenses granted by NTIS for their patents with a note that NTIS performed the licensing but was not the funding agency.

2. A similar problem exists in Table III.2 on pages 20 through 29. Although a footnote appears on p. 28 listing the agencies using NTIS for their patent licensing, the casual reader may be misled by tables showing that NIST and NIH have no royalty income. The data would be clearer if the table presented the royalty income for each funding agency with a footnote indicating that NTIS handled the licensing.

Thank you for the opportunity to comment on the draft report.

Sincerely,



Deborah L. Wince-Smith

Comments From the Department of Defense



DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING

WASHINGTON, DC 20301-3010

21 FEB 1991

Mr. John M. Ols, Jr.
Director, Housing and Community
Development Issues
Resources, Community, and Economic
Development Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Ols:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, "TECHNOLOGY TRANSFER: Federal Agencies' Patent Licensing Activities," dated February 1, 1991, (GAO Code 385515/OSD Case 8604).

The DoD has reviewed the report and concurs without further comment. Suggested technical changes have been provided separately. The Department appreciates the opportunity to review the report in draft form.

Sincerely,

A handwritten signature in cursive script that reads "Charles M. Herzfeld".

Charles M. Herzfeld

Comments From the Department of Health and Human Services



DEPARTMENT OF HEALTH & HUMAN SERVICES

Office of Inspector General

Washington, D.C. 20201

MAR 8 1991

Mr. John M. Ols, Jr.
Director, Housing and Community
Development Issues
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Ols:

The Secretary asked that we respond to your request for the Department's comments on your draft report, "Technology Transfer: Federal Agencies' Patent Licensing Activities." The Department has carefully reviewed your report and has no comments except for the technical comments which were provided earlier to your staff.

We appreciate the opportunity to comment on this draft report before its publication.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "R. Kusserow".

Richard P. Kusserow
Inspector General

Major Contributors to This Report

Resources,
Community, and
Economic
Development Division,
Washington D.C.

Lowell Mininger, Assistant Director
Richard Cheston, Evaluator-in-Charge
Stephanie Keith, Evaluator

Related GAO Products

Patent and Trademark Amendments of 1980 Set the Stage for Uniform Patent Practice by Federal Agencies (PAD-82-32, May 20, 1982).

Major Federal Research and Development Agencies Are Implementing the Patent and Trademark Amendments of 1980 (GAO/RCED-84-26, Feb. 28, 1984).

Federal Agencies' Policies and Practices Are in Accordance With Patent and Trademark Amendments of 1980 (GAO/RCED-85-94, Aug. 29, 1985).

Patent Policy: Universities' Research Efforts Under Public Law 96-517 (GAO/RCED-86-93, Apr. 4, 1986).

Patent Policy: Recent Changes in Federal Law Considered Beneficial (GAO/RCED-87-44, Apr. 16, 1987).

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