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TECHNOLOGY TRANSFER FROM FEDERAL LABORATORIES TO THE PRIVATE SECTOR

INSTRUCTIONAL MATERIALS FOR TECHNOLOGY MANAGERS

Volume 1 of 2

Prepared for

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PREFACE

These materials were prepared by Gulf South Research Institute (GSRI) in Baton Rouge, Louisiana, for the Office of Federal Technology Management of the U.S. Department of Commerce. Assisting GSRI were:

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In addition, a group of 50 Federal laboratory, agency, and organization personnel interested in or practicing technology transfer provided a preliminary review of the materials.

ORGANIZATION OF

INSTRUCTIONAL MATERIALS FOR TECHNOLOGY MANAGERS

This manual contains the following units, published in two volumes:

Volume 1

Introduction

Unit 1: National Policy for Technology Transfer

Unit 2: Technology Transfer Legislation

Unit 3: Technology

Unit 4: Technology Transfer

Unit 5: Key Implementation Concepts

Unit 6: Technology Transfer Mechanisms

Unit 7: The Technological Innovation Process

Unit 8: The Innovation Process in the Company

Unit 9: Technology Transfer and the Private Sector

Unit 10: Management of Technology Transfer

Unit 11: Actors in the Transfer Process

Volume 2

Unit 12: Cooperative Research

Unit 13: Intellectual Property: Patents and Licenses

Unit 14: Conflict Issues

Unit 15: Classifying, Evaluating, and Managing Technologies for Transfer

Unit 16: The Technology Portfolio Concept

Unit 17: Marketing Technology

Unit 18: Introduction to Technology Value and Pricing Issues

Unit 19: Technology Transfer Incentives

Unit 20: Commercialization Strategy Workshop

Intro

INTRODUCTION

PURPOSE

Technology Transfer From Federal Laboratories to the Private Sector provides a set of instructional materials that can be used within Federal laboratories to assist in meeting Federally mandated responsibilities for technology transfer.

The materials appear in three major sets:

1. Instructional Materials for Technology Managers
2. Instructional Materials for Scientists and Engineers
3. Instructional Materials for Policy Makers.

This set is for technology managers (including lab directors, program directors, and ORTAs) and appears in two volumes. The sets for policy makers and scientists and engineers are essentially modified versions of the materials for technology managers.

SCOPE

1. These materials are not intended to impart specific skills, but rather to orient the participants toward the general features of technology transfer to the private sector and to sensitize the participants to private sector transfer concerns so that Federal laboratories can more adequately respond to private sector needs.

2. These materials do not address technology transfer from Federal laboratories to state and local governments. There is no intention to designate that important function. However, the purpose of these materials is to address technology transfer as a commercialization mechanism leading to new and improved products, processes, and services, with attendant job and firm creation, enhanced innovation, and increased U.S. industrial competitiveness. Some of the materials are applicable to transfer to the public sector. However, this is a much different problem and needs to be treated on its own terms.

3. These materials do not provide full coverage for all transfer mechanisms, but concentrate on the newer mechanisms (mainly licensing and cooperative research agreements) created by recent legislation.

4. These materials are intended for voluntary use within the laboratories. In addition, it is assumed that the materials will be modified by instructors to meet their particular needs. This is particularly important because technology transfer is not a

well-understood process. The materials should be added to and portions deleted over time as Federal laboratories gain greater experience in technology transfer.

5. These materials have been designed so that they can be used by instructors within the Federal laboratories or in other organizations interested in technology transfer. However, given the complexity of the materials and the numerous topics that are discussed, many instructors will probably find it necessary to engage in self-education. The best way to do this is to read not only the required readings for each unit, but also the optional readings, and consult the comprehensive bibliography. In addition, instructors may wish to supplement (or replace) their presentations with presentations by specialists either within the laboratory or elsewhere.

6. These materials do not address the overall issue of technology management in Federal laboratories, but rather that component of technology management that deals with technology transfer. Technology management is concerned with the overall management of technologies and technological activities within the laboratories and necessarily concentrates on the movement of technologies toward the fulfillment of primary mission activities.

   The management of technology transfer is a subset of overall technology management that concentrates on the fulfillment of secondary mission activities. However, the implementation of transfer activities dramatically expands the scope of overall technology management, since it provides a supplementary path for technological development. From the management perspective, laboratory technologies and technological activities are most effectively viewed not only in terms of primary mission objectives, but also in terms of secondary mission objectives. This perspective places a large responsibility on laboratory and agency management to engage in comprehensive technology management.

   This situation is analogous to the situation in the private sector when a firm begins to look upon its technological assets not only in terms of product development, but also in terms of sale, licensing, and new venture creation. The experience of the private sector in comprehensive technology management can provide some lessions for the Federal laboratories. However, though analogous, the situation is different, since the private sector must operate within the context of strict considerations of profitability (e.g., in licensing a technology), whereas a Federal laboratory has a greater latitude for action because transfer activities are directed toward the promotion of public goods and therefore do not operate in terms of monetary cost/benefit criteria.

7. These materials place a heavy emphasis on what should be done with patents and patentable materials. However, much laboratory

transfer activity is concerned with the transmission of technology that has not assumed a patented (or even a patentable) form. Non-patented technology may be subsumed under the broad term of knowhow--essentially, the expertise of personnel manifest in ongoing research activities. Moreover, the mode of transmission is not simple, since knowhow may be transmitted as it is developing continuously over time.

The path of knowhow transfer is somewhat different from the path of intellectual property transfer, where intellectual property is understood as patented or patentable technology (with knowhow serving at times as a component of transfer activities involving licensing). Although these instructional materials do not address knowhow transfer as a separate item, persons interested in such issues should concentrate on Unit 10 (Management of Technology Transfer) and Unit 12 (Cooperative Research), since cooperative research is the primary mechanism available to the Federal laboratories for knowhow transfer.

8. These material were initially reviewed in Washington, D.C. by a group of 50 laboratory, agency, and organization personnel interested in or practicing technology transfer. The materials were modified on the basis of group comments.

9. These materials are available for sale to the Federal laboratories and other interested parties through the National Technical Information Service. In particular, instructors would probably desire to obtain issue papers, handouts, and paper copies of transparencies for distribution to course participants. Persons desiring materials should contact:

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 722161
(703) 487-4650

ISSUE PAPERS

The instructional materials were prepared on the basis of eight issue papers that addressed various aspects of technology transfer, including the university experience in cooperative research and private sector operations and concerns. The eight issue papers, each of which is assigned as required or optional reading for at least one of the units, are as follows:

I--Federal Policy and Technology Transfer Legislation

II--The Technology Transfer Process

III--Innovation and the Private Sector

IV--Cooperative Research and the Private Sector

V--Cooperative Research: The University Experience

VI--Intellectual Property and Technology Transfer

VII--Classification System for Technology

VIII--Evaluating Technology for Transfer

The issue papers are available in a separate volume: Technology Transfer from Federal Laboratories to the Private Sector: Issue Papers and Bibliography. The issue papers are joined by an annotated bibliography organized roughly in keeping with the subjects covered in the instructional materials.

INSTRUCTIONAL MATERIALS

The instructional materials for technology managers are made up of the following 20 units:

Unit 1: National Policy for Technology Transfer

Unit 2: Technology Transfer Legislation

Unit 3: Technology

Unit 4: Technology Transfer

Unit 5: Key Implementation Concepts

Unit 6: Technology Transfer Mechanisms

Unit 7: The Technological Innovation Process

Unit 8: The Innovation Process in the Company

Unit 9: Technology Transfer and the Private Sector

Unit 10: Management of Technology Transfer

Unit 11: Actors in the Transfer Process

Unit 12: Cooperative Research

Unit 13: Intellectual Property: Patents and Licenses

Unit 14: Conflict Issues

Unit 15: Classifying, Evaluating, and Managing Technologies for Transfer

Unit 16: The Technology Portfolio Concept

Unit 17: Marketing Technology

Unit 18: Introduction to Technology Value and Pricing Issues

Unit 19: Technology Transfer Incentives

Unit 20: Commercialization Strategy Workshop

Some of these units are long and may be broken into parts (instructions for doing so are provided). In other cases, the instructor may wish to combine units for a mini-seminar.

Conceptually, units 1 through 9 deal primarily with theory, and units 11 through 19 deal primarily with implementation. Unit 10 is a pivotal unit, since it serves as an introduction to the implementation units. Unit 20 describes a methodology for conducting a transfer strategy workshop and includes the transcript of a workshop that was conducted during the initial review of the instructional materials.

The units are presented in a sequence through which a story unfolds. Some of the units are stand-alone presentations, but most build on concepts presented in previous units. Thus, care must be taken in presenting any of the units individually or out of sequence.

UNIT FORMAT

Each unit begins with an instructional sheet that covers the following elements:

1. Title--the name of the unit
2. Purpose--the overall goal to be achieved
3. Objectives--what the participants will obtain
4. Materials--a list of transparencies and handouts
5. Required Reading--papers that should be read prior to participation in the unit
6. Optional Reading--additional papers that are to be assigned at the instructor's discretion
7. Supplemental Materials--supplementary papers that contain examples of subjects covered in the unit
8. Notes to Instructor--relating this unit to other units, covering special problems that the instructor should be aware of, and discussing the relevance of the readings
9. Estimated Time--for presentation, with an estimate of total time if discussion is included.

Each unit then follows with a complete text that may be used as-is or modified in keeping with the instructor's perspective and needs. Included in the text are instructions for presentation of the transparencies, clarification notes, and recommended questions for discussion.

Each unit ends with a paper copy of the relevant transparencies, a copy of the handouts (if included), and a copy of the supplemental readings (if included). Copies of books and papers for required and optional readings are not included with the units. The issue papers and bibliography are available in a separate volume (Technology Transfer From Federal Laboratories to the Private Sector: Issue Papers and Bibliography). Additional copies of issue papers for distribution to participants are available from NTIS. Required and optional readings other than the issue papers may be obtained from NTIS if they are government publications (order numbers are included). Non-government publications must be obtained directly from the publisher or organization (noted in the citation) or from a library.

TABLE OF CONTENTS

The instructional materials are lengthy and complex and cover a wide variety of subjects and issues. Because of this, a detailed table of contents has been provided. The Table of Contents can be used as a ready reference or guide for quickly locating the major subjects and issues covered in the materials.

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Unit 1

TITLE: NATIONAL POLICY FOR TECHNOLOGY TRANSFER

PURPOSE: The purpose of this session is to provide a review of Federal policies concerning technology transfer within the context of national innovation policy.

OBJECTIVES: Upon completion of this session, participants should:

- Have an awareness of Federal technology transfer policy as it has evolved since World War II
- Understand why the Federal government is interested in technology transfer.

MATERIALS:

Transparency 1-1:	National Policy for Technology Transfer
Transparency 1-2:	Themes of Technology Transfer Legislation
Transparency 1-3:	Three Approaches to Technology Transfer
Transparency 1-4:	Postwar Science and Technology Policy
Transparency 1-5:	Innovation Policy
Transparency 1-6:	Policy Problems

REQUIRED READING: Boyce Rensberger, "Lessons of the VCR Revolution," The Washington Post, April 13, 1987, page A1.

OPTIONAL READING:

1. President's Commission on Industrial Competitiveness, 1985, Global Competition: The New Reality, Volume 1.
2. Trudy Solomon and Louis G. Tornatzky, "Rethinking the Federal Government's Role in Technological Innovation," pages 41-53 in Dennis O. Gray et al., eds., Technological Innovation, North-Holland, New York, 1986.

NOTES TO INSTRUCTOR:

1. The required reading by Rensberger has been included because it makes a sharp distinction between science and technology on the one hand and the importance of commercialization on the other.
2. The optional reading entitled Global Competition: The New Reality is included because it provides a good picture of present U.S. industrial policy

concerns. The optional reading by Solomon and Tornatzky is included because it provides an up-to-date description of the problems and issues involved in formulating a national innovation policy.

3. There is little available on the historic development of technology transfer policy and its place in U.S. innovation policy.

4. Some of the points covered in this unit are controversial, and the instructor may wish to pursue them on a discussion, rather than an assertive, basis.

ESTIMATED TIME:

15 minutes for presentation
30 minutes with discussion

Unit 1

NATIONAL POLICY FOR TECHNOLOGY TRANSFER

Transparency 1-1: National Policy for Technology Transfer

INTRODUCTION

The purpose of this session is to provide an overview of U.S. technology transfer policy. There were some technology transfer activities before 1980, along with some modest legislative initiatives. However, it was only with the series of Acts beginning in 1980 that the United States has begun to develop a strong and coherent transfer policy.

Transparency 1-2: Themes of Technology Transfer Legislation

The series of Acts that began in 1980 culminated in the Technology Transfer Act of 1986. This is the first piece of Federal legislation to use "technology transfer" in its title. The purpose of the Act is to promote U.S. technological innovation for the achievement of national goals. Preeminent among these goals is the enhanced competitiveness of U.S. products in world markets.

Thus, the Act strikes three themes:

1. Technology transfer;
2. U.S. industrial competitiveness; and
3. Technological innovation.

These are the same themes that have been operative throughout all of the 1980s legislation. The major change has been in the increased emphasis given to the theme of technology transfer, which is reflected in the title of the 1986 Act, itself an amendment of the Stevenson-Wydler Act of 1980.

The three themes are not necessarily related. We can have technological innovation without a concern with U.S. industrial competitiveness, and we can be concerned with technological innovation

and U.S. industrial competitiveness without relating them to technology transfer. Thus, by drawing these themes together, the legislation of the 1980s has begun to forge a transfer policy based on technological innovation as a key to U.S. industrial competitiveness.

NOTE: THE DIFFERENCES AND RELATIONS AMONG INNOVATION, INDUSTRIAL COMPETITIVENESS, AND TECHNOLOGY TRANSFER SHOULD BE BRIEFLY DISCUSSED AT THIS POINT TO MAKE CERTAIN THAT THE PARTICIPANTS UNDERSTAND THE SIGNIFICANCE OF THE POINTS MADE IN THE REST OF THIS UNIT.

Where did these themes come from? Why have they come together? What is the larger policy context to which they belong and to which the 1980s legislation is contributing? To answer these questions we must go back in time and consider the elements separately. This background sets the stage for the specific pieces of legislation that are of concern to the Federal laboratories in their technology transfer efforts.

TECHNOLOGY TRANSFER

Transparency 1-3: Three Approaches to Technology Transfer

During the postwar period, Federal policies concerning the transfer of the fruits of Federally supported scientific and technical endeavors have gone through three distinct stages characterized by three distinct approaches to transfer.

1. Passive Approach. During the immediate postwar period, it was assumed that if the Federal government produced high-quality scientific and technical information that resulted in published articles, the private sector would become aware of it automatically and would be able to use it because technology was thought to be little more than applied science.

2. Semi-Active Approach. During the 1960s and early 1970s, the passive approach gave way to a more active approach. This was the period of large, centralized programs that attempted to focus on the technological possibilities in government research and to develop

catalogues describing those possibilities that were prepared and organized so that they would be accessible by potential user groups. It was assumed that application could occur simply through the awareness provided by information.

3. Active Approach. Since the late 1970s, the accent has changed from simple transfer of information about technologies to the actual transfer of technologies, necessitating a much closer relationship between producers and users. Incentives have been provided to stimulate action, and transfer has been decentralized to such a degree that it has now become the responsibility of every Federal laboratory professional.

DO THE PARTICIPANTS THINK THAT THESE ARE ADEQUATE CHARACTERIZATIONS OF THE CHANGING APPROACHES TO TECHNOLOGY TRANSFER?

U.S. INDUSTRIAL COMPETITIVENESS

Transparency 1-4: Postwar Science and Technology Policy

These changes in transfer policy paralleled changes in national science and technology policy and were influenced by them. Postwar science and technology policy can also be divided into three distinct periods:

1. The Cold War Period (1945-65), which was concerned with the military/technology race with the Soviets that was largely stimulated by Soviet space achievements.

2. The Social Priorities Period (1965-78), which, inspired by the successes of the U.S. space program and some military systems programs, assumed that science and technology could be mobilized to solve social problems; and

3. The Innovation Policy Period (1978-present), which is concerned with the emergence of a global economy and U.S. industrial competitiveness.

According to Harvey Brooks, the well-known authority on science, technology, and public policy:

> American competitiveness in the world economy has become the highest-priority item of public discussion, and almost every government policy is being assessed for its impact on the rate and quality of industrial innovation and competitive performance.

TECHNOLOGICAL INNOVATION

Thus, an aggressive technology transfer policy has been developed within the context of a national concern with U.S. industrial competitiveness. How can technology transfer contribute to U.S. industrial competitiveness? The answer to this question introduces the third major theme--technological innovation--since it is only through the application of technologies in products and processes that technology transfer can promote U.S. industrial competitiveness.

Transparency 1-5: Innovation Policy

The Technology Transfer Act of 1986 states that "No comprehensive national policy exists to enhance technological innovation for commercial and public purposes;" and this is true. There have been some major innovation policy reports such as the Charpie report in 1967, the Baruch report in 1979, and the Young report in 1985.

These reports differ in their emphasis. If you look at the Charpie report of 1967, which is an exceptional piece of work, you will find no mention of either technology transfer or U.S. industrial competitiveness. These were simply not primary concerns at the time. The Young report of 1985, however, is concerned entirely with the problem of industrial competitiveness, which is reflected in its title: Global Competition: The New Reality.

Transparency 1-6: Policy Problems

Although these reports contain a number of excellent recommendations, some of which have been implemented, they have not (as the Technology Transfer Act of 1986 indicates) resulted in a comprehensive national policy to enhance innovation. There are many reasons. A few of the most important:

1. There is a growing awareness that many of the problems connected with innovation can be resolved only indirectly and in the long term (for example, through changes in education).

2. Innovation policy has been burdened by the assumption that technology is nothing but applied science, which achieved widespread acceptance with the publication in 1945 of Vannevar Bush's report, Science the Endless Frontier. This assumption led to the conclusion that a technological innovation policy could be carried out merely through the funding of science.

3. Although technology is beginning to be understood as an independent realm with its own concerns and needs and only partly dependent on science, the stress on technology has itself given rise to additional problems. Technology in itself has little market value unless it is embodied in products and processes. Thus, an emphasis on technology alone has caused us to pay inadequate attention to commercialization.

4. New types of government - private sector relationships are beginning to develop which recognize that the success or failure of technology transfer as it relates to commercialization will be determined in the marketplace. Commercialization ultimately is a private sector affair. Since many of these newer relationships are still in their formative stages, implementation remains experimental and highly flexible.

DO THE PARTICIPANTS AGREE WITH THESE POINTS?

NOTE: REMOVE TRANSPARENCY.

EMERGING POLICY

The Technology Transfer Act of 1986 and the legislation that preceded it are beginning to point us in the right direction. They have introduced technology transfer as an important tool, they have placed transfer in the context of the innovation process with a heavy emphasis on commercialization, and they have emphasized the critical nature of transfer efforts by stressing U.S. industrial competitiveness. Thus, the recent legislation is contributing to the formulation of a comprehensive innovation policy in which technology transfer from Federal laboratories can play a key role.

ARE THE DIFFERENCES AND RELATIONSHIPS AMONG INNOVATION, INDUSTRIAL COMPETITIVENESS, AND TECHNOLOGY TRANSFER CLEAR TO THE PARTICIPANTS? NOTE: USE THE REQUIRED READING BY RENSBERGER AS A BASIS OF DISCUSSION.

DO THE PARTICIPANTS THINK THAT THE UNITED STATES IS FACED WITH COMPETITIVE CHALLENGES AND THAT THEIR TECHNOLOGY TRANSFER ACTIVITIES CAN MAKE A SIGNIFICANT CONTRIBUTION TO MEETING THOSE CHALLENGES?

IF THE OPTIONAL READINGS HAVE BEEN INCLUDED, DO THE PARTICIPANTS HAVE ANY REFLECTIONS ON THE POINTS MADE IN GLOBAL COMPETITION OR BY SOLOMON AND TORNATZKY?

TRANSPARENCIES FOR UNIT 1

NATIONAL POLICY FOR TECHNOLOGY TRANSFER

THEMES OF TECHNOLOGY TRANSFER LEGISLATION

- TECHNOLOGY TRANSFER
- U.S. INDUSTRIAL COMPETITIVENESS
- TECHNOLOGICAL INNOVATION

gsri



THREE APPROACHES TO TECHNOLOGY TRANSFER

- **PASSIVE APPROACH**
- **SEMI-ACTIVE APPROACH**
- **ACTIVE APPROACH**

gsri

POSTWAR SCIENCE AND TECHNOLOGY POLICY

- THE COLD WAR PERIOD (1945-1965)
- THE SOCIAL PRIORITIES PERIOD (1965-1978)
- THE INNOVATION POLICY PERIOD (1978-PRESENT)

"AMERICAN COMPETITIVENESS IN THE WORLD ECONOMY HAS BECOME THE HIGHEST-PRIORITY ITEM OF PUBLIC DISCUSSION, AND ALMOST EVERY GOVERNMENT POLICY IS BEING ASSESSED FOR ITS IMPACT ON THE RATE AND QUALITY OF INDUSTRIAL INNOVATION AND COMPETITIVE PERFORMANCE."

HARVEY BROOKS

gsri



INNOVATION POLICY

NO COMPREHENSIVE NATIONAL POLICY EXISTS TO ENHANCE TECHNOLOGICAL INNOVATION FOR COMMERCIAL AND INDUSTRIAL PURPOSES.

TECHNOLOGY TRANSFER ACT OF 1986

MAJOR POLICY REPORTS:

1. TECHNOLOGICAL INNOVATION: ITS ENVIRONMENT AND MANAGEMENT
   (THE CHARPIE REPORT, 1967)

2. DOMESTIC POLICY REVIEW OF INDUSTRIAL INNOVATION
   (THE BARUCH REPORT, 1979)

3. GLOBAL COMPETITION: THE NEW REALITY
   (THE YOUNG REPORT, 1985)

gsri

POLICY PROBLEMS

- INDIRECT EFFECTS
- EMPHASIS ON SCIENCE
- EMPHASIS ON TECHNOLOGY
- EXPERIMENTATION

gsri

2

Unit 2

TITLE: TECHNOLOGY TRANSFER LEGISLATION

PURPOSE: The purpose of this unit is to provide an overview of the Federal legislation on technology transfer beginning with the Stevenson-Wydler and Bayh-Dole acts of 1980 and continuing through the Federal Technology Transfer Act of 1986 and Executive Order 12591.

OBJECTIVES: Upon completion of this unit, participants will:

- Be introduced to the concept of public good with respect to technology transfer activities
- Understand the purpose of technology transfer from Federal laboratories to the private sector
- Be aware of the contributions of innovation to the public good
- Understand the purpose and significance of decentralization of authorities and responsibilities to the laboratory level
- Be familiar with the general and specific authorities and responsibilities granted to government-operated laboratories
- Be familiar with the general and specific authorities and responsibilities granted to nonprofit contractor-operated laboratories
- Recognize the primary mechanisms that Congress has attempted to encourage by legislation:
  - Licenses
  - Cooperative R&D agreements
  - Personnel exchanges
- Be introduced to incentives provided to agencies, laboratories, and research personnel for participation in technology transfer activities.

MATERIALS:

Transparency 2-1: Technology Transfer Legislation

Transparency 2-2: Rationale for Technology Transfer Efforts

Transparency 2-3: Innovation Provides an Improved Standard of Living

Transparency 2-4: Rationale for Technology Transfer Efforts

Transparency 2-5: Authorities Granted to Laboratories

Transparency 2-6: Stevenson-Wydler Technology Innovation Act of 1980

Transparency 2-7: Bayh-Dole Act - 1980

Transparency 2-8: Trademark Clarification Act of 1984

Transparency 2-9: Federal Technology Transfer Act of 1986

Transparency 2-10: Executive Order - 1987

Transparency 2-11: Authorities: Rights to Technologies

Transparency 2-12: Licensing Authorities

Handout 2-1: Matrix: General Legislative Authorities Given to Federal Laboratories and Agencies

Handout 2-2: Matrix: Specific Authorities: Rights to Technologies

Handout 2-3: Matrix: Specific Authorities: Licensing

Handout 2-4: Matrix: Specific Authorities: Incentives

Handout 2-5: Legislative Authorities and Actions, Government-Operated Laboratories

Handout 2-6: Legislative Authorities and Actions, Nonprofit Contractor-Operated Laboratories

Handout 2-7: Public Law 99-502

Handout 2-8: Public Law 98-620

Handout 2-9: Federal Register, Vol. 50, No. 48. "Licensing of Government Owned Inventions; Final Rule." Tuesday, March 12, 1985.

Handout 2-10: Federal Register, Vol. 52, No. 52. "Rights to Inventions made by Nonprofit Organizations and Small Business Firms; Final Rule." Wednesday, March 18, 1987.

REQUIRED READING: Issue Paper I--Federal Policy and Technology Transfer Legislation; and all handouts.

OPTIONAL READING: None

NOTES TO INSTRUCTOR:

1. Unit 1 (National Policy for Technology Transfer) serves as background for this unit. Although Unit 2 may be used on its own, the historical context presented in Unit 1 provides an understanding of Congressional intent with respect to technology transfer legislation.

2. This discussion concentrates on the aspects of the legislation related to transfer to the private sector. Aspects of the legislation dealing with transfers to the public sector and international transfers are not discussed.

3. The instructor should read Issue Paper I and become very familiar with the handouts for this unit. The handouts provide detailed information on the authorities granted to government-operated and nonprofit contractor-operated laboratories and the legislative acts that granted these authorities.

4. Handouts 2-1 through 2-4 are matrices providing detailed information on the legislative authorities granted to government-operated and nonprofit contractor-operated laboratories and the laws that granted these authorities. Handout 2-1 is a general matrix covering the major subject areas affecting the laboratories addressed in the legislation. Handouts 2-2, 2-3, and 2-4, which detail very specific authorities related to rights to technologies, licensing, and incentives, duplicate some of the information found in the more general matrix (Handout 2-1).

ESTIMATED TIME:

25 minutes for presentation
45-60 minutes with discussion

Unit 2

TECHNOLOGY TRANSFER LEGISLATION

Transparency 2-1: Technology Transfer Legislation

INTRODUCTION

The purpose of this unit is to provide an overview of the Federal legislation on technology transfer beginning with the Bayh-Dole and Stevenson-Wydler acts in 1980 and continuing through the Federal Technology Transfer Act of 1986 and Executive Order 12591. The legislation and Executive Order provide the context for Federal laboratory technology transfer activities.

Before discussing the legislation, we need to become acquainted with a concept that serves as a background principle for all public technology transfer activities. I'm referring to the concept of a public good. I'm using the word "good" here not as in doing a "good" deed but as something that is produced--a good as in goods and services.

Public goods are goods that can be enjoyed or consumed by one person without diminishing the amount other people can consume. As a general rule they come in large units and are indivisible; and it is very difficult, if not impossible, to break them down so that they can be bought and sold in ordinary markets.

Classic examples of public goods are national defense and free public education. Whether you contribute to the provision of national defense or not, if you live in the United States, you can't be prevented from enjoying its benefits.

Public goods are paid for by taxes. Whether to produce a public good and how much to produce are basically political decisions made by elected representatives.

As we work through the rationale for technology transfer legislation, you will see a great deal of emphasis on items such as increased innovation, enhanced international competitiveness, improved

public services, and increased productivity. These are public goods towards which technology transfer activities are directed.

RATIONALE FOR TRANSFER EFFORTS

Transparency 2-2: Rationale for Technology Transfer Efforts

The Federal government first stated its technology transfer policy in the Stevenson-Wydler Technology Innovation Act of 1980. This Act emphasized that results obtained from the Federal government's investment in R&D can legally be used for private benefit and should be transferred to the private sector and state and local governments because:

- Innovation provides an improved standard of living;
- Industrial and technological innovation is lagging;
- New advances in university and Federal laboratories are potentially useful; and
- It is in the national interest to promote wider use of Federally funded technologies.

NOTE THE EMPHASIS ON USE IN THE FOURTH RATIONALE. WE ARE NOT CONCERNED WITH MERELY GETTING TECHNOLOGIES OUT OF THE LABORATORIES, BUT RATHER WITH GETTING THEM OUT IN SUCH A FASHION THAT THEY WILL BE PUT TO USE.

Transparency 2-3: Innovation Provides an Improved Standard of Living

NOTE: THIS TRANSPARENCY PRESENTS MORE DETAIL ON THE FIRST ITEM IN TRANSPARENCY 2-2.

The first rationale is that transfer improves the standard of living. Innovations serve to improve the standard of living by:

- increasing public and private sector productivity;
- creating new industries and employment opportunities;
- improving public services; and
- enhancing the competitiveness of U.S. products in world markets.

Also, increased innovation leads to:

- a reduction in trade deficits;
- stabilization of the dollar;
- increased productivity gains;
- increased employment; and
- stabilized prices.

Transparency 2-4: Rationale for Technology Transfer Efforts

NOTE: TRANSPARENCY 2-4 IS THE SAME AS TRANSPARENCY 2-2, EXCEPT THAT THE LAST THREE ITEMS, WHICH THE INSTRUCTOR SHOULD TALK ABOUT WHILE THE TRANSPARENCY IS ON THE SCREEN, ARE HIGHLIGHTED.

The other three rationales are concerned with industrial lags, new advances, and the promotion of wider use.

When compared to historic patterns and to what is happening in other industrialized countries, industrial and technological innovation in the United States may be lagging.

Many new advances in science and technology occur in university and Federal laboratories, and these developments are potentially useful to the private sector and state and local governments.

Lastly, the legislation states that it is in the national interest to promote the use of Federally funded technological innovations by the private sector and state and local governments.

DO THE PARTICIPANTS BELIEVE THAT TECHNOLOGY TRANSFER EFFORTS CAN AFFECT OUR NATIONAL ECONOMY? ASK FOR EXAMPLES.

LEGISLATIVE OVERVIEW

Transparency 2-5: Authorities Granted to Laboratories

Prior to 1980, there was little incentive or capacity for the aggressive management and transfer of technology from Federal

laboratories to the private sector. Beginning in 1980, Congress enacted a series of legislative measures designed to enhance the capacity of the laboratories to actively participate in the technology transfer process. Each Act gradually, but consistently, expanded transfer authorities toward the inclusion of all Federal laboratories.

Laboratories are now authorized to license the technologies they develop, to enter into cooperative R&D agreements with firms and universities, to reward inventors by sharing royalties with them, and to exchange personnel with industry. Congress authorized the laboratories to handle their own technology transfer activities under the assumption that this is the most effective way to ensure transfer. Companies trying to obtain access to laboratory technologies generally cannot afford the long time delays that often occur when negotiations for the licensing of technologies, cooperative research agreements, or personnel exchanges must be approved by an agency.

Stevenson-Wydler Act

Transparency 2-6: Stevenson-Wydler Technology Innovation Act of 1980

The first piece of legislation, the Stevenson-Wydler Act, makes technology transfer a specific mission of all Federal laboratories and initiates the decentralization of authority to the laboratories that has continued through 1987. Offices of Research and Technology Applications (ORTAs) are created and funded to manage the technology transfer activities at the laboratories. Personnel exchanges among industry, academia, and the Federal laboratories are also authorized. These provisions apply to both government-operated and contractor-operated laboratories.

Bayh-Dole Act

Transparency 2-7: Bayh-Dole Act - 1980

The Bayh-Dole Act, also passed in 1980, gives small business and nonprofit contractors certain rights related to the technologies they develop while under contract with the laboratories. They can:

- retain title to inventions made under contract with the Federal government;
- patent technologies; and
- license technologies.

Under Bayh-Dole, nonprofit contractor-operated laboratories are required to share royalties with inventors and to use the remaining royalties to cover patent and licensing costs and other administrative expenses and to fund R&D consistent with the mission and objectives of the facility, including activities that increase the licensing potential of other laboratory technologies.

However, the Act contained an exception that allowed agencies to withhold these rights from contractor-operated laboratories, and most of the nonprofit contractor-operated laboratories were excluded from provisions of the law.

Bayh-Dole also clarified authorities for the agencies to apply for patents and for the first time clearly authorized agencies to license their patents.

A Presidential Memorandum on Government Patent Policy issued in 1983 extended the rights given to small business and nonprofit contractors in the Bayh-Dole Act to all contractors; however, its impact on contractor-operated laboratories was limited by conflicting laws.

Trademark Clarification Act

Transparency 2-8: Trademark Clarification Act of 1984

In 1984, Congress amended Bayh-Dole through the Trademark Clarification Act. This Act requires further decentralization of authorities to the laboratories by limiting the exceptions for nonprofit contractor-operated laboratories, so that all nonprofit contractor-operated laboratories may own inventions developed in their

laboratories and may patent and license these inventions unless they are related to weapons systems or naval nuclear propulsion.

Federal Technology Transfer Act of 1986

Transparency 2-9: Federal Technology Transfer Act of 1986

The most recent technology transfer legislation, the Federal Technology Transfer Act of 1986, amends Stevenson-Wydler. It strengthens the language with respect to the government's policy on the utilization of Federal technology by:

- stating that technology transfer is a responsibility of everyone in the laboratories; and
- requiring that technology transfer efforts be considered positively in job descriptions, job performance evaluations, and laboratory promotion policies.

This Act gives new authorities to the government-operated laboratories, which had not been specifically included in the technology transfer legislation up to that time. It allows Federal agencies to permit these laboratories to:

- enter into cooperative research and development agreements; and
- license technologies developed at these laboratories.

Incentives for the agency, the laboratory, and laboratory personnel are authorized. Royalties from inventions made at government-operated laboratories are retained by the laboratory's governing agency, which then distributes them to the inventor or inventors and to its government-operated laboratories, with the major share going to the laboratory where the technology was developed.

The ways in which the laboratories must use the royalties are specified. They must be used for covering administrative and licensing expenses, for rewarding laboratory employees, for fostering scientific exchange among the government-operated laboratories, for education and training of employees, and for other activities that increase the licensing potential of the laboratories.

Executive Order 12591

Transparency 2-10: Executive Order - 1987

Since the 1986 legislation was passed, President Reagan has issued an Executive Order further emphasizing the administration's commitment to the transfer of laboratory technologies. The Order requires the agencies to delegate the authority to enter into licensing and cooperative agreements to their government-operated laboratories (to the extent permitted by law). It also requires the agencies to allow all contractors the same rights with respect to inventions that small and nonprofit contractors are allowed by the Bayh-Dole and Trademark Clarification acts. The Order emphasizes that royalty-sharing and cash awards programs should implemented as soon as possible, encourages the exchange of scientific and engineering personnel between the laboratories and the private sector, and encourages cooperative research and development.

AUTHORITIES

When implemented, these legislative measures and the Executive Order allow the laboratories to exercise more control over their technologies than ever before. Laboratories are now authorized to manage their technologies to promote commercialization. Some or all of the laboratories may:

- Retain ownership of technologies;
- License technologies;
- Enter into cooperative R&D agreements; and
- Initiate personnel exchanges.

Ownership

Transparency 2-11: Authorities: Rights to Technologies

Nonprofit contractor-operated laboratories are treated differently than government-operated laboratories. The nonprofit

contractor-operated laboratories may obtain ownership of technologies by meeting deadlines established by the regulations; and they must:

- disclose each invention to their contracting agency within two months after the inventor discloses it in writing to laboratory personnel;
- state in writing any intentions to retain title to the invention within two years of disclosure; and
- file U.S. and foreign patent applications within the designated time periods.

Failure to comply with these regulations may result in the loss of ownership of the technology to the Federal government.

The inventor may claim ownership of the invention if the contractor and/or the Federal government does not intend to promote its commercialization.

NOTE: IF THE CONTRACTOR DOES NOT CHOOSE TO RETAIN TITLE AND THE INVENTOR WOULD LIKE TO RETAIN TITLE, THE CONTRACTOR MUST ASK THE AGENCY TO ALLOW THE INVENTOR TO OWN THE INVENTION.

The government always retains the right to use or have the invention used for its own purposes on a royalty-free basis.

Licensing

Transparency 2-12: Licensing Authorities

Both nonprofit contractor-operated and government-operated laboratories have been given legislative authority to negotiate licenses for technologies developed in their laboratories; however, the legislation has not yet been implemented in all the labs. Laboratories may grant exclusive, partially exclusive, or nonexclusive licenses to their technologies, although there are numerous regulations setting forth conditions under which exclusive licenses may be granted.

In negotiating licenses, laboratories must give preference to small businesses that are considered as likely as other firms to commercialize the invention. In addition, products based on a

licensed technology that are to be used in the United States must be made in the United States.

Government-operated laboratories must require potential licensees to submit a plan for marketing and/or developing the technology they want to license. The plan or plans must include information on the applicant's ability to carry it out.

The 1986 legislation allows employees at government-operated laboratories to work with licensees to promote the commercialization of technologies they developed.

When licenses are granted, the government retains royalty-free right of use. This is to ensure that the Government does not have to pay royalties on technologies that are developed with Federal funds.

NOTE: REMOVE TRANSPARENCY FROM SCREEN.

Cooperative R&D Agreements

Government-operated laboratories may enter into cooperative agreements to do research and development for and with the private sector. The government-operated laboratories are the only Federal laboratories given clear authority to enter into these agreements; however, the Executive Order urges the agencies to encourage and facilitate collaboration at all Federal laboratories.

Personnel Exchanges

All laboratories are encouraged to exchange personnel with the private sector and universities. The Stevenson-Wydler Act first permitted these exchanges, and the recent Executive Order further emphasizes their importance. In addition, the 1986 Act specifically allows employees and former employees of government-operated laboratories to work with firms to commercialize laboratory technologies, as long as agency standards of conduct are met.

SUMMARY

The technology transfer legislation passed since 1980 and the 1987 Executive Order make it clear that Congress and the President

intend for the Federal laboratories to become more active in moving technologies into the private sector and working with the private sector to solve technical problems in areas where the laboratories have expertise. It is now the responsibility of all Federal laboratory personnel to participate in technology transfer efforts.

Congress has decentralized administrative functions by authorizing the laboratories to handle their own licensing activities and to enter into cooperative R&D agreements. Recognizing that the active participation of laboratory personnel is a critical factor in successful transfer, personnel exchanges between Federal laboratories, industry, and universities are allowed and encouraged.

Finally, the laws provide financial incentives to the inventors and the laboratories for successful transfers of technology that produce royalties or other income. The inventors and laboratories receive a portion of any royalty income generated. In addition, a cash awards program is being set up to reward employees at the government-operated laboratories for outstanding scientific and technological work and exemplary technology transfer activities.

NOTE: THE HANDOUTS MAY BE USED FOR EXTENDED DISCUSSION OF THE LEGISLATION WITH THE PARTICIPANTS. HANDOUTS 2-1 THROUGH 2-4 ARE MATRICIES PROVIDING DETAILED INFORMATION ON THE LEGISLATIVE AUTHORITIES GRANTED TO GOVERNMENT-OPERATED AND NONPROFIT CONTRACTOR-OPERATED LABORATORIES AND THE LAWS THAT GRANTED THESE AUTHORITIES. HANDOUT 2-1 IS A GENERAL MATRIX COVERING THE MAJOR SUBJECT AREAS AFFECTING THE LABORATORIES ADDRESSED IN THE LEGISLATION. HANDOUTS 2-2, 2-3, AND 2-4, WHICH DETAIL VERY SPECIFIC AUTHORITIES RELATED TO RIGHTS TO TECHNOLOGIES, LICENSING, AND INCENTIVES, DUPLICATE SOME OF THE INFORMATION FOUND IN THE MORE GENERAL MATRIX. IN ORDER TO ENABLE THE INSTRUCTOR TO DISCUSS THE HANDOUTS EFFECTIVELY, THE FOLLOWING PARAGRAPHS PROVIDE AN EXTENSIVE DESCRIPTION (WITH SOME QUESTIONS) FOR EACH OF THE HANDOUTS AS THEY RELATE TO THE SUBJECTS COVERED IN THE UNIT.

LEGISLATIVE OVERVIEW

HANDOUT 2-1 SHOWS (IN GENERAL) THE AUTHORITIES GRANTED TO THE NONPROFIT CONTRACTOR-OPERATED AND GOVERNMENT-OPERATED LABORATORIES AND WHICH LEGISLATIVE ACT OR ACTS GAVE THE LABS THAT AUTHORITY. NOTE THAT FOR NONPROFIT CONTRACTORS OPERATING FEDERAL LABORATORIES, THE DEPARTMENT OF ENERGY (DOE) NORMALLY RETAINS THE RIGHTS TO INVENTIONS MADE AS PART OF DOE'S NAVAL NUCLEAR PROPULSION AND WEAPONS PROGRAMS. THE INSTRUCTOR SHOULD POINT OUT THAT IN HANDOUT 2-1, SUBHEADINGS ARE USED TO DIVIDE THE AUTHORITIES INTO SOME GENERAL CATEGORIES (E.G., RIGHTS TO TECHNOLOGIES, PATENTS, LICENSING) THAT MAY BE USEFUL FOR FINDING AREAS OF INTEREST.

BAYH-DOLE ACT

THE INSTRUCTOR SHOULD BE AWARE THAT THE BAYH-DOLE ACT (AND THE TRADEMARK CLARIFICATION ACT, WHICH MODIFIES BAYH-DOLE) APPLIES TO NONPROFIT CONTRACTORS OPERATING FEDERAL LABORATORIES AND TO SMALL BUSINESSES AND NON-PROFIT ORGANIZATIONS UNDER CONTRACT WITH FEDERAL LABORATORIES. HOWEVER, MOST AGENCIES USED THE EXCEPTION IN THE BAYH-DOLE ACT WHICH ALLOWED THEM TO WITHHOLD THE RIGHTS PROVIDED IN BAYH-DOLE FROM NONPROFIT CONTRACTORS OPERATING FEDERAL LABORATORIES. AS A RESULT, FEW OF THE NONPROFIT CONTRACTOR-OPERATED LABORATORIES ACTUALLY HAD THE RIGHTS GRANTED BY BAYH-DOLE. IN THE TRADEMARK CLARIFICATION ACT OF 1984, CONGRESS NARROWED THE EXCEPTIONS THAT ALLOWED THE AGENCIES TO WITHHOLD THE RIGHTS PROVIDED BY BAYH-DOLE FROM THEIR NONPROFIT CONTRACTOR-OPERATED LABORATORIES, SO AFTER THE PASSAGE OF THE TRADEMARK CLARIFICATION ACT, AGENCIES WERE REQUIRED TO GIVE CONTRACTORS OPERATING FEDERAL LABORATORIES THE RIGHTS PROVIDED BY THE BAYH-DOLE AND TRADEMARK CLARIFICATION ACTS. INVENTIONS MADE IN DOE'S NAVAL NUCLEAR PROPULSION AND WEAPONS PROGRAMS ARE EXCEPTIONS.

TRADEMARK CLARIFICATION ACT

HANDOUT 2-8 IS A COPY OF THE THE TRADEMARK CLARIFICATION ACT OF 1984.

HANDOUT 2-10 IS A COPY OF THE RULES AND REGULATIONS GOVERNING "RIGHTS TO INVENTIONS MADE BY NONPROFIT ORGANIZATIONS AND SMALL BUSINESS FIRMS: FINAL RULE," AS PUBLISHED IN THE FEDERAL REGISTER (VOL. 52, NO. 52, MARCH 18, 1987). IMPORTANT POINTS IN THE LEGISLATION AND REGULATIONS ARE SUMMARIZED IN THE MATRICES (HANDOUTS 2-1 THROUGH 2-4) AND IN THE SUMMARIES FOR GOVERNMENT-OPERATED AND NONPROFIT CONTRACTOR-OPERATED LABORATORIES (HANDOUTS 2-5 AND 2-6).

FEDERAL TECHNOLOGY TRANSFER ACT OF 1986

HANDOUT 2-7 IS A COPY OF THE THE FEDERAL TECHNOLOGY TRANSFER ACT OF 1986.

HANDOUT 2-9 IS A COPY OF THE RULES AND REGULATIONS GOVERNING THE "LICENSING OF GOVERNMENT OWNED INVENTIONS: FINAL RULE," AS PUBLISHED IN THE FEDERAL REGISTER (VOL. 50, NO. 48, MARCH 12, 1985). IMPORTANT POINTS IN THE LEGISLATION AND REGULATIONS ARE SUMMARIZED IN THE MATRICES (HANDOUTS 2-1 THROUGH 2-4) AND IN THE SUMMARIES FOR GOVERNMENT-OPERATED AND NONPROFIT CONTRACTOR-OPERATED LABORATORIES (HANDOUTS 2-5 AND 2-6).

HANDOUT 2-4, THE MATRIX ON INCENTIVES, PROVIDES DETAILS ON INCENTIVES TO TRANSFER PROVIDED BY THE LEGISLATION. THERE ARE ALSO SECTIONS IN HANDOUTS 2-5 AND 2-6 THAT PROVIDE DETAILS ON INCENTIVES, BY TYPE OF LABORATORY.

AUTHORITIES

DO THE PARTICIPANTS THINK IT IS IMPORTANT FOR THE LABORATORIES TO BE ABLE TO MANAGE THEIR OWN TECHNOLOGIES? WHY OR WHY NOT?

ASK THE PARTICIPANTS WHICH OF THESE AUTHORITIES (I.E., OWNERSHIP, LICENSING, COOPERATIVE RESEARCH, AND PERSONNEL EXCHANGES) GRANTED TO THE LABORATORIES THEY THINK ARE THE MOST IMPORTANT TO ENCOURAGE THE TRANSFER OF TECHNOLOGIES FROM THE LABORATORIES TO THE PRIVATE SECTOR. THE INSTRUCTOR MAY WANT TO EMPHASIZE THE AUTHORITIES GRANTED TO THE RELEVANT TYPE OF LABORATORY (I.E., GOVERNMENT-OPERATED OR CONTRACTOR-OPERATED).

OWNERSHIP

HANDOUT 2-2, THE MATRIX ON RIGHTS TO TECHNOLOGIES, PROVIDES DETAILS ON THE CONDITIONS UNDER WHICH LABORATORIES AND INVENTORS MAY RETAIN OWNERSHIP OF TECHNOLOGIES. THERE ARE ALSO SECTIONS IN HANDOUTS 2-5 AND 2-6 THAT PROVIDE DETAILS ON RIGHTS TO TECHNOLOGIES, BY TYPE OF LABORATORY.

THE INSTRUCTOR MAY WANT TO FOCUS ON THE AUTHORITIES APPLICABLE TO THE RELEVANT TYPE OF LABORATORY (I.E., GOVERNMENT-OPERATED OR CONTRACTOR-OPERATED).

LICENSING

HANDOUT 2-3, THE MATRIX ON LICENSING, PROVIDES DETAILS ON REQUIREMENTS RELATED TO LICENSING TECHNOLOGIES BY

GOVERNMENT-OPERATED AND NONPROFIT CONTRACTOR-OPERATED LABORATORIES. THERE ARE ALSO SECTIONS IN HANDOUTS 2-5 AND 2-6 THAT PROVIDE DETAILS ON REQUIREMENTS ASSOCIATED WITH LICENSING TECHNOLOGIES (E.G., CONDITIONS UNDER WHICH EXCLUSIVE LICENSES MAY BE GRANTED AND INFORMATION THAT MUST BE CONTAINED IN A MARKETING OR DEVELOPMENT PLAN) DEVELOPED AT THE LABORATORIES. HANDOUTS 2-9 AND 2-10 CONTAIN THE APPROPRIATE FEDERAL REGULATIONS.

ASK THE PARTICIPANTS WHY THE GOVERNMENT CHANGED ITS POLICY SO THAT IT NOW ALLOWS EXCLUSIVE LICENSING OF TECHNOLOGIES DEVELOPED IN FEDERAL LABORATORIES. ANSWER: THERE ARE SOME GOOD TECHNOLOGIES DEVELOPED IN THE LABORATORIES THAT REQUIRE CONSIDERABLY MORE DEVELOPMENT WORK AND LARGE AMOUNTS OF MONEY TO DO THIS DEVELOPMENT WORK IF THEY ARE TO BE BROUGHT TO MARKET. THE GOVERNMENT REALIZED THAT A COMPANY SOMETIMES IS NOT WILLING TO PUT UP LARGE AMOUNTS OF MONEY TO FURTHER DEVELOP A TECHNOLOGY UNLESS IT IS THE ONLY COMPANY WITH RIGHTS TO SELL THAT TECHNOLOGY. UNLESS THE COMPANY CAN ACHIEVE SOME COMPETITIVE EDGE, THE INNOVATION MAY NOT OCCUR.

ASK THE PARTICIPANT WHY PREFERENCES ARE GIVEN TO SMALL BUSINESSES. ANSWER: SMALL BUSINESSES ACCOUNT FOR MOST OF THE NEW JOBS CREATED IN THIS COUNTRY. DAVID BIRCH, IN AN ARTICLE ENTITLED "WHO CREATES JOBS?" (THE PUBLIC INTEREST, FALL 1981, pp. 3-14), DOCUMENTS THIS THESIS. IN HIS SAMPLE OF 5.6 MILLION BUSINESS (BETWEEN 1969 AND 1976), TWO-THIRDS OF THE NET NEW JOBS WERE CREATED BY FIRMS THAT HAD 20 OR FEWER EMPLOYEES. APPROXIMATELY 80 PERCENT OF THE NET NEW JOBS WERE CREATED BY FIRMS THAT HAD 100 OR FEWER EMPLOYEES.

ASK THE PARTICIPANTS WHY THE GOVERNMENT REQUIRES A MARKETING OR DEVELOPMENT PLAN FOR TECHNOLOGIES LICENSED FROM LABORATORIES. ANSWER: IN ORDER TO ENSURE THAT THE TECHNOLOGY WILL BE USED. DETAILS ON INFORMATION REQUIRED IN THE MARKETING OR DEVELOPMENT PLAN ARE FOUND IN THE "APPLICATIONS FOR LICENSES" SECTION OF THE MATRIX ON LICENSING, HANDOUT 2-3. THE GOVERNMENT HAS THE RIGHT TO TERMINATE THE LICENSE IF THE LICENSEE DOES NOT FOLLOW THE MARKETING OR DEVELOPMENT PLAN OR CANNOT SHOW THAT OTHER STEPS TO COMMERCIALIZE THE TECHNOLOGY ARE BEING TAKEN.

COOPERATIVE R&D AGREEMENTS

ASK THE PARTICIPANTS WHY THE ABILITY TO ENTER INTO COOPERATIVE R&D AGREEMENTS IS SO IMPORTANT. ANSWER: SEE UNIT 12 (COOPERATIVE RESEARCH); ISSUE

PAPER IV--COOPERATIVE RESEARCH AND THE PRIVATE SECTOR; AND ISSUE PAPER V--COOPERATIVE RESEARCH: THE UNIVERSITY EXPERIENCE.

PERSONNEL EXCHANGES

ASK THE PARTICIPANTS WHY PERSONNEL EXCHANGES ARE IMPORTANT. ANSWER: PERSONNEL EXCHANGES ALLOW FOR THE TRANSFER OF KNOWHOW THAT IS NOT EASILY TRANSFERRED IN ANY OTHER WAY.

ASK THE PARTICIPANTS WHY THE GOVERNMENT IS NOW ALLOWING EMPLOYEES (AT GOVERNMENT-OPERATED LABORATORIES) TO WORK WITH A COMPANY TO PROMOTE COMMERCIALIZATION OF THE TECHNOLOGIES THE EMPLOYEE DEVELOPED. ANSWER: BECAUSE KNOWHOW CAN ONLY BE EFFICIENTLY TRANSFERRED BY PEOPLE SHOWING OTHERS. SEE THE SECTION ENTITLED "PERSONAL DIMENSIONS OF TRANSFER," WHICH BEGINS ON PAGE 41 OF ISSUE PAPER II--THE TECHNOLOGY TRANSFER PROCESS.

TRANSPARENCIES FOR UNIT 2

TECHNOLOGY TRANSFER LEGISLATION