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INFORMAL REPORT

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BROOKHAVEN NATIONAL LABORATORY TECHNOLOGY TRANSFER FIVE YEAR PLAN FISCAL YEARS 1990-1994

BROOKHAVEN NATIONAL LABORATORY
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LONG RANGE PLAN
OFFICE OF RESEARCH AND TECHNOLOGY APPLICATIONS

EXECUTIVE SUMMARY

The mission of the Brookhaven Office of Research and Technology Applications (ORTA) is to transfer technology derived from government funded research to the private sector and to State and local governments. The purpose of the ORTA's efforts is to carry out the mandated requirements as well as the spirit of the technology transfer legislation and executive orders that have been promulgated since 1980.

ORTA efforts are directed internally to performing continual assessments of Laboratory programs to identify commercializable technology; and externally to undertaking deliberate efforts to reach out to industry and to State and local governments with special technical expertise and useful products, processes or services.

The Office strives to transfer information, expertise and programs to U.S. industry thus supporting and enhancing the international competitiveness of the U.S. in world markets and contributing to national security through a strong national economic base. To accomplish this goal the Office labors to establish working relationships and initiate communication between BNL staff and industry.

This document describes the organization of the ORTA in the framework of the Laboratory management system with emphasis on how the organizational structure fosters attainment of the stated goals. The four key elements used by Laboratory management to stimulate technology transfer are:

- the programmatic departments, laboratory facilities and scientific and technical staff,
- the Technology Transfer Coordinating Committee,
- the Patent Office and
- the ORTA staff.

Other key elements in the technology transfer process are the DOE program offices. They fund and direct the research activities from which transfer arises. The role to be played by these organizational elements in technology transfer is evolving.

The five year program is directed to integrating the four internal elements to facilitate the individual and collective outreach to industry and State and local governments. The individual elements described in the plan tend to be "opportunistic" in that creativity, change and constant vigilance are important aspects of an effective program.

Section I states the mission of the ORTA. Section II presents the strategic setting for viewing the ORTA's selection of technology transfer activities including developing strategies for integrating program objectives with planning assumptions. Section III describes the general elements, guidance and strategies for action with respect to:

- organization,
- programmatic transfer,
- spinoff transfer,
- special initiatives,
- mechanisms, and
- ad hoc related efforts.

Section IV concludes with a statement of currently available resources and an indication of additional resources needed to implement the five year plan as presented in this document.

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LONG RANGE PLAN

OFFICE OF RESEARCH AND TECHNOLOGY APPLICATIONS

I. MISSION

The mission of the Brookhaven Office of Research and Technology Applications is to:

- expedite the transfer of technology resulting from government funded activities at BNL to the private sector and to State and local governments.

II. STRATEGIC VIEW

A. PURPOSE

The provisions of the Stevenson Wydler Act of 1980 requires Brookhaven to have an active technology transfer program. This program is conducted by the Office of Research and Technology Applications which endeavors to:

- Promote and facilitate the fullest range of technical cooperation between Brookhaven and America's large and small business, academia, State and local governments and Federal agencies;
- Stimulate acceptance by the U.S. private and public sectors of the Laboratory as a source of useful technology;
- Collaborate with local, State and regional organizations that promote technical cooperation;
- Improve the effectiveness of individual and organizational efforts in technology transfer through assistance, training, recognition and awards;
- Develop a laboratory program of technology transfer that includes programmatic and spinoff technologies and is consistent with the Laboratory culture;
- Act as a clearing house for technical assistance requests made directly to the laboratory and forwarded by other Federal laboratories.

B. PLANNING ASSUMPTIONS

- The U.S. is now a part of a global economy which means that the importance of competing internationally is more important than ever before and will continue to increase in the foreseeable future;
- To be competitive, the time lags between concept formulation and commercialization must continue to shorten;

- The Federal Laboratories (particularly DOE laboratories) will be called upon to contribute the product of billions of dollars of government research to the competitiveness struggle;
- Government, industry and academia will choose to link more fully their research and application activities in both product and service areas;
- Emphasis on technology transfer will expand in both the Federal government and industry resulting in lowering many of the current legal, institutional and structural barriers while providing greater autonomy to the laboratory in pursuit of transfer activities;
- Both legislative and administrative actions will increase the role of program planners and managers in transferring DOE generated technologies;
- State governments will increasingly focus on coupling Laboratory technologies and capabilities to economic development;
- A proactive technology transfer policy by the DOE and the Laboratory will slowly modify the cultural background at the Laboratory enhancing the acceptability and increasing the involvement of Laboratory staff in technology transfer;
- The current system that reviews and assesses the technological value of laboratory R&D programs will continue to evolve according to DOE and legislated requirements.

C. PROGRAM OBJECTIVES

- Fulfill the responsibility of the Federal government to ensure full use of the nation's Federal investment in research and development.
- Strive, where appropriate, to transfer federally owned or originated technology to the private sector and State and local governments.
- Increase the awareness and responsiveness of the staff to opportunities for transferring technology.
- Expand and improve our patenting and licensing program and to initiate copyrighting procedures for software.
- Convince Laboratory managers and scientists that technology transfer is an important aspect of programmatic research and that contributions will be recognized and rewarded.
- Respond to requests for technical assistance from outside the Laboratory and disseminate requests directed to the Laboratory to other Federal Laboratories.
- Participate in the Federal Laboratory Consortium, utilize its support services in enlisting the aid of other Federal Laboratories, and for direct technical cooperation with other Laboratories and the Federal Government.

D. STRATEGIES

- Increase participation of principal investigators in technology transfer efforts by means of:

  - designating technology transfer coordinators in each research Department,
  - including a section in the FTP/A identifying the technology transfer activities to be associated with a specific program or project,
  - making principal investigators and staff members knowledgeable about the benefits and rewards available to them through patents and licensing,
  - incorporating, where appropriate, technology transfer contributions in the salary review and career development assessments of staff members.

- Increase Laboratory interaction with State and local governments to foster economic development in this State and region.

- Develop greater awareness by Laboratory staff of the importance of technology transfer for national well being by means of:

  - emphasis and publicity associated with awards programs for noteworthy transfer activities,
  - continuation of emphasis on R&D-100, FLC Excellence Awards, and Engineering Society awards, and cash awards for filing patents, combined with internal Laboratory recognition for outstanding technology transfer efforts, and
  - publication of the rewards schedule associated with successful licensing of patents derived from government funded research.

E. MANAGERIAL IMPLICATIONS

- Develop a focused plan for the laboratory technology transfer program.
- Improve programmatic transfer by incorporating additional awareness at the program level.
- Seek additional industrial users for user facilities.
- Develop "ferret" activities through outside consultants and resident transfer staff from State agencies.

III. PROGRAM

A. ORGANIZATION

The Office of Research and Technology Applications is in the Director's Office and the Head of the ORTA reports directly to the Laboratory Associate Director for Applied Programs. Figure 1 depicts a modified organization chart of the Laboratory highlighting the organizational location of the ORTA. The chart also shows the Technology Transfer Coordinating Committee that is a vital link between the ORTA and the programmatic Departments in the Laboratory. This organizational location provides the ORTA with direct access to the Laboratory Director, Deputy Director and Associate Directors. Direct support for the ORTA is provided by the Laboratory patent counsel.

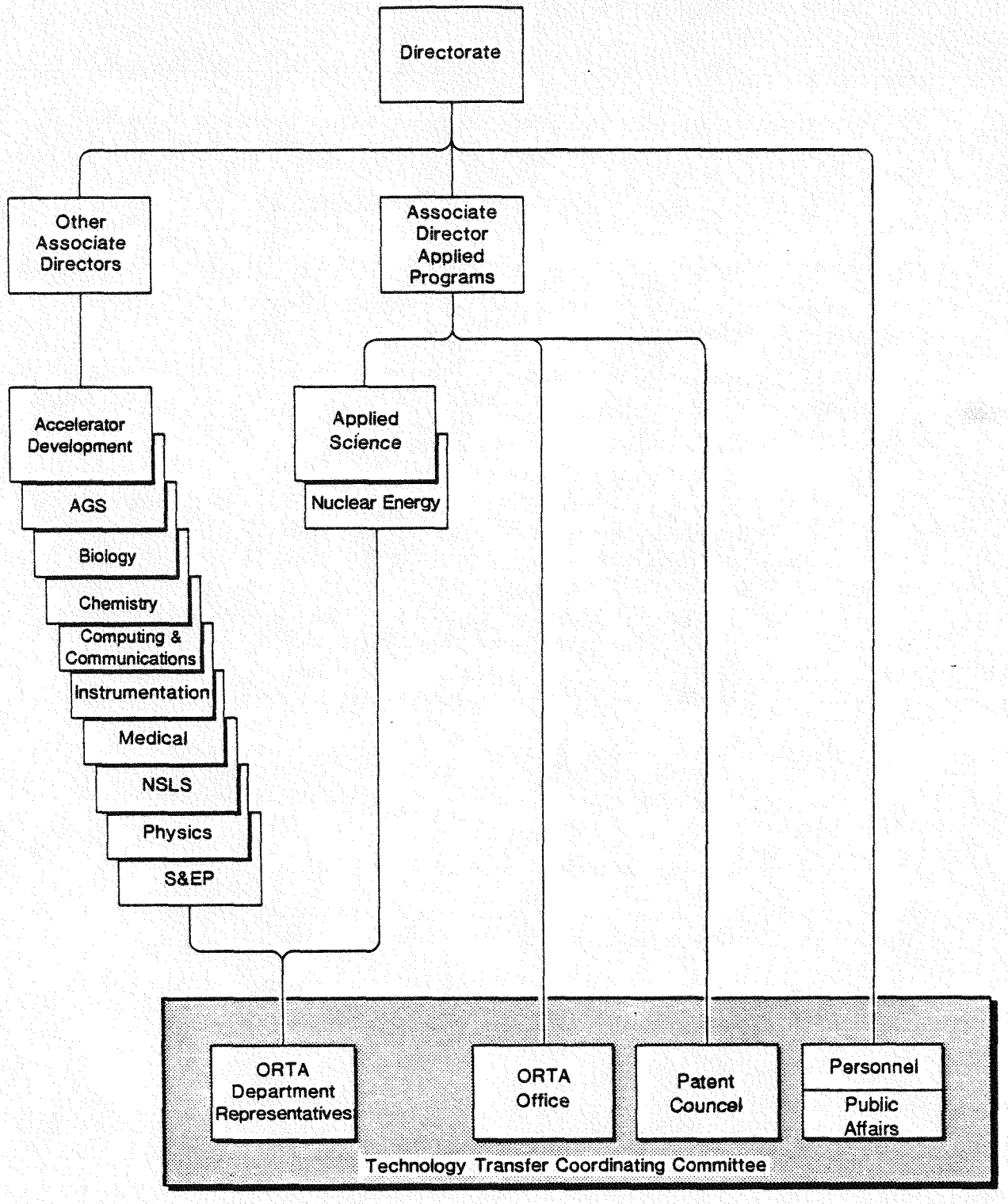


FIGURE 1

Organizational Location of the ORTA
and the Technology Transfer Coordinating Committee

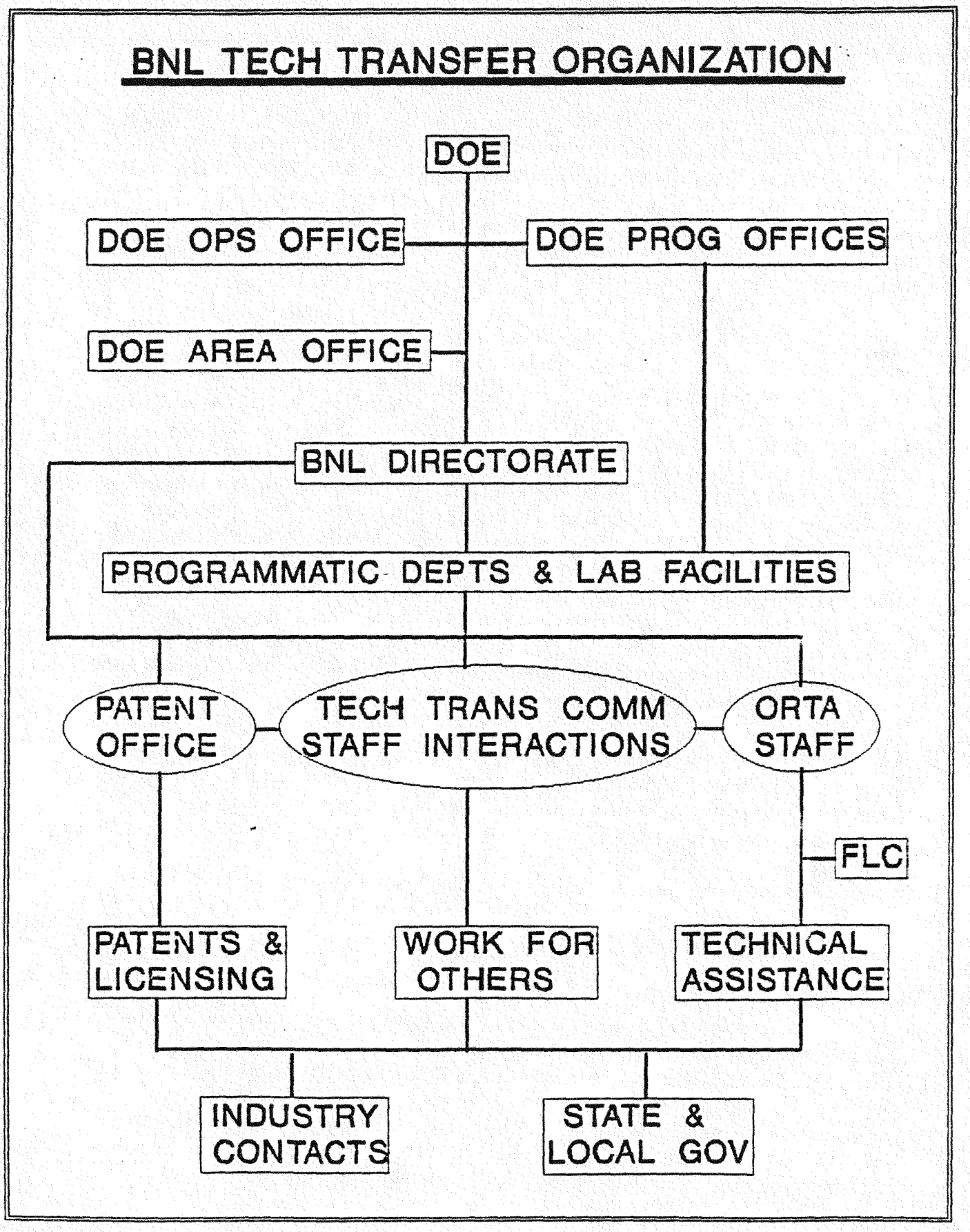
The Head of the ORTA chairs the Technology Transfer Coordinating Committee, a Committee identified by the Director in the Laboratory Committee Handbook. This Committee is composed of one or more senior members from each of Laboratory's research departments and independent divisions, the Laboratory Patent Counsel, and ex officio representatives from Personnel, Public Affairs and Technical Information. The Committee assists the ORTA in identifying research areas for applications assessments and for providing guidance and counsel in developing ORTA policies. They also play an important role in this research oriented laboratory in increasing the awareness of the scientific staff concerning the importance of applications. The decentralized Technology Transfer Coordinating Committee has been very effective in extending the span of the ORTA in accessing key program activities.

Figure 2 places technology transfer at Brookhaven in the structure of the Agency and the Laboratory. The bulk of the work at Brookhaven is sponsored through the DOE Program Offices and performed by the Laboratory programmatic departments. It is imperative that program managers at Headquarters and principal investigators at the Laboratory recognize that technology transfer is part of their mission. Therefore, these players must be motivated by DOE and Laboratory management as well as by the ORTA to identify potential commercial applications. The use of Laboratory facilities, work-for-others and any other contractual arrangements between the Laboratory and industry requires the administrative approval of DOE Headquarters, the Chicago Operations Office and the Brookhaven Area Office. Since transfer activities are fraught with possible conflict, fairness, and public property stewardship issues, such approvals are often accompanied by lengthy delays. These must be reduced if we are to interact with industrial partners. Patents and licensing should work more smoothly now that AUI can ask for ownership waivers and negotiate licenses.

All of the interactions between the ORTA and the BNL technical staff are outside the programmatic support and technical supervision chains. Technology transfer interactions are informal and must be encouraged by DOE and Laboratory management. Thus, a well defined system of encouragement and reward for technology transfer contributions parallel to that which exists for research efforts is needed to encourage staff participation in the technology transfer process.

B. FUNCTION

The Laboratory Office of Research and Technology Applications currently is manned by two full time professionals plus assistance from a technology transfer specialist. The Office regularly reviews the Laboratory's research program and prepares Application Assessments for each technology that appears to have a potential for commercialization. Subsequent legislation permits Associated Universities Incorporated (AUI) to elect to take title to intellectual property developed in government funded research programs. The ORTA assists the


BNL TECH TRANSFER ORGANIZATION
DOE
DOE OPS OFFICE
DOE PROG OFFICES
DOE AREA OFFICE
BNL DIRECTORATE
PROGRAMMATIC DEPTS & LAB FACILITIES
PATENT OFFICE
TECH TRANS COMM STAFF INTERACTIONS
ORTA STAFF
FLC
PATENTS & LICENSING
WORK FOR OTHERS
TECHNICAL ASSISTANCE
INDUSTRY CONTACTS
STATE & LOCAL GOV

patent counsel in identifying potential licensees and licensing patented technologies. The ORTA plays a primary role in commercializing all other technologies that are derived from Laboratory research programs. The ORTA identifies technical capabilities within the Laboratory and alerts private sector firms to their existence; channels requests for technical assistance to other Federal laboratories; responds to requests originated by other laboratories; and identifies laboratory/industry partnerships in areas of common interest through work-for-others agreements, cooperative agreements, demonstration projects and personnel exchanges. A key function of the ORTA is to represent the Laboratory in the Federal Laboratory Consortium for Technology Transfer (FLC) and participate in association with other Federal laboratories in national and regional activities of the FLC.

1. PROGRAMMATIC TRANSFER

a. Description

The basic mission of Brookhaven is the design, construction, commissioning and operation of user facilities. These mission activities lead to two major types of programmatic technology transfer. First, the Laboratory contracts with private sector companies to build these user facilities. Since they are state- of-the-art their specifications often dictate products or processes that are new to U.S. industry. Hence by providing the design and monitoring the product, new technology is transferred to industrial contractors. Second, industry may make use of these facilities to carry out R&D that cannot be performed elsewhere. Thus technology development is fostered by the use of unique facilities. In most cases new technology is developed by industrial scientists but is carried out at the Laboratory using unique facilities.

A second major activity at Brookhaven is fundamental research in the physical, chemical, biological, medical and environmental sciences. Although most of these activities are too early in the R&D cycle to generate direct technology transfer, support technologies that are transferrable are developed in instrumentation, metrology and related areas. The ORTA works closely with the technology transfer coordinators to identify these opportunities.

A third type of activity at Brookhaven is research in energy related applications. These are sponsored by DOE Assistant Secretaries in Conservation and Renewables, Fossil Energy, Nuclear Energy and Environment Safety and Health. Since these programs are generally goal oriented, technology transfer is incorporated in the mainstream of the work and is primarily the responsibility of DOE program staff. The ORTA cooperates with the program transfer efforts when the Laboratory is requested to do so by DOE Headquarters Staff. Increased initiatives for incorporating technology transfer capabilities and resources of the Laboratory to the transfer of energy applications programs technology is best coordinated at DOE Headquarters.

b. Plan

Scientific staff attitudes toward the value of broadening the knowledge base through fundamental research has evolved over many years. The quality of this research has been sharpened by the encouragement of the scientific managers at BNL as well as DOE/OER. Similar attitudes toward research applications through technology transfer need to evolve if Laboratory participation with U.S. industry is viewed as highly desirable. Our plans call for a focused effort to increase the awareness of BNL program managers and staff in the special value of technology transfer. This will be accomplished in two ways:

- a reward system which shows positive appreciation for technology transfer efforts commensurate with the Laboratory emphasis on world class research in state-of-the-art facilities, and
- continuous reminders to staff regarding the value of technology transfer and the need to assess all of our research activities for technology transfer elements of special value to U.S. industry.

Towards these ends a formal reward system has been defined by A.U.I. and is now under review by DOE. Secondly, we have added two technology transfer related questions which must be answered by an author submitting a paper for publication. One asks if the paper contains elements for technology transfer, while the second asks that the author identify the potential commercial significance of his work. We have suggested to DOE and are exploring approaches to incorporate a technology transfer assessment statement in each FTP/A submitted by the Laboratory. Even for basic science programs where one does not expect any potential transferrable technology, preparing this statement obliges the principal investigator to consider the technological as well as the scientific elements of the program. For each technology identified, the principal investigator would be required to assess the timing, cost and risk related to the technology. Where appropriate, the ORTA working with the BNL principal investigator, would seek to make industrial contacts and identify means to incorporate government and/or industry in advanced research leading towards commercialization. In some cases we may seek outside consultants to make such assessments and to assist in generating cooperative activities leading to commercialization.

BNL staff is aware of their responsibility for filing invention disclosures. These permit the Patent Office to continually monitor research activities and identify those programs that are likely to produce licensable property. If AUI elects to take title to such properties, the patent counsel negotiates licenses with interested parties in the commercial arena. In general the Laboratory makes no public announcement of these opportunities so as not to adversely interfere with licensing negotiations. As may be required, the ORTA supports the search for interested industrial participants.

The Technology Transfer Coordinating Committee members in each department also continually monitor their programmatic activities. When they identify potential spinoff or programmatic transfer, they bring it to the attention of the ORTA.

The ORTA is intensifying its continuing systematic search of laboratory programs to identify potential transfers. Toward this end we are employing consultants who have occupied key positions in making R&D decisions in industry. These consultants will review relevant portions of the Laboratory's programs. Also, we are now negotiating with the New York State Science and Technology Foundation for a part-time person who will be stationed at the Laboratory to act as a conduit for technology to New York State companies.

2. SPINOFF TRANSFER

a. Description

Spinoff technologies arise in the normal process of carrying out programmatic research. This may take three forms. One of these is when new products or processes are identified or invented external to the main objective of the program/project. These arise from the requirements for instrumentation and measurement, the need for special mechanical devices, experimentation with the application of new materials or processes and/or by-product applications of the primary product of the research. The commercial implication of many of these may often be overlooked without continuing vigilance on the part of the researchers and systematic efforts by the Laboratory for the continuous assessment of opportunities for technology transfer . A major goal of the transfer program is to raise the level of awareness of the research staff to the existence of prospective spinoff technologies. Most spinoff technologies are not obvious and are identifiable by a small change in process or the addition of a new item in the product line of a commercial company. These new products usually appear without the knowledge of anyone in the laboratory. Their nature is such that their source in the Laboratory or the involvement of BNL is not revealed. Often it is misplaced, occasionally hidden.

When the spinoff technology is of a magnitude that it will support a separate business entity, spinoff companies frequently arise. Over the past few years a number of spinoff companies have been started by laboratory employees. The ORTA encourages this and assists employees who wish to start their own enterprises.

Spinoff technologies may be commercialized by a particular company. Application assessments are directed to making knowledge of potential spinoffs available to industry. Encouraging potential technology users to visit the laboratory is pursued in the hope that they will identify technologies of commercial significance. Responding to requests for assistance often takes the form of searching for spinoffs

that have not yet been recognized but that will meet some unique needs of a company or industry.

b. Plan

The overall strategy of the ORTA is based on two primary functions:

- Outreach to industry and State and local governments to assess their technology needs and match them with unique laboratory technology.
- continually searching and assessing on-going laboratory programs for elements that have potential commercial applications or would prove useful to State and local governments.

All of the various initiative and special activities described below belong in one of these categories:

- search and assessment of on-going programs for potentially transferrable technology,
- staff interactions leading to work-for-others contracts with the private sector, or
- technical information activities through interaction with other Federal laboratories to respond to requests from the private sector and State and local governments.
- participation in the Federal Laboratory Consortium and interaction with other federal Laboratories through FLC national and regional activities.

The specific initiatives, other ORTA transfer activities, transfer mechanisms and resources allocated to technology transfer constitute the specific active elements in the ORTA program plan for the next five years. These elements fit into an overall information flow scheme depicted in Figure 3. This figure illustrates the in-house and outreach activities involving information and technology exchanges with industry as well as with State and local governments.

3. INITIATIVES

The ORTA, in addition to effecting technology transfer programmatic activities, i.e., specific technology and spinoff transfers, has started and will carry out a number of specific initiatives. In a Laboratory, such as Brookhaven, where most of the programmatic activities are directed toward basic research, the implementation of these require special efforts by theLaboratory Directorate and individual Departments and often need supplemental government support in order to move them into industry. It is in this arena where the U.S. is now least effective and most vulnerable in the battle to remain internationally competitive.

In the next five years the ORTA is committed to a continuing program of special initiatives involving unique facilities or capabilities at BNL. Some of these

have been completed, othersare in the planning stage, while still others remain to be developed. All of these are a form of "affirmative action" in technology transfer. These activities go above and beyond the search for ongoing activities which may have commercial value. Rather, they represent an effort to create opportunities out of the pool of skills and facilities available at the laboratory. These initiatives include:

a. XLS - The ORTA with the cooperation of the National Synchrotron Light Source (NSLS) alerted U.S. industry that the technology for an X-ray lithography Source (XLS) for future micro-chip production existed at the Laboratory. As a result of a series of workshops, a prototype commercial synchrotron is under construction.

b. SXLS - The Department of Defense has provided funding for the construction at Brookhaven of a prototype superconducting X-ray lithography synchrotron. A request for proposal has been issued and six teams have responded for industrial partners to work with Brookhaven in designing, constructing, commissioning and operating this commercial prototype. Three of these firms will probably be chosen and it is hoped that at least one will decide to venture into commercial production.

c. NORTHEAST UTILITY OUTREACH - A Center has been established at Brookhaven that will direct the attention of some BNL staff to problems faced by Northeastern urban utilities. The Laboratory Utility R&D Center provides easier access for these companies to specific technologies and skills resident at BNL.

d. CAMP - The New York State Science and Technology Foundation and the Department of Energy have provided support for the Laboratory to explore the creation of a Center for Advanced Microelectronic Processing (CAMP). The conception of the Center is to join the NSLS and XLS facilities at Brookhaven with Brookhaven materials capability and related skills at other New York State institutions, such as nanofabrication activity at Cornell and computer aided design at SUNY at Stony Brook. Industry participation in CAMP on a shared cost basis will be explored. The product of this one year effort will be a program plan for such a specialized technology development center and integration with on-going materials research programs.

e. MINI-INCUBATOR - The ORTA sponsors a start-up facility in available space on the Laboratory site. This has been in formulation for several years but no tenants have yet been approved because of problems related to conflict of interest, or the space not being appropriate to the tenant's mission.

f. OTHER - The ORTA intends to pursue a program to increase the use of BNL user facilities by industrial firms. It will follow along two lines. First, new or planned facilities will be scrutinized to identify prospective industrial users and acquaint them with their specialized functions. These facilities are:

- the Free Electron Laser
- the Single Event Upset facility, and
- the Neutral Beam Particle Accelerator.

Second, an effort will be made to identify mechanisms whereby industrial entities smaller than Fortune 500 size companies might find it worthwhile to do experimental work at the NSLS and other existing user facilities. Third, a number of other initiatives are being considered including

- a center for low temperature superconductivity applications,
- a program to construct a prototype angiometry ring,
- expansion of the supply of radionuclides,
- radiopharmaceuticals,
- applications of perfluorocarbon tracers,
- composite materials applications, conducting polymer applications and a coal technology center.

4. OTHER ORTA TRANSFER ACTIVITIES

The ORTA performs a number of other activities. Primary among these are technical assistance. It acts as a source of requests that are generated as a result of interactions with small companies. Increasingly the ORTA represents Brookhaven or the Federal Laboratory Consortium at symposia, workshops, and other transfer activities aimed at the industrial community. The ORTA will expand this activity since it is one of the most useful results of technology transfer legislation. However, the effort is limited both by the ability of the ORTA to spend time and travel on outreach activities and staff-time limitations to respond to technical information requests arising from these activities. Greater outreach not only absorbs more direct effort, but it increases the population of small industrial companies that know how to tap the Federal Laboratory system for assistance.

Where Brookhaven cannot provide the direct technical assistance, the ORTA relays the requests to other Laboratories through the FLC electronic mail and personal contact networks. It also forwards requests to the FLC resource directory clearing house in San Diego. The ORTA also receives requests from other Laboratories through the network.

Brookhaven acts as the FLC regional coordinator for the Northeast and is one of the entry points where requests are entered into the system. It also serves on the national executive committee of the FLC. In this role the ORTA is involved in planning and conducting technology transfer activities relevant to the interests of the state and region. For the foreseeable future the ORTA will continue in the role of FLC Northeast Regional coordinator.

C. MECHANISMS

Implementation of technology transfer is carried out through nine mechanisms. The use of these mechanisms is uneven and, to some extent, dependent upon the nature of the transfer. Some of these approaches have been heavily utilized, others have been employed marginally, while still others have not yet been tried. Some, such as licensing, is expected to be an important transfer mechanism, but has only become available with the modification of the AUI contract with DOE on January 1, 1988.

1. INFORMATION DISSEMINATION

This has been the most common form of transfer. Publication of research results is the primary product of all BNL programmatic activities. The ORTA prepares applications assessments and other publications identifying the Laboratory's potential for technology transfer. The ORTA makes frequent appearances before industrial workshops and symposia to provide information on the accessibility of Federal laboratories. Although this is already an extensive activity, plans call for an increasing commitment.

2. USE OF LABORATORY FACILITIES

One of the primary missions of BNL is the supply of scarce, expensive, state-of-the-art user facilities to academic researchers. Some of these have proven to be of great use to industry. It is likely that the emphasis on international competitiveness may bring into existence future user facilities that will be more attractive to industry. The ORTA will continue to work with the user facilities to increase industrial use.

3. INDUSTRY SPONSORED RESEARCH

Closely related to user facilities is industry sponsored research. Where BNL has specific exceptional expertise, or where industry desires to have the laboratory perform the experiments at the user facility, it can arrange for the work to be done under "work-for-others" contractual arrangements. At the present time only one percent of the laboratory program represents work- for-others for the private sector. The goal of the ORTA is to raise this to three percent by 1994. Currently work-for-others contracts must meet three tests. One, they must not interfere with DOE's mission oriented program; two, the work must be of significant scientific value; and three, the capability to perform the work must not compete with private sector capability. Often the administrative lead time necessary to gain DOE approval of these three conditions discourages industry. The ORTA plans to work with DOE to attempt to reduce these lead times and better define the conditions for rapid approval by DOE.

4. WORKSHOPS, SEMINARS AND BRIEFINGS

These activities are conducted with two goals. One is to acquaint potential users with a particular capability at the laboratory. This may vary from technical consulting to assistance in preparing SBIR grant proposals. The second is where technology transfer is encouraged by Congressional mandate or Executive Order. This includes making industrial firms aware of the technical assistance available from Federal laboratories.

5. COOPERATIVE R&D AGREEMENTS

At the present time, DOE Laboratories cannot directly enter into cooperative technology transfer projects. A cooperative project implies that the government provides part of the funding, although most of the direction is up to industry. Laboratory funds presently come from DOE programs and the respective program managers would have to approve funds for cooperative research. We do not see how we can expand the use of this mechanism unless some source of funding, e.g., overhead, direct DOE or programmatic funds become available.

6. LICENSING

Prior to January 1, 1988, the Laboratory did not have the authority to use this mechanism. Within the first nine months of this year, six licenses have been negotiated by the Patent Office. This will become the primary transfer mechanism for Laboratory patented technology.

7. EMPLOYEE EXCHANGE

This can be a very effective mode of technology transfer. We have attempted to make arrangements with industrial companies to either exchange personnel or have them resident on site. Industry does not like to dispense with the services of a high quality researcher for several months or a year, nor do Laboratory people find positive career development as an outcome of spending time in industry. Couple these disincentives with the need to move to a new location with consequent family dislocations and it is evident that such exchanges are hard to arrange. We have had three cases where industrial people have spent various periods of time in residence at the Laboratory working with specific technologies. We plan to try and increase this type of transfer in spite of the difficulties.

8. INDIVIDUAL LABORATORY VISITS

This mechanism is heavily used. We have large numbers of individuals representing many companies, both large and small, that visit the Laboratory for periods of a half a day to two days. These visits are prearranged and center on an agenda that has been prepared based upon mail or telephone conversations with the visitor. We try to identify the areas that will be of greatest interest and arrange for staff interaction in those areas.

IV. RESOURCES

A. STAFFING

1. CURRENT

The ORTA is staffed by two senior scientists and a technology transfer specialist. Although the ORTA requires a full time secretary for typing, clerical and mailing work, this is avoided by maximally implementing modern computer technology to share the secretarial tasks, thus stretching existing staff. Staffing is just sufficient for present activities. It will need to be increased to carry out the activities described in the five year plan. The patent office is staffed by two attorneys and two secretaries. In addition some of the load of the business office is connected with work-for-others and represents additional staff applied to technology transfer. That portion of the user facility staffs that are involved directly with proprietary users are contributing direct support to technology transfer. Finally, a fraction of the Associate Director for Applied Programs and his staff are directly involved in technology transfer. Estimates are made of the efforts provided by these latter three groups.

2. PLANNED

It is anticipated that the technical assistance demands will continue to grow. These have almost doubled in each of the past two years. This has resulted from the increase in outreach activities by the ORTA, from the increased visibility of Federal laboratories in the technology transfer process arising from the passage of the PL 99-502, and from the increased resources provided to the FLC by the new legislation.

We also expect the activity of our on-going and new initiatives to occupy an increased amount of our time. The CAMP initiative will be a major effort during FY 1989, and proposals that evolve from CAMP will require more effort in FY 1990 to FY 1992. The Utility initiative, now well underway, is also expected to grow in scope and require additional effort by the ORTA.

In FY 1989, New York State will support approximately a half an FTE by a person placed at the Laboratory who will identify laboratory capabilities and expertise that may be useful to business entities within New York State. In addition the Laboratory is providing support to enlist retired R&D management executives to consult with us on moving our technology to the private sector.

We envisage a steady growth from the present level of three full time equivalents (FTE) in the ORTA to six FTE by FY 1994. We also expect as a result of a successful licensing effort that the patent office will grow from its present staffing of four FTE to six FTE by FY 1994.

Although one cannot justify the level of staffing for technology transfer upon the revenue generated, it is still worth looking at the record for the past two years. The ORTA was instrumental in initiating the XLS initiative which has resulted in the decision to construct a prototype at the Laboratory. Funding for this will total $18 million over four years. The ORTA has prepared proposals that have brought $50,000 to Physics and $75,000 to Medical for Technology share programs. An additional $50,000 is almost certain for ADD in FY 1989. The ORTA has also garnered joint funding by DOE and the State of New York totaling $110,000 for a scoping study for Center for Advanced Microelectronic Processing. The Northeast Utility initiative has raised $40,000 and is promised another $20,000 in direct support of the Center from utilities. In addition $650,000 of work-for others has been derived directly from the utility initiative. It is expected that technology transfer activities generated by the ORTA and resulting in Laboratory programs will continue to grow in the future. Thus, in a sense the growth in the ORTA is self supporting since the additional overhead generated by ORTA derived projects more than compensates for the additional cost.

B. FACILITIES AND CAPITAL EQUIPMENT

The ORTA does not have a need for additional facilities or capital equipment. It does plan to add personal computers as it increases its staff and upgrade those that are currently being used. Current space is fully utilized and any addition to ORTA effort will require additional space. There are plans to relocate the ORTA to the new administrative building when it is available. It is currently in the planning stage and funding has not yet been allocated. In addition to more space as staff increases or visitors come aboard, it would also be desirable to collocate the ORTA and the Laboratory patenting and licensing activities.