

**BROOKHAVEN NATIONAL LABORATORY  
FIVE YEAR TECHNOLOGY  
TRANSFER PROGRAM PLAN**

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**OFFICE OF RESEARCH AND TECHNOLOGY APPLICATIONS**

**MASTER**

**BROOKHAVEN NATIONAL LABORATORY  
UPTON, LONG ISLAND, NEW YORK 11973**

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# BROOKHAVEN NATIONAL LABORATORY

## FIVE YEAR TECHNOLOGY TRANSFER PROGRAM PLAN

### MISSION

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

- expedite the transfer of technology resulting from BNL research efforts to the private sector and to State and local governments.

### GOALS

To accomplish this mission the ORTA has established the following goals:

- increase awareness and interest of the professional and scientific staff and Laboratory management in technology transfer and identify mechanisms to provide motivation for technology applications.
- Seek means of approaching and informing private sector entities that would benefit from implementing Laboratory developed technology.
- Identify Laboratory efforts that need continued applied research and engineering development to commercialize and seek out means for effecting commercialization.

### CURRENT ACTIVITIES

#### *Staff Awareness*

The ORTA encourages Laboratory innovators to enter competitions for awards. The Laboratory defrays costs associated with entering and winning IR-100 awards. It encourages entries in the Awards programs of the FLC, Long Island Engineer's week and State Engineering awards and arranges, with the Public Relations Office widespread announcement of the winners.

The ORTA encourages staff scientists to submit invention disclosures and file for patents. It has disseminated information on the potential profitability to inventors of licenses on their patents and their right to request waivers when the patents are not pursued by AUI or DOE.

The Scientific Staff Manual has been revised to incorporate a section on Technology Transfer. A Policy and Procedure Manual is being prepared for the Laboratory's technology transfer program. This will be incorporated in the Employees Manual when it is issued. It will address responsibilities and advantages of the Laboratory's technology transfer program. An annual Laboratory award for the most important contribution to technology transfer is under consideration.

The ORTA interacts with the staff in the individual Departments through the Technology Transfer Coordinating Committee. The members of this committee act as a two way conduit; informing department personnel about the program of the ORTA and informing the ORTA of the innovations initiated within the Departments.

### *Interaction with Private Sector*

The Laboratory processes over 100 specific requests annually. Although these are encouraged, at this time the ORTA is not planning an initiative to increase these since they would impose a requirement on the staff that would preclude attaining other ORTA goals. Interaction is encouraged by other ORTA activities and it is projected that direct requests will continue to grow at the same rate as experienced in the past two years.

The ORTA has had direct interaction with the incubator facility at Science Park in New Haven. It has recently begun an interaction with the eight incubator facilities located in New York State. Through the Federal Laboratory Consortium, it has been active in assisting the Federal Aviation Center in New Jersey in initiating the Southern New Jersey Technology Consortium.

The ORTA interacts with the Long Island business community by representing the Laboratory in the Long Island Forum for Science and Technology (LIFT). This group represents the high technology companies located on Long Island.

The ORTA encourages spinoff companies. It has encouraged Laboratory management to better define conditions under which an employee in the process of forming a company might retain part time employment at the Laboratory. The ORTA provides information and encourages applicants under the SBIR program. Laboratory-wide announcements are made when the solicitations are issued and of the availability of assistance by the State in applying for grants.

The ORTA encourages Laboratory scientists to consider the commercial potential of spinoff products. A major problem is the provision of risk capital for products that need further development prior to commercialization. In the past the ORTA has brought venture capitalists together with

individual innovators at the Laboratory. The ORTA is seeking out a means of providing a continuing relationship between venture capital purveyors and interested Laboratory scientists.

BNL's user facilities are a major source of transfer to industry. Dissemination of the availability of the user facilities attracts Fortune 500 type companies as users. The ORTA is searching for a means of bringing their benefits to smaller companies. Since use of the facilities usually is in connection with specific research activities, the issue is how to increase the breadth of research activities sponsored by small and medium sized firms. This can be done through consortia, trade associations, or professional associations, probably with some government assistance. Perhaps this might be the basis of a Department initiative.

#### *Interactions with the Public Sector*

Several activities are under discussion with the New York Science and Technology Commission. One of these is to initiate a joint effort with DOE to begin a scoping activity for the creation of the Center for Advanced Microelectronic Processing Technology Applications incorporating beam lines at the X-ray Lithography Synchrotron (XLS) prototype, computer aided design capability from the State University of New York at Stony Brook's computer science department, microelectronics technology from Cornell's Nanofabrication Center and industry. A second activity is to support the State's Industrial Innovation Extension Agent Program. A demonstration program is planned between the Agents in the Southern Tier Counties and the Laboratory. The final possibility that is under exploration is the development of a solid state consortium with the Rome Air Development Center, the University of Rochester and Rensselaer Polytechnic Institute.

#### *Federal Laboratory Consortium*

The Laboratory has been and plans to continue to be an active member of the Consortium. The Head of the ORTA plans to continue to serve as FLC Regional Coordinator and as a member of the FLC Executive Committee. Several FLC regional programs are in the process of initiation. Planning is underway for regional sponsorship of the FLC National Meeting to be held at Mystic, Connecticut in the Fall of 1988.

#### *Promotion of Technology Transfer*

Within the Laboratory the ORTA is attempting to generate both with Laboratory Management and the staff an understanding of the importance of technology transfer of government owned and developed technologies. The Supervisor's Personnel Manual is being revised to include language to have supervisors consider, where appropriate, technology transfer contributions in personnel review and promotion actions.

The ORTA works closely with the Laboratory Office of Public Affairs to disseminate information about the services provided by the ORTA and its technology transfer activities. The Office of Public Affairs also plays a useful role in increasing staff awareness of the technology transfer function. This effort will be continued and expanded.

The ORTA interacts with the BNL patent office regarding the patenting of inventions by BNL inventors. The ORTA is planning to publish a document of the BNL patents owned by DOE and available for licensing from the government and will update it annually.

### *Outreach and Industry Interaction*

Two industrial companies have participated in the DOE's supported Industry-Laboratory Technology Exchange Program. As opportunities arise the ORTA intends to continue its participation in this useful effort. In addition the ORTA sponsors two guests from an industrial company who are resident. The ORTA is seeking ways to bring more industry personnel into residence at the Laboratory. Past efforts have taken advantage of targets of opportunity. A systematic approach would be preferable but so far the ORTA has not been able to identify such an approach. The ORTA intends to increase its presence with incubator facilities within New York State. Experience at New Haven's Science Park has shown that incubator facilities are good outlets for outreach efforts. In addition, through leadership in regional FLC programs the ORTA hopes to reach small high technology companies in the other seven states in the region.

## MAJOR INITIATIVES

Over the next five years the ORTA plans to initiate five major initiatives. Three of these, the BNL Incubator Facility, the Northeast Utility Initiative and the X-ray Lithography Synchrotron (XLS) program have been initiated. All three are in their infancy and represent major efforts by the ORTA during the next few years. Two others, the Industrial Innovation Extension Service and the Center for Advanced Microelectronic Technology are in the planning stage. Initiation of each should start in FY 1988.

The ORTA has requested additional staffing. If this materializes, plans call for organizing a materials center. The focus of the center will be in an area where BNL has unique capabilities. This center would have a number of industrial participants with the Laboratory acting as an industry resource to assure that research was translated into products and processes as rapidly as possible. Such a center will have an industry focus. Four technologies are under consideration: polymer concrete, radiopharmaceuticals, superconductivity applications and surface chemistry applications.

### *Northeast Regional Utility Initiative*

This initiative grows out of the natural relationship between the historical and ongoing research programs at the Laboratory and the needs of the electric and gas utility industries. Although EPRI and GRI fulfill many of the utility research and support requirements, their focus is national and often regional problems and concerns are not addressed. Where a problem is utility specific, EPRI or GRI will not address it. In addition neither EPRI or GRI have their own research capabilities so that they are always one step removed from the research they fund. It is to fill this gap and to harness the special expertise and facilities at the Laboratory that the utility initiative has been created.

Initially there were scattered work-for-others efforts for utilities. This led to the recognition that there was a natural coupling between the Laboratory and the Industry. A utility advisory committee was formed and a regional workshop was sponsored. Both of these suggested a permanent relationship between the Lab and the research arms of the utility companies. One recommendation was that a Center be established at BNL to systematically review the Laboratory programs and resources and identify activities that will help the utilities meet the problems of least cost electricity and generating requirements a decade hence. It is expected that this Center will be established next year and that in each following year a utility representative will be present at the Laboratory at least half of the time.

Recent advances in high temperature superconducting materials may have significant impact upon technologies in the electric utility industry. Brookhaven has a long history of leadership in superconducting material research and applications. Under review is an effort by Laboratory and utility staff that will provide a window for the utilities on high temperature superconducting materials developments. In particular it is proposed that this effort will identify improved properties of materials that have significant meaning for utilities, the dates at which they might be available, their effect on utility costs and operations, and the research activities required to bring them into being. This effort will be incorporated into the activities of the Center.

### *X-Ray Lithography Synchrotron*

In March, 1986, the ORTA initiated an effort to alert U.S. industry to the existence of accelerator technology at DOE Laboratories that would permit them to overtake and surpass foreign competitors for sub 0.25 micron resolution in the mid- 1990's. The ORTA arranged for a series of workshops that culminated in a planning study for a prototype commercial x-ray source. The construction of the prototype will begin in FY 1988. The ORTA intends to play a continuing role as the interface with industrial partners to transfer the technology.

The method used for this transfer has gained the attention of the International Trade Administration of the Department of Commerce. They are considering using the model developed for the XLS transfer for transfer of superconducting technology to the microelectronics industry.

#### *BNL Mini-Incubator Facility*

The BNL mini-incubator facility is an initiative generated by the ORTA. The concept is that new start-up high technology companies would be greatly benefitted by their proximity to Laboratory staff, availability of Laboratory Research Library facilities, and use of unique Laboratory facilities. It is expected that in the near future, contractual arrangements will be completed with the first occupant of this facility. Not more than two or three other start-ups will be considered. If the facility proves valuable for the first few start-ups it will be used to illustrate that a larger community supported incubator should be established near the Laboratory with the Laboratory as a support facility. It is expected that the ORTA will play an important advisory role in the commercial facility when it is established. The ORTA will also act as a conduit to Federal Laboratory technology and contacts for incubator companies.

#### *New York State Industrial Innovation Extension Service*

New York has initiated a program of four experimental industrial extensions services modeled on the agricultural extension service that performed so well for American agriculture. One of these, located on the Southern tier of the State consists of two agents and is managed by Cornell University. The ORTA has initiated discussions with Cornell to act as a gateway to Federal technology for the agents in that area. This preliminary activity, if useful, is a first step toward a broader interaction. Among future activities under discussion are the development of a resource directory for in-state and Federal resources and direct support of an extension agent on Long Island. Plans for the next stage will be governed by the experience gained in this initial interaction.

#### *Center for Advanced Microelectronic Processing Technology Applications*

This is the most far ranging of the ORTA initiatives. In 1990, when the prototype XLS synchrotron has been built, it will provide beam lines that are optimized for x-ray lithography at 0.25 micron and smaller resolution. The ORTA has proposed that at least one of those beam lines be set aside to support a microelectronic technology applications center. This center would bring together the optimized beam line, the imaging capabilities of BNL's NSLS, the computer aided design capabilities of SUNY at Stony Brook's computer science department, the advanced electronics technology capabilities of Cornell's Nanofabrication Research Center and industrial partners from New York State such as IBM, General Electric, Kodak, Grumman and

Xerox. Industrial partners from outside the State will be welcome and Bell Labs in New Jersey and companies such as Perkin Elmer in Connecticut might wish to participate. All of this would be coordinated by the New York State Science and Technology Foundation. If the Federal Government chooses to become an active partner, Department of Energy and Department of Commerce support may also be available.

The first step toward this Center is to develop a detailed plan and scope the roles and activities for each of the participants. Toward this end the ORTA has held preliminary discussions with the major participants and with the State Science and Technology Foundation and the Department of Energy. The ORTA is preparing a proposal for joint support of a scoping study by DOE, BNL and the State Science and Technology Foundation.