REVIEW DEPARTMENT PROGRAMS RELATED TO INTELLECTUAL
PROPERTY AND TECHNOLOGY TRANSFER TO ENSURE
DEPARTMENT RESOURCES ARE LEVERAGED TO THE
ECONOMIC BENEFIT OF THE U.S.

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February 1995

Prepared by
Pacific Northwest Laboratory and the
National Intellectual Property Law Institute

Prepared for
the U.S. Department of Energy
under Contract DE-AC06-76RLO 1830

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Concept Paper for the U.S. Department of Energy
Office of the Under Secretary for
Technology Partnerships and Economic Competitiveness

**Review Department Programs Related to Intellectual Property
and Technology Transfer to Ensure Department Resources
Are Leveraged to the Economic Benefit of the U.S.**

Prepared by
Pacific Northwest Laboratory
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National Intellectual Property Law Institute

Purpose: Review domestic and international policy, U.S. Intellectual Property (IP) and Technology Transfer (TT) legislation, and related Department of Energy (DOE) programs to ensure Department resources are leveraged to the benefit of the U.S. economy. Mapping such processes should determine if/how foreign governments and/or foreign owned or controlled enterprises, specifically Japanese and to a lesser extent other Pacific Rim nations, are able to access and at times leverage U.S. technology to their benefit. This process will also generate lessons learned that should be useful to government and industry alike in the area of TT. The review will concentrate on technology innovations developed or funded by the Department.

Analysis of information gleaned from the review will allow observations to be made regarding the following:

- Identify barriers imbedded within the existing Department TT processes, whether they be regulatory, social, cultural, economic or bureaucratic, that inhibit U.S. industry from taking advantage of the DOE laboratory system.
- Determine how existing IP and TT processes/programs are vulnerable to manipulation or exploitation by foreign entities, both public and private.
- If specific instances of technology loss to a foreign entity are identified, determine causal factors, and evaluate and illustrate the negative impact on the U.S. economy.
- How existing U.S. IP and TT legislation, Department implementing policies and procedures, international agreements and related technology transfer programs can be enhanced to maximize the economic benefit to the U.S. Develop metrics by which existing program effectiveness can be monitored.

- Identify barriers to overcome and recommend potential modifications to Department policy, procedures or programs that would allow U.S. industry to effectively leverage DOE developed IP or technology to the benefit of the U.S. Such modifications should also serve to inhibit manipulative and/or exploitative access to and/or use of Department innovations by foreign entities. Evaluate the impact of suggested modifications.

Background: The Department of Energy (DOE) is one of the preeminent basic and applied scientific research resources of the U.S. DOE has a broad research mandate from basic research using one-of-a-kind research facilities to demonstration of the commercial viability of energy production or conservation technologies. Because of its weapons production mission, a large portion of DOE's research budget has historically been devoted to materials production and weapons design. DOE's mandate to operate the commercial nuclear waste disposal program for the country and to restore the environment at surplus production sites has led to a strong research program in waste management and environmental restoration technologies.

With the end of the Cold War, the decrease in defense related spending and the increased emphasis in leveraging public funded research to enhance U.S. economic competitiveness, the role and mission of the Department's research and development efforts are shifting. DOE is searching for industrial applications for technologies developed for other government-related end users (e.g., the military, the weapons complex, OGA WFO programs.) The Department, including its laboratory system, is also expending significant effort to make its technological resources available to address a broader range of national needs. They are partnering with industry to find commercial applications for technologies resulting from basic research or applications intended to solve a specific DOE problem.

While the U.S remains a world leader for scientific and technological innovation, research and development and remains on the leading edge of technology to whom other

nations frequently turn, this is a two edged sword. Logic will dictate that since we are on the leading edge of basic scientific research and technological development, this should give us the competitive edge not only in the U.S. market, but also on a global scale. While this historically has been true, recent history paints a slightly different picture, one where foreign entities have been able to utilize U.S. technological developments and innovations to their benefit, as exemplified repeatedly by the Japanese. To a large extent these foreign government or corporate entities are able to take unfair advantage of U.S. developed technology in full compliance with U.S. law with the end result being that a foreign economy benefits from U.S. technological developments.

This of course, if not properly managed, can be counterproductive to U.S. interests. There are many factors involved that not only allow, but at times facilitate acquisition of innovative concepts by foreign entities, while at the same time act as social, cultural, economic, bureaucratic, or regulatory barriers that effectively deny use of the same technologies to U.S. industry. While the Department must remain in compliance with existing IP and TT legislation, there are two perspectives that Department policy and implementing procedures should be viewed from. One is the court of law and is compliance oriented. The other is the *court of equity*, which if overlooked can easily result in the development of policy and procedures that while they ensure compliance, may actually disadvantage U.S. interests.

In June 1994, DOE established a new high-level office, the Office of Technology Partnerships and Economic Competitiveness, which serves to highlight the importance Secretary O'Leary has attached to this subject. This office will play an essential role in coordinating partnerships between DOE science and technology programs and industry. Its primary goal is to bolster U.S. economic competitiveness in the global marketplace by leveraging the DOE laboratory system (a national asset) to this end.

In order to strengthen the Department's ability to protect IP, while at the same time transferring technology in a manner that optimizes U.S. economic interests, the

Secretary's revitalized emphasis on leveraging the Department's resources to bolster U.S. economic competitiveness is expected to focus on the following:

- Strengthen Department IP and TT implementing policies and procedures to minimize the ability of a foreign entity to unfairly capitalize on U.S. developed technology, thereby ensuring that such innovations enhance U.S. economic competitiveness in real and measurable terms.
- Eliminate those barriers that inhibit U.S. industry from taking advantage of Department resources and capabilities.
- While existing programs and recent initiatives appear to be performing admirably, it may be necessary to revise existing programs that unilaterally determine the technology needs of U.S. industry and then apply Department resources to meet those needs. Envisioned is a proactive approach that brokers existing technologies available in the DOE laboratory system that meet a clearly defined industrial need.
- Realizing that the Department has made considerable progress over the last few years, build on and, if necessary, revise existing programs that jointly determine technological needs of U.S. industry and then apply Department resources to meet those needs (e.g., the CRADA program). Metrics need to be developed to accurately measure the effectiveness of these programs and their contribution to the U.S. economy. Concurrent engineering concepts are examples of how basic and applied research can be carried out to meet diverse needs. Government and industry can work together to solve technological problems, the resolution of which meets the needs of a U.S. industry end-user.
- Identify potential research to solve technological problems of industry.

Approach/Scope: Based on the mission and functions of the Department's newly formed Office of Technology Partnerships and Economic Competitiveness, Pacific Northwest Laboratory, Richland, WA, proposes to join forces with Dr. James Chandler and the National Intellectual Property Law Institute, Washington D.C., to conduct a holistic review and analysis of Department IP and TT programs. Specifically we would contribute to the mission of this office and the attainment of near and long term goals via the following tasks:

Task 1: Review of domestic and international policy and regulations related to IP and TT that affect partnerships between the Department, industry and others. The review would demonstrate, through generalized illustrative examples, the processes that allow foreign entities to legally capitalize on US developed technology (e.g., the compact disc technology developed at Pacific Northwest Laboratory). Such examples will then be contrasted with illustrative examples of technology that was effectively transferred to U.S. industry, enhancing the competitive edge that industry enjoys in the global market as a result. Comparative analysis will reveal the strengths and weaknesses of current domestic and international policy in these areas.

Task 2: Review of Department IP and TT implementing policy and procedures, and related programs. This in-depth review of selected programs will contribute to the development of a "process map" demonstrating how IP is protected within the Department and how it flows from the Department to the market place. This will facilitate identification and illustration of existing controls mechanisms, built into the processes, to ensure effective implementation within related programs. Conversely, it will also allow identification of possible vulnerabilities that could allow unfair and/or exploitative acquisition of U.S. IP by foreign entities. Mapping and analysis of processes in this manner, once accomplished, allow evaluation of the effectiveness of the process generally and of process control mechanisms specifically. Process mapping also facilitates identification of opportunities for modifications designed to enhance effectiveness while at the same time strengthening their defensive aspects. Analysis of

process modifications identified, to include cost/benefit analysis, will be accomplished to determine the potential impacts on the Department should those modifications be implemented. Such a process would also yield information relevant to the development of metrics to evaluate the effectiveness of the programs reviewed and validate the prior cost/benefit analysis.

Task 3: Make recommendations to streamline and improve technology partnership processes to ensure technology transfer is efficient, effective and that such transfers are leveraged to benefit the U.S. versus foreign entities. Attempts will be made to deal with the issue of multinational corporations and how to leverage TT to such entities so that it contributes to the U.S. economy, again striving to develop that process and metric which includes consideration for the "*court of equity!*"

Task 4: Develop sufficient information to assist with or develop metrics that effectively evaluate the Department's contribution to U.S. economic competitiveness. While some metrics will be required to measure the attainment of Department goals and objectives, others must measure the Departments TT programs contribution to the economic competitiveness of the US. While no one metric can measure such contributions, perhaps a blending of metrics to measure various facets of the Departments contributions is appropriate. Possible metric options would logically be: creation/elimination of jobs, balance of trade, gross domestic product (GDP), increased/decreased market share, return on investment, etc..

Task 5: The program review should develop sufficient information to identify Department and industry needs relating to proactive communication and/or more proactive technology brokering mechanisms that will facilitate technology transfer.

Task 6: The use of competitive intelligence and industrial analysis to forecast technology needs of U.S. industry can facilitate proactive brokering of TT to U.S. industry. Conversely, results of the same analysis could assist in the identification of those

technological developments within the Department that should receive additional defensive measures to ensure they are leveraged to enhance U.S. interests.

Other Program Reviews and Analyses: We would also suggest a review of Department programs that while not under the Office of Technology Partnership and Economic Competitiveness' direct purview, can contribute to or detract from the Department's contribution to U.S. economic competitiveness. For example, we would recommend review of the below listed programs that could have a direct bearing on this analysis:

- Review of programs involving foreign funded research at Department facilities to assure suitable precautions against loss of IP.
- Review of the foreign visits and assignments program to determine if such exchanges unnecessarily expose or result in the loss of IP.

Key Staff:

Proposed staff from PNL's National Security Directorate and the National Intellectual Property Law Institute. (to be finalized at the time of acceptance)

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Industrial/Competitive Economics: Orman Paananen

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Deliverables:

- Report documenting the following
 - review of international and domestic IP and TT policy highlighting strengths and weaknesses of existing legislation
 - review of Department implementing policies, programs and procedures
 - comparative analysis of how implementation within the Department complies with domestic policy and stated goals of this administration and the Department
 - barriers (bureaucratic, social, economic, cultural, regulatory, etc) to transfer of technology to US industry
 - process map for IP and TT programs
 - recommendations pertaining to process modification and analysis of impacts that would result should those modifications be implemented and measurables to monitor the effectiveness of such recommendations
- Develop metrics for evaluating effectiveness of DOE's IP/TT processes and their contributions to the economic competitiveness of U.S. industry
- From the lessons learned, develop proactive process models to link Department technological innovations with industrial needs.