

Licensing Federal Technology From Oak Ridge Lab

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Martin Marietta's aggressive program to transfer public technology well accepted

The Patent Policy of the United States Government continues to undergo changes designed to stimulate increased commercial application of technologies developed by federally-sponsored R&D programs.

The first change in 1980 was enactment of the Bayh-Dole Act, amendments to the Patent Act. These provisions allow nonprofit organizations and small-business government contractors to retain title to inventions conceived while under contract to the Federal Government to conduct research. The act also included an initial effort to set up rules for exclusive, royalty-bearing licensing of federally-owned inventions. After two years' experience under Bayh-Dole, President Reagan issued an Executive Order in 1983 to expand the scope to large for-profit contractors.

Congress again took up the issue in November 1984 with passage of P.L. 98-620, wherein the disposition of rights by waiver was extended to government-owned, contractor-operated research or production facilities. The restriction to small businesses or nonprofits remained. However, the five-year licensing period restriction was removed from the statutory provisions so that licenses could be granted for longer, more equitable periods of time, from a licensee's point of view.

On February 5, 1985, Department of Energy Secretary, Donald T. Hodel, signed a new department Patent Policy for the Department of Energy. It stated that it is the policy of the department to allow contractors to retain title to inventions to

the extent possible, consistent with the President's memorandum on Patent Policy, applicable statutory authority and mission requirements.

TECHNOLOGY TRANSFER PROGRAM

The Oak Ridge National Laboratory, the Oak Ridge Y-12 Plant, and the Oak Ridge Gaseous Diffusion Plant in Tennessee, and the Paducah Gaseous Diffusion Plant in Paducah, Kentucky, are operated by Martin Marietta Energy Systems, Inc. (Energy Systems), a subsidiary of Martin Marietta Corporation, for the U.S. Department of Energy under a management and operating contract with the DOE. These government-owned-and-contractor-operated facilities include a large interdisciplinary research and development program.

Within a month after assuming the management and operating contract in April 1984, Energy Systems submitted a request for an advance blanket patent waiver to the Department of Energy. Its provisions provided for Energy Systems to license many of the inventions emanating from the facilities to outside commercial concerns. All of the incomes derived from such licensing would be devoted to the Department of Energy's program of technology transfer and, thus, not inure to any benefit or use of Energy Systems or its parent company. The title to these proprietary rights would be assigned to any successor contractor to the facilities. It would leave the title to the patent rights in the hands of the party managing and operating the DOE facilities so as to assure that any technical assistance as may be necessary under the

licensing arrangements shall continue. There are some special restrictions on technology transfer of some technologies from production facilities. Therefore, this article will deal mostly with technologies emanating from the Oak Ridge National Laboratory.

The Energy Systems Technology Transfer Program includes proposals to remunerate inventors of inventions to stimulate interest in innovation and the transfer of such innovations to the private sector for commercial use. An aggressive program has been undertaken to evaluate technologies emanating from these DOE facilities included in the prime contract with the DOE to determine the potential uses for such technologies and to aggressively solicit potential licensee interest in such innovations. This has resulted in the selection of some technologies that are thought to have widespread commercial application and drafting of a licensing strategy designed to maximize the commercial penetration of these technologies in the private sector. Additionally, the strategy is to seek royalty-bearing license agreements with those outside potential licensee candidates who exhibit the capabilities for rapidly commercializing some of the technologies emanating from the DOE facilities.

LICENSING

One of the technologies initially selected was a series of innovations related to various nickel aluminide alloys, particularly for high-temperature applications. An exclusive field-of-use approach to

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licensing this technology was adopted, and the primary patent rights associated with this technology were waived by the Department of Energy to Martin Marietta Energy Systems, Inc.

Energy Systems adopted a hybrid of a normal, commercial license and clauses the DOE needed to license proprietary rights emanating from the Oak Ridge facilities. It was considered essential, where significant additional investment is necessary, to take the product emanating from the laboratory to the production line of a private concern and to issue an exclusive license in the field of use to which the licensee would subscribe. Since the government always retains a nonexclusive, paid-up, royalty-free license for governmental purposes, this takes the form of a sole, nonexclusive commercial right instead of an exclusive right.

Martin Marietta Energy Systems, Inc. is committed to licensing U.S. rights only to those firms that will produce the commercialized product substantially in the United States for U.S. consumption. It is hoped this approach will enhance the ability of U.S. companies to compete in international markets through the use of federally-owned inventions in the United States.

The grants, records and reports, and royalty provisions of these agreements are expected to be negotiated by the parties and, generally, in accordance with normal commercial practices. However, there are differences that are necessary since it is a national laboratory-originated technology that is being licensed. This is often reflected in business terms designed to require commercial use and market penetration of the invention in the private sector with off-setting provisions for royalty-free governmental-use market penetration.

Technical assistance provisions of the agreements are very important to most licensees. These provisions assure that the licensee has the necessary backup to use the technology commercially in the private sector, which would guarantee minimum royalty requirements and minimum commercial-use provisions. Many times this includes

work-for-others contracts with the laboratory, consultation of laboratory scientists who worked on the project, and perhaps technical exchange meetings.

Energy Systems agrees to extend to the licensees any improvements or modifications that occur during the license life. This assures licensees the greatest possible benefit from the use of the federally-owned inventions by providing licensees with the most up-to-date technology available. At the end of the normal term of the agreement, it is expected that licensees will obtain a paid-up license to all improvements and modifications developed during the term of the agreement, which will generally run for 20 years or the last to expire of the rights licensed.

In exclusive licenses the licensee is asked to agree to a reciprocal grant of rights to improvements and modifications of the basic licensed inventions. This allows Energy Systems to license other fields of use with regard to all inventions that may arise while providing the licensee with rights to improvements and modifications in licensee's field of use from the licensor and other fields of use licensees. It is hoped that this approach will spur additional development.

It is important that the government not be saddled with any significant liability from a licensing program. Therefore, any agreement to be propounded to a prospective licensee includes representations, warranties and disclaimer clauses that shift responsibility to the licensee.

Infringement of the licensed rights by third parties are policed jointly, with Energy Systems having the option to control litigation. In nonexclusive licensing, it is anticipated that a royalty pool will support policing efforts by Energy Systems. In either case, there are commitments to police the rights licensed.

PATENT LICENSING

Late in 1985, Martin Marietta Energy Systems, Inc. announced the licensing of the waived nickel

aluminide patent rights on an exclusive basis to Cummins Engine Company, Inc., of Columbus, Indiana, for use in large displacement diesel engines and associated machinery. This established that Energy Systems, a large for-profit corporate contractor for the Department of Energy could negotiate an exclusive field-of-use patent license agreement such that a licensee was ultimately willing to accept the license and sign the agreements. In July 1987, another nickel aluminide license was announced with Armada Corporation for electrical-resistance heating elements. Licensing agreements in other fields-of-use are actively solicited by Energy Systems for this nickel aluminide technology. In fact, there has been interest shown in several other fields of use, and it is expected that other licensing agreements will be consummated in a fashion that will permit and require actual commercial use of a federally-owned invention in the private sector.

◀ Start Licensing ▶

Soon after the start-up of the nickel aluminide licensing program, Martin Marietta Energy Systems, Inc. started up a licensing program based on a silicon carbide whisker reinforced alumina material to be used in various fields of use but particularly in ceramic cutting tools and wear parts. This licensing program was established on the basis of a nonexclusive field-of-use approach to licensing various fields of use for the ceramic materials. The most immediate field-of-use opportunity appeared to be in cutting tool inserts. A specimen nonexclusive patent license agreement was worked out with the DOE.

That agreement is different in many respects from exclusive agreements, particularly in the area of enforcement of rights. A defense-pool concept was utilized to provide for defense of the patent as well as prosecution of infringement actions. This concept relies on the willingness of licensees to agree to kick in sufficient funds to the defense pool to assure that the patent will be defended and/or infringement pursued.

Another unusual feature of this arrangement is that the commercial use and royalty provisions are designed to maximize market penetration of the product, particularly in the private sector. The agreement is also designed to assist in expansion of use of this material in the public sector. A number of such license agreements have been executed with minimal changes to the basic concepts of the agreements.

The first two agreements were with Atlantic Richfield Corporation, and Arco Chemical Company of Greer, South Carolina, in June 1986. Subsequently, companies such as American Matrix, Inc., Knoxville, Tennessee; Dow Chemical Company, Midland, Michigan; High Velocity Tool Company, Waterford, Wisconsin; and Iscar Ceramics, Inc., Livonia, Michigan, executed licenses based on this technology for wear parts, ceramic cutting tool inserts, or both fields of use. Additionally, negotiations continue in other fields of use, as well as additional licenses in these fields of use.

At times it is difficult to determine the exact intended use of the material. This made field-of-use grant clauses difficult to draft. In these cases we inserted a "hunting clause" to allow the licensee to look at fields of use that are newly discovered. The licensee presented a commercialization plan that assured Energy Systems and the DOE that a new private sector market will be penetrated within some reasonable period of time. At that point a new field-of-use grant clause would be drafted and a new license executed.

Another technology that has been licensed is one based on a new type of ceramic gripper for tensile testing of ceramic materials, which was licensed in September 1986 on an exclusive patent license to Instron Corporation for inclusion in its equipment.

Other technologies being reviewed for licensing include osmium/iridium generators for medical applications, a whole-blood sampling apparatus, biochemical processes and biocatalyst systems, lead iron phosphate glass composition, zirconia insulation materials, fiber

optic coupling systems, explosive sensors, ultrasonic sensing and ranging systems, new computer architecture, brain and heart imaging radiopharmaceuticals, motor current signature analysis systems, various heat pump designs and many more which result from the large interdisciplinary research and development program going on in Oak Ridge, Tennessee.

COPYRIGHT LICENSING

In its technology transfer program for the Department of Energy, Energy Systems quickly realized that copyright licensing might be as important, if not more important, than patent licensing, with regard to federally-owned technologies. For example, many valuable computer source codes emanate from the laboratory for which it is expected that copyright licensing will be the primary vehicle to seek use of these source codes in the private sector for commercial use. Several of these packages have been assembled and are now being circulated to solicit potential licensee interest.

It is noteworthy that the areas between copyrighted source codes and patented technologies have yielded a mixed type of arrangement wherein there may be patent coverage as well as copyright coverage for the package of materials that appear to be licensable. One such package was assembled with regard to a Fiber Optic Luminescope, which is a portable analytical instrument to detect hydrocarbons. It is a very useful device in environmental and health and safety areas of use.

The capital investment requirement was in a range small business could handle and the market was right for a small business, and not as favorable for a larger company, so a small, local company was solicited to license this package. This approach provided local community development to the Knoxville/Oak Ridge area, additional tax base for those areas, and additional jobs. It was considered important that a local business be involved, because of the readily available technical assistance to provide a

higher probability of success.

Late in 1985, Martin Marietta Energy Systems, Inc. signed a license agreement for the package to Environmental Systems Corporation of Knoxville, Tennessee. The license agreement was exclusive and sets minimum commercial use requirements, as well as royalty requirements, for the actual commercial use.

In early 1986, Martin Marietta Energy Systems, Inc., signed a license agreement on an exclusive basis with a second small business, AnFlow, Inc., of Oak Ridge, Tennessee. The technology pertained to a waste treatment technology based on the use of bacteria to break down pollutants in liquid waste. The process takes place in an oxygen-free environment as sewage flows up through a treatment chamber where the bacteria attached to inner stationary packing materials in the chamber convert the waste into methane and carbon dioxide. It is expected that this licensing arrangement will take this process from a demonstrated, scaled-up process in a 50,000-gallon-per-day facility, which was demonstrated in the early 1980s in the Knoxville area, to a fully commercialized process and system.

In May 1986, Energy Systems announced a license agreement with Ontario Hydro of Ontario, Canada, for a Radioactive Material Shipping Cask design, which was developed at the laboratory for the shipment of such materials in the United States. This was a straight, nonexclusive copyright license agreement in which Ontario Hydro obtained rights to utilize these materials and to further reproduce those materials incident to manufacture of the casks.

In October 1986, Energy Systems licensed its first major piece of software on a service provider contract in an exclusive arrangement with Future Tech Corporation of Oak Ridge, Tennessee. The laboratory, more particularly the Gaseous Diffusion Plant at Oak Ridge, did not want to continue operating and maintaining the source code for the benefit of outside parties, so a small, local company was sought. Future Tech Corporation agreed to

do this for outsiders as well as the government on an exclusive basis for Martin Marietta Energy Systems, Inc., so as to provide basic support for additional nonexclusive license agreements for use of the software, which was designed for very large analytical chemistry laboratory systems to handle specimens and samples. Future Tech also agreed to report results of testing.

A reason for reviewing these license agreements is that Martin Marietta Energy Systems, Inc., a large for-profit DOE management and operating contractor, is attempting to license technology to the private sector finds enticing and profitable. It is our sincere belief that if the licensee finds the license arrangement profitable to his organization, we will in turn secure for the DOE the widespread commercial use of the invention in the private sector in accordance with DOE desires. Therefore, Martin Marietta Energy Systems, Inc. does not hesitate to consider new approaches to such licensing activities and to review the terms and conditions to tailor them to each individual situation. It is hoped that this will provide the parties to the agreement with sufficient incentives to enter into the agreements and provide for a long-term relationship.

It is also an attempt to increase the probability factors for success of transferring the technology to the private sector. All of these agreements are based on the concept that products for use or sale in the United States must be substantially manufactured in the United States.

As with all such licensing agreements negotiated by Martin Marietta Energy Systems, Inc., the business terms of such arrangements are maintained in confidence and cannot be discussed here in detail. Suffice it to say that, at present, the licensing arrangements consummated by Martin Marietta Energy Systems, Inc., on behalf of the Department of Energy, have brought in significant amounts of royalties. It is hoped that this early success with the Technology Transfer Program will continue and that additional potential licensees will

see that dealing with a contractor for the Department of Energy, with regard to federally-owned inventions may be significantly facilitated by the technology transfer programs of the Department of Energy, as implemented by its contractors.

OAK RIDGE NATIONAL LABORATORY INTERACTIONS WITH INDUSTRY

In accordance with DOE desires, Martin Marietta Energy Systems, Inc., as the DOE contractor for the Oak Ridge facilities, is attempting to increase interactions with private industry and to transfer federally-owned technologies to the private sector. In addition to the licensing of such inventions to the private sector concerns, the Laboratory does have some user facilities which may form the basis of a project that would assist a licensee in commercializing the licensed invention or assist a private firm in some particular area of research for which the equipment or facility is not readily available.

Oak Ridge now has 12 of these designated facilities which relate to Atomic Physics and Tandem Accelerator, a Health Physics Research Reactor, a High Temperature Materials Laboratory, the Hollifield Heavy Ion Research Facility, the Low Temperature Neutron Irradiation Facility, the National Center for Small Angle Scattering Research, Neutron Scattering Facility, the Oak Ridge Electron Linear Accelerator, the Oak Ridge National Environmental Research Park, the Roof Research Center, the Shared Research Equipment, and the Surface Modification and Characterization Collaborative Research Center.

There are some standard user agreement forms for both proprietary and nonproprietary research at these facilities. These should spur more interactions between the Oak Ridge facilities personnel and private sector firms.

Another area wherein the parties can establish technical assistance as set forth in the license agreements is what we call a Work-for-Others Agreement wherein the outside party desires something specific to

be done at the Laboratory. Upon obtaining approval from the DOE and the signing of Work-for-Others Agreements, this work can be done at the facilities. Again, these Work-for-Others Agreements are available to licensees as well as other private sector firms and other federal agencies to conduct research at the Laboratory.

◀ Collaborative Research ▶

Another more recent area is that of collaborative research wherein the parties may get together on a joint research program with each party doing its own research in its own facilities and combining the results to the benefit of both the Laboratory and the outside collaborating party. One such arrangement recently concluded is one in which Martin Marietta Energy Systems, Inc. licensed technology related to an advanced servomanipulator to a small, local firm, Remote Technology Corporation of Oak Ridge, Tennessee. This was done in the form of a patent license agreement, a copyright license agreement, both which were exclusive in nature, and a collaborative agreement between the parties to spur on the development of the commercial embodiment that Remotec, the licensee, will market. This was a considerably more complicated contractual arrangement between the parties for the transfer of a technology. But these arrangements were put together with the thought that this arrangement will maximize the potential for success of transferring this technology to the private sector and seeing it used commercially.

In conclusion, Martin Marietta Energy Systems, Inc., as the management and operating contractor for the DOE Oak Ridge facilities, is attempting an aggressive program of technology transfer to the private sector of federally-owned technologies emanating from the Oak Ridge facilities. With the 15 licenses in force at present, it can certainly be said that the mix of programs and contractual arrangements, which Energy Systems is offering, are being favorably considered by private sector concerns.

While the program is really just beginning to build momentum, Martin Marietta Energy Systems, Inc. views the program with con-

siderable optimism in terms of the possible, ultimate success for transfer of widely varied innovations emanating from the Oak

Ridge facilities. If your company has not already reviewed the technologies available at Oak Ridge, it would be wise to do so.