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MEMORANDUM

April 28, 1983

TO: U.S. Nuclear Regulatory Commission

FROM: Doub and Muntzing, Chartered

RE: Proposed Sterling Forest Operating License Transfer
to a Subsidiary of Medi-Physics.

The purpose of this memorandum is to analyze proposed license conditions accompanying a transfer of the operating license for the Sterling Forest research reactor from Union Carbide to a subsidiary of Medi-Physics, Inc., a wholly-owned subsidiary of Hoffmann-LaRoche, Inc.

I. Proposed License Transfer

In an agreement dated April 10, 1981, Union Carbide Corporation agreed to transfer, with the approval of the Nuclear Regulatory Commission ("NRC"), its operating license for the Sterling Forest, New York research reactor to a subsidiary of Medi-Physics, Inc. ("Medi-Physics"), a Delaware corporation. Medi-Physics is a wholly-owned subsidiary of Hoffmann-LaRoche, Inc., a New Jersey corporation, which is owned by Curacao Pharmholding, N.V., ("Curacao") a Curacao corporation. Curacao is wholly-owned by Sapac Ltd., a New Brunswick (Canada) corporation. Sapac is publicly owned, with its shares traded as a unit with the shares of F. Hoffmann-LaRoche and Co., Ltd., a corporation registered in Switzerland.

The Sterling Forest research reactor is rated at five megawatts and is employed for the fabrication of radio-pharmaceutical products used by the medical industry. A major product of the reactor is molybdenum-99. Sterling Forest accounts for fifty (50%) percent of the molybdenum-99 medical requirements in the United States, Japan and western Europe. A reactor near Ottawa, Canada, operated by Atomic Energy Canada, Ltd., is the only other North American facility producing fission product molybdenum-99.

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Table A below shows the portion of the United States requirement for medical radioisotopes supplied by the Sterling Forest facility:

TABLE A

<u>Medical Isotope</u>	<u>% of Total Demand</u>
Mo-99/Tc-99m	50%
I-131	50%
Xe-133	30%
I-125	50%

The number of diagnostic procedures that use isotopes from the Sterling Forest facility are as follows:

<u>Procedure</u>	<u>No./Yr.</u>	<u>% Union Carbide Con- tributes of Total Proceeds</u>
<u>Mo-99/Tc-99m Diagnostic Scans</u>		
Brain	798,000	50%
Liver/Spleen	1,424,000	50%
Bone	1,811,000	50%
Thyroid	236,000	50%
Lung	756,000	50%
Heart	630,000	50%
Kidney	<u>186,000</u>	50%
TOTAL	5,841,000	50%
<u>I-131 Diagnostic Scans</u>		
Thyroid	187,000	50%
Kidney	<u>51,000</u>	50%
TOTAL	238,000	50%
<u>Xe-133 Lung Scans</u> ¹	412,000	30%
I-125 Radiomunoassay ²	120,000,000	33%

¹/Market Measures, Inc., 3rd Quarter 1980 - 3rd Quarter 1981, (Quarterly Reports of Products Used for In-Vivo Radiodiagnostic Procedures Performed In U.S. Hospitals - By Organ).

²/Based on I-125 Customer's Share of In-Vitro Market as Reported in IMS America, 4th Quarter 1979, Hospital and Private Laboratories Survey, P. 344.

The Sterling Forest reactor is the only privately owned nuclear reactor in the world producing commercial quantities of radioisotopes for medical diagnosis and other research purposes. All other reactors producing isotopes in commercial quantities are owned and operated outside of the United States by foreign government agencies. It would not be in the best interest of the United States to interrupt the major domestic source of the isotopes which enable these procedures.

The countries listed below have one or more operating nuclear research or test reactors that were exported from the United States, using United States technology, in accordance with the export provisions of the Atomic Energy Act:

Austria	Holland	S. Korea
Bangladesh	Iran	Spain
Belgium	Italy	Switzerland
Brazil	Japan	Sweden
Canada	Malaysia	Taiwan
Columbia	Mexico	Turkey
Denmark	Morocco	Venezuela
Finland	Pakistan	West Germany
Great Britain	Philippines	Yugoslavia
Greece	Rumania	

The nuclear research reactors listed above were constructed, fueled and operated under the same statute, Section 104(d) of the Atomic Energy Act of 1954, as amended, that creates problems regarding the license transfer of the Sterling Forest reactor to Medi-Physics. Their existence represents a contradiction in United States law and policy. Thus, failure to prevent the decommissioning of the reactor at Sterling Forest may result in depriving this nation's medical community of a much needed service.

From the standpoint of safeguards and non-proliferation, the Sterling Forest reactor does not lend itself to clandestine operations. First the quantity of weapons grade plutonium produced by operation of the facility results in extremely insignificant quantities combined with other elements. In order to separate any quantity of weapons grade plutonium, a reprocessing facility would be necessary. Even then, only miniscule amounts of plutonium would result.

Highly enriched uranium (i.e. over 90 percent) is used for the Sterling Forest reactor core and targets. However, there is a study under way by Argonne National Laboratories to devise a means for using low-enriched uranium in the reactor core. Assuming the Argonne study is successful, neither a safeguards nor a non-proliferation threat would be posed by the presence of low-enriched uranium in the reactor's core. The use of low-enriched uranium for targets would require complete redesign of the chemical separation process whereby fission product molybdenum-99 of suitable purity is

isolated. A minimum of two years and a few hundred thousand dollars would be required to test the feasibility of using low-enriched uranium for isotope targets, much less as fuel. Each of these moves to low-enriched uranium would be commercially difficult. Nonetheless, even with its present core, the reactor produces a low amount of plutonium which the licensee by agreement cannot allow to reach strategic quantities.

In accordance with the agreement executed April 10, 1981, UCC agreed to operate the Sterling Forest reactor through its subsidiary Union Carbide Subsidiary B, Inc. ("Sub B") for a period not longer than six (6) years, during which time Medi-Physics would pursue a reactor operating license from NRC. If Medi-Physics or its wholly-owned Delaware subsidiary Cintichem, Inc. is not approved for an operating license within the six year period, UCC will decommission the Sterling Forest reactor.

II. License Transfer Under Existing United States Law and Regulations

Subsidiary B, Inc. holds the operating license for the Sterling Forest reactor. The operating license was granted under Section 104(d) of the Atomic Energy Act of 1954, as amended, which states:

No license may be issued to an alien or any corporation or other entity if the Commission knows or has reason to believe it is owned, controlled, or dominated by an alien, a foreign corporation or a foreign government. In any event, no license may be issued to any person within the United States if, in the opinion of the Commission the issuance of the license to such person would be inimical to the common defense and security or to the health and safety of the public.

The Atomic Energy Commission/NRC history of interpretation of Section 104(d) has been to allow participation by foreign entities in U.S. nuclear activities, provided that participation was conditioned sufficiently to prevent the subjugation of the U.S. entity's will to that of an alien, to assure compliance with AEC/NRC laws, rules and regulations and to insure that none of the anticipated U.S. activities would be inimical to the common defense and security of the United States.

A landmark Atomic Energy Commission case treating the issue of ownership control or domination of a U.S. production or utilization by a foreign corporation was In the Matter of General Electric Company and Southwest Atomic Energy Associates

("SEFOR" case) 3 AEC 99 (1966). In that case, the General Electric Company and Southwest Atomic Energy Associates, an Arkansas joint venture composed of utility companies ("SAEA"), filed a construction permit application with the AEC. The construction permit was needed to build the SEFOR test reactor in conjunction with the AEC fast breeder reactor program. Gesellschaft Fur Kernforschung, a Germany non-profit association ("GK"), had agreed to contribute 50 percent of the SEFOR construction expenses pursuant to a contract with SAEA. SAEA was bound under the contract to advise and consult with GK on all issues that might influence construction costs. GK could also nominate technical persons to aid in the design and construction of the reactor and its breeder program. GK was not a shareholder in either GE or SAEA. At the trial level, the Atomic Safety and Licensing Board revoked a previously issued construction permit on the ground that the SEFOR project was under the control and domination of GK, an alien corporation. In reversing the Atomic Safety and Licensing Board, the AEC stated:

In context with the other provisions of § 104(d), the limitation should be given an orientation toward safeguarding the national defense and security. We believe that the words "owned, controlled, or dominated" refer to relationships where the will of one party is subjugated to the will of another, and that the congressional intent was to prohibit such relationships where an alien has the power to direct the actions of the licensee.

The board erred in failing to take into consideration the many aspects of corporate existence and activity in which control or domination by another would normally be manifested in giving undue significance to the voice and influence afforded contractually to Gesellschaft in the program execution. The ability to restrict or inhibit compliance with the security and other relations of AEC, and the capacity to control the use of nuclear fuel and dispose of special nuclear material generated in the reactor would be of greater significance. In the matter of General Electric Company and Southwest Atomic Energy Associates, 3 AEC 99, 101 (1966). [emphasis supplied].

The Commission then concluded:

We believe that the Board failed to give proper consideration to the provisions of the contracts other than the SAEA-Gesellschaft contract in reaching the finding of alien domination. The effect of those

contracts is to retain positive control of the project in the Commission and in the General Electric Company. It is provided that nothing in them is intended to confer upon Gesellschaft any measure of control over SEFOR or the related research and development program. Id., 102.

Thus, the Commission in its leading case on ownership, control and domination defines it as "the subjugation to the will of another" and mandates an examination of contractual provisions that result in control and domination in reality. Therefore, to insure that there may be no question of the subjugation of the will of a subsidiary of Medi-Physics to a foreign corporation, the license conditions offered above are proposed.

The Commission further upheld the participation by a foreign entity in U.S. nuclear projects in the General Atomic case. By an agreement dated November 19, 1973, Gulf Oil Corporation ("Gulf") and Royal Dutch/Shell formed a joint venture in the nuclear energy field to conduct the business then under the aegis of Gulf Energy and Environmental Systems Company, Gulf General Atomic Company and Gulf Environmental Systems Company, all part of Gulf Oil Corporation. Two U.S. partnerships were involved. The partnership conducting the U.S. business was organized under the California Uniform Partnership Act, and was wholly-owned by Scallop Nuclear and Gulf in equal shares. Scallop Nuclear Inc. was a Delaware corporation whose shares were owned by Scallop Holding, Inc., a wholly-owned subsidiary of Shell Petroleum N.V., a Netherlands company which was owned 40% by Shell Transport and Trading, a British group and 60% by Royal Dutch Petroleum, a Dutch business association.

The U.S. partnership was established to conduct the interests in and rights to several facility licenses issued pursuant to Section 104 by the Commission, including licenses for three TRIGA reactors, the Barnwell nuclear fuel reprocessing plant and certain reactor component export licenses required for a Rumanian TRIGA reactor. Gulf requested the Atomic Energy Commission to transfer these licenses to the U.S. partnership. Gulf had also acquired 100% of the stock of the Gulf United Nuclear Fuels Corporation ("Gulf United"), formerly owned 57% by Gulf and 43% by United Nuclear Corporation, liquidated such corporation into Gulf, and proposed to transfer to the U.S. partnership two research reactors then held by Gulf United (either through the parent corporation, Gulf, or directly to the partnership).

The property, including the physical assets of Gulf Energy, Gulf General Atomic, and Gulf Environmental Systems, was also to be transferred to the U.S. partnership. The

contribution of Scallop, the Delaware corporation set up by the Royal Dutch/Shell Group to enter into the joint venture, was to be primarily in the form of money.

The license transfer was approved by the AEC Director of Regulation in a letter to General Atomic dated December 14, 1973, which outlined the following license conditions:

- (1) the president and any officers of the partnership having direct responsibility for the control, and any employees having direct custody of, special nuclear material must be U.S. citizens.
- (2) a separate department of General Atomic must be responsible for special nuclear material, and the head of the department must report directly to the president.
- (3) the president shall be charged with the responsibility and exclusive authority of ensuring that the business and activities of the partnership are at all times conducted in a manner consistent with the protection of the common defense and security of the United States.
- (4) the foregoing conditions apply to the partnership and any entities in which the partnership shall have voting control.
- (5) General Atomic will not change any of the foregoing conditions without approval of the Director of Regulation of the AEC or of the person holding any equivalent successor position with the Commission or its successor.

Comment d. of § 27 of the Restatement of the Foreign Relations Law of the United States supports the argument that the laws of the state in which a foreign corporation is doing business apply if the persons who own or control it are nationals of a different state. It is as follows:

d. Corporation owned or controlled by nationals of another state. When the nationality of a corporation is different from the nationality of the persons (individual or corporate) who own or control it, the state of the nationality of such persons has jurisdiction to prescribe, and to enforce in its territory, rules of law governing their conduct. It is thus in a position to control the conduct of the corporation even though it does not have jurisdiction to prescribe rules directly applicable to the corporation.

Therefore, the foreign incorporation of the ultimate parent of Medi-Physics does not initially preclude the transfer of the UCC license to a subsidiary of Medi-Physics.

The proposed license conditions satisfy the major U.S. standards as determined by NRC case law and congressional intent regarding ownership, control or domination by a foreign corporation. First, Medi-Physics and its subsidiary are or will be incorporated in the United States, thus subject to the laws of the states in which business will be conducted and the rules and regulations of the NRC. Second, the license conditions are designed to avoid any threats to the security or common defense of the United States, such as the unauthorized use of special nuclear material. In effect, strategic amounts of radioactive materials may not be maintained at the Sterling Forest site under present license conditions, which requirement would continue subsequent to license transfer. Third, express conditions are proposed that will allow NRC greater control over reactor operations than exists with other holders of production or utilization facilities in the United States. For example, all members of the initial board of the subsidiary of Medi-Physics, in addition to being U.S. citizens, are subject to specific approval by NRC. Next, the SEFOR test for control -- "subjugation to the will of another," -- with regard to activities at the reactor is satisfied. The conditions requiring reports to NRC of shareholder communications in designated areas, and prohibiting communications of specific types of information pertaining to reactor operation to a shareholder or affiliate ensure operational independence for the reactor management.

Finally, as noted in the SEFOR case, Congressional intent in passing Section 104(d) of the Atomic Energy Act was to prohibit those relationships where an alien has the power to direct the actions of the licensee. Here, the proposed conditions safeguard the subsidiary of Medi-Physics from such direction by separating from any shareholder affiliate two of three directors and all officers (except the secretary/treasurer) of the subsidiary of Medi-Physics, who then maintain voting majorities in the decisions of the subsidiary.

Conclusion

The license conditions set forth above, coupled with the inherent ability of the United States and its political subdivisions to regulate an entity doing business within the United States, preclude the subsidiary of Medi-Physics's being subjugated to the will of another for purposes of holding an operating license for the Sterling Forest research reactor.

Likewise the conditions safeguard the common defense and security of the United States. The transfer of the Sterling Forest reactor operating license to a subsidiary of Medi-Physics, with the proposed license conditions, therefore, does not violate the prescribed NRC tests for avoiding foreign ownership, domination or control of a U.S. production or utilization facility.