STATEMENT OF CONSIDERATIONS

REQUEST BY SOLVAY SOLEXIS SpA (SOLVAY) FOR AN ADVANCE WAIVER OF DOMESTIC AND FOREIGN PATENT RIGHTS UNDER DOE GRANT NO. DE-FG36-06GO16033; W(A)-06-007

The Petitioner, Solvay, has requested a waiver of domestic and foreign patent rights for all subject inventions arising from its participation under the above referenced grant entitled "High Temperature Membrane with Humidification Independent Cluster." The Petitioner will be partnering with a small business, Fuel Cell Energy, Inc. (FCE), which is not subject to this waiver request.

The objective of the grant is to synthesize and characterize novel membrane materials, particularly with regard to automotive fuel cell applications. Specifically, the proposed project is to develop a polymer electrolyte membrane (PEM) suitable for operation at elevated temperatures (up to 120°C) and conditions of lower relative humidity (25-50%). Successful development of such high temperature membrane (HTM) will help in achieving system targets for automotive fuel cell applications and contribute to success in combined heat and power applications for stationary fuel cells. Widespread implementation of this technology has the potential to dramatically reduce, or even end, dependence on foreign oil. The objective of phase one of the project is to develop membrane materials which meet the conductivity targets. Membrane materials should demonstrate acceptable conductivity under high temperature and low humidity condition in order to continue into phase two of the project. Solvay's task is to contribute proprietary membrane material and assist FCE in tailoring the material to make a better final product.

The total anticipated cost of the grant is $2,101,191, with a DOE share of $1,499,697, and the total cost share being $601,494, for both phases of this project, which will occur over two budget periods. Solvay's subaward will be $800,000, and Solvay will cost share $400,000, or 50%, of that, leaving $201,494 as FCE's cost share. Solvay's petition states that the total approved budget is $1,300,314 and that the DOE share is $899,871. These figures are for Phase I only. Solvay's cost share of $400,000 is over both phases of the award. This waiver is contingent upon the Petitioner maintaining, in aggregate, the above cost sharing percentage over the course of the agreement.

As noted in its waiver petition, Petitioner is a global leader in the development and manufacture of fluorinated specialty materials with twenty years of experience in the development and production of fluoropolymers. The fully-fluorinated membrane proposed by Solvay is a short side chain perfluorinated ionomer. Solvay's proprietary material, Hyflon® Ion, may be produced using a proprietary hypofluorite process and possesses properties that make it more promising than established ionomers for high-temperature and low-humidification conditions such as in fuel cells. These properties include a higher glass transition temperature that allows continuous operation at 120 ° C or above, and a higher crystallinity that further reduces Equivalent Weight and boosts power output of fuel cells. Solvay has applied for patents to cover post-processing to increase the material's durability. The material retains ionic

conductivity when subject to subfreezing temperatures (down to -40 ° C) as outlined in the DOE 2010 Goals.

Since the late 1990's, Petitioner has invested significant funding and resources for the development of ion conductive membranes, including dedicated investments in fourteen fuel cell test stations and shared equipment, and for such processes as monomer syntheses, polymerization, post treatment, and film-forming inventory. Petitioner plans to continue such resource and funding commitments. This waiver will enable Petitioner to enrich the PEM Fuel Cell market with an additional, more efficient membrane material for stack manufacturers to use in fuel cell applications. The company will offer all products and technology developed under the grant to U.S. customers via its U.S. affiliate, Solvay Solexis, Inc., based in New Jersey.

Referring to item 19 of the waiver petition, Solvay's initial response regarding the U.S. Competitiveness and preference clauses was that it did not intend to manufacture in the U.S. at all. In subsequent discussions regarding the waiver, Solvay indicated that it agrees to the U.S. Competitiveness and preference clauses, and that although it will probably not conduct the manufacturing itself, it will comply with these clauses by licensing the subject inventions to its partner, FCE, or another suitable licensee for substantial manufacture in the U.S.

Although Petitioner does not plan to manufacture products embodying subject inventions in the United States, Petitioner's partner in the project, FCE, does plan to manufacture such products in the United States. FCE is a world leader in the development of carbonate fuel cells and has demonstrated its ability to establish carbonate fuel cell manufacturing facilities in the United States and promote the commercialization of its carbonate fuel cell technology. Should this high temperature membrane development program prove successful and demonstrate likely commercial applications for Solvay's membrane technology, FCE intends to either develop its own U.S. manufacturing capabilities for composite membranes for PEM fuel cells and other applications using advanced materials developed by Solvay under this program, or arrange for domestic U.S. manufacture by appropriate subcontractors or licensees thereof, in compliance with the U.S. Competitiveness clause.

Petitioner has agreed that this waiver shall be subject to the march-in and preference for U.S. industry provisions, as well as the U.S. Government license, comparable to those set out in 35 U.S.C. 202-204. Further, Petitioner has agreed to the U.S. competitiveness provision as attached to this Statement. In brief, Petitioner has agreed that products embodying intellectual property developed under this agreement shall be substantially manufactured in the United States by its partner, FCE, and that Petitioner will not license, assign, or otherwise transfer any waived invention to any entity unless that entity agrees to these same requirements.

Referring to item 10 of the waiver petition, granting this waiver is not anticipated to have any adverse impact on competition. Petitioner does not occupy a preferred or dominant position in the field of membrane technology, and several major manufacturers of such membranes are present worldwide, including the U.S. The commercial availability of Petitioner's membrane material would expand the supply of such material for U.S. stack manufacturers, potentially reducing any anti-competitive effects. Further, the success of Petitioner and its partner, under this

grant, can be expected to stimulate further investment and competition in this technology.

Considering the foregoing, it is believed that granting this waiver will provide Petitioner with the necessary incentive to invest its resources in commercializing the results of the grant in a manner that will make the above technology available to the public in the shortest time. Therefore, upon evaluation of the waiver petition and in view of the objectives and considerations set forth in 10 CFR 784, all of which have been considered, it is recommended that the requested waiver be granted.

[redacted]

Julia Cook Moody
Patent Attorney
Golden Field Office

Date: 17 December 2007

Based upon the foregoing Statement of Considerations and representations in the attached waiver petition, it is determined that the interests of the United States and the general public will best be served by a waiver of patent rights of the scope determined above, and therefore the waiver is granted. This waiver shall not apply to any modification or extension of the grant, where through such modification or extension, the purpose, scope, or cost of the grant has been substantially altered.

CONCURRENCE:

[redacted]

Jo Ann Milliken
Program Manager
EE-2H

Date: 1/8/08

APPROVAL:

[redacted]

Paul A. Gottlich
Assistant General Counsel for Technology
Transfer and Intellectual Property

Date: 1-14-08

U.S. COMPETITIVENESS

The Contractor agrees that any products embodying any waived invention or produced through the use of any waived invention will be manufactured substantially in the United States, unless the Contractor can show to the satisfaction of DOE that it is not commercially feasible to do so. In the event DOE agrees to foreign manufacture, there will be a requirement that the Government's support of the technology be recognized in some appropriate manner, e.g., recoupment of the Government's investment, etc. The Contractor further agrees to make the above condition binding on any assignee or licensee or any entity otherwise acquiring rights to any waived invention, including subsequent assignees or licensees. Should the Contractor or other such entity receiving rights in any waived invention undergo a change in ownership amounting to a controlling interest, then the waiver, assignment, license, or other transfer of rights in any waived invention is suspended until approved in writing by DOE.