

STATEMENT OF CONSIDERATIONS

REQUEST BY W. R. GRACE AND COMPANY FOR AN ADVANCE WAIVER OF DOMESTIC AND FOREIGN PATENT RIGHTS UNDER DOE AWARD NO. DE-EE0004392 W(A) 2011-029

The Petitioner, W. R. Grace and Co. ("Grace"), has requested a waiver of domestic and foreign patent rights for all subject inventions arising from its participation under the above-referenced award entitled "New Reactor Technology for Hydroprocessing Bio-fuels to Produce Gasoline, Diesel, and Jet Fuels." VTT Technical Research Centre of Finland is a subawardee to Grace, and is not subject to this waiver petition. VTT will supply feedstock oil to Grace and does not expect to need a patent waiver. If it does, VTT will submit a separate petition. Oak Ridge National Laboratory (ORNL) and Pacific Northwest National Laboratory (PNNL) will receive federal funds to carry out work under this project.

The objective of this award is to demonstrate and evaluate a new catalytic approach for upgrading bio-oil to hydrocarbon fuels. Hydrodeoxygenation of bio-oil in fixed catalytic beds has been studied for the past 25 years and the successful processing to hydrocarbon fuels has been demonstrated in relatively short-term tests. Grace proposes to evaluate hydrodeoxygenation of bio-oil using a catalytic, three-phase, fluidized reactor known as an ebullated bed. Traditional fixed-bed reactor systems are prone to high levels of coke formation when upgrading bio-oil, which greatly reduces the hydroprocessing activity of the catalyst and can result in poor operational stability in part due to bed fouling. Ebullated bed reactors have been applied industrially to handle problem petroleum feedstocks with high coking potential, such as distillation residuals. Therefore, Petitioner proposes that ebullated bed reactor development with simultaneous hydroprocessing catalyst development will produce a novel catalytic approach for an initial bio-oil hydroprocessing step that will result in a bio-based drop-in replacement to petroleum-based fuels.

The total anticipated cost of the agreement is \$4,328,211, with Grace cost sharing \$929,244, or 21%, and VTT cost sharing \$99,000¹. ORNL will receive \$300,000 in federal funding to complete work under the project, and PNNL will receive \$1,500,000. This waiver is contingent upon Grace maintaining the above cost share percentage.

As indicated in more detail in its petition, Grace is a world leading materials and chemicals company with headquarters in Columbia, Maryland and an annual revenue in 2009 of approximately \$2.8 billion. Grace has two operating segments: Grace Davison manufactures catalysts, chemical additives, engineered materials, chromatography columns, and silica-based products; and Grace Performance Chemicals produces specialty construction chemicals, building materials, sealants, and coatings.

Grace has extensive expertise in the synthesis, development, and scale-up of hydrotreating catalysts that will efficiently and selectively remove oxygen and acidity, leaving behind useful hydrocarbons. This expertise will be brought to bear as Grace works to develop catalysts suitable for the upgrading process, as applied to pyrolysis-derived oils to make


¹ These figures are based on final budget numbers, which differ slightly from the estimates provided in the petition.

transportation fuels. Grace has plans to take commercially viable catalysts developed under this award to the marketplace, utilizing capabilities and resources similar to those it uses for its petroleum-derived fuels catalysts.

Grace 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, Grace has agreed to the U.S. competitiveness provisions as attached to this Statement. In brief, Grace has agreed that products embodying intellectual property developed under this agreement shall be substantially manufactured in the United States, and that Grace 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. According to the petition, granting the waiver will enable Grace to offer unique catalysts and processes to further improve the cost-competitiveness of fuel production from biomass. Furthermore, other companies are actively pursuing alternatives to the ebullated bed catalytic technology proposed in this award. A range of competitive technology options exists for biofuel producers, which will reduce any anti-competitive effects of granting this waiver.

Considering the foregoing, it is believed that granting this waiver will provide Grace with the necessary incentive to invest its resources in commercializing the results of the agreement 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.



Julia Cook Moody
Patent Counsel
Golden Field Office

Date: 4/13/11

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 agreement, where through such modification or extension, the purpose, scope, or cost of the agreement has been substantially altered.

CONCURRENCE:

APPROVAL:



Paul F. Bryan
Program Manager
Biomass Program

Date: 5/27/2011

John V. Lucas
Acting Assistant General Counsel for
Technology Transfer and Intellectual
Property

Date: 5/31/2011

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.