STATEMENT OF CONSIDERATIONS

Request by Ceramatec, Inc. for Identified Waiver of Domestic and Foreign Invention Rights in inventions S-131,264, S-131,265 and S-131,266 made under DOE Cooperative Agreement No. DE-FE0000408 W(I) 2012-014, W(I) 2012-015, W(I) 2012-016 CH-1670, 1671, 1672

The Petitioner, Ceramatec, Inc. (Ceramatec) was awarded a cooperative agreement with DOE for the performance of work entitled, "Shale Oil Upgrading Utilizing Ionic Conductive Membrane". The objective of the work was to process various hydrocarbon (oil) feedstocks including shale oil (oil formed by retorting oil shale), heavy oil, and bitumen by treating with molten alkali metal, either sodium or lithium with pressurized hydrogen or methane. The process improves the properties of the hydrocarbon stream by substantially removing sulfur, metals, nitrogen and reduces the resid fraction. In addition, the scope of the work also included electrochemical regeneration of the alkali metal salts using ionic conducting ceramic membranes.

The subject inventions for which Ceramatec is requesting title are described below:

DOE Case S-131,264: "Integrated Oil Production and Upgrading Using Molten Alkali Metal "

The invention describes an upgrading process using molten sodium as an agent that is integrated with retorting processes and heavy oil production processes. A copy of the invention disclosure is attached as Exhibit "1".

DOE Case S-131,265: "Upgrading Platform Using Alkali Metals"

The invention describes a process for removing sulfur, nitrogen, or metals from an oil feedstock (such as heavy oil, bitumen, shale oil, etc.). The method involves reacting the oil feedstock with an alkali metal and a radical capping substance. The alkali metal reacts with the metal, sulfur or nitrogen content to form one or more inorganic products and the radical capping substance reacts with the carbon and hydrogen content to form a hydrocarbon phase. The inorganic products may then be separated out from the hydrocarbon phase. A copy of the invention disclosure is attached as Exhibit "2".

DOE Case S- 131,266 "Process for Desulfurizing Petroleum Feedstocks and Recovering Alkali Metals"

The invention describes a process for reducing sulfur content in petroleum feedstocks by molten alkali metal with the petroleum feedstock and separating the solids formed from the liquids. The solids are treated and alkali metal sulfides dissolved. Alkali metals and sulfur may be recovered from alkali sulfides in an electrolytic process that utilizes an electrolytic cell having an alkali ion conductive membrane. Applying an electric current oxidizes sulfur in the anolyte compartment, causes alkali metal ions to pass through the alkali ion conductive membrane to the catholyte compartment, and reduces the alkali metal ions in the catholyte compartment. Sulfur is recovered by removing from the bottom of the anolyte compartment. A copy of the invention disclosure is attached as Exhibit "3".

The work under this agreement took place from September 28, 2009 through September 30, 2012. The total amount of the contract was $4,757,779, with Ceramatec providing $951,561 (response to question 7) in cost share or 20%. DOE contributed the remaining $3,806,218 or 80% of the budget.

In its response to question 5 of the attached waiver petition, Ceramatec has described its technical competence in the field of upgrading using molten alkali metals. It states that no other company has achieved as much success in either upgrading or the regeneration of alkali metal as Ceramtec, and that it is the only company that produces a ceramic membrane suitable for low temperature recovery of sodium from sodium sulfide. Ceramatec has also listed two published patent applications and two issued patents that are relevant to this technological field.

Ceramatec, in response to question 6, has stated that it continues to develop the technology under non-Governmental, commercial funding, with Alberta, Canada and Venezuelan entities. The upgrade product resulting from these developments will be destined for the United States market. In response to question 8, Ceramatec states that it will make considerable effort over the next 4-6 years to bring the technology to the level of commercialization. This will include $2-3 million over the next 18 months at the laboratory level, and then an additional $4-8 million for two plants, one in Canada for bitumen and one in the U.S. for heavy oil. It has already obtained private funding to continue with the lab scale work. Ceramatec states that it plans to obtain commercial funding to take the technology through the pilot scale, estimated at $10-15 million. This demonstrates Ceramatec's commitment to the technology and its intent to further develop and exploit the inventions' potential.

In its response to question 10 of the attached waiver petition, Ceramatec states that there is no anticipated effect on market concentration or competition, nor will it be placed in a dominant market position if the waivers are granted. Its technology is an alternative to methods of upgrading such as hydrotreating or solvent separation followed by hydrotreating, or Heavy-to-Light (HTL) process by Ivanhoe Energy. Therefore, there is no evidence that grant of the waiver will have an adverse effect on competition and market concentration.

Ceramatec has agreed to accept the terms of the Large-Business, Confirmatory license, including the Government license, march-in rights and preference for U.S. industry set forth in 35 USC § 202, 203, and 204, and the attached U.S. Competitiveness clause.

Upon evaluation of the waiver petitions for the three subject inventions, in view of all the objectives and consideration set forth in 10 CFR 784, all of which have been considered, it is recommended that the requested waivers be granted.

[redacted]

Mark P. Dvorscak
Deputy Chief Counsel
Office of Intellectual Property Law
Date: February 5, 2013
Revised: 10/15/13 [redacted]

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

CONCURRENCE:

[redacted] 10/15/13

Guido DeHoratiis, FE-32
Director
Office of Oil and Gas Resources

APPROVAL:

[redacted] 11/25/2013

John T. Lucas, GC-62
Assistant General Counsel
for Technology Transfer & Intellectual Property

(t) 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 the DOE that it is not commercially feasible to do so. In the event the 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 agrees that it will not license, assign or otherwise transfer any waived invention to any entity unless that entity agrees to these same requirements. Should the Contractor or other such entity receiving rights in the invention undergo a change in ownership amounting to a controlling interest, then the waiver, assignment, license, or other transfer of rights in the waived invention is suspended until approved in writing by the DOE.