

STATEMENT OF CONSIDERATIONS

REQUEST BY BAKER HUGHES OILFIELD OPERATIONS, INC. ("BAKER HUGHES")
FOR AN ADVANCE WAIVER OF PATENT RIGHTS UNDER DOE AWARD NO. DE-
EE0005505; W(A) 2012-013

Baker Hughes has requested a waiver of patent rights of the United States of America for all subject inventions arising from its participation under the above referenced award entitled "Directional Measurement-While-Drilling System for Geothermal Applications."

The purpose of the award is to develop a reliable Directional Measurement-While-Drilling (MWD) System for the creation of Enhanced Geothermal Systems (EGS). The system to be developed under this award is a probe-based MWD tool for directional drilling that is alternator or battery powered, contains a navigation package capable of measuring inclination and azimuth, and transmits this information to the surface. The project is based on an existing MWD tool that targets high temperature operation. However, the existing tool is not suitable for the 300°C temperatures encountered in EGS drilling.

Baker Hughes has developed a directional drilling system -- consisting of a drill bit, drilling motor, and drilling fluid for the high temperatures encountered while drilling EGS wells. That system, however, lacks any means of communicating directional trajectory to the surface while drilling -- a shortcoming that adds significant time and risk to drilling operations while directional measurements are taken. The main components to be developed under this award are a downhole transmitter, a downhole power system, downhole electronics, and a downhole navigation package. Some or all of these components will be exposed to ambient wellbore temperatures. The objective of this project is to develop the individual high-temperature sub-systems, and then combine these sub-systems in a reliable, fit-for-purpose, directional MWD system for geothermal applications.

The total anticipated cost of the project is \$6,250,000, with Baker Hughes cost sharing \$1,250,000. This waiver is contingent upon Baker Hughes maintaining, in aggregate, a cost sharing percentage of at least 20% during the course of the award. The period of performance for the award is September 30, 2011 through March 31, 2015.


As noted in the waiver petition, Baker Hughes has extensive experience with MWD systems, including MWD telemetry systems, power systems, and directional navigation packages. Baker Hughes has extensive experience and know-how developing these systems for operations at elevated temperatures. Baker Hughes also has extensive experience drilling conventional geothermal wells.

Baker Hughes has made multi-million dollar investments to advance the technology that is the focus of this award. Baker Hughes intends to invest \$1,250,000 of its own resources under this award, plans to commercialize the developed technology, and already has a sizeable patent position in the technology that will be utilized in furthering the development of the technology.

Baker Hughes 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, Baker Hughes has agreed to the attached U.S. Competitiveness provision, paragraph (t). In brief, Baker Hughes has agreed that products embodying a waived invention or produced through the use of a waived invention will be manufactured substantially in the United States unless Baker Hughes can show to the satisfaction of the DOE that it is not commercially feasible to do so.

Referring to item 10 of the waiver petition, granting this waiver is anticipated to have a minimal effect on limiting competition. The waiver will enhance competition in the drilling of geothermal wells. The industry is composed of several leading companies, including Baker Hughes, each of which has developed technology that they are trying to advance and bring to the market. To meet the demands of their respective customers and the competition, each company has brought its advances in technology to market as expeditiously as possible. Participation in this award may produce one or more further advances in the technology, which Baker Hughes will have every incentive to promptly bring to the market to meet commercial competitive forces. Thus, the acquisition of the waiver rights requested would not place Baker Hughes in a preferred or dominant position in the field and is likely to foster additional competition in the field of geothermal formation evaluation services.

Considering the foregoing (*e.g.*, Baker Hughes's technical experience and competence and past and on-going investments in this technology), it is believed that awarding this waiver will provide Baker Hughes with the necessary incentive to invest its resources in commercializing the results of the award 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 awarded.



Julia Cook Moody
Deputy Chief Counsel for Intellectual Property
Golden Field Office

Date: 3/20/12

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 be best served by a waiver of patent rights of the scope determined above, and therefore the waiver is awarded. This waiver shall not apply to any modification or extension of the award, where through such modification or extension, the purpose, scope, or cost of the award has been substantially altered.

CONCURRENCE:

APPROVAL:



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Date: April 17, 2012

Date: 4/18/2012