STATEMENT OF CONSIDERATIONS

REQUEST BY MODINE MANUFACTURING COMPANY ("MODINE") FOR AN ADVANCE WAIVER OF DOMESTIC AND FOREIGN PATENT RIGHTS UNDER DOE GRANT NO. DE-EE0002895; W(A) 2010-040

Modine has requested a waiver of domestic and foreign patent rights of the United States of America for all subject inventions arising from its participation under the above referenced grant entitled "Advanced Refrigerant-Based Cooling Technologies for Information and Communications Infrastructure (ARCTIC)" ("the ARCTIC grant"). Alcatel-Lucent USA Inc. ("Alcatel-Lucent") is the prime awardee of the ARCTIC grant. Modine is a sub-awardee of Alcatel-Lucent under the ARCTIC grant. This waiver pertains only to the subject inventions arising from Modine's participation under the sub-award to the ARCTIC grant. Alcatel-Lucent has requested a patent waiver for subject inventions arising from its participation under the ARCTIC grant in a separate petition. U.S. Hose Corporation, the only other sub-awardee under the ARCTIC grant, has not expressed interest in pursuing a waiver at this time.

Alcatel-Lucent has recently developed modular cooling technology that removes heat directly at the shelf level of data center equipment racks via refrigerant evaporation. Modine developed and supplied key components of this technology including a microchannel evaporator that transfers the heat produced by the data center equipment directly into a refrigerant rather than the room air. Alcatel-Lucent and Modine believes this modular cooling technology is a more cost-effective and efficient solution of cooling data centers than the traditional computer room air conditioning cooling methods used today. As examples, testing has indicated that this technology uses 93% less energy than a conventional computer-room air conditioner unit and allows for up to three times greater equipment density.

The objective of the ARCTIC grant is to further develop the modular cooling technology. As set forth in Modine's petition, the specific objectives include "(i) advanced research innovations that dramatically enhance the ability to deal with ever-increasing device heat densities and footprint reduction by bringing the liquid cooling much closer to the actual heat sources; (ii) manufacturing optimization of key components; and (iii) ensuring rapid market acceptance by reducing cost, thoroughly understanding system-level performance, and developing viable commercialization strategies." The further developments of the modular cooling technology should deliver substantial benefits and capabilities in terms of reduced cooling costs, reduced footprint, and increased reliability.

The total anticipated cost of the ARCTIC grant is $2,269,096, with the prime and sub-awardees providing 20 % cost share, totaling $453,819. The total anticipated cost of Modine's work under the ARCTIC grant is $526,634 with Modine providing $105,328 for a cost share of 20%. This waiver is contingent upon Modine maintaining, in aggregate, a cost sharing percentage over at least 20% during the course of the ARCTIC grant. In addition to the above cost share, Modine has invested millions developing and commercializing parallel flow microchannel technology since the early 1990s. This parallel flow microchannel technology is a key component of the work to be performed under ARCTIC grant.

For more than 90 years, Modine has designed, developed, and manufactured heat transfer and thermal management systems. It is a leader in the field of heat transfer as evident by the issuance of more than 2,000 worldwide patents and its development of key innovations that are used worldwide in heat exchange designs, such as the serpentine louvered fin and the microchannel heat exchanger. More recently, Modine designed and developed key components for Alcatel-Lucent's prototype modular cooling technology system.

Modine 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.

Modine has not agreed to the standard U.S. competitiveness provision that requires products embodying any waived invention or produced through the use of any waived invention to be substantially manufactured in the United States. However, Modine is willing to make specific commitments to U.S. investment in lieu of the standard U.S. competitiveness provision. Specifically, as set forth in the attached letter from Modine dated August 23, 2010, Modine makes the following justification for deviating from the standard U.S. competitiveness and agrees to other commitments, in lieu of the standard U.S. competitiveness provision, that should benefit the U.S. economy:

> Modine conducts a global business. In determine the cost structure for its business Modine has determined that manufacturing products for its coil business in the U.S. is not commercially viable. As a result, Modine has a manufacturing plant in Nuevo Laredo, Mexico at which it manufactures these products in order to supply a price competitive product. Modine's competitors for these types of products also have manufacturing facilities in low-cost countries. Therefore, to be competitive with its global competition, Modine must use facilities and capital investments that are already in place to commercialize this technology.
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> Modine's Specific Commitments to U.S. Investment in Lieu of the Standard U.S. Manufacturing Commitment
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> While Modine is seeking the ability to manufacture this cooling technology, if developed, outside the U.S., it does not mean U.S. jobs will not be supported by the DOE award. In fact the entire DOE award will support U.S. engineering, drafting, sample technician and administrative positions. Specifically, it will support design engineers, manufacturing engineers, sample technicians and administration jobs at the Modine facilities in Racine, WI (where unemployment is more than 14%) and West Kingston, RI. In total, this contract will, at least partially, support a total of three engineering positions, three technician or laborer positions and two administrative positions. Beyond this initial award, if a commercial solution is feasible we see the follow additional possibilities:
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> - Modine prototype components would be made at Modine's facility in Racine, WI;
> - Testing of products would be done at Modine's facility in Racine, WI;

- Modine engineering, purchasing and sales positions would be based in the U.S. with some support roles in Mexico and the United Kingdom where Modine has its Airedale facility in place;
- For U.S. installation, approximately 50% or more of the commercial components would be manufactured in the U.S. (the pumping station would be made in the U.S. and the UK);
- For U.S. installation approximately 70% or more of the heat exchanger parts (by weight) would come from U.S. suppliers (i.e., the heat exchangers tubes currently come from a plant in Kentucky and Manifolds are made in a plant in Illinois); and
- The completed cooling solution would be offered by Alcatel-Lucent to U.S. companies and, thereby, support jobs in the U.S.

Furthermore, if Modine fails to have a product in the marketplace within five years after the grant of patent for an invention developed under the DOE award, Modine agrees to license the use of the waived invention, on commercially reasonable terms, to a party that agrees that any products embodying the subject invention would be manufactured in the U.S.

In addition to the cost share requirement discussed above, this waiver shall be contingent upon Modine agreeing to the above activities provided that the ARCTIC grant is successful in developing a commercially feasible solution.

Referring to item 10 of the waiver petition and as further discussed in the attached letter from Modine dated August 23, 2010, granting this waiver is not anticipated to have any adverse impact on competition. Specifically, the objective of the ARCTIC grant is to further develop enhanced modular cooling technology aimed at cooling servers and data centers. Alternate technology and equipment exist and are in use today for this purpose. Although the enhanced modular cooling technology may be able to achieve certain improvements over the existing technology, obtained reduced cooling costs, reduced footprint and increased reliability, the enhanced modular cooling technology would still compete with the established and existing technologies of Modine's competitors, such as the existing similar cooling solutions with water and refrigerant as the working fluid.

Considering the foregoing, it is believed that granting this waiver will provide Modine 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.

[redacted]

Glen R. Drysdale
Patent Attorney
Golden Field Office
Date: 8/30/10

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:

[redacted]

~~Douglas Koempf~~ Isaac Chan
Program Manager
Industrial Technologies Partnerships

Date: 11/18/10

APPROVAL:

[redacted]

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

Date: 11/19/2010