

# **MEMORANDUM OF UNDERSTANDING**

## **BETWEEN**

**BATTELLE MEMORIAL INSTITUTE, PACIFIC NORTHWEST DIVISION, AS MANAGEMENT  
AND OPERATING CONTRACTOR FOR THE PACIFIC NORTHWEST NATIONAL  
LABORATORY**

## **AND**

**NORAM ENGINEERING & CONSTRUCTORS LTD**

## **CONCERNING**

**COOPERATION IN THE FIELD OF  
ALTERNATIVE AVIATION FUELS PRODUCED FROM WOODY BIOMASS**

### **I. PARTICIPANTS**

This Memorandum of Understanding (MOU) is between Battelle Memorial Institute, Pacific Northwest Division (Battelle), in its capacity as the manager and operator of the Pacific Northwest National Laboratory (PNNL), and NORAM Engineering & Constructors Ltd (NORAM), a Canadian corporation that develops, engineers, and commercializes technologies for the process and resource industries. PNNL is a United States Department of Energy (DOE) National Laboratory managed and operated by Battelle pursuant to Contract No. DE-AC05-76RL01830. NORAM and Battelle are collectively referred to as the "Participants" or individually as a "Participant."

### **II. PURPOSE**

The purpose of this MOU is to strengthen and coordinate activities to advance the knowledge base and understanding of upgrading biocrude feedstocks from forest residues for biojet fuel production.

### **III. AREAS OF COOPERATION**

The Participants intend to cooperate in one or more of the following areas:

a. Cooperate and share information on the range of disparate biocrudes produced from woody biomass by the following technologies:

- Hydrothermal Liquefaction
- Fast Pyrolysis
- Catalytic Pyrolysis

b. Share knowledge and information of upgrading methodologies and pathways to industrial upgrading, including Life Cycle Analysis.

#### **IV. OBJECTIVES**

The Participants intend to cooperate through mutual visits, the exchange of publicly available information, exchanges of researchers and experts, training and planning for potential future joint research, with any future collaborative research to be undertaken only pursuant to an appropriate written agreement therefor.

#### **V. NON-BINDING COMMITMENTS**

This MOU does not create any legally binding obligations between the Participants. As the need may arise, specific details of support to be furnished by each of the Participants may be developed separately from this MOU in specific agreements or contracts, subject to the availability of funds.

#### **VI. INTELLECTUAL PROPERTY**

The Participants do not anticipate the transfer of rights in intellectual property under this MOU. If the Participants decide that a particular activity may lead to the creation of intellectual property, they should consult with each other and make appropriate written arrangements therefor.

#### **VII. PROPRIETARY INFORMATION**

In the event that any activities under this MOU would benefit from one Participant's use of another Participant's proprietary information, the Participants have the option to enter into good faith negotiations to produce a mutually agreeable written arrangement regarding the obligations and terms associated with the exchange.

#### **VIII. NO ADDITIONAL COMMITMENTS**

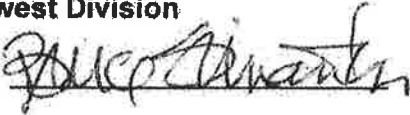
This MOU is not intended to directly or indirectly constitute, create, or give effect to, or to otherwise imply a joint venture, corporation, partnership, contract, or any form of formal business entity.

#### **IX. DURATION, MODIFICATION AND DISCONTINUATION**

Cooperation under this MOU may commence upon signature and may continue for 5 years unless discontinued in accordance with this Section. This MOU may be modified or extended upon mutual written consent of the Participants. The Participants may discontinue this MOU at any time by mutual consent in writing. Alternatively, a Participant that desires

to discontinue its participation in this MOU should endeavor to provide the other Participant at least 30 days' advance written notice.

**Battelle Memorial Institute, Pacific  
Northwest Division**

By: 

Name: Bruce Simanton

Title: Contract Manager

Date: 1-25-17

**NORAM Engineering & Constructors  
Ltd**

By: 

Name: TONY BOYD

Title: PRESIDENT

Date: JAN 31, 2017