

PATENT ASSIGNMENT

Electronic Version v1.1
 Stylesheet Version v1.1

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| SUBMISSION TYPE: | NEW ASSIGNMENT |
| NATURE OF CONVEYANCE: | NUNC PRO TUNC ASSIGNMENT |
| EFFECTIVE DATE: | 01/01/2010 |

CONVEYING PARTY DATA

| Name | Execution Date |
|--|----------------|
| Alberta Science and Research Authority | 07/26/2011 |

RECEIVING PARTY DATA

| | |
|-------------------|--|
| Name: | Alberta Innovates - Energy and Environment Solutions |
| Street Address: | 10020 - 101 A Avenue |
| Internal Address: | 1800 Phipps McKinnon Building |
| City: | Edmonton, Alberta |
| State/Country: | CANADA |
| Postal Code: | T5J 3G2 |

PROPERTY NUMBERS Total: 4

| Property Type | Number |
|----------------|---------|
| Patent Number: | 7090014 |
| Patent Number: | 6631761 |
| Patent Number: | 6591908 |
| Patent Number: | 7677313 |

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PATENT

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REEL: 027376 FRAME: 0254

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Total Attachments: 4

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ALBERTA

ADVANCED EDUCATION AND TECHNOLOGY

Office of the Minister

MINISTERIAL ORDER NO. 4/2011

ALBERTA INNOVATES - ENERGY AND ENVIRONMENT SOLUTIONS

TRANSFER ORDER

I, Greg Weadick, Minister of Advanced Education and Technology, pursuant to section 14 of the *Alberta Research and Innovation Act*, hereby make the order in the attached Appendix, being the Alberta Innovates - Energy and Environment Solutions Transfer Order. This order is effective January 1, 2010.

Dated at Edmonton, Alberta the 26 day of July, 2011.

A handwritten signature in black ink, appearing to read 'G Weadick', written over a horizontal line.

Greg Weadick
Minister

APPENDIX

1.0 INTRODUCTION

1.1 The Alberta Oil Sands Technology and Research Authority ("AOSTRA") was established by Her Majesty the Queen in right of Alberta as a corporation on June 6, 1974, pursuant to the *Alberta Oil Sands Technology and Research Authority Act*.

1.2 The Alberta Science, Research and Technology Authority ("ASRTA") was established as a corporation by the Crown in 1998 under the *Alberta Science, Research and Technology Act* ("ASRTA Act"). In 2000, the ASRTA Act was amended by the *Alberta Science, Research and Technology Amendment Act*, which among other things, added section 16.4 to the ASRTA Act dissolving AOSTRA and transferring its rights, assets, and liabilities, including all contracts, patents, and other intellectual property rights, to ASRTA.

1.3 Subsequently in 2000, the name of the ASRTA Act was changed to the *Alberta Science and Research Authority Act* ("ASRA Act") and the name of ASRTA was changed to the Alberta Science and Research Authority ("ASRA"). The section dissolving AOSTRA and transferring its rights, assets, and liabilities, became section 23 of the ASRA Act.

1.4 In addition, the ASRA Act authorized the creation of the following institutes which made recommendations and reported to the Minister of Innovation and Science:

Alberta Agricultural Research Institute
Alberta Energy Research Institute ("AERI")
Alberta Forestry Research Institute
Alberta Information and Communications Technology Institute
Alberta Life Sciences Institute

(the "ASRA Entities").

1.5 ASRA divested all of its operational rights, assets, and liabilities, including all contracts, patents, and other intellectual property rights, to Her Majesty the Queen in right of Alberta as represented by the Minister of Innovation and Science ("I&S") by a Transfer Agreement executed on March 22, 2005. The energy-related rights, assets, and liabilities that had been transferred from AOSTRA were administered by I&S on the recommendations made by AERI.

1.6 Section 2 of the *Designation and Transfer of Responsibility Regulation* (Alta. Reg. 317/2006) transferred responsibility for the ASRA Act from the Minister of Innovation and Science to the Minister of Advanced Education and Technology ("AET").

1.7 As set out in section 14(2) of the *Alberta Research and Innovation Act* ("ARI Act") and Order in Council No. 560/2009, the Lieutenant Governor in Council dissolved the ASRA Entities as of January 1, 2010.

- 1.8 Section 7 of the ARI Act and the *Alberta Research and Innovation Regulation* (Alta. Reg. 203/2009) established the following research and innovation corporations as of January 1, 2010:

Alberta Innovates - Bio Solutions
Alberta Innovates - Health Solutions
Alberta Innovates - Energy and Environment Solutions
Alberta Innovates - Technology Futures

(the "ARIA Entities").

- 1.9 AET Ministerial Order No. 90/2009 transferred the powers, duties, functions, assets, obligations and liabilities, and records of the ASRA Entities to the ARIA Entities as of January 1, 2010. AET Ministerial Order No. 90/2009 also included the following provision:

"If the New Entity is required by law to record, register, or otherwise document the transfer of any asset or liability and obligation, the Province shall execute documents or take other reasonable steps necessary to assist the New Entity."

- 1.10 Intellectual property offices are seeking confirmation of the transfer of obligations, assets and rights, specifically patents from AOSTRA to ASRA and ultimately, to Alberta Innovates - Energy and Environment Solutions.

2.0 ORDER

- 2.1 Therefore, I make the following order:

For greater certainty, all the powers, duties, functions, assets, rights, obligations, liabilities and records, including all contracts, patents, and other intellectual property rights previously held by AOSTRA, which were transferred from AOSTRA to ASRA, and then transferred to Her Majesty the Queen in right of Alberta and administered on the recommendations of AERI, are hereby transferred to Alberta Innovates - Energy and Environment Solutions, effective January 1, 2010.

List for Attachment to Ministerial Order 4/2011

(Prepared on December 13, 2011)

Alberta Innovates – Energy and Environment Solutions

1. **U.S. Patent No. – 7,090,014**
Issue Date – August 15, 2006
U.S. Application No. – 10/926,574
Filing Date – August 25, 2004
Priority Date – None
Inventors – William Keith Good, Rick W. Luhning and Kenneth E. Kisman
Assignee – **Alberta Science and Research Authority**
Title – PROCESS FOR SEQUENTIALLY APPLYING SAGD TO ADJACENT SECTIONS OF A PETROLEUM RESERVOIR

2. **U.S. Patent No. – 6,631,761**
Issue Date – October 14, 2003
U.S. Application No. – 10/016,626
Filing Date – December 10, 2001
Priority Date – None
Inventors – Jian-Yang Yuan, Ezra Eddy Isaacs, Haibo Huang and Deborah G. Vandenhoff
Assignee – **Alberta Science and Research Authority**
Title – WET ELECTRIC HEATING PROCESS

3. **U.S. Patent No. – 6,591,908**
Issue Date – July 15, 2003
U.S. Application No. – 09/934,963
Filing Date – August 22, 2001
Priority Date – None
Inventor – Tawfik Noaman Nasr
Assignee – **Alberta Science and Research Authority**
Title – HYDROCARBON PRODUCTION PROCESS WITH DECREASING STEAM AND/OR WATER/SOLVENT RATIO

4. **U.S. Patent No. – 7,677,313**
Issue Date – March 16, 2010
U.S. Application No. – 11/574,843
Filing Date – September 13, 2005
Priority Date – September 15, 2004
Inventors – Bernard Tremblay, Haibo Huang, Ron Sawatzky, Douglas A. Lillico and Zhihong (John) Zhou
Assignee – **Alberta Science and Research Authority**
Title – METHOD FOR CONTROLLING WATER INFLUX INTO WELLBORES BY BLOCKING HIGH-PERMEABILITY CHANNELS