

## **GFC Academic Planning Committee (APC)**

### Approved Motions

The following Motions and attendant Final Documents were approved by the GFC Academic Planning Committee (APC) at the meeting of Wednesday, October 26, 2011:

Agenda Title: **Proposal for the Establishment of the Canadian Centre for Clean Coal/Carbon and Mineral Processing Technologies (C<sup>5</sup>MPT) (Faculty of Engineering)**

**MOTION:** THAT the GFC Academic Planning Committee approve, under delegated authority from General Faculties Council, the proposal submitted by the Dean of the Faculty of Engineering for the formal establishment of the Canadian Centre for Clean Coal/Carbon and Mineral Processing Technologies (C<sup>5</sup>MPT) to be housed in the Faculty of Engineering at the University of Alberta, as set forth in Attachment 1, to be effective upon final approval.

Final Document: [Item 4](#)

Agenda Title: **Proposed Name Change for the Alberta Ingenuity Centre for Carbohydrate Science to the Alberta Glycomics Centre**

**MOTION:** THAT the GFC Academic Planning Committee approve, under delegated authority from General Faculties Council, the proposed name change of the Alberta Ingenuity Centre for Carbohydrate Science to the 'Alberta Glycomics Centre', as submitted by the Dean of the Faculty of Science and as set forth in Attachment 1, to take effect upon final approval.

Final Document: [Item 5](#)

**OUTLINE OF ISSUE**

Agenda Title: **Proposal for the Establishment of the Canadian Centre for Clean Coal/Carbon and Mineral Processing Technologies (C<sup>5</sup>MPT) (Faculty of Engineering)**

**Motion:** THAT the GFC Academic Planning Committee approve, under delegated authority from General Faculties Council, the proposal submitted by the Dean of the Faculty of Engineering for the formal establishment of the Canadian Centre for Clean Coal/Carbon and Mineral Processing Technologies (C<sup>5</sup>MPT) to be housed in the Faculty of Engineering at the University of Alberta, as set forth in Attachment 1, to be effective upon final approval.

**Item**

Action Requested	<input checked="" type="checkbox"/> Approval <input type="checkbox"/> Recommendation <input type="checkbox"/> Discussion/Advice <input type="checkbox"/> Information
Proposed by	David Lynch, Dean, Faculty of Engineering
Presenter	David Lynch, Dean, Faculty of Engineering
Subject	Proposed establishment of the Canadian Centre for Clean Coal/Carbon and Mineral Processing Technologies (C <sup>5</sup> MPT) as an academic institute in the Faculty of Engineering at the University of Alberta.

**Details**

Responsibility	Provost and Vice-President (Academic)
The Purpose of the Proposal is (please be specific)	Please see the attached proposal.
The Impact of the Proposal is	Please see the attached proposal.
Replaces/Revises (eg, policies, resolutions)	N/A
Timeline/Implementation Date	Effective upon final approval.
Estimated Cost	See the attached proposal.
Sources of Funding	See the attached proposal.
Notes	N/A

**Alignment/Compliance**

Alignment with Guiding Documents	<i>Dare to Discover</i> and <i>Dare to Deliver</i>
Compliance with Legislation, Policy and/or Procedure Relevant to the Proposal (please <u>quote</u> legislation and include identifying section numbers)	<p>1. <b>Post-Secondary Learning Act (PSLA):</b> The <i>Post-Secondary Learning Act (PSLA)</i> gives General Faculties Council (GFC) responsibility, subject to the authority of the Board of Governors, over "academic affairs" (section 26(1)). Section 26(1)(o) provides that GFC may make recommendations to the Board of Governors on a number of matters, including "the budget" and "academic planning." GFC has thus established an Academic Planning Committee (GFC APC), as set out below. GFC delegates certain of its powers to the GFC Academic Planning Committee.</p> <p>The complete wording of the section(s) of the <i>PSLA</i>, as referred to above, and any other related sections, should be checked in any instance where formal jurisdiction or delegation needs to be determined.</p> <p>2. <b>University of Alberta Policies and Procedures On-Line (UAPPOL):</b> According to the University of Alberta's <i>Academic Centres and Institutes Establishment Procedure</i> (Section 2 – <u>Establishment</u>) (available at:</p>

	<p><a href="http://www.uappol.ualberta.ca">www.uappol.ualberta.ca</a>): “All proposals for establishment of academic centres and institutes shall be submitted initially to the Provost and Vice-President (Academic). The Strategic Initiatives Group (SIG) shall review operational details (e.g. budget, space) for the proposed centre or institute and suggest revisions or recommend clarification as needed. Proposals deemed to be in good order will be forwarded by the proposer(s) to the GFC Academic Planning Committee (APC) for final approval.</p> <p>When the University of Alberta forms a partnership with another entity in creating an academic centre or institute, full approval processes must be followed with all partner entities prior to operation.</p> <p>Proposed academic centres and institutes shall not operate prior to receipt of notice of approval.</p> <p>All academic centres and institutes existing but not approved by APC shall come into compliance immediately or be considered for closure.”</p>
--	--

**Routing** (Include meeting dates)

Consultative Route (parties who have seen the proposal and in what capacity)	See the attached proposal for information on the consultative routing of this initiative.
Approval Route (Governance) (including meeting dates)	Centres and Institutes Committee (May 24, 2011) (for discussion); Strategic Initiatives Group (September 20, 2011) (for discussion); GFC Academic Planning Committee (October 26, 2011) (for final approval)
Final Approver	GFC Academic Planning Committee

Attachments (each to be numbered 1 - <>)

- Attachment 1 (pages 1 – 71) – Proposal for the Establishment of the C<sup>5</sup>MPT in the Faculty of Engineering

*Prepared by:* JP Tetreau, C<sup>5</sup>MPT Centre Manager, for Dean David Lynch

## University of Alberta Template for Proposals to Establish New Academic Centres and Institutes

Proposers will complete and submit this template to the Office of the Provost for approval in accordance with UAPPOL Policy. This template is expandable ; the completed template may be up to 8 to 10 pages in length (not including letters of support or other appendices relevant to the proposal). Before completing this template, the complete UAPPOL Centres and Institutes Policy, as well as associated procedures for academic centres and institute, should be reviewed.

1.	<p><b>Name and Faculty of Reporting Dean: Dean Lynch, Faculty of Engineering</b></p> <table border="1" style="width: 100%;"> <tr> <td style="width: 75%;"> <p>Signature:</p> <ul style="list-style-type: none"> <li>• See attached memo (D. Lynch) dated May 9, 2011</li> </ul> </td> <td style="width: 25%;"> <p>Date:</p> </td> </tr> </table>	<p>Signature:</p> <ul style="list-style-type: none"> <li>• See attached memo (D. Lynch) dated May 9, 2011</li> </ul>	<p>Date:</p>
<p>Signature:</p> <ul style="list-style-type: none"> <li>• See attached memo (D. Lynch) dated May 9, 2011</li> </ul>	<p>Date:</p>		
2.	<p><b><u>Name and Detailed Purpose of the Proposed Centre or Institute:</u> CANADIAN CENTRE FOR CLEAN COAL/CARBON AND MINERAL PROCESSING TECHNOLOGIES (C5MPT)</b></p> <ul style="list-style-type: none"> <li>• See attached memo (D. Lynch) dated May 9, 2011</li> <li>• Page 2 (A.1, A.2)</li> </ul>		
3.	<p><b><u>Provide a statement of the priority</u> of the proposed centre or institute within the overall priorities of the Faculty and/or the University of Alberta. Include a <u>statement of benefits</u> the University of Alberta could expect to receive through creation of the proposed centre or institute, including benefits to students.</b></p> <ul style="list-style-type: none"> <li>• See attached memo (D. Lynch) dated May 9, 2011</li> <li>• Page 2 (A.3)</li> </ul>		
4.	<p><b><u>Provide a description of the proposed centre/institute governance structure/reporting lines. Include a diagram of organizational structure.</u></b></p> <ul style="list-style-type: none"> <li>• Pages 5-7 (C. Key Operating Principles)</li> </ul>		
5.	<p><b><u>Provide a statement of the role and qualifications of the centre/institute lead of the proposed centre or institute.</u></b></p> <ul style="list-style-type: none"> <li>• Page 5, 2.4 – Alberta Ingenuity Agreement</li> </ul>		
6.	<p><b><u>Employees</u></b></p> <ol style="list-style-type: none"> <li>a) Provide a statement of the employment status of employees (i.e., are they University of Alberta employees?)</li> <li>b) Specific source(s) of any “University funding” must be identified</li> <li>c) Personnel expenditures must include adequate provisions for benefit costs, salary settlements, and other escalating factors.</li> </ol> <ul style="list-style-type: none"> <li>• Page 7</li> </ul>		
7.	<p><b><u>Detailed Budget</u></b></p> <ol style="list-style-type: none"> <li>a) Include key sources of operating funds, and include revenue sources and expenditures for [ideally] 5 years projected.</li> <li>b) State specific source(s) of any “University funding”</li> <li>c) personnel expenditures must include adequate provisions for benefit costs</li> <li>d) escalation factors must be built into expenditure projections (i.e. escalation due to inflation, future salary settlements, etc.)</li> <li>e) if in-kind support is identified, the specifics of that support must be listed separately</li> </ol>		

	<ul style="list-style-type: none"> <li>• Pages 8 - 11 (2010-2013 Budget)</li> <li>• Pages 7-8, Section 3 – Alberta Ingenuity Agreement</li> </ul>
8.	<p><b><u>Space Requirements.</u></b></p> <p>Space required?      Yes <input checked="" type="checkbox"/>    No <input type="checkbox"/></p> <p>If “No” selected, where is current space? _____</p> <p>If “Yes” selected, complete the following:</p> <p><input checked="" type="checkbox"/> On-site at the University of Alberta</p> <p><input type="checkbox"/> Awaiting allocation</p> <p><input type="checkbox"/> Rent/lease required</p> <p>If rent/lease is required, has this been budgeted for?    Yes <input type="checkbox"/>    No <input type="checkbox"/></p> <p>Is funding required?    Yes <input type="checkbox"/>    No <input checked="" type="checkbox"/>    Reasons: <b><u>See Page 8, C.2</u></b></p> <p>Address the following questions:</p> <p>a) If rent/lease or license is required, what is the University of Alberta’s commitment?</p> <p>b) If new space or modifications to existing space are required, has Facilities and Operations been contacted and has this been included in the budget?</p>
9.	<p><b><u>Equipment</u></b></p> <p>a) Identify any existing equipment (major or minor), where the equipment is located and who owns the equipment.</p> <p>b) If additional equipment is required, where will it be located, who will purchase?</p> <ul style="list-style-type: none"> <li>• Page 6, 2.8 – Alberta Ingenuity Agreement</li> </ul>
10.	<p><b><u>Potential Risks to the University of Alberta</u></b></p> <p>a) State any reputational, financial, and/or operational risks to the University of Alberta.</p> <p>b) Outline plans to mitigate/manage those risks.</p> <p>c) Risk Management Services may be consulted.</p> <ul style="list-style-type: none"> <li>• Page 11</li> </ul>
11.	<p><b><u>Annual Reporting and Strategic Review: In accordance with UAPPOL Policy</u></b></p> <p>a) State a provision for annual reporting to the Reporting Dean</p> <p>b) State a provision for annual reporting to the Office of the Provost</p> <p>c) State a provision for strategic and operational review by the Reporting Dean (or delegate) at no less frequency than every five years.</p> <ul style="list-style-type: none"> <li>• Page 8, C.3</li> </ul>
12.	<p><b><u>Intellectual Property (IP) and Copyright</u></b></p> <p>a) Will any copyright or patentable IP be created, and if so, how will it be handled?</p> <p>b) How will ownership and commercialization of IP be handled?</p> <ul style="list-style-type: none"> <li>• Page 11, Sections 5.1, 5.2 – Alberta Ingenuity Agreement</li> </ul>
13.	<p><b><u>Termination Plan/Provisions</u></b></p> <p>a) Exigency plan for termination: If physical and/or financial resources will remain upon termination, a plan for consultation with donors or agencies associated with the centre or institute must be included in the dissolution plan.</p> <ul style="list-style-type: none"> <li>• Page 13, Section 7 – Alberta Ingenuity Agreement</li> </ul>

14.	<p><b>Letters of Support:</b> Attach letters from relevant on- and off-campus sources</p> <ul style="list-style-type: none"> <li>• See attached (Hatch Ltd., Teck Metals Ltd., Capital Power Corporation, Foundation CMG, D. Lynch)</li> </ul>
15.	<p>Provide, if applicable, any <b><u>agreements and/or memoranda of understanding between the University of Alberta and its partner(s)</u></b> to establish, fund and operate the proposed academic centre or institute</p> <p>See attached:</p> <ul style="list-style-type: none"> <li>• August 28, 2009 Agreement between the Governors of the University of Alberta and the Alberta Heritage Foundation for Science and Engineering Research (operating as Alberta Ingenuity Fund – AIF)</li> <li>• January 18, 2010 Agreement between the Governors of the University of Alberta and Hatch Ltd., Capital Power Corp, CMG Reservoir Simulation Foundation, Teck Resources, and Nexen Inc.</li> </ul>

G:\AD02\CEN\CEN Meeting Materials 2009-2011\CEN 24May11\C5MPT Faculty of Engineering\C5MPT.ProposalTemplate.24May11.docx



UNIVERSITY OF  
ALBERTA

Office of the Dean  
Faculty of Engineering

E6 050 Engineering Teaching and Learning Complex  
Edmonton, Alberta, Canada T6G 2V4

www.engineering.ualberta.ca

Tel: 1.780.492.3320

Fax: 780.492.0500

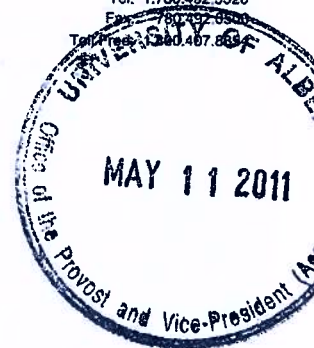
Toll Free: 1.800.407.8634

FILE  
ADO7-CCC

to C. Watt

May 9, 2011

Dr. Dru Marshall  
Deputy Provost  
Chair, Academic Planning Committee  
2<sup>nd</sup> Floor, University Hall  
University of Alberta  
Edmonton, AB



**Re: Establishment of the Canadian Centre for Clean Coal/Carbon and Mineral Processing Technologies (C5MPT)**

Dear Dr. Marshall:

I am writing to provide the strong and unequivocal support of the Faculty of Engineering for the formal establishment of the Canadian Centre for Clean Coal/Carbon and Mineral Processing Technologies (C5MPT) as an official University of Alberta "Centre". C5MPT is an interdisciplinary collaborative initiative based in the Faculty of Engineering that will focus on fundamental research and applications leading to the development of efficient, economically viable and environmentally responsible methods to develop Canada's natural resources. The work in C5MPT will specifically focus on the strategic needs of clean coal, mineral processing, and carbon capture and storage technologies for sustainable development.

The Faculty of Engineering and the University of Alberta have identified education and research focused on energy, natural resources, and materials as very high priorities. Through the establishment of C5MPT, we will support current, and recruit additional, faculty members, graduate students and PhDs to conduct research and provide education in the broad areas related to natural resources development. This will also lead to enhanced educational and research opportunities for undergraduate students and enable increased collaborative interactions with industry.

The formal establishment of C5MPT is a key component of the broader strategy by the Faculty of Engineering to establish a number of inter-related institutes and centres, such as C5MPT and the Centre for Oil Sands Innovation (COSI), that will provide synergy, visibility and focus for our research and educational activities in the broad related areas of natural resources, energy and the environment.


The vision for C5MPT is to be an internationally-recognized research centre, which will be built on a firm fundamental base of surface and interfacial sciences, focused on the creation of novel processing technologies for carbon and mineral resources. The work will encompass the complete life-cycle of the resource use, from extraction through processing to environmental stewardship (i.e., CO<sub>2</sub> capture and storage, process water recycling and so forth). The envisioned centre will build on recognized strengths of the Faculty of Engineering and exploit synergies with other centres at the University of Alberta and beyond, e.g., Alberta Centre for Surface Engineering and Sciences, National Institute for Nanotechnology, Imperial Oil Centre for Oil Sands Innovation, Alberta Water Research Institute, etc. C5MPT's impact will extend well beyond the creation of enabling technologies for the resource industry; it will prepare students and researchers to carry the centre's contributions into industrial practice, as well as providing a resource for industry to address the challenges that they will face over the coming decades.

The faculty members involved in C5MPT will be supported, in part, by Chair/Professorship endowments for which there are current commitments of over \$8 million (approx. \$5 million already received) with additional endowment funding requests pending. In addition, C5MPT has received operating support of \$4.25 million from Alberta Innovates for an initial three-year period and several industries have already contracted with the University of Alberta for collaborative research in the C5MPT areas. Additional external funds will, in due course, be secured from other organizations to increase the endowment base and to provide additional operating funds.

Given the importance of C5MPT to its strategic initiatives, the Faculty of Engineering is fully invested in the creation of C5MPT and has committed financially to its creation and operation. These commitments extend beyond the previously discussed endowments and include additional resources estimated at \$5.5 million in the first five years of operation. These commitments include approximately 400 m<sup>2</sup> of newly renovated and customized laboratory research space for C5MPT, a Tier 1 Canada Research Chair (Professor Zhenghe Xu), and the salaries of three recently-appointed faculty members. In addition, the Faculty of Engineering intends to recruit up to a further five new faculty with expertise in the focus areas of C5MPT.

The Faculty of Engineering unreservedly supports the establishment of the Canadian Centre for Clean Coal/Carbon and Mineral Processing Technologies as an official “Centre” of the University of Alberta.

Sincerely yours,

A handwritten signature in black ink that reads "David T. Lynch". The signature is written in a cursive style with a large initial 'D'.

David T. Lynch, PhD, PEng  
Dean, Faculty of Engineering



# Proposal to Academic Planning Committee

October, 2011

## Canadian Centre for Clean Coal/Carbon and Mineral Processing Technologies (C<sup>5</sup>MPT)



Submitted from  
Faculty of Engineering  
University of Alberta  
Edmonton, Alberta



## **A. PURPOSE, PROPOSED ACTIVITIES, AND BENEFITS TO THE UNIVERSITY OF ALBERTA**

### *A.1 Purpose*

The purpose of C<sup>5</sup>MPT is to conduct research to find efficient, economically viable and environmentally responsible methods to develop Canada's fossil fuels and mineral resources. Canadian university researchers, in collaboration with industry partners will seek innovative new methods and technologies to process fossil fuels and mineral resources that will reshape the future of Canada. We support sustainable development of Canada's natural resources through reducing or eliminating the environmental impact of water use and greenhouse gas emissions; educating a new generation of clean energy engineers; and driving economic growth to create highly skilled, sustainable jobs. The emphasis of the research will be a mission-oriented blend of fundamental and applied research targeted at strategic needs of clean coal, mineral processing, and carbon capture and storage technologies for sustainable development.

### *A.2 Proposed Activities*

In support of its mandate to conduct research and education programs on clean coal/carbon and mineral processing technologies, C<sup>5</sup>MPT will conduct a wide range of activities:

- a) Sponsor research projects on clean coal/carbon, mineral processing, and carbon capture and storage
- b) Conduct workshops and symposia to foster new research ideas and to exchange information
- c) Recruit new faculty members in areas of research relevant to clean coal/carbon and mineral processing technologies
- d) Recruit graduate students and post-doctoral fellows for research on clean coal, mineral processing and carbon capture and storage
- e) Enhance research opportunities for undergraduate students through internships and coop placements
- f) Collaborate with other universities and organizations on research programs of clean coal/carbon, mineral processing, and carbon capture and storage
- g) Engage our industrial sponsors and partners to support the transformation of scientific discoveries to commercial products and services.

### *A.3 Benefits to the University of Alberta*

The University of Alberta has identified research and education in energy, water, and environment for sustainable development of natural resources as high priorities. The establishment of C<sup>5</sup>MPT as a GFC-recognized Centre will support the University of Alberta's strategic plan by advancing existing research strength in the areas of clean coal/carbon and mineral processing technologies, interfacial science, and advanced

materials and catalysis. The development of energy related research is a high priority for the Faculty of Engineering.

C<sup>5</sup>MPT is a collaborative university-industry-government initiative among the University of Alberta, TECK, Capital Power, Hatch, Foundation CMG, Nexen, and Alberta Ingenuity Fund (now Alberta Innovates). The initial endowment funding of about \$10 million from our industry sponsors will support our research in perpetuity, and serve to attract matching funds from research agencies such as Alberta Innovates and the Natural Sciences and Engineering Research Council as well as Alberta Access Future Funds. As outlined in this document, space and funding for the Centre come from the Faculty of Engineering, and this proposal does not request additional space or funding.

The research conducted by C<sup>5</sup>MPT will complement the activity of the established industrial research chairs in oil sands extraction, Helmholtz/UofA Initiatives (HAI), and oil sands tailings consortium. Our open innovation practices enable industrial partners to use these discoveries to develop commercial application of breakthrough technologies. We will expand the research on Alberta's preeminent energy resources and sustainable development, and offer more opportunities for training of students and postdoctoral fellows.

## **B. BACKGROUND**

Energy is responsible for one-half of Alberta's economic output and two-thirds of our exports. Energy production and consumption have shaped the way we live: energy fuels our exceptional standard of living in Alberta. The benefits derived from Alberta's energy sector extend well beyond our borders. Canada is an energy-rich nation, and the energy sector in Alberta has been a key driver of national wealth for decades.

Alberta has about 2 trillion tonnes of coal reserves and resources that are not internationally recognized (2010, Alberta Innovates). Alberta's proven coal reserves are valued at more than \$3 trillion. If coal is to remain a prime energy source and become a key petrochemical source, new technologies must be developed to isolate pollutants and to capture CO<sub>2</sub> and methane in order to reduce emissions. The research under coal technology will focus on: coal cleaning and upgrading of both thermal and coking coals; multi pollutant control strategies; clean coal technologies to capture CO<sub>2</sub> and CH<sub>4</sub> in order to reduce (greenhouse gas) GHG emissions; value added products; and underground coal gasification. Some key technologies under this theme are fine coal cleaning to produce ultra-clean coal, coal-water slurry, novel sorbent and underground coal gasification for reducing GHG emissions, oxy-firing and gasification for carbon capture. Efficient use of this resource with minimal environmental impact is imperative if coal is to remain a prime energy source and become a key petrochemical source. The research initiatives in C<sup>5</sup>MPT will be aligned with the technology gaps identified in the Clean Coal Technology Roadmap of Canada.

Canada is also one of the major producers for base metals. The mining and oil and gas extraction industry contributes to about 5% gross domestic production (GDP). Significant

challenges facing minerals industry include declining grades, increasing complexity, social expectations, environmental legislation, energy cost/availability, water limitations, carbon taxes, and sustainable development. Mining sector productivity fell by 24.3% between 2001-2007 while energy intensity of mining sector increased 3.7% per year from 1990-2006. Global shortage of skilled metallurgists for the minerals industry is a pressing issue for the industry. Universities are struggling to attract top tier research professors resulting in a shortage or disappearance of u/g degrees in Mineral Processing and Metallurgy. There is no identifiable Centre of Excellence for mineral processing research in Canada and only limited capacity to conduct fundamental research to develop innovative technology solutions that address industry challenges.

Research under mineral processing technologies will focus on the science essential to minerals processing and beneficiation of metals, thermal and metallurgical coals and water-based oil sands extraction. It will include: ultra-fine grinding and mineral liberation; solution and colloidal chemistry studies in mineral processing, including reagent-mineral (coal and bitumen) interactions, froth phase study, and ultraclean fine coal slurry fuels; ultra-fine mineral particle flotation technologies; and water management in mineral processing and water-based oil sands extraction.

Carbon capture and storage is another key research area for C<sup>5</sup>MPT. Approximately 81% of global primary energy in 2006 was provided by oil, coal, and natural gas, and the percentage is expected to remain at about this level until at least 2030. The recovery, processing, and use of fossil resources produce most of the greenhouse gases (GHG) that contribute to climate change. The international energy agency (IEA) has projected that without significant new policy interventions, the growing use of fossil fuels would result in a 50% increase in global CO<sub>2</sub> emissions with potentially devastating effects on the world's climate systems.

In 2007, Canadian GHG emissions were 26% above 1990 level and 33% above the Kyoto target of 558 million tonnes. Emissions related to energy have been a major factor contributing to the increase in greenhouse gases. It is estimated that 82% of Canadian GHG emissions are energy-related. Transformative changes are needed in Canadian and global energy systems to quickly and deeply cut GHG emissions to mitigate climate change and to ensure secure and reliable energy supplies. The Government of Canada is committed to reduce GHG emissions by 20% in 2020 and 65% in 2050 (the national target is 250 Mt/yr. in 2050). This is a massive challenge. Implementation of renewable energy is constrained by a small supply base and, in many cases, by high cost and/or long lead times for technology development. Furthermore, renewable alternatives cannot yet match the flexibility and reliability of fossil fuel systems. Clean fossil energy solutions (e.g. carbon capture and storage, cogeneration and major improvements in energy efficiency) will be needed to provide a smooth transition to the desired future. These technologies must be quickly developed and implemented to fill the gap. Carbon capture and storage (CCS), cogeneration, and energy efficiency are the key themes for the Canadian Centre for Clean Coal/Carbon and Mineral Process Technologies (C<sup>5</sup>MPT).

The challenge of reducing GHG emissions is one of the catalysts for C<sup>5</sup>MPT. Our vision

is to develop and put in place the advanced clean coal/carbon and mineral processing technologies that will allow continued development of our natural resources, while at the same time mitigating key environmental issues, namely GHG emissions and water use. The production cycle of coal and unconventional hydrocarbon sources offers several points of intervention to deal with GHG emissions and water use. Improved mineral processing techniques can reduce energy requirements – and therefore GHG emissions – as well as reduce the need for fresh water. Clean coal technology can allow CO<sub>2</sub> to be economically recovered from flue gases. The capture and geological storage of CO<sub>2</sub> has been identified as the critical enabling technology that would reduce GHG emissions significantly while also allowing coal and oil sands developments to meet the world's pressing energy needs.

Research under this theme will focus on knowledge development contributing to the demonstration that CCS is a safe, reliable and environmentally beneficial practice for long-term CO<sub>2</sub> storage (the order of thousands of years). Research activities will range from the micro-scale to the macro-scale and is motivated by the growing recognition that assumptions of uniformity, at certain scales are inadequate for extrapolating fluid (CO<sub>2</sub>, brine, oil, gas) behaviour both in time and space. Research programs will focus on developing an understanding of the relationships between measured and modeled subsurface CO<sub>2</sub> and fluid flows spanning the range of spatial and temporal scales relevant to management of geological storage. The research activities aim to cover the main gaps identified for the storage components in the Carbon Capture and Storage Technology Roadmap of Canada.

## **C. KEY OPERATING PRINCIPLES**

### *C.1. Governance*

The Centre will be an entity operated by the University of Alberta, under the Dean of Engineering. The Dean of Engineering is ultimately responsible for the operations of the Centre, as an entity within the Faculty of Engineering. The Management Advisory Board (MAB) recommends action, but the Dean is responsible for executing decisions that affect the operation of the Centre. In addition to hiring, the Dean is responsible for the accounts related to the Centre. Control of all Centre accounts is through the Dean's Office.

The nature of this governance model is described further in the section below, but an important factor is the hierarchy of control embodied in the structure, agreements, and charters related to this. Upper level control of the Centre rests with the University. It is perhaps easiest to describe from bottoms up, keying not on role, but on control/authority levels. The Scientific Advisory Committee (SAC) works collaboratively with the Director. As evidenced by this quote from the MAB Charter [attached], the SAC is subordinate to the authority of the MAB. “ *The detail of some MAB functions may be handled through MAB Committees, such as the Scientific Advisory Committee. However, the MAB as a whole is responsible for determining the extent of powers residing in each*

*committee, and ultimately responsible for accepting, modifying, or rejecting Committee recommendations.”*

Thus, the SAC is determined to be under the control of the MAB.

The MAB provides the Centre with valuable governance advice and guidance. Control of the MAB is not a function of voting power, as the ultimate accountability rests with the UofA. This statement from the Foundation Agreement is clear on this point.

8.1 The C<sup>5</sup>MPT shall be governed by a Management Advisory Board (MAB). In accordance with Clause 2.6 of the AITF Agreement, the MAB is accountable to AITF but is ultimately accountable to the U of A. All Annual Operating Plans, C<sup>5</sup>MPT Budgets and C<sup>5</sup>MPT Reports must be reviewed and approved by the MAB before submission to the U of A and AITF. Notwithstanding anything otherwise contained in this Foundation Agreement, although it is expected that the U of A and the C<sup>5</sup>MPT Scientific Director will consider the advice and guidance of the MAB, no term or condition of this Foundation Agreement compels the U of A to accept such advice or guidance.

Through this hierarchy, the control of the Centre is clearly established as resting with the UofA.

The administrative structure of the Centre is designed to support its research mandate and to foster the collaboration with the industry partners and sponsors and government agencies. In order for C<sup>5</sup>MPT to succeed in its goals, it requires the ongoing commitment and collaboration of the University of Alberta and key stakeholders (including Teck, Capital Power, Foundation CMG, Hatch, Nexen, and Alberta Innovates) as well as a management structure that fosters strong communication and the formation of consensus decisions. We will employ the committee structure developed for the Centre for Oil Sands Innovation (COSI) to enable these success factors. There are two key committees of C<sup>5</sup>MPT: the Management Advisory Board (MAB) and the Scientific Advisory Committee (SAC). The centre governance structure is described below.

- **Management Advisory Board (MAB)** - MAB provides strategic direction; monitors progress; approves budgets, research plans and intellectual property proposals, and undertakes other centre governance tasks. It is expected that MAB will meet at least twice a year. Details will be described in MAB Charter (See Appendix D).
- **Scientific Advisory Committee (SAC)** - The SAC sets priority areas of research and calls for research proposals from U of A and other universities; reviews and screens proposals; and works with researchers to align proposals with existing work and strategic direction and areas. The SAC proposes projects to the MAB to be funded, and conducts “gate reviews” on research projects. At the initial stage of a project, these reviews determine whether a research proposal is aligned with the objectives of C<sup>5</sup>MPT and industry needs. As research progresses, these reviews will determine

which projects are ready for further technology development. Details on SAC will be described in Charter for Scientific Advisory Committee (see Appendix II)

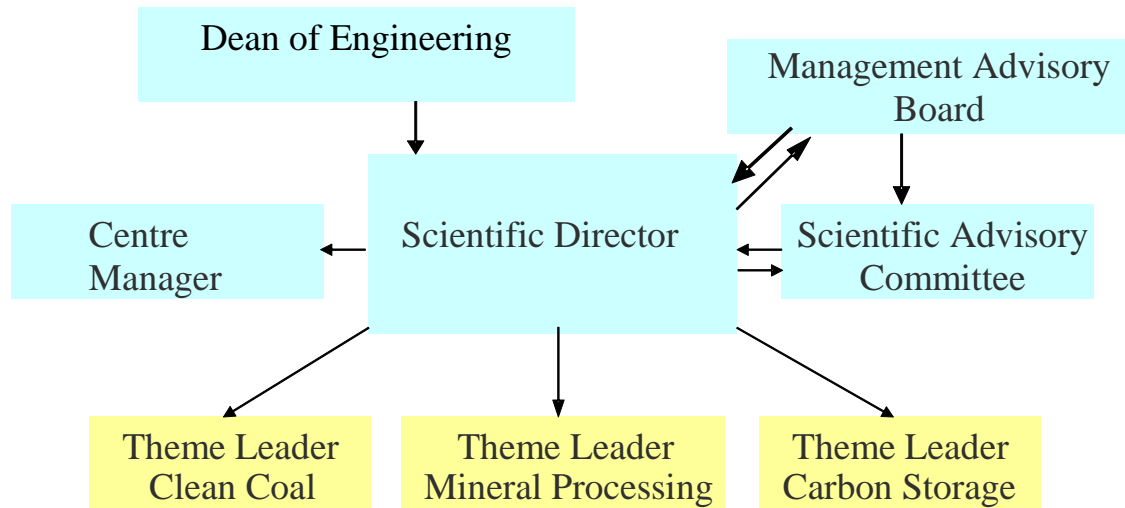


Figure 1. Management Structure for C<sup>5</sup>MPT

The Scientific Director of C<sup>5</sup>MPT will lead the University activities, including recruitment of faculty members and staff, development of new research projects, and promotion of the Centre to the University community. A Manager will be recruited to oversee the day-to-day operations of C<sup>5</sup>MPT, coordinate committee meetings, assist in the preparation of reports, and manage the research accounts. All continuing staff of the Centre, from the Director through to technicians, will be employees of the University of Alberta, subject to the hiring and employment policies of the University.

C<sup>5</sup>MPT research projects will be selected through rigorous screening and selection, with a mandate to focus on research that has the potential to lead either to completely new technologies, or to novel integration of process steps leading to improved environmental performance and energy efficiency. This approach could require evaluation of a large number of ideas in order to select the most promising. The workshop process that has been successfully developed for COSI will be adopted for use in C<sup>5</sup>MPT. The selection of projects involves significant collaboration between the University of Alberta and organizations represented on the SAC. Potential projects are reviewed for scientific merit and assessed for commercial potential. The SAC, with representatives from all sponsors, then meets at each stage of project selection to decide which projects are ready to proceed, and which projects require further discussion and improvement. Stage gating processes – ranging from front-end innovations to commercialization – will be adopted for project portfolios management.

### *C.2. Space*

The Faculty of Engineering will provide excellent office and laboratory space to house the incremental needs of C<sup>5</sup>MPT, within existing building space and space currently under construction. The newly renovated CME building provides new space for the Faculty of Engineering on the fourth and fifth floor in 2011. In addition, we anticipate that a couple of hundreds of square meters of space will become available in the newly renovated Chemical and Materials Engineering Building over the next two-three years. This space will provide ample room for the administration of the Centre, for the additional faculty positions that we anticipate filling as a result of the Centre that is creating Industry/NSERC chairs and the expansion in the number of students working on Centre's research programs.

### *C.3. Reporting and Review*

The Centre will provide an annual report to the Dean of Engineering. The Dean will annually report on the progress of the Centre as required by University of Alberta policy. Further, in consultation with key stakeholders, the Dean will conduct a major operational and strategic review of the Centre and its activities within three years of its establishment. Centre will provide annual report to stakeholders and Alberta Innovates – Energy and Environment Solutions.

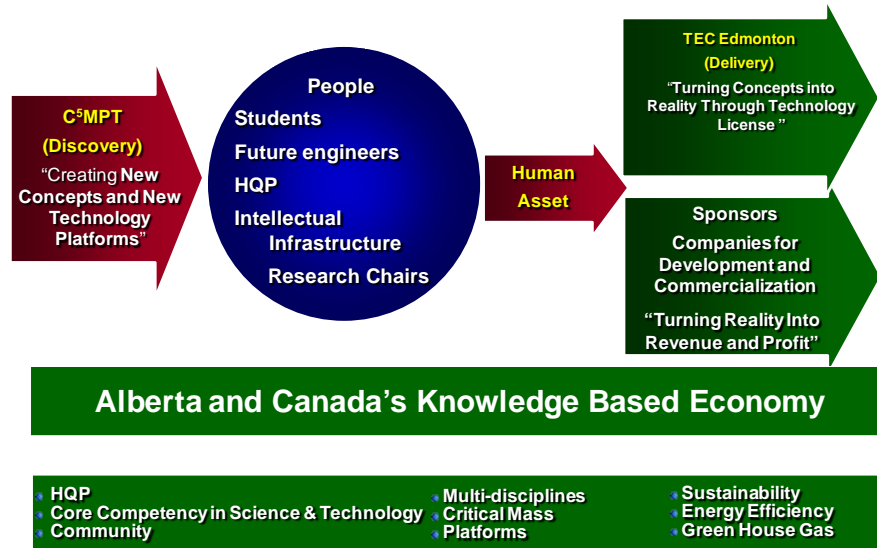
## **D. BUSINESS PLAN AND BUDGET**

Our business plan is shown in Figure 2 on the following page.

C<sup>5</sup>MPT has adopted a business model by which our integrated research programs create technology platforms that can be commercialized in a range of industries while creating a critical mass in multidiscipline research contributing to high qualified personnel trainings. The collaboration with industry by leveraging our solid fundamental understanding of surface science and phenomena and process know-how will accelerate the transformation of our scientific discoveries into industrial applications.

Benefits to Alberta and Canada will come from job creation from technology commercialization, generating new revenue and profit.





**Figure 2.** Business Model – Industry Partner Consortium

Projected Five Year Funding is about \$21.75 MM with the assumption that Alberta Innovates will continue to invest \$3.09 MM for additional two (2) years after initial three-year agreement of \$4.25 MM funding (see Appendix III). Industry funding excludes the NSERC-Industry oil sands chair program which has been in operation for almost one and half years.

[Response to SIG committee query] Putting any estimate of ‘probability’ or ‘certainty’ of AI’s continued support of the Centre beyond the third year before the committee would be problematic. What can be said is that AI has been heavily involved with the Centre at both the operational and scientific level, received the initial performance report and strategic and operation plan in a very positive manner, and continues to work closely with the Centre on all issues. Additionally, Centre sustaining funding is an MAB priority. Extensive Centre sponsor development, with support from the MAB and at the Dean level, has been undertaken to address sustaining funding. Notable sponsor candidates such as Vale, Barrick, Xstrata, and Deloitte, are in progress, with some decisions expected before calendar year end.

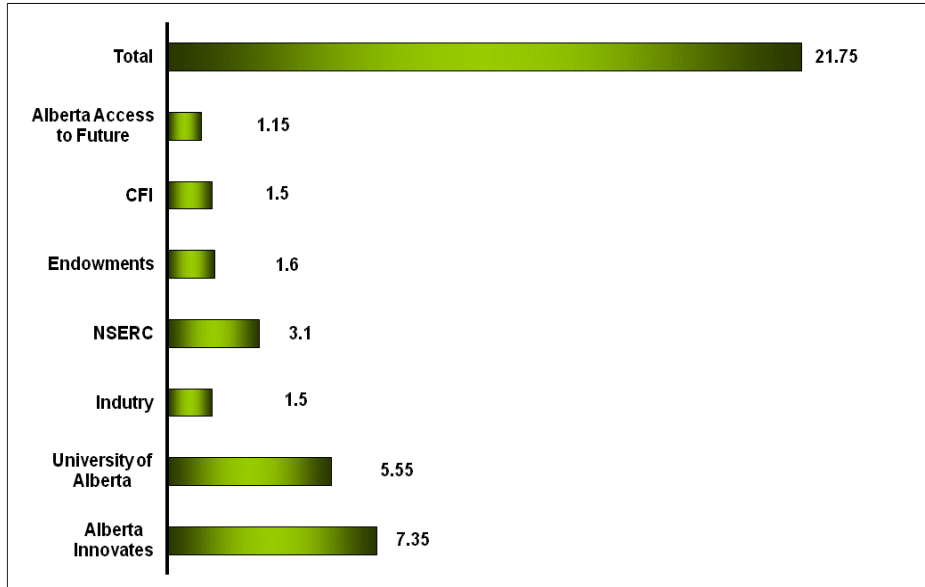


Figure 3. C<sup>5</sup>MPT Funding Structure – values in millions

**Alberta Access Funds:** From the interest on endowment money from industry partners, we will be eligible to request funding from the Alberta Access to the Future Fund for the sustained long-term operation of C<sup>5</sup>MPT well beyond the initial five-year period. The interest from contributing industry partners totals \$1.6 million with an additional \$1.15 million anticipated from the Access to the Future Fund, depending on the terms of the program. [ Response to SIG committee query – Associate Dean Mary-Ellen Compton has confirmed that requests for this funding is a previous priority, with some funding having actually been received to date. ]

**CFI Funds:** For part of the infrastructure (particularly for clean coal technology development), we are applying for about \$1 million from the Canada Foundation for Innovation (CFI). Our new faculty members will seek infrastructure funding from CFI for another \$500,000 in the third year, with matching from the centre.

**University of Alberta:** The University of Alberta is committed to provide outstanding facilities and faculty support. A Tier 1 Industry Research Chair in Clean Coal Technology and another one in the area of Carbon Storage will be applied for in the next round for IRCs. As verified below from a statement from the AITF agreement with respect to the nature of funding [ renovations, salary support], this support will come from within the Faculty of Engineering. The University of Alberta is committed to provide outstanding facilities in new building space (\$1 million for the renovation of 400 m of lab space) and substantial support for faculty positions.

- University of Alberta is committing salaries of \$650,000 per year for the four existing principal investigators for five years.
- All new appointments will be appointed from C<sup>5</sup>MPT funds. Apart from that, the University commits 50% of the start-up funds for these new academics.
- The University will contribute \$5000 towards TA and RA for each student per year.

The planned expenditures are shown in the following table. The actual expenditures by the Centre will depend on its success in obtaining these funds. Annual expenditures will be set by the funds available from these sources in a given year; therefore, the establishment of the Centre does not pose a financial risk to the University of Alberta. The fiscal year of the Centre will follow the University of Alberta; the dates are shown in the attached table based on an application to Alberta Innovates for matching funds, proposed to commence in September 2011.

As other components of the funding structure come available, any additional funding components will be assessed for use in the following priority:

- 1) For any urgent research needs that will have a leveraged/synergistic effect on current projects.
- 2) Any capital purchases that will act as enablers for research efforts by provide capability or capacity currently lacking [prioritized list in place]
- 3) Review of research staffing [Research Associates, project managers, or technicians] that will have a broad positive impact to Centre-funded research,
- 4) Augmentation of internal or external research funding that may be obtained by an increase in funding for this RFP pools.

As the research program develops, we plan to expand our collaborations to include researchers from other universities. On a project-specific basis, we also plan to seek collaborations with Carbon management of Canada (CMC), HAI program, and Alberta Water Research Institute. C<sup>5</sup>MPT will collaborate on specific projects with other industry partners, in support of its vision to develop the breakthrough technologies. The University of Alberta already enjoys extensive collaboration with government organizations and mining companies, and we will seek collaboration on C<sup>5</sup>MPT projects to bring the best minds and facilities to the research program, and to avoid duplication of effort and resources.



# CANADIAN CENTRE FOR CLEAN COAL\CARBON AND MINERAL PROCESSING TECHNOLOGIES (C<sup>5</sup>MPT)

## MANAGEMENT ADVISORY BOARD CHARTER

### Responsibilities:

Subject to the University of Alberta's right to reject the advice and guidance of the MAB and without intending to limit this general role of the MAB, the principal functions and responsibilities of the MAB include the following:

- To govern C<sup>5</sup>MPT in accordance with the Foundation Agreement
- To set strategic direction for C<sup>5</sup>MPT and determine research areas to be investigated.
- To periodically review C<sup>5</sup>MPT's performance versus expectations.
- To review and approve C<sup>5</sup>MPT budget, Annual Operating Plans, and Reports.
- To approve all research projects before funded research starts.
- To approve all decisions on intellectual property, in accordance with the Foundation Agreement.
- To approve new C<sup>5</sup>MPT endowment and/or term sponsors.
- To review proposed changes to foundation and partnership agreements.
- To review and make recommendations on issues and growth opportunities for C<sup>5</sup>MPT.
- To review and approve financial planning for the long-term sustainability of C<sup>5</sup>MPT.
- To act as ambassadors in the promotion of C<sup>5</sup>MPT's activities to the minerals resources and fossil fuel industry.

The detail of some MAB functions may be handled through MAB Committees, such as the Scientific Advisory Committee. However, the MAB as a whole is responsible for determining the extent of powers residing in each Committee and is ultimately responsible for accepting, modifying or rejecting Committee recommendations.

Notwithstanding anything else in this Charter, the MAB acknowledges that the University of Alberta is the employer of all C<sup>5</sup>MPT personnel, including but not limited to the Scientific Director, Centre Manager and Secretary. As such, the University of Alberta is wholly responsible for C<sup>5</sup>MPT's personnel and makes all of the final decisions regarding those personnel.

Notwithstanding anything else in this Charter, the MAB acknowledges that the C<sup>5</sup>MPT personnel are subject to the policies, procedures and applicable collective agreements of the University of Alberta and all recommendations of the MAB shall be in compliance with those policies, procedures and applicable collective agreements.

## **Membership:**

Subject to the Foundation Agreement, the Program Guide and the AI-TF Agreement, the Management Advisory Board shall be composed of:

- One representative from each of the C<sup>5</sup>MPT Endowment Sponsors and current Term Sponsors at that time
- One representative from Alberta Innovates – Energy and Environment Solutions
- One representative from the University of Alberta
- The Chair of the Department of Chemical and Materials Engineering of the University of Alberta and C<sup>5</sup>MPT Scientific Director are non-voting ‘ex officio’ members of MAB.

The Chairman must be drawn from the members of MAB and shall be determined by a vote of MAB members.

Designates for the sitting members may attend meetings by notifying the Chair of MAB prior to MAB meeting and carry voting rights for the MAB member they are attending in lieu of.

## **Meetings:**

Meetings to achieve the responsibilities detailed above will be called as required by the MAB Chair, at a minimum of twice in each fiscal year. At Chair discretion, meetings may be held via a teleconference [or similar means] if physical attendance by MAB members dictates.

## **Decisions:**

- Wherever possible decisions will be consensus based.
- Where voting is required, each MAB member or designate holds a single vote.
- A quorum for voting is the total number of voting members minus two.
- Where the vote is tied the MAB Chair will cast a deciding vote.
- If necessary, the procedures for arbitration are set out in the Foundation Agreement.
- MAB review/discussion and decisions may occur via electronic means [i.e. email or other].

All operating matters affecting University of Alberta funding, resources and staff are to be ultimately approved by the Scientific Director on behalf of the University of Alberta, considering the recommendations of the MAB that arise at the meeting.

## **Administration:**

- The Scientific Director will provide the administration for the committee e.g. meeting notices, room bookings.
- The Scientific Director arranges for the minutes of meetings to be recorded and published for review and comment after which a final version will be published and filed.
- The meeting minutes serve as the definitive documentation of the MAB decisions.

# CANADIAN CENTRE FOR CLEAN COAL\CARBON AND MINERAL PROCESSING TECHNOLOGIES (C<sup>5</sup>MPT)

## SCIENTIFIC ADVISORY COMMITTEE CHARTER

### Responsibilities:

The Scientific Advisory Committee (SAC) is a Committee of the C<sup>5</sup>MPT Management Advisory Board (MAB) established as required under the Foundation Agreement. The duties of the SAC are to:

- set priority areas of research and review research proposals from University of Alberta, other universities and all research organizations
- review and screen proposals, and work with researchers to align proposals with existing work and strategic direction and areas
- propose projects to the MAB to be funded via creation of a proposal review summary sheet
- conduct “gate reviews” on research projects as stated in the Foundation Agreement of C<sup>5</sup>MPT
- align proposed research projects with the objectives of C<sup>5</sup>MPT and industry needs
- determine the projects that are ready for further technology development or for the protection of intellectual property and make recommendations to MAB
- meet at least two (2) times a year.

### Membership:

Subject to the Foundation Agreement, the Program Guide and the AITF Agreement, the Scientific Advisory Committee shall be composed of:

- One representative as a voting member from each of the C<sup>5</sup>MPT Endowment Sponsors and current Term Sponsors
- One representative as a voting member from Alberta Innovates – Energy and Environment Solutions
- One representative as a voting member from the Faculty of Engineering of the University of Alberta
- One representative as a voting member from the Department of Chemical and Materials Engineering of the University of Alberta
- The Scientific Director of C<sup>5</sup>MPT as a voting member
- World-renowned scholars within the C<sup>5</sup>MPT’s Theme areas as non-voting ‘ex officio’ members

NOTE: World-renowned scholars in the area of clean coal/carbon and mineral processing shall be added to the Scientific Advisory Committee upon recommendation of the C<sup>5</sup>MPT Scientific Director.

The SAC Chairperson must be drawn from the SAC, and is recommended by the SAC to the MAB. The MAB holds final approval on the Chair appointment. If the Scientific Director is designated Chair, a Co-Chair must also be appointed to address the Conflict of Interest issues detailed below.

Designates for the sitting members may attend meetings and vote, if the member they are attending in lieu of holds voting privileges.

### **Meetings:**

Meetings to achieve the responsibilities detailed above will be called as required by the Scientific Director of C<sup>5</sup>MPT.

### **Decisions :**

- Wherever possible decisions will be consensus based.
- Where voting is required, each voting SAC member holds a single vote.
- A quorum for voting is the total number of voting members minus three.
- Where the vote is tied the set of choices and the case for each is referred to the MAB for resolution and final decision. [As per mandate, all funding decisions must be approved at the MAB level regardless.]

### **Administration:**

- The Scientific Director will provide the administration for the committee e.g. meeting notices, room bookings.
- The Scientific Director arranges for the minutes of meetings to be recorded and published for review and comment after which a final version will be published and filed.
- The meeting minutes serve as the definitive documentation of the SAC decisions.

### **Conflict of Interest:**

The SAC role may include the evaluation of research projects that involve members of the SAC. The proper functioning of SAC requires the scientific insight of faculty members who are knowledgeable about aspects of C<sup>5</sup>MPT's research, but these same faculty members are likely to be involved in proposals submitted to SAC. In order to avoid a conflict of interest in evaluating research proposals, the following practices will be followed:

1. When an SAC member is personally involved in a project as an investigator or co-investigator, that member will have no involvement with the peer review of their proposal, and will leave the room while SAC is discussing the project.
2. If SAC is discussing ranking of projects for recommendation to MAB in order to meet budget targets, then all SAC members who are involved in any of the projects will leave the room.
3. Recommendations to MAB will be presented by the Scientific Director of C<sup>5</sup>MPT.





March 9, 2011

Dr. Carl G. Amrhein  
Provost & Vice-President (Academic)  
University of Alberta 2-10, University Hall  
Edmonton, Alberta T6G 2J9

**Re: Letter Of Support For The Canadian Centre For Clean Coal/Carbon and Mineral Processing Technologies (C<sup>5</sup>MPT), University Of Alberta**

Dear Dr. Amrhein:

Teck Resources is very pleased to support the proposal to establish the Canadian Centre for Clean Coal/Carbon and Mineral Processing Technologies (C<sup>5</sup>MPT) at the University of Alberta.

The University of Alberta has identified research and education in energy, water, and environment for sustainable development of natural resources as high priorities. The establishment of C<sup>5</sup>MPT as a GFC-recognized Centre will support the University of Alberta's strategic plan by advancing existing research strength in the areas of clean coal/carbon and mineral processing technologies, interfacial science, and advanced materials and catalysis. The development of energy related research is a high priority for the Faculty of Engineering.

Canada is one of the major producers for base metals. The mining and oil and gas extraction industry contributes to about 5% gross domestic production (GDP). Significant challenges facing minerals industry include declining grades, increasing complexity, social expectations, environmental legislation, energy cost/availability, water limitations, carbon taxes, and sustainable development. Mining sector productivity fell by 24% from 2001 to 2007 while the energy intensity of the sector increased 3.7% per year from 1990 to 2006.

We are facing a global shortage of skilled metallurgists for the minerals industry. Universities are also struggling to attract top-tier research professors resulting in a shortage or disappearance of u/g degrees in Mineral Processing and Metallurgy. There is no identifiable Centre of Excellence for mineral processing research in Canada, and only limited capacity to conduct fundamental research to develop innovative technology solutions that address our industry's challenges. C<sup>5</sup>MPT will expand the University's research on mineral and energy resources and sustainable development, and offer more opportunities for training of highly qualified undergraduate and post-graduate students.

The proposed Centre provides an exciting opportunity for Teck to expand its collaboration with both the University of Alberta and the minerals industry, and we are pleased to offer the Centre substantial support.

Sincerely,

A handwritten signature in blue ink, appearing to read "Andrew Stradling", is positioned above the typed name.

Andrew Stradling  
Consulting Metallurgist  
Teck Metals Ltd.

March 1, 2011

Dr. Carl G. Amrhein  
Provost & Vice-President (Academic)  
University of Alberta 2-10,  
University Hall  
Edmonton, Alberta  
T6G 2J9

Dear Dr. Amrhein

**Subject: Letter Of Support For The Canadian Centre For Clean Coal/Carbon and Mineral Processing Technologies (C<sup>5</sup>MPT), University Of Alberta**

Hatch is very pleased to support the proposal to establish the Canadian Centre for Clean Coal/Carbon and Mineral Processing Technologies (C<sup>5</sup>MPT) at the University of Alberta.

The University of Alberta has identified research and education in energy, water, and environment for sustainable development of natural resources as high priorities. The establishment of C<sup>5</sup>MPT as a GFC-recognized Centre will support the University of Alberta's strategic plan by advancing existing research strength in the areas of clean coal/carbon and mineral processing technologies, interfacial science, and advanced materials and catalysis. The development of energy related research is a high priority for the Faculty of Engineering.

Canada is one of the major producers for base metals. The mining and oil and gas extraction industry contributes to about 5% gross domestic production (GDP). Significant challenges facing minerals industry include declining grades, increasing complexity, social expectations, environmental legislation, energy cost/availability, water limitations, carbon taxes, and sustainable development. Mining sector productivity fell by 24.3% from 2001 - 2007 while energy intensity of mining sector increased 3.7% per year from 1990 - 2006. Global shortage of skilled metallurgists for the minerals industry is a pressing issue for the industry. Universities are struggling to attract top tier research professors resulting in a shortage or disappearance of u/g degrees in Mineral Processing and Metallurgy. There is no identifiable Centre of Excellence for mineral processing research in Canada and only limited capacity to conduct fundamental research to develop innovative technology solutions that address industry challenges. C<sup>5</sup>MPT will expand the research on Alberta's preeminent energy resources and sustainable development, and offer more opportunities for training of students and postdoctoral fellows.

March 1, 2011

The proposed Centre is an exciting opportunity for Hatch to expand its collaboration with both the University of Alberta and the energy industry, and we are pleased to offer the Centre substantial support.

Yours faithfully,

A handwritten signature in black ink, appearing to read "L. Gunnewiek".

Lowy Gunnewiek  
Global Managing Director, Oil & Gas  
Hatch Ltd.  
700,840-7Ave SW  
Calgary, Alberta  
T2P 3G2

LG:sm



CMG Reservoir Simulation Foundation  
Suite 700, One Executive Place  
1816 Crowchild Trail NW  
Calgary, AB Canada T2M 3Y7  
Office: (403) 450-8399

July 15, 2011

Dr. Carl G. Amrhein  
Provost & Vice-President (Academic)  
University of Alberta 2-10  
University Hall  
Edmonton, Alberta  
T6G 2J9

Dear Dr. Amrhein

**Subject: Letter of Support For The Canadian Centre For Clean Coal/Carbon and Processing Technologies (C<sub>5</sub>MPT), University of Alberta**

Foundation CMG is very pleased to support the establishment of the Canadian Centre for Clean Coal/Carbon and Mineral Processing Technologies (C<sub>5</sub>MPT) at the University of Alberta. The University of Alberta has identified research and education in energy, water, and environment for sustainable development of natural resources as high priorities. The establishment of C<sub>5</sub>MPT as a GFC-recognized Centre will support the University of Alberta's strategic plan by advancing existing research strength in the areas of clean coal/carbon and mineral processing technologies, interfacial science, and advanced materials and catalysis. The development of energy related research is a high priority for the Faculty of Engineering.

Canada is one of the major producers for base metals and petroleum. The mining and oil and gas extraction industry contributes to about 5% gross domestic production (GDP). Significant challenges facing minerals industry include declining grades, increasing complexity, social expectations, environmental legislation, energy cost/availability, water limitations, carbon taxes, and sustainable development. Global shortage of skilled engineers for the petroleum industry is a pressing issue for the industry. Universities are struggling to attract top tier research professors resulting in a shortage of undergraduate degrees in petroleum.

C<sub>5</sub>MPT will expand the research on Alberta's preeminent energy resources and sustainable development, and offer more opportunities for training of students and postdoctoral fellows. The proposed Centre is an exciting opportunity for Foundation CMG to expand its collaboration with both the University of Alberta and the energy industry, and we are pleased to offer the Centre substantial support.

Sincerely,

A handwritten signature in dark ink, appearing to read "D. Anderson", with a stylized flourish at the end.

Duke Anderson  
President  
Foundation CMG

Capital Power Corporation  
5<sup>th</sup> Floor TD Tower  
10085-102 Avenue  
Edmonton, AB T5J 2Z1  
T 780.392.5373 F 780.392.5200  
www.capitalpower.com

Capital Power  
Corporation



June 16, 2011

Dr. Carl G. Amrhein  
Office of the Provost & Vice-President (Academic)  
University of Alberta 2-10, University Hall  
Edmonton, AB T6G 2J9

Dear Dr. Amrhein,

**Re: Letter of Support for the Canadian Centre for Clean Coal/Carbon and Mineral Processing Technologies (C5MPT), University of Alberta**

Capital Power is pleased to support the Canadian Centre for Clean Coal/Carbon and Mineral Processing Technologies (C5MPT) at the University of Alberta.

Led by Dr. Chad Liu, the centre will educate the next generation of clean energy engineers and cultivate new technologies to process minerals, produce clean coal, and reduce greenhouse gas emissions.

World class facilities such as C5MPT will help build, improve and enhance research excellence, research capacity and create new technologies and best practices that will help develop cleaner coal technologies and further establish the University of Alberta's reputation for conducting leading-edge research.

We look forward to the successes and cutting edge advancements that C5MPT will enable both now and in the future for significant producers of CO<sub>2</sub> including Capital Power in-order for us to reduce emissions and our environmental footprint.

We fully support academic research on carbon management and coal technologies which will create value for not only industry but for Alberta.

Sincerely,



Darcy Trufyn, Senior Vice-President  
Construction, Engineering and Project Management  
Capital Power Corporation



File

4007-CCC

**nexen**

NEXEN INC.  
801 - 7 Avenue SW Calgary AB Canada T2P 3P7  
T 403 699.5433 F 403 699.5760 www.nexeninc.com  
Email pat\_jamieson@nexeninc.com

To: D. Lynch - for  
response

e. C. Watt

June 1, 2011

Dr. Carl G. Amrhein  
Provost & Vice President (Academic)  
University of Alberta 2-10  
University Hall  
Edmonton, Alberta T6G 2J9



Dear Dr. Amrhein:

**RE: Letter of Support for the Canadian Centre For Clean Coal/Carbon and Mineral Processing Technologies (C5MPT)**

Nexen Inc. is pleased to support the Canadian Centre for Clean Coal/Carbon and Mineral Processing Technologies at the University of Alberta. The University has identified research and education in energy, water and environment for sustainable development of natural resources as high priorities. Nexen believes that the establishment of C5MPT will clearly support the University's strategic plan, support the priorities of the Faculty of Engineering, and support the needs of the Centre's industrial partners.

As you are well aware, Western Canada is a world leading developer of oil & gas, a key contributor to our country's economic growth and employment. We fully expect the Centre's research activities to add significant value in the years to come, via new innovations to increase the energy industry's sustainability. The goal of producing clean energy is a formidable challenge, requiring effective collaboration between industry, academia and government. C5MPT is an excellent example of this type of collaboration.

The Nexen Professor in Reaction Engineering, a key contributor to C5MPT, will focus on gasification and thermal conversion processes, areas which are near and dear to our business. As a result, Nexen has agreed to contribute \$1,500,000 to the Centre.

Our Nexen/Opti Long Lake project is a unique, next generation oil sands development that integrates the steam assisted gravity drainage (or SAGD) recovery process with our proprietary OrCrude upgrading technology. The overall process involves a gasification unit and a hydrocracker, producing a very high quality, 39 degree API synthetic crude oil. We welcome the opportunity to work closely with the Reaction Engineering Professor to seek even more efficient and environmentally friendly gasification and upgrading technologies. We also expect that this new initiative will generate a badly needed, new stream of highly qualified engineering professionals.

In summary, Nexen Inc. is strongly supportive of C5MPT and we look forward to working with the University of Alberta to make this research program a productive and valuable one for our company and our other industry partners in the years to come.

Sincerely,



Patrick Jamieson, Ph.D.  
Senior Technology Advisor  
Nexen Inc.

**ALBERTA INGENUITY CENTRE FOR CLEAN COAL/CARBON AND  
MINERAL PROCESSING TECHNOLOGIES AGREEMENT**

THIS AGREEMENT made the 28 day of August, 2009.

BETWEEN:

**The Governors of the University of Alberta,**  
a corporation under the *Post Secondary Learning Act*, (Alberta),

(the "University")

-and-

**Alberta Heritage Foundation for Science and Engineering Research,**  
Operating as the Alberta Ingenuity Fund  
("AIF")

PREAMBLE

WHEREAS:

- A. Alberta Heritage Foundation for Science and Engineering Research is a corporation established by an Act of the Legislature of the Province of Alberta that operates under the official mark of Alberta Ingenuity Fund.
- B. The general objects of AIF are to establish and support a balanced long-term program of science and engineering research based in Alberta directed to the discovery of new knowledge and the application of that knowledge to improve the quality of Alberta's economy, communities and environment.
- C. The specific objects of AIF are to:
1. stimulate research in science and engineering;
  2. promote effective means of using in Alberta science and engineering resources of Alberta;
  3. support science and engineering research laboratories and related facilities in Alberta;
  4. promote co-operation in science and engineering to minimize duplication in, and promote concentration of, effort in that research in Alberta;
  5. encourage young Albertans to pursue careers in research in science and engineering.



D. In furtherance of its objects and in order to create a competitive edge for recruiting highly qualified investigators to Alberta, AIF has developed the Alberta Ingenuity Centres Program (the "Ingenuity Centres Program").

E. The Ingenuity Centres Program supports groups of outstanding researchers from Alberta universities or other research institutions and industry, with interdisciplinary scope and vision, led by an internationally-recognized researcher.

F. The University, in accordance with the process established by AIF for the Ingenuity Centres Program, submitted to AIF a proposal and AIF approved the proposal for the establishment by the University of an AIF centre under the Ingenuity Centres Program on the terms and conditions set forth in this Agreement.

In consideration of these premises and of the mutual covenants, agreements and conditions herein contained AIF and the University agree as follows:

**1. GENERAL**

**1.1 Conditions Precedent**

This Agreement is executed subject to the following condition precedents, namely that:

- (a) On or before September 15, 2009, provided the terms and conditions in the agreement are acceptable to the University, the University shall execute the Intellectual Property Agreement and provide evidence of the execution of the Intellectual Property Agreement to AIF;
- (b) On or before February 1, 2010, AIF and the University agree upon and attach a Strategic Business Plan as Schedule "A" to this Agreement, which Strategic Business Plan will have been approved by the Management Advisory Board of the Centre;
- (c) On or before February 1, 2010, AIF and the University will agree upon and attach a Centre Budget and Payment Schedule as Schedule "B" to this Agreement;
- (d) On or before February 1, 2010, AIF and the University will agree upon and attach Performance Targets as Schedule "C" to this Agreement.

On performance of these conditions, this Agreement shall be in force and binding on the Parties, but otherwise the Agreement shall be void, save for:

- (i) the provisions in the Agreement pertaining to the obligations of each Party with respect to Fiscal Year 0; and
- (ii) Section 7.5 hereof.

which provisions are in force on the date that AIF provides to the University the Notice of Award and attached Budget pertaining to Year 0 as contemplated in Schedule "B" of this Agreement.

In the event that the conditions are not performed and the Agreement is void, the Centre shall be wound up in accordance with Section 7.5 hereof;

- 1.2 The Parties acknowledge that the Program Guide is a comprehensive document that governs the operation of the Ingenuity Centres Program and agree to abide by the rules and requirements in the Program Guide at all times. In the event that this Agreement conflicts with the Program Guide the Program Guide will supersede this Agreement to the extent of such conflict unless otherwise expressly indicated in this Agreement.
- 1.3 In this Agreement the following words and phrases will have the following meanings:
- (a) "AIF Board of Trustees" means the board of trustees of AIF in place from time to time;
  - (b) "Annual Contribution" means the cash contributions made by AIF to the Ingenuity Centre described in Section 3.1;
  - (c) "Annual Operating Plan" means the "Annual Strategic Outlook and Operation Plan" describe in the Program Guide which shall include the items described in Appendix "D" of the Program Guide;
  - (d) "Agreement" means this Alberta Ingenuity Centre For Clean Coal/Carbon and Mineral Process Technologies Agreement;
  - (e) "Centre Budget" means the Ingenuity Centre budget described in the Strategic Business Plan and as modified by the AIF approved Annual Operating Plans;
  - (f) "Centre Research" means the research defined in Section 5.1;
  - (g) "Centre Reports" means the reports and other documentation described in Section 4;
  - (h) "Commercialization" means the following:
    - (i) those activities undertaken to add value to the intellectual property created through Centre Research with the aim to develop such intellectual property for use in a public marketplace including, without limitation, the following activities:
      - (A) the design, development, testing and characterization of prototypes;
      - (B) the study and evaluation of the marketplace intended for the intellectual property and the creation of marketing plans;

(C) the design and evaluation of production processes for resulting products; and

(D) the preparation of business plans and the establishment of business frameworks for areas such as financing, intellectual property protection, company formation and technology transfer;

and

(ii) the commercial use of intellectual property created through Centre Research, including making, using, selling or offering for sale goods or services that involve the use of such intellectual property, marketing, business or legal exploitation and transfers of the intellectual property, including but not limited to licensing or selling of any intellectual property created through Centre Research, at any time during or after the Term.

- (i) "Direct Costs" means those direct costs or expenses approved by AIF as recoverable by the University from the Annual Contribution;
- (j) "Effective Date" means September 1, 2009
- (k) "Eligible Costs" means Direct Costs and the Indirect Costs Allowance;
- (l) "Indirect Costs Allowance" means the allowance for indirect costs of the University which is equal to 15% of the Direct Costs excluding costs of equipment;
- (m) "Parties" means the parties to this Agreement;
- (n) "Performance Targets" means the objectives, strategies, milestones and deliverables described in the Strategic Business Plan and as modified by the AIF approved Annual Operating Plans;
- (o) "Personnel Costs" means those costs described in Section 3.3;
- (p) "Program Guide" means the program guide for the Ingenuity Centres for Research and Commercialization Program available online at [http://www.albertaingenuity.ca/files/Program%20Guide%20ICRC%20Nov23\\_0.pdf](http://www.albertaingenuity.ca/files/Program%20Guide%20ICRC%20Nov23_0.pdf), as it as exists from time to time;
- (q) "Scientific Director" means the individual described in Section 2.4;

- (s) Year 0" means the time period required to achieve the milestones established in the "Implementation Schedule", which Implementation Schedule is attached to this Agreement as Schedule "D", occurring between formal communication of acceptance to the ICRC program and no later than the Year 1 start date of April 1, 2010.

1.4 The following Schedules shall form part of this Agreement:

- Schedule "A" Strategic Business Plan
- Schedule "B" Centre Budget and Payment Schedule
- Schedule "C" Performance Targets
- Schedule "D" Implementation Schedule

**2. ESTABLISHMENT AND OPERATION OF AN AIF CENTRE**

- 2.1 The University establishes an Alberta Ingenuity Centre named the Alberta Ingenuity Centre for Clean Coal/Carbon and Mineral Process Technologies (the "Ingenuity Centre") effective as at the date as of which this Agreement is made (the "Effective Date").
- 2.2 AIF will make an Annual Contribution and the University will operate the Ingenuity Centre each as provided in this Agreement for a period of three years from the Effective Date subject to any earlier termination or renewal as provided in this Agreement (the "Term"). The Ingenuity Centre shall be operated according to AIF's fiscal year being April 1 – March 31 (the "Fiscal Year") as follows:
- (a) Fiscal Year 0 – September 1, 2009 – March 31, 2010;
  - (b) Fiscal Year 1 – April 1, 2010 – March 31, 2011;
  - (c) Fiscal Year 2 – April 1, 2011 – March 31, 2012;
  - (d) Fiscal Year 3 – April 1, 2012 – March 31, 2013;
- 2.3 If AIF is satisfied with the conclusions of the three year performance review undertaken pursuant to Section 4.4, it will consider a request from the University to renew the Term of this Agreement for an additional five years. Renewal of the Term is subject to approval by the AIF Board of Trustees.
- 2.4 AIF in its approval of the Ingenuity Centre acknowledged Dr. Qingxia Liu as an internationally-recognized researcher and approved the Proposal on the condition that Dr. Qingxia Liu be appointed as the initial Scientific Director. Accordingly, the University appoints Dr. Qingxia Liu as the initial Scientific Director. Except as otherwise provided in this Agreement, the Scientific Director will, on behalf of the University, oversee operations of the Ingenuity Centre and the scientific and technical conduct of the research undertaken through the Ingenuity Centre. If any



as otherwise provided in this Agreement, the Scientific Director will, on behalf of the University, oversee operations of the Ingenuity Centre and the scientific and technical conduct of the research undertaken through the Ingenuity Centre. If any then designated individual ceases to act as the Scientific Director and a successor Scientific Director proposed by the University is not accepted by AIF as an internationally-recognized researcher or for any other reason, the parties will wind-down the Ingenuity Centre in accordance with Section 7.5.

- 2.5 The University, in consultation with and with the consent of AIF, will cause the Ingenuity Centre to be managed and governed in accordance with the Strategic Business Plan. Any changes made to the governance of the Ingenuity Centre during the Term must be approved by AIF.
- 2.6 A "Management Advisory Board", as described in the Program Guide, and in this Agreement, this Agreement superceding the Program Guide in this regard, shall be appointed for the Ingenuity Centre to oversee the management, direction and financial accountability of the Ingenuity Centre. The Management Advisory Board is accountable to AIF and all Annual Operating Plans, Centre Budgets and Centre Reports must be reviewed and approved by the Management Advisory Board before submission to AIF.

The University is not required to obtain the consent of AIF or its Board of Trustees to the appointment of members to the Management Advisory Board. Although it is expected that the University and the University's Ingenuity Centre Scientific Director will consider the advice and guidance of the Management Advisory Board, the Scientific Advisory Board and the Intellectual Property Committee, no term or condition of this Agreement, the Program Guide or the Intellectual Property Agreement compels the University to accept such advice or guidance.

- 2.7 The University will operate the Ingenuity Centre substantially in accordance with the Strategic Business Plan and this Agreement and according to the advice and direction of the Management Advisory Board at all times. Any material change in the operation of the Ingenuity Centre from the Strategic Business Plan requires the prior approval of AIF. Amendments made to this Agreement may only be made by mutual agreement of the Parties and must be made in writing.
- 2.8 Equipment – Equipment purchased by the University or by another university or other institution collaborating in the Ingenuity Centre with the University will be owned by the University or the collaborating institution that purchased it. The primary use of any such equipment is for the purposes of the Ingenuity Centre. Any usage capacity in excess of that required by the Ingenuity Centre may be used for other purposes of the owner.

### 3. CONTRIBUTIONS

- 3.1 Amount of Contribution - AIF will provide to the University over the first three years of the Term a financial contribution (the "Annual Contribution") equal to the lesser of:
- (a) the aggregate of **four million two hundred fifty thousand dollars (\$4,250,000)**, and any additional amount for the three year Term as approved by AIF in conjunction with AIF's approval of the budget for each Fiscal Year as contemplated in the Strategic Business Plan and as modified in the Annual Operating Plan; and
  - (b) the total of Eligible Costs incurred by the University in the first three years of the Term.
- 3.2 The Annual Contribution may be used only for Eligible Costs. The Eligible Costs for the initial Fiscal Year are set forth in Schedule "B" and in each subsequent Fiscal Year will be identified in the Annual Operating Plan for such Fiscal Year and approved by AIF.
- 3.3 Personnel Costs – In order to create the competitive edge for recruiting highly qualified investigators to Alberta referred to in Recital D of this Agreement and in order to encourage young Albertans to pursue careers in research in science and engineering, AIF has approved specific amounts of the Annual Contribution for the recruitment and retention of personnel (the "Personnel Costs"). Notwithstanding any provision of Section 3.4 to the contrary, no Eligible Costs that are Personnel Costs may be reallocated to Eligible Costs that are not Personnel Costs as otherwise contemplated in Section 3.4.
- 3.4 Limited Reallocation of Eligible Costs - Eligible Costs for any Direct Cost budget line item for a Fiscal Year may exceed the amount for that line item contained in the Centre Budget approved by AIF by a percentage of not more than ten (10%) percent or such greater percentage permitted by AIF. No such increase in a budget line item will result in an increase in the maximum amount of Eligible Costs payable by AIF for that Fiscal Year.
- 3.5 Payment Procedure - The Annual Contribution will be paid by AIF in quarterly installments via the Consolidated Payment plan in each Fiscal Year according to the terms of Schedule "B" and the Annual Operating Plans and adjusted accordingly to the cash position of the Ingenuity Centre as depicted by the mid-year financial status report described in Section 4.1(c)(i). Unused funds from an approved annual budget may be rolled over into the following fiscal year but only

to address an expenditure issue and only with the prior written approval of AIF. Unused funds in excess of these amounts will be applied against the approved budget of the following fiscal year and will reduce the amount to be transferred from AIF.

- 3.6 Payment of the Annual Contribution shall be subject to receipt and approval by AIF of the Centre Reports according to the terms described in this Agreement and all other documentation required to be submitted to AIF pursuant to this Agreement and payment shall be made by AIF according to the payment schedule described in Schedule "B".
- 3.7 Upon expiry of the Term, or earlier termination thereof, the University shall pay all unexpended Annual Contributions to AIF. Any portion of the Annual Contributions expended other than in accordance with this Agreement or not permitted to be retained by the approved Centre Budget or the terms of this Agreement shall be returned forthwith to AIF by the University.
- 3.8 The University shall not pledge any part of the Annual Contributions as security for any loan or debt of any kind except as expressly authorized by AIF in writing.
- 3.9 Start-up Site Visit – Within 12 months of the Effective Date, AIF shall conduct a "Start-up Site Visit and Centre Review" and provide a report to the University as described in the Program Guide. The University shall be required to respond to such report to the satisfaction of AIF and AIF shall not be required to disburse further installments of the Annual Contribution to the University until it receives such response.
- 3.10 The Parties acknowledge that AIF funding for the Ingenuity Centre is approved only for the Term. If the Ingenuity Centre requires continued funding by AIF after the end of the Term, an application for renewal of this Agreement according to the process described in the Program Guide will be required. The Parties acknowledge that AIF funding is subject to financial constraints and AIF's mandate and that there is no obligation of any kind on AIF to renew its funding for the Ingenuity Centre, in whole or in part, at the end of the Term.
- 3.11 The University shall use reasonable efforts to conduct the operation of the Ingenuity Centre in accordance with the time lines and schedules described in the Performance Targets and to meet and deliver the milestones and deliverables described in the Performance Targets as set out in Schedule C or amended from time to time in writing by AIF and the University..
- 3.12 The provision of the Annual Contribution is dependent upon AIF being satisfied with the progress and success of the Ingenuity Centre. The progress and success of the Ingenuity Centre will be measured according to the Performance Targets and



evaluated by AIF using the “Ingenuity Centres Framework” and the five key “Performance Perspectives” described in the Program Guide.

#### **4. REPORTING, RECORDS AND AUDITS**

4.1 Reporting Requirements - The University will provide the following reports to AIF in a timely and accurate fashion, as well as any additional reports described in the Program Guide or reasonably requested by AIF pertaining to the Ingenuity Centre and its operations, in the form described in the Program Guide or as otherwise deemed satisfactory by AIF:

- (a) **Annual Operating Plan** – This document provides the Ingenuity Centre management with an effective and efficient tool to highlight any updates or revisions to the Strategic Business Plan for the Ingenuity Centre. This document will also contain any revisions and supporting details regarding the next years operating budget. The Annual Operating Plan is due by February 28 of each Fiscal Year of the Term.
- (b) **Performance Reporting** – The University will provide the following reports detailing actual Ingenuity Centre results and estimated expenditures with respect to the performance criteria and the approved Centre Budget for the respective Fiscal Year of the Term:
  - (i) An annual performance report detailing actual results for each Fiscal Year with respect to the Ingenuity Centre’s indicators specified in the Performance Targets and any other performance criteria included in the Strategic Business Plan. The annual performance report is due by February 28 of each Fiscal Year of the Term (the University will be required to project results and performance details for the final month of each Fiscal Year);
  - (ii) A mid-year performance report updating progress as it relates to the Performance Targets and any other performance criteria included in the Strategic Business Plan and any changes in the strategic direction for the period of April 1 – September 30. The mid-year performance report is due by October 1 of each Fiscal Year of the Term;

The annual and mid-year performance reports will report with reference to “Ingenuity Centres Framework” and the five key “Performance Perspectives” described in the Program Guide.



- (c) **Financing Reporting** – The University will provide the following financial reports reflecting the sources and uses of Annual Contributions according to generally accepted accounting principles:
- (i) A mid-year financial status report for the period (April 1 – September 30) that updates the Ingenuity Centre’s financial position and signals the appropriate disbursement of funds for the remaining period of the Fiscal Year (October 1 – March 31) by October 1 of each Fiscal Year of the Term.
  - (ii) An annual financial status report for the period (April 1 – March 31) that updates the Ingenuity Centre’s financial position and provides a financial summary including all additional funding, and a variance report and a forecast for the upcoming year

The financial reports shall describe the Ingenuity Centre expenditures and provide an account of sources of Annual Contributions during that period including: Expenditures detailed by separate line items and with separate columns for Annual Contributions and financial contributions made by the University and any other third party for expenditures during the year covered by the report and for total expenditures-to-date; Separate account of any Ingenuity Centre related income, including revenue from intellectual property created through Centres Research; and, requests for disbursement of Annual Contributions that coincide with the payment commitment within that period.

- (d) **Final Report** – A final report is due within sixty days of termination of the Ingenuity Centre. The final report will detail actual results with respect to the performance criteria specified in the Performance Targets and any other performance criteria included in the Strategic Business Plan for the reporting period ending with the date of termination of the Ingenuity Centre. The final report will be approved by the management of the Ingenuity Centre and be in a form satisfactory to AIF. It will also include statements of expenditures for the reporting period showing that the Annual Contributions have been spent in accordance with the Centre Budget approved by AIF and the terms of this Agreement.

- 4.2 If any report or part thereof contains confidential information the University must clearly label the report or part thereof as “confidential” or clearly identify any other reason why the information cannot be disclosed. AIF, to the extent possible, shall take all steps necessary to maintain the confidentiality of this information.
- 4.3 **Implementation of Feedback** – Annually, the documents specified above will be reviewed by AIF’s “Ingenuity Centres Review Committee” to provide guidance and constructive feedback to the Ingenuity Centre. Any significant changes or modifications required to the Annual Operating Plans stemming from this

feedback will be provided by the University to AIF prior to June 30<sup>th</sup> of each respective Fiscal Year of the Term.

4.4 **Three Year Performance Review** - Within the first eight months of Fiscal Year 4, a full performance review of the operations of the Ingenuity Centre to and including the end of Fiscal Year 3 will be conducted by AIF with the full participation and co-operation of the University. That performance review will be conducted in accordance with the requirements of AIF including the appointment of external reviewers.

4.5 **Books and Records**

(a) The University shall preserve and keep available proper books of account, in accordance with generally accepted accounting principles, recording Ingenuity Centre revenues and costs, including, without limitation, statements, invoices, accounts receipts and other records related to the Ingenuity Centre that are necessary in the circumstances to support the books of account (collectively referred to as "Supporting Documents") for seven years following the expiration or earlier termination of this Agreement for audit or examination by AIF on reasonable notice, in accordance with Section 4.6.

4.6 **Audit and Inspection**

(a) AIF reserves the right to audit the Supporting Documents of the University, on reasonable notice and at the sole cost and expense of AIF, at any time during the Term and within seven years of the expiration or earlier termination of this Agreement.

(b) The University shall, if requested by AIF, permit any authorized representative of AIF, or auditors engaged by AIF, reasonable access to its premises to do the following:

- (i) Inspect and assess the progress of the Ingenuity Centre; and
- (ii) Examine the Supporting Documents of the University and make copies thereof at AIF's expense.

**5. INTELLECTUAL PROPERTY**

5.1 The University acknowledges the importance to AIF of intellectual property created through research conducted at or supported through the Ingenuity Centre ("Centre Research") being used to improve the quality of Alberta's economy, communities and environment. Intellectual property created through Centre Research will be:

- (a) owned in accordance with the applicable policies and contractual rights and obligations of the University or collaborating institution conducting the research;
- (b) subject to the publication policies of the University or collaborating institution conducting the research including policies permitting contractual delays for limited time to permit the assessment of the intellectual property and the seeking of statutory protection.

5.2 All Commercialization efforts relating to the Ingenuity Centre shall be in accordance with the terms of this Agreement and in accordance with the principle of "Benefit to Alberta". "Benefit to Alberta" is defined as incremental Canadian economic activity and improved quality of life in Alberta. Maximum benefits would be derived from the creation of high-quality jobs in Alberta. Short-term economic benefits (e.g. licensing to the highest bidder regardless of whether in province or not) will be subordinate to the longer-term benefit to companies with operations in Alberta and strengthening Alberta's economic base and capacity to innovate. The University shall take the following possible outcomes into consideration prior to taking steps to Commercialize intellectual property created through Centre Research:

- (a) An existing company in Alberta with receptor capacity to commercialize;
- (b) An expansion of an existing company in Alberta;
- (c) The formation of a new company in Alberta;
- (d) Joint ventures or strategic alliances with a company in Alberta;
- (e) Co-manufacturing involving a company in Alberta;
- (f) Cross-licensing or co-development with a company in Alberta;
- (g) Establishment of a new subsidiary in Alberta (R&D, manufacturing, sales, marketing, distribution); and
- (h) Development and/or production in Alberta by a foreign company (world product mandate).

The Parties agree that opportunities to Commercialize intellectual property generated through Centres Research will, where feasible, be presented firstly to appropriate Alberta businesses or organizations with suitable expertise, and secondly to appropriate Canadian businesses or organizations with suitable expertise. If the University chooses to pursue Commercialization opportunities through a foreign company it must first, before finalizing such decision, provide the AIF Board of Trustees with the rationale and circumstances for such decision.

## **6. PUBLICITY**

6.1 AIF is committed to long-term investment in Alberta in support of the objects set forth in the Recitals of this Agreement. It is important to AIF that the public is aware of its activities and the benefits being obtained by Albertans through AIF. Accordingly the University shall cause its officers, employees and agents to



acknowledge the role of AIF in the establishment and operation of the Ingenuity Centre in all publication of research results or intellectual property created through Centre Research, whether through a written or oral format, and in presentations and public messages respecting the Ingenuity Centre and its activities. The University and AIF will ensure that press releases or other public messages respecting the Ingenuity Centre and its activities are in a form and content acceptable to each.

- 6.2 The Ingenuity Centre shall at all times be publicly known as and advertised and referred to as the "Alberta Ingenuity Centre for Clean Coal/Carbon and Mineral Process Technologies" and shall operate under such name at all times.
- 6.3 The parties shall not make any public announcement or issue any press release regarding this Agreement or any aspect of the Ingenuity Centre without consulting each other as to the contents of the announcement or press release.

## 7. TERMINATION

- 7.1 Alberta Funding Terminated - AIF may terminate its obligations under this Agreement immediately at any time during the Term (or any renewal thereof) in the event that the Government of Alberta at any time suspends, revokes, reduces or terminates funding to AIF. AIF will notify the University of such suspension, revocation or termination of funding by the Government of Alberta as soon as is reasonably practicable.
- 7.2 Early Termination – The Term of this Agreement may be terminated prior to its stated expiration date by:
- (a) AIF providing not less than six-months written notice to that effect to the University if AIF is not satisfied that the on-going performance of the Ingenuity Centre is contributing to the required extent to the achievement by AIF of its objects in which event the parties will wind down the Ingenuity Centre in accordance with Section 7.5; or
  - (b) either AIF or the University providing not less than six-months written notice to the other.
- 7.3 Termination on Bankruptcy or Dissolution – This Agreement shall immediately terminate if either Party becomes bankrupt or insolvent, goes into receivership or takes the benefit of any statute from time to time in force relating to bankrupt or insolvent debtors, or is dissolved or ceases to carry on business, except in the case of the reorganization of AIF.
- 7.4 Termination for Cause - In the event that either Party fails to satisfy a term or condition of this Agreement or otherwise breaches a material obligation under this Agreement, and fails to remedy such breach within thirty (30) days of notice from

the other Party to that effect, the Party not in breach may upon written notice to the Party in breach terminate this Agreement immediately. Any such termination is without prejudice to or limitation of any other right or remedy of the Party not in breach including the right to collect sums due to it at the time of such termination. Specifically, AIF may demand repayment of the unexpended (meaning not yet used or consumed according to the terms of the Centre Budget) portion of the Annual Contributions and all or any portion of the Annual Contributions expended other than in accordance with this Agreement and such amounts constitute a debt due to AIF and may be recovered as such.

- 7.5 Wind down of Ingenuity Centre - Where the Parties are required to wind down the Ingenuity Centre because the conditions precedent at Section 1.1 were not performed, or pursuant to Section 2.4 or Section 7.2(a), the Parties will use all reasonable steps to do so with a minimum of costs, and the University's costs of such wind down, including committed and non-cancelable costs, in categories that are included in Eligible Costs in the Fiscal Year of the Term in which such wind down begins will constitute Eligible Costs. Notwithstanding the foregoing sentence, the liability of AIF for Eligible Costs incurred following the commencement of a wind down will not exceed one half of the amount of the Annual Contribution for the Fiscal Year of the Term in which the wind down commences. If either AIF or the University terminates the Term pursuant to Section 7.2(b) other than effective at the end of a Fiscal Year of the Term, the University shall submit an amended Annual Operating Plan, including an amended Centre Budget, for the remaining portion of the Term. The amended Annual Operating Plan and Centre Budget must be approved by AIF, and once approved, the remaining Annual Contribution shall be paid by AIF in accordance with such amended documents.

## **8. INDEMNIFICATION AND INSURANCE**

- 8.1 The University will defend, indemnify and hold harmless AIF, its officers, employees and agents from any and all claims, demands, actions and cost whatsoever that may arise, directly or indirectly, out of the University's establishment and operation of the Ingenuity Centre.
- 8.2 The University will independently insure its operations under a contract of Comprehensive General Liability insurance in an amount not less than Five Million Dollars per occurrence insuring against bodily injury, personal injury and property damage. Such insurance will include blanket contractual liability.
- 8.3 AIF will defend, indemnify and hold harmless the University, its officer, directors, employees, students and agents from all liabilities, demands, damages, expenses (including legal fees on a solicitor and that solicitor's own client basis) and losses arising out of the Commercialization or other use by AIF or by any party acting on behalf of or under authorization from AIF of intellectual property or other results

of the Centre Research or out of any Commercialization, use, sale or disposition by AIF, or by any party acting on behalf of or under authorization from AIF of products made by use of the intellectual property or other results of the Centre Research.

**9. GENERAL**

- 9.1 Amendment - No amendment or variation of this Agreement will operate to change or vary the terms, obligations, or conditions hereof except upon mutual agreement by all parties signed by authorized representatives of each Party.
- 9.2 Notices - All notices, requests, directions or other communications required or permitted herein will be in writing and shall be duly given if delivered personally or sent by registered mail, return receipt requested, faxed or e-mailed to the respective addresses of the Parties as follows:

**The University:**

**For Contract/Finance Matters:**

Research Services Office  
222 Campus Tower  
University of Alberta  
Edmonton, Alberta, T6G 2E1  
Attention: Assistant Director, Partnerships  
Phone: (780) 492-9705  
Fax: (780) 492-0949

**For Scientific Matters:**

Department of Chemical and Materials Engineering  
7<sup>th</sup> Floor, ECERF  
University of Alberta  
Edmonton, Alberta T6G 2V4  
Attention: Dr. Qingxia Liu  
Phone: (780) 492-1119

**AIF :**

Trevor Thera, Director – Centres and Industry Programs  
Team Leader  
2410-10180 101 Street NW  
Edmonton, AB T5J 3S4  
Phone: (780) 423-5735  
Fax: (780) 420-0018



Any notice given by registered mail shall be deemed to have been received by the parties to whom the same is addressed on the fifth (5<sup>th</sup>) business day following the day upon which such notice has been deposited in a post office within Canada with postage and cost of registration prepaid. Any notice given by hand shall be delivered to an adult person at the office of the recipient on a business day. Any notice given by hand, fax or e-mail shall be deemed to have been received by the parties to whom such notice is so delivered on the following business day. A business day shall be a day on which the offices of the recipient are open for business.

- 9.3 Governing Law - This Agreement will be governed by and interpreted in accordance with the laws of the Province of Alberta and the Parties expressly attorn to the exclusive jurisdiction of the courts of Alberta for enforcement thereof.
- 9.4 Relationship - The Parties are not, will not be considered to be, and will not represent themselves to be joint venturers, partners or agents of each other and will have no power to bind or obligate one another. The Parties mutually covenant and agree that they will not, in any way, incur any contractual or other obligation in the name of the other Parties, nor will they have liability for any debts incurred by other Parties.
- 9.5 Dispute Resolution - In the event of a dispute, all Parties shall initially use their respective best efforts to resolve the manner in a fair and reasonable manner. If such dispute cannot be settled by the Parties among themselves, the Parties agree that all disputes arising out of or in connection with this agreement, or in respect of any legal relationship associated with or derived from this agreement, shall be arbitrated and finally resolved, pursuant to the National Arbitration Rules of the ADR Institute of Canada, Inc. The place of arbitration shall be Edmonton, Alberta, Canada. The language of the arbitration shall be English.
- The number of arbitrators shall be one. If the parties have not mutually agreed on the designation of the arbitrator within 45 days after the commencement of the arbitration, the Parties shall follow the procedures found in the National Arbitration Rules of the ADR Institute of Canada, Inc. The hearing shall be confidential to the extent permissible by the legislation by which each party is bound.
- 9.6 Survival - Notwithstanding the termination of this Agreement, any terms, covenants or conditions that when given their fullest intent and effect necessarily extend past the termination of this Agreement, will survive and remain fully enforceable beyond termination of this Agreement, including without limitation Sections 1, 3, 4, 5, 6, 7 and 8.

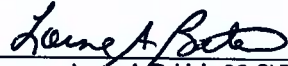
- 9.7 **Environment** - The University represents that any environmental issues or concerns relating to the Ingenuity Centre which are known or ought to be known to the University have been disclosed to AIF, and the University shall inform AIF of any environmental issues or concerns regarding the Ingenuity Centre which arise during the Term.
- The University shall obtain all certificates, consents, permits and approvals required for compliance with applicable legislation and shall comply with the requirements of such legislation and use its best efforts to resolve any environmental issues that may arise.
- 9.8 **Non Waiver** - Except as otherwise expressly provided herein, the failure of any Party to exercise its rights herein upon the occurrence of any breach by any other Party of its obligations will not in any event constitute a waiver of such rights.
- 9.9 **Assignment** - This Agreement and all its rights and privileges hereunder may not be assigned by any Party without the prior written consent of all other Parties. This Agreement and everything herein contained will enure to the benefit of and be binding upon each of the Parties hereto and upon their respective successors and permitted assigns.
- 9.10 **Entire Agreement** - This Agreement constitutes the entire agreement between the Parties pertaining to the Ingenuity Centre and the subject matter hereof and supersedes all prior agreements, understandings, negotiations and discussions with respect to the subject matter hereof whether oral or written. Except as provided herein, there are no conditions, representations, warranties, undertakings, promises, inducements or agreements, whether direct or indirect, collateral, express or implied made between the Parties concerning this Agreement, the subject matter hereof or any other matter embodied herein. In the event of a conflict between the provisions of any previous agreement between the Parties and the provisions of this Agreement, the provisions of this Agreement will prevail to the extent of such conflict.
- 9.11 **Amendment** - No supplement, modification or waiver of this Agreement, or any part thereof, including without limitation the Schedules attached hereto, will be binding unless executed in writing by each of the Parties.
- 9.12 **Force Majeure** - In the event that any Party is prevented or delayed from fulfilling any of its obligations herein by Acts of God, war, terrorism, strikes, riots, storms, fires, floods, epidemics, governmental orders or governmental restrictions, then that Party will be excused from such performance to the extent that it is necessarily prevented or delayed during the continuance of such happening or event.



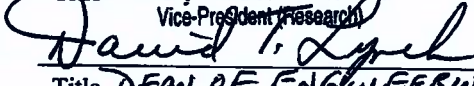
- 9.13 **Ethics Conditions** - It is a condition of this Agreement that if any research work in the Ingenuity Centre involves human subjects, human tissues, laboratory animals, or animal tissues, it shall not proceed without prior approval of the University of Alberta's Human Subjects Research Ethics Committee or Animal Care Committee, as required, or any other body from which approval is required.
- 9.14 **Conflict of Interest** - The University shall abide by the Conflict of Interest Policy that is described in the Program Guide insofar as it does not conflict with the University Conflict of Interest policy. AIF shall abide by the Conflict of Interest Policy that is described in the Program Guide.
- 9.15 **Headings** - The headings in this Agreement have been inserted for reference and as a matter of convenience only and in no way define, limit or enlarge the scope or meaning of this Agreement or any provision hereof.
- 9.16 **Unenforceable Terms** - If any term, covenant or condition of this Agreement or the application thereof to any Party or circumstance shall be invalid or unenforceable to any extent the remainder of this Agreement or application of such term, covenant or condition to a Party or circumstance other than those to which it is held invalid or unenforceable shall not be affected thereby and each remaining term, covenant or condition of this Agreement shall be valid and shall be enforceable to the fullest extent permitted by law.
- 9.17 **Singular, Plural and Gender** - Wherever the singular, plural, masculine, feminine or neuter is used throughout this Agreement the same shall be construed as meaning the singular, plural, masculine, feminine, neuter, body politic or body corporate where the fact or context so requires and the provisions hereof and all covenants herein shall be construed to be joint and several when applicable to more than one Party.
- 9.18 **Further Assurances** - The Parties and each of them do hereby covenant and agree to do such things and execute such further documents, agreements and assurances as may be necessary or advisable from time to time in order to carry out the terms and conditions of this Agreement in accordance with their true intent.
- 9.19 **Counterparts** - This Agreement may be executed in several counterparts each of which when so executed shall be deemed to be an original, and such counterparts shall constitute the one and same instrument and notwithstanding their date of execution shall be deemed to bear date as of the date of this Agreement.

**IN WITNESS WHEREOF** the duly authorized officers of the parties have executed this Agreement on the date first above written.

**THE GOVERNORS OF THE  
UNIVERSITY OF ALBERTA**

Per: 

Title Lorne A. Babiuk, OC, PhD, DSc  
Vice-President (Research)

Per:   
Title DEAN OF ENGINEERING

Per: \_\_\_\_\_  
Title


Per: \_\_\_\_\_  
Title

**ALBERTA HERITAGE FOUNDATION  
FOR SCIENCE AND ENGINEERING  
RESEARCH**

Per:   
Title

Per: \_\_\_\_\_  
Title

I have read this Agreement and agree with the University that I will be bound by its terms and conditions.

Per:   
Dr. [name] Qingxia Liu  
Scientific Director

**SCHEDULE A**

**STRATEGIC BUSINESS PLAN**

*To be added in accordance with the Condition Precedent at Section 1.1*

**SCHEDULE B**

**CENTRES BUDGET AND PAYMENT SCHEDULE**

To be added in accordance with the Condition Precedent at Section 1.1

Payment Procedure - The Annual Contribution will be paid by AIF in quarterly installments via the Consolidated Payment plan in each Fiscal Year as follows:

**Year 0 Implementation**

*September 15 (for implementation phase September to March 31)*

**Annual Contribution**

*April 1<sup>st</sup> (for period April – June)*

*July 1<sup>st</sup> (for period July – September)*

*October 1<sup>st</sup> (for period October – December)*

*January (for period January – March)*

AIF will confirm annual funding and any amendments throughout the award year via a Notice of Award, along with the corresponding budget approved for the budget period, to the following:

**For Contract/Finance Matters:**

Research Services Office  
222 Campus Tower  
University of Alberta  
Edmonton, Alberta, T6G 2E1  
Attention: Assistant Director, Partnerships  
Phone: (780) 492-9705  
Fax: (780) 492-0949

**For Scientific Matters:**

Department of Chemical and Materials Engineering  
7<sup>th</sup> Floor, ECERF  
University of Alberta  
Edmonton, Alberta T6G 2V4  
Attention: Dr. Qingxia Liu  
Phone: (780) 492-1119

The University will not set up an account or release any funding for spending towards the Project for Year 0 until the first Notice of Award and accompanying budget are received by the University.

In addition, the University will not release funding for spending towards the Project each year until the University has received these Notices of Awards and accompanying budgets each year.

**SCHEDULE C**

**PERFORMANCE TARGETS**

*To be added in accordance with the Condition Precedent at Section 1.1*

**Schedule "D"**  
**IMPLEMENTATION SCHEDULE**  
 July 2009

This Implementation Schedule outlines the major milestones required for initial start-up and implementation of the Centre.

<b>ALBERTA INGENUITY CENTRE FOR CLEAN COAL/CARBON AND MINERAL PROCESS TECHNOLOGIES (AIC4MPT) START UP IMPLEMENTATION SCHEDULE</b>	
<b>ACTIVITY</b>	<b>DATE COMPLETED</b>
Agreement between Alberta Ingenuity and University of Alberta (UofA) signed	September 1, 2009
Official announcement of Centre	September 29, 2009
Official signing of agreement between Helmholtz Group and U of A	September 29, 2009
Founding board and management appointed	September 29, 2009
First payment of Alberta Ingenuity funding	September 29, 2009
Strategic plan completed including: - environmental scan            - governance model - management model            - business model - budget                                - outcomes - performance measures        - IP policy - communications plan	November 30, 2009
Collaboration agreement with University of Calgary	November 30, 2009
Confirmation of theme area projects	June 29, 2010
Call for new projects	June 29, 2010
Host Alberta Ingenuity site visit	January – February 2010 Date to be determined
Staffing of Centre	April 1, 2010
Centre fully operational	April 1, 2010
Implementation of strategic plan with quarterly reviews and reporting on measures and milestones	November 30, 2009 Reviews: February 26, 2010 May 31, 2010 September 30, 2010

This Foundation Agreement is Effective the 18 day of January, 2010 (the "Effective Date") with respect to

**THE CANADIAN CENTRE FOR CLEAN COAL/CARBON AND MINERAL PROCESSING TECHNOLOGY ("C<sup>5</sup>MPT")**

Between:

**THE GOVERNORS OF THE UNIVERSITY OF ALBERTA,**  
a corporation under the *Post-secondary Learning Act* (Alberta),  
(the "U of A")

-and-

**HATCH LTD.  
CAPITAL POWER CORPORATION  
CMG RESERVOIR SIMULATION FOUNDATION  
TECK RESOURCES LIMITED  
AND  
NEXEN INC.**

(individually known as a "Sponsor",  
collectively known as the "Sponsors")

**Preamble**

**WHEREAS** the U of A and the Sponsors have come together for the purposes of scientific exchange, Research Project selection, coordination work and a managed co-operative approach to research, education and commercialization and to develop efficient, economically viable, and environmentally responsible technologies to secure Canada's fossil fuels and mineral resources for the global economy;

**WHEREAS** the mission of the C<sup>5</sup>MPT is to help ensure that Canadians are world leaders in innovative and responsive development and sustainable growth of knowledge based natural resource economy;

**WHEREAS** there is an agreement for the establishment and funding of the C<sup>5</sup>MPT between the U of A and Alberta Heritage Foundation For Science and Engineering Research operating as the Alberta Ingenuity Fund dated August 28, 2009 and effective September 1, 2009 and Alberta Innovates – Technology Futures has assumed all rights and responsibilities of Alberta Heritage Foundation for **Science and Engineering Research (the "AITF Agreement")**;

**WHEREAS** Alberta Innovates – Energy and Environment Solutions has or will be assuming all of the rights and responsibilities of Alberta Innovates – Technology Futures pursuant to the AITF Agreement;

**WHEREAS** the C<sup>5</sup>MPT will operate in accordance with that AITF Agreement and the Alberta Innovates - Technology Futures Program Guide that is **referred to in the AITF Agreement ("Program Guide")**; and

**WHEREAS** the Parties would like to confirm the relationship between the U of A, Term Sponsors and Endowment Sponsors through this Foundation Agreement that enables them to work together in the pursuit of the objectives set out herein.

**NOW THEREFORE** this Foundation Agreement sets out the intent of the working relationship between the Parties as follows:



## 1. NATURE OF THE FOUNDATION AGREEMENT

1.1 This Foundation Agreement establishes the framework by which the Parties will work together in an effort to coordinate and realize all research and educational Research Projects conducted within the framework of the C<sup>5</sup>MPT or supported by C<sup>5</sup>MPT in a manner consistent with:

- (a) mandates, policies, priorities, and resources of each Party;
- (b) applicable legislation, including but not limited to the *Post – Secondary Learning Act*, Alberta;
- (c) the AITF Agreement; and
- (d) the Program Guide.

The realization of each research or educational Research Project is subject to the conclusion of a separate contract between an applicable recipient of C<sup>5</sup>MPT funds and the U of A.

## 2.0 DEFINITIONS

In this Foundation Agreement, the following expressions have the following meanings:

2.1 **“Affiliate” means**, with respect to any person, any other person that directly or indirectly controls, is controlled by or is under common control with that person. For purposes of this definition, **“control” means the ownership**, directly or indirectly, of 50% or more of the voting securities of a person or the possession of the power to direct, or cause the direction of, the management and policies of that person, whether through the ownership of partnership interests, membership interests or voting shares, by contract or otherwise.

2.2 **“Background Intellectual Property” means a method, process, technique, know – how** or other intellectual property, including but not limited to proprietary and confidential intellectual property of one of the parties, whether statutorily protected or not, that was developed or discovered by that Party prior to the Project Term, or is developed or discovered by a Party independent of the Research Project.

2.3 **“Dollar” or “\$” means Canadian dollars.**

2.4 **“Endowment Sponsor” means a Sponsor that has made an endowment contribution of at least One Million Dollars (\$1, 000,000) pursuant to section 4.2 .** At the time of execution of this Foundation Agreement, the Endowment Sponsors are: Capital Power Corporation, Teck Resources Ltd., CMG Reservoir Simulation Foundation, Nexen Inc. and Hatch Ltd..

2.5 **“Management Advisory Board” (or “MAB”) is the body created in accordance with Section 8.1** with the mandate of governing C<sup>5</sup>MPT;

2.6 **“Operating Expenses” means the operation of laboratories, materials, supplies, salaries for post-doctoral fellows, research associates, graduate students and technicians, workshops, conferences and collaboration for the C<sup>5</sup>MPT.**

2.7 **“Patentable Intellectual Property” (or “PIP”) means Research Results that are patents, patentable ideas, including computer software that is capable of being legally protected by patent, whether in Canada or elsewhere. Patentable Intellectual Property does not include copyrights on work published or unpublished.**

2.8 **“Research Project” means a research endeavour approved in accordance with Section 11 of this Foundation Agreement in the area of clean coal/carbon and mineral processing and undertaken as work of the C<sup>5</sup>MPT pursuant to this Foundation Agreement;**

2.9 **“Research Results” means any and all intellectual property both tangible and intangible, conceived, discovered or developed through the Research Projects by the U of A (the “U of A Solely Discovered Research Results”), or by a Sponsor and the U of A jointly (the “Jointly Discovered Research Results”) and includes, without limitation, databases, audiovisual and computer material or equivalent circuitry, biotechnology and genetic engineering products, computer software, inventions, processes, products and discoveries. Research Results do not include: (i) proprietary confidential**

information of a Party which is disclosed to another Party to facilitate the Research Project; (ii) restatements of previously existing information by one or more of a Sponsor and the U of A; or (iii) methods, techniques, processes or computer codes utilized by one or more of a Sponsor and U of A for the conduct of the Research Projects.

2.10 "Research Report" means each report of the Research Results to be provided to the Sponsors as contemplated in Section 12.3, including but not limited to any final report.

2.11 "Term" means that period of time specified in Section 16 hereof.

2.12 "Term Sponsor" means a Sponsor that has made a contribution of Five Hundred Thousand Dollars (\$500,000), or a different amount that may be approved by the Management Advisory Board, towards the research performed by the C<sup>5</sup>MPT, pursuant to section 4.3 hereof.

### 3.0 THE RESEARCH PROJECT

3.1 Given the nature of the support from the Sponsors to build capacity in the area of clean coal/carbon and mineral processing research at the U of A, the C<sup>5</sup>MPT will undertake research pursuant to this Foundation Agreement.

### 4.0 FUNDING

4.1 Pursuant to the AITF Agreement, AITF is providing funds to be expended on the Operating Expenses of the C<sup>5</sup>MPT to a maximum of \$4,250,000 for a three-year period with options of renewal for a further five-year period.

4.2 Each Endowment Sponsor has provided an endowment of at least One Million Dollars (\$1 million) (the "Endowment Funds") to the U of A pursuant to a separate agreement with the U of A. The Endowment Funds will be managed in accordance with each separate agreement that each Endowment Sponsor has with the U of A (the "Endowment Agreement") and the Endowment Agreement will apply where there is any conflict between the Endowment Agreement and this Foundation Agreement.

4.3 In accordance with Section 4.3 hereof, each Term Sponsor will pay to the U of A for the Operating Expenses the fixed Term Amount of Five Hundred Thousand Dollars (\$500,000), or a different amount as may be permitted by the Management Advisory Board (the "Term Amount"), that amount having been calculated by reference to the C<sup>5</sup>MPT Budget (the "Budget"). The Term Amount will not be adjusted as a result of any difference between budgeted costs and actual costs.

4.4 Upon executing the Undertaking, each Term Sponsor will pay to the U of A, upon receipt of an invoice from the U of A, \$100,000, being a portion of the Term Amount. The U of A will invoice the Term Sponsor for the balance of the Term Amount in accordance with the schedule specified in the executed Undertaking attached as Schedule "A".

Notwithstanding the foregoing provisions of this Section 4.4, if the Foundation Agreement is terminated pursuant to Section 16, the U of A will provide each Term Sponsor with a final invoice as soon as possible after that termination.

CHEQUES SHOULD BE MADE PAYABLE TO: The Governors of the University of Alberta  
*PLEASE REFERENCE DR. QINGXIA (CHAD) LIU, RES \_\_\_\_\_ AND  
FORWARD TO THE FOLLOWING ADDRESS:*

Financial Services  
U of A  
3<sup>rd</sup> Floor, Administration Building  
Edmonton, Alberta  
Canada T6G 2M7  
ATTENTION: RESEARCH RECEIVABLES

4.5 Invoiced amounts are due and payable by each Term Sponsor within thirty (30) days of receipt of invoice or within such shorter time as provided in Section 4.4. Interest will be paid on overdue amounts at the rate stated on the invoice. The Term Amount is exclusive of GST which, if applicable, will be paid by each Term Sponsor at the same time as the payment of the Term Amount on which the same is based.

## 5.0 ADDITION OF SPONSORS

5.1 Upon the approval of an applicant by the U of A and majority recommendation of the Management Advisory Board of the C<sup>5</sup>MPT, and upon receipt by the U of A of an executed **undertaking of the applicant in the form of Schedule "A" hereto (the "Undertaking")** accompanied by the payment of any required Term Amount or Endowment Funds, beginning on the date that the Undertaking is executed, that applicant shall be entitled and subject to the rights and obligations of a Sponsor pursuant to this Foundation Agreement.

## 6.0 RESPECT FOR OTHER RELATIONS

6.1 **The U of A's relationship with existing research partners will be respected and this Foundation Agreement will not prevent any Party from entering into other agreements, research endeavours or relationships.**

## 7.0 CONFLICTS OF INTEREST

7.1 Conflicts of Interest will be avoided whenever practicably possible. If it is determined that a particular conflict cannot be avoided, such conflict will be disclosed and managed in accordance with **the U of A "Conflict Policy – Conflict of Interest and Commitment, and Institutional Conflict"**.

## 8.0 MANAGEMENT ADVISORY BOARD

8.1 **The C<sup>5</sup>MPT shall be governed by a Management Advisory Board ("MAB"). In accordance with Clause 2.6 of the AITF Agreement, the MAB is accountable to AITF but is ultimately accountable to the U of A. All Annual Operating Plans, C<sup>5</sup>MPT Budgets and C<sup>5</sup>MPT Reports must be reviewed and approved by the MAB before submission to the U of A and AITF. Notwithstanding anything otherwise contained in this Foundation Agreement, although it is expected that the U of A and the C<sup>5</sup>MPT Scientific Director will consider the advice and guidance of the MAB, no term or condition of this Foundation Agreement compels the U of A to accept such advice or guidance.**

8.2 In accordance with the Program Guide and always subject to the AITF Agreement, the MAB composition and duties will be set out in a MAB Board Charter. Further details of the composition of the MAB are set out in the MAB Board Charter, but it is acknowledged that each Endowment Sponsor is entitled to appoint one representative as a member of the MAB.

## 9.0 SCIENTIFIC ADVISORY COMMITTEE

9.1 There shall be a Scientific Advisory Committee.

9.2 The Scientific Advisory Committee shall be composed of representatives from each of the Sponsors, Alberta Innovates – Energy and Environment Solutions and representatives from the U of A as voting members. World-renowned scholars in the area of coal/carbon and mineral processing shall be added to the Scientific Advisory Committee upon recommendation of the C<sup>5</sup>MPT Scientific Director.

9.3 The representatives to the Scientific Advisory Committee from the U of A shall include the C<sup>5</sup>MPT Scientific Director, a representative of the Faculty of Engineering and a representative of the Department of Chemicals and Materials Engineering.

9.4 In accordance with the Program Guide and always subject to the AITF Agreement, the composition and duties of the Scientific Advisory Committee will be set out in a MAB Board Charter.

#### 10.0 C<sup>5</sup>MPT SCIENTIFIC DIRECTOR

10.1 Pursuant to the AITF Agreement, Dr. Qingxia Liu, Professor, Department of Chemicals and Materials Engineering, U of A has been appointed by the Dean of Engineering, U of A as the initial C<sup>5</sup>MPT Scientific Director. If at any time the then designated individual ceases to act as the C<sup>5</sup>MPT Scientific Director, the Dean of Engineering shall nominate a candidate for the position of C<sup>5</sup>MPT Scientific Director. The Management Advisory Board shall endorse the nomination. The Dean of Engineering shall then make the appointment of the nominee to the position of C<sup>5</sup>MPT Scientific Director. The Parties agree that the C<sup>5</sup>MPT Scientific Director is an employee of the U of A and as such is governed by a collective agreement and U of A policies and procedures and that nothing in this Foundation Agreement shall work to prevent the C<sup>5</sup>MPT Scientific Director from abiding by the collective agreement and U of A policies and procedures.

10.2 Subject always to the terms in the letter of appointment issued by the U of A, the C<sup>5</sup>MPT Scientific Director selection, responsibilities and duties shall be set out in the MAB Board Charter.

#### 11.0 SELECTION OF RESEARCH PROJECTS

11.1 Research Projects shall be subject to a Stage/Gate process to ensure each Research Project is correctly chartered and progresses according to agreed plans. It is intended that Stages 2 and 3 and Gates 2 and 3 be completed within three (3) months after the date the researcher submits the RFP at Stage 2.

The Stage/Gate Process shall be as follows:

- a) **Stage 1:** A researcher from the U of A or another University, in consultation with their institution, submits an idea for a Research Project to the C<sup>5</sup>MPT Scientific Director using the Letter of Intent (LOI) form.
- b) **Gate 1:** The Scientific Director assesses the idea for alignment with the C<sup>5</sup>MPT's **strategic direction and objectives**. If approved, the researcher's idea proceeds to Stage 2. If the idea needs to be recycled or is rejected, the C<sup>5</sup>MPT Scientific Director reviews the decision with the researcher.
- c) **Stage 2:** The researcher develops the Research Project concept and, on behalf of their institution, completes a Request for Proposal (RFP) form.
- d) **Gate 2:** The Scientific Advisory Committee assesses the Request for Proposal and determines whether and how the Research Project should proceed. If the proposal is endorsed, a recommendation is made to the Management Advisory Board for approval. If the proposal needs to be recycled or is rejected, then the C<sup>5</sup>MPT Scientific Director reviews the decision with the researcher.
- e) **Gate 3:** The final Request for Proposal is incorporated into a standard Research Agreement (C<sup>5</sup>MPT Project Agreement) that is:
  - (i) reviewed and approved by the C<sup>5</sup>MPT Scientific Director
  - (ii) **reviewed and approved by the U of A Research Services Office ("RSO")** on behalf of the Vice-President Research
  - (iii) signed by the U of A in accordance with U of A policy; and
  - (iv) where a researcher outside the U of A is receiving funding, signed in **accordance with that institution's policies**.

The C<sup>5</sup>MPT Project Agreement will include an acknowledgement to be executed by the researcher in which the researcher acknowledges critical terms of this Foundation Agreement, including but not limited to the intellectual property terms.

f) **Stage 3:** The researcher, on behalf of his or her institution, conducts the research in accordance with the proposal. If changes are required to the Research Project, then a change request is submitted to the C<sup>5</sup>MPT Scientific Director. The change request shall be reviewed by the Scientific Director and the RSO. The researcher, on behalf of his or her institution, submits annual progress reports to the C<sup>5</sup>MPT Scientific Director.

g) **Gate 4:** At the conclusion of the Research Project, the researcher, on behalf of his or her institution, submits a report to the C<sup>5</sup>MPT Scientific Director summarizing the work completed, whether

targets and goals were achieved, learnings from the work, recommendations for further work and feedback on the research process.

11.2 At a minimum, overall research progress and Research Results shall be reviewed annually by the Scientific Advisory Committee. The review shall be presented to the Management Advisory Board and thereby delivered to the Sponsors.

11.3 An annual review of the C<sup>5</sup>MPT shall take place in accordance with the AITF Agreement. A major review of the research programs and the C<sup>5</sup>MPT's progress shall take place during the first eight months of Fiscal year four (4) of the C<sup>5</sup>MPT's operation, as required by section 4.4 of the AITF Agreement.

## 12.0 INTELLECTUAL PROPERTY RIGHTS

12.1 Background Intellectual Property will continue to be the property of the Party that introduces it into the Research Project. Such Background Intellectual Property will be introduced into the Research Study only where specifically identified and with prior written agreement between the parties. To the extent such Background Intellectual Property is introduced into a Research Project, unless otherwise agreed, the use of the Background Intellectual Property shall be restricted for purposes of a Research Project. No publication, commercial use, or disclosure of such Background Intellectual Property shall be made without the prior written consent of the owner.

12.2 Subject to the use rights granted to the Sponsor in this Section 12, all Research Results, with the exception of original copyrighted works, will be owned by the person or persons who discovered or developed the Research Results or their organization or institution in accordance with their organization's or institution's policies. **The Parties hereby agree to ensure that the owner of the Research Results assigns those Research Results to the U of A. Copyright in any original work created by any employee or student of the U of A in the conduct of the Research Project, including, if applicable, a Research Report, will be owned by that employee or student of the U of A in accordance with the U of A's policies.**

Copyright in any original work created by a researcher that is not an employee or a student of the U of A, including, if applicable, a Research Report, in the conduct of the Research Project will be owned in accordance with the policies of that employee or student's organization.

The owner of the copyrighted work hereby grants to the U of A an irrevocable, perpetual, worldwide, fully paid up, royalty – free, nonexclusive license to use, reproduce and modify the Research Report.

The U of A does not have the obligation to seek statutory protection of the Research Results, Patentable Intellectual Property or any portion thereof.

12.3 The U of A will advise the Sponsors of all Research Results through a regular reporting system as identified in each C<sup>5</sup>MPT Project Agreement and will, through such reporting system, identify to the extent possible, any Research Results that are Patentable Intellectual Property.

12.4 The U of A hereby grants to each of the Endowment Sponsors an irrevocable, perpetual, worldwide, fully paid up, royalty-free, non-exclusive license to use the Research Results, including those identified as Patentable Intellectual Property in section 12.3, along with the right to freely extend this license to its Affiliates, but without any rights to sub-license to a non-Affiliate. CMG Reservoir Simulation Foundation may extend this license to Computer Modelling Group Ltd. The U of A hereby grants to each of the Term Sponsors an irrevocable, perpetual, worldwide, fully paid up, royalty-free, non-exclusive license to use the Research Results, excluding those identified as Patentable Intellectual Property in section 12.3, along with the right to freely extend this license to its Affiliates, but without any rights to sub-license to a non-Affiliate. For the term that the Term Sponsor is contributing the Term Amount, the U of A hereby grants to each of the Term Sponsors an irrevocable, worldwide, fully paid up, royalty-free, non-exclusive license to use the Patentable Intellectual Property identified in section 12.3 during the term that the Term Sponsor is contributing the Term Amount, along with the right to freely extend this license to its Affiliates, but without any rights to sub-license to a non-Affiliate.

12.5 Within 30 days of receipt of the reports referenced in section 12.4, upon majority recommendation of the MAB, and if there is funding allocated in the Budget, the U of A may choose to pay the out-of-pocket costs related to the preparation, filing, prosecution and maintenance of available statutory protection, but is not obligated to do so. In the event that there is no funding allocated in the Budget, the Sponsors must contribute equally to the out-of-pocket costs related to the preparation, filing, prosecution and maintenance of available statutory protection. In the event that the MAB does not recommend that the U of A pursue available statutory protection, TEC Edmonton will complete a full evaluation of the Research Results or Patentable Intellectual Property and may again recommend to the MAB that available statutory protection be pursued. If after 30 days from the date that TEC Edmonton presents its evaluation to the MAB the MAB declines to pursue statutory protection, the rights extended to the Sponsors at Section 12.4 hereof will terminate and the U of A, through TEC Edmonton, will be free to pursue statutory protection at its own expense and without accounting to the Sponsors.

12.6 For Sponsors whose primary business activity is providing technical consulting and strategic engineering planning/design and service, the license granted in 12.4 above shall include the right to integrate the Research Results or Patentable Intellectual Property into their processes and technology know-how for providing a system solution to their customers or clients.

12.7 No license is implied or given under this Foundation Agreement or with respect to any intellectual property that is not a part of the Research Results.

12.8 All inventors of Patentable Intellectual Property shall be required to submit a Report of Invention to the U of A's technology transfer office (TEC Edmonton) together with a copy to the Scientific Director who would then report the same to the Management Advisory Board. Researchers of the U of A shall not be allowed to own or proceed to commercialize Patentable Intellectual Property independently of the U of A unless agreed and approved in writing by the U of A.

12.9 Commercialization of Patentable Intellectual Property shall be governed by the "Benefit to Alberta" Clause 5.2 of the AITF Agreement.

### 13.0 WARRANTY, INDEMNIFICATION AND INSURANCE

13.1 The U of A will carry out each Research Project in accordance with appropriate scientific and professional standards but makes no representations or warranties, either express or implied, as to any matter including, without limitation, the Research Results to be achieved, whether the Research Results or any part or aspect of the same will be capable of statutory protection, the existence or non-existence of competing technology, the condition, quality or freedom from error of the Research Results or any part thereof, any merchantability, or its fitness for any particular purpose and all warranties and conditions expressed or implied, statutory or otherwise are hereby disclaimed. Neither the U of A nor its officers, directors, employees, students or agents will be liable for any direct, consequential or other damage suffered by any Sponsor or others whether or not claiming through a Sponsor resulting from the development or use of the Research Results or any invention, technology or product produced in the course of or using the Research Results.

13.2 Subject to Section 13.3, each Party will defend, indemnify and hold harmless the other Party, its officers, directors, employees, students and agents from any and all claims, demands, actions and costs whatsoever that arise, directly or indirectly, out of the negligence or wilful misconduct in the **performance of a Research Project by such indemnifying party or the indemnifying party's officers, directors, employees, students or agents.**

13.3 Notwithstanding the provisions of Section 13.2, each Sponsor will severally defend, indemnify and hold harmless the U of A, its officers, directors, employees, students and agents from all liabilities, **demands, damages, expenses (including legal fees on a solicitor and that solicitor's own client basis)** and losses arising out of the use by that Sponsor or by any party acting on behalf of or under authorization from that Sponsor of the Research Results or out of any use, sale or the disposition by that Sponsor, or by any party acting on behalf of or under authorization from that Sponsor of products made by use of the Research Results.

13.4 The U of A will insure its operations under a contract of Comprehensive General Liability insurance in an amount not less than Five Million Dollars (\$5,000,000) per occurrence insuring against bodily injury, personal injury and property damage. Such insurance will include contractual liability.

13.5 Except as otherwise provided in Section 13.2, in no event will the U of A be liable to any Sponsor, its officers, directors, employees and agents for all breaches of contract or for torts or otherwise arising from or in relation to this Foundation Agreement or the matters or activities dealt with herein in excess of \$100,000.

13.6 A directors and officers insurance policy is held by the Governors of the University of Alberta. Subject to: the provisions hereof, as well as any order by any administrative tribunal, Court or other authorized decision making body (which order may specify, *inter alia*, that the Director is personally responsible for costs, charges, expenses, amounts paid to settle an action or satisfy a judgment, **and/or legal expenses**), **the U of A will indemnify the Director, the Director's heirs and legal representatives, from and against all costs, charges and expenses, including any amount paid to settle an action or satisfy a judgement, and all legal expenses reasonably incurred by the Director in respect of any civil, criminal, or administrative action or proceeding to which the Director is made a party by reason of being, or having been, a director of the C<sup>5</sup>MPT on behalf of the U of A, whether or not as a result of an error in judgement by such Director if:**

- The Director has acted honestly and in good faith with a view to the best interest of the U of A; and
- In the case of a criminal or administrative action or proceeding that is enforced by a monetary penalty, **the Director had reasonable grounds for believing that the Director's conduct was lawful.**

The Indemnity shall:

- Apply as long as the Director keeps the U of A advised of any demand, actions or proceedings which could give rise to a claim pursuant to the Indemnity.
- Apply with respect to the settlement of any action agreed to by the Director provided the U of A is contacted in advance and both the U of A and the insurer of the U of A gives consent.
- Not apply in the event that the Director takes actions or makes decisions regarding the actions or proceedings (including retaining independent legal counsel) without the prior consent of the U of A.

Notwithstanding anything to the contrary expressed or implied herein, the Indemnity shall:

- Be subject to changes or termination by the U of A at any time upon not less than sixty (60) days written notice to the Director provided such change or termination shall not affect obligations of the U of A to the Director for the period of time prior to the change or termination becoming effective.
- Terminate automatically upon the expiration of any period to which the appointment by and on behalf of the U of A was limited provided such termination shall not affect obligations of the U of A to the Director for that period of time prior to the termination and shall cover all actions occurring or conducted during the period the Director was a director.
- Not apply with respect to any costs, charges or expenses, including amounts paid to settle an action or satisfy a judgement: (i) relating to an action by or on behalf of the U of A to procure a judgement against the Director, or (ii) relating to a judgement in an action which is not defended by the Director.

#### 14.0 CONFIDENTIALITY

14.1 The U of A and the Sponsors may each disclose confidential information to one another to facilitate the C<sup>5</sup>MPT's work under this Foundation Agreement. **Each Party shall use all reasonable efforts to prevent disclosure to third parties, employees or other than its Affiliates, of confidential information disclosed to it by the other Party and restrict internal disclosure to those employees, or graduate students, with a "need to know".** Disclosure to an employee or

Affiliate shall be on the basis that the employees or Affiliate agrees to be bound by the confidentiality provisions of this Foundation Agreement.

14.2 The obligation to keep information confidential will however not apply to information which:

- (a) **was in recipient's possession before receipt from discloser;**
- (b) is or becomes a matter of public knowledge through no fault of recipient;
- (c) is rightfully received by recipient from a third party without a duty of confidentiality;
- (d) is disclosed by discloser to a third party without a duty of confidentiality on the third party.

Notwithstanding the foregoing provisions of this Section 14.2, a recipient may disclose information if such disclosure:

- (e) is required by law including but not limited to applicable statute, regulation or other enactment or by lawful order of a court or administrative tribunal having jurisdiction provided recipient provides **discloser with immediate notice of such requirement upon recipient's receipt of notice of the same;** or
- (f) **is made by recipient with discloser's prior written approval.**

14.3 In the event that a Sponsor discloses confidential information, it represents and warrants that it has the right and authority to disclose the confidential information. The recipient understands that in providing access to the confidential information, the disclosing Sponsor makes no representation or warranty as to the accuracy or completeness of the confidential information. The recipient agrees that neither the disclosing Sponsor nor anyone representing the disclosing Sponsor shall have any liability to the recipient or any of its representatives as a result of any errors or omissions in the confidential information or as a result of the use of the confidential information by the recipient or its representatives.

14.4 The confidential information disclosed under this Foundation Agreement shall be kept confidential for a period of 10 years following the disclosure of such confidential information.

## 15.0 PUBLICATION RIGHTS

15.1 One of the purposes of the U of A in conducting research is the discovery and expeditious dissemination of knowledge. Accordingly, policies of the U of A require that Research Results be capable of publication and disclosure. In keeping with such policies the U of A will be entitled to publish or otherwise disclose, and permit its employees and students participating in the Research Project to publish or otherwise disclose, the Research Results or any portion of the same.

15.2 Notwithstanding any provision of Section 15.1 to the contrary, if either the U of A, a recipient or any employee or student so permitted by the U of A or a recipient wishes to publish or otherwise disclose any Research Results earlier than ninety (90) days following the end of a Project Term, the Management Advisory Board will be furnished with a written copy of the proposed publication or written disclosure or a written summary of the proposed oral disclosure at least sixty (60) days in advance of the submission for publication or the date of the proposed disclosure.

15.3 If the copy or summary furnished to the Management Advisory Board pursuant to Section 15.2 contains any confidential information of a Sponsor, the Management Advisory Board may, within sixty (60) days of its receipt of the same, by notice in writing of such to the U of A, the recipient or its employee or student proposing the publication or disclosure, identify such confidential information and require its removal from the proposed publication or disclosure, in which event the person proposing the publication or disclosure will comply with that requirement. If the Management Advisory Board does not identify and require the removal of such confidential information within such time period, the same may be included in the publication or disclosure. In the event the Management Advisory Board determines within the sixty (60)-day period that the proposed publication contains industrially useful



and/or commercially valuable Research Results or Patentable Intellectual Property, the submission for publication containing those Research Results or that Patentable Intellectual Property may be delayed until the date that the applicable protection for such Patentable Intellectual Property or Research Result is in place. Such delay may be for as long as is reasonably required, but in any event will not exceed six (6) months, including the sixty (60)-day period.

15.4 Notwithstanding anything otherwise contained in this Foundation Agreement, in the event a graduate student of the U of A or a recipient works on the Research Project and that student completes a thesis or education report relating to the Research Project, the student will own the copyright in that thesis or report. Although that graduate student must comply with the provisions of Section 15.2 and 15.3 with respect to that thesis or education report, notwithstanding anything otherwise contained in this Foundation Agreement, publication of a thesis or education report may only be delayed in accordance with applicable policies of the U of A. Defence of a thesis or education report may only be delayed in accordance with policies of the U of A.

15.5 The U of A will not make any reference to a Sponsor or its Affiliates in any publicity, advertising, or publication, other than the fact of its support for the C<sup>5</sup>MPT, in relation to the subject matter of this Foundation Agreement without the relevant Sponsor's prior written consent.

No Party will, without the prior written consent of the U of A:

- (a) use the name, trademark, service mark, logo or other symbol representative of the U of A or any related entity of, or otherwise identify, the U of A; or
- (b) use the name, title, likeness or statement of any U of A officer, director, employee (including the Principal Investigator) or student;

in conjunction with a Party's use or exploitation of the Research Results, including without limitation, the development, production or marketing of products.

## 16.0 TERM AND TERMINATION

16.1 The Term of this Foundation Agreement will be Five (5) years beginning on the Effective Date of this Foundation Agreement.

16.2 In the event that this Foundation Agreement is renewed prior to, or at the end of the Term or at any time in the future, the Endowment Sponsors will not be obligated to make any additional financial contribution to become Sponsors under the renewed version(s) of the Foundation Agreement. The continuation of each Term Sponsor as a Sponsor under the renewed Foundation Agreement will be considered on a case-by-case basis as agreed upon by the MAB and with the U of A, taking into account the Term Amount that the Term Sponsors agree to contribute.

16.3 C<sup>5</sup>MPT Project Agreements will be reviewed and approved by the U of A Research Services Office and the C<sup>5</sup>MPT Scientific Director as per 11.1 (e). The total cumulative funding of approved C<sup>5</sup>MPT Project Agreements subject to this Foundation Agreement and during the Term of this Foundation Agreement shall not exceed Five Million Dollars (\$5,000,000). No C<sup>5</sup>MPT Project Agreement shall be approved beyond the Term of this Foundation Agreement.

## 17.0 MISCELLANEOUS

17.1 This Foundation Agreement will be governed by and interpreted in accordance with the laws of the Province of Alberta and the parties expressly attorn to the exclusive jurisdiction of the courts of Alberta for enforcement of the same.

17.2 Nothing contained in this Foundation Agreement shall be construed as establishing a partnership or any joint obligations between the U of A and any of the Sponsors or as precluding any Sponsor or the U of A from carrying out its own research in directions similarly pursued by the C<sup>5</sup>MPT.

## 18.0 BUSINESS CONTROLS

18.1 Each Party will keep accurate books, records, and other documentation in accordance with generally accepted accounting principles to support all transactions and obligations performed hereunder. For two years following expiration of this Foundation Agreement, the U of A will preserve such books, records, and other documentation and will permit the Sponsors to inspect them during **usual business hours, upon reasonable notice and at the Sponsor's cost and to make excerpts** therefrom for the sole purpose of confirming performance under this Foundation Agreement.

## 19.0 ARBITRATION

19.1 In the event of any dispute between the Parties hereto during the term hereof as to any matter hereunder, the Parties shall first attempt to resolve any differences at a senior academic/management level and in the event of non-resolution, either Party shall be entitled to give to the other Party ten (10) days' notice of such dispute and demand arbitration thereof and, after giving the notice of demand, each Party shall at once appoint an arbitrator within such ten (10) day period and, within fifteen (15) days of the giving of the notice, such appointees shall jointly appoint a third arbitrator. The decision of any two of three arbitrators so appointed shall be final and binding upon the parties hereto.

19.2 If, within a reasonable time, the two arbitrators appointed by the parties hereto do not agree upon a third, or if the Party who has been notified of a dispute fails to appoint an arbitrator, then a third arbitrator or an arbitrator to represent the Party in default may, upon petition of the Party not in default, be appointed by a judge of the Alberta Courts. The cost of the arbitration shall be apportioned evenly between the parties, unless otherwise decided in an arbitral award or by the Alberta Courts.

19.3 The arbitration shall be subject to the provisions of the *Arbitration Act* of the Province of Alberta in force at the time of such arbitration proceedings.

## 20.0 ASSIGNMENT AND AMENDMENT

20.1 No amendment or variation to this Foundation Agreement shall operate to change or vary the terms, obligations, or conditions hereof except upon mutual agreement by both parties signed by authorized representatives of each Party.

20.2 No Party may assign or subcontract its obligations under this Foundation Agreement, in whole or in part, without the written consent of the other Parties.

## 21.0 NOTICES

21.1 All notices, requests, directions, or other communications required or permitted herein shall be in writing and shall be delivered to the parties hereto respectively as follows:

### SPONSORS:

#### HATCH LTD.

Attention: Lowy Gunnewiek, Global Managing Director, Oil & Gas

Address: Suite 700, 840 7th Avenue SW  
Calgary, Alberta T2P 3G2

Phone Number: office: 1-403-920-4023 Cell 1-403-614-5665

Email: [lgunnewiek@hatch.ca](mailto:lgunnewiek@hatch.ca)

#### CAPITAL POWER CORPORATION

Attention: Joanne McDonald, Director, Community Relations

Address: 9 Fl., 10065 Jasper Ave., Edmonton AB, T5J 3B1

Phone Number: 780 392 5194

Email: [jmcdonald@capitalpower.com](mailto:jmcdonald@capitalpower.com)

CMG RESERVOIR SIMULATION FOUNDATION

Attention: P. Duke Anderson, President

Address: Suite 700, One Executive Place, 1816 Crowchild Trail NW, Calgary, AB, Canada T2M 3Y7

Phone Number: 403-450-8399 (office) 403-978-1377 (mobile)

Email: [duke.anderson@foundationcmg.com](mailto:duke.anderson@foundationcmg.com)

TECK RESOURCES LIMITED

Attention: Andy Stradling, Consulting Metallurgist, Technology Group

Address: P.O.Box 2000, Trail, BC, T1R 4S4

Phone Number: +1.250.364.4407

Email: [Andy.Stradling@teck.com](mailto:Andy.Stradling@teck.com)

Nexen Inc.

Attention: Patrick Jamieson, Sr Technology Advisor

Address: 801 - 7 Avenue SW, Calgary T2P 3P7

Phone Number: (403) 699-5433

Email: [Pat\\_Jamieson@nexeninc.com](mailto:Pat_Jamieson@nexeninc.com)

University of Alberta:

CONTRACT AND ACCOUNTING MATTERS:

University of Alberta

Research Services Office

Attention: Assistant Director, Partnerships Program

222 Campus Tower

8625 – 112 Street

Edmonton, Alberta, T6G 2E1

Tel: (780)-492-5787

Fax: (780)- 492-0949

SCIENTIFIC AND TECHNICAL MATTERS:

Dr. Qingxia Liu

Professor and Centre Director

Department of Chemical and

Materials Engineering

Room 280 of CME building

9107 – 116 St

Edmonton, Alberta

Canada T6G 2V4

Tel. 780.492.1119

Cell: 780.863.8558

Fax:780.492.2881

INTELLECTUAL PROPERTY MATTERS:

TEC Edmonton

4000 Enterprise Square

10230 Jasper Avenue

Edmonton, Alberta,

21.2 In order for any notices, requests, directions, or other communications to be effective, they shall be delivered in person; or, sent by registered mail, telegram or telex (fax) addressed to the Party

for whom it is intended at the above mentioned address and shall be deemed to have been received, if sent by registered mail, when the postal receipt is acknowledged by the other Party; if sent by telegram, when transmitted by the carrier; and, if sent by telex (fax), when transmitted. The address of either Party may be changed by notice in the manner set out in this provision.

## 22. MISCELLANEOUS

### 22.1 FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY ACT

The Sponsor acknowledges that all records prepared by the University in the performance of this Foundation Agreement are in the custody and control of the University. The University is subject to the access and privacy provisions of the *Freedom of Information and Protection of Privacy Act* (Alberta) which creates a right of access to records under the custody and control of public bodies subject to specific, limited exceptions.

As this Foundation Agreement and records produced in its performance may contain information that would reveal trade secrets of the Sponsor or commercial, financial, scientific or technical information of the Sponsor, except as required by law or as otherwise permitted pursuant to the terms of this Foundation Agreement, neither the University nor the Sponsor will disclose the contents of this Foundation Agreement or the foregoing records containing confidential information of the other party other than:

- (a) as otherwise specifically provided in this Foundation Agreement;
- (b) for the purpose of implementation or enforcement of this Foundation Agreement; or
- (c) a general statement on the parties to the Foundation Agreement, the amount being paid for the Research Project and the general area of research being undertaken, either party being entitled to publish that information.

22.2 No Party shall be entitled to make legally binding statements on behalf of another Party, **nor shall any Party establish any agreement that is legally binding for another Party, without the latter's** prior written consent. The Parties expressly disclaim any intention to create any relationship not explicitly recognized in this Foundation Agreement. Nothing contained in this Foundation Agreement or any acts of any Party shall constitute or be deemed to constitute the Parties as joint venturers, principal and agent, or employer / employee in any way or for any purpose.

22.3 All forms of cooperation and collaboration undertaken within the scope of this Foundation Agreement shall be carried out in accordance with the laws of the Province of Alberta, in the country of Canada.

22.4 Should a provision of this Foundation Agreement be or become without legal effect then this shall not affect the legal validity of the remaining provisions of this Foundation Agreement. The legally invalidated provision shall instead be swiftly replaced, with retroactive force, with a provision that is legally allowable and that most closely approximates in its content and intent the original provision.

*(remainder of page intentionally left blank)*

22.5 This Foundation Agreement may be signed in six (6) counterparts. Each counterpart shall constitute an original document and these counterparts taken together, shall constitute one and the same Foundation Agreement.

IN WITNESS WHEREOF, the duly authorized officers of the parties have executed this Foundation Agreement on the date first written above.

**HATCH LTD.**

Per: \_\_\_\_\_

Per: \_\_\_\_\_

**THE GOVERNORS OF THE UNIVERSITY OF ALBERTA**

Per: \_\_\_\_\_ <sup>(for)</sup> Lorne A. Babiuk, OC, PhD, DSc  
Vice-President (Research)

Per: David T. Lopez

**CAPITAL POWER CORPORATION**

Per: \_\_\_\_\_

Per: \_\_\_\_\_

**CMG RESERVOIR SIMULATION FOUNDATION**

Per: \_\_\_\_\_

Per: \_\_\_\_\_

**TECK RESOURCES LIMITED**

Per: \_\_\_\_\_

S. F. H. THOMPSON

Per: VP TECHNOLOGY & DEVELOPMENT

**NEXEN INC.**

Per: \_\_\_\_\_

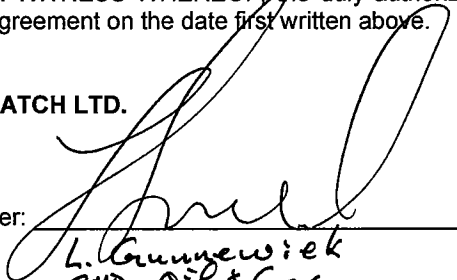
Per: \_\_\_\_\_

22.5 This Foundation Agreement may be signed in six (6) counterparts. Each counterpart shall constitute an original document and these counterparts taken together, shall constitute one and the same Foundation Agreement.

IN WITNESS WHEREOF, the duly authorized officers of the parties have executed this Foundation Agreement on the date first written above.

**HATCH LTD.**

Per: \_\_\_\_\_



L. Gunnewiek  
GMD, Oil & Gas

Per: \_\_\_\_\_

**THE GOVERNORS OF THE UNIVERSITY OF ALBERTA**

Per: \_\_\_\_\_

Per: \_\_\_\_\_

**CAPITAL POWER CORPORATION**

Per: \_\_\_\_\_

Per: \_\_\_\_\_

**CMG RESERVOIR SIMULATION FOUNDATION**

Per: \_\_\_\_\_

Per: \_\_\_\_\_

**TECK RESOURCES LIMITED**

Per: \_\_\_\_\_

Per: \_\_\_\_\_

**NEXEN INC.**

Per: \_\_\_\_\_

Per: \_\_\_\_\_

22.5 This Foundation Agreement may be signed in six (6) counterparts. Each counterpart shall constitute an original document and these counterparts taken together, shall constitute one and the same Foundation Agreement.

IN WITNESS WHEREOF, the duly authorized officers of the parties have executed this Foundation Agreement on the date first written above.

**HATCH LTD.**

**THE GOVERNORS OF THE UNIVERSITY  
OF ALBERTA**

Per: \_\_\_\_\_

Per: \_\_\_\_\_

Per: \_\_\_\_\_

Per: \_\_\_\_\_

**CAPITAL POWER CORPORATION**

**CMG RESERVOIR SIMULATION  
FOUNDATION**

Per: *Janne McDonald*  
*Director, Community Relations*

Per: \_\_\_\_\_

Per: \_\_\_\_\_

Per: \_\_\_\_\_

**TECK RESOURCES LIMITED**

**NEXEN INC.**

Per: \_\_\_\_\_

Per: \_\_\_\_\_

Per: \_\_\_\_\_

Per: \_\_\_\_\_



22.5 This Foundation Agreement may be signed in six (6) counterparts. Each counterpart shall constitute an original document and these counterparts taken together, shall constitute one and the same Foundation Agreement.

IN WITNESS WHEREOF, the duly authorized officers of the parties have executed this Foundation Agreement on the date first written above.

**HATCH LTD.**

Per: \_\_\_\_\_

Per: \_\_\_\_\_

**CAPITAL POWER CORPORATION**

Per: \_\_\_\_\_

Per: \_\_\_\_\_

**TECK RESOURCES LIMITED**

Per: \_\_\_\_\_

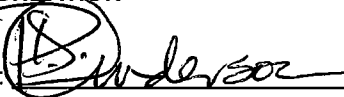
Per: \_\_\_\_\_

**THE GOVERNORS OF THE UNIVERSITY OF ALBERTA**

Per: \_\_\_\_\_

Per: \_\_\_\_\_

**CMG RESERVOIR SIMULATION FOUNDATION**

Per:  \_\_\_\_\_

Per: P. Duke Anderson  
President.

**NEXEN INC.**

Per: \_\_\_\_\_

Per: \_\_\_\_\_

22.5 This Foundation Agreement may be signed in six (6) counterparts. Each counterpart shall constitute an original document and these counterparts taken together, shall constitute one and the same Foundation Agreement.

IN WITNESS WHEREOF, the duly authorized officers of the parties have executed this Foundation Agreement on the date first written above.

**HATCH LTD.**

Per: \_\_\_\_\_

Per: \_\_\_\_\_

**CAPITAL POWER CORPORATION**

Per: \_\_\_\_\_

Per: \_\_\_\_\_

**TECK RESOURCES LIMITED**

Per: \_\_\_\_\_

Per: \_\_\_\_\_

**THE GOVERNORS OF THE UNIVERSITY OF ALBERTA**

Per: \_\_\_\_\_

Per: \_\_\_\_\_

**CMG RESERVOIR SIMULATION FOUNDATION**

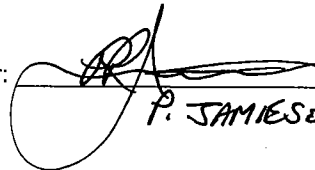
Per: \_\_\_\_\_

Per: \_\_\_\_\_

**NEXEN INC.**

Per: \_\_\_\_\_

Per: \_\_\_\_\_

  
P. JAMIESON

**SCHEDULE "A" UNDERTAKING**

This is Schedule "A" attached to and forming part of the Foundation Agreement dated as of the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_ and entered into between The Governors of the University of Alberta and the Sponsors.

This undertaking is provided by \_\_\_\_\_ to The Governors of the University of Alberta in its own right and on behalf of each of the parties who are currently Sponsors pursuant to the Terms and Conditions of the Foundation Agreement attached to this Undertaking. The undersigned agrees with the U of A and each of the Sponsors that pursuant to the provisions of Section 5 of those Terms and Conditions of the Foundation Agreement it is from the date hereof bound as a Sponsor to the Terms and Conditions of Foundation Agreement as if a signatory to the same.

**A.1 Term Amount** The Term Sponsor will pay to the U of A for the conduct of the research by C5MPT the fixed Term Amount of \$\_\_\_\_\_, that amount having been calculated by reference to the Budget attached as a part of Schedule A to the Foundation Agreement. The Term Amount will not be adjusted as a result of any difference between budgeted costs and actual costs.

Or: The Endowment Sponsor has entered into a separate Endowment Agreement with the University of Alberta and has pledged an Endowment Amount of \$\_\_\_\_\_ pursuant to the terms of that Endowment Agreement.

*Insert if Term Sponsor:*

**A.2 Invoicing** The Term Sponsor will pay to the University, upon receipt of an invoice from the University, \$\_\_\_\_\_ being a portion of the Term Amount. The U of A will invoice the Sponsor for the balance of the Term Amount in accordance with the following schedule:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**INVOICE TO BE SENT TO:**

**Company Name:**

**Address:**

**Attention:**

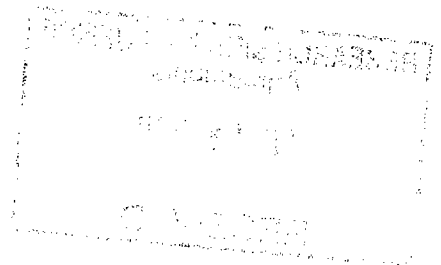
Sponsor Contact for Notices:

**Company Name:**

**Address:**

**Attention:**

\_\_\_\_\_  
Printed Name: \_\_\_\_\_



Agreed to and accepted by The Governors of the University of Alberta in accordance with the provisions of Section 5 referred to above.

\_\_\_\_\_  
\_\_\_\_\_

**OUTLINE OF ISSUE**

Agenda Title: **Proposed Name Change for the Alberta Ingenuity Centre for Carbohydrate Science to the Alberta Glycomics Centre**

**Motion:** THAT the GFC Academic Planning Committee approve, under delegated authority from General Faculties Council, the proposed name change of the Alberta Ingenuity Centre for Carbohydrate Science to the 'Alberta Glycomics Centre', as submitted by the Dean of the Faculty of Science and as set forth in Attachment 1, to take effect upon final approval.

**Item**

Action Requested	<input checked="" type="checkbox"/> Approval <input type="checkbox"/> Recommendation <input type="checkbox"/> Discussion/Advice <input type="checkbox"/> Information
Proposed by	Gregory Taylor, Dean, Faculty of Science
Presenters	Gregory Taylor, Dean, Faculty of Sciences, and David Bundle, Director, Alberta Ingenuity Centre for Carbohydrate Science (AICCS)
Subject	Proposed Name Change for the Alberta Ingenuity Centre for Carbohydrate Science (AICCS) to the Alberta Glycomics Centre.

**Details**

Responsibility	Provost and Vice-President (Academic)
The Purpose of the Proposal is (please be specific)	Alberta Ingenuity is now operating under Alberta Innovates Technology Futures which presents an opportunity for a name change. It is proposed that the name of the Alberta Ingenuity Centre for Carbohydrate Science (AICCS) be changed to the Alberta Glycomics Centre. As noted in the attached memorandum from Dean Gregory Taylor, "The proposed name change is one that more accurately reflects the changing profile of the Centre's research and the research interests of the Centre's PIs, only three of whom were part of the team that founded the Centre in 2002. The term Glycomics is more encompassing of Centre activities than "Carbohydrate Science."
The Impact of the Proposal is	See attached letter from Dean Gregory Taylor, Faculty of Science.
Replaces/Revises (eg, policies, resolutions)	See 'Purpose'.
Timeline/Implementation Date	To take effect upon approval.
Estimated Cost	\$3000-\$5000 (cost of signage for office supplies, business cards, webpage, information brochures, logo, etc).
Sources of Funding	Current Operating Revenue.
Notes	N/A

**Alignment/Compliance**

Alignment with Guiding Documents	<i>Dare to Discover, Dare to Deliver</i>
Compliance with Legislation, Policy and/or Procedure Relevant to the Proposal (please quote legislation and include identifying section numbers)	<p>1. <b>UAPPOL: Academic Centres and Institutes Operation Procedure:</b> –</p> <p>"3. PROPOSALS FOR MAJOR CHANGES TO ACADEMIC CENTRES OR INSTITUTES</p> <p>All proposals for the renaming of an academic centre or institute, or change in legal status, affiliation or substantial change to strategic direction of a centre or institute shall be submitted to the Academic</p>

	<p>Planning Committee (APC) for approval.</p> <p><b>4. ANNUAL REPORTING BY ACADEMIC PLANNING COMMITTEE TO GENERAL FACULTIES COUNCIL</b></p> <p>All approvals and re-namings of academic centres and institutes must be included in APC's annual report to General Faculties Council."</p>
--	---

**Routing** (Include meeting dates)

<p>Consultative Route (parties who have seen the proposal and in what capacity)</p>	<p>Office of the Dean of the Faculty of Science; Office of the Provost and Vice-President (Academic)</p>
<p>Approval Route (Governance) (including meeting dates)</p>	<p>GFC Academic Planning Committee – October 26, 2011 (for final approval)</p>
<p>Final Approver</p>	<p>GFC Academic Planning Committee</p>

Attachments (each to be numbered 1 – <>):

- Attachment 1 (pages 1 – 61): Proposed Name Change and Centre Update: Purpose, Governance, and Membership

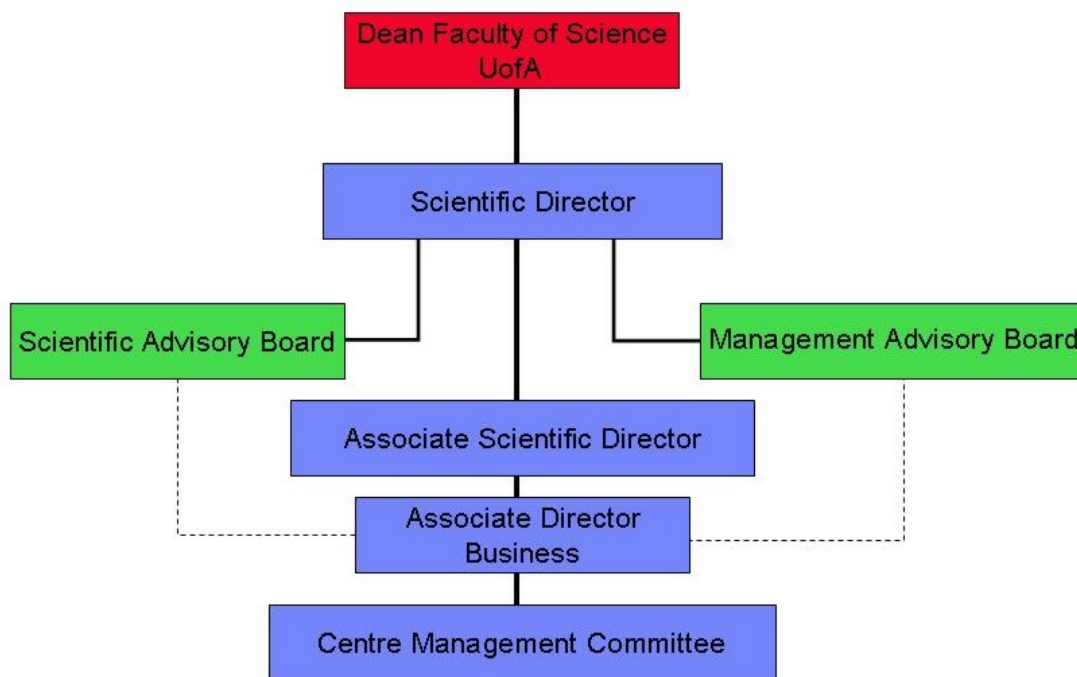
*Prepared by:* David Bundle, Director, Alberta Ingenuity Centre for Carbohydrate Science, Faculty of Science,  
[david.bundle@ualberta.ca](mailto:david.bundle@ualberta.ca)

## University of Alberta Template for Proposals to Establish New Academic Centres and Institutes

Proposers will complete and submit this template to the Office of the Provost for approval in accordance with UAPPOL Policy. This template is expandable ; the completed template may be up to 8 to 10 pages in length (not including letters of support or other appendices relevant to the proposal). Before completing this template, the complete UAPPOL Centres and Institutes Policy, as well as associated procedures for academic centres and institute, should be reviewed.

1.	<p><b>Name and Faculty of Reporting Dean: Gregory Taylor, Faculty of Science</b></p> <table border="1" style="width: 100%; margin-top: 10px;"> <tr> <td style="width: 70%;">Signature:</td> <td style="width: 30%;">Date:</td> </tr> <tr> <td style="height: 40px;"></td> <td></td> </tr> </table>	Signature:	Date:		
Signature:	Date:				
2.	<p><b><u>Name and Detailed Purpose of the Proposed Centre or Institute:</u></b></p> <p>This is an update of changes occurring in the Alberta Ingenuity Centre for Carbohydrate Science since its approval by APC in 2002. This update is concurrent with a request to APC changing the Centre's name to Alberta Glycomics Centre. This proposed name change has triggered a request to provide details of the various changes that have occurred in the Centre since its approval as a University Academic Centre in 2002.</p>				
3.	<p><b><u>Provide a statement of the priority of the proposed centre or institute within the overall priorities of the Faculty and/or the University of Alberta. Include a <u>statement of benefits</u> the University of Alberta could expect to receive through creation of the proposed centre or institute, including benefits to students.</u></b></p> <p>The Centre is an evolution of the historical dominance (largely due to the legacy of Professor R. U. Lemieux) of the University of Alberta in the field of Carbohydrate Chemistry and Biochemistry.</p> <p>Since inception the Centre has secured Alberta Ingenuity operational funding of \$7 million for the period 2002-2007, and since 2008 the annual Centre's operating budget from Alberta Ingenuity has been \$3 million. In total for the two 5 year funding periods (2002-2007 and 2008-2013) the Centre will have secured ~\$23 million of direct operating support. During the period 2008-2010 the Centre also secured ~\$4.0 million for major capital equipment from Alberta Ingenuity and Western Economic Diversification. An additional ~\$2 million from CFI has been obtained for major capital equipment.</p> <p>These funds and equipment currently support the research of 11 principal investigators, 37 postdoctoral fellows 53 graduate students and 13 technical officers. During the period 2002-2010, the Centre has expanded to include researchers from the University of Alberta's Faculty of Medicine and Dentistry, the Faculty of Engineering, and the Faculty of Pharmacy and Pharmaceutical Science, as well as from the University of Calgary's Faculty of Science and Faculty of Medicine.</p>				
4.	<p><b><u>Provide a description of the proposed centre/institute governance structure/reporting lines. Include a <u>diagram of organizational structure.</u></u></b></p> <p>AICCS was approved in 2002 as an Academic Centre reporting to the Dean of the Faculty of Science. A Management Advisory Board (MAB) and Scientific Advisory Board (SAB) are advisory to the Centre Director, and the Associate Director, Business and the Centre</p>				

Executive Assistant (both trust employees) report to the Centre Director, who in turn reports to the Dean of Science (see organizational chart below).  
 In 2006 in response to a new requirement of Alberta Ingenuity, the University agreed that the AICCS MAB would be controlled by non-UofA members and the composition of the MAB was changed to allow for a majority of non-University members. Following the renewal of the Centre in 2008 the University also agreed that it could not change these members without consent of Alberta Ingenuity. The UofA also agreed to give the MAB members authority over certain IP and licensing decisions (as referenced below the agreements relating to this are supplied).



5. **Provide a statement of the role and qualifications of the centre/institute lead of the proposed centre or institute.**  
 The Scientific Director of the Centre is professor David Bundle. He holds the R.U. Lemieux endowed chair in carbohydrate chemistry in the Department of Chemistry and is a Distinguished University Professor. His research interests focus on structural immunobiology, carbohydrate-antibody interactions, conjugate vaccines and development of novel approaches to multivalent inhibitors. He has received the Roy L. Whistler Award in Carbohydrate Chemistry from the International Carbohydrate Organization and the American Chemical Society's C.S. Hudson award. He is a member of the Board of Directors of the Society for Glycobiology, a fellow of the Royal Society of Chemistry and a fellow of the Royal Society of Canada. His contributions to science have been recognized by other awards including Outstanding Leadership in Alberta Science, awarded by Alberta Science and Technology Foundation and an Alexander von Humboldt Senior Research Award.
6. **Employees**
- a) All PIs hold tenure stream academic appointments at the University of Alberta or the University of Calgary. Research associates and technicians are University employees.
  - b) All centre employees are supported by funds from Alberta Ingenuity
  - c) Benefit costs, salary settlements, and other escalating factors are accounted for in the Centre' annual budget (attached)



7.	<p><b><u>Detailed Budget</u></b></p> <p><u>See attached budget details:</u></p> <p>2008-2013 five year Budget  Centre 2010-2011 Financial Report  Notice of Award 2011-2012  Centre Budget 2011-2012</p> <ol style="list-style-type: none"> <li>Include key sources of operating funds, and include revenue sources and expenditures for [ideally] 5 years projected.</li> <li>State specific source(s) of any "University funding"</li> <li>personnel expenditures must include adequate provisions for benefit costs</li> <li>escalation factors must be built into expenditure projections (i.e. escalation due to inflation, future salary settlements, etc.)</li> <li>if in-kind support is identified, the specifics of that support must be listed separately</li> </ol>
8.	<p><b><u>Space Requirements.</u></b></p> <p>Currently allotted space in the Department of Chemistry and CCIS accommodates most investigators with the remainder occupying laboratories and offices in their respective Departments</p> <p>Space required?      Yes <input type="checkbox"/>    No <input type="checkbox"/></p> <p>    If "No" selected, where is current space? _____</p> <p>    If "Yes" selected, complete the following:</p> <p><input type="checkbox"/> On-site at the University of Alberta</p> <p><input type="checkbox"/> Awaiting allocation</p> <p><input type="checkbox"/> Rent/lease required</p> <p>    If rent/lease is required, has this been budgeted for?    Yes <input type="checkbox"/>    No <input type="checkbox"/></p> <p>    Is funding required?    Yes <input type="checkbox"/>    No <input type="checkbox"/>    Reasons: _____</p> <p>Address the following questions:</p> <ol style="list-style-type: none"> <li>If rent/lease or license is required, what is the University of Alberta's commitment?</li> <li>If new space or modifications to existing space are required, has Facilities and Operations been contacted and has this been included in the budget?</li> </ol>
9.	<p><b><u>Equipment</u></b></p> <p>Since this is a mature, established Centre all essential equipment has been secured with the funding reported above, AI CFI and WED.</p> <ol style="list-style-type: none"> <li>All equipment is owned by the University of Alberta or the University of</li> <li>Identify any existing equipment (major or minor), where the equipment is located and who owns the equipment.</li> <li>If additional equipment is required, where will it be located, who will purchase?</li> </ol>

10.	<p><b><u>Potential Risks to the University of Alberta</u></b></p> <p>Risks are those normally associated with basic research. Research is conducted according to safety regulations and where appropriate also according to the required animal care protocols and ethical requirements. The quality of the research is reviewed annually by the Centre SAB.</p> <p>Additional risks may relate to the Centre’s commercialization strategy. The University has signed agreements that give the Centre’s MAB the authority to act on behalf of the University in deciding to whom IP will be licensed and the terms of the license. Linked to this is a document signed by all PIs that acknowledges that research funds are awarded on the understanding that the resulting IP will be managed by the MAB.</p> <p>The following documents deal with these issues: Renewal agreement 2008 INTELLECTUAL PROPERTY AGREEMENT - June 24 2008.doc MEMORANDUM OF UNDERSTANDING June 29 2008.doc</p> <ul style="list-style-type: none"> <li>a) State any reputational, financial, and/or operational risks to the University of Alberta.</li> <li>b) Outline plans to mitigate/manage those risks.</li> <li>c) Risk Management Services may be consulted.</li> </ul>
11.	<p><b><u>Annual Reporting and Strategic Review: In accordance with UAPPOL Policy</u></b></p> <ul style="list-style-type: none"> <li>a) The Centre provides a written annual report to the Dean and the funding agency.</li> <li>b) Copies of the above report and details of changes in the Centre’s operation are provided together with written annual report to the Dean.</li> <li>c) The Centre undergoes peer review every 5 years and the Dean is provide with copies of the renewal submission and copies of the peer review evaluation.</li> </ul>
12.	<p><b><u>Intellectual Property (IP) and Copyright</u></b></p> <p>The Centre creates certain patentable IP and receives an annual budget of \$300,000 from Alberta Ingenuity to manage this IP. Centre PIs have signed an agreement (see Schedule D of Intellectual Property Agreement) that acknowledges they receive operating funds in the Centre and that the resulting IP may be declared “managed IP” by an IP committee constituted from the MAB and the technology transfer offices at each University and that rights in the IP are assigned to the University. When this occurs the terms of licensing the IP are decided by the MAB on behalf of the University. Royalties from licensed IP are to flow 1/3 to the University, 1/3 to the inventor and 1/3 to the Centre. The agreements governing the terms of the delegation of the University’s control in these matters is set out in the attached.</p>
13.	<p><b><u>Termination Plan/Provisions</u></b></p> <ul style="list-style-type: none"> <li>a) If funding is terminated or not renewed phase out support for six months is stimulated in the Centres guide 2006.</li> </ul>
14.	<p><b><u>Letters of Support:</u></b> Attach letters from relevant on- and off-campus sources N/A</p>
15.	<p>Provide, if applicable, any <b><u>agreements and/or memoranda of understanding between the University of Alberta and its partner(s)</u></b> to establish, fund and operate the proposed academic centre or institute</p>

	Attached
--	----------

G:\AD02\CEN\Templates.Examples.checklists CIC\ProposalTemplate.Academic.CentresandInstitutes.post.CIC.26Apr11.docx



**Date:** June 6, 2011

**To:** Dr. Carl Amrhein  
Provost and Vice President (Academic)  
2-10 University Hall  
University of Alberta

**From:** Gregory Taylor, Dean  
Faculty of Science

**Re:** **Dean's Support for Renaming the Alberta Ingenuity Centre for Carbohydrate Science**

---

The Alberta Ingenuity Centre for Carbohydrate Science is proposing to change its name to the Alberta Glycomics Centre. I will be attending the meeting of the GFC Academic Planning Committee to champion this move.

As you know, re-organization of Alberta's innovation system has resulted in Alberta Ingenuity becoming part of the Alberta Innovates structure. This in itself provides a requirement for a name change. With that requirement at hand, the PIs of the Centre began to explore not only the Alberta Ingenuity part of their name, but also the remainder of the name that describes their research activities.

The proposed name is one that more accurately reflects the changing profile of the Centre's research and the research interests of the Centre's PIs, only three of whom were part of the team that founded the Centre in 2002. The term Glycomics is more encompassing of Centre activities than "Carbohydrate Science".

This name change has my full support as well as the agreement of Alberta Innovates.

Gregory Taylor  
Dean of Science

GT/rb

**THIS ALBERTA INGENUITY CENTRE FOR CARBOHYDRATE SCIENCE RENEWAL AGREEMENT MADE AS OF THE 1<sup>ST</sup> DAY OF APRIL 2008.**

**BETWEEN:**

**ALBERTA HERITAGE FOUNDATION FOR SCIENCE AND ENGINEERING RESEARCH**

("Alberta Ingenuity")

**AND:**

**THE GOVERNORS OF THE UNIVERSITY OF ALBERTA**

(the "University")

**WHEREAS:**

- A.** Alberta Heritage Foundation for Science and Engineering Research is a corporation established by an Act of the Legislature of the Province of Alberta that operates under the official mark of Alberta Ingenuity Fund.
- B.** The general objects of Alberta Ingenuity are to establish and support a balanced long-term program of science and engineering research based in Alberta directed to the discovery of new knowledge and the application of that knowledge to improve the quality of Alberta's economy, communities and environment.
- C.** The specific objects of Alberta Ingenuity include to:
- stimulate internationally competitive, leading-edge fundamental and applied research in areas critical to Alberta's economic and social development;
  - create province-wide multidisciplinary, multi-sector research partnerships that integrate the research and development priorities of all participants and address emerging challenges in Alberta's industries;
  - accelerate globally competitive research and development in Alberta's academic, private and public sectors by expanding the pre-existing knowledge base; and
  - develop and retain world-class researchers in areas essential to Alberta's productivity and economic growth.
- D.** In furtherance of its objects and in order to create a competitive edge for recruiting highly qualified investigators to Alberta, Alberta Ingenuity developed the Alberta Ingenuity Centres program (the "Ingenuity Centres Program"), a primary goal of which is to catalyze Alberta's innovations system – creating compelling research results and transforming Alberta's economy, culture and society.
- E.** The Ingenuity Centres Program supports groups of outstanding researchers from Alberta universities or other research institutions and industry, with interdisciplinary scope and vision, led by an internationally-recognized researcher.
- F.** Alberta Ingenuity and the University are the parties to the Alberta Ingenuity Centre for Carbohydrate Science Agreement made as of the 1<sup>st</sup> day of September, 2002 (the "Original Agreement") as amended by Amending Agreement made effective as of the 1<sup>st</sup> day of September, 2005 (the "Amending Agreement") (the Original Agreement as amended by the Amending Agreement being the "Base Agreement") a copy of the Base Agreement being attached hereto as Schedule A.
- G.** Alberta Ingenuity based on the conclusions of the full performance review of the Ingenuity Centre undertaken pursuant to the Base Agreement and a request by the University for a

renewal of the term of the Base Agreement has agreed to such renewal for a five year period commencing as of the date of this Renewal Agreement, such renewal to be on the terms and conditions contained in the Base Agreement as amended by this Renewal Agreement (collectively being the "Renewed Centre Agreement").

Each of Alberta Ingenuity and the University agrees with the other as follows:

## **1 Interpretation of Base Agreement and Renewal Agreement**

- 1.1 Affirmation of Base Agreement** – Except as amended by this Renewal Agreement, all provisions of the Base Agreement are hereby reaffirmed and remain unchanged.
- 1.2 Definitions** – All capitalized terms defined in the Base Agreement and used but not otherwise defined in this Renewal Agreement have the same meaning as set out in the Base Agreement.
- 1.3 Implementation of Renewal Agreement** – All terms and conditions of this Renewal Agreement are effective as and from the date first above written in this Renewal Agreement (the "Effective Date").

## **2 Renewal of Term**

- 2.1 Renewal** – The Term is renewed for a five year period commencing as of the Effective Date and ending on the 31<sup>st</sup> day of March 2013 subject to any earlier termination or renewal as provided in this Renewed Centre Agreement (the "Renewal Term").

## **3 Alberta Ingenuity Annual Contribution**

- 3.1 Amount of Annual Contribution** – Alberta Ingenuity will provide to the University in each year of the Renewal Term a financial contribution equal to the lesser of:
  - (a) the aggregate of Two Million Five Hundred Thousand Dollars (\$2,500,000) and any additional amount for that year approved by Alberta Ingenuity in conjunction with Alberta Ingenuity's approval of the budget for that year as contemplated in Section 2.1a) of the Original Agreement; and
  - (b) the total of Eligible Costs incurred by the University in that year;(the "Annual Contribution"). The Annual Contribution will be payable on a quarterly basis as provided in the Base Agreement.
- 3.2 Eligible Costs** – The Eligible Costs for the initial year of the Renewal Term are set forth in Part 1 of Schedule A and in each subsequent year of the Term will be identified in the budget for that year to be approved by Alberta Ingenuity as referred to in Section 3.1(a) of this Renewal Agreement. Part 1 of Schedule A includes a separate budget line item for Patent Protection and Commercialization Costs and a separate line item for Research Project Support Costs.
- 3.3 Patent Protection, Pre-clinical Studies and Commercialization Costs** – Patent Protection, Pre-clinical Studies and Commercialization Costs are to be expended only for patent protection, pre-clinical studies and commercialization costs incurred or to be incurred in accordance with the direction or approval of

the Management Advisory Board pursuant to the Intellectual Property Agreement between Alberta Ingenuity, the University and The Governors of the University of Calgary, in the form and content attached hereto as Schedule B as amended by the parties thereto from time to time (the "Intellectual Property Agreement").

- 3.4 Research Project Support Costs** – Research Project Support Costs are to be expended only for the direct costs of a research study or research project that is undertaken by one or both of the University and the University of Calgary and either is specifically approved by the Management Advisory Board, or by the Alberta Ingenuity Scientific Leader in accordance with a process established by the Management Advisory Board, as an eligible study or eligible project for the application of Research Project Support Costs (the "Research Project").
- 3.5 Condition of Eligibility** – In addition to meeting any other requirements of eligibility as a Research Project, Research Project Support Costs can only be committed to or applied to a study or project if each Researcher assigned to, or permitted to participate in, that Research Project by or through either the University or the University of Calgary has executed and delivered to such university a Researcher Acknowledgement as defined in and provided in the Intellectual Property Agreement.

#### **4 Governance**

- 4.1 Maintenance of Legal Control of Research Projects** – Section 4.3 of the Amending Agreement amended Section 1.3 of the Original Agreement (which set forth the manner of appointment to and the composition of the Management Advisory Board) in the following two respects:

- (a) requiring that the University consult with and obtain the consent of Alberta Ingenuity to the appointment of members to the Management Advisory Board;
- (b) requiring that a majority of the members of the Management Advisory Board consist of industry members external to the University.

Although it is expected that the University and the University's Ingenuity Centre Scientific Leader will consider the advice and guidance of the Management Advisory Board, the Scientific Advisory Board and the Intellectual Property Committee, except to the extent otherwise specifically stated to over-ride this Section 4.1, no term or condition of this Renewed Centre Agreement or the Intellectual Property Agreement compels the University to accept such advice or guidance. Section 4.1, Section 4.2 and Section 5.3 of the Intellectual Property Agreement over-ride this Section 4.1.

- 4.2 Amendment of Original Agreement** - Section 1.3a) of the Original Agreement is further amended to read as follows:

- a) a Management Advisory Board, a majority of which shall consist of industry members external to the university, to provide strategic advice and guidance to the Ingenuity Centre including in relation to the Ingenuity Centre's role, industry sponsorship and recruitment.



## 5 Intellectual Property Agreement

- 5.1 Concurrent Delivery** – Each of the University and Alberta Ingenuity shall execute and deliver, and the University shall cause the University of Calgary to execute and deliver, the Intellectual Property Agreement concurrently with the execution and delivery of this Renewal Agreement.

<b>ALBERTA HERITAGE FOUNDATION FOR SCIENCE AND ENGINEERING RESEARCH</b>	<b>THE GOVERNORS OF THE UNIVERSITY OF ALBERTA</b>
Dr. Peter Hackett President and CEO	Dr. Lorne Babiuk Vice President (Research)
	Dean
	Chair
	Principal Investigator

**MEMORANDUM OF UNDERSTANDING  
EFFECTIVE AS OF THE 1<sup>ST</sup> DAY OF APRIL 2008**

**BETWEEN:**

<b>THE GOVERNORS OF THE UNIVERSITY OF ALBERTA</b>  (the “University of Alberta”)	and	<b>THE GOVERNORS OF THE UNIVERSITY OF CALGARY</b>  (the “University of Calgary”)
--	-----	--

(collectively the “AICCS Universities”)

and

**THERACARB INC.**

(“TheraCarb”)

**WHEREAS:**

- A.** The AICCS Universities are the participating universities in the Alberta Ingenuity Centre for Carbohydrate Science (“AICCS”), a centre established, maintained and operated with funding support from Alberta Heritage Foundation for Science and Engineering Research (“Alberta Ingenuity”) pursuant to the Alberta Ingenuity Centres Program, one of the goals of which is to catalyze Alberta’s innovation system – creating compelling research results and transforming Alberta’s economy, communities and environment.
- B.** TheraCarb is a corporation incorporated and subsisting under the Business Corporations Act (Alberta) the shareholders of which include, but are not limited to, the University of Alberta, David Bundle, the AICCS Scientific Lead (who is an academic staff member of the University of Alberta and in that capacity participates in research using resources or activities supported by Alberta Ingenuity’s funding of AICCS) and Glen Armstrong (who is an academic staff member of the University of Calgary and in that capacity participates in research using resources or activities supported by Alberta Ingenuity’s funding of AICCS).
- C.** TheraCarb intends to provide researchers participating in AICCS through either the University of Alberta or the University of Calgary with an opportunity to become shareholders of TheraCarb through a stock option plan.
- D.** TheraCarb is a party to certain subsisting agreements with the University of Alberta pursuant to which it has obtained licenses to certain intellectual property previously developed through the use of resources or through activities supported by Alberta Ingenuity’s funding of AICCS on the terms and conditions contained in such agreements.
- E.** A major component of the business plan of TheraCarb is the development of therapeutics and vaccines for infectious diseases and neurodegenerative diseases.
- F.** The University of Alberta, Alberta Ingenuity and TheraCarb believe that the formalization of the relationship detailed in this MOU and the establishment of the mechanism contemplated in this MOU are consistent with and shall contribute to the realization of the goal of the Alberta Ingenuity Centres Program to catalyze Alberta’s innovation system through providing an opportunity for economic development, including employment and research opportunities, in Alberta of intellectual property created through research using resources or activities supported by Alberta Ingenuity’s funding of AICCS.

- G. The University of Calgary, as a research partner in AICCS, has agreed to enter into this Agreement.

**THEREFORE THERACARB AND EACH OF THE AICCS UNIVERSITIES** agrees with each of the others as follows:

## 1 OBJECTIVES AND TERM OF MOU

### 1.1 Objectives - The objectives of this MOU are:

- a) to affirm and reinforce the relationship of cooperation between the AICCS Universities and TheraCarb in the identification and pursuit of research, research development and commercialization goals that are of mutual benefit to the AICSS Universities in their maintenance and operation of AICCS and to TheraCarb;
- b) to establish a mechanism pursuant to which TheraCarb, having been identified by the AICCS Management Advisory Board as a preferred vehicle for commercialization of Managed Intellectual Property in the Field of Use, is granted a time-limited option to make a first offer to obtain a license to commercialize Managed Intellectual Property in the Field of Use.

- 1.2 **Term** - The Term commences as of the Effective Date and unless otherwise extended by agreement of the Parties or unless sooner terminated as provided in this MOU ceases on the fifth anniversary of the Effective Date.

## 2 DEFINITIONS

- 2.1 **“AICCS Research”** means a research study or project undertaken by one or both of the AICCS Universities, alone or together with others, supported in whole or in part with funding categorized and defined in the Carbohydrate Centre Intellectual Property Agreement as Research Project Support Costs.
- 2.2 **“Arising Intellectual Property”** has the meaning attributed to that term in the Carbohydrate Centre intellectual Property Agreement.
- 2.3 **“Carbohydrate Centre Intellectual Property Agreement”** means the Intellectual Property Agreement with respect to the Carbohydrate Centre made between the University of Calgary, the University of Alberta and Alberta Ingenuity effective as of April 1, 2008, as amended from time to time.
- 2.4 **“Effective Date”** means the 1<sup>st</sup> day of April 2008.
- 2.5 **“Field of Use”** means the field of therapeutics and vaccines for infectious diseases and neurodegenerative diseases.
- 2.6 **“Managed Intellectual Property”** has the meaning attributed to that term in the Intellectual Property Agreement.
- 2.7 **“Management Advisory Board”** means the Management Advisory Board of AICCS.
- 2.8 **“MOU”** means this Memorandum of Understanding.

2.9 “Term” means the term of this MOU as provided in Section 1.2.

### 3 COOPERATION RELATIONSHIP

3.1 **Affirmation of Previous Cooperation** – The AICSS Universities, in their operation and maintenance of AICCS, and TheraCarb have prior to the Effective Date identified a number of collaborative initiatives to support mutually beneficial research, research development and commercialization goals and have, where each deemed the same appropriate, entered into agreements in relation to those initiatives.

3.2 **Affirmation of Continuing Cooperation** – The AICCS Universities, in their operation and maintenance of AICCS, and TheraCarb through this MOU confirm the continuation of a cooperation relationship throughout the Term to:

- (a) identify mutually beneficial research, research development and commercialization goals and objectives;
- (b) identify and consider opportunities for collaborative initiatives (each being an “Initiative”) that shall promote the attaining of the goals and objectives referred to in Section 3.2 (a).

3.3 **Collaborative Initiatives** - This MOU provides for the identification and consideration of, but not the undertaking of, an Initiative by the Parties. An Initiative approved by one or both of the AICCS Universities and TheraCarb (an “Approved Initiative”) may only be undertaken pursuant to an Approved Initiative Agreement that establishes the rights and obligations of each of the approving Parties with respect to that Approved Initiative. Although it is expected that each approving Party shall establish those rights and obligations in good faith having regard to its own rules, regulations, policies and procedures, unless otherwise specifically agreed in writing with respect to a specific Approved Initiative, the obligations of a Party to proceed with an Approved Initiative and rights and obligations as between the Parties with respect to the same arise only upon establishment of the Approved Initiative Agreement.

### 4 RIGHT OF FIRST OFFER OPTION

4.1 **Notice of Managed Intellectual Property** - The AICCS Universities, through the Management Advisory Board, shall provide TheraCarb with written notice of an election by the Management Advisory Board to include any Arising Intellectual Property as Managed Intellectual Property pursuant to the Carbohydrate Centre Intellectual Property Agreement no later than thirty (30) days following notice of such election being received by the AICCS Universities. Such written notice shall include a description of such Managed Intellectual Property and a copy of the Report of Invention received by the AICCS Universities with respect to such Arising Intellectual Property.

4.2 **Options** – TheraCarb, subject to the conditions contained in this MOU has:

- (a) an option exercisable subject to and on the terms and conditions contained in this MOU to elect to negotiate an agreement (the “Investigatory Agreement”) with the AICCS Universities permitting TheraCarb a period of one hundred and twenty (120) days to conduct investigations with respect to the Managed Intellectual Property referred to in that notice to determine whether and the terms and conditions on which it may initiate a right of first offer to obtain a license within the Field

of Use to the Managed Intellectual Property that is the subject of the Investigatory Agreement (the “License”);

- (b) an option exercisable subject to and on the terms and conditions contained in this MOU to make a first offer to obtain a royalty-bearing exclusive license (the “License Agreement”) (without right to assign and without a right to sub-license other than in accordance with any conditions contained in such license) to commercially exploit within the Field of Use the Managed Intellectual Property that is the subject of the Investigatory Agreement.

If TheraCarb exercises its option in relation to the Investigatory Agreement, it shall pay to the AICCS Universities within thirty (30) days of receipt of any invoice from the AICCS Universities, from time-to-time, the costs of the AICCS Universities related to the preparation, filing, prosecution and maintenance of patent protection for such Managed Intellectual Property.

**4.3 Exercise of Options** – If TheraCarb has complied with all terms and conditions contained in this MOU and all terms and conditions contained in any other agreement in force between TheraCarb and one or both of the AICCS Universities, it may:

- (a) within sixty (60) days following receipt of a notice pursuant to Section 4.1 exercise the option contained in Section 4.2(a) to negotiate the Investigatory Agreement with respect to the Managed Intellectual Property referred to in that notice by giving notice in writing of such exercise to the AICCS Universities ;
- (b) within one hundred and twenty (120) days following the effective date of the Investigatory Agreement exercise the option contained in Section 4.2(b) to make a first offer to enter into a License Agreement for the Managed Intellectual Property that is the subject of the Investigatory Agreement.

A notice given by TheraCarb pursuant to either Section 4.3(a) or Section 4.3(b) shall, in addition to containing the proposed terms of the Investigatory Agreement in the first instance and the proposed business terms of the License Agreement in the second instance, contain details and an explanation of the financial and organizational capability of TheraCarb to successfully commercialize the Managed Intellectual Property, the AICCS Universities being required to enter into good faith negotiations on the proposed Investigatory Agreement or License Agreement only if satisfied that such capabilities exist.

**4.4 Terms and Conditions** - Any Investigatory Agreement or License Agreement contemplated in Section 4.3 shall except as otherwise provided herein be on such terms and conditions as the AICCS University or AICCS Universities that own such Managed Intellectual Property and TheraCarb may agree. Any such Investigatory Agreement or License Agreement shall reserve to the AICCS University or AICCS Universities a royalty-free, irrevocable and perpetual right to use such Managed Intellectual Property for internal and non-commercial purposes.

**4.5 Failure to Agree** -If TheraCarb and the AICCS University or AICCS Universities, as the case may be, each acting in good faith:

- (a) fail to execute the Investigatory Agreement within sixty (60) days of TheraCarb making its election pursuant to Section 4.3(a),
- (b) fail to execute a License Agreement within sixty (60) days of TheraCarb making its election pursuant to Section 4.3(b);

except as otherwise provided herein any further rights or obligations of TheraCarb or the AICCS Universities to negotiate or enter into such Investigatory Agreement or License Agreement shall cease and any further rights of TheraCarb pursuant to this Agreement in relation to such Managed Intellectual Property, and any obligation of TheraCarb to pay subsequently incurred costs of the AICCS Universities pursuant to Section 4.2 in relation to such Managed Intellectual Property, shall cease.

- 4.6 Results of Investigations** – Notwithstanding any other term or condition of this Agreement if TheraCarb enters into an Investigatory Agreement with respect to Managed Intellectual Property and does elect to exercise its first right of offer with respect to, or does not enter into a License Agreement with respect to, such Managed Intellectual Property TheraCarb shall provide to the AICCS Universities copies of the results of all its investigations with respect to such Managed Intellectual Property together with all supporting documentation and data and shall permit the AICCS Universities, at their own risk, to utilize the same.

## 5 CONFIDENTIAL INFORMATION

- 5.1 Disclosure Pursuant to MOU** - Each of the AICCS Universities and TheraCarb disclose information it considers confidential to the other in furtherance of the cooperation relationship referred to in Article 3 of this MOU or in furtherance of the right of first offer option of TheraCarb referred to in Article 4 of this MOU.
- 5.2 Obligation to Maintain as Confidential** - Each of the AICCS Universities and TheraCarb shall use all reasonable efforts to treat and keep confidential, and cause its officers, directors, employees and students, if any, to treat and keep confidential, any information received by it from the other marked “Confidential”. Reasonable efforts shall in no event be less than the efforts used by the receiving party to protect its own confidential information. In addition TheraCarb shall treat and keep confidential, and cause its officers, directors and employees to treat and keep confidential, the Arising Intellectual Property and Managed Intellectual Property disclosed to it by one or both of the AICCS Universities. Any confidential information shall be disclosed within the receiving party on a “need to know” basis.
- 5.3 Exclusions** - The obligation to keep confidential shall however not apply to information which:
- (a) was in recipient’s possession before receipt from discloser;
  - (b) is or becomes a matter of public knowledge through no fault of recipient;
  - (c) is rightfully received by recipient from a third party without a duty of confidentiality;
  - (d) is disclosed by discloser to a third party without a duty of confidentiality on the third party.

Notwithstanding the provisions of Section 5.2, a recipient may disclose information if such disclosure:

- (e) is required by law including but not limited to applicable statute, regulation or other enactment or by lawful order of a court or administrative tribunal having jurisdiction provided recipient provides discloser with immediate notice of such requirement upon recipient's receipt of notice of the same; or
- (f) is made by recipient with discloser's prior written approval.

## 6 GENERAL

**6.1 Early Termination of Term** – The Term may be terminated prior to the stated expiration date in Section 1.2 by:

- (a) by not less than six (6) months written notice given by either of the AICCS Universities or TheraCarb to the others;
- (b) by written notice, effective on receipt of the same, if either of the AICCS Universities or TheraCarb is in default of the terms and conditions of this MOU or the terms and conditions of any other agreement in force between TheraCarb and one or both of the AICCS Universities and has failed to remedy such default within fifteen (15) days following receipt of written notice requiring rectification of that default from a non-defaulting Party.

The termination of the Term does not result in termination of any other agreement in force between the Parties including any executed Investigatory License or License Agreement.

**6.2 Relationship** - Nothing in this MOU creates the relationship of principal and agent, employer and employee, partnership, or joint venturers between any or all of the Parties and no Party shall represent otherwise.

**6.3 No Assignment** – The rights of the Parties in this MOU are personal and neither those rights nor any part of this MOU may be assigned by a Party without the written consent of the others.

**6.4 Notices** - All notices, requests, directions or other communications required or permitted herein shall be in writing and shall be delivered to the parties hereto respectively as follows:

TheraCarb:

Alastair Ross Technology Centre  
Suite 243, 3553 31 St N.W.  
Calgary, Alberta  
T2L 2K7

Attention: President and CEO  
Phone: (403)-282-2030 Fax: (403)-547-2776



The University of Alberta:

For Contract Matters:  
Research Services Office  
222 Campus Tower  
University of Alberta  
Edmonton, Alberta, T6G 2E1  
Attention: Assistant Director, Agreements

Phone: (780) 492-9705 Fax: (780) 492-0949

For Scientific Matters:  
Dr. David Bundle  
Department of Chemistry  
Faculty of Science  
University of Alberta  
Edmonton, Alberta, T6G \_\_\_\_\_

Phone: (780) 492-8808 Fax: (780) 492-8231

with a copy to:

TEC Edmonton

The University of Calgary:

University of Calgary  
2500 University Drive N.W.  
Calgary, Alberta, T2N 1N4  
Attention: Glenn McMurray  
Senior Director, Research Services and Research Accounting

Phone: (403) 220-6354 Fax: (403) 2899-0693  
e-mail: glenn.mcmurray@ucalgary.ca

with a copy to:

University Technologies International  
Suite 130, 3553 – 31 Street NW  
Calgary, AB  
T2L 2K7  
Attention: President & CEO

Phone: (403) 270-7027 Fax: (403) 270-2384  
e-mail: cataford@uti.ca

In order for any notices, requests, directions, or other communications to be effective, the same must either be delivered in person or, sent by registered mail or facsimile addressed to the Party for whom it is intended at the above-noted address or fax number and shall be deemed to have been received, if sent by

registered mail, when the postal receipt is acknowledged by the other party and, if sent by facsimile, when transmitted. The address or fax number of a Party may be changed by notice to the other Parties in the manner set out in this Section.

**6.5 Alberta Law** - This MOU shall be governed by and interpreted in accordance with the laws in force in the Province of Alberta and the parties expressly attorn to the exclusive jurisdiction of the courts of Alberta for enforcement thereof.

**IN WITNESS WHEREOF** the authorized officers of each of the Parties have executed this MOU.

<b>THE GOVERNORS OF THE UNIVERSITY OF ALBERTA</b>
Dr. Lorne Babiuk Vice President (Research)
Dean
Chair
Principal Investigator

<b>THE GOVERNORS OF THE UNIVERSITY OF CALGARY</b>
Dr. Rose Goldstein Vice President (Research)

<b>THERACARB INC.</b>

**THIS INTELLECTUAL PROPERTY AGREEMENT MADE AS OF THE 1<sup>ST</sup> DAY OF APRIL 2008**

**BETWEEN:**

**ALBERTA HERITAGE FOUNDATION FOR SCIENCE AND ENGINEERING RESEARCH**

**THE GOVERNORS OF THE UNIVERSITY OF ALBERTA**

**THE GOVERNORS OF THE UNIVERSITY OF CALGARY**

**WHEREAS:**

- A.** The University of Alberta and Alberta Ingenuity entered into the Original Alberta Ingenuity Centre Agreement pursuant to which Dr. David Bundle of the University of Alberta was designated as the Ingenuity Centre Scientific Leader for the Carbohydrate Centre.
- B.** The Original Alberta Ingenuity Centre Agreement provided for the participation of researchers from the University of Calgary in the Carbohydrate Centre and required that the University of Alberta and the University of Calgary enter into an inter-institutional agreement in form acceptable to Alberta Ingenuity respecting the collaboration of the researchers of the two Universities within the Centre.
- C.** In accordance with the requirements of Recital B, the University of Alberta and the University of Calgary entered into the Inter-institutional Agreement.
- D.** Based on the conclusions of the full performance review of the Ingenuity Centre undertaken pursuant to the Original Alberta Ingenuity Centre Agreement and a request by the University of Alberta for a renewal of the term of the Original Agreement Alberta Ingenuity has agreed to such renewal for a five year period commencing as of the 1<sup>st</sup> day of April 2008 on certain conditions set forth in the Alberta Ingenuity Centre Renewal Agreement including the execution and delivery of this Intellectual Property Agreement.
- E.** This Intellectual Property Agreement sets forth terms and conditions applicable to certain Intellectual Property arising from Research Projects during the Renewal Term including the right of the Management Advisory Board to elect to include certain Intellectual Property as Managed Intellectual Property.
- F.** The goal of the Parties is to establish a framework for creation and commercialization of Intellectual Property which provides a long-term strategic opportunity for economic development in Alberta that impacts the quality of life through application or research results and provides employment and research opportunities.

**NOW THEREFORE** each of the University of Alberta, the University of Calgary and Alberta Ingenuity covenants and agrees with each of the others as follows:

**1 DEFINITIONS**

- 1.1** “**Alberta Ingenuity**” means Alberta Heritage Foundation for Science and Engineering Research.
- 1.2** “**Alberta Ingenuity Centre Agreement**” means the Original Alberta Ingenuity Centre Agreement as amended and renewed by the Alberta Ingenuity Centre Renewal Agreement, as further amended from time to time.

- 1.3 “**Alberta Ingenuity Centre Renewal Agreement**” means the agreement between the University of Alberta and Alberta Ingenuity made as of the 1<sup>st</sup> day of April 2008 which renews the term of the Original Alberta Ingenuity Centre Agreement and the support of Alberta Ingenuity for the Carbohydrate Centre.
- 1.4 “**Arising Intellectual Property**” means all rights to Intellectual Property created by a Researcher in the undertaking of a Research Project and required to be disclosed in a Report of Invention pursuant to this Agreement.
- 1.5 “**Carbohydrate Centre**” means the Alberta Ingenuity Centre for Carbohydrate Science described in the Alberta Ingenuity Centre Agreement.
- 1.6 “**Centre Manager**” means the individual designated from time to time by the University of Alberta as the administrative manager of the Carbohydrate Centre and in the absence of any individual being so designated the Alberta Ingenuity Scientific Leader of the Carbohydrate Centre.
- 1.7 “**Confidential Information**” means:
- (a) information or data, including any analyses or conclusions, arising from a Research Project, including, but not limited to, technical, scientific, financial, business, personal and other information, scientific and test data, research data, specifications, written documents or records, techniques, formulations, prototypes, models, operations, know-how, computer programs and systems, processes, ideas, inventions, designs, plans, drawings, devices, commercialization plans or other materials whether oral, written, electronic or otherwise;
  - (b) any other information disclosed by one Party to the other where such disclosure is made in furtherance of an obligation of the disclosing Party pursuant to this Agreement including in furtherance of the collaboration between some or all of the Parties to this Agreement with respect to a Research Project provided such information is proprietary to the disclosing Party or to a third party to which the disclosing Party owes an obligation of confidentiality and provided further that any such disclosure made in readable format is marked with a clear indication of confidentiality such as the words “Confidential” or “Protected” and any such disclosure if oral is identified as confidential at the time of such disclosure and the disclosing Party reduces such information to a written version or summary marked as above and provides the same to the receiving Party within twenty (20) days of the oral disclosure.
- 1.8 “**Effective Date**” means the date as of which this Agreement is made being the 1<sup>st</sup> day of April 2008.
- 1.9 “**Existing Managed IP**” means the IP described in Part 1 of Schedule A hereto and that IP described in Part 2 of Schedule A that is included as Existing Managed IP through the process described in Part 2 of Schedule A.
- 1.10 “**Intellectual Property**” means patents, patentable ideas, including but not limited to plant cultivars, germ plasm, and computer software that is capable of being legally protected by patent, whether in Canada or elsewhere.
- 1.11 “**Inter-institutional Agreement**” means the agreement between the University of Alberta and the University of Calgary dated the 22<sup>nd</sup> day of December, 2003 providing for the collaboration of Researchers from each of the two Universities

in the Carbohydrate Centre as amended firstly by agreement between the University of Alberta and the University of Calgary made the 31<sup>st</sup> day of March, 2006 and secondly by the Inter-institutional Renewal Agreement made effective as of the 1<sup>st</sup> day of April 2008 and as further amended from time to time.

- 1.12** “**Intellectual Property Committee**” means the committee referred to in Section 3.1.
- 1.13** “**Inventor**” means any staff member or student of a University who is an inventor of Arising Intellectual Property in accordance with Canadian patent law.
- 1.14** “**IP**” has the meaning ascribed to Intellectual Property IP in the Original Intellectual Property Agreement.
- 1.15** “**Jointly Developed Arising Intellectual Property**” means any Arising Intellectual Property created jointly by Researchers of each of the University of Alberta and the University of Calgary.
- 1.16** “**Jointly Owned Arising Intellectual Property**” means any Jointly Developed Arising Intellectual Property other than that with respect to which one University transfers its ownership interest to the other pursuant to an obligation contained in this Agreement or on a voluntary basis.
- 1.17** “**Managed Intellectual Property**” means:
- (a) the Existing Managed IP; and
  - (b) Arising Intellectual Property which the Management Advisory Board elects to include in Managed Intellectual Property as provided in Section 5.3.
- 1.18** “**Management Advisory Board**” means the Carbohydrate Centre Management Advisory Board established pursuant to, and with the rights and responsibilities set forth in, the Alberta Ingenuity Centre Agreement.
- 1.19** “**Net Revenue**” means all consideration received by or on behalf of one or both of the Universities from third parties from the sale or licensing of Managed Intellectual Property less the Out-of-Pocket Costs.
- 1.20** “**Original Alberta Ingenuity Centre Agreement**” means the agreement made between Alberta Ingenuity and the University of Alberta made as of the 1<sup>st</sup> day of September 2002 providing for the creation and operation of the Carbohydrate Centre as amended by agreement made effective as of the 1<sup>st</sup> day of September 2005.
- 1.21** “**Original Intellectual Property Agreement**” means the Intellectual Property Agreement between the University of Alberta and the University of Calgary dated effective March 1, 2005 as amended from time to time including by Section 2.2 of this Agreement.
- 1.22** “**Out-of-Pocket Costs**” means the out-of-pocket costs paid through, and as an expense to, the Carbohydrate Centre for obtaining the patent and granting, performing and enforcing any assignment or licensing of the Managed Intellectual Property.

- 1.23 “**Party**” means one of Alberta Ingenuity, the University of Alberta or the University of Calgary.
- 1.24 “**Prior Technology**” means intellectual property that is owned by and was created or acquired by a University either prior to the undertaking of the Research Project in reference to which such terms applies or independently of that Research Project.
- 1.25 “**Report of Invention**” means documentation required by a University to be completed by an Inventor in relation to Arising Intellectual Property pursuant to the applicable policies or procedures of that University.
- 1.26 “**Research Project**” means a research study or research project, including Sponsored Research, which is undertaken by one or both of the Universities, in whole or in part with Research Project Support Costs.
- 1.27 “**Research Project Support Costs**” means that portion of the annual funding received by the University of Alberta from Alberta Ingenuity pursuant to the Alberta Ingenuity Centre Agreement to be expended for the direct costs of a Research Project as provided in that Agreement.
- 1.28 “**Researcher**” means an employee, student or agent of, or any other person participating in a Research Project through, a University.
- 1.29 “**Solely Developed Arising Intellectual Property**” means any Arising Intellectual Property created or produced by Researchers of only one of the two Universities.
- 1.30 “**Solely Owned Arising Intellectual Property**” means any Solely Developed Arising Intellectual Property and any Jointly Developed Arising Intellectual Property with respect to which one University transfers its ownership interest to the other pursuant to an obligation contained in this Agreement or on a voluntary basis.
- 1.31 “**Sponsored Research**” means a Research Project undertaken by one or both of the Universities with funding provided by a sponsor pursuant to a Sponsored Research Agreement in which that sponsor is granted a right or option to use or obtain a license to Arising Intellectual Property created in the course of that Research Project.
- 1.32 “**Sponsored Research Agreement**” means an agreement between the University or Universities undertaking Sponsored Research and the third party sponsor.
- 1.33 “**TEC Edmonton**” means the joint venture created pursuant to agreement between the University of Alberta and Edmonton Economic Development Corporation as a regional technology transfer and commercialization vehicle.
- 1.34 “**Term**” means the term of this Agreement as provided in Section 14.1.
- 1.35 “**University**” means one of the University of Alberta and the University of Calgary.
- 1.36 “**University Funding Confirmation**” means a confirmation referred to in Section 7.1.

- 1.37 “**University of Alberta**” means The Governors of the University of Alberta.
- 1.38 “**University of Calgary**” means The Governors of the University of Calgary.
- 1.39 “**UTI**” means the UTI Limited Partnership, the technology transfer and commercialization entity for the University of Calgary.

## 2 APPLICABILITY OF VARIOUS AGREEMENTS

- 2.1 Each of Alberta Ingenuity, the University of Alberta and the University of Calgary is participating in operations of the Carbohydrate Centre in accordance with the terms and conditions of one or both of the Alberta Ingenuity Centre Agreement and the Inter-institutional Agreement.
- 2.2 The Original Intellectual Property Agreement shall:
- (a) continue to apply to all IP, other than the Existing Managed IP, disclosed in a Report of Invention provided to either the University of Alberta or the University of Calgary prior to the Effective Date;
  - (b) be applicable to any Jointly Owned Arising Intellectual Property which is not included in and ceases to be eligible for inclusion as Managed Intellectual Property as provided in Section 5.3;
  - (c) be applicable to any Jointly Owned Arising Intellectual Property which ceases to be Managed Intellectual Property as provided in Section 5.4.

Where the Original Intellectual Property Agreement is applicable to Jointly Owned Arising Intellectual Property referred to in Section 2.2(b) or (c), notwithstanding any term or condition of that agreement to the contrary:

- (d) no portion of the Net Revenue from any such Jointly Owned Arising Intellectual Property shall be allocated or paid to the Carbohydrate Centre;
  - (e) Net Revenue that would in the absence of (d) be allocated to the Carbohydrate Centre pursuant to Section 2.4 of the Original Intellectual Property Agreement shall be allocated to the Universities and split between the Universities in accordance with the respective ownership interest of each in such Jointly Owned Arising Intellectual Property; and
  - (f) Net Revenue that would in the absence of (d) be allocated to the Carbohydrate Centre pursuant to Section 2.7 of the Original Intellectual Property Agreement shall be allocated as to 2/3 to the Inventors and split between those Inventors in accordance with the applicable provisions of the Original Intellectual Property Agreement and 1/3 to the Universities and split between the Universities in accordance with the respective ownership interest of each in such Jointly Owned Arising Intellectual Property.
- 2.3 This Agreement shall, except as otherwise specifically provided herein:
- (a) apply to the Existing Managed IP;



- (b) apply to Arising Intellectual Property created in a Research Project on or after the Effective Date;
- (c) apply to Arising Intellectual Property created in a Research Project prior to the Effective Date but disclosed in a Report of Invention to either the University of Alberta or the University of Calgary on or after the Effective Date.

### **3 INTELLECTUAL PROPERTY COMMITTEE**

- 3.1** The Parties shall establish an Intellectual Property Committee for the Carbohydrate Centre, with the composition, responsibilities and other terms of reference set forth in Schedule B hereto and such other responsibilities as specifically set forth in this Agreement. The primary responsibility of the Intellectual Property Committee shall be to consider and make recommendations to the Management Advisory Board on the generation, development, protection, commercialization and other management of Arising Intellectual Property or Managed Intellectual Property, as the case may be.

### **4 MANAGEMENT ADVISORY BOARD**

- 4.1** The Alberta Ingenuity Centre Agreement establishes, and the Inter-institutional Agreement affirms the creation of, a management structure for the Carbohydrate Centre which includes the Management Advisory Board. The Management Advisory Board has the responsibility, following input from the Intellectual Property Committee pursuant to Section 3.1, to make decisions and provide instructions to TEC Edmonton and to UTI on the implementation of the protection, commercialization and other management of Managed Intellectual Property in accordance with, and subject to, the terms and conditions of this Agreement.
- 4.2** Without limiting the generality of the responsibility of the Management Advisory Board pursuant to the Alberta Ingenuity Centre Agreement or pursuant to any specific provision of this Agreement, the Management Advisory Board shall consider recommendations from the Intellectual Property Committee and shall:
- (a) determine the Arising Intellectual Property to be included as Managed Intellectual Property as provided in Section 5.3;
  - (b) determine the IP described in Part 2 of Schedule A to be included as Existing Managed IP through the process described in Part 2 of Schedule A.;
  - (c) determine the steps to be taken to further develop and prepare for marketing, licensing or assignment the Managed Intellectual Property including:
    - (i) selecting preferred commercialization vehicles or corporations for differing areas of application of Managed Intellectual Property;
    - (ii) determining, and instructing TEC Edmonton or UTI as the case may be on, the preferred licensee or assignee and negotiating parameters of the business terms of any proposed license or assignment of Managed Intellectual Property;

- (iii) determining, and instructing TEC Edmonton or UTI as the case may be on, the negotiating parameters of the business terms of any time-limited right of first offer or similar right to be granted to a preferred commercialization vehicle or corporation referred to in Section 4.2(c)(i);
- (iv) considering and approving the business terms of a license or assignment negotiated as contemplated in Section 4.2(c)(ii) or a right of first offer or similar right negotiated as contemplated in Section 4.2(c)(iii);

TEC Edmonton or UTI, as the case may be, in undertaking any of the foregoing activities in accordance with instructions from the Management Advisory Board is required and entitled to exercise its own discretion to optimize the likelihood of success in such activity.

- (d) keep the Parties aware of any negotiations or actions undertaken in accordance with this Section 4.2 in a timely fashion, such negotiations to be in accordance with the communicated requirements with respect to the form of any agreement of the applicable University or Universities referred to in Section 4.4, that University or Universities to be provided with copies of draft agreements during any negotiation process.

**4.3** Notwithstanding any provision of the Alberta Ingenuity Centre Agreement or this Agreement to the contrary, the Management Advisory Board shall not grant any rights to Managed Intellectual Property to any person that is not a bona-fide arm's length person to each of the Universities, Alberta Ingenuity or any member of the Intellectual Property Committee or the Management Advisory Board unless such grant is:

- (a) made in accordance with a procedure contained in a separate specific written approval from the University or Universities that own the Managed Intellectual Property; or
- (b) made in accordance with the specific approval of the University or Universities that own that Managed Intellectual Property.

**4.4** Each University shall cooperate fully in concluding and implementing the decisions of the Management Advisory Board made in accordance with the provisions of this agreement with respect to the Managed Intellectual Property, approved where necessary by a University or Universities pursuant to Section 4.3, and in that regard shall execute any license agreement, assignment or other transfer Agreement necessary to implement such decisions provided always that the form of any such agreement is acceptable to that University, acting reasonably, the Management Advisory Board having no authority to enter into any such agreement on behalf of the Universities.

**4.5** Each of TEC Edmonton and UTI shall be reimbursed through, and as an expense to the operations of, the Carbohydrate Centre for:

- (a) all third party costs and expenses reasonably incurred by it in the undertaking of an activity pursuant to this Section 4 or pursuant to Section 5.5; and

- (b) a reasonable fee for its time and effort in undertaking an activity pursuant to this Section 4 or pursuant to Section 5.5 as that fee is determined by TEC Edmonton or UTI, as the case may be, in accordance with its methods of calculation communicated to the Centre Manager prior to it undertaking any such activity.

Such third party costs and expenses and such fee shall be deemed to have been approved by the Management Advisory Board pursuant to Section 3.3 of the Alberta Ingenuity Centre Renewal Agreement.

## **5 MANAGED INTELLECTUAL PROPERTY**

**5.1** The University of Alberta shall cause TEC Edmonton to provide to the Centre Manager of the Carbohydrate Centre:

- (a) copies of such contracts and other documentation related to the Existing Managed IP as is in the possession or control of TEC Edmonton, which documentation may be reasonably required to permit the Centre Manager to undertake or instruct obtaining the patent and granting, performing and enforcing any assignment or licensing of the Existing Managed IP;
- (b) a summary of the status of Existing Managed IP and any discussions with third parties related to the licensing or assignment of that Existing Managed IP;
- (c) details of any costs or expenses incurred by TEC Edmonton in relation to activities undertaken by it in relation to the IP identified in Part 2 of Schedule A which costs and expenses it is entitled to recover from the Carbohydrate Centre as provided in Part 2 of Schedule A in order for such IP to become a part of the Existing Managed IP;
- (d) details of the costs or expenses of patenting Existing Managed IP which were paid or reimbursed to it from monies received by the University of Alberta from Alberta Ingenuity pursuant to the Original Alberta Ingenuity Centre Agreement, that payment or reimbursements having been a condition precedent to the inclusion of IP as Existing Managed IP.

**5.2** Each University shall require its Researchers to report the creation of Arising Intellectual Property by submission of a Report of Invention in accordance with that University's applicable policies and procedures. Unless otherwise advised by separate written notice from that University submission of a Report of Invention means in the case of the University of Calgary submission to UTI and means in the case of the University of Alberta submission to TEC Edmonton. A University shall as soon as practical following its receipt of a Report of Invention give written notice of the same to the other University, to the Centre Manager, to the chair of the Intellectual Property Committee and to the chair of the Management Advisory Board. The contents of a Report of Invention are Confidential Information of the University or Universities whose Researcher submitted the Report of Invention. A University shall not publicly disclose or permit its Researchers to publicly disclose any Arising Intellectual Property until a Report of Invention of the same has been submitted pursuant to this Section 5.2 and if the Management Advisory Board pursuant to Section 5.3:

- (a) elects to include the same as Managed Intellectual Property until thirty (30) days following the expiration of the sixty (60) day period referred to in Section 5.3;
- (b) does not elect to include the same as Managed Intellectual Property until such Arising Intellectual Property ceases to be eligible to become Managed Intellectual Property.

If a University wishes to publicly disclose, or permit its Researchers to publicly disclose, research results created in a Research Project in which that University participated and it appears that those research results do not include Arising Intellectual Property which continues to be eligible to become Managed Intellectual Property, the University or Researcher may give notice of the same to the Centre Scientific Leader. If the Centre Scientific Leader does not within seven (7) days after receipt of such notice give a responding notice in writing to such University or Researcher that the Centre Scientific Leader believes the research results include Arising Intellectual Property for which a Report of Invention should be submitted such University or Researcher may, subject to complying with any applicable requirement of Section 7.5 publicly disclose such research results.

**5.3** The Intellectual Property Committee shall review the Arising Intellectual Property disclosed to it in a notice pursuant to Section 5.2 and shall provide its recommendation to the Management Advisory Board to include or exclude such Arising Intellectual Property as Managed Intellectual Property. The Management Advisory Board shall have a period of sixty (60) days from receipt of notice by it pursuant to Section 5.2 to elect by notice in writing given to each University to include such Arising Intellectual Property as Managed Intellectual Property. If the Management Advisory Board fails to make such election in writing within that sixty (60) day period or if it advises the Universities that it declines to elect to include that Arising Intellectual Property as Managed Intellectual Property, that Arising Intellectual Property shall no longer be eligible to become Managed Intellectual Property and shall:

- (a) if Jointly Owned Arising Intellectual Property, be dealt with as provided in the Initial Intellectual Property Agreement. In such event, a notice given by one University to the other pursuant to Section 5.2 shall also be notice pursuant to Section 2.2 of the Initial Intellectual Property Agreement;
- (b) if Solely Owned Arising Intellectual Property, be dealt with in accordance with the applicable policies and procedures of the University whose Researcher created such Intellectual Property.

**5.4** If the Management Advisory Board pursuant to Section 5.3 elects to include any Arising Intellectual Property as Managed Intellectual Property the Management Advisory Board, acting through TEC Edmonton or UTI as contemplated in Section 5.5, shall take the necessary steps to file, prosecute and maintain patent protection for that Managed Intellectual Property as provided in this Agreement. All costs and expenses and fees, in each case as provided in Section 4.5, of applying for, prosecuting and maintaining patent protection for Managed Intellectual Property shall be paid or recovered from the Annual Contribution received by the University of Alberta from Alberta Ingenuity pursuant to and as provided in the Alberta Ingenuity Centre Agreement or from other funds paid or contributed, other than by any of the Parties, to the Carbohydrate Centre of for operations of the Carbohydrate Centre. If at any time there are insufficient funds

available to the Carbohydrate Centre to pay or permit the recovery of such costs and expenses, the affected Managed Intellectual Property shall cease to be Managed Intellectual Property subject to the provisions of this Agreement and shall be dealt with as provided in Section 5.3(a) or (b) as the case may be.

**5.5** Acting under the general guidance and instructions of the Management Advisory Board, the prosecution and maintenance of patent protection for Solely Owned Arising Intellectual Property that the Management Advisory Board elects to include as Managed Intellectual Property shall be performed through TEC Edmonton if owned by the University of Alberta and through UTI Limited Partnership if owned by the University of Calgary. Acting under the general guidance and instructions of the Management Advisory Board, the prosecution and maintenance of patent protection for Jointly Owned Arising Intellectual Property that the Management Board elects to include as Managed Intellectual Property shall be performed by one or both of TEC Edmonton and UTI Limited Partnership as the Universities agree and in the absence of such agreement as determined by the Management Advisory Board.

**5.6** Each Party shall co-operate fully with the others in completing and filing patent applications or applications for other statutory protection, in supplying information and in the preparation of necessary documents for filing, assignment and subsequent prosecution of those applications.

**5.7** Other than for:

- (a) the right of the Management Advisory Board pursuant to Section 5.3 to elect to include Arising Intellectual Property as Managed Intellectual Property;
- (b) the right of the Management Advisory Board pursuant to Part 2 of Schedule A to elect to include IP as Existing Managed IP; and
- (c) the responsibilities of the Management Advisory Board pursuant to Section 4.1 and Section 4.2 in relation to Managed Intellectual Property;

nothing in this Intellectual Property Agreement varies or detracts from the rights and obligations of TEC Edmonton in relation to such Arising Intellectual Property as exclusive service provider for technology transfer and commercialization activities for the University of Alberta or the rights and obligations of UTI Limited Partnership as the technology transfer and commercialization vehicle for the University of Calgary. Unless otherwise advised by separate written notice from the University of Alberta all interactions and communications between the Carbohydrate Centre, its Management Advisory Board or other representative and the University of Alberta in relation to Arising Intellectual Property and Managed Intellectual Property shall be through TEC Edmonton. Unless otherwise advised by separate written notice from the University of Calgary all interactions and communications between the Carbohydrate Centre, its Management Advisory Board or other representative and the University of Calgary in relation to Arising Intellectual Property and Managed Intellectual Property shall be through UTI Limited Partnership.

**5.8** The Management Advisory Board in the performance of its responsibilities with respect to:

- (a) Jointly Owned Arising Intellectual Property may separately engage TEC Edmonton or UTI as a service provider to it on such terms and conditions as agreed upon between the Management Advisory Board and such service provider;
- (b) Solely Owned Arising Intellectual Property of the University of Alberta may separately engage TEC Edmonton;
- (c) Solely Owned Arising Intellectual Property of the University of Calgary may separate engage UTI;

on such terms and conditions as agreed upon between the Management Advisory Board and such commercialization vehicle or service provider.

## **6 OWNERSHIP OF ARISING INTELLECTUAL PROPERTY**

- 6.1** Solely Developed Arising Intellectual Property created or developed by the Researchers of a University shall be owned by that University subject to any rights granted to a sponsor pursuant to a Sponsored Research Agreement.
- 6.2** Each University shall use all reasonable efforts to distinguish their respective contributions to Arising Intellectual Property in order to permit a separate patent application or other statutory protection to be filed for each University. If it is not feasible to distinguish the respective contributions of each University to Arising Intellectual Property, or if the Universities agree that they prefer to proceed jointly, that Arising Intellectual Property shall be considered Jointly Developed Arising Intellectual Property and the resulting patent application or application for statutory protection shall name the inventors from both Universities.
- 6.3** A patent for Jointly Owned Arising Intellectual Property shall be owned as to an equal share by each University, with equal rights, benefits, and liabilities allocated to each University unless otherwise agreed by the Universities acting in good faith in considering a recommendation of the Intellectual Property Committee to an allocation of the ownership, rights, benefits and liabilities of that patent unequally between the Universities, in order to fairly represent the relative creative intellectual contributions of the Researchers of each University to that Intellectual Property.

## **7 CONFIRMATION OF RESEARCH PROJECTS AND TERMS**

- 7.1** A Research Project shall not be commenced until a University Funding Confirmation substantially in the form attached as Schedule C hereto is completed, that form including:
  - (a) a title and description of the Research Project;
  - (b) the estimated anticipated expenditures for the Research Project;
  - (c) the estimated maximum duration of the Research Project;
  - (d) the minimum anticipated Research Project Support Costs for, and during the duration of, the Research Project.

Unless otherwise identified in the University Funding Confirmation applicable to a specific Research Project:

- (e) that Research Project shall be conducted by the University of Alberta without participation of the University of Calgary and only Part 1 of the University Funding Confirmation shall be completed;
- (f) if the Research Project is to be conducted in whole or in part by the University of Calgary its participation shall be by way of sub-grant from the University of Alberta and both Part 1 and Part 2 of the University Funding Confirmation shall be completed.

**7.2** A University Funding Confirmation is made pursuant to, and is subject to, any applicable provisions of this Agreement except to the extent any provision of such University Funding Confirmation is specifically stated to supersede any specific provision of this Agreement.

**7.3** A Research Project that is Sponsored Research which is to be conducted by one or both of the Universities shall not be commenced until the required Funding Confirmation pursuant to Section 7.1 is completed and a Sponsored Research Agreement in form and content acceptable to the University or Universities undertaking the research and the sponsor is executed and delivered by that University or Universities and by the Sponsor. Any such Research Project shall be undertaken in accordance with the Sponsored Research Agreement.

**7.4** A Research Project and its support through application of Research Project Support Costs may be terminated if research milestones or other key deliverables established through agreement between the Management Advisory Board and the Researchers at the commencement of that Research Project or on an on-going basis throughout the duration of the Research Project are not achieved or delivered in accordance with the required timelines for that Research Project.

**7.5** If in accordance with Section 7.1(f) the two Universities conduct a Research Project that is not Sponsored Research in the absence of any term or condition to the contrary in the applicable University Funding Confirmation the following shall apply:

- (a) Each University warrants to the other that it shall conduct such Research Project in a professional manner conforming to generally accepted practices for scientific research and development. However, because of the nature of such work, no specific result is promised.
- (b) Neither University shall include in the deliverables any technical information the use of which is known by that University to infringe the rights of others. However, neither University warrants that technical information conveyed in the deliverables does not infringe the rights of others under a present or future patent.
- (c) Neither University warrants the validity of patents under which rights may be granted pursuant to this Agreement, or makes any representation as to the scope of patents or that any invention may be exploited without infringing the rights of others.
- (d) Neither University warrants the correctness or accuracy of data supplied, advice given nor opinions expressed in the undertaking of such Research Project.



- (e) Each University shall use reasonable efforts to perform, in a timely manner, the actions allocated to that University by the work plan forming a part of University Funding Confirmation and to make available key personnel if designated therein. Sub-contracting of actions by the University of Calgary shall only be permitted only if approved in advance by the University of Alberta.
- (f) Each University shall keep the other advised of its progress and shall notify the other of any changes it believes are necessary to the work plan based on the results to that time.
- (g) Apart from reports, unless explicitly stated in a University Funding Confirmation there shall be no tangible items deliverable from one University to the other.
- (h) The University of Alberta shall pay to the University of Calgary any amounts required pursuant to the University Funding Confirmation in the manner provided in the University Funding Confirmation.
- (i) The research results created solely by a Researcher or Researchers of one University shall be owned by and be Confidential Information of that University and research results created jointly by Researchers of both Universities shall be Confidential Information of both Universities and shall be jointly and, unless otherwise agreed between the Universities, equally owned by both Universities.
- (j) A University that is an owner of research results referred to in (i) preceding may publicly disclose, or permit its Researchers to publicly disclose, those research results provided it complies with the provisions of this Section 7.5(j) and with the provisions of Section 5.2 and Section 5.3 if applicable. Prior to a University or its Researchers publicly disclosing research results, it shall give at least 60 days advance written notice to the other University and to the Centre Manager. That notice shall include a copy if available and otherwise a summary of the proposed written disclosure or a summary of the proposed oral disclosure. If such proposed disclosure includes any Jointly Developed Arising Intellectual Property and the Management Advisory Board has not elected to treat that Jointly Developed Arising Intellectual Property as Managed Intellectual Property and patent protection had not otherwise been sought for the same, the University receiving the notice of the proposed disclosure may within 45 days following such receipt give written notice to the University proposing the public disclosure that it requires a delay in such public disclosure, for a period of a further 30 days to allow it to seek patent protection for such Jointly Developed Intellectual Property.
- (k) In the event a graduate student of a University is involved in the Research Project and completes a thesis relating to the Research Project, the student shall own the copyright in that thesis. Notwithstanding anything else contained in this Agreement publication or defence of that thesis may only be delayed in accordance with applicable policies of that University.

- (l) A University may only introduce its Background Intellectual Property into the Research Project if so provided in the University Funding Confirmation or with the consent of the other University, a University introducing its Background Intellectual Property being deemed to have made the same available to the other University for the sole purpose of performing that Research Project unless otherwise provided in written agreement between the Universities.
- (m) A University will give consideration to licensing its Background Intellectual Property introduced into a Research Project as provided in Section 7.5(l) in conjunction with Arising Intellectual Property from that Research Project subject to the following conditions:
  - (i) only if necessary to facilitate commercial undertakings and licensing of that Arising Intellectual Property;
  - (ii) only if that licensing is not prevented by prior licences or rights of third parties;
  - (iii) only on terms which the licensing Party considers commercially reasonable.

**7.6** The delivery of this Agreement was a condition precedent of Alberta Ingenuity to its execution and delivery of the Alberta Ingenuity Centre Renewal Agreement. That Renewal Agreement provides that Research Project Support Costs can only be applied to a study or project if each Researcher participating in the same has executed and delivered a Research Acknowledgement as provided in this Agreement. Accordingly a University shall not assign a Researcher to, or permit a Researcher to participate through it in a Research Project, unless that Researcher has executed and delivered a Researcher Acknowledgement. A Researcher Acknowledgement for the University of Alberta shall be substantially in the form attached as Schedule D hereto. A Researcher Acknowledgement for the University of Calgary shall be substantially in the form attached as Schedule E hereto.

## **8 SHARING OF NET REVENUE**

- 8.1** Any license agreement, assignment or other transfer agreement of Managed Intellectual Property referred to in Section 4.4 shall provide that the consideration payable by the licensee or transferee pursuant to such license agreement, assignment or other transfer agreement shall be paid directly to:
- (a) the University that is the owner of Solely Owned Arising Intellectual Property at the address and in the manner provided in such agreement;
  - (b) each University that is a joint owner of Jointly Owned Arising Intellectual Property in the proportions and at the addresses and in the manner provided in such agreement.
- 8.2** Any consideration received by a University as contemplated in Section 8.1 shall be used firstly to pay the following:
- (a) firstly, if the consideration relates to Existing Managed IP, payment or reimbursement to TEC Edmonton of those costs and expenses referred to

in Section 5.1(d) that relate to the Existing Managed IP to the extent directed by the University of Alberta;

- (b) payment or reimbursement of all other outstanding Out-of-Pocket Costs paid through, and as an expense to, the Carbohydrate Centre, such payment or reimbursement to be paid or applied to the University of Alberta research account or fund referred to in Section 8.3 (b).

**8.3** The Net Revenue received by each University shall be allocated and paid in accordance with the following formula:

- (a) one-third shall be paid to that University's Researchers who are Inventors of the relevant Managed Intellectual Property in equal shares unless otherwise determined pursuant to agreement between those Inventors or through the applicable policies and procedures of that University;
- (b) one-third shall be paid to a research account or fund to be used in support of activities of the Carbohydrate Centre, such account or fund to be established and operated in accordance with the applicable policies and procedures of that University;
- (c) one-third shall be paid to that University. Having regard to the payment referred to in Section 8.3(b) in the case of the University of Alberta notwithstanding any provision of the Patent Policy to the contrary there shall be no requirement for the University of Alberta to use any of such payment to support research in the Faculty/Department where or through which the research took place.

## **9 CONFIDENTIALITY**

**9.1** A receiving Party shall not disclose Confidential Information provided by a disclosing Party except:

- (a) on a need to know basis within the receiving Party;
- (b) to someone to whom the law requires making the disclosure.

**9.2** A receiving Party shall carefully protect a disclosing Party's Confidential Information with the same degree of care used to protect the receiving Party's own information of a similar nature.

**9.3** A receiving Party shall not use the Confidential Information provided by a disclosing Party except for the purposes set forth in this Agreement, without written permission of the disclosing Party.

**9.4** A Party may, notwithstanding any other provision of this Agreement make public at any time without prior approval of the others, the following information regarding a University Funding Confirmation or a Sponsored Research Contract to which it is a participant: project title, duration, institute or faculty or department involved, committed and received funding and the names of individuals who are project leaders.

**9.5** The obligations contained in this Section 9 remain in effect:

- (a) for Confidential Information arising from a Research Project referred to in Section 1.7(a) for a period of two (2) years following the conclusion of that Research Project;
- (b) for other Confidential Information for a period of two (2) years following its disclosure as contemplated in Section 1.7(b);

from the Termination but notwithstanding any other provision of this Agreement do not apply to information which:

- (c) was in possession of a receiving Party prior to receipt from another Party;
- (d) enters the public domain, or becomes known to third parties, through no fault of the receiving Party;
- (e) is disclosed to the receiving Party by a third party not under any obligation of confidentiality to the disclosing Party.

Notwithstanding any other provision of this Agreement a receiving Party may disclose Confidential Information if:

- (f) approval for disclosure is given in writing by the disclosing Party;
- (g) disclosure is required by law including but not limited to applicable statute, regulation or other enactment or by lawful order of a court or administrative tribunal having jurisdiction provided the receiving Party provides the disclosing Party with immediate notice of such requirement upon the receiving Party becoming aware of the requirement.

## **10 LIMITATIONS AND EXCLUSIONS**

- 10.1** No Party makes any representations or warranties, either express or implied, as to any matter including, without limitation, the existence or non-existence of competing technology, the condition, quality or freedom from error of the research results, its Arising Intellectual Property or any part thereof, any merchantability, or its fitness for any particular purpose and all warranties and conditions expressed or implied, statutory or otherwise are hereby disclaimed.
- 10.2** No Party shall be liable for any direct, consequential or other damage suffered by any other Party or others claiming through any other Party resulting from the development or use by that other Party or others claiming through that other Party of the research results, the Arising Intellectual Property or any invention, technology or product produced in the course of or using either the research results or Arising Intellectual Property.
- 10.3** No Party warrants that the research results, the Arising Intellectual Property or any part of either or any aspect of the same shall be capable of receiving statutory protection.

## **11 LIABILITY AND INDEMNIFICATION**

- 11.1** Each Party is liable for its own losses, costs, damages and expenses of any nature which it may suffer, sustain, pay, or incur, by reason of any matter or thing arising out of, or in any way attributable to, activities pursuant to this Agreement except where such losses, costs, damages, and expenses are the result of the

willful breach of any term of this Agreement or a University Funding Confirmation by another Party, or that other Party's Researchers.

- 11.2** Except as otherwise provided in Section 11.1 each Party shall indemnify and hold harmless each other Party, its employees, students, agents, or subcontractors from any and all actions, claims, demands, and costs whatsoever arising directly or indirectly out of the willful breach by the indemnifying Party or its Researchers.

## **12 DISPUTE RESOLUTION**

- 12.1** Disputes concerning this Agreement or the rights or obligations of any Party pursuant to this Agreement shall not be litigated. If negotiations fail to resolve a dispute within sixty (60) days, a Party can require non-binding mediation, whereupon the Parties shall jointly appoint one impartial expert mediator to mediate according to mutually agreed procedures.
- 12.2** If any Party refuses to effectively participate in mediation, or if mediation continues for more than 60 days, a Party can require binding arbitration under the Arbitration Act (Alberta), whereupon the Parties shall attempt to jointly appoint one impartial expert arbitrator. If they cannot agree within thirty (30) days on the choice of an arbitrator, each Party shall appoint its own arbitrator and those arbitrators shall jointly appoint a chairperson of an arbitral tribunal.
- 12.3** An arbitral award shall not include punitive damages, costs, or interim measures. Each Party shall pay its own costs and an equal share of all other costs of mediation and arbitration, except for the exceptional circumstance in which an arbitral award may require the payment of all costs by a Party who has brought a frivolous dispute.
- 12.4** Unless otherwise agreed by the Parties when the occasion arises, mediation and arbitration shall be held in the City of Edmonton in the Province of Alberta. This clause shall survive expiration of the Term.

## **13 INSURANCE**

- 13.1** Each Party shall obtain and maintain during the term of this Agreement:
- (a) Property Insurance to insure all property which may be used in the performance of this Agreement by and against all risks of direct physical loss or damage in amounts adequate to cover the value of such property;
  - (b) Comprehensive General Liability Insurance against bodily injury (including death), property damage and personal injury in an amount not less than five million dollars (\$5,000,000) per occurrence;
  - (c) Such workers compensation and/or employers liability insurance as may be required by the provisions of law or otherwise deemed reasonably necessary in an amount sufficient to provide indemnification against any and all claims;
  - (d) Any other insurance coverage that may be identified from time to time and agreed to by the Parties.

Any insurance referred to in this Section 13.1 may have such deductible as the balance of similar insurance carried by that Party.

- 13.2** Upon the request of a Party, the other Parties shall provide certificates of insurance evidencing coverage to the requesting Party.
- 13.3** A Party shall be responsible for the payment of all premiums and deductible amounts relating to the insurance policies it is required to carry as listed above.
- 13.4** Where a Party self insures any portion of their insurance program, such self insurance must have sufficient reserve funds to provide coverage for any losses under that self insured program.

## **14 TERM**

- 14.1** The Term of this Agreement commences as of the Effective Date and continues until six months following the expiration of the term of the Alberta Ingenuity Centre Agreement.
- 14.2** No termination of the Term shall, in the absence of other agreement between the Parties:
- (a) affect the completion of any Research Project commenced prior to the effective date of such termination;
  - (b) affect the rights of either University to ownership of any Arising Intellectual Property that it has acquired through a Research Project that has been completed or shall be completed as provided in Section 14.2(a).
- 14.3** Prior to, or as soon as possible following, the expiration of the Term through passage of time or otherwise, the Parties shall negotiate in good faith and use reasonable efforts to jointly develop a plan for the transition of any and all responsibilities of the Management Advisory Board with respect to Arising Intellectual Property to the University that owns or is joint owner of that Arising Intellectual Property. Each of the Parties shall implement any such transition plan in accordance with its terms.

## **15 GENERAL**

- 15.1** Nothing in this Agreement creates the relationship of principal and agent, employer and employee, partnership, or joint venturers between any or all of the Parties and no Party shall represent otherwise.
- 15.2** No part of this Agreement may be assigned or subcontracted by any Party without the written consent of the others.
- 15.3** All notices, requests, directions or other communications required or permitted herein shall be in writing and shall be delivered to the parties hereto respectively as follows:

Alberta Ingenuity:

Alberta Ingenuity Fund

\_\_\_\_\_  
\_\_\_\_\_  
Edmonton, Alberta, \_\_\_\_\_  
Attention: President and CEO  
Phone: (780) \_\_\_\_\_ Fax: (780) \_\_\_\_\_

The University of Alberta:

For Contract Matters:  
Research Services Office  
222 Campus Tower  
University of Alberta  
Edmonton, Alberta, T6G 2E1  
Attention: Assistant Director, Agreements

Phone: (780) 492-9705 Fax: (780) 492-0949

For Scientific Matters:  
Dr. David Bundle  
Department of Chemistry  
Faculty of Science  
University of Alberta  
Edmonton, Alberta T6G \_\_\_\_\_

Phone: (780) 492-8808 Fax: (780) 492-8231

with a copy to:

TEC Edmonton

The University of Calgary:

University of Calgary 2500 University Drive N.W.  
Calgary, Alberta  
T2N 1N4  
Attention: Glenn McMurray  
Senior Director, Research Services and Research Accounting

Phone: (403) 220-6354 Fax: (403) 2899-0693  
e-mail: glenn.mcmurray@ucalgary.ca

with a copy to:

University Technologies International  
Suite 130, 3553 – 31 Street NW  
Calgary, Alberta, T2L 2K7  
Attention: President & CEO

Phone: (403) 270-7027 Fax: (403) 270-2384

e-mail: [cataford@uti.ca](mailto:cataford@uti.ca)

In order for any notices, requests, directions, or other communications to be effective, the same must either be delivered in person or, sent by registered mail or facsimile addressed to the Party for whom it is intended at the above-noted address or fax number and shall be deemed to have been received, if sent by registered mail, when the postal receipt is acknowledged by the other party and, if sent by facsimile, when transmitted. The address or fax number of a Party may be changed by notice to the other Parties in the manner set out in this Section.

- 15.3** This Agreement shall be governed by and interpreted in accordance with the laws in force in the Province of Alberta and subject to the provisions of Article 12 the parties expressly attorn to the exclusive jurisdiction of the courts of Alberta for enforcement thereof.

**IN WITNESS WHEREOF** the duly authorized officers of the parties have executed this Agreement as of the Effective Date.

<b>THE GOVERNORS OF THE UNIVERSITY OF ALBERTA</b>	<b>THE GOVERNORS OF THE UNIVERSITY OF CALGARY</b>
Dr. Lorne Babiuk Vice President (Research)	Dr. Rose Goldstein Vice President (Research)
Dean	
Chair	
Principal Investigator	

<b>ALBERTA HERITAGE FOUNDATION FOR SCIENCE AND ENGINEERING RESEARCH</b>
Dr. Peter Hackett President & CEO



## SCHEDULE A

### EXISTING MANAGED IP

#### PART 1 - EXISTING MANAGED IP

1. Lowary, T.L. Immunomodulatory Oligosaccharide Compounds. US Provisional Patent Application 60/783,657 filed: March 16, 2006.
2. Lowary, T.L. Immunomodulatory Oligosaccharide Compounds. US Patent Application US11/687,400 filed: March 16, 2007.
3. Feldman, M., Faridmoayer, A. . Methods and Systems for O-Glycosylating Proteins. PCT Application filed: December 13, 2007.
4. Bundle, D.R., Kitov, P.I. Multivalent Heterobifunctional Polymer Therapeutics and Methods of their Use. US Provisional Patent Application 60/896,878 filed: March 23, 2007
5. Bundle, D.R., Kitov, P.I. Multivalent Heterobifunctional Polymers and Methods of their Use. PCT Application filed: March 2008.

#### PART 2 – POTENTIAL EXISTING MANAGED IP

1. Bundle, D.R., Wu, X., Rennie, R., Lipinski, T. Synthetic anti-*Candida albicans* oligosaccharide based vaccines. US Patent Application filed: March 14th, 2006.
2. Bundle, D.R., Kitov, P.I. Grant, G., Lipinski, T., Dziadek, S. Methods and compositions for pharmacologically controlled targeted immunotherapy. International and US Patent Application Serial No. 11/602,493 filed: November 21, 2006.

As at the date of delivery of this Agreement the IP identified in this Part 2 of Schedule A is IP that is subject to the terms and conditions of the Original Intellectual Property Agreement. If prior to the 31<sup>st</sup> day of December, 2008 the Management Advisory Board elects to include any of such IP as Existing Managed IP and pays to TEC Edmonton the amount calculated by TEC Edmonton in relation to that IP pursuant to Section 5.1(c) that IP shall become Existing Managed IP. If such election and payment is not made by the foregoing date there shall be no further right to make such election and payment.

## SCHEDULE B

### INTELLECTUAL PROPERTY COMMITTEE

**B.1 Background** -The Carbohydrate Centre focuses its efforts on several areas of carbohydrate research, including vaccine development, drug discovery, and synthetic biological materials, which have key medicinal and commercial applications. As of the Effective Date the Carbohydrate Centre comprises 12 investigators located at the University of Alberta or at the University of Calgary.

**B.2 Terms of Reference** - The primary responsibility of the Intellectual Property Committee shall be to consider and make recommendations to the Management Advisory Board on the generation, development, protection, commercialization and other management of Arising Intellectual Property or Managed Intellectual Property, as the case may be, and in the performance of that responsibility shall consider and make recommendations on:

- (a) strategies for Arising Intellectual Property identification and commercialization;
- (b) the Arising Intellectual Property disclosed to it in a notice pursuant to Section 5.2, and the inclusion or exclusion of such Arising Intellectual Property as Managed Intellectual Property;
- (c) the IP described in Part 2 of Schedule A to be included as Existing Managed IP through the process described in Part 2 of Schedule A.;
- (c) potential licensing opportunities in relation to Managed Intellectual Property including the identification of potential commercial partners that could participate in further development of Managed Intellectual Property;
- (d) such other matters as specifically directed by the Management Advisory Board, any such specific direction to include the context in which such considerations and recommendations are sought.

Each member of the Intellectual Property Committee shall be available from time to time for individual consultation with the Management Advisory Board in areas of scientific, technical, commercial or managerial expertise relevant to that member.

**B.3 Administration and Organization** – The Intellectual Property Committee administration and organization shall include the following components:

- (a) Confidentiality Agreement - Prior to or concurrent with the appointment of an individual as a member of the Intellectual Property Committee that individual must sign a confidentiality agreement acceptable in form to each of the Universities or must otherwise be subject to obligations of confidentiality with respect to its activities as a member of the Intellectual Property Committee acceptable in nature to each of the Universities.
- (b) Procedure – Subject to any specific provisions of this Agreement to the contrary, the Intellectual Property Committee may, through unanimity of its voting members, establish such rules of procedure relating to the calling and holding of meetings as it deems appropriate.
- (c) Communications and Reporting - The Chair of the Intellectual Property Committee shall serve as a liaison between the Intellectual Property Committee and the Management Advisory Board to ensure effective and timely communication.

- (d) Members of Committee – The Intellectual Property Committee shall be comprised of three voting members appointed as follows:
- (i) the Chair of the Management Advisory Board who shall also be the Chair of the Intellectual Property Committee;
  - (ii) a representative designated, from time to time, by the University of Alberta from TEC Edmonton;
  - (iii) a representative designated, from time to time, by the University of Calgary from UTI.

If the three voting members of the Intellectual Property Committee determine that its considerations with respect to any matter falling within its responsibilities including but not limited to particular Arising Intellectual Property or particular Managed Intellectual Property would benefit from the appointment of additional individuals with specific knowledge or experience in relation to such matter it may make a recommendation to that effect to the Management Advisory Board. The Management Advisory Board may, in accordance with any such recommendation of the Intellectual Property Committee approve the appointment of up to two non-voting members in relation to such matter. The term of appointment of such non-voting members shall end on the earlier of the conclusion of considerations of the matter in relation to which the appointment was made or any fixed term of such appointment.

## SCHEDULE C

### UNIVERSITY FUNDING CONFIRMATION ALBERTA INGENUITY CARBOHYDRATE CENTRE

#### PART 1

#### Authorization for the Categorization of a Study or Project as a Research Project

This University Funding Confirmation is delivered pursuant to the Intellectual Property Agreement made between The Governors of the University of Alberta, The Governors of the University of Calgary and Alberta Heritage Foundation for Science and Engineering Research as of the 1<sup>st</sup> day of April 2008 (the "Intellectual Property Agreement").

Project Title:

Anticipated Start Date:

Estimated Maximum Project Duration:

Principal Investigator:

Other Potential Investigators:

Minimum Estimated Research Project Support Costs (by project year and aggregate):

Minimum Estimated Research Project Costs (by project year and aggregate)

Sponsored Research: Yes No – If Yes identify Sponsored Research Agreement

#### Certifications Required (circle):

Human Ethic:	yes	no
Animal Care:	yes	no
Biohazards:	yes	no

#### Attachments:

- Project Description and Objectives
- Certification Approvals if required (must be valid at start date of project)

Dr. David Bundle of the University of Alberta, Alberta Ingenuity Scientific Leader of the Alberta Ingenuity Carbohydrate Centre, confirms to the Management Advisory Board that the University has approved this Research Project as a part of the program of the University of Alberta to be conducted through the Alberta Ingenuity Carbohydrate Centre in accordance with the foregoing details.

\_\_\_\_\_  
Dr. David Bundle

\_\_\_\_\_  
Signature of Principal Investigator

## PART 2

This Part 2 requires completion only if the University of Calgary is conducting the Research Project on its own or in conjunction with the University of Alberta and upon completion this University Funding Confirmation constitutes a written sub-grant by the University of Alberta in favor of the University of Calgary in accordance with the terms and conditions of this University Funding Confirmation and the terms and conditions of the Intellectual Property Agreement stated therein to be applicable hereto.

Principal Investigator of the University of Calgary: \_\_\_\_\_

Scope of Work: \_\_\_\_\_

Deliverables: \_\_\_\_\_

Project Term: Start Date: \_\_\_\_\_ End Date: \_\_\_\_\_

Approved Funding Amount and Payment Terms: \_\_\_\_\_

### Attachments:

- Project Description and Objectives (with Scope of Work for University of Calgary)

The University of Calgary, confirms to the University of Alberta that the University of Calgary has approved its participation, through a sub-grant from the University of Alberta, in this Research Project as a part of the program of the University of Calgary to be conducted through the Alberta Ingenuity Carbohydrate Centre in accordance with the terms and conditions of this University Funding Confirmation and the terms and conditions of the Intellectual Property Agreement stated therein to be applicable hereto.

\_\_\_\_\_  
Senior Director, Research Services and Research Accounting

\_\_\_\_\_  
Signature of Principal Investigator of University of Calgary

### Transfer of Funds:

Fund P/G Number: \_\_\_\_\_ Fund Speedcode: \_\_\_\_\_

\_\_\_\_\_  
Authorizing Signature  
Fund P/G Account Holder  
cc. Department Administrators

### PART 3

The Chair of the Management Advisory Board of the Alberta Ingenuity Carbohydrate Centre confirms to the University of Alberta that the Management Advisory Board has approved the application of Research Project Support Costs in support of this Research Project in accordance with the foregoing details.

---

Chair of Management Advisory Board

## SCHEDULE D

### RESEARCH ACKNOWLEDGMENT – UNIVERSITY OF ALBERTA

I acknowledge to The Governors of the University of Alberta (the “University”) that:

1. I have read the Carbohydrate Centre Intellectual Property Agreement made between the University, the University of Calgary and Alberta Ingenuity as of the 1<sup>st</sup> day of April 2008 (the “IP Agreement). and accordingly am aware of the terms and conditions pursuant to which the University must undertake a research project or study (a “Research Project”) which is supported in whole or in part with Research Project Support Costs received from Alberta Ingenuity (the “University Obligations”).
2. The University has advised me that it believes the IP Agreement, including the provisions of Article 6 relating to ownership of Arising Intellectual Property, is in the best overall interests of the University and each University research team member who is an inventor of Arising Intellectual Property.
3. Section 7.5 of the IP Agreement requires the University to obtain from me prior to assigning me to, or permitting me to participate in a Research Project, an acknowledgement substantially in this form.
4. I am aware that in accordance with the terms and conditions applicable to my **[appointment as an academic/non-academic staff member] [status as a registered student]** of the University my participation in a Research Project must be in accordance with the University Obligations.
5. I am aware that the University will own Solely Developed Arising Intellectual Property created or developed by me as contemplated in Section 6.1 and will jointly own with the University of Calgary Jointly Develop Arising Intellectual Property created or developed in part be me as contemplated in Section 6.3 and I assign to the University my right, title and interest in all Arising Intellectual Property for the purpose of compliance with the University Obligations.
6. I am aware of the responsibilities of the Management Advisory Board with respect to establishing and directing the implementation of the protection, commercialization and other management of Managed Intellectual Property contained in Section 4.1 and Section 4.2 and the designation of TheraCarb Inc., a corporation the shareholders of which include the Centre Scientific Leader and the University of Alberta, as a preferred commercialization vehicle of Managed Intellectual Property in the field of therapeutics and vaccines for infectious diseases and neurodegenerative diseases.
7. This Research Acknowledgement applies to my participation in each Research Project whether identified at, of subsequent to, the time of execution of this Research Acknowledgment.

8. I am executing and delivering this Research Acknowledgement on a voluntary basis after having been given an opportunity to review and discuss the Research Acknowledgement both on my own and with others of my choosing.

Dated the \_\_ day of \_\_\_\_\_, \_\_\_\_\_.

\_\_\_\_\_  
Witness  
[Print Name of Witness]

\_\_\_\_\_  
Research Participant  
[Print Name of Team Member]



## SCHEDULE E

### RESEARCH ACKNOWLEDGMENT – UNIVERSITY OF CALGARY

I acknowledge to The Governors of the University of Calgary (the “University”) that:

1. I have read the Carbohydrate Centre Intellectual Property Agreement made between the University, the University of Alberta and Alberta Ingenuity as of the 1<sup>st</sup> day of April 2008 (the “IP Agreement). and accordingly am aware of the terms and conditions pursuant to which the University must undertake a research project or study (a “Research Project”) which is supported in whole or in part with Research Project Support Costs received from Alberta Ingenuity (the “University Obligations”).
2. Section 7.5 of the IP Agreement requires the University to obtain from me prior to assigning me to, or permitting me to participate in a Research Project, an acknowledgement substantially in this form.
3. I am aware that in accordance with the terms and conditions applicable to my **[appointment as an academic/non-academic staff member] [status as a registered student]** of the University my participation in a Research Project must be in accordance with the University Obligations.
4. I am aware that the University will own Solely Developed Arising Intellectual Property created or developed by me as contemplated in Section 6.1 and will jointly own with the University of Alberta Jointly Develop Arising Intellectual Property created or developed in part by me as contemplated in Section 6.3 and I assign to the University my right, title and interest in all Arising Intellectual Property for the purpose of compliance with the University Obligations.
5. I am aware of the responsibilities of the Management Advisory Board with respect to establishing and directing the implementation of the protection, commercialization and other management of Managed Intellectual Property contained in Section 4.1 and Section 4.2 and the designation of TheraCarb Inc., a corporation the shareholders of which include the Centre Scientific Leader and the University of Alberta, as a preferred commercialization vehicle of Managed Intellectual Property in the field of therapeutics and vaccines for infectious diseases and neurodegenerative diseases.
6. This Research Acknowledgement applies to my participation in each Research Project whether identified at, or subsequent to, the time of execution of this Research Acknowledgment.

7. I am executing and delivering this Research Acknowledgement on a voluntary basis after having been given an opportunity to review and discuss the Research Acknowledgement both on my own and with others of my choosing.

Dated the \_\_ day of \_\_\_\_\_, \_\_\_\_\_.

\_\_\_\_\_  
Witness  
[Print Name of Witness]

\_\_\_\_\_  
Research Participant  
[Print Name of Team Member]

\_\_\_\_\_  
Senior Director, Research Services and Research Accounting

**Table 3.** Five-year budget for the AICCS.

	Requested Funding (\$)									
	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 10	Year 9	Year 8	Year 7
<b>Salaries and benefits</b>	<b>1,105,100</b>	<b>1,249,000</b>	<b>1,343,000</b>	<b>1,487,000</b>	<b>1,587,500</b>	<b>1,666,875</b>				
Training envelope	490,600	554,000	628,000	737,000	800,000	840,000				
Research staff	614,500	695,000	715,000	750,000	787,500	826,875				
<b>Professional and technical services</b>	<b>15,000</b>	<b>15,000</b>	<b>15,000</b>	<b>15,000</b>	<b>15,000</b>	<b>15,000</b>				
<b>Establishment grant</b>	<b>—</b>	<b>100,000</b>	<b>100,000</b>	<b>100,000</b>	<b>—</b>	<b>—</b>				
<b>Associate investigators</b>	<b>40,000</b>	<b>40,000</b>	<b>40,000</b>	<b>40,000</b>	<b>40,000</b>	<b>40,000</b>				
<b>Equipment</b>	<b>123,000</b>	<b>100,000</b>	<b>100,000</b>	<b>100,000</b>	<b>100,000</b>	<b>100,000</b>				
<b>Materials, supplies and other expenses</b>	<b>543,000</b>	<b>592,000</b>	<b>622,000</b>	<b>653,000</b>	<b>686,000</b>	<b>720,500</b>				
Laboratory consumables	347,500	420,000	441,000	463,000	486,000	510,500				
General operating	144,000	120,000	126,000	132,000	139,000	146,000				
Conferences and workshops	51,500	52,000	55,000	58,000	61,000	64,000				
<b>Business activities</b>	<b>50,500</b>	<b>75,000</b>	<b>100,000</b>	<b>100,000</b>	<b>100,000</b>	<b>100,000</b>				
<b>Recruitment</b>	<b>2,000</b>	<b>15,000</b>	<b>25,000</b>	<b>10,000</b>	<b>5,000</b>	<b>5,000</b>				
<b>Research collaboration</b>	<b>130,500</b>	<b>120,000</b>	<b>120,000</b>	<b>120,000</b>	<b>120,000</b>	<b>120,000</b>				
<b>Communication and outreach</b>		<b>50,000</b>	<b>50,000</b>	<b>50,000</b>	<b>50,000</b>	<b>50,000</b>				
<b>Total cost of the direct budget</b>	<b>2,009,100</b>	<b>2,356,000</b>	<b>2,515,000</b>	<b>2,675,000</b>	<b>2,703,500</b>	<b>2,817,375</b>				
<b>Total cost of the administration budget</b>	<b>213,600</b>	<b>224,000</b>	<b>235,000</b>	<b>246,000</b>	<b>258,000</b>	<b>270,000</b>				
<b>Annual centre budget</b>	<b>2,222,700</b>	<b>2,580,000</b>	<b>2,750,000</b>	<b>2,921,000</b>	<b>2,961,500</b>	<b>3,087,375</b>				

Assumptions:

- Years 6 to 10: salaries/benefits will increase 5% annually.
- Years 6 and 7: SRA funding will be obtained from BioVeris and TheraCarb.
- Year 6: two associate investigators will become PIs.
- Year 6: separate capital equipment requests for approximately \$5 million will be sent to the AIF and the CFI.
- Year 7: an additional PI (a biologist) will be recruited.
- Year 8: an additional PI (a synthetic chemist) will be recruited and succession planning will be finalized for the Director's position.
- Years 9 and 10: additional industrial funding will be obtained.

## Financial Report as of March 31, 2011-06-08

APRIL 1, 2010 TO MARCH 31, 2011	ANNUAL BUDGET	ACTUAL EXPENDITURES as of March 31, 2011	COMMITTED EXPENDITURES as of March 31, 2011	TOTAL EXPENDITUR ES	VARIANCE	
SALARIES & BENEFITS	\$1,729,341	\$1,675,453	\$0	\$1,675,453	\$53,888	3%
ESTABLISHMENT GRANT	\$0	\$0	\$0	\$0	\$0	NA
EQUIPMENT (1)	\$125,000	\$186,205	\$49,549	\$235,754	-\$110,754	-89%
MATERIALS SUPPLIES & OTHER EXPENSES	\$561,275	\$479,988	\$16,757	\$496,745	\$64,530	11%
GOVERNANCE & BUSINESS ACTIVITIES	\$120,000	\$131,159	\$2,000	\$133,159	-\$13,159	-11%
RESEARCH COLLABORATION (2)	\$120,000	\$157,244	\$0	\$157,244	-\$37,244	-31%
COMMUNICATION AND OUTREACH (3)	\$10,000	\$742	\$0	\$742	\$9,258	93%
TECHNOLOGY TRANSFER & PRE- COMMERCIALIZATION (4)	\$390,000	\$286,789	\$2,932	\$289,721	\$100,279	26%
MANAGEMENT COSTS	\$244,384	\$222,680	\$0	\$222,680	\$21,704	9%
<b>TOTAL</b>	<b>\$3,300,000</b>	<b>\$3,140,259</b>	<b>\$71,238</b>	<b>\$3,211,497</b>	<b>\$88,503</b>	<b>3%</b>

### Notes

(1) Due to the move of several investigators to the newly built CCIS, needs for unbudgeted equipment have appeared. A cell disrupter, a flow cytometer and a solvent purification system were purchased subsequently. The purchases are necessary to advance effectively the research program and avoid any unnecessary disruption.

(2) This expense includes the cost of the for the PIs' retreat in November as well as a large down-payment for the 2011 Annual Carbohydrate Symposium

(3) Communication activities were delayed as the Centre waited for additional information and instructions from the funding agency on Centre's name change before developing any new website and printing material

(4) IP protection and legal costs were lower than expected. The contingency funds for the pneumonia project was not used as TheraCarb remained until March 31, 2011 the official sponsor of the project.

## NOTIFICATION OF AWARD

**Notification Number** 20110637

**Notification Date** 12-May-2011

**Record Number** 200200121

**PA/BA Number**

**Award Category**

**Period of Support**

**Start Date**

01-Apr-2011

Alberta Innovates Centres

**End Date**

31-Mar-2012

**Award Payable To**

**Amount of Award**

University of Alberta

Centre's Payments AICCS -  
Stipend

\$3,300,000.00

**Recipient** IC - Carbohydrate Science

**Department of** Chemistry

**Faculty of** Science

01-May-2011	Centre's Payments AICCS - Stipend	\$825,000.00
01-Aug-2011	Centre's Payments AICCS - Stipend	\$825,000.00
01-Nov-2011	Centre's Payments AICCS - Stipend	\$825,000.00
01-Feb-2012	Centre's Payments AICCS - Stipend	\$825,000.00

Alberta Ingenuity Centre for Carbohydrate Science 2011/04/01 - 2012/03/31

As per 2002 Alberta Ingenuity Centre agreement between the Alberta Heritage Foundation for Science and Engineering Research (now part of Alberta Innovates - Technology Future) and The Governors of the University of Alberta.

Alberta Innovates - Technology Futures Year 9 Contribution. This award is provided in quarterly payments based on acceptable reporting as per the reporting schedule found in Section 9 of the Ingenuity Centres for Research & Commercialization Program Guide.

**Distribution:** David R Bundle  
Elizabeth Nanak  
Office of Research Services




<b>AI CENTRE PROGRAM BUDGET 2011 -2012</b>	<b>Year 9</b>
PERSONNEL	\$1,734,784
<i>Subtotal Training Envelope</i>	<i>\$502,083</i>
<i>Subtotal Salaries</i>	<i>\$1,232,701</i>
ESTABLISHMENT GRANT	\$40,000
EQUIPMENT	\$100,000
MATERIALS SUPPLIES & OTHER EXPENSES	\$560,832
BUSINESS & MANAGEMENT	\$120,000
RESEARCH COLLABORATION	\$100,000
COMMUNICATION AND OUTREACH	\$10,000
TECHNOLOGY TRANSFER & PRE-COMMERCIALIZATION	\$390,000
ADMINISTRATION	\$244,384
<b>TOTAL</b>	<b>\$3,300,000</b>

David R. Bundle

Strathcona County RU Lemieux  
Professor of Carbohydrate Chemistry

Department of Chemistry  
Edmonton, Alberta  
Canada T6G 2G2



UNIVERSITY OF ALBERTA

File

to A Drummond

Director Alberta Ingenuity Centre for  
Carbohydrate Science and  
Associate Chair of Research

↓  
G Bodnar

Phone 780-492-8808  
FAX 780-492-7705  
e-mail: dave.bundle@ualberta.ca

Dr. Doug Owram  
Provost & Vice President (Academic)  
University of Alberta

2-10 University Hall

November 15, 2002

Dear Dr. Owran,

Please find enclosed a copy of the proposal to the University of Alberta Academic Planning Committee for the establishment of "The Alberta Ingenuity Centre for Carbohydrate Science" an Alberta Ingenuity Research Centre. As you are no doubt aware this was one of two centres funded in the first competition for Ingenuity Research Centres.

If you require additional information please do not hesitate to contact me.

Yours sincerely

A handwritten signature in cursive script that reads "David R. Bundle".

Dr. David R. Bundle  
Director Alberta Ingenuity Centre for Carbohydrate Science,  
Associate Chair of Research  
Department of Chemistry  
University of Alberta  
Edmonton, Alberta, Canada T6G 2G2  
dave.bundle@ualberta.ca  
Phone 780-492-8808  
FAX 780-492-7705



**Proposal to the University of Alberta  
Academic Planning Committee for the  
The Alberta Ingenuity Centre for  
Carbohydrate Science**

**An Alberta Ingenuity Research Centre**

**Director: David R. Bundle, Professor, Department of Chemistry**



## Index

### *Table of Contents:*

- **General**

1. Name and Purpose	page 1
2. Priorities	page 1
3. Business Plan	page 2
4. Facilities	page 2
5. Management and Governance	page 4
6. Budgets	page 5
7. Officers	page 5
8. Annual Reporting	page 6

- **Appendixes**

1. A: Principal Investigators	page i
2. B: General Description of Ingenuity Research Centres	page iii
3. C: Letters of Support	page v
4. D: Year 1 – Approved Budget	page xxxi
5. E: Original 5 Year Budget	insert after page xxxi
6. F: Budget Justification	page xxxii
7. H: Draft Agreement between Alberta Ingenuity and the University of Alberta	page xxxviii

### **Name and Detailed Purpose**

The Alberta **Centre for Carbohydrate Science** is one of two centres selected for funding, following peer review, in the first competition of Alberta Ingenuity's Research Centres Program (See appendix A for the Centre's Principal Investigators and appendix B for a description of the Centre's Programs of Research).

The chemical biology of carbohydrates—the last of nature's unconquered biopolymers—is the focus of the Alberta Centre for Carbohydrate Science. This elite interdisciplinary organization is composed of principal investigators who have either attained recognition at the highest international levels or are individuals of exceptional promise. The Centre will seek to bridge the chasms between academia, industry and government. It will strive to be recognized internationally as the foremost Centre in pure and applied carbohydrate research and training; and will be a distinguished resource to industry, academia and government.

The centre will lay a **BASIC SCIENCE FOUNDATION for the anticipated future research effort on the carbohydrates and their role in life processes**. Within an initial 5 year time frame the centre's vision is to be recognized internationally as the foremost Centre in pure and applied carbohydrate research and training; and to be a distinguished resource to industry, academia and government.

### **Priority within the Faculty and University and Benefits to the University of Alberta**

The creation of this Centre and direct measures of support in the form of allocation of resources such as return of indirect costs to the Centre and allocation of Canada Research Chairs to support recruitment and renewal within the Centre have been made in writing by the VP Research and the Dean of the Faculty of Science (see copies of letters of support, Appendix C).

Other considerations include the historical dominance (largely due to the legacy of Professor R. U. Lemieux) of the University of Alberta in the field of Carbohydrate Chemistry and Biochemistry. Alberta is already known internationally for its carbohydrate chemistry, an area strongly aligned with federal, provincial and University objectives. However, a continual cycle of renewal and growth is required if it is to remain a leader. Furthermore, the creation of a Centre which makes possible projects that can not be contemplated without such diverse resources and multidisciplinary expertise accessible from day 1 will be an unrivalled drawing card at all levels of recruitment. This Centre is therefore pivotal to attracting new star researchers, students and funding, and its success will be reflected in the future capacity of its academic, industry and government partners.

Within ten years, these efforts will make the Centre the most important source of glycoscience solutions, opportunities and highly trained personnel worldwide. By concentrating on both the science and on diverse industries—agriculture, veterinary, biotechnology, pharmaceutical, nanotechnology and the environment—the Centre sets itself apart from its international competitors. Comparable international groups, such as the Oxford Glycobiology Institute (UK), the Complex Carbohydrate Research Center (USA), the EU GlycoTrain Consortium, and the Consortium for Functional Glycomics, are typically concentrating only on biomedical applications, or are only networks of geographically disparate researchers.

As Canada's premier centre for research on carbohydrates, the Alberta Centre for Carbohydrate Science will have major impacts on academic research in Canada and especially in Alberta. The increased appreciation of chemical biology and of the important roles of

carbohydrates in life processes will make Alberta a location of choice for new life sciences businesses. It is anticipated that the short and long term impacts of glycoscience research on Alberta's economy will be substantial and diverse. The Centre will offer opportunities for collaborative problem solving, technology transfer and commercialization, and highly qualified personnel (HQP) development.

As one of only a handful of such centres world-wide, the Alberta Centre for Carbohydrate Science will provide unique capabilities to the Alberta biomedical community, especially those with research interests in the structure and function of glycoproteins and glycolipids. A core of world-leading life science research performed by a critical mass of highly qualified researchers will allow Alberta to advance dramatically both in the creation of new knowledge and in the application of new discoveries.

### **Detailed Business Plan**

The Centre will be located in four Departments, two at the University of Alberta and two at the University of Calgary. The principal investigators supported by the Centre are Dr. David Bundle (Centre Director, Department of Chemistry, University of Alberta), Dr. Ole Hindsgaul (Co-Director, Department of Chemistry, University of Alberta) [*Professor Hindsgaul has submitted his resignation from the University to take effect July 1 2003*], Dr. Monica Palcic (Department of Chemistry, University of Alberta), Dr. Glen Armstrong (Department of Medical Microbiology and Immunology, University of Alberta), Dr. David Schriemer (Department of Biochemistry and Molecular Biology, University of Calgary), Dr. Kenneth Ng (Department of Biological Sciences, University of Calgary) . With the passage of time new faculty are expected to be recruited to replace departing or retiring Centre members. The Centre has hired the first new member, Dr. Todd Lowary from the Department of Chemistry, Ohio State University.

The administrative Centre will be located in offices in the Department of Chemistry and initial plans call for it to be run by a Business Manager and Administrative Assistant.

### **Operational Space and Facilities for Research**

The Centre will operate from the laboratories of the principal investigators. With the extra support received these researchers will need in most cases to seek additional space allocation from their Departments. Given the space constraints in most Department's additional space allocation is likely to be limited. There can be no hiding from the fact that adequate office and laboratory space will become a major problem. In addition to this laboratory space the Centre can call upon very impressive support facilities as follows.

The Centre will build on the extensive research infrastructure available at the U. of A. and U. of C. The Department of Chemistry at the U. of A. possesses instrumentation and research infrastructure that rivals that of major centers such as Harvard, MIT and Berkeley. Full time faculty service officers run major installations, such as nuclear magnetic resonance (NMR) spectroscopy and mass spectrometry, which frees research faculty from the burden of overseeing and maintaining these complex operations.

Principal Investigator labs include the following facilities: microbial culture and fermentation, tissue culture, titration micro-calorimetry, cold rooms and a radioisotope lab.

The NMR Laboratory has modern spectrometers for organic chemistry and biomolecular applications (600 MHz, two 500 MHz, two 400 MHz, and 300 MHz), equipped to perform modern multidimensional NMR techniques such as 2D and 3D experiments. The second of the two 500 MHz NMR spectrometers and an Applied Biosystems Marrison Electrospray-TOF mass spectrometer were funded by a CFI grant awarded to the Institute for Biomolecular Design (IBD).

The mass spectrometry lab is one of the largest and best equipped in Canada, offering rapid turnaround of samples with a wide variety of ionization techniques available. Their Micromass ZabSpec-oaTOF hybrid high-resolution magnetic sector/time of flight MS/MS is the largest instrument commercially available, and is the only one of its kind in Canada.

The X-ray crystallography lab offers single-crystal X-ray crystallographic services for small molecules. The facility has access to the Cambridge Structural Database of over 230,000 structures.

The machine shop, the glassblowing shop and the electronic instrument services/electronics shop provide exceptional support for manufacturing custom-designed devices, instruments, and apparatus maintenance and repair. The Centre will also have access to an in-house elemental analysis lab and an in-house spectral service lab with diverse instrumentation, including Fourier transform infrared spectrometers capable of analyzing solid surfaces.

Other U. of A. facilities available to Centre researchers include those offered by the National High Field Nuclear Magnetic Resonance Centre (NANUC), IBD, the Health Sciences Laboratory Animal Services, the Alberta Research Council's carbohydrates and biotechnology groups, and the Protein Engineering Center of Excellence (PENEC). The Centre is also extensively networked into the Canadian Bacterial Diseases Network National Centre of Excellence (CBDN) through Bundle and Armstrong.

The Centre will also have access to exceptional and internationally unique sample collections: the Lemieux Collection of Compounds, the Chembiomed Collections of Antibody Cell Lines, and the Chembiomed Collection of Compounds and Antibodies.

The U. of C. is providing access to surface plasmon resonance and 2D gel facilities in addition to Schriemer's new Ultrasensitive Biomolecular Interaction Laboratory (UBIL), a CFI New Opportunities application. The protein X-ray crystallographic facility at the U. of C. includes a Rigaku rotating anode generator, Osmic multi-layer optics, Mar345 image plate detector, Oxford Cryostream and crystal storage and transport dewars for analysis and data collection at synchrotron beamlines.

The newly constructed Canadian Light Source (CLS) in Saskatchewan will provide an intense and tunable source of synchrotron radiation to greatly accelerate the determination of structures of macromolecular complexes by X-ray crystallography. The Alberta Synchrotron Institute (ASI) oversees the investment of several million dollars for crystallography beamlines at the CLS, and also provides Alberta crystallographers with interim access to synchrotron beamlines facilities in the United States.

A solid phase peptide synthesizer, multiple reactors for combinatorial chemistry, multiple sample evaporators, and a state-of-the-art QSTAR mass spectrometer have also received contingent funding from CFI, and are to be located in the Department of Chemistry at the U. of A. (with Hindsgaul as PI on the Centre of Excellence in Viral Hepatitis Research proposal, with L. Tyrrell as lead applicant).

In addition to this infrastructure, it is expected that two CFI proposals will be put forth by Centre PIs: New Opportunities (Ng), and Innovation Fund (~\$3 million). These proposals will likely request funds for a crystallization robot, a CCD X-ray detector, an NMR probe, a robotic CombiChem synthesizer, multiplexed capillary electrophoresis instrumentation, and graphics workstations.

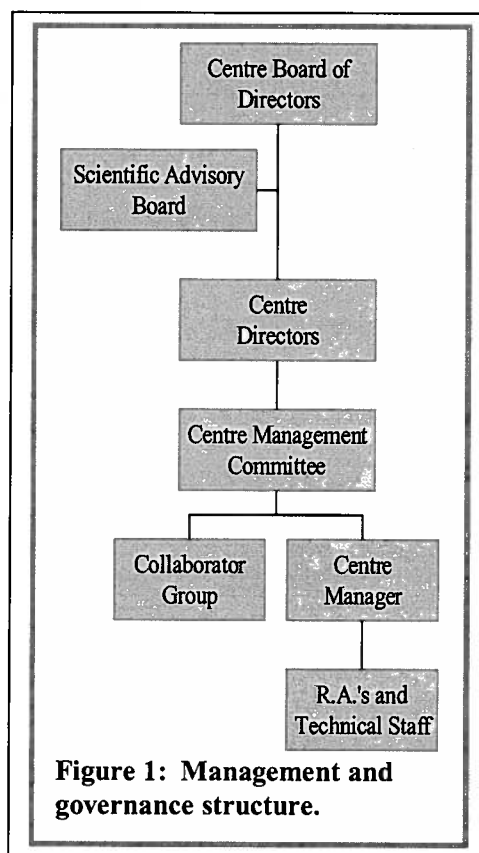
## Management and Governance

Standard U. of A. and U. of C. procedures will be followed for establishing the Centre at the University. The provisional management and governance structure of the Centre (Figure 1) will provide for both research and administrative accountability.

A Board of three Directors will provide strategic advice and guidance to the Centre's Directors on policy and direction. This Board will be selected from the Dean of the Faculties of Science or Medicine at the U. of C. (or a designated representative), the VP (Research) at the U. of A. (or designate), and the Dean of the Faculty of Science at the U. of A. They will act as the final decision makers on issues such as the Centre's role, industry sponsorship, recruitment, and unresolved issues relating to IP. The Board will meet quarterly in person or by teleconference. The Centre Directors and Manager will be ex-officio board members, and when necessary University legal services will be asked to advise on IP matters.

An International Scientific Advisory Board will provide the international peer review for the science undertaken at the Centre. It will be composed of Dr. Steve Withers (UBC, and Scientific Director of PENCE) as Chair, Dr. Kurt Drickamer (Oxford U.), and one other chosen from Gerry Hart (Johns Hopkins U.), James Paulson (Scripps Research Institute), and Jim Richards (Director, Institute for Biological Science NRC). This Board will ensure that the science is cutting-edge and that the Centre is able to take advantage of international opportunities. The Advisory Board will meet annually by teleconference, and in person in the first and third years to ensure the Centre is on track at the start and renewal of its mandate. The Advisory Board will provide its recommendations to the Scientific Co-Directors of the Centre (David Bundle and Ole Hindsgaul). In consultation with the Management Committee, the Centre Directors will be responsible for establishing and managing the Centre's research plan. They will also assess opportunities for research grant development, and help to identify and recruit new PIs. An administrative assistant will support the Advisory Board, the Board of Directors, and the Centre Directors.

The Management Committee will be composed of the Centre's PIs. The Committee's role will be to ensure smooth implementation of the interdisciplinary research plan and to pursue appropriate funding and collaborations. The committee will be supported and guided by the



Centre's Manager. The Centre's Manager<sup>1</sup> will be responsible for the day-to-day activities of the Centre, with support from a second administrative assistant. The Manager will be active in managing the Centre's infrastructure, developing its budget, purchasing equipment and supplies, liaising with and developing industry opportunities, and coordinating meetings and speakers. Technology transfer and commercialization opportunity development will be a major focus: client groups will meet directly with the Manager.

Five research associates will be hired in the first two years to support Centre research, in addition to five technical staff (protein biochemistry, molecular biology, analytical chemistry, and two in synthetic chemistry). The Centre Manager will track their time commitments to various projects to ensure equitable access to this key resource, as mandated by the Management Committee.

A Collaborator Group consisting of Centre collaborators will be formed to provide practical input into the Centre's development and facilitate the exchange of ideas and opportunities. The group will provide its input to the Centre's Management committee.

### **Budgets and Budget Justification**

An approved budget for year 1 of the 5 year program has been agreed upon following discussions with Dr. Bridger. The year 1 budget (appendix D) supersedes the year one budget submitted as an integral part of the Centre Proposal submitted to Alberta Ingenuity. The original submitted budget (Appendix E) and its justifications (Appendix F) will form the basis of discussions with Alberta Ingenuity when year 2 budget projections are submitted. It appears that the intent of Alberta Ingenuity is to come as close to these submitted budgets as their endowment permits with due regard for what the real needs of the Centre will be when budget carry-overs are taken into account.

### **Chief Officers of the Centre**

**David Bundle** (Centre.Director) has built an international reputation in carbohydrate chemistry and immunochemistry: he led a team that solved the first crystal structure of a carbohydrate-antibody complex. He has extensive experience in leading a large group: at the National Research Council in Ottawa, where he was director of the Structural Immunobiology Section, a diverse group of 40 scientists, PhDs, students and technicians with a \$4 million annual budget. He has received the Whistler Award of the International Carbohydrate Organization (1988) and the R. U. Lemieux Award for Organic Chemistry from the Canadian Society for Chemistry (2000). He became a Fellow of the Royal Society of Canada in 1995. Excluding Alberta Ingenuity Centre's support, he currently holds annual research support in excess of \$400,000.

**Ole Hindsgaul** (Centre.Co-Director) was the recipient of the 1990 Merck-Frosst Center for Therapeutic Research Award from the Chemistry Institute of Canada, a 1993 Steacie Fellowship from NSERC, and the 1998 Whistler Award of the International Carbohydrate Organization. In 2001, he was elected a Fellow of the Royal Society of Canada. He has been on the Editorial Advisory boards of seven international journals and has over 200 publications. Since Dr. Hindsgaul has indicated his intention to leave the University on June 30<sup>th</sup> 2003, a new co-

---

<sup>1</sup> See the Budget Justification section for duties of hired personnel.

director may have to be selected. The implications of this process will have to be discussed with the Board of Directors and the Scientific Advisory Board.

**Scientific Advisory Board** will be headed by Dr. Steve Withers (UBC and Scientific director of PENCE). Dr. Kurt Drickamer (Oxford University, UK) has accepted the invitation to be a member of the scientific advisory board. A third and final board member will be selected by the Centre Director and the current members of the Advisory Board. The members of this board will review the work of the Centre on an annual basis by written report and in years 1 and 3 by an on-site meeting. The Centre will also hold an annual meeting where its members will present their work to the whole Centre and to invited guest speakers, who will be chosen from a group of prestigious specialists.

### **Letters of Support**

Letters of Support from the VP Research University of Alberta, the deans of Science at the Universities of Alberta and Calgary, as well letters of support from numerous industries and the National Research Council are to be found in appendix C.

### **Annual Reporting, Strategic And Operational Review,**

The Director and Co-Director will submit Annual Progress Reports to the Board of Directors, the Scientific Advisory Board and Alberta Ingenuity (the report to the latter is a requirement of the Centre Agreement see appendix H).

The International Scientific Advisory Board will meet annually by teleconference, and in person in the first and third years to ensure the Centre is on track at the start and renewal of its mandate. It will provide the peer review for the science undertaken at the Centre. This Board will ensure that the science is cutting-edge and that the Centre is able to take advantage of international opportunities. The Advisory Board will provide its recommendations to the Scientific Co-Directors of the Centre (David Bundle and Ole Hindsgaul or his successor). In consultation with the Management Committee, the Centre Directors will be responsible for establishing and managing the Centre's research plan. They will also assess opportunities for research grant development, and help to identify and recruit new PIs.

Centres will be reviewed by Alberta Ingenuity in Accordance with the Agreement to which the Universities are signatories.

### **Potential Risks Inherent In The Activities Of The Centre**

The risks associated with the Centre are those of normal laboratory research. Other risks relate to the ownership of intellectual property and its assignment for commercial application. The issues of IP will be managed according to University guidelines as described under the governance section.