UNIVERSITY OF CALGARY

OFFICE OF THE PRESIDENT

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February 13, 2011

Mr. Thomas Jenkins, Chair
Federal Support to Research and Development Review Panel
1200-270 Albert Street
Ottawa, Ontario
Canada K1A 5G8

Dear Mr. Jenkins,

Re: Request for Feedback - Review of Federal Support to Research and Development

As an active participant in the Canadian research and development dialogue, the University of Calgary welcomes the opportunity to provide feedback in this important initiative.

Defining and strategically growing a Canadian innovation strategy must be approached as partnership activity between knowledge creators and industrial receptor groups. On this stage, we feel government can play a key role in enabling conditions whereby highly functional relationships between these two groups can occur. It is in this context that we provide our thoughts regarding the areas of advice you have been asked to provide to the federal government.

1.) What federal initiatives are most effective in increasing business R&D and facilitating commercially relevant partnerships?

A successful academic research enterprise must carry out both basic and translational research. Basic research is essential for creating new knowledge, while translational research harnesses that knowledge for society. While these two aspects of research may be interconnected, they are also different, and should be approached accordingly.

Direct funding is essential for basic research, and enables academic research enterprises to preserve their academic autonomy in the search for knowledge. Translational research, on the other hand, can be funded in a variety of ways; in addition to direct funding there is the potential to leverage the expertise and capital of industry partners. While strides have been made in this direction over the last few years, there is still significant potential for improvement. Partnerships between industry and universities would benefit from greater accessibility, more streamlined administration, and ways for industry elements to take the lead using their market and technology expertise. In this regard, tax credits for industry partners are a good incentive, but more work needs to be done to facilitate linkages and increase awareness of the benefits of working with a university.

A key driver of translational research is industrial involvement. While industrial partners in Canada have relied on universities for cutting-edge research and technology, they have many functionalities to drive research to the market that are often not inherent to academic core business, including pre-existing production facilities, access to high levels of investment capital, knowledge of markets, tax laws, and sophisticated IP management schemes. The partnership between industry and academic research enterprises needs to leverage all of these assets to help fund and commercialize research in order to maximize innovation via university / industry collaboration.

Canada and most other OECD countries have identified that research extracted from universities will be a very important source of commercializable technology, which is of crucial importance to the growth of a country's

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economy in the knowledge age. Under present models, Canadian universities and their partners must often work through varied and complex regulations of granting agencies and abide by disparate commercialization policies and objectives at the institutional, provincial, and federal levels in order to innovate. Streamlining and consolidating these regulations and policies would remove one of the major obstacles to university-industry partnerships. In effect, for partnership ventures to truly reach their potential, we must allow industry more of a hand in leading the way while ensuring that regulations exist to protect the autonomy, well-being, and strategic objectives of both parties.

In looking towards the future, the applications of technologies developed for use at the interface between space and earth have provided enormous benefits to the Canadian economy and Canadian life, from orbital surveying to global positioning to the informatics infrastructure. The Space Technologies Development program of the Canada Space Agency has the continuing opportunity to play a leading role in bridging the interface between academia and industry in this fast moving area.

As the top University recipient of R&D funding for the CSA, the University of Calgary has been at the front line of driving technological innovation in space technologies and their terrestrial application. The advent of a new generation of large scale international space science projects programs like the STDP provide Canada with the opportunity for leadership on the international stage, as well as the opportunity to derive the technological benefits of its contribution. For example, Canadian leadership in the multibillion dollar international Square Kilometer Array Radiotelescope project will provide Canada with the opportunity to be at the leading edge of the development and application of the next generation of computing that will be required to handle data that will be generated on a scale that is beyond current informatics capacity. Partnerships between university researchers and leading informatics companies like IBM Canada provide the opportunity for Canada to lead the world in benefiting from these technological drivers.

2.) Is the current mix and design of tax incentives and direct support for business R&D and business focused R&D appropriate?

Canada's level of direct support for translational research is low in relation to that provided by other countries. The advantage of direct investment is that it is a dependable source of funding which is less susceptible to becoming tangled up in overhead and administration of sponsored research contracts, as well as increased ability to leverage industrial investment. Increasing direct support for translational research projects in academic research enterprises would bring Canada into line on the global stage while affirming the nation's commitment to knowledge creation and a strong knowledge-based economy.

3.) What, if any, gaps are evident in the current suite of programming, and what might be done to fill these gaps?

Methods to raise the effectiveness of existing programs, centers, and granting agencies through a process of streamlining and consolidation of policy and priorities should be considered. National Centres of Excellence (NCEs), Centres of Excellence in the Commercialization of Research (CECRs), and other centers attached to the University all represent excellent programs of knowledge creation. However, they also pose a significant challenge in terms of administration and regulations.

Universities must currently devote considerable resources (in terms of both capital and personnel) to developing proposals, overseeing, and ensuring compliance with a wide array of requirements and conditions for these centres. In particular, IP control and the different but interconnected requirements for federal and provincial matching funds have proved an impediment to research and commercialization. By consolidating the administration in different kinds of research centers, streamlining IP regulations, and liaising with the provinces on a cohesive innovation strategy, the federal government could greatly improve the efficiency, focus, and

commercialization throughput of Canadian universities. Recent successes at the University of Calgary include extensive private sector leveraging within the Carbon Management Canada NCE and the Tecterra CECR.

The University of Calgary has thus far met with overall success as it grows its research enterprise and works to move innovation into the marketplace. In particular, its training of highly-qualified graduates has been greatly enhanced by access to federally-funded research centers and programs. However, receptor capacity within the province and the nation is not currently enabling the Canadian economy to reap the fullest possible benefit from HQP trained by the U of C and other universities.

Other gaps and potential solutions include:

What initiatives / undertakings / strategies / resources would help attract new high technology firms to locate in Canada?

- Plentiful supplies of highly qualified graduates in a wide scope of industry areas
- A strong business environment fueled by a competitive tax structure
- Affordable office/lab space
- World class research-intensive educational institutions with sensible intellectual property policies, and functionally supportive industry liaison mechanisms
- The presence of anchor industry players and enablers in innovation clusters

What would help create and keep more high tech spin-off firms in Canada?

- More availability of financing for early stage spin-off and spin-off creation
- More expert managers available to facilitate knowledge transfer
- More programs and structures to enhance a positive regional entrepreneurial atmosphere

What would help increase engagement between universities and industry in Canada?

- Strong, functional and easily navigable intellectual property policies
- More resident industry receptors
- Much improved interagency connections/interoperability (prov/fed)
- Focused and streamlined funding, both direct and indirect, to enable partnership style research, development and commercialization
- Enhancing NSERC IRCs and similar
- Enhancing NSERC CRDs and similar
- More effective/faster legal review of agreements/contracts/NDAs, MTAs etc
- More catalytic workshops where industry meets researchers in research theme areas
- More national/international business developments activities in priority areas (both UofC research capacity strengths/provincial priorities)
- Offset of contract research overhead
- Lead business development missions to other parts of Canada/internationally where industry receptors conduct business, incorporating the findings of best practice reviews into strategic initiatives
- Fund undergraduate programs that are highly valued by industry
- Fostering the development of regional technology clusters

The University of Calgary has engaged successful collaborations with industry that have yielded productive innovation outcomes. A sample of these positive collaborations are illustrated in three letters from industry partners that we have appended to this submission: ConocoPhilips, Foundation CMG, and Suncor Energy. In their letters, the partners affirm the importance and value of university-industry collaboration and note how their operations have benefitted from an alliance with the University.

How do we measure success in an innovation strategy?

As with any strategic initiative, perhaps the most important set of criteria to outline are benchmarks by which the success of an innovation strategy would be measured. The following metrics should be considered:

- Number of new high technology job created in Canada associated with industry/university innovation activities
- Number and value of licenses granted by Canadian universities to Canadian-based industry
- Number (listed on major stock market) and capitalization (annual and cumulative) of high tech spin-offs (limited to counting first generation commercialization) generated in identified industry target areas by research conducted at Canadian universities
- Financing attracted by high tech spin-offs in Canada (annual and cumulative)
- Volume and value of industry sponsored grant and contract research (associated with Canadian university activities)
- Industry sponsored research matching for research/chair CFI support, etc

NSERC has provided some excellent architecture through its various programs, especially the pairing of university researchers with receptive industry partners and the creation of employment opportunities for highly qualified graduates. These programs have proven very beneficial to the University of Calgary and, through the process of knowledge translation, to society as a whole. We believe that this program architecture represents a vision for the future of partnership-based research, and suggest that they should be adopted more widely (by institutions and granting agencies in different fields) and made more accessible (so as to attract and facilitate the involvement of more industrial partners). This would also help industry become more aware of the benefits that can be gained from working with a university partner and contribute to the creation of receptor capacity for HQP in the Canadian workforce.

Over the past five years, the University of Calgary has benefited from NSERC collaborative program investment, engaging hundreds of researchers and trainees and promoting tangible interactions with hundreds of companies. These interactions have not only provided tangible spinouts and allowed us to better prepare students for productive private sector careers, they have also brought direct benefits to the building of the University's academic reputation and as a much sought after destination for both Canadian and international students.

Universities offer knowledge, innovation, and ideas that have the potential to change the world. Through their vision, initiative, and experience, industry leaders add value to these ideas while helping to make them a reality. By joining the research power of universities with the real-world expertise of industry partners, collaborative programs pave the way to a brighter and more prosperous future. Through these facilitated partnerships, researchers and their industry allies are striving to create a diverse, knowledge-based economy while inventing the technologies and processes that will drive Canada forward in the twenty-first century.

Sincerely,

M. ELIZABETH CANNON, PhD, FCAE, FRSC
President and Vice-Chancellor

3 Attachments...

ConocoPhillips

ConocoPhillips Canada
401 - 9th Avenue S.W.
P.O. Box 130, Station "M"
Calgary, Alberta T2P 2H7
(403) 233-4000

February 15, 20111

Dr. Elizabeth Cannon
President, University of Calgary
2500 University Drive NW
Calgary, Alberta, T2N 1N4

Dear Dr. Cannon,

Letter of Support

We are writing this letter in support of your submission to the Federal government relating to their review of federal support to research and development.

ConocoPhillips is an integrated energy company with interests around the world. We are active in exploration and production, as well as refining oil and gas into usable products. With a global workforce of about 30,000 people, we operate in over 30 countries, including Canada. Our Canadian operations are headquartered in Calgary. In Canada, we have a leading land position in the oil sands and are one of the country's top three producers of natural gas. We have substantial potential future developments in the Canadian Arctic region as well and are active in working the MacKenzie Gas Pipeline project. In Canada we have about 2,000 employees primarily based throughout Alberta, with a presence in BC as well. We are very proud of our Canadian operations. They are among the best in our global portfolio and we see enormous potential here, especially for our oil sands business.

ConocoPhillips Canada has a long history of providing significant support to the University of Calgary in a variety of different areas. We are proud of the many initiatives that we have collaborated on to further technological development and engineering studies. It is clear to us that technology will be the key to improvements in developing the oil sands in an economic and environmentally sustainable way. This need for continued technological improvement was the primary reason that we became one of the founding members of Carbon Management Canada (CMC). We have not only chosen to invest in this organization, we are also an active member of the Board and find immense value in being a member of the Research Management Committee. The true R&D proposals solicited from around the world, that this committee screens, have the real potential to make step changes in innovation and technology that will ultimately allow us to reduce our environmental footprint.

Attachment 1

This type of collaboration between industry, universities and government is not only critical in making game changing advances in technology related to carbon management, it also fosters the type of R&D that makes our Canadian universities the leading practical academic institutions that they are.

We look forward to working as part of the CMC team for many years to come.

Yours truly,

Nick Olds
Senior VP, Oil Sands

Attachment 1

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

Feb 14, 2011

Dr. Elizabeth Cannon
University of Calgary
2500 University Dr. NW
Calgary, Alberta, Canada
T2N 1N4

Letter of Support for University of Calgary Research Projects

Dear Dr. Cannon

Foundation CMG is a not-for-profit, member directed organization that promotes and funds research and student work in the area of computer numerical modelling and the four-dimensional visualization of oil and gas reservoirs. Expertise in this area is crucial when it comes to helping the industry find new and better ways to maximize oil and gas recovery while reducing costs and environmental impact.

The Foundation has been funding research at the University of Calgary for many years and to date has contributed over $5.4 million. One of the chairs that we sponsor is with Dr. Zhangxing (John) Chen – the NSERC/AERI/ Foundation CMG Industrial Research Chair in Reservoir Simulation. Another chair that we sponsor is with Dr. Mario Costa Sousa - the iCORE/Foundation CMG Industrial Research Chair in Scalable Reservoir Visualization. This chair is currently being evaluated for NSERC funding as well. Foundation CMG participates in 4 other consortia at the University of Calgary that include: Canada Research Chair in Energy & Imaging (Dr. Apostolos Kantzas), SAGD Simulation Screening (Dr. Jerry Jensen), Shale Lens in Bitumen (Dr. Richard Wan) and Bitumen Properties (SHARP).

Foundation CMG is composed of members from the oil and gas community. These members benefit from the research that is conducted plus the development of high quality people that are being trained at the University of Calgary. We believe that the University of Calgary is providing a critical service to the oil and gas industry through the research that it is conducting. We are very pleased with our collaboration with the University of Calgary and NSERC and intend to continue to fund research far into the future.

Sincerely,

Duke Anderson
President

Attachment 2

PO Box 2844

150 – 6th Avenue SW

Calgary, Alberta T2P 3E3

Tel 403.296.8000

www.suncor.com

February 16, 2011

Dr. Elizabeth Cannon
President
University of Calgary
2500 University Drive NW
Calgary, Alberta,
Canada
T2N 1N4

Dear Dr. Cannon,

Suncor Energy Inc. is the largest Canadian based energy company, and the 5th largest petroleum company in North America. It is active in the oilsands; refining and marketing of petroleum products; exploration and production of natural gas; renewable wind and ethanol energy; and international oil development. The company has more than 11,000 employees and a capital investment program of over $40 billion for the next decade.

Well known as a pioneer in oilsands development Suncor is also very active in technology development to address the environmental impacts of our business activity. This work is undertaken at company facilities, as well as through a series of collaborations with other industry players, and research and academic institutions.

Suncor has been involved in the conception and development of Carbon Management Canada (CMC) as a founding industrial partner in 2009. We initially worked with Dr. Steve Larter, Dr. Wayne Patton, Bruce Carson and Dr. David Layzell during the formation of the CMC concept and including acting as the industry representative on the final review panel to the Centre of Excellence process. I have also been active on the Board since CMC was awarded status as an NSERC Center of Excellence.

The CMC has quickly established itself as a credible group acting in a key role to network between governments, institutions, industry, and most importantly as an interface among over 30 universities in Canada to allow research work to be conducted on a joint basis with the right specialists in each field. The role of the long term funding through the NSERC Strategic Networks Program, has been key to attracting strong individuals, like the current Managing Director of CMC, Richard Adamson. It has also allowed an extensive series of research projects to commence, with guidance by 4 leaders from various institutions across Canada. The leveraged effort across and within sectors makes our investment in CMC very attractive. The

Strategic alignment is also a tremendous value add. Researchers know where effort and progress is needed and can tailor their focus to meet CMC interests.

The ongoing close liaison between the energy industry, the University of Calgary as host of CMC, has helped to position Canada as a leader in this important area of work related to climate change. Suncor looks forward to seeing the results of the study programs over the coming years, and applying them to further development or commercialization by industry, as appropriate

Sincerely,

Gord Lambert
Vice President, Sustainable Development
Suncor Energy Inc.