

UNIVERSITY COUNCIL  
PLANNING AND PRIORITIES COMMITTEE  
REQUEST FOR DECISION

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**PRESENTED BY:** Bob Tyler, Chair, Planning and Priorities Committee

**DATE OF MEETING:** September 22, 2011

**SUBJECT:** **Proposal to establish the Canadian Centre for Nuclear Innovation as a Type C Centre**

**DECISION REQUESTED:**

*It is recommended:*

*That Council approve the establishment of the Canadian Centre for Nuclear Innovation as a Type C Centre at the University of Saskatchewan, and recommend the approval of the Centre to the Board of Governors.*

**PURPOSE:**

The Canadian Centre for Nuclear Innovation will place the University of Saskatchewan and the Province among global leaders in nuclear research, development and training through investments in partnerships with government, academia and industry, for maximum societal and economic benefit. The Centre will provide a framework for the allocation of \$30 million in funding provided to the University by the Province, support academic programming and research at the University of Saskatchewan and other educational institutions, and create research partnerships between the University and other academic and research institutions and the private sector. The key areas of activity for the Centre will be creation of multi-disciplinary academic and research programs, provision of funding for research and development partnerships, and operation and maintenance of nuclear infrastructure at the University, initially the Cyclotron facility. The Centre will facilitate the engagement of the broader community in policy development and education related to nuclear science and technology, and in the work and the direction of the Centre.

**CONTEXT AND BACKGROUND:**

In March, 2011 the Government of Saskatchewan announced that it would provide \$30 million in funding over seven years for a centre in nuclear science at the University of Saskatchewan. Concurrently, the Province announced \$14 million in capital funding for a Cyclotron and associated infrastructure at the University of Saskatchewan, as well as \$3 million in funding for operation and maintenance of the Cyclotron and related research and training. The Canadian Centre for Nuclear Innovation will provide funding,

using a proposal-based model with proposal review by expert advisory committees, for programs and projects in nuclear science, and will provide oversight of nuclear infrastructure at the University, but will not itself engage in research, development or academic programming. The Centre's emphasis will be on funding partnerships between the University of Saskatchewan, other educational and research institutions, and the private sector. The Centre will establish itself as a centre of expert knowledge on nuclear science and technology, including societal impacts and technological risks and benefits.

### **IMPLICATIONS:**

The Canadian Centre for Nuclear Innovation will be established as a Type C Centre. Centres of this type are incorporated and legally distinct from the University, but have academic/research implications for the University. Their establishment requires the approval of both University Council and the Board of Governors and the development of a Business Plan. The Centre will report annually to the Vice-President Research and to the Board of Governors. Its Board of Directors will include representatives of the founding stakeholders (the University and the Province) and representatives from other organizations, both public and private.

The Centre will build on the University's long history in nuclear science and application and will strengthen the University's nuclear research infrastructure. The impacts of activities funded by the Centre will be in four areas: nuclear medicine, materials and structural sciences, safety and engineering of nuclear systems, and understanding and managing the risks of nuclear technology.

### **CONSULTATION:**

Consultation with the Centres Subcommittee regarding the intent to establish a centre for nuclear studies took place in 2008 and 2009. A proposal to establish the Canadian Centre for Nuclear Innovation was reviewed by the Centres Subcommittee on August 25, 2011, and by the Planning and Priorities Committee on September 7 and 14, 2011. Proponents of the Centre have consulted widely with campus units, and letters of support are appended to the proposal.

### **SUMMARY:**

The Province has provided funding in the amount of \$30 million for an initial seven-year period to support the creation of the Canadian Centre for Nuclear Innovation at the University of Saskatchewan, along with \$17 million for the construction and operation of a Cyclotron research facility at the University. The Centre will not engage directly in research or academic programming, rather the Centre will fund proposals for programs and projects in the area of nuclear science and technology, mainly to partnerships between the University of Saskatchewan, other academic and research institutions, and the private sector. Operation of the Centre beyond the initial seven-year is contingent on its success in developing partnerships that will provide on-going funding to the Centre, and on receiving additional funding from the Province and other funding agencies.

The Planning and Priorities Committee supports the establishment of the Canadian Centre for Nuclear Innovation as a Type C Centre at the University, which will advance the University's goal of becoming a pre-eminent research institution and will place the

University of Saskatchewan and the Province among global leaders in nuclear research, development and training. As a public institution, establishing the Canadian Centre for Nuclear Innovation at the University of Saskatchewan fulfills the mandate of the University to create and disseminate knowledge. The Centre will build upon the University's existing infrastructure and history of nuclear research to create new knowledge and expertise in the area of nuclear science and technology, and will publicly report on its findings and activities. In addition, the Centre will serve as the steward for investments made in the University's nuclear research infrastructure. The Centre will also encourage public debate on the social and environmental implications of the applications of nuclear technology, and therefore will engage the community in a broader discourse regarding nuclear science and public policy. This multidimensional approach provides the opportunity for researchers, members of academia and government, community participants, and others to participate in a comprehensive discussion on a wide array of topics related to the nuclear domain.

**ATTACHMENTS:**

1. Centres Subcommittee response to the initial proposal, August 30, 2011
2. Letter of support from Planning and Priorities Committee, September 9, 2011
3. Proposal to establish the Canadian Centre for Nuclear Innovation
4. Business Framework for a Canadian Centre for Nuclear Innovation

The Centres Policy and Guidelines may be found at:

[www.usask.ca/university\\_secretary/policies/research/8\\_23.php](http://www.usask.ca/university_secretary/policies/research/8_23.php)



## *MEMORANDUM*

TO: John Root, Interim Director, Canadian Centre for Nuclear Innovation (CCNI)

FROM: Bob Tyler, Chair, Centres Subcommittee and Chair, Planning and Priorities Committee of Council

DATE: August 30, 2011

RE: **Canadian Centre for Nuclear Innovation (CCNI)**

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I am writing on behalf of the members of the Centres Subcommittee to express our support for the establishment of the Canadian Centre for Nuclear Innovation (CCNI) as a Type C centre reporting to the Vice-President Research. I want to thank you for attending our meeting on August 25<sup>th</sup> and for speaking to the proposal, thereby enlarging our understanding of the Centre's role within the university and the community beyond. I also want to thank you for your thoughtful responses to the many suggestions made at the meeting. I have not made any attempt here to reiterate all of the suggestions made for minor revisions to the proposal or to the Business Framework. The role of the Centres Subcommittee is to facilitate the creation of new centres by reviewing the academic intent and financial integrity of a proposed centre and to make suggestions to clarify or strengthen the proposal, and it was from this perspective that feedback was provided. As promised, the following is a summary of the main points made at the meeting, and it includes several additional editorial suggestions for your consideration.

1. An expanded description of community engagement and integration as referenced in the proposal is strongly recommended, specifically in relation to the public discourse and debate over nuclear energy that you outlined at the meeting. Indicating the broad range of topics of public interest relative to nuclear energy and the various forums through which these could be approached would establish the intent to engage community members in the larger questions of the risks and benefits associated with nuclear energy. It would also acknowledge the diversity of opinion that exists and convey the central role the Centre can play in facilitating open discussion about aspects related to the use of nuclear technologies.
2. Including the definition of a Type C centre and the role of university centres within the proposal, as is stated in the section on the academic and research mission within the Business Framework document would clearly place the purpose and context of the Centre in the proposal.

Continued.../

3. An expansion of the various areas where the Centre would support scholarly work will be critical to Council's review of the proposal. Greater scope and depth of the vision associated with the academic interface of the Centre with the University is strongly recommended. Coupling of this with your statement that the Centre will not conduct or direct research or academic activity is critical in clarifying the role of the Centre.
4. Clarifying the timeline associated with the approval of the *Third Integrated Plan*, whereby academic units will have the opportunity to consider their relationship to the Centre in the development of their plans is necessary.
5. Presenting a five-year financial projection is appropriate for the Centre proposal. However, providing some commentary on years 6 and 7, given the 7-year timeframe of provincial funding, would convey the assumptions for activities beyond year 5.
6. A flow chart to illustrate the process by which the various advisory committees will consider programs and projects is suggested, for inclusion both within the proposal and the Business Framework. Simple language, familiar to members of the academic research community is advised, to succinctly outline the funding process envisioned. In addition, stating the authority and responsibility of the advisory committees relative to the authority and responsibility of the University is requested. This is particularly important in relation to consideration of academic programs and faculty positions, whereby the advisory committees will approve the associated funding, but University approval is required for the creation of programs or faculty positions, in accordance with our collegial governance processes.
7. Additional explanation with respect to the proposed *ad hoc* advisory committees is sought in terms of examples of their structure, role and function.
8. Contextualizing the organizational diagram on page 21 of the Business Framework would make this graphic more meaningful. The diagram should reflect the reporting relationship of the Centre to the Vice-President Research, as should the corresponding diagram in the proposal.
9. The illustration of in-kind contributions is significant for the Business Framework, but less relevant in the proposal. Where in-kind contributions are noted in the Framework, these should reference that the primary contribution of the University will be through the human resources and expertise provided to the Centre as an entity of the University, and that these contributions do not require incremental resources by the University.
10. A statement to clarify that the interim staff assigned to the Centre serve as an operational and logistical team tasked with the role of advancing the establishment of the Centre is suggested to provide clarity regarding the responsibilities of these individuals.
11. It is suggested that letters of support be obtained from the Department of Physics and Engineering Physics and from the College of Agriculture and Bioresources, as potential academic partners with the Centre.

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Please let me know if you have any questions regarding any of the above comments. I look forward to receipt of the revised proposal and Business Framework and to discussion of the proposed Centre at the Planning and Priorities Committee meeting on September 7<sup>th</sup>.

Sincerely,



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- c K. Chad, Vice-President Research
- B. Fairbairn, Provost and Vice-President Academic and Chair, PCIP
- T. Porter, CCNI
- Centres Subcommittee of the Planning and Priorities Committee



## *MEMORANDUM*

TO: John Root, Interim Director, Canadian Centre for Nuclear Innovation (CCNI)

FROM: Bob Tyler, Chair, Planning and Priorities Committee of Council

DATE: September 9, 2011

RE: **Canadian Centre for Nuclear Innovation (CCNI)**

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I am writing on behalf of the members of the Planning and Priorities Committee to follow-up on our discussion of the Canadian Centre for Nuclear Innovation (CCNI) which took place on September 7<sup>th</sup>. Let me begin, though, by thanking you and Tom for attending to speak to the proposal and clarifying several aspects for Committee members. I also wish to thank you for engaging in a thought-provoking discussion with Committee members on the goal of the centre with respect to community engagement.

The suggestion and, ultimately, the challenge offered to you by members was for greater emphasis in the core mission of the Centre on how the public will be engaged in discourse and debate about nuclear science and technology. Incorporating the opportunity for the community at large to influence the Centre's course and thereby truly embracing a mutual dialogue was proposed. Also proposed was the adoption of a funding model in support of multidisciplinary research, whereby dimensions of the social sciences and humanities would be reflected within any proposal considered for funding by the Centre. Overall, articulating within the proposal the desire to provide the means for a broader conception of science would reinforce the Centre's expressed goal of providing a forum in which the public could engage in meaningful discussion on a wide array of topics related to nuclear science.

John, please feel free to contact me if you wish to discuss the Committee's response as I have outlined it above. The Planning and Priorities Committee will continue its discussion of the proposal at its meeting on September 14<sup>th</sup>, with the intent of considering a motion to recommend to University Council the approval of the CCNI at the Council meeting on September 22<sup>nd</sup>. Although you need not attend the September 14<sup>th</sup> meeting of the Committee, please submit a copy of the revised proposal and the Business Framework by September 13<sup>th</sup> so that they may be distributed to Committee members in advance of the meeting. Any outstanding letters of support should accompany the proposal at this time as well so that a complete package may be presented to Council.

Sincerely,

A handwritten signature in black ink, appearing to read "B. Tyler".

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Bob Tyler

c K. Chad, Vice-President Research and Executive Sponsor, CCNI  
B. Fairbairn, Provost and Vice-President Academic and Chair, PCIP  
T. Porter, CCNI



**UNIVERSITY OF  
SASKATCHEWAN**

**Proposal to Establish a Type C Centre:**

**The Canadian Centre for Nuclear Innovation**

September 14, 2011



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## 1. Name of Centre:

Canadian Centre for Nuclear Innovation

## 2. Type of Centre: Type C Centre

The CCNI will be a Type C Centre – governed as a subsidiary of the University of Saskatchewan. This structure facilitates external partnerships, but remains connected to the research and academic mission of the University. The hallmark of CCNI activities will be investment in partnerships for academic programming, practical R&D projects and stewardship of selected nuclear facilities that must be maintained in a state of readiness for access by students and researchers from academia and industry. The CCNI will not directly perform research, development or training activities in-house.

## 3. Academic Plan

The purpose of the Canadian Centre for Nuclear Innovation (CCNI) is “to place Saskatchewan among global leaders in nuclear research, development and training through investment in partnerships with academia and industry, for maximum societal and economic benefit.”<sup>1</sup>

The founding stakeholders of the CCNI are the Province of Saskatchewan and the University of Saskatchewan through the Offices of the Vice-President Research and Finance and Resources. The initial base-line funding for the CCNI was committed by the Province in March 2011,<sup>2</sup> and is intended to support operation over the first seven years.

On the surface, the activities of the CCNI are expected to deliver academic and research impacts as found in many other funding frameworks. However, a fundamental goal for all of these activities is to achieve a major social impact – fostering a public capability to engage in evidence-based discussions about nuclear issues. The CCNI focuses on engaging Partners from other research institutions and industry in Canada and from around the world in order to foster a public capacity to engage in evidence-based discussions about nuclear issues. Open-forum reporting and proactive communication is intended to build a sense of confidence in Saskatchewan’s place in the nuclear domain, committed to public service, and connected to Saskatchewan’s priorities in health, science, safety and community (e.g., engagement of Aboriginal and Northern communities).

The information included in this document draws primarily from the draft “*A Canadian Centre for Nuclear Innovation – Business Framework*”. The *Business Framework* is attached.

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<sup>1</sup> “A Canadian Centre for Nuclear Innovation – Business Framework” (Draft – 2011 September 9).

<sup>2</sup> “Wall launches new centre for research in nuclear medicine and materials science at U of S”, Media release by the Government of Saskatchewan (Mar 2, 2011).

## Goals and Objectives

The University of Saskatchewan must demonstrate value to society through its stature as a recognized leader in research, education and community service, both nationally and internationally. The University proponents expect the CCNI to build on the university's current and historic strengths in medical sciences, materials science, engineering, environmental science and public policy, thus to enlarge its footprint among Canadian universities with nuclear science and engineering programs.

The University proponents expect the CCNI to stimulate the quantity and quality of faculty and students, through challenges and opportunities in the domain of nuclear research, development and training, in four themes:

1. nuclear engineering and sciences;
2. materials science with nuclear methods (*e.g.*, neutron scattering or neutron imaging);
3. health sciences with nuclear methods; and
4. the social and environmental sciences associated with nuclear technologies.

The University proponents expect the CCNI to value both applied and curiosity-driven research for innovation and development. The University proponents also expect the CCNI to leverage its impact through partnerships with industry and community, other academic institutions, and government R&D organizations from across Canada and abroad.

The success of the CCNI will be evaluated through increased recognition of the University of Saskatchewan, by provincial and federal governments and by the public, as a credible knowledge resource for policy decisions, and as a trusted steward of nuclear research infrastructure for the public good. The success of the CCNI will also be demonstrated by growth in the quality and quantity of academic programs at the University of Saskatchewan in the nuclear domain, encompassing both technical and human aspects of nuclear research, development and training, along the four themes listed above.

## Impacts and Relationships

The CCNI will impact on University colleges and departments through proposal-driven processes that build on existing capabilities or respond to new opportunities according to priorities within the nuclear domain. Through strong leadership, communications and outreach, the CCNI encourages champions to come forward with a team of partners and commit to a scope of work for the overall advancement of the CCNI's purpose. The CCNI provides a framework for the work of these champions to be recognized among their peers and in the broader public community.

The CCNI convenes the call for proposals, the meetings of potential Partners, the expert review committees and regular events for peer as well as public reporting of status and outcomes. The continuous cycle of impact-aligned proposals, reviewed against purpose-defined criteria, and open, impact-focused reporting is intended to foster a culture of conversation, participation by community, and appreciation of contributions by individuals. The continuous cycle creates multiple opportunities for Partners and the public to actively participate and ask questions – *e.g.*, at one of the many CCNI community forums – that ensure proposals address society's questions, produce societal benefits and place Saskatchewan among global leaders in nuclear innovation.

The CCNI engages in three key Activities, each qualitatively distinct, but functioning in synergy to deliver maximum impact. They are:

1. Programs – to establish multi-disciplinary clusters of academic activity in Saskatchewan, within the nuclear domain, by responding to University-led initiatives to support the appointment of academic leaders and faculty, as well as supporting the discussion of nuclear components or questions in existing courses or programs, and to provide students with opportunities for learning or accreditation in fields of nuclear science, technology or policy;
2. Projects – to support research and development projects that engage partners from academia, industry, community, and other research institutions, with target outcomes including ongoing and new business activity within the province of Saskatchewan, in turn creating a venue for young Canadians to pursue careers at the leading edge of nuclear technology; and
3. Facilities – to provide good stewardship of selected nuclear infrastructure, ensuring it is maintained in a competitive state of readiness for access in support of research, development and training, with a new Cyclotron as an initial example.

The CCNI itself is not envisioned to perform in-house research, development or academic training. The impacts of the CCNI are delivered by champions and Partners whose proposals for Programs, Projects or access to CCNI Facilities have been reviewed by Activity-specific advisory committees, and approved by the CCNI executive, subject to the availability of resources.

Advisory Committees provide critical input for the CCNI to be effective. Advisory Committee members will make value judgments that ensure proposals and CCNI investments serve research, scholarly and artistic works as well as academic purposes. Membership of the advisory committees is expected to be drawn from many sectors: Saskatchewan post-secondary educational institutions (U of S, U of R, SIAST, SIIT), national and international research organizations, industries and government, so that proposals of all kinds can be assessed with relevant expertise and academic perspective. A description of the advisory committees is included in the *Business Framework*.

## Scholarly Work

The CCNI is a Type 'C' Centre within the structure of the University of Saskatchewan. Centres are intended to strengthen, coordinate or facilitate scholarly purposes or activities not readily undertaken within the University's departmental and unit structures, and are intended to offer new areas of activity consistent with the University's strategic direction and priorities. The University Board of Governors and Council have approved a policy on Centres, which outlines the principles for the creation, monitoring and review of centres.

Type C centres are incorporated and legally distinct from the University, and have academic/research implications for the University. Establishing a centre requires the authorization of the Vice-Presidents as well as Council approval with respect to the academic and research aspects before being recommended to the Board of Governors. As a centre, the CCNI reports annually to the Vice-President (Research) of the University on its academic and research activities.

The CCNI is not directing research and academic activity; instead invites champions to submit proposals and assumes the relevant processes of their host institutions have been respected (e.g., Integrated Planning for the UofS). In this way, the CCNI impact areas are automatically aligned with University initiatives at all levels. In addition to alignment at the unit level, the CCNI impact areas are aligned with the University level initiatives such as the Signature Research Areas developed during the Second Integrated Plan and which are to be more fully explored in the Third Integrated Plan.

1. Advancing nuclear medicine is aligned with “One Health” (Solutions at the animal-human-environment interface). The use of new medical imaging methods for diagnostics and treatment is expanding globally as a result of research and developments in nuclear medicine. Significant training in medical and science fields is needed for Saskatchewan human and animal clinicians to keep pace with these global advances. Saskatchewan’s history and specialized subatomic facilities (e.g., synchrotron, cyclotron, and SLOWPOKE) offer an opportunity to participate and help lead research advances for human and animal health. The units that intend or are likely to participate include:
  - College of Medicine
  - Western College of Veterinary Medicine
  - Saskatchewan Cancer Agency
  - Canadian Light Source Inc.
  - Department of Physics and Engineering Physics
2. Developing better materials complements “Synchrotron Science” as well as other materials sciences methods and applications. Aerospace, biomedical, and electronics all depend on new materials that are lighter, stronger, environmentally stable, less expensive to produce, or otherwise improve on existing materials. Material research and techniques often require tests using nuclear methods – protons, photons, neutrons, X-rays, electrons, etc.
  - Canadian Light Source Inc.
  - Department of Physics and Engineering Physics
  - Department of Chemistry
  - Mechanical Engineering (materials and biomedical engineering)
3. Safety and nuclear energy systems offer an opportunity for Saskatchewan to develop unique programs that combine expertise in uranium and energy research under “Energy and Mineral Resources”. Engineering departments will be involved, and are expected to draw in other disciplines for collaborative research:
  - College of Engineering
  - Department of Physics and Engineering Physics
  - Computational Science
  - School of Environment and Sustainability
4. The CCNI theme to understand the benefits and managing the risks of nuclear technology is a common theme throughout Saskatchewan society and environment and represents a key link between the “Water Security” and “Aboriginal Peoples” Signature Areas. Society and environment potentially touch on all health-related units and colleges as well as the following units with specific plans to address nuclear-related questions.
  - School of Environment and Sustainability
  - Johnson-Shoyama Graduate School of Public Policy
  - International Centre for Northern Governance and Development
  - Division of Social Sciences
  - Toxicology Centre

5. Nuclear knowledge also has implications and benefits in the sixth Signature Area – “Agriculture” that may include food sciences, animal health or plant isotope tracing among many other possibilities.

## 4. Proponents

The Executive Sponsor of the CCNI is Dr. Karen Chad, Vice-President Research.

### History

The founding stakeholders of the CCNI are the Province of Saskatchewan and the University of Saskatchewan. The initial base-line funding of \$30 million for the CCNI was committed by the Province in March 2011, and is intended to support operations over the first seven years. The Province also announced, at that time, \$14 million of capital funding for a cyclotron and associated infrastructure together with \$3 million of funding for operation, maintenance and cyclotron-centered projects in research and training. The cyclotron is envisioned to be taken over and operated by the CCNI to achieve that primary mission after the capital project is completed.

These announcements were made following work completed over several years. Some key activities included:

- the Uranium Development Partnership Report recommended an expansion of nuclear research and training capability (chaired by Richard Florizone, U of S),
- extensive campus consultations about the role of the University in addressing society’s nuclear questions (led by the Office of the Vice-President Research),
- the development of a multi-disciplinary research centre concept originally called the Institute for Nuclear Studies and presented to the Centres Subcommittee of Council for comment (August 2009), and
- a cyclotron proposal was developed by the University together with the Province to build a cyclotron with matching funding from Western Economic Diversification (October, 2010) with potential in both nuclear science and nuclear medicine.

The cyclotron is a significant piece of nuclear R&D equipment and represents the most recent nuclear research, development and training opportunity for the Saskatchewan. This, along with the many other opportunities identified through campus consultations, demonstrates an interest and need for the Canadian Centre for Nuclear Innovation.

### Consultations

Campus consultations have been important in developing the scope of existing and potential nuclear research and academic opportunities. Consultations took place in 2009 and 2010 and included engineering, medicine, physics, public policy, northern governance, environment and the CLS among other units.

The initial advisory committee members for the proposed Institute for Nuclear Studies were:

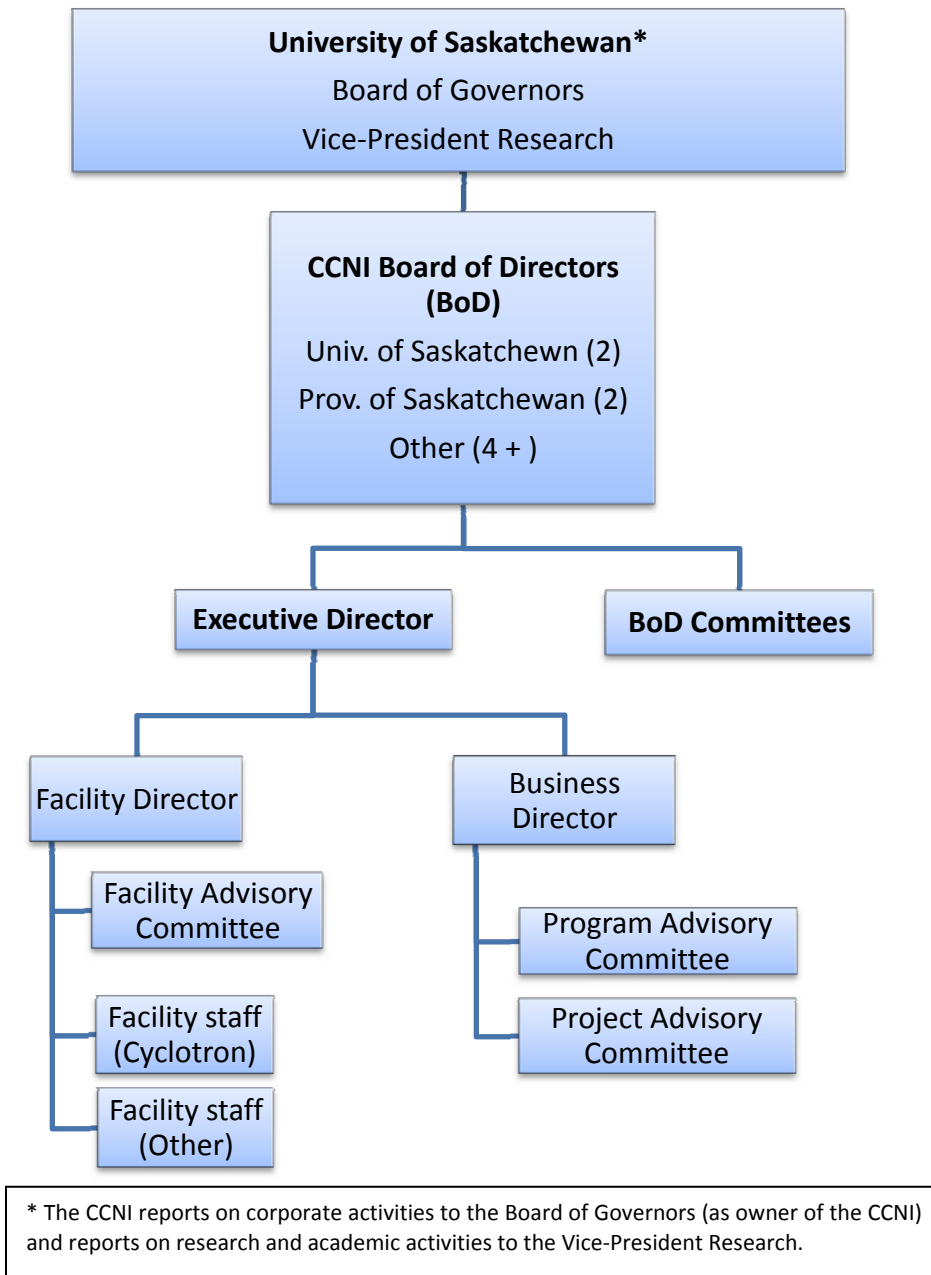
- Dean Chapman, Anatomy and Cell Biology, OVPR Nuclear Advisor
- Michael Atkinson, Johnson-Shoyama Graduate School of Public Policy (Director)
- Don Bergstrom, Mechanical Engineering (Department Head)
- Josef Hormes, Canadian Light Source (Executive Director)
- Karsten Liber, Toxicology Centre (Director)
- Greg Poelzer, Political Studies, International Centre for Northern Governance and Development (Director)
- Tom Porter, Office of the vice-President Research
- Chary Rangacharyulu, Physics and Engineering Physics (Department Head)
- Jim Basinger, Geology, Associate Vice-President Research

The CCNI will serve the broad academic and research community according to on-campus consultations and letters of support. Departments and units are currently developing plans for the Third Integrated Planning cycle that include nuclear research and student opportunities – with respect to engineering, natural resources, community participation, aboriginal engagement, environment, and health among other initiatives.

## 5. Centre Management

The CCNI is an incorporated subsidiary of the University of Saskatchewan, the sole owner.

The governance of the CCNI follows principles and details outlined in the *Business Framework*. The eventual organizational structure is depicted in this diagram, following a start-up phase of almost 18 months, and assuming a threshold of partner engagement is surpassed.



## CCNI Board of Directors

The CCNI Board of Directors will oversee the affairs of the organization. The Board of Directors is accountable to the owner and will provide annual reports to the University Board of Governors. The CCNI is also funding and impacting on the research and academic activities of the University, and will report to the Vice-President Research on these activities.



The CCNI Board of Directors plays a strong role in shaping the CCNI strategic direction by selecting the Executive Director and participating in the strategic planning process. To be effective, the Board must include Directors who have the appropriate strategic skills, knowledge and experience to identify, validate and monitor the CCNI's business in light of the CCNI's purpose, key activities and intended impacts. A list of relevant competencies is presented in the *Business Framework*.

The Executive Director is an influential leader and chief executive officer of the CCNI, and is responsible to the Board of Directors for the general supervision of the CCNI staff and the effective execution of the CCNI business. The Executive Director is expected to be an individual who has earned respect and international recognition within the nuclear industry, academia and the public sector. He or she brings a world-class career record of contributions to one or more of the CCNI's key impact areas.

## Staff

The CCNI office staff will eventually grow to a complement of seven members, who function as a cohesive team with synergistically overlapping responsibilities and a high commitment to teamwork and communication. In addition to office staff, the CCNI will support staff of selected facilities. The full complement of office staff is described in the *Business Framework*.

A smaller team will implement the management framework during the start-up phase or until the CCNI's activity level achieves a significant level of partner leveraging, *e.g.* exceeding a total annual expenditure of \$6 million per year, combining CCNI and Partner funding. The initial team will be a subset of the full staff. The current pre-operational and logistics activities of the CCNI are being led by interim staff with support from several units across campus. The interim staff members of the CCNI are:

- Dr. John Root, Interim Director
- Dr. Ian Swainson, Special Advisor to the OVPR
- Dr. Tom Porter, Seconded from OVPR
- Ms. Shalayne Benallack, Clerical Assistant

Pre-operations activities are taking place in close consultation with faculty from Engineering, Medicine, Arts & Sciences, and the School of Environment and Sustainability among other units.

## 6. Resources and Budget

The CCNI is initially funded by the Province of Saskatchewan – \$30 million over seven years.

The CCNI business model is to direct this baseline and other leveraged, partner funding into appropriate nuclear research, development and training activities. CCNI expenditures are tied to the available funding and will be maintained or grow based on success of establishing partnerships.

The financial sustainability for the CCNI beyond the initial seven year commitment will be an outcome of demonstrating long-term value of CCNI activities to the people of Saskatchewan.

A Summary of key initial activities and milestones is included in the attached CCNI *Business Framework – Financial Summary*. The Financial Summary describes anticipated financial resources and projects expenditures during the start-up phase of operations as well as for transitions to long-term growth and sustainability.

The CCNI business plan is outlined in the following 5-year financial table and accompanying notes.

<b>PROPOSAL FOR:</b>					
<b>Canadian Centre for Nuclear Innovation</b>					
	<b>2011-12</b>	<b>2012-13</b>	<b>2013-14</b>	<b>2014-15</b>	<b>2015-16</b>
<b>Funding</b>					
Contribution Agreement	1,000,000	5,000,000	4,000,000	4,000,000	4,000,000
Cyclotron Development Grant		500,000	1,500,000	1,000,000	
Other External Sources			250,000	250,000	250,000
Service Revenues					
Isotope Sales			25,000	75,000	75,000
Facility User Fees			100,000	200,000	250,000
<b>TOTAL FUNDING AVAILABLE</b>	<b>1,000,000</b>	<b>5,500,000</b>	<b>5,875,000</b>	<b>5,525,000</b>	<b>4,575,000</b>
<b>Operating Expense</b>					
Ongoing					
Staff	375,000	600,000	775,000	800,000	825,000
Office	100,000	75,000	75,000	80,000	80,000
Committee Support	25,000	75,000	100,000	100,000	100,000
Engagement of Partners	50,000	60,000	60,000	60,000	60,000
Communications	50,000	40,000	15,000	10,000	10,000
CCNI Activities					
Academic Programs	75,000	350,000	750,000	900,000	1,000,000
Projects	325,000	4,000,000	2,600,000	2,575,000	1,800,000
Facilities Stewardship	0	300,000	1,500,000	1,000,000	700,000
<b>TOTAL EXPENSES</b>	<b>1,000,000</b>	<b>5,500,000</b>	<b>5,875,000</b>	<b>5,525,000</b>	<b>4,575,000</b>
<b>NET OPERATIONS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

The 5-year financial plan includes start-up and the initial growth phase where the CCNI begins to be recognized in Canada and globally as an important centre for nuclear research, development and training. The initial Government funding commitment extends for two years past 2016. The financial plan for subsequent years is the same as that for 2015-16. In this subsequent period, however, the CCNI will begin discussions for Government funding commitments to continue CCNI investments beyond the original 7-year contribution.

The table assumes a fiscal year end of March 31<sup>st</sup> and that accounts will be managed on an accrual basis. Funding projections are based on assumptions of future events (as detailed in the following notes). Accordingly actual results will vary. Expenditures are based on University information with respect to salaries and office expenditures. There is less uncertainty in these projections, but these figures also represent future events and are subject to variance. Further, the projections are rounded to 5,000 increments to reflect the uncertainty in the projections.

## Funding Sources

Contribution Agreement – The Province of Saskatchewan has committed to a seven year contribution agreement to create the Canadian Centre for Nuclear Innovation. The Province’s contribution to the CCNI is \$4 million per year for 7 years plus \$2 million for start-up assistance. Start-up includes the period prior to incorporation, the first 6 months of operations in 2011-12, plus the first full year of operations in 2012-13.

Cyclotron Development Grant – The Province of Saskatchewan has committed to a separate contribution agreement to support operation and access to the cyclotron facility, as well as cyclotron-based research and education. The contribution is for \$3 million over 3 years, 2012-13 through 2014-15.

Other External sources – The CCNI is expected to attract additional research funds from government, industry or other third parties. These new funds will become the subject of “Special Calls” for proposals. Special calls may be for feasibility studies, research chairs, specific research or training initiatives, or nuclear policy questions among many other possibilities. A feasibility study or call for research proposals would be valued between \$75,000 and \$300,000. A research chair would be valued at a minimum of \$200,000 per year. The value of \$250,000 in the financial table represents a conservative estimate for “Other External Sources” that could include a chair or multiple studies. The bulk of these funds (95%) will flow through the CCNI directly to the nuclear research community, so these estimates do not represent a financial risk for the CCNI.

Service Revenues – These funds represent earned income for goods and services. This specifically includes sales of isotopes for medical applications (e.g., fluorine-18 or other products) and user fees for access to the cyclotron. The *Business Framework* has a complete discussion under “Facility Business Units”.

- Isotope Sales – The delivery of isotopes to a radio-pharmaceutical laboratory, for further development as medical isotopes, will be on a cost-recovery basis, so that there would be no incremental cost to the taxpayer for the cyclotron access associated with this activity. Cost recovery estimates are based on actual costs from other Canadian nuclear facilities.
- Facility User Fees – These will vary based on open access to research results. Access to Cyclotron time for research or education in the public domain, supported by CCNI project funds, is anticipated to be free of charge, granted on the basis of scientific merit, as confirmed by the Facility Advisory Committee. Access for proprietary research, or production of isotopes for business purposes will be granted on the basis of a contracted scope of work and charged for full cost recovery in proportion to actual access time. Access for public-domain research or education supported outside of the CCNI framework will be charged a lower user fee. The estimate for user fees is based on the experience of other science and nuclear facilities (see “Facility Business Units”, *Business Framework*).

## Expenditures

Ongoing office expenditures are estimated using a number of sources.

- Staff – There will be 7 staff members once the office is at full operations (see the Management section of the Business Framework for a full discussion). During start-up, 2011-12, salaries cover

interim staff. The number of continuing staff will expand as CCNI activities increase, but begins with the critical subset of positions. A permanent Executive Director will be hired before the end of 2012-13. The Executive Director will then participate in the hiring process for the remaining continuing staff. Salary estimates are based on UofS salary and employment agreements.

- Office costs and Administrative Support – office expenses are based on costs of similarly sized offices at the UofS. Space and occupancy costs for the start-up phase and for on-going operations at Innovation Place cover 1,500 ft<sup>2</sup> of office and meeting space. The UofS will provide administrative support, on the same in-kind basis as other subsidiary units, through existing financial and central administrative units. Administrative support is calculated as 1% of CCNI payroll and non-payroll office expenditures plus 0.5% of outstanding financial fund balances (those for supporting project and program calls for proposals) that are estimated to be 20% of project or program contributions made in any given fiscal year. An inflation rate of 3% is built into projections.
- Committee Support – Committee costs cover the activities of the CCNI Board of Directors and three Advisory Committees. There will be 4 Board meetings and 12 advisory committee meetings per year. Board meetings will require travel to Saskatoon. Committees will meet by phone or members will provide written comments on proposals. Each member is expected to visit Saskatoon once per year to participate in open-forum reporting and assessment of CCNI activities.
- Engagement of Partners – There will be significant costs associated with travel for conferences or networking events. The number of trips will vary as will costs for flights and conferences.
- Communications and Promotions – Communications is a separate but important part of nuclear network development. A special effort will be needed initially to develop a communications plan and branding strategy. This will include webpage design and public relations consultations. The CCNI will host several events annually, some in conjunction with annual meetings of the Board, support for select conferences, or for short courses to increase understanding, interest and use of nuclear facilities managed by the CCNI.

The major expenditures of the CCNI will be in the three Key Activities of Programs, Projects and Facilities. Expenditures in these activities will vary directly with funding from government or other external sources.

Academic Programming will start small and grow to be the major funding line of the CCNI. There will be two key aspects of academic programming support: Research Leaders and Academic Program Support.

- Research Leader funding will be proposal-based support for new faculty/research positions. These positions will be supported for a defined period of time either to help departments develop nuclear opportunities or to bridge faculty positions.
- Academic Program Support is for faculty time needed for new training programs – radio-sciences, medical, nuclear engineering, etc.

The priorities for programs will be determined in conjunction with the Executive Director, Board of Directors and Program Advisory Committee.

Project Support is for defined initiatives with time boundaries, clear leadership and specific target impacts. Projects may be research-, student- or capital-oriented and will be part of regular calls for

proposals as well as occasional or special calls for proposals (if a potential partner funds the special call). The estimated projections are subject to significant change within the overall Project Support envelope. The priorities for project, scholarship or capital proposals will be determined in conjunction with the Executive Director, Board of Directors and Project Advisory Committee.

Facilities Stewardship projections represent estimates to maintain Cyclotron and related infrastructure as accessible user facilities. The capital project for the Cyclotron was initiated by the UofS based on funding from the Province and Western Economic Diversification (see “Facility Business Units”, *Business Framework* for a description). It is the intention of both the Province of Saskatchewan and the University of Saskatchewan to transfer ownership of the Cyclotron to the CCNI after it is commissioned

A separate business plan is being developed for the Cyclotron in the context of being a business unit of the CCNI. Projections for the CCNI business plan are based on preliminary estimates from the Cyclotron business plan as well as actual costs from similar Canadian cyclotron operations. Costs include licensing fees, although regulatory compliance is expected to be maintained by UofS Workplace Safety and Environmental Protection.

At this time, the financial projections only take the Cyclotron into account. In the future, other pieces of nuclear infrastructure on the U of S campus may be considered for stewardship by the CCNI.

## 7. Support

The CCNI has letters of support from key units from across campus. These letters are attached in Appendix 2:

- Vice-President Research
- Provost’s Committee on Integrated Planning (PCIP)
- College of Engineering
- College of Medicine
- Division of Social Sciences
- Division of Sciences
- School of Environment and Sustainability
- International Centre for Northern Governance and Development
- Western College of Veterinary Medicine
- Physics and Engineering Physics
- College of Agriculture and Bioresources

## 8. Systematic Assessment

The CCNI is a funding organization rather than a research or training centre. The integration of research and academic activities into University planning processes will occur through University departments and units receiving CCNI funds. These units deliver programs (for students or for research) and lead

research and development projects. It is also these units that will be most able to report on the research and academic impact through integrated planning and assessment processes.

The CCNI Board as a Type C Centre of the UofS will also undertake assessment, performance evaluation, and reporting. The CCNI will undertake systematic review to coincide with its business planning process, including audited financial statements. This ensures the impacts of the CCNI in science, technology and society are fully understood and integrated in the next CCNI planning cycle, beginning five years from the start of operations, as well as being fully coordinated with planning, assessment and review by University departments and units interacting with the CCNI.

## 9. Attachments

Appendix 1 – Required Consultation Forms

- Information Technology Requirements
- Library Requirements
- Physical Resource Requirements

Appendix 2 – Letters of Support

*A Canadian Centre for Nuclear Innovation – Business Framework*

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## **Appendix 1: Required Consultation Forms**

Information Technology Requirements

Library Requirements

Physical Resource Requirements  
Including Cyclotron Major Project Summary

#

## Information Technology Requirements for New Centres

This form is to be completed by the faculty member responsible for the centre proposal in consultation with the Department of Information Technology Services.

1. Centre Identification: Canadian Centre for Nuclear Innovation (CCNI)  
Sponsoring Dept./College: Office of the Vice President Research

### 2. Network Requirements

- 2.1 Does the centre have any new special network requirements?

No, network requirements are unchanged from existing department/college requirements  
 Yes, the centre has the following new network requirements:  
 Video transmission (specify)  
 General web and e-mail usage  
 Large file transfers or media streaming  
 Other (specify)

- 2.2 Does the centre require any new access to the Internet or the Canadian Research network?

No, existing access and bandwidth (speed) are adequate  
 Yes, additional network access is required

Describe new requirements (e.g. type of access, room numbers, number of computers, bandwidth required):

Any requisite new network connections required to house the CCNI will be included in renovation plans and costing.

- 2.3 Will researchers require new access to University IT resources (e.g. library, e-mail, computer labs, etc.) from their homes?

No, home access requirements are unchanged from existing program  
 Yes, researchers will require new access to IT resources from home (please clarify the access required and how it should be provided):

While the researchers will require remote access, there are no new resources that currently need to be allocated on the University side.

### 3. Software Requirements

Please list the software that will be required for the centre (e.g. e-mail, web pages, SPSS, discipline-specific software, etc.), and indicate where it needs to be available. Include cost estimates for initial purchase and ongoing support/upgrading, if applicable.

The CCNI is a small office and will acquire software at its own expense. Software will include MS Office, Adobe Acrobat and similar office productivity software. No major database, graphics or other programs are expected. Web page design and content entry will be contracted. The web space will be hosted on the University web server.

### 4. Hardware Requirements

Please list any special IT hardware required for the centre (e.g. high performance workstations, colour printers, scanners, large disk space, etc.) and indicate whether the new hardware will be provided by the college/department or by the University or by research grant. Include cost estimates for initial purchase and ongoing support/upgrading.

Office (desktop and laptop) computing is all that is required.



5. Faculty IT Support

Please describe any new requirements for faculty IT support (e.g. number of hours training per year, training topics, number of hours of one-on-one support per year, support for course development, support for desktop hardware, software and peripherals, other).

The CCNI staff may attend 2 or 3 training sessions per year. The CCNI will not do course development. IT support will include normal office setup and ongoing desktop support for the 6 to 8 office staff. This is currently provided through ITS Desktop Services under contract to the Office of the Vice-President Research.

6. Impact on Institutional Systems

Please describe any changes that may be necessary to institutional systems in order to support the proposed program (e.g. student information system, telephone registration system, financial systems, etc.). Provide an estimate of the cost of systems modifications. Refer to modifications identified in the Office of the Registrar Consultation Form if applicable.

The CCNI will not have a direct impact to the university's main institutional systems – financial, human resources, student systems, etc.

7. Comments

This initial review covers the known demands of the CCNI. There will be future initiatives by the Centre that will involve intensive research that could require videoconferencing, high performance computing, discipline specific software or special data considerations. The CCNI and ITS will work together on the relevant aspects of those initiatives as they develop. The funding for any required ICT resources will be the responsibility of the initiatives.

Date: July 26, 2011

  
\_\_\_\_\_  
Dept of Information Technology Services

\_\_\_\_\_  
Faculty Member (sponsoring college/dept)

## **Appendix 1: Library Requirements for the Proposed Canadian Centre for Nuclear Innovation**

This assessment of library collections and programs has been completed by Jill Crawley-Low, Assistant Dean, responsible for collections. Li Zhang and Diane Dawson are the liaison librarians responsible for providing research assistance and supporting development of information research skills for graduate students and faculty associated with the proposed new Centre.

### **1. Proposal Identification**

Full name of program: Canadian Centre for Nuclear Innovation

Type C Centre

- 2. Introduction** Libraries are no longer the quiet, solitary and reflective places they used to be. The way our community interacts, learns, and accesses information for study, research and professional practice is changing dramatically. In an information age, library users expect a working environment suitable to their needs, state-of-the-art computing equipment, robust networks, vast collections of both traditional print-based materials and a full range of electronic resources including software as well as expert assistance when and where they need it. Strategies invoked by the University Library to create an engaged research library include transforming our services, collections and facilities to contribute to the success of our learners, teachers, researchers, scholars, practitioners, and ourselves as a learning organization.
- 3. Summation** The University Library is able to provide information resources to support teaching, learning and research needs of faculty and students from the University of Saskatchewan engaged in any of the four themes of the proposed Canadian Centre for Nuclear Innovation – nuclear engineering and sciences, materials science with nuclear methods, health sciences with nuclear methods, and social and environmental sciences associated with nuclear technologies. Existing collections in the University Library system relating to materials science, medical sciences, engineering, environmental science and public policy provide information resources to support the proposed Centre. Requests for new titles whether print or electronic, monograph or serial, should be directed to the liaison librarians.

### **4. Books**

Printed books are an important supporting resource in the disciplines to be covered by the proposed Centre. The catalogue provides access to a variety of printed resources such as dictionaries, conference proceedings, handbooks, standards, theses, and reference materials and covers decades of publication. For example, searching the University Library catalogue for the subject Neutrons- Scattering there are 21 printed books, 10 of which were published in 2000 or later; 2 published in the 1990's; 4 published in each the 1980's and 1970's. A similar distribution is found from the 1970's to 2010 with 94 books found in a search for Radiation Safety-Measures.

Resources are located mainly in the Engineering, Natural Sciences (physics, chemistry, environmental sciences), Health Sciences, Veterinary Medicine



(toxicology, public health), and Murray (public policy, social sciences) Branch Libraries. Liaison librarians selecting resources for addition to the collection will consider the focus of research, teaching, and learning in the disciplines covered by the new Centre. As well, faculty and students are asked to submit their selections for books to add to the collection.

## 5. Ebooks

The University Library subscribes to many full-text ebook collections, which are networked to allow online access at any time from any location. Individual titles are typically found using the catalogue although large collections of ebooks spanning a variety of disciplines are found in the Cambridge University and Oxford University presses and the Springer ebooks collections are also found in the catalogue.

In general, science books are considered outdated 5 years after publication, excepting classical texts, which may have an infinite lifespan. Ebooks have long been important in engineering and medical sciences because of their currency and 24-hour availability.

The Springer ebooks collections in medicine, biomedical and life sciences, physics and engineering have increased the available content and currency of information resources in those disciplines. For example, searching by subject Nuclear Engineering in the University Library's catalogue there are 69 books, of which 39 were published in 2000 or later and of those 39 titles, 30 are ebooks. A similar example in Nuclear Medicine finds 120 books, of which 91 were published later than 2000, and 75 of those 91 titles are ebooks.

Other ebook collections include CRCNetBASE (engineering, chemistry, toxicology), Books 24X7 (engineering) and Knovel Library of chemistry and chemical engineering.

## 6. Electronic Resources

The majority of the Library's electronic resources including journals, indexes, and subject-specific materials are networked to permit immediate online access at any time and from any location. Over the last decade, a number of active Canadian site licensing initiatives have dramatically increased the breadth and depth of e-resource content available in university and college libraries in Canada, including the University of Saskatchewan. Thus, large and small institutions can now boast comparable e-resource collections in a wide range of disciplines. In addition to providing access to the core e-resources needed by their clientele, academic libraries are distinguishing themselves by focussing on preserving and making available their specialized and unique materials and collections.

### 6.1 Full-text Article-level Access

Core journals - of the top ten impact factor journals in nuclear sciences the University Library has current holdings in all except for *Journal of Radiological Protection* which was cancelled in 2002. It would be a small matter to reinstate this title and collect the back issues. There is also modest funding to subscribe to new journals that faculty and students identify in the course of working and studying in the new Centre.

## **6.2 Indexes and Subject E-Resources**

Library clients use subscription-based and publicly available subject indexes as gateways to full-text e-resources. "FindIt" links embedded by the University Library in subscription e-resources as well as publicly available web resources, such as PubMed emulate seamless access to our licensed full-text journals.

Important indexes in the nuclear sciences include INIS (International Nuclear Information System), EI Engineering Village 2, INSPEC, Compendex, Web of Science, PubMed, ASTM Digital Library, ABI INFORM Global, Academic Search Complete, and many more. All listed above are electronic resources.

## **6.3 Publicly Available Web Resources**

Government publications, statistics, and GIS information resources are rapidly evolving with an increasing amount of government documents, statistical datasets, and geospatial information being made freely available on the internet. Not everything is open access, however, but the library provides access to many licensed services. For example, Statistics Canada publishes many statistical datasets, including census data and specialized surveys, which are available through the Data Liberation Initiative license to which the U of S Library subscribes.

There are many open access websites and databases that contain information about the nuclear sciences. For instance, there are websites for nuclear regulatory agencies around the world including the IAEA, EURATOM, OECD Nuclear Energy Agency, Nuclear and Industrial Safety Agency, Canadian Nuclear Safety Agency, Nuclear Regulatory Commission U.S. and many others. Many provide links to related agencies and sources.

There are documents relating to nuclear science published by the Saskatchewan and Canadian governments: whether in print or electronic format they can be discovered using the catalogue.

## **6.4 Unique Collections**

There are more than 50 theses or dissertations on the topic of nuclear science housed in the Murray Branch Library.

## **7. Interlibrary Loan**

The Interlibrary Loan Service enables library clients to request materials not owned by the University Library at no charge to them. The service depends on borrowing and lending agreements between the University Library and other libraries and does not replace on-campus support for programs

## **8. Liaison Services**

Liaison librarians are active as the link between the university community and the University Library's collections and services. Liaisons develop library collections in their assigned subject areas, provide research assistance to library clients, and

support learning in information research skill development in a variety of settings. They also communicate with their clients about library events and initiatives.

**9. Signatures**

Date: September 13, 2011

Liaison Librarian's Signature:

J. Crawley-how

University Library, Dean's Signature:

Millison



## Physical Resource Requirements for New Centre (Space, Renovations and Equipment)

This form is to be completed by the faculty member responsible for the centre proposal in consultation with the Division of Facilities Management. Contact the Manager, Space Administration (phone 4878) for assistance.

Name of centre: Canadian Centre for Nuclear Innovation (CCNI)

Sponsoring Dept./College: Office of the Vice-President Research

### 1. SPACE/RENOVATIONS

- 1.1 Does the centre require space resources in addition to the college/department's present space allocation?  No (skip to question 1.3)  Yes (describe below)

**A preliminary assessment of the office-related space needs for the CCNI has been undertaken by the Facilities Management Division and are identified below. Facilities Management and Institutional Planning and Assessment will work with the CCNI to secure space at either the University or at Innovation place.**

Director (1)	14.86 m <sup>2</sup>
Associate Director (2)	26.94 m <sup>2</sup> (13.47 m <sup>2</sup> x 2)
Professional Level (2)	22.30 m <sup>2</sup> (11.15 m <sup>2</sup> x2)
Admin/Reception (1)	12.08 m <sup>2</sup>
Service/Storage	11.15 m <sup>2</sup>
Meeting Room (20 seats)	45.00 m <sup>2</sup>
Total	132.33 m <sup>2</sup> (1424.38 sq ft)

Capital and infrastructure requirements for the CCNI are being addressed centrally by the University through the establishment of a formal Capital Project Steering Committee with Karen Chad, Vice President (Research) And Richard Florizone, Vice President (Finance and Resources) serving as Co-Executive sponsors. The capital project has been formally incorporated within the University's Major Project Planning Process. All capital needs including renovations to existing space, development of new space plus the acquisition of a Cyclotron and associated support equipment are being coordinated through the Steering Committee.

The attached Major Project Request Form was provided to the Planning and Priorities Capital Sub-committee on June 23, 2011. The University's Board of Governors was provided with documentation on March 4, 2011.

Some examples of types of space are: office (faculty, staff, graduate student), laboratory (teaching, research), workshop, studio, rehearsal room, field plot, animal facilities, etc.

1.2 Is the college/department aware of space outside of its resources which could accommodate these needs?

No  Yes:

Describe: **The Cyclotron and associated operations and equipment will be based out of the Animal Resources Centre which will undergo an expansion combined with significant renovations.**

1.3 Does the new/revised program require renovations to the college/department's current space?

No (skip to section 2)  Yes (describe below)

General description of renovations:

**Summary: The following information is taken from the Major Project Request Form:**

***Proposed Project Description:***

Located within the existing and expanded Animal Resources Centre (ARC), situated directly between the Canadian Light Source and the Western College of Veterinary Medicine, Saskatchewan Centre for Innovations in Cyclotron Science will provide a cutting-edge, fully accessible, interdisciplinary facility that will include the following:

- 24 MeV cyclotron and targetry for making isotopes;
- Synthesis modules for the synthesis of various isotopes;
- Hot cells for the safe containment of isotope synthesis and handling;
- Space for quality control equipment and personnel;
- Laboratory equipment, supplies and personnel;
- Radiation safety and monitoring equipment and personnel;
- Facilities for the care of animals used in research (taking advantage of the high-quality animal care facilities existing at the ARC); and
- Space for teams of students, researchers, and industry representatives.

Space will be "earmarked" within the building for a future dedicated research positron emission tomography (PET) computed tomography (CT) suite. The research PET-CT will be particularly useful for imaging of medium-sized animals (e.g., dogs, small pigs, substantial parts of larger animals [e.g., limbs; cranium]). This capacity for PET-CT imaging of medium and large animals will be the first such facility in Canada, and only the second in North America. Funding for the dedicated research PET-CT suite is NOT part of the federal and provincial funding package; moneys to support the PET-CT (~\$3.4) will therefore be raised through fundraising (University Advancement). The

**City of Saskatoon municipal government has expressed interest in assisting with this fundraising.**

The current project budget does not include provision for the PET-CT. Contingent on committed funding and development of a business plan, a project recommendation for the PET-CT will be developed and brought forward in the future.

**2. EQUIPMENT**

2.1 Does the centre program require additional equipment or upgrades to current equipment?

No  Yes (describe below)

**The major equipment component will be the purchase and installation of the cyclotron itself along with additional equipment required as part of the operation of the Centre.**

**3. FUNDING**

3.1 Are college/departmental funds available for the required new space, renovations, or equipment?

Initial costs:  No  Yes

Ongoing operating/maintenance costs:  No  Yes

3.2 Are funds available from non-base budget/external sources towards the cost of any of the new space, renovations, or equipment?

Initial costs:  No  Yes

Ongoing operating/maintenance costs:  No  Yes

If yes, provide details, including any special conditions:

3.3 Will there be a request to the Budget Committee for capital funds to accommodate the program?

No  Yes

**Comments: A preliminary estimate of \$16,000,000 to \$21,000,000 has been developed for facility renovations and expansion; purchase and installation of the Cyclotron, and associated equipment and operations. This estimate is currently being refined through the collection of detailed programming requirements and the completion of preliminary design. To date, \$14,000,000 has been provided from Western Economic Diversification (\$7,000,000) and the Government of Saskatchewan (\$7,000,000)**

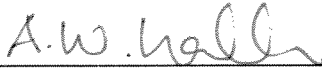


4. ADDITIONAL COMMENTS

If relevant, please comment on issues such as the adequacy of existing physical resources for delivering the proposed program, the feasibility of proposed additions or renovations, sources of funding, etc.

**The project will continue to be developed through the Major Project Planning Process. Upon determination of the capital and operating funding requirements and corresponding funding sources, the project will be submitted to the Board of Governors for final approval.**

Date: August 16, 2011



Andrew Wallace, Associate Director, Space Planning, Facilities Management



Bryan Bilokreli, Director, Institutional Capital Planning, Institutional Planning and Assessment

\_\_\_\_\_  
Faculty member (for the sponsoring college/dept)

<b>NAME OF PROJECT PROPOSAL</b>		<b>DATE</b>
Saskatchewan Centre for Innovations in Cyclotron Science (SCI-CS)		June 3, 2011
<b>COLLEGE/DEPARTMENT PROPONENT</b>	<b>PROPONENT CONTACT Email Address</b>	<b>TELEPHONE #</b>
Ian Swainson	Ian.Swainson@src.sk.ca	933-7070
<b>FMD PLANNING/DEVELOPMENT MANAGER</b>		
Darlene Machibroda, Facilities Management Division		
<b>PROPOSED EXECUTIVE SPONSOR (Co-Executive Sponsors)</b>		
Karen Chad, Vice-President (Research)/Richard Florizone, Vice-President (Finance and Resources)		
<b>PROPOSED PROJECT DEVELOPMENT TEAM</b>		
Karen Chad, Vice-President (Research); Richard Florizone, Vice-President (Finance and Resources); Beth Horsburgh, Associate Vice-President (Research-Health); Jim Basinger, Associate Vice-President (Research); Ian Swainson (Saskatchewan Research Council); John Root (Chalk River Laboratories); S. McEwan (University of Alberta); F. Thomas (Saskatoon Tribal Council); R. Klein (University of Regina); L. Kennedy (FSD); C. Tennent (FMD); T. Porter (OVPR); B. Bilokreli (IPA); P. Sen (FSD); K. Warden (OVPR); R. Labrash (Western Economic Diversification); C. Dekker (Saskatchewan Government Crown Corporations); M. Deutsher (Western Economic Diversification); G.Schuler (ILO); G. Roy (Crown Investments Corporation of Saskatchewan); P. Babyn (SHR)		
<b>PROJECT RATIONALE AND JUSTIFICATION</b>		
<p>In mid-November 2010, the University of Saskatchewan was requested by the Provincial Government to develop a proposal for an institute for nuclear science. A draft was submitted on January 31, 2011 with the final report submitted February 23, 2011.</p> <p>On March 2, 2011, it was announced that the University of Saskatchewan will receive \$30 million in funding over the next seven years from the provincial government to establish a centre for the study of nuclear medicine and science. Currently also referred to as the Canadian Centre for Nuclear Innovations (CCNI), the centre will undertake research in “material science to nuclear medicine to research on public policy”.</p> <p>On March 4, 2011 in support of the UofS nuclear investment, the Government of Saskatchewan and the Federal Government (through Western Economic Diversification (WED)) announced that an additional \$14.0 million will be provided to the University of Saskatchewan to support capital costs of a research cyclotron project. Officials also advised that a further \$3.0 million will be provided by the Crown Investments Corporation to support start-up operating costs and start-up research costs for the cyclotron project with the expectation that funding of \$1.0 million per year will be provided.</p>		

The funds will allow the University to initiate research in nuclear-related health, science and social science as well as nuclear research and training. The advanced research cyclotron is a particle accelerator that will be used for research into innovation in isotope use and detection technologies for medical diagnosis and treatment and for the production of isotopes for PET-CT scans.

### **PROJECT DESCRIPTION/SCOPE/DEVELOPMENT STRATEGY**

A cyclotron accelerates protons, which collide with targets to produce radioactive isotopes (radioisotopes) that are essential to diagnostic and therapeutic techniques in human and animal health. Positron Emission Tomography – Computed Tomography (better known by its acronym “PET-CT”), is a medical imaging device which combines in a single system both a Positron Emission Tomography (PET) and an x-ray Computed Tomography (CT), so that images of the body acquired from both devices can be superimposed on top of one another revealing fine details, particularly regarding soft tissue such as cancerous tumours. A cyclotron is necessary for the production of isotopes that are used for the PET-CT.

#### *Proposed Project Description:*

Located within the existing and expanded Animal Resources Centre (ARC), situated directly between the Canadian Light Source and the Western College of Veterinary Medicine, Saskatchewan Centre for Innovations in Cyclotron Science will provide a cutting-edge, fully accessible, interdisciplinary facility that will include the following:

- 24 MeV cyclotron and targetry for making isotopes;
- Synthesis modules for the synthesis of various isotopes;
- Hot cells for the safe containment of isotope synthesis and handling;
- Space for quality control equipment and personnel;
- Laboratory equipment, supplies and personnel;
- Radiation safety and monitoring equipment and personnel;
- Facilities for the care of animals used in research (taking advantage of the high-quality animal care facilities existing at the ARC); and
- Space for teams of students, researchers, and industry representatives.

Space will be “earmarked” within the building for a future dedicated research positron emission tomography (PET) computed tomography (CT) suite. The research PET-CT will be particularly useful for imaging of medium-sized animals (e.g., dogs, small pigs, substantial parts of larger animals [e.g., limbs; cranium]). This capacity for PET-CT imaging of medium and large animals will be the first such facility in Canada, and only the second in North America. Funding for the dedicated research PET-CT suite is NOT part of the federal and provincial funding package; moneys to support the PET-CT (~\$3.4) will therefore be raised through fundraising (University Advancement). The City of Saskatoon municipal government has expressed interest in assisting with this fundraising.

The current project budget does not include provision for the PET-CT. Contingent on committed funding and development of a business plan, a project recommendation for the PET-CT will be developed and brought forward in the future.

### **PROJECT PLANNING PARAMETERS**

SCI-CS is planned to be located on Maintenance Road in the current Animal Resources Centre (ARC) and site, with adjacencies to the Canadian Light Source and the Western College of Veterinary Medicine. In consultation with ARC Director Dr. Colette Wheler, declining utilization of the ARC was identified as a concern for the sustainability of the facility as the new vivarium in the Academic Health Sciences Building D-wing opens. The high-quality ARC facility is well suited to the needs of the SCI-CS. Continuing

consultation with Dr. Wheler will be required to develop a plan for relocation of the remaining activities within the ARC.

#### **RELATIONSHIP TO UNIT STRATEGIC PLAN**

The proposed Saskatchewan Centre for Innovations in Cyclotron Science (SCI-CS) is directly aligned with the U of S Strategic Directions (Updated April, 2010). It will help place the U of S among the most distinguished universities in Canada and the world. It builds directly upon the U of S pre-existing niche in synchrotron science and recent NRCan-supported linear-accelerator isotope initiative. SCI-CS will further galvanize collaboration across human, veterinary, and plant health imaging. SCI-CS responds to Saskatchewan's desire to capture the full value chain of uranium and to move beyond the primary nuclear industries of uranium mining and milling (sense of place).

SCI-CS is directly aligned with priorities espoused in both the Second Integrated Plan (improved student experience, enhanced research and scholarship, and working together across boundaries) and the upcoming Third Integrated Plan with its emphasis on knowledge creation, innovation and impact, Aboriginal engagement, sense of place, and innovation in academic programs. It will enhance opportunities for both programming and research. Initial discussions have been held with the Saskatchewan Institute of Applied Science and Technology (SIASST), University of Regina, Saskatchewan Indian Institute of Technologies (SIIT), and Saskatoon Tribal Council about academic programming opportunities. SCI-CS, by its very nature requires interdisciplinary engagement for operation (e.g., physicists, chemists, veterinary and medical clinicians, engineers, etc.), industry collaborations, and external partnerships (e.g., cyclotron centres in BC, AB and MB).

SCI-CS will draw upon, and further augment, two of the U of S research signature areas – synchrotron science and “one health” (health at the animal, human and environment interface).

#### **RELATIONSHIP TO UNIVERSITY INTEGRATED PLAN/STRATEGIC DIRECTIONS**

The proposed multi-disciplinary research network fits with the U of S's long-term focus on advancing pre-eminence, sense of place, and international standards. It advances the top three U of S priorities -- enhancing the U of S research profile, improving the undergraduate and graduate student experience, and working together more effectively across unit and institutional boundaries. There is a fit with Second Integrated Plan goals such as “pay particular attention to engaged and interdisciplinary scholarship, to the development of research centres and partnerships” and “be cognizant of its (*the university's*) role as a cultural and economic driver in Saskatchewan.”

The research generated will relate to at least three of the university's signature areas, namely “One Health Solutions at the Animal-Human-Environment Interface”, “Synchrotron Sciences: Innovation in Health, Environment and Advanced Technologies”, “Energy and Mineral Resources: Technology and Public Policy for a Sustainable Environment.”

#### **RELATIONSHIP WITH MASTER PLAN AND COMMENTS**

The SCI-CS will be located within a re-purposed Animal Resources Centre which is located within the Core Campus North Precinct as identified within the University's Core Area Master Plan of 2003. The siting of the Cyclotron in this sector of campus complements adjacent functions such as the Canadian Light Source and the Western College of Veterinary Medicine. The Plan notes that: “This area has perhaps the most potential to create a significant new focal area for the campus..... It is in this area that significant opportunity exists for research-related growth in response to the CLS.”

**RANGE OF ANTICIPATED CAPITAL PROJECT COSTS AND SOURCES**

A preliminary estimate of \$16,000,000 to \$21,000,000 has been developed. This cost will be refined during the design stages. Initial capital funding sources include \$7 million from the Government of Canada through Western Economic Diversification and \$7 million from the Government of Saskatchewan.

<u>Cyclotron</u>		<i>Full Renovation Estimate</i>	<i>Minimal Renovation Estimate</i>
<b>Construction</b>			
General Contractor		6,460,000	3,462,000
Equipment		9,110,000	9,110,000
		15,570,000	12,572,000
<b>Non-Construction Costs</b>			
FMD Trades		258,000	138,000
Consultants & Other External Charges		840,000	450,000
Construction Activities other than General Contractor		226,000	121,000
Utilities		129,000	69,000
Site Preparation & Development		129,000	69,000
Furniture & Furnishings		162,000	87,000
Equipment - Other		129,000	69,000
U of S Costs		388,000	208,000
		2,261,000	1,211,000
<b>Contingencies/Escalation</b>			
Contingency (30%/10%)		2,827,000	1,613,000
Escalation (5%)		436,000	234,000
		3,263,000	1,847,000
<b>Total Estimated Project Cost</b>		<b>21,094,000</b>	<b>15,630,000</b>

**ANNUAL BUILDING OPERATING, MAINTENANCE AND UTILITY COSTS AND SOURCES**

It is expected that there will be additional building operations and maintenance costs as the project will involve the construction of an adjoining concrete bunker space to house the Cyclotron itself.

**NEED FOR "SEED MONEY" FOR CONSULTING AND SOURCES**

Approximately \$900,000 will be required for the design phase of the project leading to the Board 2 recommendation and final approval.

**ADDITIONAL ONGOING OPERATING COSTS AND SOURCES**

Additional costs for the development and operation of the Cyclotron Science Centre will be accommodate through the \$30 million in funding that the University of Saskatchewan will receive over the next seven

years to establish a centre for the study of nuclear medicine and science.

**SUSTAINABLE DEVELOPMENT OPPORTUNITIES**

The University will review all opportunities to incorporate sustainability within the project.

**GENERAL PROJECT COMMENTS – PROPONENT/FMD/IPA**

SCI-CS will require the standard permits for civil construction.



It will also likely need permission for an “improvement” from the Meewasin Valley River Authority.

SCI-CS will require licensing by the Canadian Nuclear Safety Commission. CNSC Class II Nuclear Facility licenses will be required including License to Construct, License to operate, and License to Decommission.

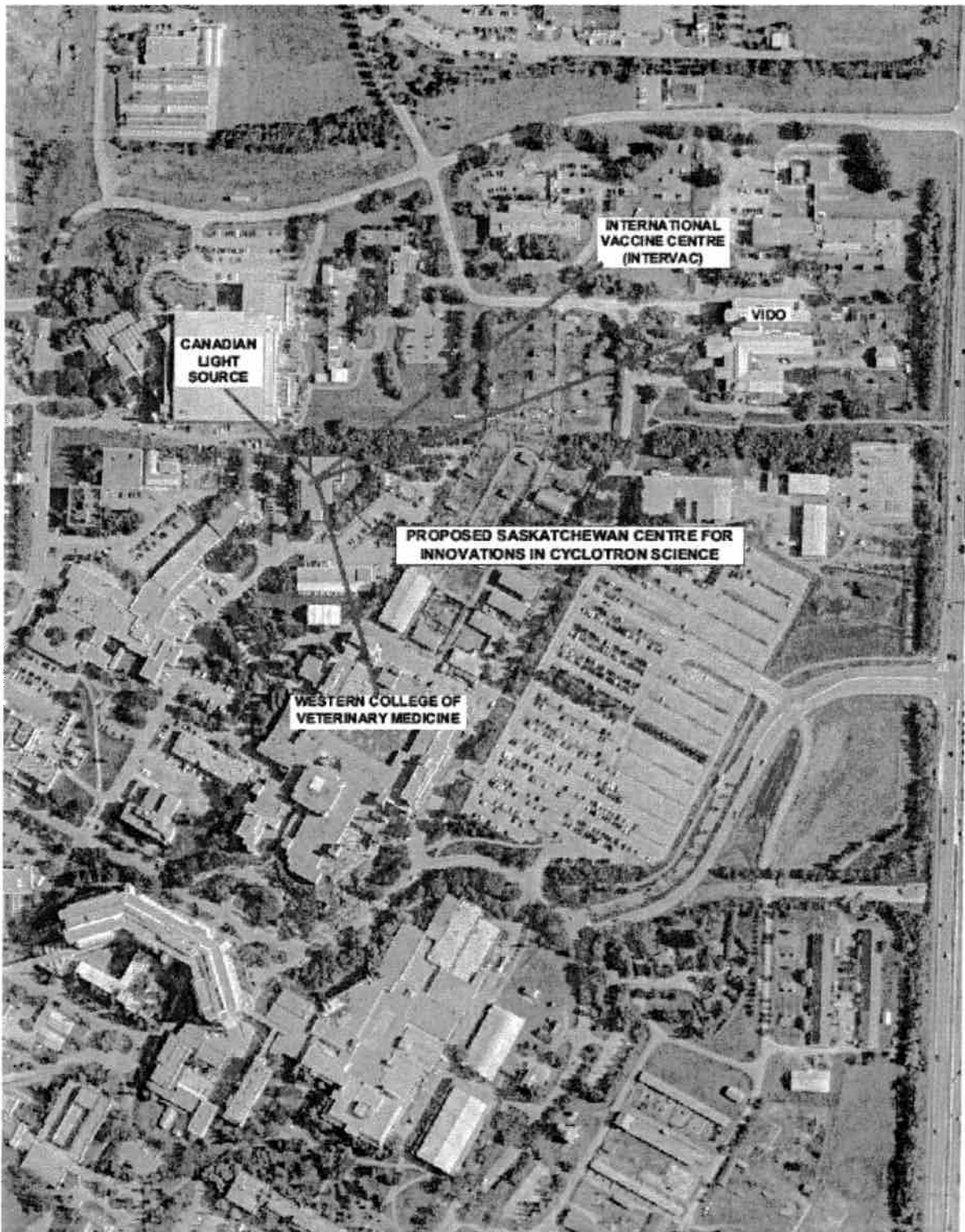
Other regulatory requirements to be addressed include Canadian Council on Animal Care (CCAC), Health Canada Good Manufacturing Practices (cGMP) for Schedule C drugs and Standard Operating Procedures (SOPs).

**NEXT STEPS**

Facilities Management Division with direction from the Steering Committee, the Design and Commissioning Working Group, and the Science Working Group will acquire and work with a consultant to begin preliminary project design.

<b>PROPONENT DEAN/DIRECTOR</b>	<b>INSTITUTIONAL PLANNING &amp; ASSESSMENT</b>	<b>FACILITIES MANAGEMENT DIVISION</b>
Karen Chad, Vice-President (Research)	Bryan Bilokreli Director, Integrated Facilities Planning	Colin Tennent Associate Vice President Facilities Management Division
<b>SIGNATURE</b>	<b>SIGNATURE</b>	<b>SIGNATURE</b>
		

Attachment 1: Cyclotron Centre Location – Aerial View



## Appendix 2: Letters of Support

The following letters of support are attached to the formal submission.

- Vice-President Research
- Provost's Committee on Integrated Planning
- College of Engineering
- College of Medicine
- Division of Social Sciences
- Division of Sciences
- School of Environment and Sustainability
- International Centre for Northern Governance and Development
- Western College of Veterinary Medicine
- Physics and Engineering Physics
- College of Agriculture and Bioresources



September 8, 2011

107 Administration Place  
Saskatoon SK S7N 5A2 Canada  
Telephone: (306) 966-8514  
Facsimile: (306) 966-8736  
<http://www.usask.ca/vpresearch>Bob Tyler, Chair  
Planning and Priorities Committee of Council**Re: A Canadian Centre for Nuclear Innovation Business Framework**

Dear Bob,

The Office of the Vice-President Research fully supports the establishment of the Canadian Centre for Nuclear Innovation ("CCNI") as a Type C Centre. The CCNI represents an important multi-disciplinary opportunity for the University of Saskatchewan, building on the historical strengths of the institution over the past 50 years in nuclear medicine and accelerator technology, and will place Saskatchewan among global leaders in nuclear research, development and training by further establishing partnerships with academia and industry.

This innovative initiative certainly is aligned well with the University's signature area of *Energy and Mineral Resources*<sup>[1]</sup> and its strategic direction to advance pre-eminence, foster a sense of place, and attain international standards. The CCNI also serves to advance the top three priorities of the university in enhancing our research profile, improving undergrad and grad student experience and working together effectively across unit and institutional boundaries.

Society is seeking answers to the broad range of questions on how to advance nuclear medicine and knowledge; develop better materials for widespread applications, including energy, health, environment, manufacturing, transportation and communication; improving safety and other engineering of nuclear energy systems; and understanding how to reap the benefits and manage the risks of nuclear technology for society and the environment. The University has the capacity to accept a leadership role in addressing the breadth of such questions for maximum societal and economic benefit. In doing so, the CCNI will serve to coordinate existing areas of expertise, to facilitate cross-disciplinary collaborations, and to contribute to the attraction of resources to the University in support of faculty and students in nuclear-related initiatives.

The intention of the CCNI is to stimulate new research, development and training so that citizens of Saskatchewan can participate in the advanced aspects of nuclear science and technology, affecting areas such as nuclear medicine, energy, the environment and social well-being. And so, It is wonderful that what began in earnest in 2007 - with broad faculty engagement and consultations across the various colleges, three interdisciplinary graduate schools and research centres, and our two major science initiatives CLS and VIDO/InterVac in the development of this initiative - has evolved into this exciting institute as a credible

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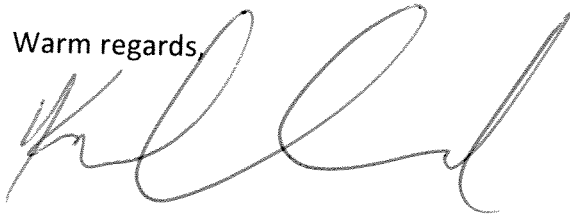
<sup>[1]</sup> The U of S Signature Areas are: Aboriginal Peoples: Engagement and Scholarship; Agriculture: Food and Bioproducts for a Sustainable Future; Energy and Mineral Resources: Technology and Public Policy for a Sustainable Environment; One Health: Solutions at the Animal-Human-Environment Interface; Synchrotron Sciences: Innovation in Health, Environment and Advanced Technologies; Water Security: Stewardship of the World's Freshwater Resources

knowledge resource for policy decisions, and as a trusted steward of nuclear research infrastructure for the public good.

The success of the CCNI will be measured by the growth in the quality and quantity of academic programs at the University of Saskatchewan in the nuclear domain, encompassing both technical and social aspects of nuclear research, development and training in nuclear engineering and sciences; materials science with nuclear methods; health sciences with nuclear methods; and the social and environmental sciences associated with nuclear technologies.

Through the CCNI, the University of Saskatchewan is positioned to take advantage of opportunities presented by an international resurgence of the nuclear industry, demand for uranium, medical isotope shortages and applications, and emerging synergies between neutron and synchrotron science. Both the Federal and Provincial governments are looking to Universities across the country to address the social, environmental, and economic questions associated with uranium and various nuclear sectors. With its strategic leadership the CCNI will draw on existing institutional capacity and as well, develop new capacity to position the University of Saskatchewan among the global leaders responding to this need and opportunity.

Warm regards,

A handwritten signature in black ink, appearing to read 'K. Chad', written in a cursive style.

Karen Chad, Ph.D.  
Vice-President Research



*Office of the Provost and  
Vice-President Academic*

*MEMORANDUM*

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TO: Dr. John Root, Interim Director, Canadian Centre for Nuclear Innovation

CC: Dr. Bob Tyler, Chair, Planning and Priorities Committee, University Council

FROM: Provost's Committee on Integrated Planning (PCIP)

SUBJECT: Canadian Centre for Nuclear Innovation

DATE: August 29, 2011

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The Provost's Committee on Integrated Planning (PCIP) met on August 25, 2011 to consider the request for a letter of support for the establishment of the Canadian Centre for Nuclear Innovation as a type C centre at the University of Saskatchewan. After careful review of the proposed business plan, PCIP noted that, although it would exist as an independent entity, the centre would be owned by the University of Saskatchewan. PCIP also noted that the proposed centre is consistent with University policy. Therefore, PCIP agreed that a type C centre is appropriate for the Canadian Centre for Nuclear Innovation.

PCIP is appreciative of the comprehensive proposal documentation presented and extends its thanks to the proponents for their work throughout the concept development.

Sincerely,

A handwritten signature in black ink that reads "Brett Fairbairn".

Brett Fairbairn  
Provost and Vice-President Academic

August 16, 2011

Dr. John Root  
Interim Director  
Canadian Centre for Nuclear Innovation  
Rm 546.6 121 Resesarch Dr  
University of Saskatchewan  
Saskatoon, SK S7N 1K2  
Phone: (306) 966 4784  
Email: [John.Root@usask.ca](mailto:John.Root@usask.ca)

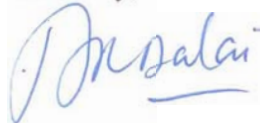
Re: Support letter for creation of the Canadian Centre for Nuclear Innovation

Dear Dr. Root:

On behalf of the College of Engineering, I would like to strongly support the proposal to create the Canadian Centre for Nuclear Innovation (CCNI) at the University of Saskatchewan. The College of Engineering has always been an advocate of innovation and has proven track-record of training of highly qualified personnel, especially in the areas of materials science, energy systems, and information and communication systems (including biomedical applications), which are of direct relevance to CCNI. The College of Engineering envisions providing support in development of multi-disciplinary programs and options, initiate collaborative research projects and share existing experimental facilities for training of highly qualified personnel. In addition, existing expertise will be enhanced by exploring new research opportunities and establishment of cutting edge facilities through CCNI, which will bring the College of Engineering and University of Saskatchewan at the forefront of nuclear innovation in Canada.

Thank you.

Sincerely,



Ajay Dalai, Ph.D., P.Eng.

Professor and Associate Dean Research and Partnerships

Canada Research Chair in Bioenergy and Environmental Friendly Chemical Processing

September 14, 2011

Dr John Root  
Interim Director  
Proposed Canadian Centre for Nuclear Innovation  
University of Saskatchewan

Dear Dr Root:

I am pleased to provide a letter of support for the formation of the Canadian Centre for Nuclear Innovation (CCNI). I believe such a centre would greatly enhance education and research in the College of Medicine, as well as beyond the University of Saskatchewan campus. Just as the Canadian Light Source has had immeasurable benefits, the CCNI would afford opportunities that could make Saskatchewan a global leader in nuclear research.

The College of Medicine is taking steps to intensify research, as expected by the University in response to the major capital investment in the Health Sciences. Our college is working collaboratively with the other health science colleges on campus and will soon occupy space in the new facilities that expand our research capacity. I feel that the establishment of the CCNI would be of great benefit for the university's researchers to work with the province to examine nuclear development, especially the faculty in Medicine and the Health Sciences.

Please let me know how the College of Medicine can further support this initiative.

Sincerely:



William L. Albritton, MD, PhD, FRCP(C)  
Dean, College of Medicine

WLA/kk



September 1, 2011

Dr. John Root  
Interim Director  
Canadian Centre for Nuclear Innovation  
University of Saskatchewan

Dear Dr. Root,

I am pleased to provide this letter of support for the proposed *Canadian Centre for Nuclear Innovation (CCNI)*. As we discussed, I believe the proposed *CCNI* initiative presents opportunities for mutually beneficial collaborations that build on existing and proposed enhancements to the strengths and capacities of the Division of Social Sciences.

Several of the Division's priority proposals for the third integrated planning period, for example, have the potential to augment the scope and focus of the proposed *CCNI*'s research, training and development objectives.

The proposed *Saskatchewan Program Evaluation & Assessment Research (SPEAR) Centre* is a case in point. The proposed *SPEAR Centre* builds on existing research expertise and academic programming in the Division of Social Sciences. This expertise and training activity potentially provides a distinctive social sciences perspective and capacity that enhances the capability of the proposed *CCNI* to address a wide range of crucial social, cultural, political, economic and environmental issues and concerns associated with the goals of placing Saskatchewan among global leaders in nuclear research, training and development.

The Division also is proposing to establish *Plan Saskatchewan* a research centre with the goal of facilitating faculty and student engagement with small and medium sized communities, including Aboriginal communities, in the province. *Plan Saskatchewan*, like the proposed *SPEAR Centre*, builds on existing research and professional programming activities in the Division and is designed as a vehicle for enhancing community engaged research and student training opportunities. The goal of maximizing the societal and economic benefits of nuclear research, training and development will only be achieved through carefully and community engaged planning. The *Plan Saskatchewan Centre* could be an invaluable collaborator with *CCNI* in ensuring benefits are maximized and the risks and concerns associated with

developing nuclear related initiatives are effectively and clearly communicated, managed and minimized.

The strong and broadly-based interdisciplinary public and social policy expertise residing in the Division of Social Sciences potentially could also be engaged in work relevant to the goals of the proposed *CCNI*. Undergraduate and graduate level academic programming in the Division could introduce students to the policy issues associated with the manifold dimensions of *CCNI*'s proposed purposes. These potential opportunities will be essential in ensuring the inevitable and necessary debates associated with all things nuclear are informed and evidence based. Related to this, scholars from the Department of Native Studies, as well as from other departments in the Division, could bring distinctive but critical Indigenous understandings and knowledge to nuclear studies and development related debates.

Finally, the infrastructure and capacity of the Social Sciences Research Laboratories (SSRL) offer unparalleled combinations of research infrastructure and expertise to better investigate and understand public opinion and decision-making processes. This facility is unique in Canada and possibly North America insofar as it brings together in one place, under one governance structure a rich array of social sciences research infrastructure and technical and administrative support. The multi-method synergies can greatly amplify the nature and scope of social sciences collaboration and thereby contribute to a unique leadership role for *CCNI*.

I look forward to the successful development of the *Canadian Centre for Nuclear Innovation* and to discussing further the establishment of mutually beneficial partnerships with faculty, research groups, Centres and Departments from the Division of Social Sciences.

I believe the Social Sciences, working together in mutually beneficial relationships with *CCNI* and a variety of partners, can make an indispensable and unique contribution to making Saskatchewan a global leader in nuclear research, training and development that maximizes societal and economic benefits.

Sincerely,



Harley Dickinson  
Vice-Dean , Social Sciences

9 Campus Drive  
Saskatoon SK, S7N 5A5  
Telephone: (306) 966-4232  
Facsimile: (306) 966-8839

Dr. John Root  
Interim Director  
Canadian Centre for Nuclear Innovation  
University of Saskatchewan  
September 7<sup>th</sup>, 2011

Dear Dr. Root,

The Division of Science, College of Arts & Science is pleased to support the establishment of the *Canadian Centre for Nuclear Innovation* as a Type C Centre. The *CCNI* will provide exciting opportunities for both the Division and the University to capitalize on current and proposed expertise, and continue to develop our research and training capability in this area.

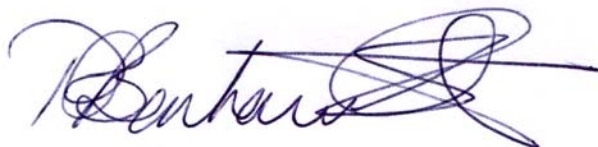
As identified in the Division of Science's 3<sup>rd</sup> Integrated Plan, the *CCNI* will provide a vehicle for enhancing research activity and developing new, innovative and interdisciplinary academic programming in areas of uncontested importance in the Canadian scientific as well as social, political, economic and legal environments.

Division researchers are actively engaged in, and often lead the field in, issues related to nuclear physics, nuclear chemistry and the environment. The *CCNI* would be unique in that it will offer an interdisciplinary focus, thus affording Division, College, University, and external researchers the potential and possibilities for creative and new collaboration. In essence, the *CCNI* would offer an exceptional opportunity for the Division of Science, to collaborate and learn alongside like minds and pre-eminent researchers.

The Division of Science holds that interdisciplinary scholarship and research carry a number of very important benefits: collaborating teams have the opportunity to address questions in different and provocative ways. Interdisciplinary training prepares a new generation of researchers for a rapidly expanding collaborative research agenda, and researchers and their trainees are better prepared and positioned to compete for a growing number of interdisciplinary research funding opportunities.

In summary, the Division of Science supports the proposed *CCNI* and considers it very much in line with the spirit of necessary and interdisciplinary nuclear research.

Yours sincerely,



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Peta Bonham-Smith  
Acting Vice-Dean, Division of Science



August 2, 2011

Dr. John Root  
Interim Director  
Proposed Canadian Centre for Nuclear Innovation

Dear Dr. Root:

**Re: Letter of Support for the Creation of the Canadian Centre for Nuclear Innovation**

It is with great pleasure that I provide you with this letter of support for the formation of the Canadian Centre for Nuclear Innovation (CCNI). I believe that this centre could become a transformative unit on campus, serving to facilitate interdisciplinary research and partnerships across this institution, and helping both the University and Saskatchewan take their rightful places as global leaders in nuclear research, development and training.

While a significant component of the proposed centre's activities would focus on nuclear sciences, engineering and medicine, I see an important role for a unit such as the School of Environment and Sustainability (SENS) to play. Among the proposed impact areas of the new Centre is "understanding how to reap the benefits and manage the risks of nuclear technology for society and the environment." Clearly, risks and liabilities are associated with any type of nuclear development, and faculty and students in SENS could potentially play a significant role in addressing or evaluating the risks and benefits to local communities (where nuclear activities may be located) and the potential impact and consequences of nuclear activities on the environment (both local and regional). Linkages could be made with associated policy implications and preventative measures undertaken as part of nuclear development to minimize adverse outcomes. Some of the School's existing graduate courses on various aspects of environment and sustainability could also be made available to select academic programs that may develop around nuclear science, technology, or medicine; such courses would provide important societal contexts to any academic program in these areas.

Overall, opportunities for SENS faculty and students to participate in select activities of the proposed institute would be an advantage to the School. I believe this would also be of advantage to the proposed CCNI. The goal of the CCNI to place Saskatchewan among global leaders in nuclear research and related activities complements the School's vision of taking its place as a national and international leader in environment and sustainability research and training. A solid partnership between the two units will help both to reach their potential.

Sincerely,

Karsten Liber, PhD  
Executive Director

September 2, 2011

To whom it may concern,

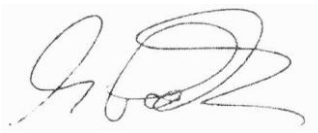
I am writing this letter in support of the application for the Canadian Centre for Nuclear Innovation (CCNI) to become a type C centre at the University of Saskatchewan.

The International Centre for Northern Governance and Development (ICNGD) works closely with communities, government stakeholders and industry in northern Saskatchewan, including a strong relationship with Cameco. The uranium industry plays a key role in the social and economic development of northern Saskatchewan, providing employment and other opportunities for northerners but also environmental consequences for the region. It is integral that the research community, industry and northern stakeholders work together to ensure that the uranium industry is not only technologically innovative, but also socially and environmentally innovative. The CCNI is poised to support innovation in all of these important areas, as reflected in its application.

The ICNGD supports the mandate of the CCNI and looks forward to working with other CCNI partners on shared research questions. In particular, we would be pleased to work on issues of concern to northern Saskatchewan communities, including the impacts, positive and negative, of the uranium mining industry; as well as explore innovations in nuclear research that could lead to better energy security for remote, northern communities.

On behalf of the ICNGD, I am pleased to support this worthwhile initiative and commit our partnership in exploring common research questions while reflecting the needs of those communities most impacted by the uranium industry.

Sincerely,



Dr. Greg Poelzer  
Director, ICNGD

September 12, 2011

Dr. John Root  
Interim Director  
Canadian Center for Nuclear Innovation  
University of Saskatchewan

Dear Dr. Root:

Re: Letter of Support for the Creation of the Canadian Centre for Nuclear Innovation

On behalf of the Western College of Veterinary Medicine, I am pleased to provide this letter of support for the formation of the Canadian Centre for Nuclear Innovation (CCNI). The proposed Center could be a great place to facilitate interdisciplinary research and partnerships across this institution. We need such a Center to foster integrative biomedical research in nuclear sciences to fully harness the intellectual and infrastructural potential at the University of Saskatchewan.

The Western College of Veterinary Medicine has identified imaging including nuclear imaging and oncology as one of the areas of research and scholarly work, which is aligned with one of the Signature Areas of our University. The College is also an active participant and leader in the development of a cyclotron on our Campus and research into nuclear molecular imaging. Therefore, we view the Center as a go to place for the College investigators and graduate students for all three areas of focus (Projects, Programs and Facilities).

My colleagues and I look forward to working with the CCNI to further grow and intensify the research and scholarly work in the area of nuclear sciences.

Thank you.

Yours sincerely



Baljit Singh, BVSc&AH, MVSc, PhD  
3M National Teaching Fellow  
Associate Dean (Research) and Professor  
Email: baljit.singh@usask.ca

September 12, 2011.

Dr. John Root,  
Interim Director, CCNI.  
U of S.

Dear Dr. John Root,

Re: Canadian Centre for Nuclear Innovation (CCNI)

This letter is to express our support to the proposed CCNI.

The department of Physics and Engineering Physics has a long-standing tradition of excellence in nuclear science and technologies. It began in 1931, when the then Head of Physics Prof. E. L. Harrington established a radon plant in the department. The betatron was set up in 1948 which resulted, among other things, the very first Ph.D. at the U of S. Professor Harold Johns' pioneering work on 60-Co therapy is well known. The on-campus nuclear science and technology research reached its pinnacle and lasted for nearly 30 years with the creation of Saskatchewan Accelerator Laboratory (SAL). The SAL was the home of a 300 MeV electron linear accelerator, which serves as the injector for the Canadian Light Source, another innovative project of the department. Also, the design and commissioning of the CLS was done by the physicists and engineers mostly trained and employed by the university.

Nuclear physics activity has been on decline since 1990s as the faculty complement was reduced from seven to the current two members. We maintained our research in nuclear science and technologies with our collaborations at international facilities in USA, Europe and Japan. We have been using those accelerators (linear accelerators, cyclotrons, synchrotrons, light sources) as training grounds for our students as well as nurturing internationalization among the youth.

During the last four years, we have been reorganizing the undergraduate programs to emphasize nuclear science and technologies in view of their importance for energy and health industry. On our initiative, the University joined the University Network of Excellence in Nuclear Engineering (<http://www.unene.ca>). We established links with

Saskatchewan Research Council's SLOWPOKE reactor for students' projects. Students are responding positively. We are working with colleagues in the College of Medicine, Department of Medical Imaging and Cancer Clinic to bring in an accredited Medical Physics Program on the campus in order to reclaim the U of S position in this area of great demand.

We have been working on developing nuclear science and technology training for professionals and interested individuals in the Society as part of our outreach program.

As we endeavor on these projects to contribute to the training of highly qualified personnel in nuclear and allied science and technologies to rebuild the research base, we welcome the opportunity to work with the Canadian Centre for Nuclear Innovation.

Sincerely,



Dr. Chary Rangacharyulu  
Professor and Head  
Physics and Engineering Physics



September 12, 2011

Dr. John Root  
Interim Director  
Canadian Centre for Nuclear Innovation  
University of Saskatchewan

Dear Dr. Root:

RE: Support for the Canadian Centre for Nuclear Innovation

It is with great pleasure that I write this letter of support for the Canadian Centre for Nuclear Innovation (CCNI). The CCNI has four laudable impact areas: development of nuclear medicine and knowledge, creation of new materials, improving safety of nuclear engineering systems and advancing knowledge of the balance between risks and benefits of nuclear activities in society and the environment. We anticipate that faculty in the College of Agriculture and Bioresources will be primarily involved with the CCNI in research projects involving isotopes produced by the cyclotron.

The current cyclotron plans and budgets are focused on producing  $^{18}\text{F}$ - FDG (fludeoxyglucose) for human clinical PET imaging. Faculty within the College of Agriculture and Bioresources will be interested in the longer term plans of the facility to produce  $^{11}\text{C}$ ,  $^{15}\text{O}$  and  $^{13}\text{N}$ . These short lived tracers will allow for high resolution imaging of plants, animals and soil microbes and dynamic, real-time measurements with the ultimate goal of this work being genetic improvement or environmental adaptation. Basic research in these areas fits with the College's domains of: 1) sustainable production systems, 2) environment, ecology and community and 3) safe food supply and bioproducts. Access to CCNI infrastructure should lead to increased research granting and post-graduate educational experiences for faculty in each of our four applied science departments.

The University of Saskatchewan is uniquely positioned in the world to study biological processes at the macro and molecular levels. With the co-location of the Canadian Light Source, the Structural Sciences Centre, Intervac, eight lifesciences colleges and departments, and two federal agricultural science laboratories, the faculty at the University of Saskatchewan have a tremendous opportunity to access facilities and interact with multiple disciplines. College of Agriculture and Bioresource faculty are global leaders in areas of soil chemistry, feed science and imaging due to the specialized infrastructure present at the Canadian Light Source. With access to the CCNI we anticipate developing an additional world-class presence. The College of Agriculture and Bioresources already is equipped with specialized infrastructure that will support the activities of the CCNI. The Phytotron Facility within the College contains environmental chambers specially designed and vented for the use of radioisotopes. In addition, the Stable Isotope lab in the Soil Science Department can be utilized for complementary measurements of  $^{13}\text{C}$  and  $^{15}\text{N}$ .

We fully support your efforts Dr. Root, and look forward to developments with the CCNI.

Sincerely

Mary M. Buhr, PhD  
Dean and Professor

MMB/mal

# A Canadian Centre for Nuclear Innovation Business Framework



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Rob Norris  
Minister of Advanced Education, Employment and Immigration  
Province of Saskatchewan

Date

---

Peter MacKinnon  
President, University of Saskatchewan

Date

---

Karen Chad  
Vice President Research, University of Saskatchewan

Date

---

John Root  
Interim Director, Canadian Centre for Nuclear Innovation

Date



## Acknowledgements

The help of many people in developing this draft document is gratefully acknowledged.<sup>1</sup>

### Representing the founding stakeholders:

Karen Chad	University of Saskatchewan, VP Research
Chris Dekker	Enterprise Saskatchewan, Chief Executive Officer
Richard Florizone	University of Saskatchewan, VP Finance and Resources
Iain Harry	Crown Investment Corp. of Saskatchewan, VP Crown Sector Initiatives

### University of Saskatchewan:

James Cook	Corporate Administration
Tom Porter	Office VP Research
Tom Roberts	Industry Liaison Office
Michael Robin	Office VP Research (Communications)
Glen Schuler	Industry Liaison Office
Lorna Shaw-Lennox	Industry Liaison Office
Jessica Smith	Industry Liaison Office
Julian Vasilescu	Industry Liaison Office
Kathryn Warden	Office VP Research (Communications)
Judy Yungwirth	Corporate Administration

### National Research Council of Canada:

John Root	Canadian Neutron Beam Centre
Ian Swainson	Canadian Neutron Beam Centre

### Deloitte:

Graham Pearson	Partner Consulting
Cameron Percy	Financial Advisory

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<sup>1</sup> Photographs on front cover, courtesy of:

TRIUMF (University of British Columbia)	- nuclear medicine, imaging with radio-isotopes
University of Saskatchewan	- developing highly qualified people in nuclear technology and policy
Areva Resources Canada Inc.	- generating knowledge-intensive jobs in the nuclear sector, and
Cameco Corp.	- developing technologies, such as detectors for workplace safety



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# The Canadian Centre for Nuclear Innovation

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## Executive Summary

This document describes the overall business framework for the Canadian Centre for Nuclear Innovation (CCNI), whose purpose is to place Saskatchewan among global leaders in nuclear research, development and training through investment in partnerships with academia and industry, for maximum societal and economic benefit.

The founding stakeholders of the CCNI are the Province of Saskatchewan and the University of Saskatchewan. Their intention is to stimulate new research, development, training and open discourse so that citizens of Saskatchewan can participate in the advancement of nuclear science and technology, affecting areas such as nuclear medicine, energy, the environment and social well-being. The hallmark of CCNI activities will be investment in partnerships for academic programming, practical R&D projects and stewardship of selected nuclear facilities that must be maintained in a state of readiness for access by students and researchers from academia and industry.

Establishing the CCNI will occur in three phases:

1. “Start-up” is the first 18 months after incorporation, when the frameworks for governance, management and operations will be completed, a Board of Directors will be established and base-line funding released. Engagement of funding Partners will commence and a first call will be issued for proposals of projects or programs aligned with the CCNI purpose. A long-term Executive Director and key staff members will be recruited. (Oct 2011 – Mar 2013)
2. “Development” will continue to expand partnerships to lever CCNI resources as it invests in its key activities. During this phase, the operating cycle will be fully established, including calls for proposals, open-forum reporting, and resource allocation based on the performance of activity champions. A Cyclotron will be operating as a business unit of the CCNI. (Apr 2013 – Mar 2019)
3. “Sustainable Operation” assumes that the initial investment of base-line funding has yielded a sustainable engagement of Partners and generated value that is recognized, leading in turn to continued investment by all parties for the ongoing operation of the CCNI. (Apr 2019 Onwards )

Base-line funding for the CCNI, \$30M over seven years, was announced by the Province of Saskatchewan on March 2, 2011. On March 4, 2011 the Province further announced \$14M of capital funding for a Cyclotron and associated infrastructure as well as \$3M of funding for operation, maintenance and Cyclotron-centered projects in research and training. The Cyclotron, once purchased and installed by the University of Saskatchewan (estimated in 2013), will become a business unit of the CCNI for operation as a resource for research and training, as well as a source for selected clinical isotopes.

In this document, financial projections will focus on Phase 1, “Start-up”. By the end of Phase 2 “Development”, the intention is to have established partnerships that expand CCNI activities to a level of approximately two to three times the levels established during “Start-up”. The demonstrated value arising from these partnerships is envisioned to justify continued operation of the CCNI into the future.

# The Canadian Centre for Nuclear Innovation

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## Overview

### Statement of Purpose

*The purpose of the Canadian Centre for Nuclear Innovation (CCNI) is to place Saskatchewan among global leaders in nuclear research, development and training through investment in partnerships with academia and industry, for maximum societal and economic benefit.*

### Stakeholders

The founding stakeholders of the CCNI are the Province of Saskatchewan and the University of Saskatchewan. The initial base-line funding for the CCNI was committed by the Province in March 2011,<sup>2</sup> and is intended to support operation over the first seven years. The CCNI is governed as a subsidiary of the University of Saskatchewan. The expectations of the founding stakeholders are recorded in Appendix 1.

The CCNI focuses on engaging Partners with other research institutions and industries from across Canada and around the world, leveraging these additional Partner resources for sustainable operation beyond the initial seven-year commitment. It is conceivable that some Partners may emerge as new, major stakeholders, bringing some influence on the direction of the CCNI over the long term.

### Impact Areas

The CCNI's Partners, Board of Directors and advisory committees constitute a network of diverse expertise able to generate and receive knowledge in the nuclear domain, as well as to apply nuclear facilities and methods to make positive impacts in four areas:

1. Advancing nuclear medicine and knowledge;
2. Developing better materials for widespread applications, including energy, health, environment, manufacturing, transportation, and communication;
3. Improving safety and other engineering of nuclear energy systems; and
4. Understanding how to reap the benefits and manage the risks of nuclear technology for society and the environment.

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<sup>2</sup> "Wall launches new centre for research in nuclear medicine and materials science at U of S" , Media release by the Government of Saskatchewan (Mar 2, 2011).

## Key Activities

The CCNI engages in three key Activities, each qualitatively distinct, but functioning in synergy to deliver maximum impact. They are:

1. Programs – to establish multi-disciplinary clusters of academic activity in Saskatchewan, within the nuclear domain, by supporting the appointment of academic leaders and faculty, as well as supporting the inclusion of nuclear components in existing courses or programs, to provide students with opportunities for learning or accreditation in fields of nuclear science, technology or policy;



2. Projects – to support research and development projects that engage partners from academia, industry and other research institutions, with target outcomes including ongoing and new business activity within the province of Saskatchewan, in turn creating a venue for young Canadians to pursue careers at the leading edge of nuclear technology; and
3. Facilities – to provide good stewardship of selected nuclear infrastructure, ensuring it is maintained in a competitive state of readiness for access in support of research, development and training, with a new Cyclotron as an initial example.

The CCNI itself is not envisioned to perform any in-house research, development or academic training. The impacts of the CCNI are delivered by champions and Partners whose proposals for Programs, Projects or access to CCNI Facilities have been reviewed by Activity-specific advisory committees, and approved by the CCNI executive, subject to the availability of resources.

Demonstrating value to the people of Saskatchewan is anticipated to arise from the CCNI's overall management framework, which is designed to foster a public capacity to engage in evidence-based discussions about nuclear issues. Open-forum reporting and proactive communication is intended to build a sense of confidence in Saskatchewan's role in the nuclear domain, committed to public service, and connected to Saskatchewan's priorities in health, science, safety and community (e.g., engagement of Aboriginal and Northern communities).

## Timeframe

Establishing the CCNI will occur in three phases:

1. Start-up: Beginning with a commitment of base-line funding from the Province, the CCNI will hire an initial group of staff. The CCNI will establish a Board of Directors, and three advisory committees, one for each of the CCNI's Activities: Programs, Projects, and Facilities. The frameworks for governance, management and operations will be defined and base-line funding released. Outreach

will focus on potential Partners, and the public. A first call will be issued for proposals to fund projects, programs or facilities, to test and refine the operational framework while building early participation in CCNI Activities. The CCNI Board of Directors will recruit a long-term Executive Director to lead the CCNI through the following phases. (October 2011 – March 2013)

2. Development: Partnerships will be developed further to lever CCNI resources and maximize the total investment in CCNI Activities. The CCNI will fill its ongoing staff complement. A cycle will be established: calls for proposals, open-forum reporting, and resource allocation based on the performance of Activity champions. Impact-focused reporting will accumulate a record of value for stakeholders and Partners. (April 2013 – March 2019)
3. Sustainable Operation: Leveraging the base-line funding from the Province through the aforementioned Partner funding in joint Partner activities, the CCNI will be recognized as an effective channel to reap both scientific and economic value from continued investment by all parties. The CCNI business will evolve in response to the emerging presence of Saskatchewan among global leaders in nuclear research, development and training. The CCNI will serve as a channel between decision-makers and reliable experts to inform policy or respond to opportunities. The CCNI will be recognized as a convener of evidence-based conversations about nuclear science, technology and society. (April 2019 - )

## Location

The initial offices of the CCNI are located at 121 Research Drive (Innovation Place – University of Saskatchewan), Suite 546 with adjoining conference rooms. Facilities associated with the CCNI, including a Cyclotron and other selected nuclear infrastructure, yet to be determined, are all located at the University of Saskatchewan, in Saskatoon.



## Governance Framework

The CCNI is an incorporated subsidiary of the University of Saskatchewan.

The governance of the CCNI follows principles and details outlined in Appendix 2, constituting a system for the exercise of authority in an organization, to ensure that its purpose is achieved. The CCNI is committed to the principles of accountability and transparency in its actions.

## Charter and Legal Structure

### Legislation

CCNI is incorporated under federal legislation, the *Canada Not-for-Profit Corporations Act*. This choice addresses the CCNI purpose to place Saskatchewan among national and global leaders in nuclear research, development and training, symbolically establishing from the outset that the CCNI reaches beyond provincial boundaries. The CCNI is solely owned by the University of Saskatchewan. Bylaws are set by the CCNI Board of Directors and approved by the University of Saskatchewan. A general summary of Articles of Incorporation and Bylaws is included in Appendix 2.

### Owner Responsibilities

Because the University of Saskatchewan is the sole owner of the CCNI, the university Board of Governors, as ultimate stewards of the university, will fulfill the role of the Owner.

In order for the University of Saskatchewan Board of Governors to exercise its stewardship responsibilities as Owner, it has approved the following format for annual reporting from subsidiary Centres such as the CCNI:

- organization overview – description of the corporation including its mission, vision and values as well as size and scope of operations;
- governance and management structure;
- report on goals, objectives and performance measures;
- material risk factors – description of foreseeable material risk factors to assess how effective the corporation is in identifying potential risks to achieving future performance, and how well these risks are managed;
- material issues with employees and other stakeholders; and
- environmental management and social responsibility.

An annual meeting will be held within four months of CCNI's year end. Normally the Chair of the CCNI Board and the Executive Director will present the annual report to the Board of Governors.

## Board of Directors Responsibilities

The CCNI Board of Directors is accountable to the Owner for the conduct of the corporation's affairs during the year. A strong, effective board is expected to play a key role in the ongoing success of the CCNI. The Board members are the stewards of the CCNI's assets and responsible for the strategic direction of the organization. They are not expected to micro-manage; their role is in *oversight, insight and foresight*<sup>3</sup>.

Each Board member is responsible to exercise the following in the performance of their duties<sup>4</sup>:

- Duty of due diligence – be informed of the CCNI's charter and legal structure, as well as policies and codes of conduct as they relate to individual Directors. Keep up to date on the CCNI's activities and the environment in which it operates, attend board meetings regularly, serve on committees of the board and contribute to board decision-making.
- Duty of loyalty – act honestly and in good faith, with their primary responsibility to CCNI not to the constituency which they represent. They should maintain solidarity with their fellow directors in support of board decisions. They need to carefully consider any apparent or real personal conflict of interest and take appropriate action.
- Duty of care – exercise care, diligence and skill in making decisions, offer personal perspectives and opinions, know and understand the approved governance structure.

Specific Board responsibilities are listed in Appendix 2.

## Board Size

Initially, there are eight members on the CCNI Board of Directors, chosen for coverage of key competencies and consist of the following:

- 2 members selected by the University of Saskatchewan
- 2 members selected by the government of Saskatchewan
- 4 other members of international stature from public and private sectors

## Board Competencies

The CCNI Board of Directors plays a key role in shaping the CCNI strategic direction by selecting the Executive Director and participating in the strategic planning process. To be effective, the Board must include Directors who have the appropriate strategic skills, knowledge and experience to identify, validate and monitor the CCNI's business in light of the CCNI's purpose, key activities and intended impacts. A list of relevant competencies is presented in Appendix 2.

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<sup>3</sup> Gill, Governing for Results a Director's Guide to Good Governance. Trafford, 2005

<sup>4</sup> *ibid*

## Meeting Frequency

The Board will establish its own meeting schedule, as required to carry out its responsibilities. Initially it is anticipated that they will meet at least four times a year.

## Board Chair

A strong and competent Chair is an important factor in board effectiveness. The Chair must have the time and ability to lead the board and act as a liaison with the Executive Director and senior management of the University as Owner.

The Board Chair is selected by a process that involves the entire Board, to be developed by the Governance and Nominating Committee after the corporation is established.

## Board Committees

Board committees handle detailed aspects of governance and report their recommendations and decisions to the Board. Standing committees deal with issues that require more time than is usually available at board meetings, and members may need to have special knowledge or expertise. The following standing committees are recommended for CCNI:<sup>5</sup>

- Science and Technology Performance Review – responsible to assess impacts of CCNI activities in science, technology and society, considering the emerging environment, and draft recommendations to the Board for reallocation of budgets among three key activities.
- Governance and Nominating – responsible for developing the corporation’s approach to governance issues. This group will also set criteria for board membership, develop a recruitment process, identify and recruit candidates to serve on the board of directors, and evaluate the performance of the Chair and the Board. It will also have responsibility for developing a process for appointing the Chair that involves the entire Board.
- Compensation/Human Resources – responsible for making recommendations to the board on the hiring, firing, evaluation and remuneration of the Executive Director, and for overseeing the succession plan and major human resource policies.
- Audit – responsible to review financial statements and internal controls and recommend the appointment of the external auditors. May be given the responsibility for risk management and fraud prevention.

Ad-hoc Advisory committees may be struck by the Board and could include external resources, as may be required to address special situations.

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<sup>5</sup> Lindsay, 20 Questions Directors Should Ask about Building a Board. Canadian Institute of Chartered Accountants, 2005



The Board establishes the terms of reference for Board committees, including criteria for selecting committee members, required experience and skills, duration of terms, etc.

## Executive Director

The Executive Director is an influential leader and chief executive officer of the CCNI. He or she is responsible to the Board of Directors for the general supervision of the CCNI staff and the effective execution of the CCNI business. The Executive Director of the CCNI is expected to be an individual who has earned respect and international recognition within the nuclear industry, academia and the public sector. He or she brings a world-class career record of contributions to one or more of the CCNI's key impact areas. Specific responsibilities include<sup>6</sup>:

- providing scientific, technological and societal insight in direction of the CCNI's key activities
- representing the corporation positively to the community and key stakeholders.
- managing the corporation's financial and human resources in pursuit of its objectives;
- recruiting, developing and managing staff performance following best practices;
- managing and mitigating risks;
- managing revenues and expenditures within the parameters of the approved budget;
- supporting the board in the development of a long-term strategic plan, annual reports, operating plans and budgets; and
- supporting the board in carrying out its governance functions and responsibilities;

## Other Stakeholders and Partners

Although the Board of Directors is ultimately responsible to the founding stakeholders, and reports to the University of Saskatchewan as Owner, it is also accountable to Partners, some of whom may emerge as major funders or new stakeholders.

Partners will be engaged through agreements with the CCNI (contracts, MOUs, etc), with specific terms and conditions. Conditions may range from broad, general goals to specific activities or results which must be accomplished to qualify for the funding. The Executive Director will represent the CCNI in executing agreements that are aligned with the established business framework of the CCNI; however, if a major funder's conditions imply a shift in the purpose of the CCNI, or address impact areas beyond the scope of the CCNI, such agreements must be brought to the Board of Directors for consideration.

On the invitation of the Board of Directors, a major funder or stakeholder may suggest nominees for membership on the Board; however the University of Saskatchewan, as owner, retains the sole responsibility and right to appoint a Board member.

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<sup>6</sup> Gill, Governing for Results A Director's Guide to Good Governance.Trafford, 2005

## Academic and Research Mission

The CCNI is a Type 'C' Centre within the structure of the University of Saskatchewan. Centres are intended to strengthen, coordinate or facilitate scholarly purposes or activities not readily undertaken within the University's departmental and unit structures, and are intended to offer new areas of activity consistent with the University's strategic direction and priorities. The University Board of Governors and Council have approved a policy on Centres, which outlines the principles for the creation, monitoring and review of centres.

Type C centres are incorporated and legally distinct from the University, and have academic/research implications for the University. Establishing a centre requires the authorization of the Vice-Presidents as well as Council approval with respect to the academic and research aspects before being recommended to the Board of Governors. As a centre, the CCNI reports annually to the Vice-President (Research) of the University on its academic and research activities.



## Management Framework<sup>7</sup>

### Overall Approach - Building a Community of Participants

On the surface, the activities of the CCNI are expected to deliver academic and research impacts as found in many other funding frameworks. However, a fundamental goal for all of these activities is to achieve a major social impact – fostering a public capability to engage in evidence-based discussions about nuclear issues. Open communication and transparent decision-making are expected to build confidence that our community has the knowledge and know-how to reap benefits from nuclear sciences while mitigating any associated risks. The CCNI aims to build a community of participants who assume voluntary responsibility (accountability) for the advancement of the collective purpose of the CCNI.<sup>8</sup> Building on an influential form of leadership, communications and outreach, the CCNI encourages champions to come forward with a team of partners and commit to a scope of work for the overall advancement of the CCNI's purpose. The CCNI provides the framework for the work of these champions to be discussed among their peers and in the broader public community. Champions participate in reporting and explaining the positive impacts of nuclear research and technology, through modes that are publicly accessible for both messaging and dialogue, such as web-based or live-forum discussions. The CCNI convenes the call for proposals, the meetings of potential Partners, the expert review committees and regular events for peer reporting of status and outcomes. The continuous cycle of impact-aligned proposals, review against purpose-defined criteria, and open, impact-focused reporting is intended to foster a culture of conversation and appreciation of contributions by individuals, through which Saskatchewan will reap societal benefits and place itself amongst the global leaders in nuclear innovation.

### Staff and Key Responsibilities

During Phase 2, "Development", the CCNI office staff will grow to a complement of seven members, who function as a cohesive team with synergistically overlapping responsibilities and a high commitment to teamwork and communication. The full complement of office staff is described below. A smaller team will implement the management framework until the CCNI's Activity level achieves a significant level of Partner leveraging, e.g. exceeding a total annual expenditure of \$6M per year, combining CCNI and Partner funding.

With the full complement of office staff, the Executive Director is the public face of the CCNI, leading the Centre to deliver impacts in science, technology and society, and ultimately accountable for the performance of the business and staff. A Facilities Director (FD) and a Business Director (BD) hold the authority to act on behalf of the CCNI with external parties, fostering engagement of Partners with CCNI activities, negotiating terms of agreements, and releasing transactions that have been initiated by the Executive Director. The other office staff members provide further support to the business of engaging external Partners, fostering evidence-based conversations about nuclear technologies and society, and ensuring high levels of efficiency, effectiveness and diligence.

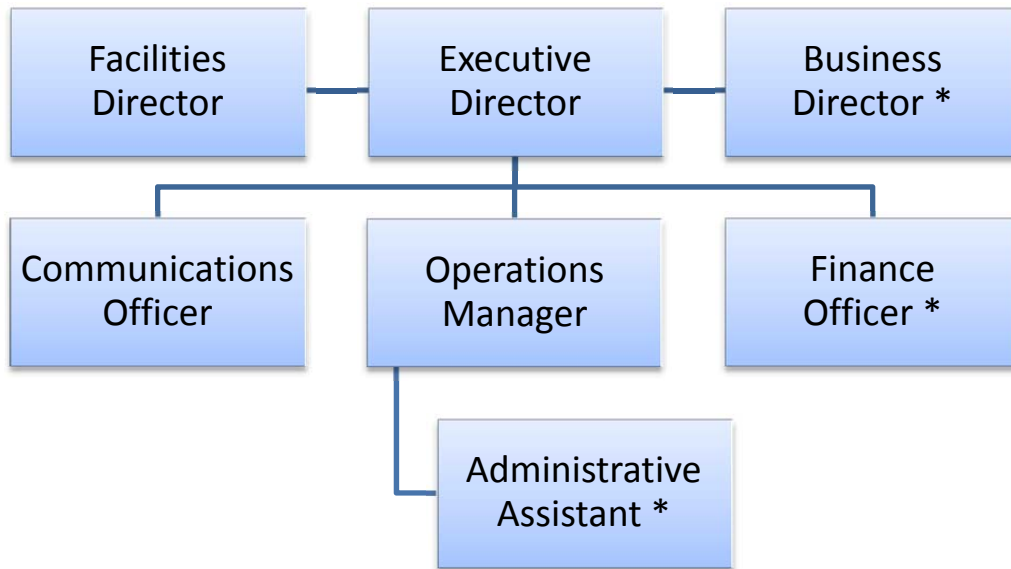
In addition to office staff, the CCNI will support staff of selected facilities, such as described in a later section about the Cyclotron as an example.

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<sup>7</sup> To be confirmed by the Board of Directors

<sup>8</sup> e.g. Peter Block, "Community: the Structure of Belonging", Berrett-Koehler Publishers, Inc. (2008)

The reporting structure of the full CCNI staff in Phase 2 “Development” is shown here.



\* Note, during Phase 1:

- the responsibilities of the Business Director will be carried by the Executive Director;
- the responsibilities of the Administrative Assistant will be carried by the Operations Manager; and
- the responsibilities of the Finance Officer will be out-sourced (less than 0.3 FTE).

## Executive Director

The Executive Director represents the CCNI to the founding stakeholders and the public, is accountable to the CCNI Board of Directors (BOD), is responsible for performance of the CCNI staff and supports the outreach of the FD and BD, as appropriate. The responsibilities of the Executive Director were listed above, in the section on Governance.

## Operations Manager

The Operations Manager (OM) ensures that the CCNI cycle of proposals, evaluation and reporting proceeds effectively and efficiently. The OM secures advice or support for CCNI activities from service providers in the University of Saskatchewan or externally (HR, Legal, Administrative Services, Property Management, IT, etc.). The OM is accountable to the Executive Director and supervises an Administrative Assistant.

### Responsibilities:

- Manages the work flow for receipt of proposals, review by Advisory committees, and reports to the CCNI, Advisory Committees and peers.
- Maintains a database to monitor workflow, and generate performance statistics for Annual Reports.
- Serves as CCNI point of contact for users, clients, Partners or stakeholders who require specific financial or activity reports for their accountability to third parties (e.g. Tri-Council agencies)
- Holds authority to consult and secure services on behalf of the CCNI, initiate business transactions of an operational nature and release transactions that were initiated by the Executive Director.

## Facilities Director

The Facilities Director (FD) represents the CCNI to the staff of nuclear facilities that comprise distinct business units of the CCNI, as well as to the users of those facilities. The FD is accountable to the Executive Director, and is responsible to ensure that the CCNI facility business units are maintained in a state of readiness for user access, as well as to foster high-capacity access to those facilities.

### Responsibilities:

- Initiates outreach to raise awareness in knowledge communities about CCNI nuclear facilities, how to access them, and what impacts have been achieved in research, development and training through their access.
- Oversees the performance of the facilities with respect to user access, operating effectiveness, impacts on nuclear research, development and training, and financial sustainability.
- Ensures responsible stewardship of the facilities, considering regulatory compliance, safe and sustainable working conditions for staff and users, and orderly maintenance.
- Serves as Chair of the Facility Advisory Committee.
- Convenes discussions involving the Facility Advisory Committee, facility staff and Partners who are proposing facility acquisitions, upgrades or major maintenance projects, encouraging alignment of Partner commitments with the purpose and key impacts of the CCNI, and verifying that proposals are ready for review by the CCNI Project Advisory Committee.
- Provides interpretation of policies and priorities, with due regard for the CCNI purpose if special intervention is warranted during evaluation of proposals for access to CCNI facilities.
- Supervises CCNI facility staff through mutually agreed commitments, respecting the values of the University of Saskatchewan.
- Holds authority to negotiate terms with Partners for sustainable operation of the CCNI facilities, and releases business transactions that were initiated by the Executive Director or Operations Manager.

## Business Director

The Business Director (BD) represents the CCNI to existing and potential Partners in research, development and training, consistent with the CCNI purpose. The BD is accountable to the Executive Director, and is responsible for promoting relationships across academia, industry and community, to strengthen a sophisticated network of expertise participating in nuclear innovation in Saskatchewan.

### Responsibilities:

- Initiates outreach to raise awareness in the public and knowledge communities about the CCNI purpose, impacts of CCNI activities, and to facilitate broad, evidence-based conversations about nuclear technology and society.
- Convenes discussions among potential Partners for research, development or training proposals, encouraging alignment of Partner commitments with the purpose and key impacts of the CCNI, and verifying that proposals are ready for review by the relevant Advisory Committee.
- Oversees the cycle of calling for proposals, review, ranking and implementation ending with impact-focused reporting to peers in an open forum.
- Serves as Chair of the Program Advisory Committee and the Project Advisory Committee.
- Maintains a watch and advises Partners of opportunities to leverage the resources they can bring to proposals for CCNI support (national and international funding agencies, industries, other research organizations, etc.).

- Holds authority to negotiate the scope of partnerships, and releases business transactions that were initiated by the Executive Director or Operations Manager.

### **Communications Officer**

The Communications Officer (CO) manages outreach initiatives of the CCNI, both external and internal communications, and advises the CCNI staff about the communications environment. The CO is accountable to the Executive Director, and expected to coordinate efforts with communications resources of the University of Saskatchewan to maximize the presence of the CCNI, cost-effectively.

#### Responsibilities:

- Coordinates and facilitates all internal and external communications.
- Holds stewardship of branding and key messages.
- Develops web-based tools:
  - public information about nuclear technology, society and CCNI activities;
  - portal for potential proponents, or facility users;
  - archive of CCNI reports and governing documents; and
  - for proposal submission, review, reporting and flow of business.
- Liaises with communications offices of founding stakeholders.
- Manages the production of Annual Activity Reports, for advisory committees and Partners.
- Manages events – conferences, open forums, workshops for facility users.
- Develops and manages communication and marketing strategies for the CCNI.
- Scans media and public records to advise CCNI about the emerging political and policy environment.

### **Financial Officer**

The Financial Officer (FO) manages financial operations, forecasting and reporting for the CCNI and any distinct business units. The FO is accountable to the Executive Director, and expected to coordinate work within the financial framework of the University of Saskatchewan to maintain the confidence of the founding stakeholders from a fiscal perspective. The FO is expected to be accredited with a recognized accounting designation.

#### Responsibilities:

- Provides advice and leadership in financial planning for the CCNI and any distinct business units.
- Reviews the financial aspects of proposals for CCNI investment, and provides input to Advisory Committees, as required.
- Establishes and manages CCNI financial operations and internal controls consistent with the University of Saskatchewan accounting system and practices, facilitating the business of the CCNI.
- Prepares financial budgets, forecasts and reports for CCNI management.
- Oversees and reports on financial operations within CCNI distinct business units.
- Holds the authority to release transactions that were initiated by the Executive Director or Operations Manager.

### **Administrative Assistant**

The Administrative Assistant (AA) provides daily support to the CCNI staff, under the supervision of the Operations Manager. The AA serves as a preliminary point of contact for external inquiries.

## Facility Business Units

An important role of the CCNI is stewardship of selected pieces of equipment or infrastructure that must comply with nuclear regulations and need to be maintained in a state of readiness for access by students or other researchers to support research, development or training aligned with the CCNI purpose. The following examples of equipment or infrastructure could conceivably be attached to the CCNI as distinct business units or partnership activities, but only after the CCNI is a legal entity, and a Business Plan for each item has been established with a suitable model for governance, management and financial sustainability. Examples could include:

- A new cyclotron for research (e.g. isotopes for imaging applications in animals or plants, material testing, detectors, etc.) training and to generate some isotopes as a service to the health sector;
- A radiochemical laboratory;
- A linear electron accelerator, which arrived at the University of Saskatchewan as part of the federal government's investigation of alternative methods to secure Canada's supply of Mo-99 radioisotope for medical imaging;
- A small tokamak (STOR-M) that already exists and supports research and training in fusion; or
- A SLOWPOKE reactor, which is located on the U of S campus, and has been operated safely for many years by the Saskatchewan Research Council.

### Cyclotron as an Example

The Cyclotron needs to be addressed urgently following the establishment of the CCNI, as funding for capital and operations was already announced by the Province of Saskatchewan, through a partnership with the federal program Western Economic Diversification.<sup>9</sup> A capital project was initiated by the temporary owners, the University of Saskatchewan, to prepare a site to receive the Cyclotron itself, perhaps as early as the spring of 2013. It is the intention of both the government of Saskatchewan and the University of Saskatchewan to transfer ownership of the Cyclotron from the University of Saskatchewan to the CCNI as soon as possible.

The primary purpose of the Cyclotron is a resource for research, development and training. The Cyclotron can also generate some radioisotopes as a service to the health-care system. A business plan will be developed for the Cyclotron before it is established as a business unit of the CCNI.

The Cyclotron provides an illustration of the scope of the CCNI's stewardship of nuclear facilities. Key elements of the Cyclotron business are described here:

1. The Cyclotron capital project includes a bunker into which the Cyclotron will be placed, the installation and commissioning of the Cyclotron, and whatever modifications are required to an existing building on



<sup>9</sup> "PET-CT scan for Saskatchewan part of significant nuclear investment" – media release of the government of Saskatchewan, March 4, 2011.



the University of Saskatchewan campus to enable the Cyclotron, to, as one element of its operation, deliver radioactive isotopes, such as  $^{18}\text{F}$ , to an adjacent radiopharmacy. This radiopharmacy is a business unit owned by the University of Saskatchewan or some other organization apart from the CCNI, as the University may deem appropriate. The ultimate destination of the Cyclotron's product is a radiopharmaceutical, such as  $^{18}\text{F}$ -FDG, that can be administered to patients for clinical imaging in a positron-emitter tomography (PET) scanner. The activities of preparing a human- or animal-ready pharmaceutical must be carried out under highly regulated conditions, and these particular radioactive products, with short half-lives, need to be processed as efficiently as possible. Therefore, the Cyclotron that produces the raw material is best located adjacent to the radiopharmacy where the material is converted into the medical product and then administered promptly to patients. Similarly, it may be prudent to provide space for a non-pharmaceutical radiochemical laboratory adjacent to the Cyclotron that provides its raw material, to further prepare it in a form suitable for research or educational activities further down the line. The University-owned capital project takes the synergy of these co-locations into account. However, it is important to note that the CCNI is not expected to provide direction for the development of these aspects of the Cyclotron capital project.

2. With regard to longer-term ownership and responsibility for the infrastructure in this situation, the University will own the Cyclotron building and adjacent buildings. The CCNI will comply with any radiological protection or licensing requirements to which the University is subject by the Canadian Nuclear Safety Commission, through the University's Radiation Safety Office.
3. With regard to the overall business of supporting PET-scanning for the health sector, nothing beyond the Cyclotron's production of the original raw material ( $^{18}\text{F}$ ) and delivering it to a suitable radiopharmaceutical laboratory is deemed part of the CCNI's business. Delivery will be made on the basis of 'full cost recovery', by which is meant that if all the Cyclotron's time were fully occupied in delivering radioisotopes as a service to the health sector, or proprietary R&D for individual clients, there would be no incremental cost to the taxpayer arising from the Cyclotron. That is, all costs including salaries, benefits, overhead (100%), recapitalization, decommissioning, occupancy costs, maintenance and consumables required for operation would be covered by user fees. Conversely, PET-scanning for research and education would be considered eligible for support from the CCNI, on the basis of a successful proposal for project funding, led by a suitable champion.
4. The Province of Saskatchewan has allocated \$3M of baseline funding over the first three years, to support research and education with the Cyclotron, after it is installed and commissioned. These funds will be applied to ensure the facility is operated and maintained in a state of readiness for access by researchers and students whose projects will generate knowledge in the public domain. Also, these funds could support CCNI project proposals that are targeted to Cyclotron-based research, for example, application of novel radiochemical markers in animal diseases.
5. Access to Cyclotron time for research or education in the public domain, supported by CCNI project funds, is anticipated to be free of charge, granted on the basis of scientific merit, as confirmed by the Facility Advisory Committee. Access for proprietary research, or production of isotopes for business purposes will be granted on the basis of a contracted scope of work and charged for full cost recovery for that level of access. Access for public-domain research or education supported outside of the CCNI framework will be charged a lower user fee. Fees for



products or services are not expected to be a substantial basis for operation of the facility; but will be applied to augment the resources for good stewardship or to enable further activities in research and education.

6. Besides stewardship of the Cyclotron or support of Cyclotron-specific research and education, the CCNI can be approached for support of projects or development of academic programs in fields where radioisotopes are applied in human or animal health. These activities fall within the CCNI's targeted impact area of advancing nuclear medicine, and would be considered whether or not the Cyclotron is required to generate the raw material. Proposals must be brought forward by a clear champion external to the CCNI, as with any other project or program that the CCNI supports as a Key Activity.

## Advisory Committees

The allocation of resources from the CCNI is guided by three advisory committees, one for each of the CCNI's Key Activities. This structure addresses the fact that the purpose and content of each Activity are so distinctive that the associated advisory committee requires a special expertise and operating framework to provide appropriate guidance. The Terms of Reference for each advisory committee, as well as the process for proposal review and prioritization are elaborated in a separate document "CCNI – Operational Framework". Membership of advisory committees is expected to be drawn from many sectors: Saskatchewan post-secondary educational institutions (U of S, U of R, SIAST, SIIT), national and international research organizations, industries and government, so that proposals of all kinds can be assessed with relevant expertise.

### Program Advisory Committee

Members are experienced academics and educational managers, who are qualified to review proposals for programs, course-clusters, or individual courses at various levels (diploma, baccalaureate, graduate), as well as proposals for faculty appointments. In assessing the merit of proposals for CCNI support of academic programs, the Program Advisory Committee considers the impacts claimed by university proponents, such factors as institutional synergy, succession-planning considerations, demand by students, post-educational market and accreditation. It is important to note that the CCNI Program Advisory Committee does not approve courses or faculty positions – this responsibility rests with the University. However, the CCNI Program Advisory Committee does evaluate how well a proposal aligns with criteria addressing the purpose of the CCNI, be this through disciplines of engineering, sciences or humanities, so that a rationale for allocation of funding can be provided to the CCNI executive and Board of Directors. This committee, more than others, must engage with proponents of academic programs or staffing, to iterate and refine a proposal to achieve a broadly based understanding and commitment from the hosting academic unit to achieve the maximum impact over many years. Depending on availability of resources, new proposals may be invited on an annual basis. The Program Advisory Committee will hear a progress report from the champion of each funded initiative, in an open forum, annually, and provide an assessment of program impacts, with recommendations for continuation or termination to the Executive Director of the CCNI.

### Project Advisory Committee

Members are experienced R&D professionals and project managers, who are qualified to review proposals for initiatives that have a clear project leader, a timeframe from start to finish, and

measurable outcomes. Projects may be aimed at knowledge generation, technology advancement, facility development, or societal engagement in the nuclear domain. In assessing the merit of proposals for CCNI support, the Project Advisory Committee considers such factors as the engagement of provincial public and private partners, the quality of the project team, and how well the proposal addresses the key impacts and purpose of the CCNI. Calls for project proposals may be invited on a semi-annual basis. The Project Advisory Committee will hear progress reports from project leaders in an open forum, annually, and provide an assessment of project impacts, with recommendations for continuation or termination to the Executive Director of the CCNI.

### Facility Advisory Committee

Members are experienced researchers and facility managers, who are qualified to assess the feasibility and safety of proposals for user access to CCNI nuclear facilities, as well as the scientific or technological merit of those proposals with regard to CCNI's target impacts. Review of proposals for user access to the facilities will be conducted by relevant subsets of the advisory committee, via electronic communication administered by the CCNI, while scheduling of approved user access will be the responsibility of the facility management. While maintaining a liaison with the Program and Project Advisory Committees, the full Facility Advisory Committee will oversee the business of the each CCNI nuclear facility, providing practical advice to the facility management and recommendations to the Executive Director of the CCNI regarding ongoing investments or changes in partnerships. The Facility Advisory Committee will hear progress reports from facility staff in an open forum, annually, and provide an assessment of the impacts of user projects as well as the facility as a whole.

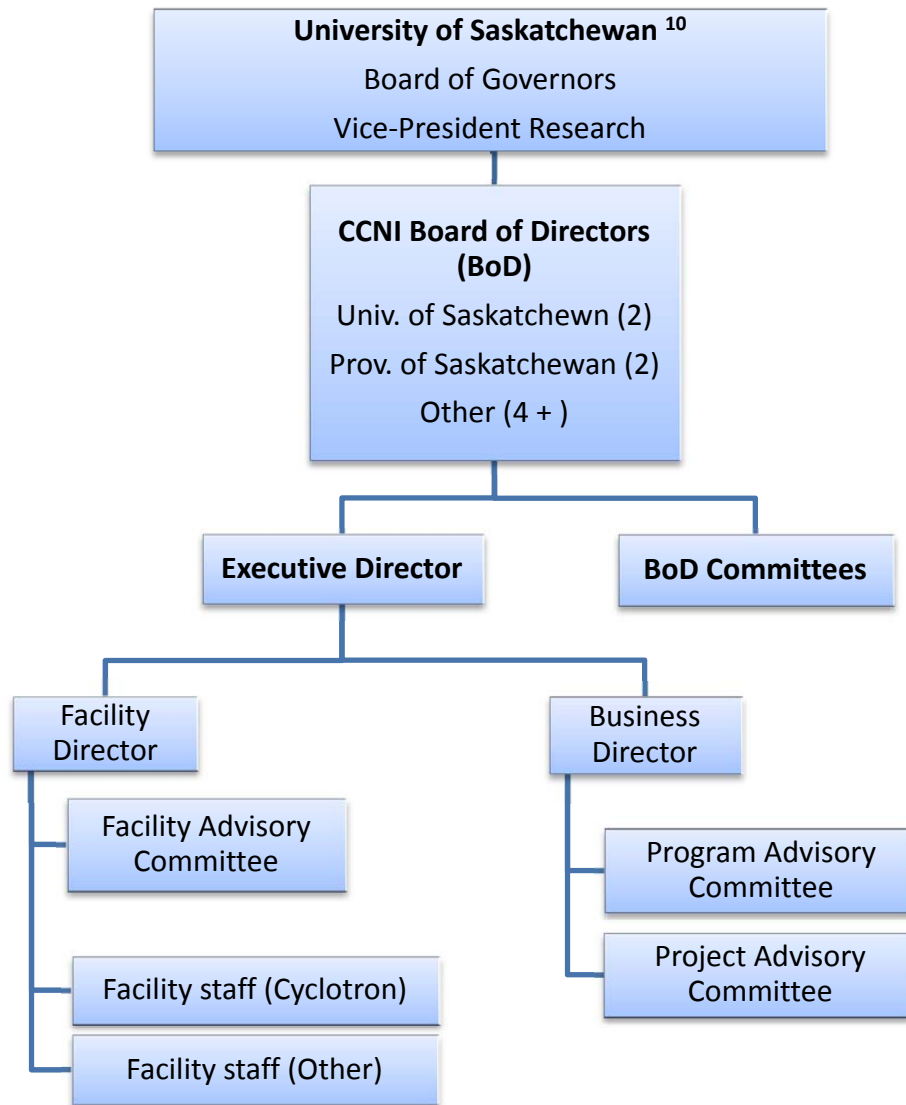
### Ad-hoc Advisory Committees

The members of the CCNI Activity-based advisory committees constitute a source of expertise in nuclear research, development and training, as well as a collection of points of contact with a wider network of highly qualified people in the nuclear domain, across Canada and internationally. One role of the CCNI is to serve as a single point of contact for the founding stakeholders when seeking expert technical input to inform policy in the nuclear domain, or for referral of proposals for various nuclear initiatives and partnerships. On occasion, it is necessary for the CCNI to assemble an Ad Hoc committee of advisors to respond to a request for advice related to any of the Key Impacts that the CCNI is intended to address. The membership of the three Activity-based advisory committees is the CCNI's primary source of expertise on these occasions, either directly or through referral by the committee members to external resources. The CCNI Executive Director, with oversight of the Board of Directors, establishes the terms of reference for an ad-hoc advisory committee, appropriate to address the issue at hand.



## Organizational Diagram

The preceding description of the frameworks for governance and management of the CCNI is summarized in the following diagram.<sup>10</sup> Board members include selections by the founding stakeholders, the University of Saskatchewan and the Province of Saskatchewan, plus four other individuals of international stature, covering the spectrum of competencies essential for strong direction of the CCNI in achieving its purpose and key impacts.



<sup>10</sup> The CCNI reports on corporate activities to the Board of Governors (as owner of the CCNI) and reports on research and academic activities to the Vice-President Research in accordance with the U of S policy on Centres.

## Financial Summary

The financial plan for the CCNI accounts for currently anticipated financial resources and projected expenditures during the Phase 1 – Start-up phase of operations as well as for transition periods. This financial summary highlights main features of financial operations and identifies key milestones. Projections are based upon assumptions about future events that cannot be predicted with accuracy; accordingly actual results may vary and variances could be material.

### Phase 1 – Start-Up

#### Milestone: Incorporation (October 2011)

The CCNI will begin formal activities in October 2011 with incorporation to coincide with a formal agreement to release the Government's \$30M contribution. The Government is providing \$2M over two years for start-up operations, beginning in October 2011 (\$1M per year in 1) plus \$4M per year for seven years, beginning in April 2012.

Table 1

<b>Phase 1 – Start-up, Financial Projection</b>		
	Pre-Operations June 2011 - March 2012	Full Operations April 2012 - March 2013
<b>Financial Sources</b>		
Government Annual Contribution	–	4,000,000
Government Start-up Contribution	1,000,000	1,000,000
Cyclotron R&D Development Grant		500,000
<b>Total Sources</b>	<b>\$1,000,000</b>	<b>\$5,500,000</b>
<b>Operational Expenditures</b>		
Academic Programs (initial call or expressions of interest)	75,000	350,000
Projects (initial call for R&D projects or capital)	325,000	4,000,000
Facilities (Cyclotron pre-operations)	–	300,000
<b>Office Expenditures</b>		
CCNI Office Staff	375,000	600,000
Office Costs (including space and committees)	125,000	150,000
Outreach and Engagement	100,000	100,000
<b>Total Expenditures</b>	<b>\$1,000,000</b>	<b>\$5,500,000</b>

Note that the financial record begins in June 2011, where CCNI funding takes over from pre-project contributions, approximately \$50K, from each of the founding stakeholders. Going forward, the University of Saskatchewan is expected to cover some in-kind costs of CCNI operation on the same basis as currently applied to other subsidiary centres of the university. Examples include services such as human resources, radiation protection and compliance with safety regulations, as well as the informal consultation of professional staff that will support many levels of the CCNI operation.

### **Milestone: Initial Call for Proposals (December 2011)**

The first significant CCNI activity will be the initial call for proposals. Starting and completing this first round indicates that the Operational Framework has been developed, and that the Advisory Committees are in place with the appropriate terms of reference. The first round of calls will serve as a prototyping exercise to test and refine the CCNI Operational Framework.

The first call for proposals will also serve to begin outreach and engagement with the nuclear community. A successful first round of proposals will demonstrate the significant opportunities for nuclear research, development and training in Saskatchewan.

The first call for proposals, together with outreach and engagement, will lead to the second call for proposals near the end of Phase 1, with a total budget exceeding \$4M. Cyclotron activities will appear at this time, for pre-operation activities and limited R&D program development. Ideally, the Executive Director will be established and lead the second call for proposals.

The successful second round of proposals represents a second milestone – the successful transition from Phase 1 to Phase 2.

### **Milestone: Recruiting Initial Staff Complement (March 2012)**

The interim Director and Board of Directors will oversee the recruitment of the Communications Officer, Operations Manager and Facilities Director before the end of March 2012.

The Board of Directors will recruit the long-term Executive Director, to be established within the second year of Phase 1. The Executive Director will lead the hiring process for a full-time Finance Officer and Business Director, as the activity level of the CCNI surpasses an acceptable threshold.

Filling the complement of ongoing staff will further indicate a transition from start-up to growth phases. This is anticipated to coincide with the timing of the beginning of Phase 2, but is dependent upon many factors including successful engagement of the nuclear community.

## Phase 2 – Development

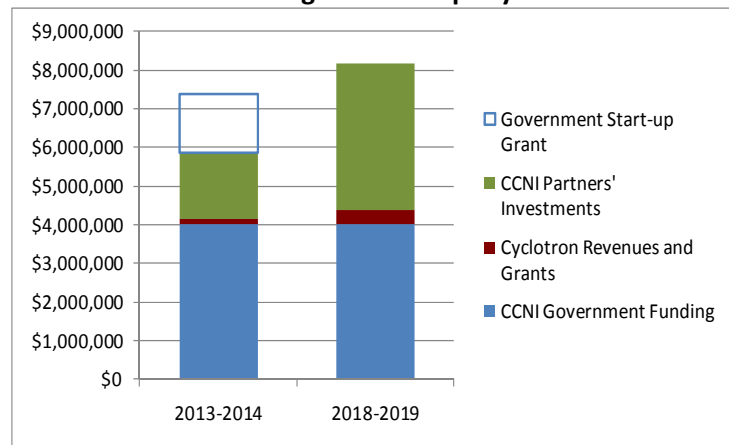
Saskatchewan’s nuclear network is projected to grow during Phase 2 of CCNI’s operations to become recognized in Canada and globally as an important centre for nuclear research, development and training. This goal is to be realized as CCNI uses the Government commitments to attract new Partners who will co-invest in CCNI activities. By the end of Phase 2, the CCNI target is for every \$1 of the Government’s annual contribution to be associated with between \$2 to \$3 of total annual expenditure on nuclear research, development or training.

Growth targets for CCNI resources and expenditures are represented in Chart 1 and 2. (Note - These projections are based upon assumptions about future events that cannot be predicted with accuracy; accordingly actual results may vary. The charts provide the comparison of resources and expenditures for fiscal years, 2013-2014 and 2018-2019. These years represent the first year of Phase 2 and the final year of the Government’s original Contribution Agreement respectively.

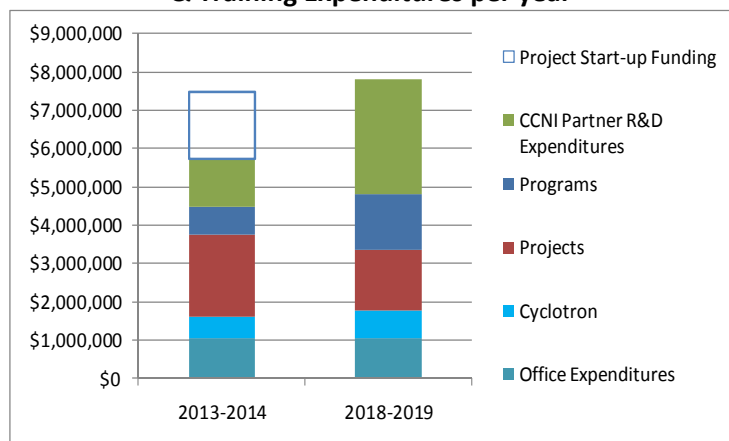
Chart 1 shows the targeted growth towards \$2 to \$1 leveraging of the Government’s annual contribution to the CCNI. The estimates are based on highly probable Partner contributions and well-established research trends. However if one additional nuclear engineering research initiative or a new medical isotope production opportunity were added, this would materially expand the projection.

Chart 2 shows the projected growth of Partner R&D expenditures and a shift of CCNI funding from projects to programs. These two transitions reflect a growing and stronger nuclear network. The value of greater Partner funding is self-evident, but growth of Programs such as medical physics or nuclear engineer which require time to develop indicates a shift from short-term developments to longer term strengthening of Saskatchewan’s competencies in the nuclear domain.

**Chart 1: Nuclear Research, Development & Training Resources per year**



**Chart 2: Nuclear Sector Research, Development & Training Expenditures per year**



### **Milestone: Transfer of Cyclotron Ownership to CCNI**

A key milestone during Phase 2 is the transfer of Cyclotron management from the University of Saskatchewan to the CCNI. The Cyclotron is targeted to be installed in the spring of 2013 with operations anticipated to begin in the fall of 2013. The dollar figures for Cyclotron revenue and expenditures appear small relative to other categories, although these figures represent modest growth.

Pending the outcome of the Cyclotron business plan, potential new research, development or training opportunities will become integrated into the CCNI financial plan. The Cyclotron opportunities together with other potential nuclear partnership opportunities such as nuclear engineering are under discussion. These are not currently part of the financial projections, but represent one of the fields where nuclear R&D may expand.

### **Phase 3 –Sustainable Operations**

Phase 3 - Sustainable Operations are projected to begin after April 2019, and follows the expected expiration of the first long-term contribution agreement that funded Phase 1 and Phase 2 of the CCNI. The financial sustainability for the CCNI in Phase 3 will be an outcome of the CCNI demonstrating long-term value of nuclear research to the people of Saskatchewan. CCNI baseline funding is expected to continue at approximately \$4M per year under a new contribution agreement that, effectively, affirms the value and impacts of CCNI activities in Saskatchewan. Due to the long term outlook of Phase 3, and the uncertainty of future events transpiring as projected, internal financial projections for Phase 3 have only been developed to a summary level and have not been included as part of this Framework.

### **Conclusion**

In conclusion, by Phase 3, the purpose of the CCNI and its intended impacts are expected to continue guiding the Centre into sustainable operation for the indefinite future. The options for projects and programs will be driven by the interests of champions and Partners who come forward to participate in placing Saskatchewan among global leaders of nuclear research, development and training. The balance among CCNI activities will undoubtedly evolve, under the leadership of a strong Board of Directors. Some of the CCNI's facility business units may be closed while new facilities may be added through the project proposal process, duly considered by the CCNI's advisory committees. All of these activities will help Saskatchewan to build and maintain a community of expertise that is capable to engage with the global nuclear establishment, to engage the broader community in evidence-based conversations about nuclear issues, and to inform policies for public investment in nuclear technologies for the benefit of society and the economy.



## Appendix 1: Expectations of the Founding Stakeholders<sup>11</sup>

### Province of Saskatchewan

The Province of Saskatchewan expects the Canadian Centre for Nuclear Innovation (CCNI) to foster investment in nuclear research, development and training in the nuclear sector, as one part of its innovation agenda. The province expects the CCNI to focus on value-added nuclear technologies, whereas uranium mining and refining are beyond its scope. Examples of activities within the scope of the centre include: education to qualify people locally for nuclear operations; research activities that involve public and private partners developing nuclear technologies as a basis for in-province businesses in the sector; as well as building or operating some nuclear infrastructure for education, research and development (e.g. Cyclotron, SLOWPOKE, new research reactor...). The province expects the CCNI to serve as a conduit into the University of Saskatchewan and other research institutions, for efficient access to knowledge about: nuclear engineering (includes safety) and related sciences; nuclear medicine and related sciences; nuclear methods (e.g. neutron beams) for materials research and development; as well as the impacts of nuclear technologies on the environment and society. For example, the province expects nuclear power to be considered in the range of energy options available for base-load generation capacity in the medium and long term after 2020, and that the CCNI will be able to serve as a source of expertise to inform decisions in this area. The province expects to refer third parties to the centre as an informed point of contact to receive ideas for innovation in nuclear technologies, and respond appropriately.

The success of the CCNI will be recognized by the establishment of new training programs and partnership agreements for research, development or training in the nuclear sector. The success of the CCNI will be evaluated by measured increases in community recognition of the benefits of nuclear technologies, and support for the nuclear industry. The success of the CCNI will be demonstrated by growth in nuclear industry activities in the province and in the number of nuclear experts in the province, who serve the Province as sources of credible advice and facilitate the commercialization of nuclear knowledge or know-how.

### The University of Saskatchewan

The University of Saskatchewan must demonstrate value to society through its stature as a recognized leader in research, education and community service, both nationally and internationally. The University of Saskatchewan expects the CCNI to build on the university's current and historic strengths in medical sciences, materials science, engineering, environmental science and public policy, thus to enlarge its footprint among Canadian universities with nuclear science and engineering programs. The University of Saskatchewan expects the CCNI to stimulate the quantity and quality of faculty and students, through challenges and opportunities in the domain of nuclear research, development and training, in four themes: (1) nuclear engineering and sciences; (2) materials science with nuclear methods (e.g. neutron scattering or neutron imaging); (3) health sciences with nuclear methods; and (4) the social and environmental sciences associated with nuclear technologies. The University of Saskatchewan expects the CCNI to value both applied and curiosity-driven research for innovation and development. The University of Saskatchewan expects the CCNI to leverage its impact through

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<sup>11</sup> These statements of expectation were developed by consensus of a Working Group with members representing the Province of Saskatchewan and the University of Saskatchewan.

partnerships with industry, other academic institutions, and government R&D organizations from across Canada and abroad.

The success of the CCNI will be evaluated through increased recognition of the University of Saskatchewan, by the public and government, as a credible knowledge resource for policy decisions, and as a trusted steward of nuclear research infrastructure for the public good. The success of the CCNI will also be demonstrated by growth in the quality and quantity of academic programs at the University of Saskatchewan in the nuclear domain, encompassing both technical and social aspects of nuclear research, development and training, along the four themes listed above.

## Values

As a subsidiary of the University of Saskatchewan, the CCNI respects the values of the University.<sup>12</sup> Specifically, the CCNI values:

- the pursuit of high ethical standards, to be expressed by
  - demonstrating integrity with the CCNI Purpose;
  - respecting commitments to partnerships that are aligned with that Purpose;
  - accepting responsibility for health, safety and sustainability of CCNI operations; and
  - assuming full accountability to our founding stakeholders for the orderly management of human and financial resources.
- the ideas, continuing interest and support of the people of Saskatchewan and Canada, to be expressed by
  - ensuring communication is honest, evidence-based, down-to-earth and transparent;
  - being accessible and responsive to our stakeholders, Partners and the public;
- the diversity of the University community, to be demonstrated by
  - welcoming contributions from across a spectrum of curiosity-driven to application-driven projects in research, development or training;
- and the expression of creativity, curiosity, innovation, critical thinking, and knowledge.

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<sup>12</sup> [http://www.University of Saskatchewan.ca/university\\_secretary/policies/contents/uofs\\_missionstat.php](http://www.University of Saskatchewan.ca/university_secretary/policies/contents/uofs_missionstat.php)

## Appendix 2: CCNI Governance Details

### Definition of Governance

Governance can be described as a system for the exercise of authority in an organization which will ensure its purpose is achieved. This includes the structures, responsibilities and processes for decision-making. The key components of governance include<sup>13</sup>:

1. Accountability – the ability of stakeholders to call decision-makers to account for their actions;
2. Transparency – timely access by key stakeholders to information regarding the decisions and management of an organization’s resources;
3. Predictability – ability to understand how and who makes decisions, and how the organization will be run; and
4. Participation – an understanding of how stakeholders will be involved in planning, decision making and evaluation of an organization.

### Responsibilities of Directors

The Board of Directors are responsible to make, amend or repeal bylaws to regulate the activities and affairs of the corporation and submit these bylaws to the Owner for approval. The bylaws are the fundamental guide for governance of the corporation. The Directors should also approve governance policies that include Code of Conduct and Conflict of Interest.

Specific responsibilities of the Board of Directors include the following:

- to safeguard the mission and plan for the future - assess and approve the strategic direction;
- to recruit, compensate and evaluate the Executive Director;
- to provide financial stewardship – approving annual budgets and monitoring fiscal performance;
- to manage risk;
- to ensure appropriate policies, processes and controls are in place to provide for the smooth, effective and efficient functioning of the organization;
- to ensure accountability to all stakeholders; and
- to represent the CCNI to the outside world.

### Board Size

Board meetings are the forum in which Directors do much of their important work of debating issues before giving their approval, direction and advice to the Executive Director.<sup>14</sup>

The effectiveness of boards depends on the ability of Directors to discuss issues knowledgeably and openly. A board should have enough members to meet its needs for committee membership and expertise, and provide a good diversity of views and experience. It should also be small enough to encourage lively, informed discussion and facilitate decision-making.<sup>15</sup>

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<sup>13</sup> Gill, Governing for Results a Director’s Guide to Good Governance. Trafford, 2005

<sup>14</sup> *ibid*

<sup>15</sup> Lindsay, 20 Questions Directors Should Ask about Building a Board. Canadian Institute of Chartered Accountants, 2005

Criteria for determining a board size include:

- the legal and regulatory requirements for a minimum board size;
- the complexity and geographical scope of the company's activities;
- the range of knowledge and experience required from board members;
- the difficulty of achieving a quorum; and
- the cost to operate the board.

An average of eight to ten members appears to be a good size for an effective board.

### Board Chair

The Chair should have integrity, demonstrated strengths in communication and leadership skills, strong facilitation skills, empathy for fellow directors, a forward looking perspective, clear strategic vision, the intellectual capacity to understand complex issues and the options for handling them, an appreciation of accountability and the need to set and monitor standards of performance, the ability to assess priorities and focus on what is important, the willingness and ability to prepare agendas with clear objectives and to chair productive board meetings, political skills and the ability to use power, and the ability and knowledge to challenge views and opinions.<sup>16</sup>

### Articles of Incorporation

The Articles of Incorporation outline the following:

- The name of the corporation (Canadian Centre for Nuclear Innovation Inc.);
- The location of the registered office (Saskatoon, Saskatchewan);
- The number of members (Directors) on the Board of Directors – minimum 3 and maximum 12;
- Any restrictions on the activities CCNI may undertake;
- A statement of purpose of the CCNI;
- One class of membership, restricted to the University of Saskatchewan;
- Upon dissolution, any remaining property is to be distributed to the University of Saskatchewan or any corporation carrying on the same or similar activities.

### Bylaws

As the fundamental guide for governance of the CCNI, the bylaws cover the following:

- Business of the CCNI (corporate seal, financial year end, execution of instruments, banking arrangements, investments);
- Directors (number, quorum, qualification, terms, removal, vacancies, notice, meetings by telephone, Chair, remuneration and expenses, conflict of interest);
- Committees (composition, procedures for appointment);
- Officer duties, i.e. Executive Director, Chair, Vice-Chair, Treasurer, Secretary;
- Liability and indemnity;

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<sup>16</sup> Ibid

- Owner’s interests;
- Annual meeting;
- Notice requirements; and
- Accounting (auditor appointment, financial statement approval).

### Competencies of the Board Members

A list of competencies is applied to ensure a balanced slate of nominees for the Board of Directors, both at start up and for replacement. Nominees self-identify their competency levels.

**Table 2 – List of Board Member Competencies for the CCNI**

Competency	Competency Level		
	Low/none	Moderate	High
Science related to nuclear technology and medicine			
Nuclear methods that enable materials research			
Engineering and safety of nuclear energy technologies			
Translating knowledge to impacts (innovation, commercialization...)			
Policies and regulations surrounding nuclear technologies			
Public understanding and response to nuclear topics			
Academic programs in nuclear topics			
First-nation, Métis and northern communities			
Network of contacts in the nuclear industry and academia			
Communication with academia, industry and public			
Financial management and accountability			
Human resource management			
Performance measurement			
Strategic planning			
Project management			
Nuclear facility management			
Risk analysis and mitigation			
Partnership development			
Corporate governance			
Legal			