

Canadian Nuclear Laboratories



Call for Proposals Guidebook



Canadian Nuclear
Laboratories

Laboratoires Nucléaires
Canadiens

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Acronyms and Abbreviations

CNL	Canadian Nuclear Laboratories
CRA	Collaborative Research Agreement
HQP	Highly Qualified Person
IT	Information Technology
IP	Intellectual Property
PAA	Portfolio Alignment Architecture
R&D	Research and Development
S&T	Science and Technology
SMEs	Small- and Medium-Sized Enterprises
TRL	Technology Readiness Level
CoE	Centre of Excellence

Overview of Call for Proposals

The Canadian Nuclear Laboratories (CNL) Call for Proposals Guidebook is prepared for potential proponents who wish to submit proposals to advance CNL Science and Technology (S&T) priorities through the use of CNL's facilities and expertise.

Proponents responding to this Call for Proposals must be either a university or federal government laboratory or institution, or both, acting as the primary proponent in the collaboration, and may include other organizations as secondary collaborators. A third-party participant, namely Small- and Medium-sized Enterprises (SMEs) or non-federal institutions, such as provincial laboratories and non-profit research institutions, acting as the secondary proponent or a funding partner, would be considered favourably.

CNL will provide in-kind support including access to its facilities, expert advice, software tools and student travel support when attached to Chalk River Laboratories, as explained in Section 3.2.

This Guidebook outlines the process by which proposals are prepared, evaluated, selected and recommended for collaboration. Proposal submission and selection will be conducted on the following schedule:

- Call for Proposals issued via an email distribution on Oct. 9, 2015.
- CNL sets up a teleconference to answer general queries from the proponents on Oct. 16, 2015 from 10 AM to noon (see details in Section 3.4).
- Preliminary Proposals in the prescribed form (Appendix A) received via c4p@cnl.ca by Oct. 30, 2015.
- Selected proponents will be contacted to submit a Detailed Proposal (prescribed form as shown in Appendix B) by Nov. 27, 2015.
- Detailed Proposals reviewed and evaluated, and collaborations offered by Jan. 8, 2016.

Any questions throughout the proposal process can be directed to c4p@cnl.ca. Please provide sufficient detail so that the questions can be directed appropriately and answered expediently.

1. Overview of CNL

1.1 Introduction

CNL is Canada's premier nuclear S&T organization. It has unique capabilities and nuclear facilities for applications important to the nuclear sector domestically and internationally. These capabilities are identified through ten Centres of Excellence. Strategically managing its capabilities is critical to ensuring that CNL continues to meet the current and future needs of federal departments, other customers and stakeholders, and advance its S&T priorities (see Section 2.1.1).

1.2 Strategic Outcome

CNL's Strategic Outcome is: Canadians and the world receive energy, health, environmental and economic benefits from nuclear science and technology, with confidence that nuclear safety and security are assured.

1.2.1 Vision

CNL's vision is to be a global partner in nuclear innovation.

1.2.2 Brand

CNL is Canada's premier nuclear S&T organization.

1.2.3 Value Proposition

CNL's Value Proposition has three aspects with national impact:

- Advisor to, and agent of, the Government of Canada for public policy purposes;
- Enabler of business innovation and technology transfer; and
- Generator of highly qualified people.

1.3 Strategic Capabilities

CNL's Strategic Capabilities have been defined through 10 Centres of Excellence:

- **Nuclear and Radioactive Material Management:** expertise available for the transport, handling and storage of a wide range of nuclear materials such as irradiated spent fuel, un-irradiated fissionable material for fuel fabrication and R&D, contaminated equipment and irradiated waste
- **Irradiation and Post-Irradiation Services:** key facilities and expertise that are required for a variety of irradiations as well as those facilities required for post-irradiation services
- **Nuclear Safety, Security and Risk :** collection of knowledge, expertise, skills and facilities that provide unique capabilities to understand and mitigate risks associated with nuclear activities in Canada and internationally

- **Radiation Biology, Radioecology and Dosimetry:** capabilities related to radiological protection research, research on the effects of radiation on biota within the environment, monitoring the distribution of radionuclides within the environment and the attribution of radiation doses to workers
- **Materials and Chemistry in Nuclear Applications:** expertise in materials science and chemistry relating to materials performance in extreme environments
- **Advanced Nuclear Fuels and Fuel Cycles:** capabilities to develop new, improved fuels for existing reactors to enhance their operation and safety, and development of alternative fuel and fuel cycles for next generation reactors with improved non-proliferation properties
- **Systems Engineering:** capabilities for the design and development of components and integrated systems, such as first-of-a-kind devices, test rigs, tooling sets and computer and control systems
- **Advanced Computing, Modelling and Simulation:** expertise required for the development, maintenance and qualification of Analytical, Scientific and Design computer programs used in analyses that support the design, licensing and safe operation of nuclear facilities, systems, structures and components
- **Hydrogen and Hydrogen Isotopes Management:** expertise in the areas of wetproofed catalysis for heavy water production and tritium management, new heavy water production and upgrading processes, and mitigation of hydrogen release during accident scenarios
- **Environmental Remediation and Nuclear Waste Management:** expertise in key areas such as long-term radioactive waste management, innovative waste treatment technologies, innovative radiological measurement systems, waste characterization capabilities, environmental remediation and decommissioning

The federal government and CNL recognize that nuclear S&T solutions benefiting Canadians can be derived using CNL's capabilities. To strategically execute and leverage its capabilities, CNL has developed seven key S&T priorities. Proposals are being sought to advance the following six priorities:

- **Understand, and address public perceptions of the effects of radiation;**
- **Understand, prevent, and mitigate the risks associated with nuclear operations and activities;**
- **Advance the knowledge base for informed standards and regulations;**
- **Enhance national and global nuclear security;**
- **Secure options for future energy needs and sustainability through nuclear technology; and**
- **Develop, and demonstrate the minimal impact of, nuclear technologies on the environment.**

2. Call for Proposals Requirements

The objective of this Call for Proposals is to collaborate with proponents to advance CNL's S&T priorities. The acceptable proponent shall constitute either a university or federal government laboratory, federal institution, or a combination, who acts as the primary proponent. A third-party participant¹ brought on by the primary proponent and acts as the secondary proponent or provides monetary contribution, would be considered favourably during proposal evaluation.

¹ Third-parties are defined as private SMEs and provincial organizations or laboratories.

This section provides proponents with an understanding of the alignment requirements for R&D activities with CNL, and outlines the acceptable types of collaboration.

Proposed projects from proponents shall be of a R&D nature, and the proposed projects must contribute to CNL S&T priorities and be aligned with capabilities of at least one Centre of Excellence. CNL will provide access to its nuclear facilities and scientific experts as in-kind contributions.

It is important that the proponent identifies CNL facilities of interest and their usage needs for the proposed project. Descriptions of various CNL facilities are available through the following website <http://www.cnl.ca/en/home/facilities-and-expertise/all-facilities/default.aspx>.

2.1 Alignment Requirements

2.1.1 S&T Priorities

Proposals submitted for consideration must align with at least one of the six S&T priorities listed below:

- 1. Understand and address public perceptions of the effects of radiation.**
By applying science and conducting dialogue with the public, present the facts on the effects of radiation on living things.
- 2. Understand, prevent and mitigate risks associated with nuclear operations and activities.**
Ensure that nuclear activities in Canada are carried out safely, and that capability exists to assess, mitigate, and respond to nuclear incidents.
- 3. Advance the knowledge base for informed standards and regulation.**
Establishment of the basis for the development and application of scientifically based regulations, standards and policies related to nuclear and radiological issues that support and advise national and international organizations and initiatives.
- 4. Enhance national and global nuclear security.**
Development of detection technologies and response capabilities associated with illicit production, use of and transportation of nuclear materials in support of non-proliferation, safeguards and counter-terrorism.
- 5. Secure options for future energy needs and sustainability through nuclear technology.**
Development of energy technologies, synergistic with nuclear innovation, which utilize nuclear energy knowledge. The use and furthering of advanced materials development for nuclear applications.
- 6. Develop and demonstrate the minimal impact of nuclear technologies on the environment.**

Enhance understanding of the behaviour and effects of radioactivity in the environment.
Develop and implement solutions that reduce life-cycle environmental effects of nuclear technologies through materials selection, design, and waste minimization initiatives.

2.1.2 Centres of Excellence

CNL's ten Centres of Excellence (see Section 1.3) provide specific focuses on the organization's capabilities to achieve current and anticipated future nuclear S&T requirements. The capabilities within these Centres are specifically suited for collaborations.

2.2 Eligible Project Types

R&D is defined as creative work undertaken on a systematic basis to increase knowledge and said use of this knowledge to devise new applications. Three types of R&D projects will be considered through the Call for Proposals process: Basic Research, Applied Research, and Experimental Development. Technology Readiness Levels (TRLs), as discussed in the following sections, are defined in Appendix C. Proponents shall identify the current and expected TRLs when submitting their proposals.

Basic Research

Basic Research is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use in view. The TRLs appropriate for this type of research are TRL1 and TRL2. Proposals would be at, or working towards achieving, these levels.

Applied Research

Applied Research is also an original investigation undertaken in order to acquire new knowledge or a new method of experimentation. It is, however, directed primarily towards a specific practical aim or objective. The TRLs appropriate for this type of research are TRL3 and TRL4. Proposals would be at, or working towards achieving, these levels.

Experimental Development

Experimental Development involves applied research that will generate new knowledge or awareness while addressing current capability gaps. These types of projects include analytical research and experiments that either mature earlier findings, or validate the analytical predictions of existing S&T in a new context. As a result, a "proof-of-concept" validation is achieved. Proposals would be at, or working towards achieving, TRL5.

2.3 Exclusion Criteria

The following activities are excluded from, and will not be considered under, the CNL Call for Proposals:

- Demonstration, deployment or replication of technologies that are already at or exceed Technology Readiness Level 6.
- Repeated technical field trials, unless the equipment or method to be tested has been significantly modified or if the environment in which the trial is to take place is significantly different.
- Incremental improvements to equipment, software, and other tools that are already in the market place, or that are ready for commercialization, and for which the improvements could be undertaken by the private sector.
- Feasibility studies to determine the appropriateness of implementing a commercially available technology in a particular actual or hypothetical setting.
- Routine testing and monitoring of materials, chemistry, physics, etc.
- General-purpose and on-going data collection (e.g., daily records of temperature).
- General-purpose equipment support, including tools and hardware maintenance, calibrations and upgrades.
- Market analyses and market assessments to support the broad deployment of a technology.
- Fee-for-service undertakings of a routine nature that do not directly support R&D, or provide an incremental benefit to it.
- Routine Information Technology (IT) support of a general nature, including the purchase of commercial software and hardware maintenance and upgrades.
- Manufacturing start-up and troubleshooting.

3. Preparation, Submission and Evaluation of Proposals

This section outlines the preparation requirements, submission process, and evaluation criteria for proponents to create and submit a successful proposal.

3.1 Proposal Forms

The Call for Proposals forms must be used to submit proposals to CNL. The Preliminary Proposals Form is attached in Appendix A and the Detailed Proposals Form in Appendix B.

Any clarifications or queries regarding the proposal form can be submitted through c4p@cnl.ca. Please provide sufficient details so that the question can be directed appropriately and answered expediently.

3.2 CNL's Contribution

CNL will be providing access to its facilities and personnel, who have nuclear expertise, as in-kind support for all accepted proposals. In addition, CNL will provide up to \$10,000 per collaboration per year in support for travel associated with using CNL's facilities and for expenses to host a student at Chalk River Laboratories. Please note that CNL's support for student's travel associated with this Call for Proposals is not eligible for matching funds from federal agencies.

3.3 In-Kind Support

In-kind support refers to the contribution in goods or services rather than the payment of cash. Informal support may be received from collaborators without a formal contract or letter of understanding in place.

Three different approaches to the valuation of in-kind support may be considered:

- **Market value:** the cost of the goods or services contributed to the collaboration if they were purchased.
- **Provider's acquisition cost:** the original or depreciated cost to the client or stakeholder of the goods and services that were contributed to the collaboration.
- **Provider's incremental cost:** the incremental or actual cost of the goods and services.

At times, there will be little differences between these three approaches (e.g., the value of commercial accommodation and travel expenses underwritten by a client or collaborator). The market value, acquisition cost, and incremental cost are essentially the same. However, significant differences do arise in other cases.

For example, consider the case of a scientist given access to a client or collaborator's proprietary database. The first approach is not practical as it is impossible to impute a market value for the database, because there is simply not a market for it - it is proprietary. Using the second approach, we might find that the total cost to the proponent of acquiring the data was \$2 million. Under the third approach, we might assess the incremental cost as simply that of the client's staff time in facilitating the access - say \$1000.

The recommended approach to assessing the value of in-kind support is as follows:

1. ***Can a direct market value be assessed for the support?*** In many cases, it can, as illustrated in the provision of standard laboratory services by the client or collaborator example. The commercial price of such services can be readily obtained from the provider. Note that if the provider has a "preferred customer" pricing structure the lowest commercial rate should be used for assessing the value of the in-kind support. Another example is the provision of equipment (new or used; permanently or on loan). For each of these cases, the market value can be assessed.
2. ***If no market value can be assessed, the provider's acquisition cost or incremental cost of the support should be used.*** The acquisition cost should be used only where there is no further benefit to the provider of the good or service being offered. In the example above, as the provider retains ownership of the database, the provider continues to derive a benefit from it. The project could not, therefore, claim the \$2 million acquisition cost as in-kind support. Hence, the incremental cost of the provider's staff time in providing access to the database should be claimed.

Wherever possible, costs can be assessed using standard rates. Appendix D illustrates examples of appropriate in-kind support.

3.4 How to Submit a Proposal

Proposal submission and selection will be conducted as follows:

- Call for Proposals issued via email distribution on Oct. 9, 2015.
- CNL hosts a teleconference to entertain queries from potential proponents on Oct. 16, 2015 from 10 AM to noon. Proponents should call 1-866-513-2325 Ext: 21000 from North America (international call: 1-613-584-3311 Ext: 21000) using Conference ID: 721749 with Passcode: 6006.
- Proponents submit Preliminary Proposals in the prescribed format (Appendix A) via c4p@CNL.ca by Oct. 30, 2015.
- Selected proponents will be contacted to submit detailed proposal in the prescribed format (Appendix B) by Nov. 27, 2015.
- Proposals reviewed and evaluated, and collaborations offered by Jan. 8, 2015.

Preliminary Proposals must be submitted using the Preliminary Call for Proposals Form (Appendix A). All members within the proponent group should review the proposal to ensure that there is agreement.

Preliminary Proposals will be evaluated by CNL subject matter experts and ranked according to the criteria and priorities outlined in Appendix E. Successful proponents will be contacted to submit a Detailed Proposal using the prescribed form in Appendix B together with a draft Collaborative Research Agreement (CRA template included in Appendix F). The Detailed Proposal and the CRA will be drafted in consultation with a CNL point of contact, who will be assigned to support the proponent once the Preliminary Proposal is accepted. For additional information, please contact c4p@cnl.ca.

Please note that successful proponents will be required to submit a work plan upon notification from CNL. Further details and expectations will be provided upon notification.

3.5 Evaluation Process

CNL will receive and review all project proposals. Preliminary Proposals that are aligned closely to the criteria are the most likely to be accepted. The selection of Detailed Proposals is dependent upon the requirements described in Section 4.

Evaluation criteria for the proposals are illustrated in Appendix E.

4. Requirements of Detailed Proposals

4.1 Collaborative Research Agreement

The primary proponent of a successful proposal must sign a Collaborative Research Agreement (CRA) with CNL. A template of the CRA is attached in Appendix F. Proponents are encouraged to review the clauses before submitting the Detailed Proposal as only minor exceptions will be considered. The CNL point of contact will work with the proponent to prepare Research Plan and Schedule as per Schedule A of the CRA for submission with the Detailed Proposal.

4.2 Intellectual Property

All Intellectual Property (IP) owned by a party and either brought by the said party or submitted by the said party, to the collaboration shall remain the sole property of the party.

Any IP generated during activities performed under this initiative will vest in and remain property of the party that developed the intellectual property. The expectation is that work will be largely of a pre-commercial nature. To the extent that this is true, the results will be published and the CNL brand/logo must be mentioned or included in any publications, posters and other materials.

4.3 Safety and Security

Safety is paramount at CNL. As such, proponents (and their associates) who wish to work at the Chalk River Laboratories will be subject to safety training requirements. In addition, proponents are required to possess valid Government of Canada security clearances to have access to CNL facilities and data.

The need for safety training and clearances is dependent on both the nature of the project and on the amount of time proponents expect to spend at the Chalk River Laboratories. CNL will help proponents determine the level of safety training and security access required for their projects. Moreover, CNL will facilitate the acquisition of security clearances pending the needs and nature of the proposed project, and will provide safety training to incoming proponent.

Appendix A: Preliminary Proposal Form

Form follows on the proceeding subsequent pages. The form contains Sections 1 (Project Information) to 6 (Summary of Proposed Funding Sources). Completed form must be submitted electronically through e-mail to c4p@cnl.ca by 4 PM on Oct. 30, 2015.

CNL – Preliminary Proposal Submission Form

1. Project Information	
Project Title	
Proposal Brief	<i>Describe in no more than 8 lines, using simple and concise sentences, the key elements of this proposal and its objectives. This summary description may be used in part or in whole for public dissemination, if the project is approved.</i>
Primary Proponent (Academic-Based Institution/Federal Laboratory or Institution)	<i>Organization name and address</i>
Secondary Proponent	<i>Organization name and address</i> <i>Note that Small- or Medium-sized Enterprise (SME)/Provincial Organization or Non-Profit Institution would be considered favourably as a secondary proponent.</i>
Project Leader	<i>Name, organization, telephone number, e-mail address</i>
Anticipated completion year of project	
Location	<i>Where will the project's work be performed? (In the case of multiple locations, report the one in which the major part of the work will be conducted). If applicable, please identify the CNL Facility(ies) in which you wish to conduct your research and why.</i>

2. Alignment

Indicate how this project proposal aligns with CNL's Centres of Excellence and S&T Priorities.

CNL's Centres of Excellence	<input type="checkbox"/> <i>Nuclear and Radioactive Material Management.</i> <input type="checkbox"/> <i>Irradiation and Post-Irradiation Services.</i> <input type="checkbox"/> <i>Nuclear Safety, Security and Risk Management.</i> <input type="checkbox"/> <i>Radiation Biology, Radioecology and Dosimetry.</i> <input type="checkbox"/> <i>Materials and Chemistry in Nuclear Applications.</i> <input type="checkbox"/> <i>Advanced Nuclear Fuels and Fuel Cycles.</i> <input type="checkbox"/> <i>System Engineering.</i> <input type="checkbox"/> <i>Advanced Computing, Modelling and Simulation.</i> <input type="checkbox"/> <i>Hydrogen and Hydrogen Isotopes Management.</i> <input type="checkbox"/> <i>Environmental Remediation and Nuclear Waste Management.</i>
CNL's S&T Priorities	<input type="checkbox"/> <i>Understand, and address public perceptions of the effects of radiation.</i> <input type="checkbox"/> <i>Understand, prevent, and mitigate the risks associated with nuclear operations and activities.</i> <input type="checkbox"/> <i>Advance the knowledge base for informed standards and regulations.</i> <input type="checkbox"/> <i>Enhance national and global nuclear security.</i> <input type="checkbox"/> <i>Secure options for future energy needs and sustainability through nuclear technology.</i> <input type="checkbox"/> <i>Develop, and demonstrate the minimal impact of, nuclear technologies on the environment.</i>

3. Project Team Members/ Partners

Include only the principal members - those people who will be engaged in the project on a substantive and ongoing basis.

List high level details of the Team Members Involved, further information will be obtained once the proposal is selected for further review.

Team Member	Role (e.g., project leader, technical support, etc.)

4. Project Description

Key Technical Objectives of the Project:

- ...
-

Proposal Abstract: Provide a proposal abstract of approximately 200 words, using non-technical language.

[expand as required]

Proposal Description: Describe the research and methodology within the context of advancing CNL's S&T priorities, and specifically the technical objectives mentioned above, using a maximum of 3 pages. Indicate the scope for each fiscal year starting 2016-17 for the duration of the project. The description should include the nature of any collaborations and partnerships. Identify the scope of work to be performed by the proponent and the expected contributions from CNL in terms of facilities and expertise. Also indicate if any students will be working on this project. Describe how progress in the project will be assessed. What indicators will be used and how will they be measured?

[expand as required]

Strategic Importance: Please explain the strategic importance of proceeding with this project and how it will contribute to the advancement of CNL's S&T priorities and/or alignment with CNL's Centres of Excellence. Also outline any additional benefits of this project – such as usefulness to industry. (200-600 words).

[expand as required]

5. Project Outputs

Identify anticipated useful products of this work. Outputs must be tangible, focused and achievable. Each output should be numbered and identified in one sentence. Indicate the dates of completion for each output throughout the life of the project.

	Project Outputs	Anticipated Date of Completion
Output 1	<i>Identify the output (the product, deliverable or publication)</i>	
Output 2	<i>As for Output 1</i>	
<i>Add rows for additional Outputs as required</i>		

6. Summary of Proposed Funding Sources

Please provide high-level funding resources for all proponents **excluding CNL's in-kind contribution**. Further details will be obtained once the proposal has been selected for the second stage of proposal evaluation.

Please refer to Section 3.3 of the *Call for Proposals Guidebook* for information on assessing the value of in kind support.

Sources	Year 1 (2016-2017)	Year 2 (2017-2018)	Total
Total Academia Partners (\$k)			
Cash			
In Kind			
Total Other Federal Government Levels (\$k)			
Cash			
In kind			
Total Other Third-Party Partners - SMEs, Provincial Labs and Institutions, Associations, Utilities, Non-Governmental Organizations, etc. (\$k)			
Cash			
In kind			
Total (\$k by year)			
Total Project (\$k)			

Appendix B: Detailed Proposal Form

Form follows on the proceeding subsequent pages. The form contains Sections 1 (Project Information) to 10 (Collaborations & Leveraging).

This form must be used by the selected proponents to submit the detailed proposal upon request by CNL by 4 PM on Nov. 27, 2015. The detailed proposal form will identify the resources needed to execute the project, the amount of labour hours needed (person/year), facilities and occupancy duration for these facilities.

Proponents are advised to prepare the Detailed Proposal in consultation with CNL point of contact.

CNL – Detailed Proposal Submission Form

1. Project Information	
Project Title	
Proposal Brief	<i>Describe in no more than 8 lines, using simple and concise sentences, the key elements of this proposal and its objectives. This summary description may be used in part or in whole for public dissemination, if the project is approved.</i>
Primary Proponent (Academic-Based Institution/Federal Laboratory or Institution)	<i>Organization name and address</i>
Secondary Proponent	<i>Organization name and address</i> <i>Note that Small- or Medium-sized Enterprise (SME)/Provincial Organization or Non-Profit Institution would be considered favourably as a secondary proponent.</i>
Project Leader	<i>Name, organization, telephone number, e-mail address</i>
Anticipated completion year of project	
Project type	<i>As further explanation to the preceding field, please identify the type of project and consider: which of the following best describes the project: basic research; applied research; experimental development; other (explain). For all R&D projects, please explain the starting Technology Readiness Level (TRL) and the expected TRL at the end of the project.</i>
Location	<i>Where will the project's work be performed? (In the case of multiple locations, report the one in which the major part of the work will be conducted). If applicable, please identify the CNL facility(ies) in which you wish to conduct your research and why.</i>
Confidentiality	<input type="checkbox"/> <i>Does this proposal contain proprietary or commercially sensitive information?</i> <input type="checkbox"/> <i>Can this project be posted/advertised on the CNL external web site?</i>

2. Alignment

Indicate how this project proposal aligns with CNL's Centres of Excellence and S&T Priorities.

CNL's Centres of Excellence	<input type="checkbox"/> <i>Nuclear and Radioactive Material Management.</i> <input type="checkbox"/> <i>Irradiation and Post-Irradiation Services.</i> <input type="checkbox"/> <i>Nuclear Safety, Security and Risk Management.</i> <input type="checkbox"/> <i>Radiation Biology, Radioecology and Dosimetry.</i> <input type="checkbox"/> <i>Materials and Chemistry in Nuclear Applications.</i> <input type="checkbox"/> <i>Advanced Nuclear Fuels and Fuel Cycles.</i> <input type="checkbox"/> <i>System Engineering.</i> <input type="checkbox"/> <i>Advanced Computing, Modelling and Simulation.</i> <input type="checkbox"/> <i>Hydrogen and Hydrogen Isotopes Management.</i> <input type="checkbox"/> <i>Environmental Remediation and Nuclear Waste Management.</i>
CNL's S&T Priorities	<input type="checkbox"/> <i>Understand, and address public perceptions of the effects of radiation.</i> <input type="checkbox"/> <i>Understand, prevent, and mitigate the risks associated with nuclear operations and activities.</i> <input type="checkbox"/> <i>Advance the knowledge base for informed standards and regulations.</i> <input type="checkbox"/> <i>Enhance national and global nuclear security.</i> <input type="checkbox"/> <i>Secure options for future energy needs and sustainability through nuclear technology.</i> <input type="checkbox"/> <i>Develop, and demonstrate the minimal impact of, nuclear technologies on the environment.</i>

3. Project Team Members/ Partners

Include only the principal members - those people who will be engaged in the project on a substantive and ongoing basis and the duration these resources are needed to execute the work.

Indicate which facilities will be used and duration that it will be needed for.

Team Member	Role (e.g., project leader, technical support, etc.)	Duration
<i>Expand as required</i>		
Facilities	Such as Labs, and specific facilities	Duration
<i>Expand as required</i>		

4. Project Description

Key Technical Objectives of the Project:

- ...
-

Proposal Abstract: Provide a proposal abstract of approximately 200 words, using non-technical language.

[expand as required]

Proposal Description: Describe the research and methodology within the context of advancing CNL's S&T priorities, and specifically the technical objectives mentioned above, in less than three pages. Indicate the scope for each fiscal year starting from 2016-17. The proposal description should include the nature of any collaborations and partnerships. Ensure that CNL requirements (facilities and expertise) are explicitly listed. Also indicate if any students will be working on this project. Describe how progress in the project will be assessed. What indicators will be used and how will they be measured?

[expand as required]

Research Plan and Schedule: Describe the detailed research, goals, plans and schedule for the research project and naming key personnel, including the Principal investigator, in less than two pages. This part will be incorporated into Schedule A of the CRA for the successful proposal.

[expand as required]

Strategic Importance: Please explain the strategic importance of proceeding with this project and how it will contribute to the advancement of CNL's S&T priorities, which target area(s) it aligns with, and how it will be strategically advantageous for Canada. Also outline any additional benefits of this project – such as usefulness to the industry. (200-600 words)

[expand as required]

5. Project Outputs

Identify anticipated useful products of this work. Outputs must be tangible, focused and achievable. Each output should be numbered and identified in one sentence. Indicate the dates of completion for each output throughout the life of the project.

	Outputs and Tasks	Anticipated Date of Completion
Output 1	<i>Identify the output (the product, deliverable or publication)</i>	
Output 2	<i>As for Output 1</i>	
<i>Add rows for additional Outputs as required</i>		

6. Technology / Knowledge Transfer and Dissemination

Identify the target recipient(s) of the project information. Describe a plan to disseminate the project results to the recipient(s). The dissemination strategy may include papers in refereed journals, conference presentations and publications, seminars, workshops, etc.

Note: CNL requires a copy of *final* versions of knowledge assets derived from its in-kind contribution, in electronic format, and an indication of whether there is any restriction on their availability to others (for example, restricted to collaborative partners; restricted to internal federal government use, etc.).

With regard to final knowledge assets arising from activities it funds, CNL may:

- Make available those that have not been published in professional journals, and for which availability is classified as unrestricted, in electronic format, via a web site, or by other means as may be deemed appropriate.
- Provide a reference to the paper on its web site to scientific and technical papers published in professional journals.

[expand as required]

7. Risks to Project

Please identify the *key* risks associated with the successful implementation of the project, the mitigation strategy for each, and an assessment of the “residual risk”, that is the level of risk even after the mitigation strategy. Examples are provided below (please also consider other risks that are specific to the proposed project).

Identified Risk (pre-mitigation)	Mitigation strategy	Residual risk (<u>L</u> ow, <u>M</u> edium, <u>H</u> igh)
Objectives not achieved at end of project	“Go-no go” decisions at key points; early termination if necessary	M
No take up of results	Receptor capacity assessed prior to beginning project; knowledge / technology transfer plan in place	L
Partner withdraws from project before it ends	Partner’s past history and current financial situation assessed prior to proceeding	L
<i>Add rows for additional risks as required</i>		

8. Summary of Proposed Funding Sources

If there are multiple funding sources in a particular category (e.g. industry or university partners), please show the breakdown of cash and in kind support by each source in Section 10.1 below.

Please refer to Section 3.3 of the *Call for Proposals Guidebook* for information on assessing the value of in kind support.

Sources	Year 1 (2016-2017)	Year 2 (2017-2018)	Total
Total Academia Partners (\$k)			
Cash			
In Kind			
Total Other Federal Government Levels (\$k)			
Cash			
In kind			
Total Other Third-Party Partners - SMEs, Provincial Labs and Institutions, Associations, Utilities, Non-Governmental Organizations, etc. (\$k)			
Cash			
In kind			
Total (\$k by year)			
Total Project (\$k)			



9. Detailed Cost Breakdown				
Item	Year 1 (2016-2017)		Year 2 (2017-2018)	
	Cash (\$k)	In kind (\$k)	Cash (\$k)	In kind (\$k)
CNL				
<i>Example, Student expenses for accessing CNL lab.</i>				
<i>Example, Technical Assistant salary</i>				
<i>Example, Research Professional salary</i>				
<i>Example, Facilities such as Lab space</i>				
<i>Example, Equipment</i>				
<i>Add rows for additional items as required</i>				
Academic partner, such as University, if more than one academic partner, separate each one individually				
Other Federal Government Levels, if more than one federal organization partner, separate each one individually				
Other Third-Party Partners - Provincial Labs and Institutions, if more than one third-party partner, separate each one individually				
TOTAL				

10. Collaborations and Leveraging

Describe both existing and planned international and national collaborations and how the proposed work is leveraged through these collaborations. Indicate approximate leverage value for collaborations.

Collaborating Organization	Leverage (\$k)		Description of Leverage
	Cash	In-kind	

Appendix C: Technology Readiness Levels

Terminology	Level	Description	Risk Tolerance	Relative Cost
Basic Research	1	Basic principles observed and reported.		
	2	Technology concept or application formulated through analytical studies.		
Applied Research/ Research to Prove Feasibility	3	Analytical and experimental critical function or characteristic proof of concept.		
	4	Concept, process, component or subsystem validation in a laboratory environment.		
Experimental or Technology Development	5	Concept, process, component or subsystem validation in a relevant environment.		
Demonstration and Validation/ Engineering Feasibility	6	Concept, process system/ subsystem model or prototype demonstration in a relevant, high-fidelity environment.		
	7	Concept, process, or system prototype demonstration in an operational environment.		
Engineering and Manufacturing Development	8	Actual concept, process or system completed and qualified through test and demonstration.		
Systems Test and Operations/ Operational Systems Development	9	Actual concept, process, or system proven through successful operational tests and evaluation.		

Appendix D: In-Kind Support Examples

Category	Accepted	Not accepted
Access to proprietary databases	Incremental costs of access	Cost of collecting the data and developing the database
Analytical and other services	Commercial rate (best “preferred customer” rate if applicable)	
Shared task work performed by the partner	Staff time to perform part of the scientific work as well as guidance on the project, billed at rates reflecting the partner’s full costs calculated using internal rates	Consultant rates Costs relating to administrative support where overhead has been included in salary costs
Equipment	Donated (used) - fair market value Donated (new) - selling price to most favoured customer Cost of manufacture (if one of a kind) Loaned - rental equivalent based on depreciation	Development costs
Use of facilities	The lower of: internal rates for logistical support, food and lodging for Program research personnel working on provider’s premises or on field work, OR current Treasury Board per diem allowances Internal rates for use of specialized equipment by Program research personnel	Equivalent commercial rates
Software	Internal cost to provider of copying, providing documentation, training of CNL staff, support of software Cost of equivalent commercial product (where donated software is not commercially available)	Development costs
Materials	Unit cost of production for commercial products Selling price to most favoured customer Cost of production of prototypes and samples	Development costs
Travel	Travel and accommodation costs (not exceeding standard Treasury Board rates) to meet with project research personnel <i>at the request of those personnel</i>	Conference attendance by Third-party participant

Appendix E: Evaluation Criteria

Does the proposal meet CNL's values:

- Advancement of CNL S&T Priorities
 - Alignment identified and evidence of how the priority will be advanced by the proposed research opportunity.
- Alignment with one or more of CNL's ten Centres of Excellence and focus areas for collaboration.
- Enhancement of CNL's Strategic Outcome and discussion of net benefit to Canada.
- Ability to develop and generate Highly Qualified Person (HQP).

Does the proposal enhance CNL's vision:

- Use of CNL Facilities
 - Collaboration arrangement – benefits of collaborations recognized, effective use of expertise and facilities available in collaborating organizations, broad national participation, SME inclusion.
- Leveraging
 - Involvement and financial contribution of private sector, and
 - CNL contribution requested (direct and in-kind).

Does the proposal enhance the knowledge community:

- Technical merit
 - Evidence of a sound proposal, capabilities of proponents, good statements of outputs, is good science/research proposed, is the project feasible.
- Risk Assessed and Mitigated
 - Delivery risks, technical risks, project risks assessed and addressed.
- Project description
 - Does the project fit within the scope of the Portfolio Alignment Architecture (PAA) structure and enhance at least one CNL S&T priority, is the proposed methodology appropriate, are the go/no-go decision points identified and are they appropriate, are the performance indicators and methodology appropriate and adequate?
- Is the proposed technology and/or new knowledge dissemination plan adequate and appropriate?
- Project compliance
 - Collaborative Research Agreement

Appendix F: Collaborative Research Agreement Template

Successful proponents will be required to sign a CRA with CNL. The CNL point of contact will work with the proponent to draft the CRA for submission with the Detailed Proposal. Proponents are encouraged to review clauses in the CRA template before submitting the Detailed Proposal as only minor exceptions will be considered. Proponents are required to submit the Research Plan and Schedule, as per Schedule A of the CRA with the detailed proposal.

Collaborative Research Agreement
Regarding
<Insert Short Title>
Agreement No. CRA-mmddyy

THIS AGREEMENT is made as of the ___ day of _____, 20__ (the “Effective Date”).

BETWEEN:

CANADIAN NUCLEAR LABORATORIES LTD. / LABORATOIRES NUCLÉAIRES CANADIENS LTÉE., a corporation incorporated under the laws of Canada having its head office at Chalk River Laboratories, 286 Plant Road, Town of Chalk River, Province of Ontario, Canada K0J 1J0
 (“CNL”)

AND

<Insert full legal name and address of Partner>
 (“ABC”) <<Create short form for partner and search and replace on ABC>>

(CNL and ABC individually referred to as a “Party”, and collectively as the “Parties”)

WHEREAS CNL and ABC share a common interest in area(s) of research and technology;

AND WHEREAS the Parties believe that collaboration between the Parties will advance the interests of each Party

NOW THEREFORE the Parties hereto agree as follows:

1. Objectives

(a) << The statement of objectives should be concise and clear. Use terms that nonscientists will readily understand and avoid the excessive use of scientific jargon. When someone outside of the science community reads the agreement, they should be able to understand what is being done and why the parties believe it is important to undertake the collaboration. The statement of objectives should explain: It should articulate:

- Context: What real-world issues the collaborative research agreement will address;
- Objective: Specify the scientific goals of the collaboration (focus on the immediate goals of this research)
- Purpose: Why the collaboration is being done and why it is important;
- Outcome: Briefly describe what each Party hopes to get out of the research project; this can include financial and infrastructure/equipment benefit, general knowledge, commercial opportunities, etc. If either Party requires the IP or research results for a specific purpose, it should be specified here.

This will be used as an aide to interpreting the intent of the Parties and to ensure that the language of the Agreement is consistent with that intent.>>

(b) In support of this objective, the Parties shall perform, or procure the performance of, the research plan as set forth in Schedule A (the “Research Plan”) in collaboration and upon the terms and conditions hereinafter set forth.

2. Definitions

- (a) **“Agreement”** means this Collaborative Research Agreement including all attached Schedules, as the same may be supplemented, amended, restated or replaced in writing from time to time as in the manner specified herein;
- (b) **“Arising Invention”** means any Intellectual Property arising as part of and during the performance of the Work;
- (c) **“Background Intellectual Property”** means Intellectual Property or Confidential Information of the named Party, which is developed by a Party prior to the Effective Date and includes that described in **Schedule B** attached hereto;
- (d) **“Confidential Information”** means the specific terms and conditions set forth in this Agreement, and any other information which is disclosed by one Party to the other Party, provided that tangible materials are clearly marked as “Confidential”, “Protected-Sensitive” or a similar designation and any information provided orally or visually is identified as confidential at the time of disclosure, and confirmed as confidential in writing within fifteen (15) days of such disclosure, but shall not include information that:
 - i) is or becomes generally available to the public other than as a result of any act by a receiving Party to this Agreement;
 - ii) is rightfully received from a third party without similar restriction or without breach of this Agreement;
 - iii) a receiving Party is able to demonstrate, in writing, was known to it on a non-confidential basis; or
 - iv) was independently developed by a receiving Party without the use of any of the Confidential Information;
- (e) **“Improvements”** means any and all improvements or enhancements or changes to Background Intellectual Property made by a Party or its contractors and includes, but is not limited to, Intellectual Property arising from the use of the Background Intellectual Property pursuant to the terms of this Agreement;
- (f) **“In-Kind Contribution”** means a contribution of one of the Parties towards the Research Plan in non-monetary form, such as in the form of equipment, material, or work by the contributing Party’s personnel;
- (g) **“Intellectual Property”** means copyrights, patents, industrial designs, mask works, trade secrets, trade-marks and other intellectual property rights associated with any ideas, inventions, concepts, techniques, models, processes, prototypes, specifications, patterns, drawings or works of authorship.
- (h) **“Research Plan”** means the plan of research set out in **Schedule A**;
- (i) **“Research Results”** means the technical information, know-how and Intellectual Property developed in performance of the Research Plan;
- (j) **“Site”** means a nuclear facility of either Party where Work is being carried out;
- (k) **“Work”** means the work to be carried out by the Parties as set out in detail in the Research Plan;
- (l) Other capitalized terms defined in this Agreement will have their indicated meaning throughout this Agreement.

3. Payments, Contributions & Materials

- (a) If payments are to be made under this Agreement, they shall be made in accordance with the terms, dates, associated milestones and amounts of any payments as specified in **Schedule C** attached hereto.
- (b) Where In-Kind Contributions shall constitute part of the value being exchanged under this Agreement, such contributions shall be fully described to the best extent possible, and a value commensurate with the In-Kind Contribution shall be proposed and mutually agreed on by the Parties before the contribution can be claimed.
- (c) Unless otherwise agreed upon by the Parties in writing, or specifically provided for pursuant to the terms of this Agreement, all equipment and materials purchased by a Party for the carrying out of the Work, shall be, and remain, the property of the Party which made the purchase.

4. Confidentiality

- (a) In performing the Work, a Party (the "Receiving Party") may obtain Confidential Information owned or controlled by the other Party (the "Disclosing Party").
- (b) The Receiving Party shall not make use of Confidential Information except as required for the performance of the Work. The Receiving Party shall not disclose any Confidential Information to any third party without the prior written consent of the Disclosing Party.
- (c) The Receiving Party's obligations under this Section shall survive the expiry or termination of this Agreement. The Receiving Party shall not, following the termination or expiration of this Agreement, without the prior written consent of the Disclosing Party, use or disclose or permit any third party access to any of the Confidential Information.
- (d) The Receiving Party shall be responsible for safeguarding the Disclosing Party's Confidential Information, proprietary documents, data and other materials in its possession in connection with the performance of the Work against sabotage, espionage and theft.
- (e) The Receiving Party shall take all precautions necessary to protect against any unauthorized use or disclosure of the Confidential Information including, where appropriate, such precautions as Receiving Party takes in protecting its own proprietary or confidential Information, but in any event not less than commercially reasonable efforts.
- (f) The Receiving Party agrees that any breach by it of any of the paragraphs of this Section would result in irreparable injury and damage to the Disclosing Party for which the Disclosing Party would have no adequate remedy at law. The Receiving Party also agrees that in the event of said breach or any threatened disclosure or use of the Confidential Information by the Receiving Party in breach of this Agreement, the Disclosing Party shall be entitled to seek immediate injunctive relief and a restraining order to remedy any actual or threatened or reasonably apprehended disclosure of Confidential Information, and the Receiving Party consents to the granting of such injunctive relief in favour of the Disclosing Party without proof of actual damages, in addition to any other remedies which the Disclosing Party may be entitled at common law or in equity. The terms of this paragraph shall not prevent the Disclosing Party from pursuing any other available remedies or breaches or

threatened breaches hereof, including, but not limited to, the recovery of damages from the Receiving Party.

- (g) No licence under Intellectual Property right of the Disclosing Party with respect to Confidential Information is granted to the Receiving Party except as set out herein.
- (h) Upon any termination of this Agreement or upon written request of the Disclosing Party, the Receiving Party shall (i) return to the Disclosing Party any disks, tapes, documentation, drawings, designs, design basis material, blueprints, notes, memoranda, specifications, devices, documents, or any other tangible embodiments of any Confidential Information; (ii) delete all digital copies of the Confidential Information from the Receiving Party's computer systems; and (iii) provide the Disclosing Party with a letter certifying that this has been done, signed by a responsible authority at the Receiving Party. Notwithstanding the foregoing, the Receiving Party may retain one archival copy of Confidential Information in the restricted access files of its lawyer or legal department for the purpose of ensuring and proving compliance with the confidentiality obligations of this Agreement. The Disclosing Party acknowledges and agrees that the Receiving Party's computer system may automatically retain back-up copies of the Confidential Information disclosed under the Contract. To the extent that such computer back up procedures create copies of the Confidential Information, the Receiving Party may retain such copies in its archival or back up computer storage for the period the Receiving Party normally archives backed up computer records. Any retained copies (including computer copies) of Confidential Information are subject to the provisions of this Section until they are destroyed, deleted or erased.
- (i) A Receiving Party may disclose Confidential Information pursuant to the lawful and compelling requirements of a government agency or pursuant to a court order, provided that the Receiving Party gives the Disclosing Party sufficient notice to enable it to seek an order limiting or precluding such disclosure

5. Intellectual Property

- (a) The Parties agree and acknowledge that the Research Plan requires the access to and use of Background Intellectual Property of both Parties and that all aspects and parts of the Background Intellectual Property shall be exclusively owned by the Party which contributed said Background Intellectual Property. Nothing herein shall serve to, or should be construed to transfer any ownership or commercial rights whatsoever in the Background Intellectual Property to the other Party. Such Background Intellectual Property may be used solely for the purpose of performing activities specified in the Research Plan and any other use of Background Intellectual Property shall only be granted by the express written consent of the Party acting under its sole discretion to grant such rights.
- (b) Subject to 5(c), any new Intellectual Property arising under this Agreement shall vest in and remain the property of the Party which developed that Intellectual Property.
- (c) All Improvements to a Party's Background Intellectual Property shall be the property of that Party, including if the Improvement is jointly developed. The Parties agree to take such reasonable actions required to give effect to the previous sentence, including the assignment of Intellectual Property Rights and requiring individuals to waive moral rights.

- (d) Where any portion of the Research Results or any Arising Invention are not the property of CNL but were developed as part of the Work, ABC hereby grants to CNL a fully paid, non-revocable, non-terminable, perpetual, non-exclusive license to use the Research Results and Arising Inventions for CNL's own uses, including research, development, education, commercial use, regulatory use and for CNL's own purposes on any of CNL's sites or facilities, including the right to sublicense the Research Result or Arising Invention to third parties. This right to use any Research Result or Arising Invention shall include, without being limited to, the right to develop, implement, manufacture, make, reproduce, modify, use, copy, execute, display, perform, distribute, transmit, broadcast, export/import, offer to sell and sell the Research Result or Arising Invention.
- (e) Notwithstanding any wording, above, the Parties shall ensure that they shall retain sufficient rights to any Intellectual Property created as part of the Research Project to fulfill their obligations hereunder and provide appropriate licenses to the other Parties as specified. For clarity, the Parties may retain staff, contractors, students and faculty to perform the Work, but must retain sufficient rights, if not ownership, in any Intellectual Property created by those staff, contractors, students and faculty.
- (f) The Parties shall use reasonable efforts to perform the Work without infringing on any valid patent or copyright and without the use of any confidential information that is the property of others, unless the Party and its personnel are licensed or otherwise have the right to grant the licenses specified herein.

6. **Publication**

- (a) The Parties recognize that publication of results may be an important component of many research programs, especially those involving academic institutions. The Parties agree that either Party may propose to publish results arising from the Work.
- (b) At any time during, before or after the completion of the Work, one Party (the "Publishing Party") may provide the other Party (the "Non-Publishing Party") with a draft copy of any proposed publication or disclosure of Research Results for its review at least sixty (60) days before submission for publication or disclosure. Upon the Non-Publishing Party's written request, which shall be received within the same sixty (60) day period, the Publishing Party shall:
 - i) delete any Confidential Information of the Disclosing Non-Publishing Party from the proposed publication or disclosure; or
 - ii) delay publication, up to a maximum of sixty (60) additional days for the purposes of filing for intellectual property protection on terms and conditions to be negotiated and agreed upon by the Parties.
- (c) Failure of the Non-Publishing Party to respond to a submission of a draft copy of a proposed publication within sixty (60) days may be interpreted as approval by the Non-Publishing Party of the intent to publish.
- (d) Unless otherwise specified, copyright to any written material produced shall remain with the Party who wrote the material in question.

- (e) Each Party shall be entitled to obtain such publicity as it considers necessary relating to the subject matter herein, provided that any press releases and other material (including electronic material) shall be approved as to form and content by each Party in writing. The Non-Publishing Party's name and logo may not be used without written permission.
- (f) Notwithstanding the limitations above, each Party may at its own discretion provide a brief listing of this cooperation activity as part of any public compendium disclosing research taking place at or being supported by the Party. Such disclosure may include, but is not limited to, the title of the cooperation activity, the approximate value of the Agreement and the names of all other parties. In any permitted statements, the Parties shall describe the scope and nature of their participation accurately.
- (g) This Agreement shall not impose any delay on the thesis defence of a student, and the Publishing Party shall take such steps to ensure that such defence is in compliance with the Confidentiality and Intellectual Property terms of this Agreement.

7. Liability

- (a) Neither Party shall be liable to the other Party whether arising under contract, tort (including negligence), strict liability, or otherwise, for loss of anticipated profits, economic loss, loss by reason of facility shutdown, non-operation or increased expense of operation, service interruptions, claims of the other Party's owners, customers, subcontractors, or suppliers, governmental fines or penalties, loss of use of capital or revenue, cost of money, radioactive contamination, or for any special, indirect, incidental, or consequential loss or damage of any nature arising at any time from any cause whatsoever.
- (b) Each Party shall indemnify and hold the other Party harmless from and against any and all claims, demands, actions, suits or proceedings of whatever nature, including all costs and expenses incurred in connection therewith, brought or instituted by a third party, and based on or arising out of the indemnifying Party's use, or disclosure, of the Work or Research Results.
- (c) The Parties expressly agree that under no circumstances shall either Party's total aggregate liability arising from this Agreement, under any theory of recovery, whether based in contract, in tort (including negligence and strict liability), under warranty, or otherwise, exceed the lesser of any payments made pursuant to this Agreement, or one million Canadian dollars (CAD\$1,000,000). The Parties shall have no liability obligations under this Section after one (1) year after the Completion Date. This Section shall apply notwithstanding any other terms and conditions of this Agreement.

8. Nuclear Liability

- (a) The Parties agree that any issues relating to a nuclear incident at either Party's Site will be dealt with in accordance with the provisions of the *Nuclear Liability Act*, RSC 1985, c N-28 (as amended).

<< If the work involves CNL doing work at a partner nuclear facility, then the following language should be used. Otherwise, the language immediately above should be used.>>

- (a) When used in this Section, the following words shall have the meanings ascribed to them in the *Nuclear Liability Act*, RSC 1985, c N-28 (as amended): “damage,” “injury,” “nuclear installation,” and “nuclear material.” The word “supplier” shall mean any person, firm or corporation other than CNL which has furnished or is furnishing, directly or indirectly, equipment, articles, materials, or services to the Partner for use at ABC’s Site. The term “nuclear incident” shall mean an occurrence at the nuclear installation resulting in damage occasioned as a result of the fissionable or radioactive properties, or a combination of any of those properties with toxic, explosive, or other hazardous properties of nuclear materials.
- (b) ABC shall indemnify CNL and its subcontractors, directors, officers, employees, agents, representatives against liability for:
- i) damage to, or loss of or loss of use of, property of ABC, or liability for damage to, or loss of property of any supplier or other third party, resulting from a nuclear incident at ABC’s site;
 - ii) damage to or loss of property of CNL and its Subcontractors at the nuclear installation resulting from a nuclear incident at ABC’s site;
 - iii) for reasonable legal costs and expenses incurred by them respecting all claims made against them for liability for damage arising out of the performance of the Work and related to or arising from a nuclear incident at ABC’s site.
- (c) This Section shall take precedence over all other provisions of this Agreement.

9. **Warranty**

- (a) The Parties make no warranty, express or implied, concerning the Research Results under this Agreement, which are all provided “as is”. Each Party makes no representations and extends no warranties of any kind, either express or implied concerning the Research Results. There are no express or implied warranties of merchantability or fitness for a particular purpose concerning the Research Results.

10. **Insurance**

- (a) CNL is an agent Crown corporation and pursuant to Section 96 of the *Financial Administration Act* (Canada), CNL may exercise its powers only as an agent of the Crown in right of Canada. As such, the liabilities of CNL under this Agreement are liabilities of its principal, the Crown.
- (b) ABC shall obtain and maintain comprehensive general liability insurance and any other insurance, for example but not limited to, pollution liability insurance as circumstances warrant, that a prudent person would deem necessary, in the minimum amount of five million Canadian dollars (CAD\$5,000,000) with respect to its operations. Such insurance shall contain provisions for cross-liability and severability of interest, and ABC shall provide a certificate of insurance as evidence of such coverage if requested by CNL.

11. **Regulatory considerations**

- (a) CNL and ABC agree that until such time as all regulatory requirements have been obtained, including all necessary approvals of any regulatory or research ethics board concerned, no work requiring such regulatory or ethics approvals shall commence (excepting any preliminary preparations which are not restricted by such requirements). For greater certainty, provided that the appropriate Party is reasonably pursuing the required approvals, any delay in obtaining such approvals shall not be considered a default or breach by either CNL or ABC.
- (b) CNL and ABC acknowledge that some research, particularly that in the natural sciences and engineering, may be subject to export control laws and regulations of Canada or the U.S. For example, transmitting the results of, or information about, certain research may require first obtaining an export permit or other authorization. Certain research may also be subject to regulation by the Controlled Goods Directorate (CGD) of Public Works and Government Services Canada, in accordance with the *Defence Production Act* (Canada) (DPA) and the *Controlled Goods Regulations* adopted pursuant to the DPA (CGR). Information may be obtained from the CGD website at http://www.cgd.gc.ca/cgdweb/text/index_e.htm.
- (c) The Parties shall use reasonable efforts to determine whether or not the Research Plan contains items subject to the DPA or CGR (a "Controlled Item"). In the event that a Controlled Item is identified to be used in the Research Plan, then the Parties shall comply with all applicable Canadian and International export control laws and regulations. In the event that the Parties wish to include a Controlled Item into the Research Plan at any time during the term of this Agreement, then the Parties agree as follows:
 - i) the Party requesting the inclusion of the Controlled Item shall promptly notify the other Party of the Controlled Item's classification prior to any shipment or transmission;
 - ii) the other Party may, at that Party's sole discretion, accept or reject the delivery of the Controlled Item; and
 - iii) in the event that the Party rejects the delivery of the Controlled Item, such rejection by that Party shall not constitute a breach of this Agreement.

12. Subcontracting

- (a) Except as outlined in Research Plan, the Parties shall not subcontract any portion of the Work without the prior consent in writing of the other Party, which may not be unreasonably withheld.
- (b) No subcontract shall relieve the Parties from any of their obligations under this Agreement or impose any liability upon the other Party.
- (c) In any subcontract, the Party subcontracting the Work (or portion thereof) agrees to bind the Subcontractor by terms and conditions which are no less protective of the other Party's rights as this Agreement.

13. Research Schedule

The Parties shall make commercially reasonable efforts to perform the Work to meet the schedule as set out in Schedule A.

14. Term and Termination

- (a) This Agreement shall come into effect upon the Effective Date specified above, and unless earlier terminated in accordance with the terms hereof, shall terminate on <<date>>.
- (b) This Agreement may be terminated by either Party without cause upon ninety (90) days written notice to the other Party. In the event of termination by either Party, ABC shall immediately stop all work in progress and terminate any orders or subcontracts related to the Work. ABC shall use commercially reasonable efforts to minimize all costs resulting from the termination. ABC shall deliver to CNL all material, documents and other work in progress obtained or performed by ABC up to the effective date of termination for which ABC has been paid. In the event of termination by CNL, CNL shall pay ABC pursuant to this Agreement for all services performed and for all reasonable, provable and unavoidable costs incurred by ABC as a result of such termination.
- (c) If either Party (the "Defaulting Party"):
- i) should become bankrupt, insolvent, go into liquidation, have a receiving or administration order made against it, compound with its creditors, or carry on business under a receiver, trustee or manager for the benefit of its creditors, or if any act is done or event occurs which has a similar effect to any of these acts or events; or
 - ii) should fail to observe or perform any of the material provisions of this Agreement, and after having received notice in writing from the other Party (the "Non-Defaulting Party") of such failure, if the Defaulting Party does not remedy such failure within thirty (30) days following notice of such breach; or
 - iii) in the reasonable judgment of the Non-Defaulting Party, the Defaulting Party has engaged in gross or willful misconduct with respect to the business affairs of the Non-Defaulting Party or has otherwise damaged, or acted in a manner that could have damaged or could lead to damage of, the reputation of the Non-Defaulting Party,

then the Non-Defaulting Party, may, without prejudice to any other right or remedy, immediately terminate this Agreement ("Termination for Cause"). The Non-Defaulting Party shall not be required to provide any notice in the event of bankruptcy, receivership, insolvency or financial instability of the Defaulting Party.

- (d) In the event of Termination for Cause, where work is being funded in whole or in part by CNL, ABC shall immediately stop all work in progress and terminate any orders or subcontracts related to the Work. ABC shall use commercially reasonable efforts to minimize all costs resulting from the termination. ABC shall deliver to CNL all material, documents and other work in progress obtained or performed by ABC up to the effective date of termination for which ABC has been paid.

15. Notices

- (a) All notices or other communications required to be made or given pursuant to the terms of this Agreement shall be delivered to the Parties by courier or registered mail at the addresses set forth below:

<p>In the case of ABC to:</p> <p><<Include full name and address>> <<Include name, title, phone, fax and email for individual contact at ABC>></p>	<p>Or in the case of CNL to:</p> <p>Canadian Nuclear Laboratories Ltd. Chalk River Laboratories 286 Plant Road Chalk River, Ontario K0J 1J0 Attention: <<Name of CNL contact Phone: Fax: Email: >>></p> <p>With a copy of any notice terminating, or alleging breach under, this Agreement to the same address but to</p> <p>Attention: General Counsel</p>
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or at such other addresses as may be given from time to time in accordance with the terms of this notice provision.

- (b) Unless otherwise stipulated within this Agreement, a notice to be delivered in accordance with the provisions of this Agreement shall be deemed to have been received by the addressee on the actual day of delivery, if delivered by courier, or on the third (3rd) day following the date of mailing, if delivered by registered mail.

16. General Provisions

- (a) Interpretation. Except as may be otherwise specifically provided in this Agreement and unless the context otherwise requires, in this Agreement the following apply. The terms "Agreement", "this Agreement", "the Agreement", "hereto", "hereof", "herein", "hereby", "hereunder" and similar expressions refer to this Agreement in its entirety and not to any particular provision hereof. References to an "Article", "Section" or "Schedule" followed by a number or letter refer to the specified Article or Section of or Schedule to this Agreement. The division of this Agreement into articles and sections and the insertion of headings are for convenience of reference only and shall not affect the construction or interpretation of this Agreement. Any reference to this Agreement means this Agreement as amended, modified, replaced or supplemented from time to time Words importing the singular number only shall include the plural and vice versa and words importing the use of any gender shall include all genders. The word "including" means including without limitation. All dollar amounts refer to Canadian dollars. Any time period within which a payment is to be made or any other action is to be taken hereunder shall be calculated excluding the day on which the period commences and including the day on which the period ends. Whenever any payment is required to be made, action is required to be taken or period of time is to expire on a day other than a business day, such payment shall be made, action shall be taken or period shall expire on the next following business day.
- (b) Amendments. No amendment or waiver of any provision of this Agreement shall be binding on either Party unless said amendment is consented to in writing by both Parties.

- (c) Waiver. Any waiver must be expressly provided. No waiver shall be inferred from or implied by any failure to act or delay in acting by either in respect of any default or by anything done or omitted to be done by the other Party. Any waiver by either Party of the strict observance, performance or compliance with any term, covenant, condition or agreement herein contained shall be deemed not to be a waiver of any subsequent default. No waiver of any provision of this Agreement shall constitute waiver of any other provision.
- (d) Assignment. This Agreement shall not be assigned by either Party without the prior written consent of the other Party, such consent not to be unreasonably withheld. Notwithstanding the foregoing, CNL may assign this Agreement without consent in connection with a corporate re-organization.
- (e) Force Majeure. If the performance by either Party of any of its obligations under this Agreement (except a payment obligation) is delayed or prevented by circumstances beyond its reasonable control, that Party will not be in breach of this Agreement because of that delay in performance. However, if the delay in performance is more than three (3) months, the other Party may terminate this Agreement with immediate effect by giving written notice sent to the address set out herein.
- (f) Entire Agreement. This Agreement, including its Schedules, constitutes the entire agreement between the Parties with respect to the subject matter hereof and supersedes all prior agreements, understandings, negotiations and discussions, whether written or oral. There are no conditions, covenants, agreements, representations, warranties or other provisions, express or implied, collateral, statutory or otherwise, relating to the subject matter hereof except as provided in this Agreement.
- (g) Severability. If any provision of this Agreement is determined by a court of competent jurisdiction to be invalid, illegal or unenforceable in any respect, all other provisions of this Agreement shall nevertheless remain in full force and effect so long as the economic or legal substance of the transactions contemplated hereby is not affected in any manner materially adverse to any Party hereto. Upon such determination that any term or other provision is invalid, illegal or incapable of being enforced, the Parties hereto shall negotiate in good faith to modify this Agreement so as to effect the original intent of the Parties hereto as closely as possible in an acceptable manner to the end that transactions contemplated hereby are fulfilled to the extent possible.
- (h) Applicable Laws. This Agreement shall be interpreted according to the laws of the Province of Ontario and the laws of Canada in force therein.
- (i) Counterparts. This Agreement may be executed in one or more counterparts and by the different Parties hereto in separate counterparts, each of which when executed shall be deemed to be an original but all of which taken together shall constitute one valid and binding Agreement. A facsimile copy or portable document format (PDF) copy of an executed counterpart signature page will be as valid as an originally executed counterpart for purposes of signing this Agreement.

[remainder of page intentionally left blank; signatures page follows]

IN WITNESS WHEREOF the Parties have executed this Agreement by their respective representatives duly authorized in that behalf.

CANADIAN NUCLEAR LABORATORIES LTD. / LABORATOIRES NUCLÉAIRES CANADIENS LTÉE.	<<FULL LEGAL NAME OF ABC>>
BY: _____ NAME: <<Director level name>> TITLE: <<Director level title>>	BY: _____ NAME: TITLE:
BY: _____ NAME: <<VP or equivalent level name>> TITLE: <<VP or equivalent level title>>	BY: _____ NAME: TITLE:

Schedule A – Research Plan and Schedule

<<<<Insert a detailed plan of research, setting out the goals, plans and schedule for the research project and naming key personnel, including the Principal Investigator, in less than two pages. These should be available from the Detailed Proposal.>>>>

Schedule B – Background Intellectual Property and Confidential Information

<<<<Insert Schedule B, detailing the Background Intellectual Property being brought to the project by the parties and identifying any confidential information that will be disclosed.>>>>

Schedule C – Fees and Fee Schedule

<<<<Insert Schedule C, detailing the fees, payment plan, expenses, etc. for the project. CNL will contribute CDN\$10,000 to support student expenses related to collaboration activities under this agreement.>>>>

Payment of Fees – General Terms

C-1. Thirty days prior to any payment due date, ABC shall deliver to CNL an invoice referencing this Agreement and specifying the amount due. The invoice shall be for the services rendered in this Agreement. In the case of contracts other than fixed price, the invoice shall be accompanied with relevant supporting documentation as CNL may require.

C-2. Invoices to CNL shall be sent to:

Canadian Nuclear Laboratories Ltd.
Chalk River Laboratories
286 Plant Road, Chalk River, Ontario K0J 1J0
ATTENTION: ACCOUNTS PAYABLE/CONTRACTS

C-3. CNL, if in agreement with ABC's invoice, will pay undisputed invoices net thirty (30) days after receipt of the invoice.

C-4. ABC shall obtain a Harmonized Sales Tax ("HST") registration number, if applicable, and shall include such number on all invoices. ABC shall be responsible for deducting and remitting HST to the applicable regulatory authorities in accordance with the Excise Tax Act (Canada).

C-5. In the case of contracts other than fixed price, ABC shall:

- (a) keep proper and detailed accounts and records including invoices, receipts and vouchers showing all information necessary for the accurate determination of the cost of performing the Work, and of all expenditures and commitments with respect to the purchase of material, equipment, supplies and services, including travel necessary to the performance of the Work and to keep all invoices, receipts and vouchers relating to them and, unless it obtains the prior written consent of CNL to otherwise dispose of such accounts, records and documents, preserve them for a period of two (2) years after completion of the Work.
- (b) on demand, make available to CNL every account, record or document mentioned in section C-5(a) that may be required by CNL, as determined by CNL and permit CNL or its authorized representatives to examine, audit, inspect and make copies and take extracts from such accounts, records and documents. ABC shall furnish CNL or its authorized representative with all information requisite to the understanding of the accounts, records and documents. Furthermore, ABC shall afford reasonable facilities for such audits and inspections.

If pricing is established by methods other than setting out a fixed price, the amounts claimed under this Agreement may be subject to audit by CNL before or after payment has been made to ABC.