Canada's Nuclear Regulator

Evaluation of the Canadian Nuclear Safety Commission's Contribution to the Canadian Standards Association's Nuclear Standards Program

Evaluation Report

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Executive Summary

This report presents the findings, conclusions and recommendations of an evaluation of the Canadian Nuclear Safety Commission's contribution to the Canadian Standards Association's Nuclear Standards Program. The evaluation examines the program's relevance, effectiveness, and efficiency and economy during the period from March 31, 2006 to March 31, 2011. The conduct of this evaluation was undertaken from December 2011 to March 2012.

Program Context

The Canadian Nuclear Safety Commission (CNSC) has been a major participant in the Canadian Standards Association's (CSA) Nuclear Standards Program since the program's establishment in the 1970s. The program develops, reviews, amends, and publishes Standards for the nuclear power industry. CSA, Canada's largest accredited and integrated standards development and certification organization, manages the program.

The CNSC participates in the Nuclear Standards Program because it has a strong interest in the development of safety Standards related to the nuclear industry. Over the period of March 31, 2006 – March 31, 2011, the CNSC contributed $1,686,375[1] to CSA for this program. Standards developed under this program form integral components of the CNSC's regulatory framework, referenced in regulatory instruments such as licences, licence condition handbooks, regulatory documents, and guidance documents.

Methodology

This evaluation was conducted in accordance with the Treasury Board *Policy on Evaluation* (April 1, 2009), and addresses its core evaluation issues: consistency with federal roles and responsibilities, alignment with Government priorities, continued need for the program, achievement of expected outcomes, and demonstration of efficiency and economy.

The evaluation includes the use of multiple lines of evidence and complementary research methods as a means to ensure the reliability of the information and data collected. Four main lines of inquiry were employed in this evaluation:

- document review
- interviews
- web-based survey
- benchmarking study

Overall, this evaluation is limited in generating a full assessment of effectiveness and efficiency/economy. The assessments made throughout this report were made available through the data collected and subsequently analyzed from the CSA Nuclear Standards Program, dating back to 2006. The combination of survey and interview data, as well as the benchmarking study, allowed for the cross-examination of findings, providing the groundwork for a systematic inquiry into the relevance, effectiveness and efficiency/economy of the CNSC's contribution to the CSA Nuclear Standards Program.

[1] The CNSC's contribution, for the purposes of this evaluation, is defined as total contribution agreement funding. This does not include CNSC's time spent (measured in full-time equivalents - FTE) on CSA activities or travel costs (by operations and maintenance - O&M); this level of information is not consistently gathered across CNSC.

Relevance

The *Nuclear Safety and Control Act* and the federal *Cabinet Directive on Streamlining Regulation* establish and support the CNSC's participation in the CSA Nuclear Standards Program. The contribution that the CNSC makes to the CSA Nuclear Standards Program is aligned with its corporate priorities. as stated in its annual reports dating back to 2007–08. This alignment is further supported by CNSC employees who reference/use CSA Standards in their work and/or participate in the Nuclear Standards Program technical committees/sub-committees, where standards are developed. CNSC staff and industry that were interviewed and/or surveyed clearly support CNSC's continued participation in the Nuclear Standards Program.

The CNSC gains significant key benefits by participating in the CSA Nuclear Standards Program: the high quality Standards that are produced are later used in the CNSC regulatory framework, greater understanding of perspectives between CNSC and industry, better "buy-in" into Standards from industry to facilitate regulation, technical expertise gained and leveraged by participating in the standards process, and greater efficiencies in standards development by building on past technical work that has been developed in previous related Standards.

Moving forward, there is identified room for growth by developing and implementing guidance materials for CNSC staff, covering process and procedures for standards development and implementation within the CNSC regulatory framework, senior management support of CNSC staff on technical committees/sub-committees, and continued need to monitor CSA Standards as part of the CNSC regulatory framework plan. Additionally, if the CSA is to remain a relevant, accredited standards development organization for the nuclear industry, the CSA must broaden its membership base to include more organizations representing other technologies. While this remains out of the direct scope of the CNSC and this evaluation, it nevertheless was found to be a factor in determining CNSC's future contribution renewals.

Effectiveness

The Standards developed by the CSA Nuclear Standards Program are integral to CNSC's ability to regulate the nuclear industry. Currently, 82% of the current CSA Standards are referenced in requirements (i.e., mandatory) as well as guidance (i.e., voluntary) documents, otherwise referred to as the CNSC's regulatory framework. CNSC staff who are responsible for maintaining and implementing the CNSC regulatory framework refer to/use CSA Standards on a daily and weekly basis; ultimately, the Standards provide them with the tools for day-to-day compliance verification.

Status reports, special reviews and task forces have all contributed to the success of the Nuclear Standards Program in producing timely and relevant Standards. However, the information contained in the status reports (i.e., data on performance, developing needs and trends of the Nuclear Standards Program) is not effectively communicated to CNSC staff, especially those participating in technical committees/sub-committees. As a result, this may have impacts on the functioning of technical committees/sub-committees work as well as the ability for CNSC staff on these committees to prepare for meetings and brief/update their supervisors.

Furthermore, the efforts to inform all CNSC staff involved in technical committees/sub-committees, as well as those who refer to/use CSA Standards in their work, need to include clarity on the strategic and operational direction and application of Standards development. Currently, many CNSC staff members are unaware of the distinction between the CNSC's responsibility for setting regulatory requirements and CSA's role in developing consensus industry Standards. Additionally, the federal *Cabinet Directive on Streamlining Regulation*, which encourages the use of Standards organizations such as CSA, should be

included in CNSC's efforts to build awareness among staff participating in developing and/or implementing CSA Standards.

Efficiency and Economy

It is not possible to determine the extent to which CNSC's contribution[2] to the CSA Nuclear Standards Program is economical at this time. Additionally, the extent to which efficiency could be assessed is limited; a partial allocative efficiency exercise was undertaken based on available data. There was no discrepancy between the planned and actual contribution agreement funding spent on the Nuclear Standards Program from 2006–11; the planned person days for each technical committee/sub-committee in which the CNSC participated accounts for, on average, 405.04 person days per year. In assessing planned versus actual time spent on all activities related to the Nuclear Standards Program, the efficiency analysis was limited, as the CNSC does not track in a specific and consistent manner its spent time on these activities. Most of the CNSC staff uses a program called Integrated Time Accounting System (ITAS) to track their time spent on these activities; however, the cost code includes other activities, such as time spend on developing regulatory documents. As a result, the actual time spent on Nuclear Standards Program activities alone is not known.

Notwithstanding the lack of data to support a full analysis of efficiency and economy, there was a high degree of support among the CNSC staff members interviewed and surveyed, indicating the CNSC contribution to the Nuclear Standards Program was a good investment, and that technical committees/sub-committees (where Standards are developed) were managed in a cost-effective manner. Both are proxy indicators used to assess some degree of efficiency and economy; the findings suggest the CNSC is indeed achieving these factors by contributing to the CSA Nuclear Standards Program.

A benchmarking study was undertaken, comparing Canada's approach to nuclear Standards development and implementation to the current practices in Great Britain, France, and the United States. Although the study was limited in generating a concrete assessment of efficiency and economy – as available cost data was very limited in all jurisdictions examined – it ultimately revealed that there are many models for Standards development. A regulator can choose the value it places on Standards; it can mandate that Standards should be developed by a consensus body-in-law, or it can choose to not include Standards as part of a regulatory regime at all, thereby rendering Standards development as a voluntary option of industry, for their own benefits. Additionally, if the regulator places value in Standards development, it can further choose to participate in the Standards development process or not.

Although there is an established strong need, and significant benefits are gained by the CNSC's continuing participation in the CSA Nuclear Standards Program, the organization has yet to formalize a clearly articulated rationale for the use and implementation of CSA Standards into licensing and compliance. In support of this rationale, objectives that are clear and measurable and supported by ongoing data collection can be designed and implemented. In order for the CNSC to continuously monitor and assess the results of its contribution to the CSA Nuclear Standards Program, as well as the efficiency and economy in the management of this relationship, performance information needs to be collected on an ongoing basis.

[2] The CNSC's contribution, for the purposes of this evaluation, is defined as total contribution agreement funding. This does not include CNSC's time spent (by FTE) on CSA activities or travel costs (by O&M); this level of information is not consistently gathering across CNSC.

Recommendations

Moving forward, the following recommendations should be addressed sequentially:

- Recommendation #1: Construct a rationale that is clearly articulated to CNSC management and staff, to support the use and implementation of CSA Nuclear Standards into CNSC processes for licensing and compliance. The rationale should be consistent with the federal government directive to streamline regulation.

- Recommendation #2: Redraft the current set of objectives defined in the contribution agreement between the CNSC and CSA, to be clear and measurable.

- Recommendation #3: Develop and implement ongoing, systematic data collection to support CNSC objectives for contributing to – and participating in – the CSA Nuclear Standards Program.

- Recommendation #4: Develop and disseminate information to CNSC staff involved in developing and/or implementing CSA Standards. Efforts to build awareness should specifically address the rationale, objectives, and supporting processes and procedures for use and implementation of CSA Nuclear Standards into licensing and compliance. This information should be developed with senior management support for CNSC staff on technical committees/sub-committees, as well as continuous efforts to monitor activities related to the CSA Nuclear Standards Program against CNSC's regulatory framework plan.

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1. Introduction

This report presents the findings, conclusions and recommendations of an evaluation of the Canadian Nuclear Safety Commission's (CNSC) contribution to the Canadian Standards Association's (CSA) Nuclear Standards Program. The evaluation examines the program's relevance, effectiveness, and efficiency and economy during the period from March 31, 2006 to March 31, 2011. The conduct of this evaluation was undertaken from December 2011 to March 2012.

The evaluation report is organized as follows:

- Section 1: Program Description and Evaluation Context
- Section 2: Methodology for the Evaluation
- Section 3: Conclusions for Supporting Evidence
- Section 4: Summary and Recommendations.

1.1 Program Description

1.1.1 Canadian Standards Association

The Canadian Standards Association is Canada's largest integrated Standards development certification organization accredited by the Standards Council of Canada (SCC). Its Standards are used by regulators in many fields, both in Canada and around the world.

The objectives of CSA's Standards development function are to:

- Provide an efficient, highly respected, inclusive, collaborative and affordable system of consensus standards that consistently addresses the needs of Canadian society and provides added value for users;
- Support the development of a strong Canadian industrial base that can satisfy domestic demand with high quality products and offer internationally competitive exports;
- Foster the confidence of consumers in the safety of products and services they use; and
- Influence global standards that are important to Canada by maintaining effective and appropriate representation on the International Standards Organization (ISO) and the International Electrotechnical Commission (IEC) committees, and other international standards development fora as Canadian societal needs demand.

CSA is an independent and neutral third party, providing a structure and accredited process for developing a standard. CSA Standards are voluntary when developed, but are made mandatory when referenced by governments or regulatory authorities in legislation, regulations or other legally enforceable instruments. CSA has published over 3000 codes, Standards, and related instruments in some 50 technology fields. Examples of these fields include energy systems, electrical and fuel safety, energy efficiency, renewable energy, conservation, environment, construction, structures, health, occupational health and safety, public safety, transportation and distribution, as well as materials technology.

1.1.2 Nuclear Standards Program

CSA's Nuclear Standards Program was established in the mid-1970's, and is managed by CSA. The program develops, publishes and maintains Standards for the nuclear industry. The SCC requires that Standards developed by accredited Standards development organizations be maintained and kept current. To meet this requirement, CSA reviews all Standards on a five-year cycle, and amends them as required. This practice of ensuring that Standards remain useful and current, so as to meet the continuing needs of users, is typical of Standards development organizations.

The objectives of the Nuclear Standards Program are to contribute to a safe and reliable Canadian nuclear industry, and to have a positive influence on the international industry.

The program undertakes numerous activities, including:

- Providing strategic direction and oversight.
- Issuing status reports.
- Developing, publishing, amending, maintaining, interpreting, and reaffirming or issuing new editions of Standards for nuclear and related facilities and activities.
- Conducting special reviews on the improvement of the Nuclear Standards Program.

Additionally, over 2011, the Nuclear Standards Program has been actively updating the certification scheme guidance materials for the training and examination for operators of certified exposure devices.

1.1.3 Committee Structures and Process for Developing Standards

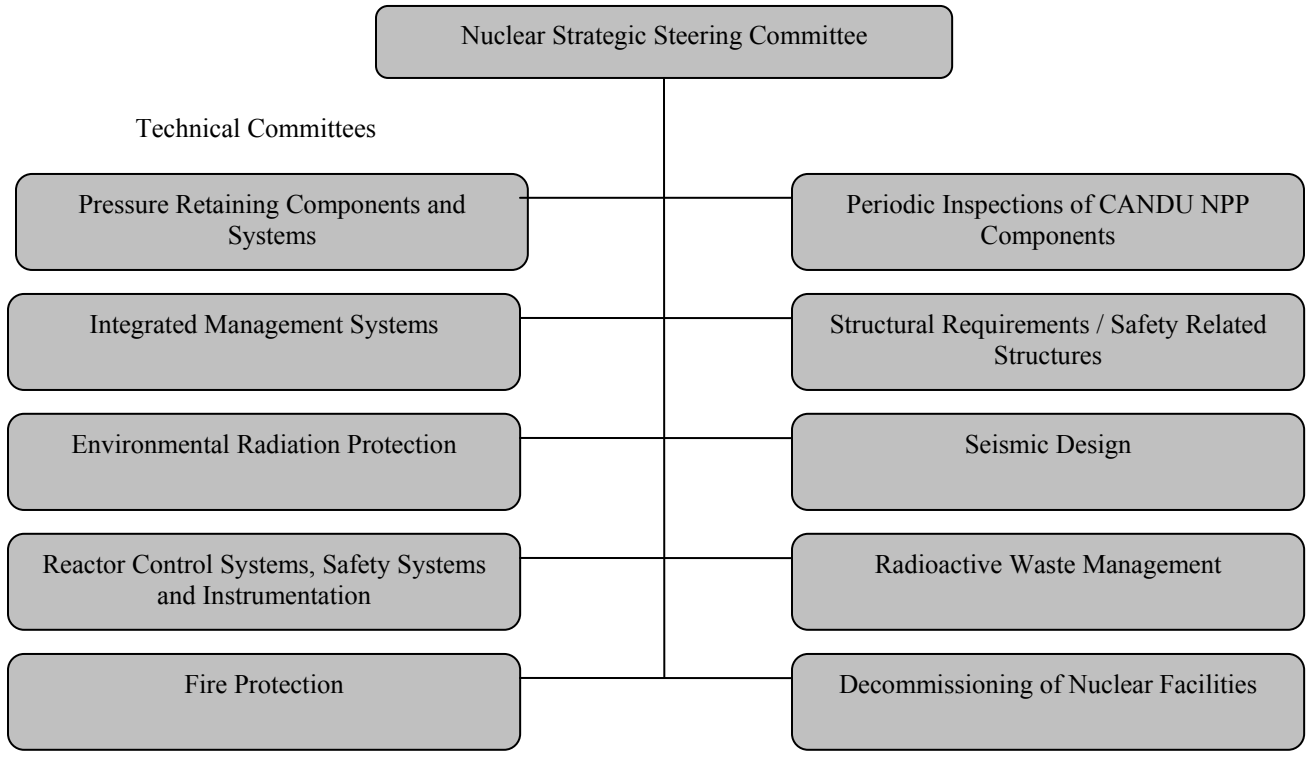
The committee structures are created using a "balanced matrix" approach, which means that each committee is structured according to a matrix that represents the national and sector stakeholder community, to capitalize on the combined strengths and expertise of its members, and to ensure that no single interest group dominates.

Strategic direction and support for the Nuclear Standards Program is provided to CSA by the Nuclear Strategic Steering Committee (NSSC). The NSSC is led by senior management of the licensees, industry, government and regulatory interests including the CNSC, and other stakeholders.

The Nuclear Standards Program carries out its work through ten technical committees (see Figure 1 below) and associated sub-committees and working groups. The committees are comprised of volunteer members representing the industry stakeholders (owners, operators and producers, service providers, suppliers and fabricators, as well as industry associations). In addition, the committees have participants from federal, provincial and municipal governments, regulatory agencies, subject matter experts, and the general public. CNSC staff members manage all the levels of these committees.

A standard is issued using the following systematic process: a work program and project proposals are reviewed and approved by the NSSC; a technical committee is assigned to projects; and reports are made twice per year to the NSSC. The assigned technical sub-committee drafts the specific standard, the technical committee reviews and achieves consensus on technical content of the draft, and the draft is released for public consultation. All the comments received are reviewed and dispositioned, and the revised standard is then issued for ballot or vote by the technical committee. Negative ballots are dispositioned and, upon consensus being reached, the final standard is published in both English and French.

Figure 1: CSA Nuclear Standards Program – NSSC and Technical Committees



1.1.4 Canadian Nuclear Safety Commission and the Nuclear Standards Program

The CNSC has participated in CSA's Nuclear Standards Program since its inception. Participation by governments and regulators is essential for the nuclear Standards developed by CSA to be recognized as accredited Canadian Standards. Standards developed under this program are often referenced in licenses or License Conditions Handbooks, or referenced by licensees in the documentation submitted in support of a license application. In both cases, they become part of the CNSC's licensing basis for the licensed nuclear facility.

Through its participation in the program, CNSC seeks to:

- Support the development of national Standards that are accepted and used by both the CNSC and industry.
- Ensure that Canadian Standards continue to reflect current technology and regulatory needs, are internationally benchmarked, and technology neutral.
- Promote voluntary compliance with best practices, which continuously raises the bar for safety, reliability and performance.
- Make more effective and efficient use of resources, by leveraging industry resources and expertise to develop Standards that support regulatory objectives.
- Support professional development of staff, by providing opportunities to share expertise and knowledge with respect to technology and regulatory practices with industry experts.
- Comply with the federal government's *Cabinet Directive on Streamlining Regulation* with respect to participation in – and use of – industry-developed Standards.

The activities of the program are described below:

- Providing strategic direction and oversight.
- Developing, publishing, amending, maintaining, interpreting, reaffirming or re-issuing new editions of Standards for nuclear and related facilities and activities.
- Conducting special reviews on the improvement of the program.
- Updating the certification scheme, training and examination for operators of certified exposure devices.

For further illustration on how activities link to outcomes, please refer to the program logic model exhibited in Appendix B.

1.2 Program Description

The contribution of resources provided by the CNSC to CSA for the administration and establishment of activities associated with the Nuclear Standards Program, per financial year, is listed in Table 1 below.

Table 1: Summary of the Total Contribution Agreement between the Canadian Nuclear Safety Commission and the Canadian Standards Association, per Financial Year ($)[3]

	2006–07	2007–08	2008–09	2009–10	2010–11
Standards	20,000	400,000	400,000	400,000	400,000
Special Studies	---	---	---	18,300	11,300
Certified Exposure Device Operator Program*	---	---	---	---	36,775
	20,000	**400,000**	**400,000**	**418,300**	**448,075**

1.3 Governance

The CNSC's participation in the CSA's Nuclear Standards Program is managed by several parties within the CNSC, depending on whether the Standard is to be used in licensing and compliance, or whether direction/guidance is being given on the CNSC's participation in the program itself.

Once Standards have been published by CSA, it is the responsibility of technical specialists, directors or directors general to determine whether a CSA Standard is appropriate for use in a licence condition, or as guidance on compliance with the licence by reference in the *Licence Conditions Handbook*. In addition, when developing regulations and/or regulatory documents, technical specialists and directors draw upon existing documentation setting out requirements and guidance, including CSA Standards.

The first governance body, the Operations Management Committee (OMC) – co-chaired by the Vice President of the Regulatory Operations Branch and Vice President of the Technical Support Branch – provides direction regarding the use of regulatory documents and industry developed Standards, including

[3] Financials do not include applicable GST/HST in total calculations per year.

Notes: (1) The Nuclear Standards Program underwent significant expansion over the years 2006–07 to 2007–08, hiring additional project managers and administrative support. (2) The Certified Exposure Device Operator Program, while covered under this contribution agreement, was not assessed during this evaluation; the initiative is not regarded to be mature enough to be evaluated at this point in time.

CSA Standards, in licensing and compliance. The Directors General in the Regulatory Operations Branch are ultimately responsible for recommendations regarding licensing, including the use of CSA Standards in licences and *Licence Conditions Handbooks*.

The second governance body, the Regulatory Framework Steering Committee (RFSC), is a Director General- level committee, responsible for developing and overseeing the implementation of the CNSC's multi-year Regulatory Framework Plan (RFP). The RFSC is chaired by the Director General of the Regulatory Policy Directorate, with the Director General of the Directorate of Assessment and Analysis as vice-chair. Given the extensive use of CSA Standards in licensing and compliance, the development of CSA Standards is integrated into the CNSC's RFP, and any proposals for new CSA Standards are reviewed by RFSC, in the context of the CNSC's regulatory framework priorities. The RFSC chair represents the CNSC on the CSA Nuclear Strategic Steering Committee, with the objective of providing input to the program's strategic management and work planning, including to avoid overlap and duplication between the CNSC's efforts and the CSA's Nuclear Standards Program.

Management Committee (MC), composed of Vice Presidents from all CNSC branches (Regulatory Affairs Branch, Regulatory Operations Branch, Technical Support Branch, and Corporate Services Branch), as well as the Senior General Counsel and Commission Secretary, is the third governance body. MC provides strategic direction to the Regulatory Framework Program, setting priorities for the development and publication of regulations and regulatory documents, and approves the Regulatory Framework Program each year. The President, as Chief Executive Officer, is also responsible for approving the CNSC's contribution agreement to CSA.

The last governance structure is the Commission Tribunal, composed of up to seven independent members. The Commission Tribunal is responsible for issuing licences, making regulations, and approving regulatory documents. As noted earlier, licences issued by the Commission Tribunal frequently reference CSA Standards in licences and *Licence Conditions Handbooks*. Standards are often referenced in regulatory documents as well.

1.4 Stakeholders

There are various internal stakeholders included in the development, implementation, and endorsement of CSA Standards.

Internal stakeholders included in the development of CSA Standards are the staff and management of the Nuclear Standards Program, who provide the project management of the Standards development process, and who report to the CSA executive leadership team and board of directors responsible for overseeing CSA Standards development. The Nuclear Standards Program membership is composed of various members representing the industry stakeholders (owners, operators and producers, service providers, suppliers and fabricators, as well as industry associations), as well as provincial, federal and municipal regulatory bodies. Members who participate in voting or in associate capacities on the NSSC oversee the strategic direction of the Nuclear Standards Program. Additionally, the same member organizations participating in the NSSC are often represented on the program's technical committees/sub-committees. These technical committees/sub-committees also include representatives who are deemed to be subject-matter experts in the nuclear field.

Internal stakeholders included in the implementation of CSA Standards are the CNSC technical specialists, directors or directors general participating in the program's technical committees/sub-committees, who are further supported by their senior management in RFSC and OMC. Additionally, there are other CNSC staff members who do not participate in the development of Standards but who are

responsible for implementing and assessing compliance against specific Standards inherent in requirement documents covering Class I and Class II facilities and activities. Their work is further supported by their senior management, who are also participants of either RFSC and/or OMC. Directors General and Vice Presidents involved in RFSC and OMC are responsible for overseeing the implementation of the content covered by CSA Standards within both requirement and guidance documents.

Stakeholders included in the endorsement of CSA Standards include MC (approving guidance documents) and the Commission Tribunal (approving regulatory documents).

Additionally, it should be noted that the Canadian public is involved at key stages within the development and implementation process for CSA Standards. CSA engages the Canadian public, licensees and interested organizations to provide input and feedback on Standards before they are published, during their established public notification and review periods. The CNSC engages the Canadian public, licensees and interested organizations on its draft regulatory and guidance documents during public consultation periods. All the regulations developed by the CNSC include two public consultations periods; new regulations or amendments to regulations are published in the Canada Gazette Part I for the period of public consultation, as well.

2. Evaluation Scope and Objectives

The objectives of this evaluation are to assess relevance, effectiveness, efficiency and economy of the CNSC's contribution to the CSA's Nuclear Standards Program during the period from March 31, 2006 to March 31, 2011.

2.1 Evaluation Questions

This evaluation was conducted in accordance with the Treasury Board *Policy on Evaluation* (April 1, 2009), and addresses its core evaluation issues: consistency with federal roles and responsibilities, alignment with Government priorities, continued need for the program, achievement of expected outcomes, and demonstration of efficiency and economy.

During the planning phase for this evaluation (October 2011 to December 2011), the evaluation function at the Canadian Nuclear Safety Commission consulted with the Evaluation Working Group (EWG) and the Evaluation Advisory Committee (EAC) to validate the evaluation framework, including the evaluation matrix (see Appendix C), to guide the evaluation. The following evaluation questions were agreed upon:

Relevance

- Question #1: Is there a legitimate role for the CNSC's participation in the Nuclear Standards Program?
- Question #2: Are the Nuclear Standards Program objectives aligned with the CNSC's corporate priorities?
- Question #3: Is there a continued need for the CNSC to participate in the Nuclear Standards Program?

Effectiveness

- Question #4: To what extent have strategic and operational plans provided clear direction to the Nuclear Standards Program?
- Question #5: To what extent is committee progress monitored and stakeholders are kept informed of the status of projects?

- Question #6: To what extent are the published Standards used by the CNSC in its regulatory framework, licenses and the *License Conditions Handbook* (LCH)?
- Question #7: To what extent are regulations and Standards developed using the principles of openness and transparency?
- Question #8: To what extent have special reviews and task force reports led to the continuous improvement of the management of the Nuclear Standards Program?
- Question #9: To what extent is CNSC aligned with the federal *Cabinet Directive on Streamlining Regulation*, as a result of participating in the Nuclear Standards Program?

Efficiency and Economy

- Question #10: Are there options for CNSC's participation in the Nuclear Standards Program that could reduce the cost of its contribution without adversely affecting results?
- Question #11: Are there more cost-effective ways for the CNSC to participate in the Nuclear Standards Program committees?
- Question #12: Are there more efficient or economical ways for the CNSC to develop accredited nuclear Standards?
- Question #13: What, if any, unintended (positive or negative) outcomes have occurred as a result of CNSC's participation in the Nuclear Standards Program?

3. Evaluation Approach and Methodology

The program evaluation matrix (see Appendix C) outlines which methods were used to capture data for each of the evaluation indicators. The evaluation matrix includes the use of multiple lines of evidence and complementary research methods, as a means to ensure the reliability of the information and data collected. Four main lines of inquiry were employed, including both quantitative and qualitative methods: a document review, interviews, web-based survey, and a benchmarking study. A description of the data sources is described below by line of inquiry.

3.1 Data Sources

3.1.1 Document Review

A documentation review was undertaken, for the purposes of describing the program and its activities, outputs and mandate; assessing relevance; establishing production of outputs leading to achievement of outcomes; and assessing efficiency.

Identified sources include, but are not limited to:

- CNSC *Annual Reports*, *Departmental Performance Reports*, and *Reports on Plans and Priorities*
- CSA *10-Year Plans*, NSSC status reports, action item logs, *Chairs Task Force Reports*, program health metrics, NSSC resources allocation tables
- CSA policy and directives governing standardization.
- CNSC licenses, license condition handbooks, regulatory documents, guides, CNSC Standards, policies and staff review procedures
- CNSC PowerPoint presentations on contributions to CSA Nuclear Standards Program

A full list of documents is listed in Appendix D. A customized template was developed by the evaluator to populate findings and conclusions from the document review; this enabled the extraction and analysis of relevant information according to evaluation questions and indicators.

3.1.2 Interviews

For the purpose of addressing program relevance, productivity of outputs leading to achievement of outcomes and efficiency, key informant interviews were conducted with CNSC staff. Interviews were mainly conducted with management (directors and directors general), covering all areas in CNSC where CSA Standards are developed and implemented. A few CNSC senior staff members (technical specialists and officers) were identified as having a significant amount of content expertise, covering a significant history of CNSC's participation in CSA Nuclear Standards development and/or use of CSA Standards within the CNSC regulatory context. It was identified that the level of content expertise achieved by the identified senior staff members was best captured in an interview, rather than by including them in the survey. Additionally, a select number of interviews were held with representatives identified as having key roles in the management of the CSA Nuclear Standards Program. In total 15 interviews were conducted, illustrated in Table 2 below.

Table 2: Key Informant Interviews

Interviewee Grouping	Number of Interviews
CNSC staff	
Directors general	7
Directors	3
Senior staff	3
CSA Nuclear Standards Program	
Management	2
Total	15

An interview guide was drafted based on the evaluation matrix presented in the evaluation framework, as well as findings and conclusions based on the document review. The guide was pre-tested with members of the EWG for feedback on content, clarity, length, and flow.

Interviewees were sent an engagement letter at least three weeks before the interview was conducted. Interviews took place January 27, 2012 to February 22, 2012.

Interviewees were assured of their anonymity (according to Canadian privacy and access to information laws) before each interview commenced, and findings were reported in an aggregate manner, with no references to an individual interviewee.

A customized template was developed by the evaluator to populate findings and conclusions from the interviews; this enabled the extraction and analysis of relevant information according to evaluation questions and indicators.

3.1.3 Survey

For the purpose of addressing program relevance, productivity of outputs leading to achievement of outcomes and efficiency, a Web-based survey was conducted. The survey sample included a total of 56 participants belonging to any one of three categories: a) CNSC representatives who participate in the CSA Nuclear Standards Program technical committees/sub-committees; b) other CNSC employees who reference/use Standards in their work; and c) external to the CNSC, CSA Nuclear Standards Program members/stakeholders who participate as voting members or associate members of the CSA NSSC. It should be noted that a significant number of NSSC voting members or associate members are also representatives on the Nuclear Standards Program technical committees/sub-committees. The average number of years reported by the respondents as being involved with the program was 6.5 years.

A survey guide was drafted, based on the evaluation matrix presented in the evaluation framework and the findings and conclusions based on the document review. The guide was pre-tested with members of the EWG for feedback on content, clarity, length, and flow.

Participants were sent an engagement letter three weeks before the survey was launched, outlining the intention of the survey, how survey results were to be used, logistical details regarding accessing the survey, and privacy and anonymity considerations. A short reminder email was also sent to all participants two days before the survey was launched (on February 1, 2012). The survey was available to participants for the duration of three weeks; it was accessible via a personalized PIN, emailed to each participant. The personalized PIN allowed participants to leave and go back into the survey at any time, in order to complete or change information before it had been submitted. Additionally, by use of a PIN, once each survey questionnaire was completed and submitted, the particular case became locked and could not be accessed again, except by the survey administrator. This ensured that only the people assigned a PIN could gain access to the survey and that cases could not be completed more than once.

Overall, there was a 63% response rate for the survey. The response rate by category of participants is listed in Table 3 below. It should be noted that inferential statistics were not used to describe the survey data. The total population did not exhibit normal distribution characteristics, and the sample size could not be drawn randomly.

Table 3: Survey Response Rate, by Participant Category

Category of Respondent	Valid Email Addresses	Number of Responses by Category	Response Rate (%)
CNSC representatives on technical committee/sub-committee	17	11	65
Other CNSC employees	18	7	39
CSA Nuclear Standards Program members/stakeholders	21	17	81
Total Responses	**56**	**35**	**63**

A customized template was developed by the evaluator to populate findings and conclusions from the survey; this enabled the extraction and analysis of relevant information according to evaluation questions and indicators.

3.1.4 Benchmarking Study

For the purpose of addressing alternative design/delivery approaches in other countries to increase cost-effectiveness and efficiency, a benchmarking study was conducted. The study compared Canada's design/delivery model for national nuclear Standards development and implementation to that of the United States, Great Britain and France. These three jurisdictions were selected based on their nuclear energy complement. A benchmarking framework was developed, identifying four key benchmark indicators. Since cost-effectiveness and efficiency are challenging priorities to measure for this type of process, the indicators were aimed at measuring complexity (in terms or process and issues scope), cost and timing. Furthermore, factors were developed which helped to inform each of the four benchmark indicators. The study included a review of documentation from all three jurisdictions, and was further supplemented with interviews with technical experts in the countries selected, except France.[4]

[4] An interview was not conducted with the identified technical representative from France, or a delegate, as they were unreachable during the timeframe, despite multiple CNSC efforts to make contact with the French Nuclear Safety Authority.

An interview guide was drafted based on the benchmarking framework. Interview participants were sent engagement letters three weeks before interviews were scheduled, outlining the intention of the interview, the indicators defining the study and how the study will be used. Notably, there were no privacy or anonymity considerations to be outlined, as these interviews were strictly factual, and used to fill in any information gaps based on data analyzed from the review of documentation.

A customized template was developed by the evaluator to populate findings and conclusions from the survey; this enabled the extraction and analysis of relevant information according to evaluation questions and indicators.

3.2 Limitations of the Evaluation Methodology and Mitigation Strategies

The evaluation methodology was designed to provide multiple lines of evidence, in order to identify relevant evaluation findings. The data and information were collected to respond to the evaluation questions and indicators. As in all evaluations, there are limitations and considerations that should be noted.

Lack of Performance Data
During the planning stage it became evident that CNSC did not have a performance measurement strategy in place for its contribution to the CSA Nuclear Standards Program. As such, there was no documentation of the benefits and measures to assess performance of intended results. In order to be able to effectively evaluate CNSC's contribution to the Nuclear Standards Program, credible and reliable performance data should be collected on an ongoing basis.

Mitigation Strategy: The evaluator met with the Evaluation Working Group (EWG) to identify and gather key documentation on the Nuclear Standards Program, in order to assess whether there was sufficient data that could be generated to effectively conduct an evaluation. CSA maintains an organized record of its documents, accessible by the evaluation working group members, dating back to 2006. The documents inherently tracked CSA's performance over these years. Additionally, the EWG was quick to identify key documents outlining program governance and issues. An initial assessment of this data determined that it was sufficient for effectively conducting an evaluation. A logic model was created and supported by an evaluation matrix, identifying issues, questions, indicators and data sources. Both the logic model and evaluation matrix were validated by the EWG and the Evaluation Advisory Committee (EAC).

Lack of Financial Data
During the planning stage, it became evident that the financial data supporting outputs and outcomes was insufficient. Financial data on outcomes is required, being fundamental to assessing economy. On the other hand, some degree of efficiency was measurable, since CSA produces planned resource tables for the fiscal year. These resource tables include planned person days of CNSC representative(s) on the NSSC, as well as the CSA Nuclear Standards Program technical committees/sub-committees. It was not determined, at the planning stage, whether CNSC staff members track their actual time spent against the planned time identified by CSA.

Mitigation Strategy: The evaluator introduced a financial analysis on planned versus actual expenditures spent on CSA activities, relative to regulatory documents. The underlying assumption was that sufficient financial data was tracked throughout the CNSC, addressing both CSA activities and regulatory document activities. By introducing the regulatory documents comparator, economy could partially be addressed. Additionally, the evaluator introduced proxy measures for cases in which actual financial expenditures could not be obtained. The proxy measures included a series of interview and survey questions targeting recalled time spent on activities related to CSA, and opinions on efficiency and cost-effectiveness (the latter of which is a determinate of economy). Additionally, a benchmarking study was designed as

another line of inquiry, specifically addressing alternative design and delivery approaches (to increase cost effectiveness and efficiency) in three other countries.

4 Management of the Evaluation

4.1 Roles and Responsibilities

The lead evaluator is responsible for managing all phases of the evaluation (planning, conduct and reporting), developing all evaluation deliverables, including the terms of reference, evaluation framework, data collection templates and instruments, contracts, correspondence to interviewees and survey respondents, draft evaluation reports, final evaluation report, technical support on management action plan, and briefing materials to inform senior management of evaluation findings, conclusions and recommendations.

The Evaluation Working Group (EWG) is composed of the Director General, one Director and two senior staff within the Regulatory Policy Directorate. The primary role of the EWG is to help coordinate timely data collection and define the data collection instruments. Furthermore, the EWG played a key role in validating the evaluation framework (including logic model and evaluation matrix) before the Evaluation Advisory Committee (EAC). The EWG also provided input to the draft evaluation report, validating its content before EAC, as well as added input into the management response to evaluation recommendations, via the management action plan.

The EAC is composed of three Directors General, representing the Regulatory Policy Directorate, Directorate of Assessment and Analysis, and the Strategic Planning Directorate (Head of Evaluation). The primary role of the EAC is to provide strategic management input to help validate the evaluation framework (including logic model and evaluation matrix), as well as the evaluation report and management response to evaluation recommendations, via the management action plan, before the Departmental Evaluation Committee's (DEC) and President's approval.

The Management Committee serves as the CNSC DEC, responsible for the timely validation of evaluation reports and management action plans. The DEC is supported secretarially by the Head of Evaluation (Director General of Strategic Planning Directorate) and includes the President of CNSC, the deputy head responsible for approval of all CNSC evaluation reports and management action plans.

4.2 Contracts and Associated Procedures / Considerations

There were two contracts associated with supporting the CSA contribution evaluation:

1) A sole-source contract to develop and conduct a web-based survey.[5]

2) A sole-source contract to develop and conduct a benchmarking exercise.[6]

The contracts supported the evaluation function's use of in-house resources, and contracted resources to produce timely evaluation reports. The evaluator decided to contract out the survey, as the CNSC currently does not hold software licenses to effectively conduct a Web-based survey. The benchmarking study was also deemed suitable to contract out, as content expertise on Standards development could be best utilized by having a contracting firm (with content knowledge in this area) conduct the study.

[5] The sole-source contract to develop and conduct a web-based survey was in the amount of $22,402.25.
[6] The sole-source contract to develop and conduct a benchmarking exercise was in the amount of $24,860.

4.3 Timelines – Planned versus Actual

The timelines for planning and conducting this evaluation were all met as planned and set out in the evaluation framework. Table 4 below identifies the timelines, categorized by planning phase (yellow), conducting phase (green), and reporting phase (pink).

Table 4: Evaluation Timelines

Year	2011			2012					
Phase									
Activity/Month	10	11	12	1	2	3	4	5	6
Review and approve evaluation framework									
Develop and approve evaluation terms of reference									
Develop contracts for evaluation									
Development of data collection tools									
Collect documentation									
Issue contracts for evaluation									
Select survey participants									
Select interviewees									
Conduct document review									
Selection of contractor for evaluation									
Conduct interviews									
Obtain analysis from contractor									
Draft evaluation report									
Approve evaluation report									

4.4 Challenges to Implementation

Timing

This evaluation was expected to be completed within a tight timeline, given that the full evaluation scope and plan had not been previously developed. Without a clear plan (articulated in an evaluation framework, and validated with key program stakeholders and careful project management oversight, against timelines established within that plan), the evaluation would not have been delivered in its intended timeline. Moreover, the lack of financial or performance data, outlined previously under Section 3.2, further compounds the challenge of timing.

Mitigation Strategy: The evaluator met with key program stakeholders at the beginning of the evaluation project, in order to quickly identify and collect relevant background documentation, solicit opinions on perceived issues that define the scope of the evaluation, and identify intended involvement of key stakeholders throughout the evaluation process. An evaluation framework, including a logic model and evaluation matrix, was subsequently developed; this plan effectively set the full scope, methodology and design, and timelines of the evaluation. Frequent consultation with the EWG and EAC were practiced throughout the process. Following the approval of the evaluation framework, the evaluator developed and implemented a comprehensive work breakdown structure, to manage the conduct of the evaluation process. As a result of careful planning and management of timelines, combined with effective communication between the evaluator and key stakeholders, the evaluation report and management action plan achieved its intended timeline.

5 Findings and Conclusions

5.1 Relevance

Evaluation questions explored in this section include:

- Is there a legitimate role for the CNSC's participation in the Nuclear Standards Program?
- Are the Nuclear Standards Program objectives aligned with CNSC's corporate priorities?
- Is there a continued need for the CNSC to participate in the Nuclear Standards Program?

Conclusion

The *Nuclear Safety and Control Act* (NSCA) and the federal *Cabinet Directive on Streamlining Regulation* support CNSC's participation in the CSA Nuclear Standards program. The NSCA establishes that the CNSC is responsible for applying consistent national Standards to the development, production and use of nuclear energy, whereas the cabinet directive encourages the use of organizations, such as the CSA, to develop Standards. The CNSC's contribution to the CSA Nuclear Standards Program is aligned with its corporate priorities, as stated in its annual reports dating back to 2007–08. This alignment is further supported by CNSC employees, who reference/use CSA Standards in their work, and/or participate in the Nuclear Standards Program technical committees/sub-committees where Standards are developed. All the CNSC and industry staff that were interviewed and/or surveyed clearly supported the CNSC's continued participation in the Nuclear Standards Program. Moreover, by participating in this program, the CNSC gains significant key benefits: high quality Standards that are produced and later used in the CNSC regulatory framework; greater understanding of perspectives among the CNSC and industry; better "buy-in" into Standards from industry to facilitate regulation; technical expertise gained and leveraged by participating in the Standards process; and greater efficiency in Standards development, by building on past technical work developed for previous related Standards.

Moving forward, there is identified room for growth, by developing and implementing guidance materials for CNSC staff, covering process and procedures for Standards development and implementation within the CNSC regulatory framework, senior management support of CNSC staff on technical committees/sub-committees, and continued need to monitor CSA Standards as part of the CNSC Regulatory Framework Plan. Additionally, the federal *Cabinet Directive on Streamlining Regulation,* which encourages the use of Standards organizations such as CSA, should be included in the CNSC's efforts to build awareness among staff participating in developing and/or implementing CSA Standards.

Supporting Evidence

Is there a legitimate role for the CNSC's participation in the Nuclear Standards Program?

There is a legitimate role for the Canadian Nuclear Safety Commission's participation in the Nuclear Standards Program, as established under the *Nuclear Safety and Control Act*. The CNSC's participation in the Nuclear Standards Program is supported by the federal *Cabinet Directive on Streamlining Regulation*.

The CNSC is mandated, under the *Nuclear Safety and Control Act* (NSCA, 1997), to apply consistent national Standards to the development, production and use of nuclear energy. Moreover, the NSCA provides the CNSC with comprehensive powers to establish and enforce these national Standards for nuclear energy in the areas of health, safety, security and environment. The federal *Cabinet Directive on Streamlining Regulation*, which applies to all departments and agencies involved in the federal regulatory process, encourages the use of standardization tools and approaches offered by Canada's National Standards System (CNSS) governed by the Standards Council of Canada (SCC). The SCC accredits the Canadian Standards Association to develop national Standards in many areas, including the nuclear sector.

Are the Nuclear Standards Program objectives aligned with CNSC's corporate priorities?

The contribution to the Canadian Standards Association's Nuclear Standards Program is aligned with CNSC's corporate priorities.

Explicit reference to the CNSC's contribution to the revision, updating and modernizing of several CSA Standards for nuclear power plants is provided in the CNSC's *Annual Reports* dating back to 2007–08. These annual reports state that "CNSC staff contributed to the revision, updating and modernizing of several Canadian Standards Association standards for nuclear power plants[…]"

Survey respondents (CNSC members of technical committee/sub-committees and other CNSC staff) were asked to rate if the objective of the CSA Nuclear Standards Program aligned with CNSC's four corporate priorities. Overall, a high degree of alignment is perceived. The few respondents who felt the objectives were only "somewhat aligned" generally focused on the differing priorities and perspectives of the CNSC versus the business community (the CNSC is focused on safety, while the business community is focused on business processes and profits).

Is there a continued need for the CNSC to participate in the Nuclear Standards Program?

In order to make a clear and full assessment of a continued need for the CNSC to participate in the Nuclear Standards Program, a specific series of questions – covering assessment of continued need, key benefits, areas for change (i.e., improvement) and clear roles between CNSC and CSA – was provided to all survey respondents.

There is a continued need for the CNSC to participate in the Nuclear Standards Program. Findings from the interviews and survey respondents indicate that there is a continued need for the CNSC to participate in the CSA Nuclear Standards Program – as suggested by 100% of interviewees and 88% of survey respondents. Support for the CNSC participation in the program is evident across all three categories of respondents; however, CNSC staff members who did not sit on technical committees/sub-committees tended to be slightly less supportive (with only 71% of them indicating agreement).

There are significant key benefits gained from CNSC's participation in the Nuclear Standards Program. All survey respondents and interviewees were asked to identify key benefits arising from CNSC's participation in the CSA Nuclear Standards Program. The benefits thus identified tended to be consistent, covering the following priorities:

- The CSA has a formal and rigorous process for Standards development that results in high quality Standards that can be used in the CNSC regulatory framework.
- Greater understanding of perspectives between CNSC and industry, including clarity of the difference between regulation (specifying the "what is to be done") and Standards (specifying the "how it is going to be done").
- Better "buy-in" from industry on technical aspects included in Standards and referenced in the CNSC regulatory framework.
- All participants leverage technical expertise, by participating in the development of Standards.
- Continuous building and evolution of Standards development practices - when a new standard is developed, there is increased efficiency in not having to re-discuss the technical groundwork covered for previous related Standards.

There is identified room for growth in the future, to further support additional needs. Although this remains outside of CNSC control, this is directly impacted by the ability of CSA to broaden its membership base. All survey respondents and interviewees were asked to provide opinions on any changes required to CNSC's participation in the Nuclear Standards Program. The following changes, or opportunities for improvement, were consistent amongst respondents and interviewees:

- There is a need to review and clarify objectives, processes and procedures for implementing Standards as a regulatory requirement, including guidance for CNSC staff participating in CSA technical committees.
- There is a need to support CNSC staff participating in Standards development by including more senior management oversight, particularly if any issues arise that disrupt the Standards process and if reviews of Standards are undertaken at a more strategic level within the CNSC.
- There is an ongoing need to ensure CSA Standards do not duplicate CNSC work and are used to support the CNSC framework; the CNSC Regulatory Framework Plan is a key driver of prioritizing and organizing the CNSC's efforts in this area.

Although not directly related to the CNSC's participation, interviewees frequently suggested that CSA should broaden its membership, by including more organizations representing other technologies, characteristic of new builds for Canada in the future, and participate in international organizations such as the International Atomic Energy Agency (IAEA).

There is a need to further clarify roles and responsibilities of the CNSC and CSA, by developing guidance materials for staff, covering processes and procedures for participating in Standards development and implementation. All survey respondents and interviewees were asked to provide their opinions on whether the roles and responsibilities of the CNSC and CSA are clear, with 69% of survey respondents and 60% of interviewees stating that this was, indeed, the case. It is worth noting that, among the survey respondents, 57% of the CNSC employees felt that the roles and responsibilities are not clear. Additional explanations were obtained from those survey respondents and interviewees who indicated that roles and responsibilities were not clear. They consistently stated that there is a general lack of understanding of processes and procedures concerning the CNSC's role on technical committees (particularly related to voting), who takes the lead in preparing a standard, and knowledge of CNSC's process for implementing Standards as regulatory requirements.

5.2 Effectiveness

Evaluation questions explored in this section include:

- To what extent have strategic and operational plans provided clear direction to the Nuclear Standards Program?
- To what extent is committee progress monitored and stakeholders are kept informed of the status of projects?
- To what extent are the published Standards used by the CNSC for the benefit of the regulatory framework and in licences?
- To what extent have special reviews and task force reports led to the continuous improvement of the management of the Nuclear Standards Program?
- To what extent is the CNSC aligned with the federal *Cabinet Directive on Streamlining Regulation*?

Conclusions

The Standards developed by the CSA Nuclear Standards Program are integral to the CNSC's ability to regulate the nuclear industry. Currently, 82% of the available CSA Standards are referenced in requirements (i.e., mandatory) as well as guidance (i.e., voluntary) documents, otherwise referred to as CNSC's regulatory framework. The CNSC staff members responsible for maintaining and implementing the CNSC regulatory framework refer to/use CSA Standards on a daily and weekly basis; ultimately, the Standards provide them with the tools for day-to-day compliance verification.

Status reports, special reviews and task forces have all contributed to the success of the Nuclear Standards Program in producing timely and relevant Standards. However, the information inherent in the status reports (i.e., information on performance and the developing needs and trends of the Nuclear Standards Program) is not effectively communicated to CNSC staff, especially those participating in technical committees/sub-committees. As a result, this may have impacts on the work of these technical committees/sub-committees, as well as the ability of the CNSC staff on these committees to prepare for meetings and brief/update their supervisors.

Furthermore, any efforts to inform all CNSC staff members (whether involved in technical committees/sub-committees, and/or those who refer to/use CSA Standards in their work) needs to include clarity on the strategic direction and application of Standards development. Currently, many CNSC staff members are unaware of the distinction between the CNSC's responsibility for setting regulatory requirements and the CSA's role in developing consensus industry Standards. Additionally, the environment which defines Canadian regulation and the federal *Cabinet Directive on Streamlining Regulation* (encouraging collaboration between government and non-government bodies to provide an efficient system for regulating) should be included in the CNSC's efforts to engage all of its staff participating in developing or implementing CSA Standards.

Supporting Evidence

To what extent have strategic and operational plans provided clear direction to the Nuclear Standards Program?

It is evident that all CNSC employees participating in the CSA Nuclear Standards Program technical committees need to be provided with sufficiently clear strategic and operational direction. More specifically, the jurisdiction and application of Standards development by the CSA Nuclear Standards Program and implementation within the CNSC regulatory framework needs to be defined and clearly communicated. This is particularly evident among CNSC staff who are new participants on the Nuclear Standards Program technical committees/sub-committees.

Strategic and operational planning within the Nuclear Standards Program is integrated into technical committee work through NSSC status reports (used to inform stakeholders of any constraints, priorities, or strategies regarding future projects to increase efficiency) and *Chairs Task Force Reports* (used to identify and develop shared improvements for the Nuclear Standards Program).[7] Some examples of identified constraints, priorities or strategies and subsequent improvements include, but are not limited to: the implementation of executive committees, which improve planning and enhanced control of the

[7] These reports include: the technical committee report card, the NSSC resources allocation table, the Nuclear Standards Program business plan, the 10 year technical committee plan, individual technical committee reports, and inputs on issues that propose risk to current or future standards development.

development process; and enhanced CSA staff involvement, which can significantly reduce demand on stakeholder's time and the length of the standard development schedule.

Furthermore, strategic and operational planning is driven by CSA special review exercises, engaging its Nuclear Standards Program stakeholders around a specific issue to determine an agreed-upon course of mitigating/resolving actions for the future. The most recent special review exercise took place in June 2009, and examined the development of CSA Standards and their implementation within the regulatory context.[8] It was clear from this strategic workshop that the differing roles and responsibilities between the CNSC and CSA do not seem to be well understood, and there are unresolved issues regarding the implementation of new or revised Standards into the CNSC regulatory framework. Two mitigation strategies were put forward: the first was to clarify the roles and responsibilities between the CNSC and CSA – both organizations need to define the distinction between the "what" (i.e., CNSC's responsibility for setting regulatory requirements) and the "how" (i.e., CSA's ability to provide expectations for how licensees meet regulatory requirements) and communicate this thoroughly to all stakeholders; the second strategy (met with significant agreement among the nuclear industry) would allow licensees to submit concurrent applications in order to amend their licenses to adopt the new or revised Standards, resulting in equal application of requirements to all licensees.

Based on the feedback received during the interviews, there is a significant difference between CNSC staff members who participate in the Nuclear Standards Program management committees (NSSC and the augmented Executive) and CNSC staff who are new participants in the Nuclear Standards Program Technical Committees. Those CNSC staff members who have participated in technical committees for successive years, as well as in the program's management committees, clearly understand the strategic and operational direction of the Nuclear Standards Program, and fundamentally understand the differing roles and responsibilities between the CNSC and CSA.

Further evidence of this distinction was exhibited in the survey data. The CNSC staff members who participate in the Nuclear Standards Program technical committees (including new participants) were asked to state whether the existing strategic and operational plans provided them with clear direction for working in those committees. The majority (63%) stated they were not being provided with sufficient direction. Some respondents indicated that they received directions from their director, while others said that they received no direction at all. Notably, two respondents further commented that there is a general lack of clarity with respect to the overall strategy or direction for the CNSC's involvement in the CSA program.

To what extent is committee progress monitored and stakeholders are kept informed of the status of projects?

Committee progress is monitored, and stakeholders are kept informed of the status of projects, through various reports produced by the CSA Nuclear Standards Program. These various status reports – identifying progress, needs and trends – have contributed to the success of relevant and timely CSA Standards. NSSC members are kept well informed of the status of the Nuclear Standards Program; however, CNSC staff participating in the technical committees/sub-committees, in particular, are not. The strategic content (i.e., developing needs, trends and performance of the Nuclear Standards Program) inherent in the status reports may have significant

[8] The special review exercise defined this issue by posing three questions: (1) Are the CSA standards the right structure and content relative to CNSC regulatory documents and are industry needs being met? (2) Is there a system in place to handle the impact of changes required as new standards are published? (3) What needs are emerging given the changing industry environment?

impacts on the functioning of technical committee/sub-committee work as well as the ability for CNSC staff participants of these committees to prepare for meetings and brief/update their supervisors.

Progress is monitored, and stakeholders are kept informed of the status of projects, through various documents produced and disseminated by the Nuclear Standards Program. The documents produced and disseminated biannually include: technical committee status reports (which provide NSSC members with an overview of the Standards that are on track, Standards that are at risk – but manageable in terms of schedule and do not need NSSC intervention, and Standards that need NSSC intervention to move forward, along with new standard proposals); NSSC status reports (which outline the status of all Standards in a fiscal year, and provide information about developing needs and trends that will affect the future of the program); the program health reports (which provide an assessment of how Standards development is performing against the 10-year technical committee plan); and action item logs (which serve to organize action items for the NSSC, the NSSC chair, the CSA staff, or the TC chairs, including due dates and report on status). The documents produced and disseminated annually include: the 10-year technical committee plans (which provide a roadmap for the current fiscal year and future years regarding the preparation, review and issuance/publishing of amendments to Standards, new editions of Standards, or development of Standards that did not exist in the past and were recently introduced); and NSSC resource allocation tables (which establish planned in-kind contributions "person-days" by each member per technical committee).

In essence, all of the documents produced by the Nuclear Standards Program report directly on, or support the development of Standards. These various monitoring efforts serve to manage and oversee the program, and are likely to have contributed to the success in producing timely Standards.

As exhibited in Table 5 below, the Nuclear Standards Program is generally on track to meeting its intended standards development schedule. Where NSSC intervention is needed to move forward, all issues appear to be resolved without consistent continuation into subsequent years. Where yellow (at risk but manageable and no NSSC intervention) is listed, most of the issues seem to be consistently related to timing (lags due to French translation, the addition of new members to the technical committees, drafting the standard taking longer to develop than expected, or publication time requiring longer than scheduled). Where red (needs NSSC intervention) is listed, issues span from time lag (French translation) to additional resources being required to complete the work associated with the standard in question. A single unresolved item, CSA Standard N290.3, was put on hold due to difficulty in forming a technical sub-committee; the issue was resolved after a year and a half.

Table 5: Assessment of Nuclear Standards Program Planned Development Schedule

Coding/Report	On Track	At Risk	Require NSSC Intervention	New Proposal	Total
Spring '06	14	8	0	0	22
Fall '06	23	0	2	6	31
Spring '07	16	0	7	3	26
Fall '07	27	1	0	0	28
Spring '08	21	4	0	0	25
Fall '08	24	4	1	1	30
Spring '09	28	1	1	0	30
Fall '09	27	1	1	0	29
Spring '10	20	0	0	6	26
Fall '10	20	0	0	2	22
Spring '11	22	0	1	0	23
Fall '11	22	0	1	5	28

Both the CNSC staff members who participate in technical committees/sub-committees and the CSA Nuclear Standards Program members/stakeholders were asked if they receive status reports. If they indicated that they did, they were further asked if they received them in a timely manner, in order to effectively participate in the committees. Based on these survey findings, a significant proportion of CNSC technical committee/sub committee members do not receive status reports (64%), compared to CSA members (24%). However, all those CNSC staff members who said they do receive reports (36%) felt they received them in a timely manner. This was also exhibited, albeit to a lesser degree, with CSA members (92%). CNSC staff members who receive status reports were asked whether the reports could be improved in any way. Suggestions for improvement included: having a template for the status reports, which would make it easier to prepare the reports and easier to read; review/revise metrics contained in the reports, to make sure they reflect the status of the Nuclear Standards Program; and provide more information on the progress made on the development of CNSC requirements and guidance documents.

Based on the feedback received in interviews, it was clear that the status reports are delivered to members of the NSSC. Additionally, it was noted that the CNSC representative on the NSSC hosts annual meetings with CNSC staff on technical committees/sub-committees, to share the overall status of the Nuclear Standards Program and solicit feedback on current and future CNSC issue areas.

To what extent are the published standards used by the CNSC for the benefit of the regulatory framework?

There is significant benefit to including CSA Standards in the CNSC regulatory framework, as there is a clear identified need for use of CSA Standards among the CNSC staff involved in developing or implementing them. Over the period 2006–11, the CSA Nuclear Standards Program has published 29 Standards and reaffirmed 9 existing Standards, for a total of 38 publicly available Standards. The CNSC uses 82% of the CSA Standards in its requirement (i.e., mandatory) and guidance (i.e., voluntary) documents.

There are currently 38 published CSA nuclear Standards[9], within the time period 2006–11. 29 of these 38 were developed, and 9 were reaffirmed. Taking primary (direct) and secondary (indirect) reference to CSA Standards into account, 31 out of 38 (a total of 82%) are referenced in the CNSC regulatory framework. The regulatory framework consists of requirements (i.e., mandatory) documents – including regulations, licenses, *License Condition Handbooks*, regulatory documents, and nuclear substance regulatory documents – as well as guidance (i.e., voluntary) documents – represented by guides, CNSC Standards, policies, staff review procedures and other documents. All of these documents were examined, in order to assess the extent to which CSA Standards are referenced; all licenses and *License Condition Handbooks* reference CSA Standards (7 out of 7). To a lesser extent, CSA Standards are also referenced in regulatory documents (5 out of 16), guides (4 out of 31), CNSC Standards (5 out of 7) and staff review procedures (13 out of 73). CSA Standards were not found in CNSC nuclear substance regulatory documents, policies, or other documents. Table 6 (below) exhibits the primary and secondary references to CSA Standards found in both requirement and guidance documents, as part of the CNSC regulatory framework.

[9] Canadian Standards Association, "Shop CSA", <http://shop.csa.ca/en/canada/energy/nuclear/icat/nuclear#nuclear?sort=name&parentCategoryRef=nuclear&order=asc&q=*&setpagenum=1&isviewall=1&perpage=38&bklist=icat,5,shop,publications,energy,nuclear&_suid=1341508385049099520826183949 35>

Table 6: CSA Standards Referenced in CNSC Regulatory Framework[10]

Primary CSA Standard Reference (by Code)	CSA Standard (by Name)	Published or Reaffirmed (2006–11)	Secondary CSA Standard Reference (by Code)	Regulations	Licenses	*License Condition Handbooks*	Regulatory Documents	Guidance Documents	CNSC Standards	Staff Review Procedures
N285.0/ N285.6	*General Requirements for Pressure-Retaining Systems and Components in CANDU Nuclear Power Plants / Material Standards for Reactor Components for CANDU Nuclear Power Plants*	published '08	N285.4 N285.5 N285.8 N286 N289.1 N289.2 N289.3 N289.4 N289.5		X	X				X
N285.4	*Periodic Inspection of CANDU Nuclear Power Plant Components*	published '09	N285.0/N285.6 N285.8		X	X			X	
N285.5	*Periodic Inspection of CANDU Nuclear Power Plant Containment Components*	published '08	N285.0/N285.6 N285.4 N287.7		X	X			X	
N285.8	*Technical Requirements for In-Service Evaluation of Zirconium Alloy Pressure Tubes in CANDU Reactors*	published '10	N285.0/N285.6 N285.4		X	X				
N286	*Management System Requirements for Nuclear Facilities*	reaffirmed '10	N286.7-99		X	X	X	X	X	
N286.7-99	*Quality Assurance of Analytical, Scientific and Design Computer Programs for Nuclear Power Plants*	reaffirmed '07	N286		X	X	X	X		
N286.7.1[11]	*Guideline for the Application of N286.7-99, Quality Assurance of Analytical, Scientific and Design Computer Programs for Nuclear Power Plants*	published '09	N286 N286.7-99							
N287.1	*General Requirements for Concrete Containment Structures for CANDU Nuclear Power Plants*	reaffirmed '09	N286 N287.2 N287.7 N289.1 N289.2			X*				
N287.2	*Material Requirements for Concrete Containment Structures for CANDU Nuclear Power Plants*	published '08	N285.6 N287.1 N287.3 N287.4 N287.5			X*				
N287.3	*Design Requirements for Concrete Containment Structures for CANDU Nuclear Power Plants*	reaffirmed '09	N285.0 N287.1 N287.2 N287.4 N287.5 N287.6 N287.7 N289.2 N289.3			X*				
N287.4	*Construction, Fabrication and Installation Requirements for*	published '09	N285.0/N285.6 N286			X*				

[10] Light grey illustrates a primary reference of a CSA nuclear Standard in the CNSC regulatory framework; light blue illustrates a secondary reference of a CSA nuclear Standard in the CNSC regulatory framework; white illustrates that there is no current primary or secondary reference of a CSA nuclear Standards in the CNSC regulatory framework.

[11] CSA nuclear Standard N285.7.1 is a guideline primarily developed by a COG working group.

	Concrete Containment Structures for CANDU Nuclear Power Plants		N287.1 N287.2 N287.3 N287.5							
N287.5	*Examination and Testing Requirements for Concrete Containment Structure for Nuclear Power Plants*	published '11	N285.0/N285.6 N286 N287.1 N287.2 N287.3 N287.4 N287.5			X*				
N287.6	*Pre-operational Proof and Leakage Rate Testing Requirements for Concrete Containment Structures for Nuclear Power Plants*	published '11	N285.0/N285.6 N287.1 N287.7			X*				
N287.7	*In-Service Examination and Testing Requirements for Concrete Containment Structures for CANDU Nuclear Power Plants*	published '08	N285.5 N287.1 N287.2 N287.6		X*	X				
N288.1	*Guidelines for Calculating Derived Release Limits for Radioactive Material in Airborne and Liquid Effluents for Normal Operation of Nuclear Facilities*	published '08	N288.2		X*	X*				
N288.2	*Guidelines for Calculating Radiation Doses to the Public from a Release of Airborne Radioactive Material under Hypothetical Accident Conditions in Nuclear Reactors*	reaffirmed '08	N288.1		X*	X*				
N288.4	*Environmental Monitoring Programs at Class I Nuclear Facilities and Uranium Mine and Mills*	published '10	N288.1 N292.3			X*				X
N288.5[12]	*Effluent Monitoring Programs at Class I Nuclear Facilities and Uranium Mines and Mills*	published '11	N288.1 N288.4 N292.3							
N289.1	*General Requirements for Seismic Design and Qualification of CANDU Nuclear Power Plants*	published '08	N285.0/N285.6 N286 N287.1 N289.2 N289.3 N289.4 N289.5 N290.6 N290.13			X*				X
N289.2	*Ground Motion Determination for Seismic Qualification of Nuclear Power Plants*	published '10	N289.1 N289.3			X*				X
N289.3	*Design Procedures for Seismic Qualification of Nuclear Power Plants*	published '10	N285.0/N285.6 N285.4 N286 N286.7-99 N287.3 N289.1 N289.2 N291			X*				X
N289.4	*Testing Procedures for Seismic Qualification of CANDU Nuclear Power Plants*	reaffirmed '08	N289.1 N289.2 N289.3 N289.5			X*				X
N289.5	*Seismic Instrumentation*	reaffirmed '08	N289.1			X*			X	

[12] The CSA nuclear Standard N288.5 was recently published in 2011 and is being considered for inclusion in CNSC regulatory framework.

	Requirements for CANDU Nuclear Power Plants		N289.2 N289.3 N289.4							
N290.0/ N290.2[13]	*General Requirements for Safety Systems of Nuclear Power Plants / Requirements for Emergency Core Cooling Systems of Nuclear Power Plants*	published '11	N285.0/N285.6 N285.4 N285.5 N286 N287.1 N287.2 N287.3 N287.4 N287.5 N287.6 N287.7							
N290.0/ N290.3[14]	*General Requirements for Safety Systems of Nuclear Power Plants / Requirements for the Containment Systems of Nuclear Power Plants*	published '11	N285.0/N285.6 N285.4 N285.5 N286 N287.1 N287.2 N287.3 N287.4 N287.5 N287.6 N287.7 N289.1 N289.2 N289.3 N289.4 N289.5 N290.5 N290.6 N290.13 N290.15 N293							
N290.1[15]	*Requirements for the Shutdown Systems of CANDU Nuclear Power Plants*	reaffirmed '11	N285.0 N286							
N290.4[16]	*Requirements for Reactor Control Systems for Nuclear Power Plants*	published '11	N285.0/N285.6 N285.4 N286 N289.1 N289.2 N289.3 N289.4 N289.5 N290.1 N290.13 N290.14							
N290.5	*Requirements for Electrical Power and Instrument Air Systems of CANDU Nuclear Power Plants*	published '06	N285.0/N285.6 N286 N289.1 N289.2 N289.3 N289.4 N289.5 N290.13			X*				
N290.6	*Requirements for Monitoring and*	published '09	N285.0/N285.6		X	X				

[13] The CSA nuclear Standards N290.0/N290.2 were published in 2011, and are being considered for inclusion in CNSC regulatory framework.
[14] Ibid.
[15] The CSA nuclear Standard N290.1 was reaffirmed in 2011 and utilized by licensees in licensing applications.
[16] Ibid.

	Display of Nuclear Power Plant Safety Function in an Event of an Accident		N285.4 N285.5 N286 N289.1 N289.2 N289.3 N289.4 N289.5 N290.13 N290.14							
N290.13	*Environmental Qualification of Equipment for CANDU Nuclear Power Plants*	reaffirmed '10	N286 N289.1 N289.4		X	X				
N290.14[17]	*Qualification of Pre-Developed Software for Use in Safety-Related Instrumentation and Control Applications for Nuclear Power Plants*	published '07	N286							
N290.15	*Requirements for the Safe Operating Envelope of Nuclear Power Plants*	published '10	---		X*	X*		X		
N291	*Requirements for Safety-Related Structures for CANDU Nuclear Power Plants*	published '08	---			X*				
N292.2	*Interim Dry Storage for Irradiated Fuel*	published '07	N286 N287.2 N289.1				X	X		X
N292.3	*Management of Low and Intermediate Level Radioactive Waste*	published '08	N286 N292.2		X*	X	X	X		
N292.5	*Guideline for Exemption or Clearance from Regulatory Control of Materials that Contain, or Potentially Contain Nuclear Substances*	published '11	N288.4 N288.5	X						
N293	*Fire Protection for CANDU Nuclear Power Plants*	published '07	N285.0 N286 N289.3 N290.5 N290.6		X	X		X	X	X
N294	*Decommissioning of Facilities Containing Nuclear Substances*	published '09	N285.0/N285.6 N286 N288.4 N292.3 N293		X*	X*				

[17] The CSA nuclear Standard N290.14 is utilized by licensees to qualify software components at nuclear power plants.

* Some licenses include reference to the following CSA Standards: N287.7 (Bruce A and B, Gentilly-2, Pickering A and B, and Point Lepreau), N288.1 (Pickering A), N290.15 (Gentilly-2, Point Lepreau), N292.3 (Bruce A and B), N294 (Gentilly-2, Pickering A, Point Lepreau). Some *License Condition Handbooks* include reference to the following CSA Standards: N287.1-.6 (Pickering A, Point Lepreau), N288.1 (Gentilly-2, Pickering A, Point Lepreau), N288.4 (Point Lepreau), N289.1-.5 (Pickering A, Point Lepreau), N290.5 (Pickering A, Point Lepreau), N290.15 (Gentilly-2, Point Lepreau), N291 (Pickering A, Point Lepreau), N294 (Gentilly-2, Pickering A, Point Lepreau).

All interviewees and survey respondents were asked if there is a need for both CSA Standards and regulatory documents, with 100% of interviewees and 89% of all survey respondents being in agreement.

Additionally, all interviewees and survey respondents were asked to quantify how many times a month they refer to (or use) CSA Standards. The average among all survey respondents was 13 times a month. Interviewees preferred to answer the same question stating "daily", "weekly", "monthly" or "yearly", with the majority (88%) citing "daily" or "weekly". Responses from interviews and survey respondents both indicate high reference/use of CSA Standards.

All interviewees, as well as surveyed CNSC staff on technical committees/sub-committees and other CNSC staff were asked to identify key benefits of the CSA Standards to them. Four key benefits were identified: providing CNSC staff with the tools for day-do-day compliance verification; providing licensees with technical requirements (guidance) for meeting regulatory requirements; CSA Standards represent the minimum requirements agreed to by industry, making enforcement easier; and enabling CNSC staff to participate alongside top talents in academia and industry to form safety requirements that are later referenced in regulation.

To what extent have special reviews and task force reports led to the continuous improvement of the management of the Nuclear Standards Program?

The special reviews and task forces are all developed to improve a specific issue area identified by the Nuclear Standards Program membership, and are dissolved once that area has been improved. It is evident that these internal improvement practices have contributed to improved management of the CSA Nuclear Standards Program.

Over the period March 31, 2006 - March 31, 2011, three special reviews were conducted: Beyond Design Basis Accidents (which seeks to find a common understanding on how to write Standards for "poorly defined events, criteria and scope")[18], Industry and Regulatory Compliance to CSA Process (which seeks to improve awareness and compliance to the CSA Standards development process), and the Lean Thinking Initiative (seeking to streamline the CSA Standards development process to a 6-month development cycle, and remove any unnecessary steps). Additionally, over this same time period, eleven task forces were put into action, to improve the technical committee process, CSA/CNSC alignment, the NSSC mandate, as well as a host of other subject areas. The special reviews and task forces all provide input into the development of Canadian Nuclear Standards, whether explicitly (through developing new Standards, editions or amendments using technology neutral concepts) or implicitly (through improving the work of technical committees, by shortening the time it takes to develop Standards products, and decreasing the likelihood of negative ballots during the decision-making process). Each special review and task force is developed to target the specific area of concern, and is dissolved once a report has been tabled at NSSC.

A small number of interviewees – specifically, those who were aware of CSA special reviews and task forces – and surveyed Nuclear Standards Program members/stakeholders and CNSC staff on technical committees/sub-committees were asked if these reports have contributed to improving the management of the program. 100% of interviewees and 74% of survey respondents stated that the special review and task force reports have contributed to improved management. The remaining survey respondents (26%) who indicated that the reports have not contributed to improved management of the program were asked to

[18] Canadian Standards Association, Chairs Task Force Report, December 2007, slide 9.

provide further clarifications. Two explanations were provided: CSA must work on improving the reports; there are too many reports, and therefore the program needs more focus.

To what extent is CNSC aligned with federal Cabinet Directive on Streamlining Regulation as a result of participating in the Nuclear Standards Program?

There is evidence to suggest that many CNSC staff members do not understand the rationale established in the federal *Cabinet Directive on Streamlining Regulation*, which supports the CNSC's contribution to and participation in the CSA Nuclear Standards Program. There is also evidence that the content of the federal directive is not widely communicated within the CNSC, particularly among CNSC representatives on technical committee/sub-committees and, to a lesser extent, other CNSC employees who reference/use CSA Standards in their work.

The survey and interviews included the same question, to test the alignment between the objectives of the CSA Nuclear Standards Program and the federal *Cabinet Directive on Streamlining Regulation*: "To what extent do you feel that the CNSC is responsive to federal directives on streamlining regulations, as a direct result of participating in the CSA Nuclear Standards Program?" The findings were mixed; surveyed CNSC staff members on technical committees/sub-committees and other CNSC staff were more likely to state that the Nuclear Standards Program is having only a limited impact on responding to the federal directive. Most interviewees, on the other hand (93%) felt that the CNSC is responsive to this policy by participating in the program.

It is difficult to determine whether any external factors influenced the results of the survey. The interviews targeted mainly directors general, who may be more familiar with the content of this policy, whereas the survey addressed mainly technical specialists and directors who may not be as familiar with the subject. Additionally, interviews provide opportunities to ask clarifying questions, in order to confirm the responses, whereas the survey is set up to be close-ended.

Those who provided a positive assessment of this relationship stated that: a) by participating in the Nuclear Standards Program, the CNSC assists in the creation of Standards that get incorporated into a license requirement, thereby avoiding new regulations; b) the CSA is representative of the nuclear industry, and is involved in developing the Standards; c) through the exercise of streamlining the CNSC regulatory framework, a number of older regulatory documents got amalgamated into new regulatory documents or CSA Standards. The survey respondents who indicated that the CNSC was not responsive to the federal directive provided the following reasons: a) streamlining regulations is about regulations, while CSA is focused on Standards; b) CSA Standards should be used to complement and support regulations, and not introduce new requirements; and c) there is no clear policy in terms of engagement of staff (as well as for the CNSC, as an organization) for participation in the program. Note, that these responses are indicative of not fully understanding the context of the federal directive.

Ultimately, the fact that some CNSC staff members do not fully understand the federal directive is indicative that the CNSC has not clearly articulated its rationale for contributing to – and participating in – the CSA Nuclear Standards Program. The Government of Canada values the use of tools and approaches offered by the Standards Council of Canada, in which CSA is a member. The use of a mutually agreed-upon best practice by industry stakeholders improves the acceptance of the requirement, and reduces the need for multiple testing of that specific requirement; effectively, the regulatory approach has been streamlined.

5.3 Efficiency and Economy

Under the Treasury Board *Evaluation Policy* (April 1, 2009), efficiency is defined as maximizing the outputs produced with a fixed level of inputs, or minimizing the inputs used to produce a fixed level of outputs. Economy is defined as "minimizing the use of resources […] to achieve expected outcomes."[19] These elements of performance are demonstrated when:

a) outputs are produced at minimum cost (efficiency)
b) outcomes are produced at minimum cost (economy)

In an effort to determine the efficiency and economy of the CNSC contribution to the CSA Nuclear Standards Program, the following evaluation questions were explored:

- Are there options for CNSC's participation in the Nuclear Standards Program that could reduce the cost of its contribution without adversely affecting results?
- Are there more cost-effective ways for the CNSC to participate in the Nuclear Standards Program committees?
- Are there more efficient or economical ways for the CNSC to develop accredited nuclear Standards?
- What, if any, unintended (positive or negative) outcomes have occurred as a result of CNSC's participation in the Nuclear Standards Program?

Conclusion

It is not possible to determine the extent to which the CNSC's contribution to the CSA Nuclear Standards Program is economical at this time. Additionally, the extent to which efficiency could be assessed is limited; a partial allocative efficiency exercise was undertaken based on available data. There was no discrepancy between planned and actual contribution funding spent on the Nuclear Standards Program from 2006–11, and the planned person days for each technical committee/sub-committee in which the CNSC participated accounted for (on average) 405.04 person days per year. In assessing planned versus actual time spent on all activities related to the Nuclear Standards Program, the efficiency analysis was limited, because the CNSC does not track in a specific and consistent manner, its actual time spent on these activities. The majority of CNSC staff members use the Integrated Time Accounting System (ITAS) program to track their time spent on these activities; however, the cost code includes other activities, such as time spent on developing regulatory documents. As a result, the actual time spent on Nuclear Standards Program activities alone is not known.

Notwithstanding the lack of data to support a full analysis of efficiency and economy, there was a high degree of agreement among CNSC staff (both interviewed and surveyed) that the CNSC contribution to the Nuclear Standards Program was a good investment, and that technical committees/sub-committees (where Standards are developed) were managed in a cost-effective manner. Both of these elements are proxy indicators used to assess some degree of efficiency and economy; the findings suggest that the CNSC is achieving some degree of efficiency and economy by contributing to the CSA Nuclear Standards Program.

A benchmarking study was undertaken to compare Canada's approach to nuclear Standards development and implementation to that of Great Britain, France, and the United States. While the study was limited in generating a concrete assessment of efficiency and economy (since available cost data was very limited in all jurisdictions examined), it ultimately revealed that there are many models for Standards development. A regulator can choose the value it places on Standards; it can mandate that Standards should be

[19] Treasury Board of Canada Secretariat, *Policy on Evaluation* (April 1, 2009) <http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=15024&section=text#cha4>.

developed by a consensus body-in-law, or it can choose to not include Standards as part of a regulatory regime at all, thereby rendering Standards development as a voluntary option of industry, for their own benefits. Additionally, if the regulator places value in Standards development, it can further choose to participate in the Standards development process or not.

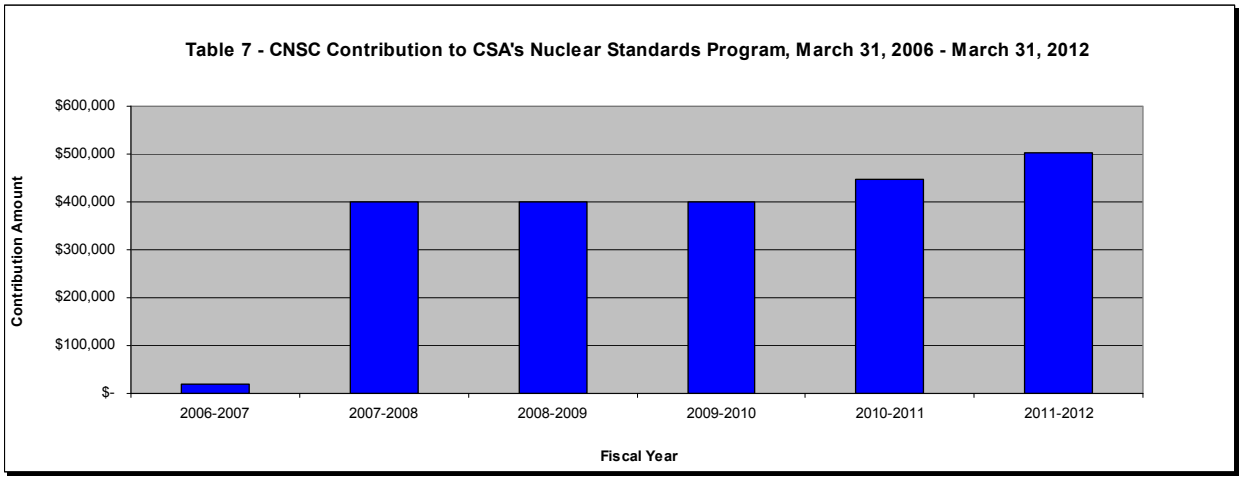
There were no unintended positive or negative outcomes experienced among any of the CNSC staff and CSA members/stakeholders interviewed and surveyed.

Supporting Evidence

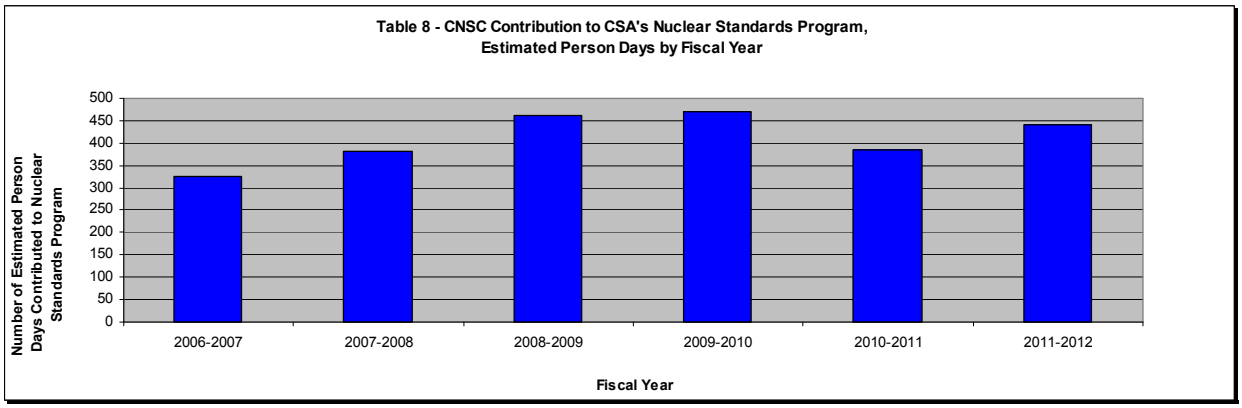
Are there more efficient or economical ways for the CNSC to develop nuclear standards or other nuclear regulatory documents?

Comparison of cost in developing a regulatory document versus a CSA Standard could not be achieved, as the CNSC – for the most part – does not track its time spent on CSA activities as separate from regulatory documents. A partial allocative efficiency assessment was undertaken, based on the availability of financial data on planned and actual contribution dollars, as well as planned estimates of CNSC staff time devoted to the Nuclear Standards technical committee/sub-committees. There was no discrepancy between planned and actual contribution dollars spent on the CSA Nuclear Standards Program from 2006–11. However, data on actual CNSC staff time spent on CSA activities was not available, as the CNSC does not have a specific or consistent model for tracking staff time spent on CSA activities.

Some financial data was available; in order to conduct a partial allocative efficiency assessment of planned and actual contribution dollars spent on the CSA Nuclear Standards Program, as well as planned estimates of CNSC staff time spent on the Nuclear Standards Program technical committees/sub-committees. Contributing funding has increased from $20,000 in 2006–07, to $400,000 from 2007–10, to $448,075 in 2010–11, and to $513,325 in 2011–12. In 2006–07, the Nuclear Standards Program accepted a funding proposal to staff various CSA employees as project managers within each of the technical committees, in response to the significant growth experienced in the Standards development areas and the need to produce timely Standards. In 2010–11 and 2011–12, the program expanded again, due to the update to the Certified Exposure Device Operators (CEDO) personnel certification program. Contribution dollars in 2010–11 also included a small one time payment of $11,300 for a study on methodologies inspections of balance of plant pressure retaining systems and components. All funds were expended as planned, and are exhibited in Table 7 below.



Every year, the CSA Nuclear Standards Program develops planned estimates of staff time devoted to technical committees/sub-committees, and distributes this to its members. The planned estimates are based on the status of each Standard development schedule and the necessary work identified by the technical committee to meet the timelines set out in the Nuclear Standards Program 10-year plan.[20] The total planned time per year varies, and reflects the demand identified by each Standard development schedule against the 10-year plan. The average amount of time that the CNSC spent participating in technical committees/sub-committees was 405.04 person days, with the maximum amount of 471 person days spent in 2009–10, and minimum amount of 324.7 person days spent in 2006–07.[21] In other words, the average number of full-time equivalents (FTEs) is approximately 1.92 FTEs per year.[22] Table 8 below illustrates the estimated person days of CNSC staff by fiscal year spent on technical committees/sub-committees. The analysis of allocative efficiency with respect to time spent on CSA activities is limited, since the actual CNSC time spent on technical committees/sub-committees was not available. Additionally, the values for the planned and actual time spent on the implementation of CSA Standards into CNSC requirement and guidance documents are not available, either.



[20] The figures presented in the Nuclear Standards Program 10-year plan are primarily based on the number of planned meetings scheduled by the committees during the year.
[21] Total planned person days spent in 2007–08 was 380.5, 463 in 2008–09, 386 in 2010–11 and 439.5 in 2011–12.
[22] Number of FTE working days in the Canadian federal public service is 250 per year.

The majority of interviewees (90%) stated they use a task code in ITAS to track their time spent on activities related to the CSA Nuclear Standards Program; however, in the majority of cases[23], this task code includes other activities associated with the regulatory framework (e.g., time spent in developing a regulatory document). One exception (10%) was a directorate that created its own tracking tool. The tool is used to compare the directorate's yearly staff time devoted to various technical committees/sub-committees against the planned estimates of resources developed by the Nuclear Standards Program. This tool is completely separate from ITAS. Furthermore, interviewees were asked if they felt the current system used to track CSA activities was effective and, if not, how it could be improved. Responses were completely mixed: some interviewees (50%) stated that the current system was sufficient, whereas others (50%) stated that it was not. Those stating it was not explained that the CNSC has no way of knowing how much staff effort is spent on the Nuclear Standards Program. This effort includes time of staff on technical committees/sub-committees in developing CSA Standards, and time of other CNSC staff who refer to/use CSA Standards in their work (e.g., referencing in licenses). Improvements tended to focus on the way in which the CNSC used to track time spent on all activities related to the Nuclear Standards Program, via a specific task code in ITAS.

While a benchmarked study of Canada's approach to nuclear Standards development and implementation, compared to that of Great Britain, France, and the United States, was limited in generating a concrete assessment of efficiency and economy (as available cost data was very limited in all jurisdictions examined), the study ultimately revealed that there are many models for Standards development. A regulator can choose the value it places on Standards; it can mandate that Standards should be developed by a consensus body-in-law, or it can choose to not include Standards as part of a regulatory regime at all, thereby rendering Standards development as a voluntary option of industry, for their own benefits. Additionally, if the regulator places value in Standards development, it can further choose to participate in the Standards development process or not.

The benchmarking study covered three jurisdictions: Great Britain, France and United States. All three have a dedicated agency responsible for the nuclear industry.

Nuclear Standards are integral to each country; however, the United States is the most prescriptive, mandating Standards development by a consensus body by law, whereas Great Britain is the least prescriptive, with Standards development being the responsibility of licensees. France and Canada both have one national Standards body responsible for developing Standards for the nuclear industry, the United States has multiple Standards organizations involved in the process, and Great Britain has none. Most jurisdictions use a structured format in developing Standards, based on nuclear issue areas and supported by a complement of project management staff employed by the Standards organization and mix of representatives from the nuclear industry, government bodies, and the interested public. The United States and Canada are members of their standard development organizations, whereas standard development in France is strictly performed by a mix of representatives from the nuclear industry only. Costs in developing Standards is limited; although some data on direct funding to the Standards organization is available, the data is not reflective of all jurisdictions, and does not include all costs borne by the nuclear regulator (namely staff time for participating in the development and implementation of Standards within the regulatory regime). It is clear that the United States and Canada spend more on nuclear Standards, by virtue of the importance placed on Standards development and the way in which this process interacts with the Standards organizations. Efficiency, as measured by average cycle time, was also limited: most jurisdictions do not report the average time it takes to develop a Standard. Table 9 (below) summarizes the main findings based on the benchmarking study comparing Great Britain, France, and United States against Canada.

[23] Notable exception includes a specific task code related to CEDO.

Table 9: Main Findings from Benchmarking Study

Country and Regulator/ Factor	Great Britain Office of Nuclear Regulation (ONR)	France Nuclear Safety Authority (ASN)	United States Nuclear Regulatory Commission (NRC)	Canada Canadian Nuclear Safety Commission (CNSC)
Benchmark Indicator #1: Process Overview and Scope				
How Prescriptive	Least Prescriptive • Standards development and implementation are the responsibility of licensees. • No inclusion of Standards in mandatory or voluntary documents.	• Standards are developed by industry; ASN does not participate in development. • ASN reviews Standards and adopts them into voluntary documents (e.g., basic safety rules, ASN guides).	Most Prescriptive • U.S. law stipulates Standards developed by consensus body; NRC participates in development and implementation. • Standards are included in mandatory (e.g., regulation) and voluntary (e.g., regulatory guides) documents.	• Canadian policy to develop Standards by consensus body; CNSC participates in development and implementation. • Standards are included in mandatory (e.g., licenses) and voluntary (e.g., guides) documents.
Approach	• No organization within ONR or Great Britain coordinates development of national Standards. • Technical requirements are delivered in voluntary documents: SAPs, TAGs and TIGs.[24]	• AFCEN[25] coordinates and develops Standards.	• NRC coordinates its staff participation on approximately 36 Standards development organizations (SDO) including the American National Standards Institute (ANSI), responsible for developing Standards.	• Canadian Standards Association (CSA) coordinates and develops Standards.
Benchmark Indicator #2: Issues Scope				
Organization Structure	• Standards are not developed by the ONR; SAPs, TAGs and TIGs are all developed internally by nuclear topic leads and associated nuclear topic groups.	• AFCEN has seven industrial code grouping for Standards. • Each code has a dedicated manager with editing and training committees.	• The NESCC[26], within ANSI, is tasked with developing nuclear Standards through 8 task groups, covering the Standards issue areas. • Each task group is led by a convener and supported by multi-stakeholders (industry, academia, government, subject matter experts) from broader NESCC membership.	• The Nuclear Standards Program, within CSA, is tasked with developing nuclear Standards through 10 technical committees. • Each technical committee is composed of multi-stakeholders (industry, academia, government) from broader Nuclear Standards Program membership and supported by non-voting project leads from CSA.
Reliance on International Standards	• IAEA Standards are reflected in SAPs and TAGs through periodic review and benchmarking; however, these documents are voluntary.	• ASN ensures that it is consistent with IAEA Basic Safety Standards and WENRA[27] reference levels in mandatory (e.g., regulations) and voluntary (e.g., practices) documents.	NRC participates in harmonization efforts; however, it is confident that its own process meets the highest IAEA Standards, and uses them as a specific reference in their mandatory documents (e.g., regulation).	• CNSC participates in harmonization efforts and includes references to IAEA Standards in both mandatory (e.g., license conditions) and voluntary (e.g., guides) documents.

[24] Safety Assessment Principles (SAPs), Technical Assessment Guides (TAGs), and Technical Inspection Guides (TIGs).
[25] Association Française pour les règles de conception, de construction et de surveillance en exploitation des matériels des chaudières électro nucléaires.
[26] Nuclear Energy Standards Coordination Collaborative.
[27] Western European Nuclear Regulators Association.

Benchmark Indicator #3: Cost				
Development	• No organization develops Standards. • Technical criteria in TAGs, TIGs, and SAPs are financed, for the most part, by licensees, as the ONR is a 98% cost recovery organization.	• AFCEN does not report on costs to develop Standards; it does, however, collect revenue from publication of Standards and training.	• NRC contributes $100,000 per year to the NESCC.[28] • Additional costs to Standards development borne by NRC is staff volunteer time (hours in a day, travel and some contractor support).	• CNSC contributes approximately $450,000 per year to the Nuclear Standards Program. • Additional costs to Standards development borne by CNSC staff volunteer time (hours in a day and travel) are estimated at $495,563.[29]
Implementation	• No organization implements Standards	• ASN does not report costs to implement Standards.	• NRC does not report costs to implement Standards.	• No information on Standards implementation is available.
Benchmark Indicator #4:Timing				
Average Cycle Time	• National Standards are not developed or used by the ONR. • TAGs and TIGs are reviewed every 3 years; SAPs have only been reviewed 3 times since 1979.	• AFCEN recognizes the need for regular updates to its codes in response to changes in the regulatory framework; however, no information is published on timing.	• There is no prescribed review cycle for Standards.	• There is a 5 year cycle prescribed review time.

Are there options for CNSC's participation in the Nuclear Standards Program that could reduce the cost of its contribution without adversely affecting the realization of results?

All interviewees (100%) and most CNSC technical committee/sub-committee survey respondents (73%) responded "Yes" when asked if the CNSC's contribution of $450,000 to the CSA Nuclear Standards Program in 2010–11 was a good investment.

This interview and survey question was developed as a proxy to qualifying efficiency and economy. Explanations – particularly from those who felt that the Nuclear Standards Program was not a good investment – provided insights into options that the CNSC could pursue to reduce the cost of its contribution without adversely affecting the results. However, there were no survey respondents who felt that the CNSC's contribution was not a good investment; the remaining 27% selected "Don't know/No answer" to answer this question. Those who answered "Yes" were asked to provide explanations substantiating their opinion. A consistent explanation provided among interviewees and survey respondents was that it would cost the CNSC much more to obtain the same benefits, if it were to develop the Standards on its own. Furthermore, it was stated that the CNSC's contribution dollars are equivalent to three technical positions, which – taken alone – would not have all the required technical expertise to be able to construct the Standards, while the CNSC receives the equivalent of 5,000-6,000 industry person days per year invested in the Standards used in its regulatory system. Additional arguments to support the majority view include the ability for the CNSC to influence the industry, by virtue of developing Standards together, and that the CSA Standards represent the contribution of the best Canadian technical experts in the field, and there is no substitute for this expertise.

[28] The NESCC is co-chaired by the United States Department of Energy, with contributions of $250,000 per year.
[29] Planned estimates prepared by the CSA Nuclear Standards Program for 2011–12.

Are there more cost-effective ways for the CNSC to participate in the Nuclear Standards Program Technical Committees?

All interviewees (100%) and most survey respondents (79%) stated that the CSA technical committees and sub-committees are managed in a cost-effective manner.

The interview and survey question was developed as a proxy to qualifying cost-effectiveness. Explanations – particularly from those who felt that the Nuclear Standards Program Technical Committees were not managed in a cost-effective manner – provided insights into options that the CNSC could pursue to improve efficiency and economy. Overall, 29% of the CNSC staff members on technical committees/sub-committees and CSA Nuclear Standards Program members/stakeholders surveyed felt that there were more cost-effective means for the CNSC to participate in technical committees, citing the use of teleconferences/WebEx/videoconferences. Additionally, some interviewees mentioned that cost-effectiveness has improved within the past few years. These factors include sending the right people (with sufficient technical knowledge of the subject area) to committees, and efforts within CSA to decrease the time necessary for developing, amending or renewing a standard. CNSC technical committee/sub-committee representatives, as well as CSA Nuclear Standards Program members/stakeholders, were asked to respond to this question. Of note, CNSC representatives tended to be less positive (64%) relative to other members/stakeholders (88%).

What, if any, unintended (positive or negative) outcomes have occurred as a result of CNSC's participation in the Nuclear Standards Program?

There were no unintended positive or negative outcomes experienced among any of the CNSC staff and CSA members/stakeholders interviewed and surveyed.

All interviewees and survey respondents were asked if, to the best of their knowledge, there have been any unintended positive outcomes as a direct result of CNSC's participation in the CSA Nuclear Standards Program. Key positive unintended outcomes identified focused on the sharing of knowledge, relationship building, incorporating international best practices into Standards development, increased time efficiencies due to industry acceptance of Standards included in regulatory documents and licensing requirements, and the request for interpretation process developed and implemented by CSA. In regards to the latter, this interpretation service was created to provide users with guidance on how to apply all or part of a standard. In the past, the licensees and the regulator sometimes interpreted differently the requirements of a standard; the interpretation service mitigates for this. It is worth noting that these identified outcomes are not entirely unintended; in all likelihood, the respondents were commenting on the extent to which these aspects of the CNSC's participation in the CSA Nuclear Standards Program have been successful.

The respondents were also asked if, to the best of their knowledge, there have been any unintended negative outcomes as a direct result of CNSC's participation in the CSA Nuclear Standards Program. The number of survey respondents who identified negative unintended outcomes was small (23%), compared to those who identified positive unintended outcomes (43%), and non-CNSC respondents tended to be less negative than CNSC employees. Similarly, fewer (33%) interviewees stated that unintended negative outcomes had occurred, relative to positive ones (92%). The explanations provided in support of these answers included: recognition of differing interests between the industry ("who wants what will work and what they can live with") as opposed to the CNSC ("who wants what is best, safest and strongest"); the fact that the industry is represented more at the CSA table than the CNSC can disrupt the balance of power; there is a risk that the Standard agreed upon does not meet CNSC needs (weak or inappropriate

standards); unrealistic expectations that CNSC representatives are able to provide regulatory rulings; and, at one point in time, confusion on how Standards and regulatory documents fit together.

6 Summary and Recommendations

Overall, this evaluation is limited in generating a full assessment of effectiveness and efficiency/economy. The assessments made throughout this report were made available through the data collected and subsequently analyzed by gathering CSA Nuclear Standards Program information that is disseminated to its membership base, dating back to 2006. Additionally, the combination of survey and interview data allowed for the cross-examination of findings, providing the groundwork for a systematic inquiry into the relevance, effectiveness and efficiency/economy of the CNSC's contribution to the CSA Nuclear Standards Program.

The contribution that the CNSC makes to the CSA Nuclear Standards Program is well aligned with government priorities, and is supported by the *Nuclear Safety and Control Act*, as well as the federal *Cabinet Directive on Streamlining Regulation*. The CNSC is a high user of CSA Standards; it gains significant benefits by participating in the program, and has identified room for further improvement in moving forward. Altogether, this demonstrates a continued need to support the Nuclear Standards Program. However, the CNSC should further clarify processes and procedures for participating in Standards development and implementation for its staff. Additionally, if CSA is to remain a relevant accredited Standards development organization for the nuclear industry, it must broaden its membership base to include more organizations representing other technologies. While this remains out of the direct scope of the CNSC and this evaluation, it nevertheless was found to be a factor in determining CNSC's future contribution renewals.

The determination of expected outcomes: continuous improvement of the management of the Nuclear Standards Program and accepted Standards are used by the CNSC for the benefit of the regulatory framework, were all achieved. However, the determination on expected outcomes: establishment of clear and strategic direction, informing stakeholders on the status of the Program's projects, and alignment to the federal Cabinet Directive on Streamlining Regulation were not fully achieved.

In all cases, CNSC staff – particularly those participating on the CSA Nuclear Standards Program technical committees/sub-committees – did not feel that the direction provided was clear and strategic, did not understand the performance needs and trends of the Nuclear Standards Program as exhibited in status reports, and did not understand the alignment between CNSC's contribution to the Nuclear Standards Program and the federal *Cabinet Directive on Streamlining Regulation*.

While there is a high degree of agreement among the participating CNSC staff that the CNSC contribution to the Nuclear Standards Program is a good investment, and that technical committees/sub-committees (where Standards are developed) are being managed in a cost-effective manner – both factors indicating that the CNSC is achieving some degree of efficiency and economy, a full assessment could not be obtained. The majority of CNSC staff use ITAS to track their time spent on these activities; however, the cost code includes other activities (such as time spent on developing regulatory documents). Ultimately, in order to assess efficiency and economy, the costs associated with the CNSC's participation in CSA activities and achievement of intended results must be tracked as standalone items.

A benchmarking study was undertaken to compare Canada's approach to nuclear Standards development and implementation to that of Great Britain, France, and the United States. While the study was limited in generating a concrete assessment of efficiency and economy (since available cost data was very limited in all jurisdictions examined), the study ultimately revealed that there are many models for Standards development. A regulator can choose the value it places on Standards; it can mandate that Standards

should be developed by a consensus body-in-law, or it can choose to not include Standards as part of a regulatory regime at all, thereby rendering Standards development as a voluntary option of industry, for their own benefits. Additionally, if the regulator places value in Standards development, it can further choose to participate in the Standards development process or not.

Although the CNSC's continuing participation in the CSA Nuclear Standards Program responds to a strong need and provides significant benefits, the CNSC has yet to formalize a clearly articulated rationale for the use and implementation of CSA Standards into licensing and compliance. Objectives that are clear and measurable – and supported by ongoing data collection – can be designed and implemented in support of this rationale. In order for the CNSC to continuously monitor and assess the results of its contribution to the CSA Nuclear Standards Program, as well as the efficiency and economy of the management of this relationship, performance information needs to be collected on an ongoing basis.

Moving forward, the following recommendations should be addressed sequentially:

- Recommendation #1: Construct a rationale that is clearly articulated to CNSC management and staff, to support the use and implementation of CSA Nuclear Standards into CNSC processes for licensing and compliance. The rationale should be consistent with the federal government directive to streamline regulation.

- Recommendation #2: Redraft the current set of objectives defined in the contribution agreement between the CNSC and CSA, to be clear and measurable.

- Recommendation #3: Develop and implement ongoing, systematic data collection to support CNSC objectives for contributing to – and participating in – the CSA Nuclear Standards Program.

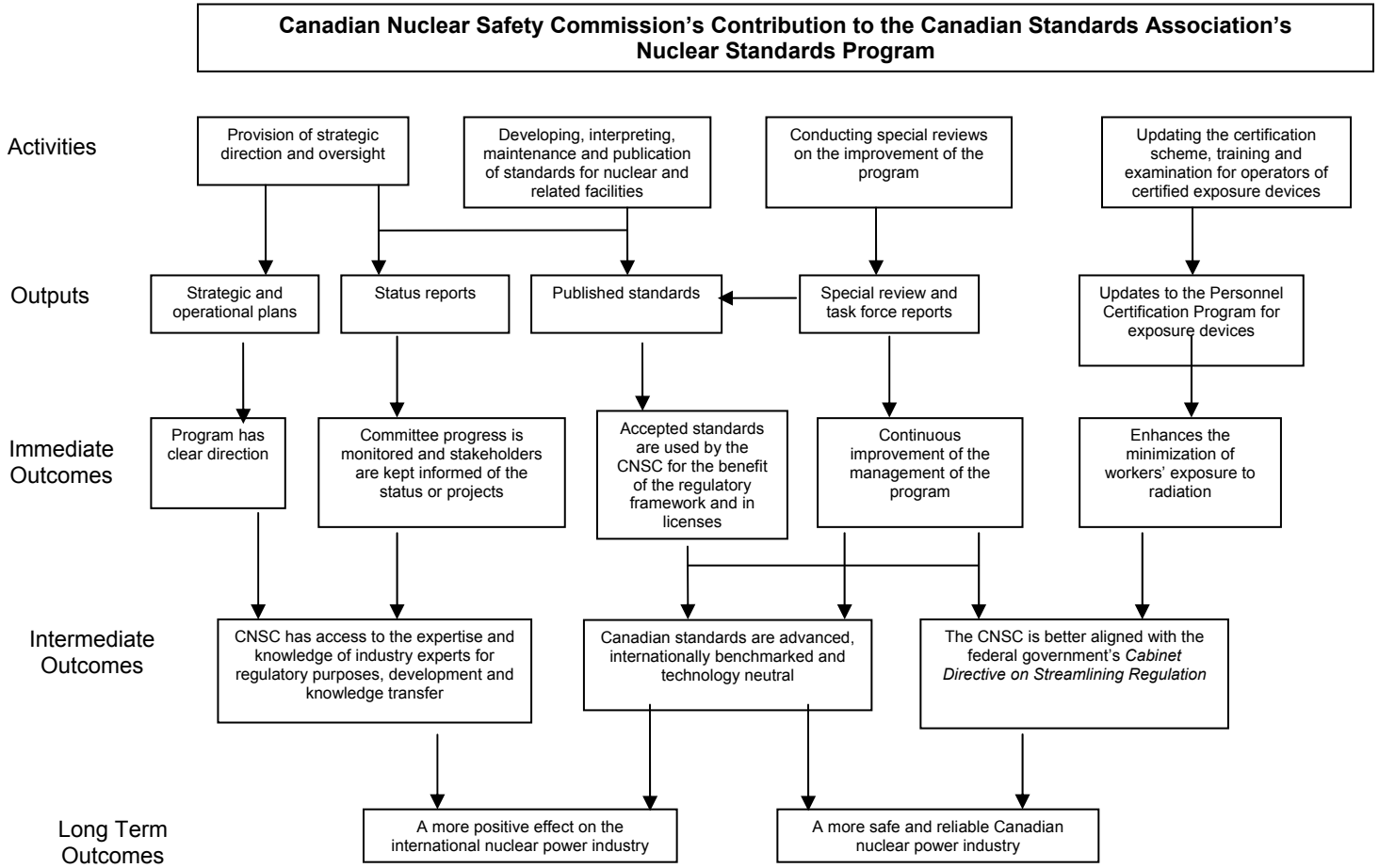
- Recommendation #4: Develop and disseminate information to CNSC staff involved in developing and/or implementing CSA Standards. Efforts to build awareness should specifically address the rationale, objectives, and supporting processes and procedures for use and implementation of CSA Nuclear Standards into licensing and compliance. This information should be developed with senior management support for CNSC staff on technical committees/sub-committees, as well as continuous efforts to monitor activities related to the CSA Nuclear Standards Program against CNSC's regulatory framework plan.

Appendix A – Management Action Plan

#	Recommendation	Type of Recommendation	Response	Planned Actions	Responsibility	Expected Date of Completion (M/Y)	Measures of Achievement
1	Construct a rationale that is clearly articulated to CNSC management and staff, to support the use and implementation of CSA Nuclear Standards into CNSC processes for licensing and compliance. The rationale should be consistent with the federal government directive to streamline regulation.	Program Design	Accepted	1. Develop, as part of the initiative described under recommendation 4, clear objectives that outline the role and use of CSA Standards in the CNSC's regulatory framework 2. Publish objectives on the CNSC Web site, as part of the information relating to the regulatory framework and its components	RPD	1. Dec. 2012 2. Jan. 2013	Objectives developed, approved by Management Committee and published on the CNSC Web site
2	Redraft the current set of objectives defined in the contribution agreement between the CNSC and CSA, to be clear and measurable	Program Design	Accepted	1. Review contribution agreement objectives and adjust as necessary, in consultation with CSA, to ensure adequate capture of the objectives and deliverables developed in recommendations 1 and 3	RPD/SPD	1. Next renewal of agreement	Contribution agreement revised
3	Develop and implement ongoing, systematic data collection to support CNSC objectives for contributing to – and participating in – the CSA Nuclear Standards Program	Program Delivery	Accepted	1. Establish a dedicated cost code to capture all CNSC work related to developing CSA Standards, in order to provide a complete picture of the CNSC's in-kind contribution of time and travel costs, and assess the need for codes specific to the work of technical committees 2. Establish program monitoring metrics in consultation with CSA, including publications of new/revised Standards and the integration of CSA Standards into licensing and compliance activities	RPD/FAD RPD	1. Sept. 2012 2. Sept. 2012	Cost code established Metrics developed and reported upon annually to MC

4	Develop and disseminate information to CNSC staff involved in developing and/or implementing CSA Standards. Efforts to build awareness should specifically address the rationale, objectives, and supporting processes and procedures for use and implementation of CSA Nuclear Standards into licensing and compliance. This information should be developed with senior management support for CNSC staff on technical committees/sub-committees, as well as continuous efforts to monitor activities related to the CSA Nuclear Standards Program against CNSC's regulatory framework plan.	Program Delivery	Accepted	1. Formalize governance role of RFSC and MC in overseeing CNSC involvement in CSA activities taking into consideration CSA's mandate, policies and processes 2. Develop guidance for CNSC staff involved in developing CSA Standards, taking into consideration CSA's mandate, policies and processes 3. Formalize processes for collecting and providing CNSC comments on draft Standards and developing whole-of-CNSC positions for the final balloting of CSA Standards	RPD	1. Dec. 2012 2. Dec. 2012 3. Dec. 2012	Program governance approved by MC and guidance and processes are developed and available to CNSC staff

Appendix B – Logic Model



Appendix C – Evaluation Matrix

Relevance: *Assessment of the role and responsibilities for the federal government in delivering the program; assessment of the linkages between program objectives and (i) federal government priorities and (ii) departmental strategic outcomes; assessment of the extent to which the program continues to address a demonstrable need and is responsive to the needs of Canadians*

Evaluation Question	Success Factors (i.e. what should be observed	Indicators	Collection Methods
1. Is there a legitimate role for the CNSC's participation in the Nuclear Standards Program?	CNSC's participation in the Nuclear Standards Program is consistent with their role as a federal regulator.	1.1 Demonstrable support for CNSCs participation in the Nuclear Standards Program	Document Review
2. Are the Nuclear Standards Program objectives aligned with CNSC's corporate priorities?	The objectives of the Nuclear Standards Program are aligned with CNSC's corporate priorities.	2.1 Extent to which the Nuclear Standards Program is aligned with CNSC's corporate priorities	Document Review
3. Is there a continued need for the CNSC to participate in the Nuclear Standards Program?	There is a continued need demonstrated by CNSC staff.	3.1 Extent to which CNSC staff demonstrate a continued need in contributing to the Nuclear Standards Program	Survey Interviews

Performance – Effectiveness: *Assessment of progress toward expected outcomes with reference to performance targets and program reach, program design, including the linkage and contribution of outputs to outcomes*

Evaluation Question	Success Factors (i.e. what should be observed	Indicators	Collection Methods
4. To what extent have strategic and operational plans provided clear direction to the Nuclear Standards Program?	Strategic and operational plans have provided clear direction to the committees in which the CNSC participates.	4.1 Evidence that strategic and operational plans have been implemented to guide committee work	Interviews Document Review
		4.2 Extent to which staff agree/disagree that strategic and operation plans provide clear direction within committee work	Survey

5. To what extent is committee progress monitored and stakeholders are kept informed of the status of projects?	Status reports effectively capture committee progress on projects and keep stakeholders informed.	5.1 Number of status reports disseminated to stakeholders in a year	Document Review
		5.2 Evidence that status reports provide stakeholders with relevant information to keep them informed	Interviews
			Survey
6. To what extent are the published Standards used by the CNSC for the benefit of the regulatory framework and in licenses?	Published Standards have been incorporated into the regulatory framework and in licenses.	6.1 Number of Standards that have been incorporated into the regulatory framework	Document Review
		6.2 Number of Standards that have been incorporated into licenses	
		6.3 Number of Standards that have been incorporated into the Licensing Conditions Handbook	
7. To what extent have special reviews and task force reports led to the continuous improvement of the management of the Nuclear Standards Program?	Special reviews and task force reports have been used to inform the development of Canadian Nuclear Standards and have led to continuous improvement of the Nuclear Standards Program.	7.1 Number of special reviews and task force reports produced	Document Review
		7.2 Number of special reviews and task force reports that have been used to inform the development of Canadian Nuclear Standards	
		7.3 Extent to which staff agree/disagree that the special reviews and task force reports lead to continuous improvement of Canadian Nuclear Standards	Survey
			Interviews
8. To what extent has the CNSC better aligned with the federal *Cabinet Directive on Streamlining Regulation* as a result of participating in the Nuclear Standards Program?	The CNSC's alignment with the federal *Cabinet Directive on Streamlining Regulation* has increased as a result of participating in the program.	8.1 Extent to which staff agree/disagree that CNSC is better aligned with the federal *Cabinet Directive on Streamlining Regulation*, as a result of participating in the Nuclear Standards Program	Survey
			Interviews

Performance – Efficiency and Economy: *Assessment of resource utilization in relation to the production of outputs and progress towards expected outcomes*

Evaluation Question	Success Factors (i.e. what should be observed	Indicators	Collection Methods
9. Are there options for CNSC's participation in the Program that could reduce the cost of its contribution without adversely affecting the realization of results?	Opinions are gathered from staff on ways to reduce costs of its contribution to the Program without adversely affecting the realization of results	9.1 Opinions on how CNSC's contribution to the Nuclear Standards Program could be reduced without adversely affecting the realization of results	Survey Interviews
10. Are there more cost-effective ways for the CNSC to participate in the Nuclear Standards Program Technical Committees?	Opinions are gathered from staff on ways to improve cost-effectiveness of participating in the Nuclear Standards Program Technical Committees	10.1 Opinions on how the cost-effectiveness of participating in the Nuclear Standards Program Technical Committees could be improved	Survey Interviews
11. Are there more efficient or economical ways for the CNSC to develop nuclear standards or other nuclear regulatory documents?	Benchmarking exercise, comparing Canada to U.S., Great Britain and France, reveals alternative design/delivery (to increase cost effectiveness and efficiency) approaches, if any exist.	11.1 Comparison of Nuclear Standards Program to alternative design/delivery (to increase cost effectiveness and efficiency) approaches in other countries	Benchmarkers comparing Canada to the U.S., Great Britain and France
	Financial analysis, comparing cost of developing a regulatory document versus cost of developing a standard supports / does not support authenticity of developing standards via the CSA.	*11.2 Comparison of cost ($ and FTE time allotment) in developing a regulatory document and developing a standard	Financial analysis comparing development of a regulatory document to development of a standard at CNSC
12. What, if any, unintended (positive or negative) outcomes have occurred as a result of CNSC's participation in the Nuclear Standards Program?	Unintended outcomes (positive or negative) are identified and when appropriate.	12.1 Presence/absence of unintended outcomes	Survey Interviews

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Appendix F – Matrix of Interview Questions

1) *How are you involved in the CSA Nuclear Standards Program?*

2) *How many years have you been participating in the CSA Nuclear Standards Program?*

3) *Do you feel it is important for the CNSC to continue participating in the CSA Nuclear Standards Program?*

4) *To the best of your knowledge, how much effort does your division spend on all activities related to CSA in a year?*

5) *What are the key benefits arising from CNSC participating in the CSA Nuclear Standards Program?*

6) *In your opinion, are there any changes required to CNSC's participation in the CSA Nuclear Standards Program?*

7) *Can you describe the decision making process that the CNSC uses to determine if it incorporates/does not incorporate a specific CSA standard into a regulatory document?*

8) *Can you describe the decision making process that the CNSC uses to determine if it incorporates/does not incorporate a specific CSA standard into licensing and compliance?*

9) *Do you feel that the CNSC is responsive to federal directives on streamlining regulations as a direct result of participating in the CSA Nuclear Standards Program?*

10) *How does your division monitor effort spent in activities related to the CSA Nuclear Standards Program?*

11) *In your opinion, are the respective roles and responsibilities of the CNSC and CSA clear?*

12) *In your opinion, is there a need for both CNSC regulatory documents and CSA standards?*

13) *How many times a month do you refer to or use the CSA Standards?*

14) *As a regulator, of what benefit are the CSA Standards to you?*

15) *In 2010–11, CNSC provided approximately $450,000 in funding to CSA for the Nuclear Standards Program. Do you feel this is a good investment from the perspective of the CNSC?*

16) *To your knowledge, have there been any unintended negative outcomes as a direct result of CNSC's participation in the CSA Nuclear Standards Program?*

17) *To your knowledge, have there been any unintended positive outcomes as a direct result of CNSC's participation in the CSA Nuclear Standards Program?*

Appendix G – Survey Results

EQ 2: Alignment of CNSC Priorities with CSA Nuclear Standards Program

1. *The objective of the CSA Nuclear Standards Program is "to help promote a safe and reliable nuclear power industry in Canada and have a positive influence on the international nuclear power industry."*

How well do you feel this objective aligns with CNSC's four corporate priorities[30]?

	CNSC Representative – Technical Committee/Sub-Committee Representative	CNSC Representative – Other CNSC Employee	Total
Completely aligns	27%	14%	22%
Mostly aligns	27%	43%	33%
Somewhat aligns	45%	43%	44%
Does not align at all	0%	0%	0%
Don't know/No Answer	0%	0%	0%

EQ 3: Continued Need

2. How important do you feel it is for the CNSC to continue participating in the CSA Nuclear Standards Program?

	CNSC Representative – Technical Committee/Sub-Committee Representative	CNSC Representative – Other CNSC Employee	CSA Nuclear Standards Program Members/Stakeholders	Total
Very important	82%	57%	76%	74%
Important	9%	14%	18%	14%
Somewhat important	9%	29%	6%	11%
Not at all important	0%	0%	0%	0%
Don't know/No Answer	0%	0%	0%	0%

3. What are the key benefits arising from CNSC participation in the CSA Nuclear Standards Program?

	CNSC Representative – Technical Committee/Sub-Committee Representative (#)	CNSC Representative – Other CNSC Employee (#)	CSA Nuclear Standards Program Members/ Stakeholders (#)	Total (#)
Understanding of perspectives between industry and CNSC/sharing of information	6	3	6	15
Obtaining industry buy-in into Standards which may feed into regulations	4	1	5	10
Communication of CNSC direction, concerns, and priorities to industry	4	2	3	9

[30] Hyperlinks to CNSC's four corporate priorities were provided to survey participants.

Efficiency and effectiveness with respect to developing documents (regulations and Standards)	2		3	5
Obtaining technical input and advice from experts	2	1	1	4
Increased quality of Standards as a result of CNSC involvement in CSA		1	2	3
Helps identify where CSA Standards can be better used versus regulations (which save taxpayer money)			2	2
Increased credibility of Standards		1	1	2

4. *In your opinion, are there any changes required to CNSC's participation in the CSA Nuclear Standards Program?*

	CNSC Representative – Technical Committee/Sub-Committee Representative	CNSC Representative – Other CNSC Employee	CSA Nuclear Standards Program Members/Stakeholders	Total
Yes	45%	57%	24%	37%
No	27%	14%	71%	46%
Don't know/No Answer	27%	29%	6%	17%

5. *In your opinion, are the respective roles and responsibilities of the CNSC and CSA clear?*

	CNSC Representative – Technical Committee/Sub-Committee Representative	CNSC Representative – Other CNSC Employee	CSA Nuclear Standards Program Members/Stakeholders	Total
Yes	64%	57%	76%	69%
No	18%	29%	18%	20%
Don't know/No Answer	18%	14%	6%	11%

EQ 4: Extent to Which Standards are Used by the CNSC

6. *To what extent do strategic and operational plans provide you with clear direction for working in CSA technical committees and/or sub-committees?*

	CNSC Representative – Technical Committee/Sub-Committee Representative
Very clear direction	0%
Mostly clear direction	27%
Somewhat clear direction	27%
Not at all clear direction	36%
Don't know/No response	9%

EQ 5: Extent to Which Progress is Monitored

7. Do you receive status reports?

	CNSC Representative – Technical Committee/Sub-Committee Representative	CSA Nuclear Standards Program Members/Stakeholders	Total
Yes	36%	71%	57%
No	64%	24%	39%
Don't know/No Answer	0%	6%	4%

8. Do you receive status reports in a timely manner so that you are able to effectively participate in the technical committees and/or sub-committees?

	CNSC Representative – Technical Committee/Sub-Committee Representative	CSA Nuclear Standards Program Members/Stakeholders	Total
Yes	100%	92%	94%
No	0%	8%	6%
Don't know/No Answer	0%	0%	0%

9. Could the status reports be improved in any way?

	CNSC Representative – Technical Committee/Sub-Committee Representative	CSA Nuclear Standards Program Members/Stakeholders	Total
Yes	25%	36%	33%
No	50%	27%	33%
Don't know/No Answer	25%	36%	33%

EQ 6: Extent to Which Standards are Used by the CNSC

10. In your opinion, is there a need for both CNSC regulatory documents and CSA Standards?

	CNSC Representative – Technical Committee/Sub-Committee Representative	CNSC Representative – Other CNSC Employee	CSA Nuclear Standards Program Members/Stakeholders	Total
Yes	91%	100%	82%	89%
No	9%	0%	18%	11%
Don't know/No Answer	0%	0%	0%	0%

11. How often do you refer to or use the CSA Standards?

	CNSC Representative – Technical Committee/Sub-Committee Representative	CNSC Representative – Other CNSC Employee	CSA Nuclear Standards Program Members/Stakeholders	Total
Average	17	8	13	13
Maximum	98	25	50	98

Minimum (excluding zero)	2	2	1	1

12. Overall, how useful do you find the CSA Standards in your work?

	CNSC Representative – Technical Committee/Sub-Committee Representative	CNSC Representative – Other CNSC Employee	CSA Nuclear Standards Program Members/Stakeholders	Total
Extremely useful	27%	29%	71%	49%
Very useful	73%	43%	24%	43%
Somewhat useful	0%	29%	6%	9%
Not useful at all	0%	0%	0%	0%

EQ 7: Extent to Which Special Reviews and Task Force Reports Led to Improvement

13. To what extent do you feel these reports have contributed to improved management of the CSA Nuclear Standards Program?

	CNSC Representative – Technical Committee/Sub-Committee Representative	CSA Nuclear Standards Program Members/Stakeholders	Total
Completely improved	0%	24%	14%
Mostly improved	27%	29%	29%
Somewhat improved	27%	18%	21%
Not at all improved	0%	0%	0%
Don't know/No Answer	45%	29%	36%

EQ 8: Alignment with *Directive on Streamlining Regulation*

14. *To what extent do you feel that the CNSC is responsive to federal directives on streamlining regulations as a direct result of participating in the CSA Nuclear Standards Program?*

	CNSC Representative – Technical Committee/Sub-Committee Representative	CNSC Representative – Other CNSC Employee	Total
Completely responsive	9%	14%	11%
Mostly responsive	18%	14%	17%
Somewhat responsive	9%	14%	11%
Not at all responsive	9%	29%	17%
Don't know/No Answer	55%	29%	44%

EQ 9: Reducing CNSC's Cost of Participating in the CSA Nuclear Standards Program

15. In 2010–11, the CNSC provided approximately $450,000 in funding to the CSA for the Nuclear Standards Program. Do you feel this is a good investment from the perspective of the CNSC?

	CNSC Representative – Technical Committee/Sub-Committee Representative	Total
Yes	73%	73%

No	0%	0%
Don't know/No Answer	27%	27%

EQ 10: Improving Cost-Effectiveness

16. Are there more cost-effective ways through which the CNSC could participate in the technical committees?

	CNSC Representative – Technical Committee/Sub-Committee Representative	CSA Nuclear Standards Program Members/Stakeholders	Total
Yes	45%	18%	29%
No	18%	24%	21%
Don't know/No Answer	36%	59%	50%

EQ 11: Unintended Outcomes

17. To your knowledge, have there been any unintended positive outcomes as a direct result of CNSC's participation in the CSA Nuclear Standards Program?

	CNSC Representative – Technical Committee/Sub-Committee Representative	CNSC Representative – Other CNSC Employee	CSA Nuclear Standards Program Members/Stakeholders	Total
Yes	36%	0%	65%	43%
No	18%	14%	0%	9%
Don't know/No Answer	45%	86%	35%	49%

18. *To your knowledge, have there been any unintended negative outcomes as a direct result of CNSC's participation in the CSA Nuclear Standards Program?*

	CNSC Representative – Technical Committee/Sub-Committee Representative	CNSC Representative – Other CNSC Employee	CSA Nuclear Standards Program Members/Stakeholders	Total
Yes	27%	29%	18%	23%
No	18%	0%	47%	29%
Don't know/No Answer	55%	71%	35%	49%

List of Acronyms

AFCEN	Association Française pour les règles de conception, de construction et de surveillance en exploitation des matériels des chaudières électro nucléaires
ASN	Autorité de sûreté nucléaire
CSA	Canadian Standards Association
CNSC	Canadian Nuclear Safety Commission
CNSS	Canadian National Standards System
EAC	Evaluation Advisory Committee
EWG	Evaluation Working Group
DEC	Departmental Evaluation Committee
IAEA	International Atomic Energy Agency
IEC	International Electrotechnical Commission
ISO	International Standards Organization
ITAS	Integrated Time Accounting System
LCH	*License Condition Handbook*
MC	Management Committee
NESCC	Nuclear Energy Standards Coordination Collaborative
NRC	Nuclear Regulatory Commission
NSCA	*Nuclear Safety and Control Act*
NSSC	Nuclear Strategic Steering Committee
MC	Management Committee
OMC	Operations Management Committee
ONR	Office of Nuclear Regulation
RFSC	Regulatory Framework Steering Committee
SAP	Safety Assessment Principle
SDO	Standards Development Organization
TAG	Technical Assessment Guide
TIG	Technical Inspection Guide
WENRA	Western European Nuclear Regulators' Association

List of Figures and Tables