



CNSC Staff Action Plan on the CNSC Fukushima Task Force Recommendations

INFO-0828

December 2011

DRAFT



CNSC Staff Action Plan on the CNSC Fukushima Task Force Recommendations

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The public and stakeholders are invited to provide written comments on the draft *CNSC Staff Action Plan on the CNSC Fukushima Task Force Recommendations*. The public has until February 3, 2012, to provide comments in writing. Comments should be submitted by email to dprconsult-consultdrcn@cnsccsn.gc.ca.

The revised Action Plan will be presented to the Commission at a public meeting in Spring 2012. Written interventions will be invited for this proceeding.

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Également disponible en français sous le titre de : Plan d'action du personnel de la CCSN concernant les recommandations du Groupe de travail de la CCSN sur Fukushima

Document availability

This document can be viewed on the CNSC Web site at nuclearsafety.gc.ca

Canadian Nuclear Safety Commission
280 Slater Street
P.O. Box 1046, Station B
Ottawa, Ontario K1P 5S9
CANADA

Tel.: 613-995-5894 or 1-800-668-5284 (in Canada only)

Facsimile: 613-995-5086

Email: info@cnsccsn.gc.ca

Web site: nuclearsafety.gc.ca

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Preface

The *CNSC Staff Action Plan on the CNSC Fukushima Task Force Recommendations* sets out the strategy and timeline upon which stakeholders will develop their implementation plans to address the *CNSC Fukushima Task Force Report* recommendations.

This document also contains the CNSC staff disposition of the comments received from the public and stakeholders on the *CNSC Fukushima Task Force Report* and *Management Response* following the October 28, 2011 posting on the CNSC Web site. Comments received were taken into consideration during the development of this draft Action Plan, and are dispositioned in Appendix B to this document.

In addition, this draft Action Plan comprises the preliminary conclusions made by the International Atomic Energy Agency (IAEA) Integrated Regulatory Review Service (IRRS) follow-up mission, in Ottawa from November 28 to December 9, 2011, in its review of the CNSC's response on the implications of the Fukushima nuclear event for Canadian nuclear power plants.

Message from the Executive Vice-President and Chief Regulatory Operations Officer

Please find attached the draft CNSC Staff Action Plan, which describes specific actions to be implemented by staff, licensees and affected federal and provincial authorities, in response to the *CNSC Fukushima Task Force Report* recommendations, to strengthen defence in depth, emergency preparedness and the regulatory oversight of nuclear power plants in Canada.

The CNSC is committed to being open and transparent. I strongly encourage the public and stakeholders to comment in writing on the draft Action Plan and on the Comments Disposition Table (Appendix B) received during the first round of public input. The views expressed during this second round of comments will be dispositioned and presented, in a separate publication together with the revised Action Plan, to the Commission members for their considerations at a public meeting in Spring 2012.

The *CNSC Fukushima Task Force Report* confirmed that Canadian nuclear power plants are safe and rely on multiple layers of defence. CNSC management has endorsed the findings and recommendations of the *Task Force Report* and is committed to addressing each recommendation through the actions outlined in the CNSC Staff Action Plan. The basis of the recommendations, along with a clear mapping of all the recommendations to each finding, is included in Appendix D of the *Task Force Report*.

In addition, I would like to share with you in this document the preliminary findings from the recent International Atomic Energy Agency (IAEA) Integrated Regulatory Review Service (IRRS) follow-up mission, which reviewed the CNSC's response to the Fukushima nuclear event and its implications for Canadian nuclear power plants. The IRRS Team acknowledged that the CNSC has an effective and pragmatic regulatory framework in place to continue the follow-up of the Fukushima Daiichi nuclear accident and to ensure the continued safety of Canadian nuclear facilities. The IRRS Team did not raise any concerns or make any observations that impacted this draft Action Plan.

Ramzi Jammal
Executive Vice-President and
Chief Regulatory Operations Officer
Canadian Nuclear Safety Commission

Executive Summary

On March 11, 2011, a magnitude 9.0 earthquake, followed by a devastating tsunami, struck Japan. The combined impact of the earthquake and tsunami on the Fukushima Daiichi nuclear power plant caused a severe nuclear accident. In response to these events, the Canadian Nuclear Safety Commission (CNSC) established the CNSC Fukushima Task Force in April 2011 to review licensees' responses to the CNSC request to re-examine the safety cases of their nuclear power plants. On September 30, 2011, the Task Force completed its review and documented its findings and recommendations in the *CNSC Fukushima Task Force Report* (Task Force Report).

On October 28, 2011, the CNSC posted, on its Web site, the *Fukushima Task Force Report* and its accompanying *CNSC Management Response* to the report recommendations, for review and comment by the public until December 1, 2011. Twelve responses were received from stakeholders, including members of the public, nuclear industry, and non-government organizations. These comments were considered in the preparation of the draft CNSC Staff Action Plan.

The draft Action Plan outlined in Appendix A of this report sets out the strategy and expectations upon which stakeholders will formulate their respective implementation schedules and plan to discharge each recommendation within the short-, medium- or long-term timeline established in the *Management Response*. The measures and actions required of stakeholders outlined in this draft Action Plan will be subject to review and comment by the public and stakeholders until February 3, 2012. Comments from the public and stakeholders together with the revised Action Plan will be presented to the Commission at a public meeting in Spring 2012.

From November 28, 2011 to December 9, 2011, the CNSC hosted an international team of experts for a follow-up IAEA Integrated Regulatory Review Service (IRRS) mission that encompassed a review dedicated to CNSC actions on the regulatory implications of the Fukushima Daiichi nuclear accident for Canadian nuclear power plants (NPPs).

The official IRRS Report will not be available before February 2012; however, preliminary findings provided at the closing meeting indicated that CNSC actions and responses to the nuclear accident were prompt, comprehensive and robust. Specifically, the IRRS Team rated the CNSC response to the Fukushima accident as a good practice, indicating that the CNSC had systematically and thoroughly reviewed the lessons learned from the accident and had made full use of available information, including the review of actions taken by other international regulators.

The IRRS Team also acknowledged that the CNSC has an effective and pragmatic regulatory framework in place to continue follow-up to the Fukushima Daiichi nuclear accident. The IRRS Team did not raise any concerns or make any observations that impacted the draft Action Plan.

Once the Action Plan is approved by the Commission, progress on its implementation will be reported annually to the Commission until full implementation is achieved. This annual report to the Commission will be tabled in August of each year as part of the *CNSC Staff Integrated Safety Assessment of Canadian Nuclear Power Plants*. Annual reports will also provide the public with further opportunities to comment on the progress of implementation of the Action Plan.

Finally, it is important to understand that the Canadian nuclear power plants were found to be safe and pose a very small risk to the health and safety of Canadians and the environment. This Action Plan is designed to enhance the safety of these facilities.

Table of Contents

Executive Summary	iii
1.0 Overview	1
2.0 CNSC Staff Action Plan.....	1
2.1 Objective	1
2.2 Implementation plan	2
3.0 Public Consultation.....	4
3.1 Consultation outcome	4
3.2 Disposition of comments.....	4
4.0 IAEA IRRS Follow-up Mission.....	5
5.0 Next Steps.....	5
6.0 Conclusion.....	6
Appendix A – CNSC Staff Action Plan	7
Part 1 – Strengthening reactor defence in depth	7
Part 2 – Enhancing emergency response.....	14
Part 3 – Improving regulatory framework and processes	18
Appendix B – Comments Disposition Table	24

1.0 Overview

On March 11, 2011, a magnitude 9.0 earthquake, followed by a devastating tsunami, struck Japan. The combined impact of the earthquake and tsunami on the Fukushima Daiichi nuclear power plant caused a severe nuclear accident. In response to these events, the Canadian Nuclear Safety Commission (CNSC) issued a request to Class I nuclear facilities, under subsection 12(2) of the *General Nuclear Safety and Control Regulations*, to re-examine the safety cases of their nuclear power plants. In April 2011, the CNSC established the CNSC Fukushima Task Force to review licensees' responses to the request.

On September 30, 2011, the Task Force completed its review and presented its findings and recommendations in the *CNSC Fukushima Task Force Report* (Task Force Report)¹. The report particularly emphasizes:

- the capability of Canadian nuclear power plants to withstand conditions similar to those that triggered the Fukushima nuclear accident
- emergency preparedness and response in Canada
- the effectiveness of the CNSC regulatory framework

The Task Force concluded that Canadian nuclear power plants are safe and pose a very small risk to the health and safety of Canadians and the environment. Nevertheless, the Task Force made 13 recommendations to further enhance the safety of nuclear power plants in Canada. These are presented in section 10 of the *Task Force Report*. CNSC management also provided its response to the recommendations.

On October 28, 2011, the CNSC posted on its Web site the *Task Force Report* and its accompanying *CNSC Management Response*² for review and comment by the public until December 1, 2011. Twelve responses were received from stakeholders, including members of the public, the nuclear industry, and non-government organizations.

To ensure transparency, this report, the *CNSC Staff Action Plan on the CNSC Fukushima Task Force Recommendations*, provides stakeholders with an opportunity to comment on the draft Action Plan and on the disposition of comments received from the public. Stakeholders will have until February 3, 2012 to submit their written comments. All written comments will be dispositioned and considered by CNSC staff and presented to the Commission at a public meeting in Spring 2012.

2.0 CNSC Staff Action Plan

2.1 Objective

This draft Action Plan is intended to enhance the existing regulatory oversight programs and sets out the specific actions needed to address the Task Force recommendations which are to be implemented by staff, licensees and affected federal and provincial authorities to strengthen defence in depth, emergency preparedness and the regulatory oversight of nuclear power plants in Canada.

¹ [CNSC Fukushima Task Force Report](#), CNSC INFO-0824, October 2011

² [CNSC Management Response to CNSC Fukushima Task Force Recommendations](#), CNSC INFO-0825, October 2011

The implementation of a final Action Plan will give rise to site-specific and CNSC schedules and plans and will ensure tracking and completion of each action.

The draft Action Plan identifies 33 actions that address the 13 *Task Force Report* recommendations. These are grouped in Appendix A in the following three categories:

- Part 1 – Strengthening reactor defence in depth
- Part 2 – Enhancing emergency response
- Part 3 – Improving regulatory framework and processes

2.2 Implementation plan

The final Action Plan will be implemented through existing regulatory oversight programs and internally by the CNSC staff for the initiatives that fall under regulatory framework improvements.

The Task Force recommendations in the *CNSC Management Response* have been categorized in this draft Action Plan as follows:

- **Technical and operational recommendations**, which pertain to design and operational enhancements to strengthen reactor defence in depth and technical cooperation at the international level to be implemented through existing regulatory oversight operations.
- **Regulatory recommendations**, which require Commission approval to amend the regulatory framework and Commission approval and direction to enhance emergency preparedness. Implementation will be through revised priorities by CNSC staff.

The assignment of the 13 recommendations to each category and their associated short-, medium- and long-term completion date is shown in the following table.

Table – Task Force Recommendations

Recommendations	Implementation Timeline		
	Short term (Dec 2012)	Medium term (Dec 2013)	Long term (Dec 2015)
Technical and operational recommendations for CNSC staff and licensee actions			
Recommendation 1	x	x	x
Recommendation 2		x	
Recommendation 3		x	
Recommendation 4	x		
Recommendation 5	x		
Recommendation 12	x		
Recommendation 13	x		
Regulatory recommendations for Commission approval			
Recommendation 6*		x	
Recommendation 7		x	
Recommendation 8		x	
Recommendation 9	x	x	
Recommendation 10	x		
Recommendation 11	x		

* to be referred to the Commission for consideration.

The actions outlined in this draft Action Plan set out the requirements upon which stakeholders will formulate their respective schedules and plans to implement each recommendation within the timelines prescribed in the *CNSC Management Response*:

- Short term (**12 months**) – for all actions currently underway that can be accelerated within this period
- Medium term (**24 months**) – for all measures requiring further analysis and engineering design, or regulatory development
- Long term (**48 months**) – for all actions initiated in the previous periods that will require station retrofits and/or prolonged outages

The implementation of the technical and operational recommendations will consist of action items that are site specific and which take into consideration differences in reactor designs and locations. The regulatory recommendations that deal with amendments to existing licences, CNSC regulations or regulatory documents will be referred to the Commission.

The draft Action Plan recognizes that many recommendations have already been implemented or are ongoing through normal regulatory oversight activities by the CNSC. These activities will be considered by all regulatory program divisions in their development of site-specific compliance action items and closure criteria.

The draft Action Plan also acknowledges that in some instances the complexity of certain technical requirements, site-specific planned outages or refurbishment activities may impact the implementation timeline of the required action. In this light, the draft Action Plan provides for alternative measures, where appropriate, such as the development of plans and schedules that will establish the licensee's commitment and timeline to full resolution of the action.

3.0 Public Consultation

On October 28, 2011, the CNSC posted, on its Web site, the *Fukushima Task Force Report* and its accompanying *CNSC Management Response* for review and comment by the public until December 1, 2011. The *CNSC Management Response* provided CNSC staff, licensees and federal and provincial stakeholders with general direction on addressing the recommendations identified by the Task Force.

The main objective in submitting the *Task Force Report* to the public for comment was to assure Canadians that nuclear power plants in Canada are safe and able to withstand the conditions that led to the Fukushima nuclear accident, as well as to solicit constructive input from the public for consideration in the development of the draft Action Plan.

3.1 Consultation outcome

Twelve responses were received from stakeholders, including members of the public, nuclear industry, and non-government organizations.

The actions described in the draft Action Plan are intended to complement measures already being considered or implemented by the CNSC and licensees as part of normal regulatory oversight initiatives.

3.2 Disposition of comments

All comments received were dispositioned and can be found in Appendix B – Comments Disposition Table.

For clarity, the comments received have been grouped under the following general categories:

- Editorial
- Emergency management
- Environmental consideration
- External hazards

4.0 IAEA IRRS Follow-up Mission

From November 28, 2011 to December 9, 2011, the CNSC hosted an international team of experts for a follow-up IAEA Integrated Regulatory Review Service (IRRS) mission. One of the reviewed focus areas was the regulatory implications of the Fukushima Daiichi nuclear accident as they relate to Canadian NPPs. A dedicated team of international experts conducted the review of actions taken by the CNSC against international requirements.

The IRRS Team commended the CNSC for its efforts in managing its response to the Fukushima nuclear accident, concluding that the regulatory response was prompt, robust and comprehensive. At its exit meeting, the IRRS Team rated the CNSC response as a good practice, indicating that the CNSC had systematically and thoroughly reviewed the lessons learned from the accident and had made full use of available information, including the review of actions taken by other international regulators, in its review. The IRRS Team commented favourably on the fact that the CNSC had drafted an Action Plan for addressing the findings and recommendations resulting from the CNSC Fukushima Task Force's review and expressed its appreciation that the report was publicly available.

The specific findings in the draft IRRS review report were well aligned with the *CNSC Fukushima Task Force Report*. The IRRS Team did not raise any concerns or make any suggestions or recommendations that impacted the draft Action Plan.

5.0 Next Steps

To ensure transparency and public input to the process, the following actions will be undertaken going forward:

December 21, 2011 – February 3, 2012

- Posting of the draft Action Plan for public review
- Posting of the Disposition of Comments received from the first public review

February 4 – March 16, 2012 (tentative)

- Disposition of comments arising from the second public review
- Revision to the draft Action Plan as deemed necessary

Spring 2012

- Commission public meeting to present the revised draft Action Plan and supplementary Commission Member Document (CMD) that may arise from the public review
- Written interventions will be invited for these proceedings.

Progress on the implementation of the *Task Force Report* recommendations will be reported to the Commission in August of each year, in the publicly posted *CNSC Staff Integrated Safety Assessment of Canadian Nuclear Power Plants* report, until full implementation of the Action Plan. This will also provide the public with further opportunities to comment on the progress of implementation of the Action Plan.

6.0 Conclusion

The *CNSC Fukushima Task Force* confirmed that Canadian nuclear power plants are safe and have a robust design that relies on multiple layers of defence. CNSC management has endorsed the findings and recommendations of the *Task Force* and is committed to addressing each recommendation through the actions outlined in the draft CNSC Staff Action Plan.

This draft Action Plan describes 33 specific actions that are needed by staff, licensees and affected federal and provincial authorities to strengthen defence in depth, emergency preparedness and the regulatory oversight of nuclear power plants in Canada.

CNSC staff recognize that some actions currently underway may be completed well ahead of the stated dates, or that others may extend beyond their timeline, in part due to their complexity or other factors such as additional research or development, analysis, scheduled refurbishment activities, or extended outages.

The IRRS Team also acknowledged that the CNSC has an effective and pragmatic framework in place to continue follow-up to the Fukushima Daiichi nuclear accident and to ensure the continued safety of Canadian nuclear facilities. The IRRS Team did not raise any concerns or make any observations that impacted the draft Action Plan.

The CNSC is committed to being open and transparent. The public and stakeholders have an opportunity to comment in writing on the draft Action Plan and the Comments Disposition Table arising from the first public review period. The views expressed by the public in the second review will be presented in together with the revised Action Plan to the Commission at a public meeting in Spring 2012.

Appendix A – CNSC Staff Action Plan

Part 1 – Strengthening reactor defence in depth

The CNSC Task Force confirmed that Canadian NPPs are safe and have a robust design that relies on multiple layers of defence. The design ensures that there will be no impact on the public from external events that are regarded as credible. The design also offers protection against more severe external events that are much less likely to occur. Nevertheless, the CNSC Task Force recommended strengthening each layer of defence built into the Canadian NPP design and licensing philosophy. In particular, certain design enhancements for severe accident management – such as containment performance to prevent unfiltered releases of radioactive products, control capabilities for hydrogen and other combustible gases, and adequacy and survivability of equipment and instrumentation – will be evaluated and implemented wherever practicable; some of which have already been implemented. The following sections describe those actions that are needed to strengthen each layer of defence in depth.

Responsibility: Directorate of Power Reactor Regulation

CNSC staff will develop site-specific action items detailing the implementation measures and closure criteria for each recommendation required of licensees to strengthen reactor defence in depth. The implementation of these actions will be prioritized, on a risk-informed basis, commensurate with short-, medium- or long-term completion dates established for each action below. Cost-benefit implications may be included in the rationalization of each action but will be subject to CNSC review and acceptance. Site-specific actions will be developed, by the respective Regulatory Program Division, taking into consideration differences in reactor designs and locations.

Recommendation 1

- 1.0** Licensees should systematically verify the effectiveness of, and supplement where appropriate, the existing plant design capabilities in beyond-design-basis accident and severe accident conditions, including:
- a) overpressure response of the main systems and components (**Short Term**)
 - b) containment performance to prevent unfiltered releases of radioactive products (**Long Term**)
 - c) control capabilities for hydrogen and other combustible gases (**Medium Term**):
 - i) accelerate installation of the hydrogen management capability and sampling provisions
 - ii) include spent fuel bays and any other areas where hydrogen accumulation cannot be precluded
 - d) make-up capabilities for the steam generators, primary heat transport system and connected systems, moderator, shield tank, and spent fuel bays (**Medium Term**)
 - e) design requirements for the self-sufficiency of a plant site such as availability and survivability of equipment and instrumentation following a sustained loss of power and capacity to remove heat from a reactor (**Short Term**)
 - f) control facilities for personnel involved in management of the accident (**Long Term**)
 - g) emergency mitigating equipment and resources that could be stored offsite and brought onsite if needed (**Short Term**)

1.1 Action:

Licensees should submit additional evidence (e.g. test results) that provide confidence in the bleed condenser / degasser condenser relief capacity.

Deliverables:

1. An updated evaluation of the capability of bleed condenser / degasser condenser relief valves providing additional evidence that the valves have sufficient capacity.
2. If required, a plan and schedule either for confirmatory testing of installation or provision for additional relief capacity.

Applicable to: All sites

Timeline: Completion by end of December 2012.

1.2 Action:

Licensees should re-examine the capability of the shield tank / calandria vault relief to discharge steam produced in a severe accident. The benefits of sustainability of shield tank heat sink during accident conditions should also be re-examined.

Deliverables:

1. An assessment of the capability of shield tank / calandria vault relief.
2. If relief capacity is inadequate, an assessment of the benefit available from adequate relief capacity and the practicability of providing additional relief.
3. If additional relief is beneficial and practicable, a plan and schedule for provision of additional relief.

Applicable to: All sites (Item 1 does not apply to Pickering A station)

Timeline: Completion by end of December 2013.

1.3 Action:

Licensees should evaluate the means to prevent the failure of the containment systems and, to the extent practicable, unfiltered releases of radioactive products in beyond-design-basis accidents including severe accidents. If unfiltered releases of radioactive products in beyond-design-basis accidents including severe accidents cannot be precluded, then additional mitigation should be provided.

Deliverables:

1. Assessments of adequacy of the existing means to protect containment integrity and prevent uncontrolled release in beyond-design-basis accidents including severe accidents.
2. Where the existing means to protect containment integrity and prevent uncontrolled releases of radioactive products in beyond-design-basis accidents including severe accidents are found inadequate, a plan and schedule for design enhancements to control long-term radiological releases and, to the extent practicable, unfiltered releases.

Applicable to: All sites (Point Lepreau is completed)

Timeline: Completion by end of December 2015.

- 1.4** Action:
Licensees should complete the installation of passive autocatalytic recombiners (PARs) as quickly as possible.
- Deliverable:
A plan and schedule for the installation of PARs as quickly as possible.
- Applicable to: All sites (Complete for all Ontario Power Generation (OPG) stations)
- Timeline: Completion by end of December 2012.
- 1.5** Action:
If draining of the irradiated fuel bay (IFB) following a beyond design basis event cannot be precluded, the need for hydrogen mitigation should be evaluated.
- Deliverable:
An evaluation of the potential for hydrogen generation in the IFB area and the need for hydrogen mitigation.
- (Note: recommendation 1c.ii) and 1d) are linked. If fuel uncovering cannot be precluded, then hydrogen mitigation becomes essential.)
- Applicable to: All sites
- Timeline: Completion by end of December 2013.
- 1.6** Action:
Licensees should evaluate the structural integrity of the IFB at temperatures in excess of the design temperature limit. If structural failure cannot be precluded, then additional mitigation (e.g. high capacity make-up or sprays) should be provided. Consequences of the loss of shielding should be evaluated.
- Deliverables:
1. An evaluation of the structural response of the IFB structure to temperatures in excess of the design temperature, including an assessment of the maximum credible leak rate following any predicted structural damage.
 2. A plan and schedule for deployment of any additional mitigating measures shown to be necessary by the evaluation of structural integrity.
- Applicable to: All sites (Darlington exempted from Item 1)
- Timeline: Completion by end of December 2013.
- 1.7** Action:
Licensees should evaluate means to provide coolant make-up to the primary Heat Transport System, steam generators, moderator, shield tank/calandria vault, spent fuel pools and dousing tank where applicable. It includes:
1. Coolant make-up to prevent severe core damage.
 2. If severe core damage cannot be precluded, then the make-up coolant should be used in severe accident management guidelines (SAMG) to mitigate the severe accident.

Deliverable:

A plan and schedule for optimizing existing provisions and putting in place additional coolant make-up provisions, and supporting analyses.

Applicable to: All sites

Timeline: Completion by end of December 2013.

1.8Action:

Licensees should provide a reasonable level of confidence that the means (e.g., equipment and instrumentation) necessary for severe accident management and essential to the execution of SAMGs will perform its function in the severe accident environment for the duration for which it is needed.

Deliverable:

A detailed plan and schedule for performing assessments of equipment survivability, and a plan and schedule for equipment upgrade where appropriate based on the assessment.

Applicable to: All sites

Timeline: Completion by end of December 2013

1.9Action:

Licensees should ensure the habitability of control facilities under conditions arising from beyond-design-basis and severe accidents.

Deliverable:

An evaluation of the habitability of control facilities under conditions arising from beyond-design-basis and severe accidents. Where applicable, detailed plan and schedule for control facilities upgrades.

Applicable to: All sites

Timeline: Completion by end of December 2014.

1.10Action:

Licensees should investigate means of extending the availability of power for key instrumentation and control (I&C) needed in accident management actions following a loss of all AC power.

Deliverables:

1. An evaluation of the requirements and capabilities for electrical power for key instrumentation and control. The evaluation should identify practicable upgrades that would extend the availability of key I&C, if needed.
2. A plan and schedule for deployment of identified upgrades. A target of 8 hours without the need for offsite support should be used.

Applicable to: All sites

Timeline: Completion by end of December 2012.

1.11 Action:

Licensees should procure, as quickly as possible, emergency equipment and other resources that could be stored offsite and brought onsite to mitigate a severe accident.

Deliverable:

A plan and schedule for procurement.

Applicable to: All sites (Complete for all OPG stations, installation to be performed on delivery of equipment)

Timeline: Completion by end of December 2012.

Recommendation 2

2.0 Licensees should conduct more comprehensive assessments of site-specific external hazards to demonstrate that **(Medium Term)**:

- a) considerations of magnitudes of design-basis and beyond-design-basis external hazards are consistent with current best international practices
- b) consequences of events triggered by external hazards are within applicable limits

Such assessments should be updated periodically to reflect gained knowledge and modern requirements.

2.1 Action:

Licensees need to complete the review of the basis for external events against modern state-of-the-art practices for evaluating external events magnitudes and relevant design capacity for these events.

Deliverables:

Through implementation of the current S-294, *Probabilistic Safety Assessment (PSA) for Nuclear Power Plants*:

1. Re-evaluate, using modern calculations and state-of-the-art methods, the site specific magnitudes of each external event to which the plant may be susceptible.
2. Evaluate if the current site specific design protection for each external event assessed in 1 above is sufficient. If gaps are identified a corrective plan should be proposed.
3. Perform deterministic analyses for representative severe core damage accidents.

Applicable to: All sites (Complete for Darlington station)

Timeline: Completion by end of December 2013.

2.2 Action:

Implementation of RD-310, *Safety Analysis for Nuclear Power Plants*, is already in progress and tracked by the CNSC/Industry Safety Analysis Improvement Initiative working group.

Deliverable:

No new requirement since it is already being implemented.

Applicable to: All sites

Timeline: Completion by end of December 2013.

Recommendation 3

3.0 Licensees should enhance their modeling capabilities and conduct systematic analyses of beyond-design-basis accidents to include analyses of **(Medium Term)**:

- a) multi-unit events
- b) accidents triggered by extreme external events
- c) spent fuel bay accidents

The analyses should include estimation of releases, into the atmosphere and water, of fission products, aerosols and combustible gases.

3.1 Action:

1. Licensees should develop/finalize and fully implement Severe Accident Management Guidelines (SAMGs) at each station.
2. Licensees should expand the scope of SAMGs to include multi-unit and IFB events.
3. Licensees should demonstrate effectiveness of SAMGs. Licensees should validate and/or refine SAMGs to demonstrate their adequacy in the light of lessons drawn from the Fukushima Daiichi nuclear accident.

Deliverables:

1. Where SAMGs have not been developed/finalized or fully implemented, provide plans and schedules for completion.
2. For multi-unit stations, provide plans and schedules for the inclusion of multi-unit events in SAMGs.
3. For all stations, provide plans and schedules for the inclusion of IFB events in station operating documentation where appropriate.
4. Demonstrate the effectiveness of SAMGs via table-top exercise and drills.

Applicable to: All sites (Item 1 is complete for all OPG stations)

Timeline: Completion by end of December 2013.

3.2 Action:

Licensees of multi-unit NPPs should develop improved modeling of multi-unit plans in severe accident conditions or demonstrate that the current simple modeling assumptions are adequate.

Deliverables:

1. An evaluation of the adequacy of existing modeling of severe accidents in multi-unit stations. The evaluation should provide a functional specification of any necessary improved models.

2. A plan and schedule for the development of improved modeling, including any necessary experimental support.

Applicable to: All sites

Timeline: Completion by end of December 2012.

Part 2 – Enhancing emergency response

The CNSC Task Force also confirmed that the current status of emergency preparedness and response measures in Canada, both the onsite and offsite preparedness and response, remain adequate. Nevertheless, the Task Force identified further improvements to be achieved through streamlining emergency preparedness between onsite and offsite authorities. These improvements are described in the actions outlined below. Commission consideration will be sought for all measures required to strengthen interaction with provincial and federal emergency planning authorities and where legislation may be needed. The CNSC has no regulatory mandate to interact in these areas; nevertheless, the CNSC is committed to facilitating discussions and liaising with appropriate regulatory authorities to address the concerns expressed by the Task Force.

Responsibility: Directorate of Security and Safeguards

The CNSC will retain the overall responsibility for coordinating, with licensees and affected federal or provincial authorities, the measures needed to implement the actions required by stakeholders to strengthen onsite and offsite emergency response plans and improvements to emergency facilities and equipment. The implementation of these actions will be prioritized, on a risk-informed basis, commensurate with short-, medium- or long-term completion dates established for each of the actions identified below. Cost-benefit implications may be included in the rationalization of each action but will be subject to CNSC consideration. Specific actions that include or may include overlapping among various federal, provincial and municipal jurisdictions will be referred to the Commission for consideration or guidance at the public Commission meeting in Spring 2012.

Recommendation 4

4.0 Licensees should assess emergency plans to ensure emergency response organizations will be capable of responding effectively in a severe event and/or multi-unit accident, and conduct sufficiently challenging emergency exercises based on them. **(Short Term)**

4.1 Action:

Licensees should evaluate and revise their emergency plans in regard to multi-unit accidents and severe external events. This activity should include an assessment of their minimum complement requirements to ensure their emergency response organizations will be capable of responding effectively to multi-unit accidents or to severe natural disaster events.

Deliverables:

1. An evaluation of the adequacy of existing emergency plans and programs.
2. A plan and schedule to address any gaps identified in the evaluation.

Applicable to: All Stations (multi-unit accident conditions are not applicable to Point Lepreau and Gently-2)

Timeline: Completion by end of December 2012.

4.2 Action:

Licensees should review their drill and exercise programs to ensure that they are sufficiently challenging to test the performance of the emergency response organization under severe events and/or multi-unit accidents conditions.

Deliverable:

A plan and schedule for the development of improved exercise program.

Applicable to: All Stations (multi-unit accident conditions are not applicable to Point Lepreau and Gentilly-2)

Timeline: Completion by end of December 2012.

Recommendation 5

5.0 Licensees should review and update their emergency facilities and equipment, in particular (**Short Term**):

- a) ensure operability of primary and backup emergency facilities and of all emergency response equipment that require electrical power and water
- b) formalize all arrangements and agreements for external support and document these in the applicable emergency plans and procedures
- c) verify or develop tools to provide offsite authorities with an estimate of the amount of radioactive material that may be released and the dose consequences, including the installation of automated real-time station boundary radiation monitoring systems with appropriate backup power

5.1 Action:

Licensees should review primary and alternate emergency facilities, and all emergency response equipment that requires electrical power to operate (e.g., electronic dosimeters, two-way radios), to make sure that appropriate backup power sources exist. The requirements and limitations should be documented in the applicable emergency plans and procedures.

Deliverables:

1. An evaluation of the adequacy of backup power for emergency facilities and equipment.
2. A plan and schedule to address any gaps identified.

Applicable to: All sites

Timeline: Completion by end of December 2012.

5.2 Action:

Licensees should formalize all arrangements and agreements for external support, and document these in the applicable emergency plans and procedures.

Deliverables:

1. Identify the external support and resources that may be required during an emergency.

2. Identify the external support and resource agreements that have been formalized and documented.
3. Confirm if any undocumented arrangements can be formalized.

Applicable to: All sites

Timeline: Completed by December 2012.

5.3

Action:

Licensees should install automated real-time station boundary radiation monitoring systems with appropriate backup power and communications systems.

Deliverable:

Provide a project plan and installation schedule.

Applicable to: All sites

Timeline: Completion by end of December 2012.

5.4

Action:

Licensees should develop source term estimation capability including dose modeling tools.

Deliverable:

Provide source term and dose modeling tools specific to each NPP.

Applicable to: Hydro-Québec and NB Power

Timeline: Completed by December 2012.

Recommendation 6

6.0

Federal and provincial nuclear emergency planning authorities should undertake a review of their plans and supporting programs, such as **(Medium Term)**:

- a) ensuring plan revision activities are expedited and making regular full-scale exercises a priority
- b) establishing a formal, transparent, national-level oversight process for offsite nuclear emergency plans, programs and performance
- c) reviewing the planning basis of offsite arrangements in view of multi-unit accident scenarios
- d) reviewing arrangements for protective action including resolving the issues pertaining to public alerting, validating the effectiveness of potassium iodide (KI) pill-stocking and distribution strategies and verifying, or developing the capability for predicting, offsite effects.

6.1

Action:

CNSC staff will meet with provincial and federal nuclear emergency planning authorities to ensure understanding of recommendations and findings.

Deliverables:

CNSC staff will participate in activities led by respective provincial and federal authorities and initiate adequate CNSC regulatory framework or oversight measures to address recommendations.

Applicable to: All sites, federal and provincial emergency planning authorities

Timeline: Completion by end of December 2012.

Part 3 – Improving regulatory framework and processes

The CNSC Task Force performed a review of the CNSC regulatory framework and processes and confirmed that the Canadian regulatory framework is strong and comprehensive. Nevertheless, the Task Force identified further improvements to existing regulations and supporting regulatory documents and to the licensing basis to strengthen the oversight of existing programs and of programs currently being considered for potential new nuclear power plants. These are described in each of the actions outlined below.

**Responsibility: Regulatory Policy Directorate
Directorate of Power Reactor Regulation
Directorate of Regulatory Improvement and Major
Projects Management**

When considering the measures needed to strengthen the regulatory framework, CNSC staff will develop enhancements to regulatory oversight programs under prioritized CNSC initiatives consistent with the general guidance outlined in the *CNSC Management Response*.

Recommendation 7

7.0 The CNSC should initiate a formal process to amend the *Class I Nuclear Facilities Regulations* to require NPP licensees to submit offsite emergency plans with an application to construct or operate a nuclear power plant. (**Medium Term**)

7.1 Action:
The CNSC will initiate a project to amend the *Class I Nuclear Facilities Regulations* to require submission of applicable provincial and municipal offsite emergency plans along with evidence to support how the licensees are meeting the requirements of those plans to the CNSC as part of the licence application or licence renewal process.

Deliverable:

1. The CNSC will prepare proposed amendments to the *Class I Nuclear Facilities Regulations* for consultation in *Canada Gazette Part I* and submit to the Commission for approval to proceed.
2. The CNSC will review results of consultation and prepare final amendments to the *Class I Nuclear Facilities Regulations* and propose to the Commission for enactment.

Applicable to: CNSC Staff

Timeline: Completed by December 2013.

Recommendation 8

8.0 The CNSC should amend the *Radiation Protection Regulations* to be more consistent with current international guidance and to describe in greater detail the regulatory requirements needed to address radiological hazards during the various phases of an emergency. **(Medium Term)**

8.1 Action:

The CNSC will initiate a project to amend the *Radiation Protection Regulations* to introduce additional clarity on emergency dose limits for workers and to establish return to work criteria.

Deliverable:

1. The CNSC will prepare and consult on a discussion paper on potential amendments to the *Radiation Protection Regulations* which will include proposed amendments to the emergency provisions in the regulations.
2. The CNSC will prepare proposed amendments to the *Radiation Protection Regulations* for consultation in *Canada Gazette Part I* and submit to the Commission for approval to proceed.
3. The CNSC will review results of consultation and prepare final amendments to the *Radiation Protection Regulations* and propose to the Commission for enactment.

Applicable to: CNSC Staff

Timeline: Completed by December 2013.

Recommendation 9

9.0 The CNSC should update the regulatory document framework through:

- a) updating selected design-basis and beyond-design-basis requirements and expectations, including those for **(Short Term)**:
 - i) external hazards and the associated methodologies for assessment of magnitudes
 - ii) probabilistic safety goals
 - iii) complementary design features for both severe accident prevention and mitigation
 - iv) passive safety features
 - v) fuel transfer and storage
 - vi) design features that would facilitate accident management
- b) developing a dedicated regulatory document on accident management **(Medium Term)**
- c) strengthening the suite of emergency preparedness regulatory documents **(Medium Term)**
- d) reviewing applicable Canadian Standards Association standards **(Medium Term)**

9.1Action:

The CNSC will initiate projects to amend applicable regulatory documents in order to incorporate the findings of the CNSC Task Force for both existing and new nuclear power plants.

Deliverables:

1. The CNSC will adapt the proposed GD-310, *Guidance on Safety Analysis for Nuclear Power Plants* to address the findings of the CNSC Task Force review findings prior to publishing this document.
2. The CNSC will prepare revisions to RD-337, *Requirements and Guidance for Design of New NPPs* and, following a public consultation period, submit to the Commission for approval to publish.
3. The CNSC will prepare targeted amendments to specific regulatory documents and, following a public consultation period, submit to the Commission for approval to publish. These include:
 - RD-346, *Site Evaluation for New Nuclear Power Plants*
 - S-294, *Probabilistic Safety Assessments for Nuclear Power Plants*
 - S-296, *Environmental Protection Policies, Programs, and Procedures at Class I Nuclear Facilities and Uranium Mines and Mills*
 - RD-310, *Safety Analysis for Nuclear Power Plants*
 - G-306, *Severe Accident Management Programs for Nuclear Reactors*

Applicable to: CNSC staff

Timeline: Completed by December 2013.

9.2Action:

The CNSC will initiate a project to develop a dedicated regulatory document on accident management.

Deliverable:

The CNSC will prepare a draft document on accident management and, following a period of public consultation, submit to the Commission for approval to publish.

Applicable to: CNSC staff

Timeline: Completed by December 2013.

9.3Action:

The CNSC will initiate a project to develop a dedicated regulatory document on emergency management.

Deliverable:

The CNSC will prepare a draft regulatory document on emergency management, reviewing and incorporating existing information in G-225, *Emergency Planning at Class I Nuclear Facilities and Uranium Mines and Mills*, and RD-353, *Testing the Implementation of Emergency Measures* and, following a period of public consultation, submit to the Commission for approval to publish.

Applicable to: CNSC staff

Timeline: Completed by December 2013.

9.4

Action:

The CNSC will support the review of Canadian Standards Association (CSA) Standards to take into account the lessons from the Fukushima Daiichi nuclear accident through its participation in the CSA Nuclear Strategic Steering Committee (NSSC).

Deliverable:

The CNSC will request the CSA to provide in the timeline proposed:

1. identification of the issues that need to be addressed in the next review cycles for its Standards.
2. action and work plans to address the identified needs.

Applicable to: CNSC staff

Timeline: Completed by December 2013.

Recommendation 10

10.0 The CNSC should amend all power reactor operating licences to include specific licence conditions, requiring implementation of accident management provisions, severe accident management and public information. **(Short Term)**

10.1 Action:

Require licensees to have programs for accident management, severe accident management and public communication.

Deliverables:

1. A Commission Member Document (CMD) will be produced for the February 2012 Commission Meeting, requesting approval of a new power reactor operating licence (PROL) template that will include new licence conditions. The following wording is proposed:

“The licensee shall develop and implement operational guidance and adequate capabilities to deal with abnormal situations, emergencies, and accidents, including severe accidents and, where applicable, multi-unit events.”

A licence condition will also be proposed, requiring licensees to implement and maintain a public information program that includes a proactive disclosure protocol, once RD-99.3 (or its replacement) has been approved for publication (refer to Action 10.2 below for details).

Sections will be added to the NPP Licence Condition Handbook (LCH) template to clarify the compliance verification criteria for the new licence conditions.

2. The amendments to the existing PROLs to comply with the updated template are planned to be complete by 2014.

Applicable to: CNSC Staff

Timeline:

Item 1: Completion by February 01, 2012.

Item 2: Completion by end of December 2014.

10.2 Action:

The CNSC will continue to develop and submit to the Commission for approval, RD/GD-99.3, *Requirements and guidance for public information and disclosure*

Deliverable:

1. The CNSC will submit the updated draft RD/GD-99.3 to the Commission for approval to publish at the February 2012 Commission meeting.
2. The amendments to existing PROLs to be consistent with the implementation timeline set out in Action 10.1.

Applicable to: CNSC Staff

Timeline: Completion by end of February 2012.

Recommendation 11

- 11.0** The CNSC should further enhance the regulatory oversight of nuclear power plants through implementation of a periodic safety review process. (**Short Term**)

11.1 Action:

The CNSC to consider the development of a regulatory framework for the implementation of the periodic safety reviews process.

Deliverable:

1. A CMD seeking endorsement to proceed with the development of regulatory requirements for conducting periodic safety reviews by licensees is to be submitted for consideration by the Commission at the February 15, 2012 public Commission Meeting.
2. Amendments to existing PROLs are anticipated to be completed by December 2015 or as set out by the Commission.

Applicable to: CNSC Staff

Timeline:

Item 1: Completion by February 01, 2012.

Item 2: Completion by end of December 2015.

Recommendation 12

12.0 The CNSC should review memoranda of understanding with regulatory counterparts in countries with CANDU reactors to outline what support, if any, they would require from the CNSC during a nuclear emergency. **(Short Term)**

12.1 Action:

The CNSC is to initiate discussions with CANDU Senior Regulators to determine areas of interest where mutual support can be offered during a nuclear emergency.

Deliverable:

The CNSC in collaboration with the IAEA and CANDU Senior Regulators proposes a meeting in April 2012 in Vienna, Austria in advance of National Report submissions for peer review in May 2012 to establish a common platform for harmonization of future improvements arising from the lessons learned from their independent safety reviews.

Applicable to: CNSC Staff

Timeline: Completion by end of May 2012.

Recommendation 13

13.0 The CNSC should enhance cooperation with other nuclear regulators in addressing the lessons learned from the Fukushima Daiichi nuclear accident and thus further strengthen the capability to respond efficiently to any nuclear emergency. **(Short Term)**

13.1 Action:

Canada as signatory to the Convention on Nuclear Safety is required to participate in triennial review meetings of the Convention and any Extraordinary Meeting that may be agreed to by Contracting Parties. The CNSC on behalf of Canada is responsible for coordinating the preparation and submission of the National Reports for peer review and the participation of Canadian delegates at the review or extraordinary meetings. The CNSC in collaboration with industry and government stakeholders is to prepare a National Report for peer review by Contracting Parties and to participate at the 2nd Extraordinary Meeting of the Convention on Nuclear Safety on the sharing of lessons learned and actions taken by Contracting Parties in response to the Fukushima Daiichi nuclear accident.

Deliverable:

The CNSC in collaboration with industry and government stakeholders is to coordinate the preparation of a National Report on lessons learned from the Fukushima Daiichi nuclear accident consistent with the requirements established by Contracting Parties at the 5th Review Meeting in April 2011. The National Report is to be submitted to the IAEA Secretariat in May 2012 for peer review by the Convention on Nuclear Safety (CNS) States and discussed at an Extraordinary Meeting of the Convention in Vienna, Austria, August 27-30, 2012.

Applicable to: CNSC Staff

Timeline: Completion by end of September 2012.

Appendix B – Comments Disposition Table

#	From	Intervener Comment	CNSC Response
1	<p>Keivan Torabi Member of public</p>	<p>Hi there,</p> <p>I was reading the recent CNSC Fukushima Task Force Report (INFO-0824), and I was wondering if there is an inconsistency in referencing to the 2003 station blackout.</p> <p>On page 76 of CNSC Fukushima Task Force Report (INFO-0824), dated October 2011 (attachment 1):</p> <p>However, on page 62 of Annual CNSC Staff Report for 2003 on the Safety Performance of the Canadian Nuclear Power Industry (INFO-0745), dated November 2004 (attachment 2):</p> <p>if the standby generators started automatically to supply shutdown cooling pumps (as the 2003 report says), the circulation would have been forced, not natural (thermosyphoning). So, it seems the two statements in the two reports are contradicting as whether there was a forced circulation or natural convection.</p> <p>Would you please, forward my question to technical staff and clarify this issue, please.</p>	<p>The Class III standby generators at Pickering B are capable of providing power to the shutdown cooling pumps. However, shutdown cooling is not designed to be used on a reactor that is hot and pressurized. High temperature primary coolant would cause boiling in the secondary side of the shutdown cooling heat exchangers which contains service water at a much lower pressure.</p> <p>During the 2003 loss of bulk electrical supply, Units 5, 6 and 8 could not use shutdown cooling because they were hot and pressurized. Class IV power was restored before they could achieve cold shutdown. These units were cooled by natural convection for 9 hours as stated in the <i>CNSC Fukushima Task Force Report</i>.</p> <p>Unit 7 was already using shutdown cooling at the time of the event and continued to do so.</p> <p>In response to the 2003 event, OPG has added an auxiliary power system to provide limited Class IV power in the event of a loss of bulk electrical supply. This allows primary heat transport pumps to be run. Had this been available in 2003, units 5, 6 and 8 could have been quickly taken to the cold, depressurized state allowing shutdown cooling to be used.</p>
2	<p>Roy Colquhoun Member of public</p>	<p>Please accept my compliments on a well-balanced and insightful report, Ref. 1.</p>	<p>Bruce A has a Qualified Power Supply (QPS) that provides power to Emergency Boiler Cooling (EBC) pumps and valves, emergency</p>

#	From	Intervener Comment	CNSC Response
		<p>I am a Nuclear Engineer with over 45 years experience in the design and operation of Nuclear Power plants.</p> <p>I have several minor points that I will pass over to focus on the major point.</p> <p>CNSC staff recognise the significance of the Two Group approach adopted at all stations beginning with the design of Pickering B and Gentilly 2, circa 1973. That approach involves the installation of a level of defence independent of external power supplies or standby generators. The following stations were constructed and licenced with such capabilities: Pickering B, Gentilly 2, Point Lepreau, Bruce B and Darlington. Each of these stations has the ability to survive a loss of offsite power and failure of the Standby Generators, without involving fuel damage.</p> <p>The other two stations, Pickering A and Bruce A do not have a complete Group 2 per se.</p> <p>Pickering A has installed the capability to derive Class I and II power from Pickering B via a duplicated Class III Inter Station 600V transfer bus. Therefore long term monitoring is redundantly provided. Pickering A boilers can be supplied from Pickering B Service water so Pickering A has a capability similar to that provided via Group 2 EWS. Therefore, Pickering A has a “3rd” line of defence similar to Group 2.</p> <p>Bruce A does not have “3rd” line of defence for electrical power and for long term (beyond 5 hours) has insufficient battery capability to support essential instrumentation. Bruce A does have a single (one per unit) dedicated diesel driven pump capable of supplying the boilers for a long time. Note that there is no unit redundancy for these pumps.</p>	<p>coolant injection valves and monitoring equipment, heat transport main pump circuit breaker trip, safety shutdown system 2 (SDS2) system equipment and air conditioning and lighting loads for the control and instrumentation rooms. This group of structures, systems and components (SSCs) can maintain essential safety functions following a main steamline break or design basis earthquake.</p> <p>The QPS consists of two 600V buses with one bus being supplied by a Unit 3 class III bus and the second by one of two QPS diesels. Each bus is rated to supply the loads of both buses and can be connected via a tie breaker.</p> <p>Equipment associated with the QPS is located in rooms which are designed to withstand environmental conditions resulting from a main steam line break. Specified loads will be transferred manually to the QPS and the system can be monitored from the main control room.</p> <p>The EBC system is designed to provide feedwater to the steam generators to ensure that adequate decay heat removal is available in the event of loss of normal feed. The EBC water is supplied by two pumps from Lake Huron via the fire pump suction headers. The EBC pump motors and valves are supplied by QPS power and are independent of the normal boiler feedwater system. The EBC system can supply up to four units simultaneously.</p> <p>The installation/upgrade of the QPS was a</p>

#	From	Intervener Comment	CNSC Response
		<p>Consequently, Bruce A does not appear to meet the requirements for a 3rd line of defence.</p> <p>Please note that Bruce A had a “close call” re loss of off-site power and failure of all 4 Standby Generators, circa 1979, that was resolved by recovering off-site power.</p> <p>Questions: Does the CNSC staff concur with the above assessment? If not – why? And if CNSC staff agrees, what measures are proposed to upgrade Bruce A?</p> <p>References 1. CNSC Fukushima Task Force Report, INFO-0824, October 2011.</p>	<p>condition of return to service for units 3 and 4. The system was retrofitted to meet CSA 290.5, section 5.6 for emergency power supply requirements. By including the QPS, Bruce A is on par with other facilities in terms of electrical backup.</p>
3	Raidis Zemdegs Candu Energy Inc.	<p>Overall</p> <p>This is a well-written and thorough report, largely consistent with the findings of other regulators and Candu Energy’s own EC6 Fukushima Design Impact Assessment Team.</p> <p>Section 9 of the report lists issues which need to be considered for new designs; some elements discuss the potential for detailed prescriptive requirements. This approach could constrain the designer in choosing the best solution to an issue - in an effort to achieve a balanced design. It would be preferable to restate these issues in terms of goals where possible, and allow the designer to demonstrate how the goals will be achieved.</p>	<p>RD-337, <i>Design of New Nuclear Power Plants</i>, section 11 explicitly allows a designer to use an alternative approach that provides an equivalent level of safety.</p>
4	Raidis Zemdegs Candu Energy Inc.	Pg.13, Sect. 4.2.2	The purpose of taking comments on the <i>CNSC Fukushima Task Force Report</i> was to allow

#	From	Intervener Comment	CNSC Response
		<p>The description of CANDU in this section may be enhanced as “CANDUs have two groups of separated backup power supplies and most postulated failures are unlikely to incapacitate both”.</p> <p>Editorial - clarification</p>	<p>those comments to be considered in the Action Plan.</p>
5	Raidis Zemdegs Candu Energy Inc.	<p>Pg.14, 4.2.3, para. 2</p> <p>Consider clarifying that CANDU spent fuel bays, unlike Fukushima, have the large advantage that they are mostly below grade and outside containment, hence far more accessible for mitigation of loss of heat sink.</p> <p>Editorial - clarification</p>	<p>The purpose of taking comments on the <i>CNSC Fukushima Task Force Report</i> was to allow those comments to be considered in the Action Plan.</p> <p>In addition to better accessibility, CNSC is also aware that the leakage rate, for a given degree of damage, from an in-ground pool is likely to be much lower than for an above-ground pool.</p>
6	Raidis Zemdegs Candu Energy Inc.	<p>Pg.15, Sect. 4.2.7, para. 2 Also pg.32, Sect. 6.4.2.1 Also pg.59, item #10 Also pg.60, Section</p> <p>The statement that “Containment integrity for multi-unit severe accidents should be assured by adequate venting” should be qualified as applying to existing multi-unit stations for which the long-term reliability of electrical power cannot be guaranteed. New designs may choose a different means to preserve containment.</p> <p>Issue – Allowing designer flexibility in design to address “preserving containment”.</p>	<p>RD-337, <i>Design of New Nuclear Power Plants</i>, section 11 explicitly allows a designer to use an alternative approach that provides an equivalent level of safety.</p>
7	Raidis Zemdegs Candu Energy Inc.	<p>Pg.22, top of page</p> <p>Section 6.1 appears to cover design basis accidents. The primary coolant piping in CANDUs will withstand a Design</p>	<p>The purpose of taking comments on the <i>CNSC Fukushima Task Force Report</i> was to allow those comments to be considered in the Action Plan.</p>

#	From	Intervener Comment	CNSC Response
		<p>Basis Earthquake.</p> <p>The description of consequences of design basis earthquake should be clarified (consider wording from Sect. 6.3.4.)</p> <p>Editorial - clarification</p>	<p>Section 6.1 deals with both design basis and beyond design basis hazards.</p>
8	Raidis Zemdegs Candu Energy Inc.	<p>Pg.24, Sect. 6.2.1, 1st para.</p> <p>The main reason for not analyzing the design basis of external events in detail was that the plant was designed to withstand them.</p> <p>Clarification</p>	<p>The purpose of taking comments on the <i>CNSC Fukushima Task Force Report</i> was to allow those comments to be considered in the Action Plan.</p>
9	Raidis Zemdegs Candu Energy Inc.	<p>Pg.33, Sect. 6.4.4</p> <p>While use of external resources would be helpful, and is certainly an option, they may not be available for some time, as Fukushima has shown. An alternative would be to ensure sufficient flexible on-site resources (e.g. portable power supplies) to perform key safety functions for many days.</p> <p>Issue – Broaden options to specify a mitigating strategy</p>	<p>CNSC staff agrees that onsite resources have an important role to play. Task Force recommendations 1 e) and 9 a) vi) make this clear.</p> <p>In revising RD-337, CNSC staff is considering setting a target duration for the capability of an NPP to be self-sufficient with installed equipment (not requiring connection), and a second target duration for the NPP to be self-sufficient with onsite resources, such as portable power supplies, that need connection.</p>
10	Raidis Zemdegs Candu Energy Inc.	<p>Pg.58, item 2</p> <p>Suggest that the requirement be on the probability of production of combustible gases be below a specific threshold, including the impact of any design features that provide combustible gas management.</p> <p>Clarification/Definition</p>	<p>The purpose of taking comments on the <i>CNSC Fukushima Task Force Report</i> was to allow those comments to be considered in the Action Plan.</p> <p>This area will be clarified in the Action Plan response to Task Force recommendation 9 a).</p>
11	Raidis Zemdegs	Pg.58, Item #3	The purpose of taking comments on the <i>CNSC</i>

#	From	Intervener Comment	CNSC Response
	Candu Energy Inc.	<p>The meaning is not clear. Does this refer to safety goals for multi-unit facilities?</p> <p>Clarification.</p>	<p><i>Fukushima Task Force Report</i> was to allow those comments to be considered in the Action Plan.</p> <p>This finding asks CNSC to consider setting, or requiring the licensee to provide and justify, a release for use in emergency planning that takes account of multiple units at a site that may be seriously damaged in an external event.</p>
12	Raidis Zemdegs Candu Energy Inc.	<p>Pg.58, Item #5</p> <p>The safety goals in RD-337 of small release frequency and large release frequency also apply to irradiated fuel bays (BDBAs).</p> <p>Clarification/Definition</p>	<p>The purpose of taking comments on the <i>CNSC Fukushima Task Force Report</i> was to allow those comments to be considered in the Action Plan.</p>
13	Raidis Zemdegs Candu Energy Inc.	<p>Pg.59, Item #10</p> <p>A lesson learned from Fukushima is that the emergency ventilation system experienced difficulty in operation under the specific accident conditions. It may be preferable to include defence-in-depth provisions that act to control containment pressure before containment integrity is threatened.</p> <p>Issue – Designer should have the ability to demonstrate how the goal of containment integrity is ensured.</p>	<p>RD-337, <i>Design of New Nuclear Power Plants</i>, section 11 explicitly allows a designer to use an alternative approach that provides an equivalent level of safety.</p>
14	Raidis Zemdegs Candu Energy Inc.	<p>Pg. 59, Item 11</p> <p>Discussion for requirements for ‘minimum times’ before significant operator interventions are required. The PSA identifies operator actions and times for operator to act. Operator performance is part of the human-machine interface, which provides operators with comprehensive</p>	<p>The purpose of taking comments on the <i>CNSC Fukushima Task Force Report</i> was to allow those comments to be considered in the Action Plan.</p>

#	From	Intervener Comment	CNSC Response
		<p>information, in accordance with the necessary decision times and action times.</p> <p>Clarification/Definition</p>	
15	Raidis Zemdegs Candu Energy Inc.	<p>Pg. 59, Item 12</p> <p>RD-337 Section 7.3.4, 3rd para under ‘severe accidents’ has a statement dealing with equipment hardening (equipment is to perform as intended in the case of severe accidents) and also applies instrumentation for monitoring.</p> <p>Clarification/Definition</p>	<p>The purpose of taking comments on the <i>CNSC Fukushima Task Force Report</i> was to allow those comments to be considered in the Action Plan.</p>
16	Mark Mattson Lake Ontario Waterkeeper	<p>The Task Force failed to address the need to separate Canada’s nuclear regulator from the body charged with promoting the nuclear industry.</p> <p>One of the most significant responses to the Fukushima crisis by Japanese officials has been an effort to restructure the nuclear regulatory system. The restructuring aims to remove the conflict of interest (real or perceived) amongst officials responsible for both promoting the domestic nuclear industry, and for ensuring safety and environmental protection. The Task Force report fails to address this issue or consider its relevance to the Canadian nuclear regulatory system.</p> <p>Japan’s new regulatory system structure is likely to include the separation of the Nuclear and Industrial Safety Agency (NISA) from the Ministry of Economy, Trade and Industry (METI). The new structure is set to be implemented by April 2012. The restructuring stems from the perception that the link between the NISA and the METI resulted in an insufficient level of independence and a potential conflict of interest, in that METI acted as both the promoter and</p>	<p>As reported at the 5th Convention on Nuclear Safety (please note the link to the Report at the end of the quote):</p> <p>“Separation of CNSC and organizations that promote and utilize nuclear energy</p> <p>The passage of the NSCA created distinct, enabling legislation for the regulation of nuclear activities and the separation of functions of the regulatory body from organizations that promote or use nuclear energy. The mandate of the CNSC (see subsection 7.1 a) focuses clearly on the health, safety and security of persons and the protection of the environment, as well as the implementation of international obligations. The mandate does not extend to economic matters.</p> <p>The Commission Tribunal is defined as a court of record in the NSCA, which allows it to conduct its matters in an independent manner. The NSCA provides that only the governor in</p>

#	From	Intervener Comment	CNSC Response
		<p>regulator of the nuclear industry.</p> <p>Canada faces the same challenge as Japan in that our nuclear watchdog, the CNSC, is charged with regulating the nuclear industry, while simultaneously acting as its promoter.</p> <p>The CNSC includes the Commission Tribunal, which makes all major licensing decisions related to the nuclear industry. The Chair of the Commission Tribunal is also the President of the CNSC, Dr. Michael Binder. Dr. Binder regularly acts as a spokesman for the industry. He promotes the “nuclear renaissance” and declares nuclear power universally “safe”.</p> <p>Dr. Binder writes regular Letters to the Editor in response to articles in the media that describe negative aspects of the nuclear industry. For instance, in January 2011, just two months before the Fukushima disaster, Dr. Binder wrote to the Windsor Star in response to an article about wind power, stating that, “the very small controlled releases of nuclear facilities do not pose any risk to people and the environment”. In his presentations, Dr. Binder emphasizes that the public lacks understanding of nuclear issues, rather than acknowledging the valid concerns of an informed public. In a June 2011 presentation, he described proposals coming before the CNSC, such as the Darlington New Nuclear Power Plant proposal and the Deep Geologic Repository, as being, “all against a skeptical post-Fukushima public”.</p> <p>The Commission does not enjoy the independence traditionally associated with administrative tribunals in Canada. This issue was brought into sharp relief in early 2008 when then Commission Chair, Linda Keen, was fired</p>	<p>council may issue directives to the Commission Tribunal, and these must be broad and not directed at any particular licensee. In addition, such an order would be published in the <i>Canada Gazette</i> and laid before each House of Parliament. A recent example can be found in the <i>Directive on Health of Canadians</i> (described in subsection 8.2 b).</p> <p>To safeguard the integrity of the Commission Tribunal’s role as an independent decision-maker, contact between the Commission Tribunal and CNSC staff occurs through the Secretariat. With the exception of the Secretariat and the president, CNSC staff has limited interaction with the Commission Tribunal outside of hearings.</p> <p>Please refer to Canada’s National Report to the 5th Review Meeting of the Convention on Nuclear Safety on the CNSC Web Site: http://www.nuclearsafety.gc.ca/eng/readingroom/reports/cns/</p>

#	From	Intervener Comment	CNSC Response
		<p>by the Prime Minister after shutting down a medical isotope-producing nuclear reactor due to safety concerns. The Commission's decision was overturned in the House of Commons and the nuclear facility reopened.</p> <p>By combining the regulator, particularly the Commission Tribunal that makes licensing decisions, with the body that promotes and speaks in defence of the nuclear industry, Canada faces the same conflict of interest identified by Japanese authorities as one cause of the disaster at Fukushima. In order to ensure that the Commission Tribunal can make truly independent decisions in the interest of safety and the environment, it should be separated from the rest of the CNSC. Only by creating this independence can decisions made by the Commission be free of the perceived or actual conflict of interest that led, in part, to Fukushima.</p>	

#	From	Intervener Comment	CNSC Response
17	Mark Mattson Lake Ontario Waterkeeper	<p>The Task Force failed to address the CNSC’s role in environmental assessment.</p> <p>The Task Force limited its regulatory review to the Nuclear Safety and Control Act and its regulations. No review was made of the other statutes and regulations regularly administered by the CNSC. Of particular concern, given the extensive negative impact to the environment around Fukushima, is the failure to review the CNSC’s role in administering the Canadian Environmental Assessment Act [CEAA].</p> <p>The CNSC is a Responsible Authority for any federal EA where the proponent requires a licence or approval from the Commission. Despite this regulatory responsibility, the relationship between accidents and environmental damage was not clearly acknowledged or addressed in the Task Force report. Instead, the Task Force report mentions offhand in section 8.6 that, “it may be useful for the environmental assessment process to include consideration of severe accidents, should this be regarded as responsive to public concerns”.</p> <p>The CNSC’s approach to environmental assessments should have been evaluated in light of Fukushima. The disaster in Japan shows how connected emergency planning is to protecting the environment from spills and deliberate contaminant releases. It is clear that emergency planning is not strictly a licensing issue and must not be restricted to review during licensing stages for new nuclear facilities. Instead, detailed design information, including how releases to the environment will be prevented in the case of an emergency, must be considered during the environmental assessment approval process.</p>	<p>While the task force report does not explicitly evaluate the CNSC's approach to environmental assessments, the <i>Canadian Environmental Assessment Act (CEAA)</i> requires the consideration of the environmental effects of accidents or malfunctions that may occur in connection with a project. CNSC's approach to assessing malfunctions and accidents is described on a project-by-project basis in a project specific Scoping Information Document (or equivalent). Guidance to the legislated obligations for environmental assessments under CEAA is typically provided by the Canadian Environmental Assessment Agency (the Agency). The CNSC is committed to continuous improvement which includes working with the Agency to ensure the requirements of CEAA, including the requirements to consider the environmental effects of accidents or malfunctions for nuclear projects, continue to be met.</p> <p>The CNSC review of the Fukushima Daiichi accident indicates that the CNSC’s overall approach to examining the potential environmental consequences of severe accidents in environmental assessments is robust.</p>

#	From	Intervener Comment	CNSC Response
		<p>An example is the recent environmental assessment and licensing hearing for the Darlington New Nuclear Power Plant [DNPP]. Waterkeeper was an Intervenor in that proceeding and participated throughout the process. A major concern with the approach applied by the Joint Review Panel, as advanced by the CNSC as a Responsible Authority, was to apply the notion of a “plant parameter envelope” or “bounding scenario”. The premise of the bounding scenario approach is that an EA can be completed without even basic design information, such as how many reactors will be built or what kind of cooling water system will be installed. Instead of detailed information, the EA is meant to proceed on the basis of the hypothetical maximum potential impact of a range of possible scenarios.</p> <p>While this approach has been applied by the CNSC at licensing hearings, it is not appropriate for an environmental assessment. The key difference is that the proponent must return for further licences as the project proceeds, at which time detailed design information will be provided to, and reviewed by, the Commission. In an environmental assessment, the initial review is never revisited; it is meant to cover the entire life of the facility from site preparation to decommissioning.</p> <p>If detailed (or even basic) design information is not available at the time of the EA review, it will never be reviewed in the context of the CEAA requirements. The public will never have the opportunity to participate in the project review with respect to the CNSC’s environmental protection responsibilities, outside of the more basic licensing requirements. This approach should have been reviewed by the Task Force in light of the events in Japan.</p>	

#	From	Intervener Comment	CNSC Response
18	Mark Mattson Lake Ontario Waterkeeper	<p>No new nuclear plants in Canada should proceed until the Task Force recommendations can be applied throughout the licensing and environmental assessment process.</p> <p>Following the nuclear disaster in Japan, many countries decided to put nuclear activities on hold, learn lessons from the unfolding disaster, and apply those lessons to improve safety and environmental protection in domestic facilities. Japan has announced that it will abandon plans to build any new nuclear reactors. Germany is phasing out all reactors in favour of renewable power options. China suspended approvals for all new nuclear power plants until revised safety rules can be developed based on new information from Fukushima. Switzerland has frozen plans to build or replace any nuclear power plants.</p> <p>In contrast, Canada has charged ahead with approvals for new nuclear plants. Within days of the meltdown at Fukushima, the Panel responsible for the hearing into new nuclear reactors at Darlington decided to proceed with a licensing and environmental assessment hearing. Information about the crisis in Japan was not before the Panel for consideration, including the problems faced by TEPCO in attempting to cool the reactors, the insufficient storage space for contaminated water, and the major emissions to the air, soil, and water that resulted.</p> <p>When asked by Waterkeeper and other concerned Interveners to postpone the hearing until information about the events in Japan became available, the Panel replied that there was no need to adjourn the hearing. The Chair stated that the Panel would continue its review until, “satisfied that it has all the relevant information to allow it to fulfill its mandate”. Yet, the Panel released its final report, including</p>	<p>In light of the lessons learned to date from Fukushima, CNSC's approach to the consideration of malfunctions and accidents in EAs remains robust. The CNSC is acting diligently to the <i>Task Force Report</i> recommendations for new build projects in strengthening its regulatory requirements. These requirements will be implemented for new build projects at the time of the licence to construct or thereafter in subsequent licensing steps.</p> <p>Moreover, the CNSC cannot comment in detail on this recommendation given the legal proceedings underway with respect to the noted project.</p>

#	From	Intervener Comment	CNSC Response
		<p>recommendations to Cabinet, on August 25, 2011, more than two months before the Task Force released its draft report on lessons to be learned from Fukushima. This indicates that the Panel did not believe the lessons from Japan’s disaster were “relevant” to the environmental assessment of a new nuclear plant in Canada.</p> <p>In his announcement of the Panel’s decision to proceed with the hearing despite Fukushima, the Chair acknowledged that the lessons from Japan would be studied and applied to future regulatory supervision of nuclear facilities in Canada. Yet, he did not find that these lessons were relevant to the environmental assessment or licence to prepare the site hearing; instead, he stated that they would be, “rigorously examined if and when the Proponent can apply to the Canadian Nuclear Safety Commission for a license to construct and operate”.</p> <p>Upon release of the Task Force report, it is clear it includes lessons relevant to the Darlington hearing. The Task Force found that, while the CNSC’s current approach to reviewing NNP plans is sound, there are 16 specific improvements that should be made to the review process. These include issues relevant to the Darlington EA, such as:</p> <ul style="list-style-type: none"> • “The CNSC has no requirements for the analysis of multi-unit accidents, particularly those that could arise from common-cause events”. OPG plans to build up to four new reactors immediately beside four existing reactors. The recent Darlington NNPP hearing failed to analyze multi-unit accidents resulting from common-cause events. The project should be reassessed to address this gap. • “The CNSC does not have a full set of requirements for plant and site layout that would facilitate protection against 	

#	From	Intervener Comment	CNSC Response
		<p>external hazards”. The Darlington hearing was conducted before the plant and site layout for the project were established by OPG. The project must be reassessed against the new criteria to ensure that plant and site layout meet these new requirements.</p> <ul style="list-style-type: none"> • “The CNSC has not documented an overall, systematic approach to the evaluation of all types of external events that could occur in Canada. A systematic approach would encompass both design-basis events and beyond-design-basis events”. This information should have been considered during the Darlington hearing. The project should be sent back to the Joint Review Panel for reassessment that fills the identified gaps. <p>The Task Force Report states that the recommendations listed “must be considered for new builds”. The lessons and recommendations identified by the Task Force should be applied to all nuclear facility reviews, regardless of whether they are licensing hearings or environmental assessments. The Task Force’s findings should not be arbitrarily restricted to reviews commenced after October 2011, when it was clear from the early hours of the Fukushima disaster that lessons for the industry would be forthcoming.</p> <p>The CNSC has the opportunity to ensure that the updated, more robust standards recommended by the Task Force are applied prior to the construction of Canada’s next nuclear power plant. The Darlington New Nuclear Power Plant proposal should be sent back to the Panel for reconsideration with specific reference to the Task Force report.</p>	

#	From	Intervener Comment	CNSC Response
19	Mark Mattson Lake Ontario Waterkeeper	<p>SUMMARY OF RECOMMENDATIONS</p> <ol style="list-style-type: none"> 1. The Task Force report should include consideration of the real and/or perceived conflict of interest inherent in Canada's nuclear regulatory system, in light of Japan's decision to separate the nuclear regulator from the industry's promoter. 2. The CNSC's approach to environmental assessments, including administration and application of the Canadian Environmental Assessment Act, should have been evaluated in light of Fukushima.. 3. The lessons and recommendations identified by the Task Force should be applied to all nuclear facility reviews, regardless of whether they are licensing hearings or environmental assessments. 4. The Darlington New Nuclear Power Plant proposal should be sent back to the Panel for reconsideration with specific reference to the Task Force report 	See responses to detailed comments above.
20	R. J. Maceacheron Ontario Power Generation	<p>The purpose of this email is to provide a written submission of OPG consolidated comments on the CNSC Fukushima Task Force Report, INFO-0824, October 2011.</p> <p>Overall, the report is well written and presents the results of the Task Force review in an organized and cogent manner. The review was conducted in a manner consistent with the Task Force Nuclear Power Plant Safety Review Criteria (e-Doc 3743877, July 2011) and presents the information in an accurate and balanced fashion. Except as discussed below, OPG agrees with the recommendations and findings set out in the report. OPG has already undertaken activities which address many of the issues identified in the report (see OPG letter to CNSC dated September 15, 2011, e-Doc 3804501).</p>	CNSC recognizes that licensees have been proactive in learning the lessons of Fukushima and have already taken a number of actions as a result of their own evaluations.

#	From	Intervener Comment	CNSC Response
		<p>The following comments aim to provide clarity around specific areas covered by the report:</p>	
21	R. J. Maceacheron Ontario Power Generation	<p>1) Section 6.3.3: The last sentence in paragraph 5 regarding degasser (or bleed) condenser relief valve capacity stipulates that: "The CNSC Task Force finds that licensees should perform tests to verify the capacity of the degasser (or bleed) condenser relief valve capacity to respond to a complete loss of heat sinks." OPG maintains that additional testing is not required and proposes to provide the CNSC with an updated evaluation of the capability of these relief valves that demonstrates the valves have sufficient capacity.</p>	<p>CNSC staff accepts that alternative approaches may be possible to demonstrate the adequacy of pressure relief. The Action Plan response to Task Force recommendation 1 a) will take this into account.</p>
22	R. J. Maceacheron Ontario Power Generation	<p>2) Section 6.3.6 and section 10.1, item 1(c), ii: The CNSC Task Force finds that the need for hydrogen mitigation in the Irradiated Fuel Bay (IFB) has not been adequately evaluated. The issue around the potential for hydrogen gas production in the IFB has been already evaluated and dispositioned by OPG through existing assessments and the provision of Emergency Mitigating Equipment (EME). OPG maintains that it has adequately evaluated the need for hydrogen mitigation and has concluded that hydrogen formation is precluded provided that the fuel remains covered with water. OPG has committed to perform analysis to demonstrate the structural integrity of its fuel bays for elevated temperatures and has committed to additional water make-up for the Darlington and Pickering B fuel bays.</p>	<p>CNSC staff notes that the Fukushima accident demonstrated the destructive power of hydrogen; provision of hydrogen mitigation would provide additional defence in depth and should therefore be considered. CNSC staff accepts that, provided spent fuel is covered, it will not overheat. Provided the structural integrity of the irradiated fuel bays can be successfully demonstrated, existing assessments may be found to be adequate. The Action Plan response to Task Force recommendations 1 c) ii) and 1 d) will make this clear.</p>
23	R. J. Maceacheron Ontario Power Generation	<p>3) Section 6.4.2: OPG agrees with the overall discussion in this section and subsections. However, the CNSC Task Force report focuses on prevention of unfiltered releases. OPG maintains that for the extreme beyond design basis</p>	<p>Section 6.4.2.1 acknowledges that all current NPPs have the ability to vent to preserve containment integrity. The emphasis here is on the capability for filtered venting. The Action</p>

#	From	Intervener Comment	CNSC Response
		events (BDBE) and severe accidents (SA) under consideration, there needs to be a focus on both filtered releases and the preservation of the containment envelope through controlled releases (if required) in order to minimize public exposure to radiological hazards under these extreme conditions.	Plan response to Task Force recommendation 1 b) will emphasize the importance of providing filtered venting to the extent practicable.
24	R. J. Maceacheron Ontario Power Generation	4) Section 6.3.1: The CNSC Task Force finds that its prediction of the time to pressure tube failure following a total loss of heat sinks is shorter than what has been reported by the licensees. Further discussion around this observation is required to determine if additional activities (beyond those already underway as part S-294 Probabilistic Risk Assessment (PRA) revision) are required.	CNSC staff would welcome the opportunity to discuss this issue as industry prepares its response to the Action Plan.
25	R. J. Maceacheron Ontario Power Generation	5) Sections 6.4.3 and Section 6.3 (and elsewhere): The CNSC Task Force has several findings related to opportunities to improve upon the Safety Analysis, Assessment of External Hazards and Assessment of Severe Accidents. There are significant improvement initiatives currently underway in these areas across the nuclear industry that were initiated prior to the Fukushima event. OPG maintains that the scope of BDBE analyses and assessments being undertaken to meet the requirements for PRA under S-294 compliance projects will adequately characterize the consequences of these extreme events, both in terms of the potential for (and/or extent of) core damage and ex-plant release of radioactive materials.	CNSC agrees that the ongoing activities, such as Safety Analysis Improvement and meeting S-294 will go far in addressing the FTF recommendation. Nevertheless, we maintain that the scope of these activities may need to be expanded to fully account for the lessons learnt. In particular, the Industry and CNSC expert will need to engage in discussions concerning the rules for beyond-design-basis events (BDBE) analyses, range of events considered, as well as release paths of radioactivity to the environment.
26	Gilles W. Grenier Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec	Préambule L'Agence tient en premier lieu à souligner la qualité du rapport présenté par le Groupe de travail de la CCSN sur Fukushima; qualité démontrée par son souci de transparence, par la portée des actions suggérées et par l'ampleur de sa démarche actuelle de consultation.	Noté. Merci pour vos commentaires.

#	From	Intervener Comment	CNSC Response
		Le service de la coordination régionale de la mission santé en sécurité civile de l'Agence a mandaté un groupe de travail affecté au dossier du Plan des mesures d'urgence nucléaire externe à Gentilly 2 (PMUNE-G2), dont le représentant de la Direction de santé publique, afin d'analyser ce rapport et d'émettre ses commentaires.	
27	Gilles W. Grenier Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec	<p>Commentaires plus spécifiques :</p> <p>L'émission de nos commentaires respectera l'ordre de présentation du rapport.</p> <p>Page v, Amélioration des interventions en cas d'urgence Il semble y avoir une certaine hésitation entre l'affirmation qu'au Canada, l'état actuel de la préparation et des mesures d'intervention est adéquat, mais qu'il pourrait être meilleur si nous avons des arrangements, des accords spécifiques, un processus national officiel et un calendrier d'exercices à échelle réelle.</p> <p>Par contre, un processus national, officiel et transparent portant sur les plans et programmes serait sans doute très intéressant notamment au niveau des systèmes d'alerte de la population.</p>	Nous avons bien noté votre commentaire visant la mise en place d'un processus national officiel afin de prendre en charge, à tous les ordres du gouvernement, la coordination des mesures d'intervention d'urgence au Canada.
28	Gilles W. Grenier Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec	<p>Page 11, Lignes directrices canadiennes sur les interventions en situation d'urgence nucléaire L'affirmation « <i>On n'a observé aucun effet néfaste pour la santé à des doses inférieures à 100 mSv.</i> » nous semble inexacte puisque des études menées auprès des enfants suite à l'accident de Tchernobyl ont démontré l'augmentation de l'incidence du cancer de la thyroïde chez les enfants à partir de 50 mSv.</p>	Le personnel de la CCSN a consulté des collègues qui ont mené des recherches épidémiologiques auprès des enfants de Tchernobyl atteints d'un cancer de la thyroïde. Selon ces experts internationaux réalisant la recherche en question (communication personnelle avec D ^{re} L. Zablotska), une estimation du risque statistique significatif pour la plus faible catégorie de dose connue a été publiée par Zablotska et al., 2011, dans le <i>British Journal of Cancer</i> . Un risque en excès

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			statistiquement significatif a été perçu à environ 0,45 Gy ou 450 mGy pour les enfants biélorussiens. En Ukraine, ce risque se mesurait à 0,75 Gy ou 750 mGy. (Dans toutes les études sur la thyroïde, le risque se fonde sur la dose à l'organe et s'exprime donc en Gy plutôt qu'en Sv.) À moins que l'intervenant ne possède de l'information tirée d'une (obscur) étude écologique, la CCSN s'appuie sur les constatations d'études publiées dans des revues scientifiques qui se composent de comités de lecture.
29	Gilles W. Grenier Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec	Page 20, Intervention d'urgence On y affirme que les séismes et tsunamis majeurs ne constituent pas des menaces crédibles pour les centrales nucléaires canadiennes. Or, une vague de 14 à 15 mètres ne constituait pas non plus une menace crédible à Fukushima, la préparation se limitant à une vague de 5,6 m. Il nous semble opportun de demeurer prudents au regard de séismes pour Gentilly-2, surtout en rapport à ce que nous pouvons lire en 5.1.2 et 5.2.4.	Nous sommes d'accords avec le principe de la prudence, c'est pourquoi la Recommandation 2 du Groupe de travail fera en sorte que les risques externes seront réévalués avec les meilleures méthodes internationales et les protections de la centrale contre ces risques seront aussi examinées et renforcées si nécessaire.
30	Gilles W. Grenier Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec	Page 26, Analyses de dimensionnement originales Nous jugeons important, du point de vue de la protection de la population, de s'assurer que la magnitude des événements externes de dimensionnement corresponde aux meilleures pratiques internationales modernes.	Nous sommes d'accord et la Recommandation 2 fait en sorte que ce soit le cas.
31	Gilles W. Grenier Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec	Page 28, Constatations de l'examen des risques externes Même commentaire.	La Recommandation 2 nous assure que l'évaluation des risques externes sera faite selon les meilleures pratiques internationales.
32	Gilles W. Grenier Agence de la santé et des services sociaux	Page 29, Constatations de l'examen des accidents de dimensionnement Nous saluons le fait que le groupe de travail reconnaisse	Noté. Merci pour le commentaire.

#	From	Intervenir Comment	CNSC Response
	de la Mauricie et du Centre-du-Québec	que les risques externes peuvent causer des accidents durant plusieurs jours et qu'un accident de dimensionnement peut dégénérer en accident hors dimensionnement, voire en accident grave. (Voici une preuve de transparence dans l'analyse des risques.)	
33	Gilles W. Grenier Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec	Page 41, Constatations de l'examen pour la gestion des accidents graves Nous ne nous reconnaissons pas dans l'affirmation que tous les services publics ont mis en place des directives claires qui assignent à l'exploitant de la centrale la responsabilité décisionnelle concernant l'éventage de l'enceinte de confinement. Il faudrait peut-être préciser les services publics en question.	Merci pour le commentaire traitant de la responsabilité de la décision de l'éventage de l'enceinte de confinement. La CCSN va vérifier et obtenir plus d'information afin de confirmer les attentes de cette recommandation.
34	Gilles W. Grenier Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec	Page 45, Estimation du terme source Nous sommes très en accord avec le fait qu'Hydro-Québec devrait nous fournir l'estimation du terme source.	La CCSN a l'intention de coordonner cette fonction entre l'exploitant et la province pour y trouver une solution.
35	Gilles W. Grenier Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec	Page 46, Surveillance radiologique à la périphérie de la centrale et sur le terrain Il est vrai qu'Hydro-Québec obtient les informations en temps réel, mais ce n'est pas le cas pour les autorités hors site malgré une demande répétée.	La CCSN a l'intention de coordonner cette fonction entre l'exploitant et la province pour y trouver une solution.
36	Gilles W. Grenier Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec	Page 49, Gestion des urgences nucléaires au Canada Nous ne sommes pas certains que les responsabilités des organismes et les canaux de communication sont bien définis et que les besoins d'information sont clairement établis. À tout le moins, cela reste à être vérifié ultérieurement lors d'un exercice.	La CCSN est d'accord que cette fonction devrait être vérifiée lors d'un exercice.
37	Gilles W. Grenier Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec	Page 50, Titulaire de permis de centrale nucléaire Nous sommes d'accord avec l'affirmation que les titulaires de permis doivent apporter un soutien aux autorités hors site, mais il faudrait mieux définir la nature précise de ce soutien.	La CCSN a l'intention de coordonner cette fonction entre l'exploitant et la province pour y trouver une solution.

#	From	Intervener Comment	CNSC Response
38	Gilles W. Grenier Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec	Page 56, Québec Il faudrait définir précisément ce que l'on entend par un exercice à échelle réelle parce qu'à notre sens, il n'y a jamais eu de tel exercice rassemblant tous les ministères et organismes impliqués. Nous ne croyons pas être tous prêts à réaliser un tel niveau d'exercice.	La CCSN a l'intention de discuter des attentes de cette recommandation avec les autorités de (la province du) Québec.
39	Gilles W. Grenier Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec	Page 56, Plans Une question : Pourquoi ne parler que de la mission santé, d'autres ministères et organismes ont également des coordinations spécifiques à exercer dans le cadre du plan des mesures d'urgence nucléaire.	La CCSN a mis l'accent sur la santé sachant qu'il y a d'autres aspects également importants à vérifier.
40	Gilles W. Grenier Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec	Page 57, Évaluation des accidents/événements On ne peut affirmer que l'ORSC a la capacité de réaliser la modélisation du panache, car c'est à Santé Canada ou à Hydro-Québec que nous nous référons pour obtenir cette modélisation.	La CCSN va vérifier afin de mieux comprendre l'acheminement de l'information.
41	Gilles W. Grenier Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec	Page 57, Évaluation des accidents/événements Cette affirmation « Les membres de l'équipe utilisent des mesures en temps réel provenant de la centrale pour prédire les effets hors site. » est également inexacte puisque, comme mentionné précédemment, nous n'avons pas les données en temps réel à l'ORSC.	Noté. Merci pour le commentaire.
42	Gilles W. Grenier Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec	Page 57, Résumé - Québec Il faut nuancer l'affirmation de la première puce parce que nous avons un plan directeur actuellement en révision et certains ministères ou organismes ont des plans d'intervention plus ou moins complets. Nous ne pouvons donc pas affirmer qu'il existe un plan d'intervention complet regroupant la réponse opérationnelle de tous les ministères et organisations impliqués.	La CCSN est d'accord avec votre commentaire et le fait que la version provisoire du plan directeur est actuellement en révision de même que des plans de soutien d'intervention. L'aspect opérationnel devrait être validé par l'entremise d'un exercice.
43	Gilles W. Grenier Agence de la santé et des services sociaux de la Mauricie et du	Page 62, Constatations de l'examen sur la gestion des urgences nucléaires au Canada Au point 4, on mentionne le fait que nous travaillons surtout sur les mesures de préparation et d'intervention et pas sur	Noté. Merci pour le commentaire.

#	From	Intervener Comment	CNSC Response
	Centre-du-Québec	les éléments de rétablissement. Évidemment, nous sommes en accord avec cette constatation et nous croyons qu'il serait très important de commencer la planification de la sortie de crise et de la phase post-accidentelle car, advenant la survenue d'un accident important, cela représenterait pour les autorités hors site une gestion excessivement complexe qui risquerait de s'étendre très loin dans le temps.	
44	Gilles W. Grenier Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec	Page 65, Permis, conditions et ordres/ordonnances Nous sommes d'accord avec les nouvelles exigences notamment le protocole de divulgation publique. Cependant, nous aurions aimé que l'ordonnance suggérée de mettre en œuvre les leçons tirées des accidents survenus soit maintenue même si les titulaires de permis y ont effectivement répondu. Cela démontrerait une volonté de transparence encore plus grande.	Noté. Merci pour le commentaire.
45	Gilles W. Grenier Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec	Page 73, Améliorer l'intervention d'urgence Nous sommes d'accord avec les recommandations émises, mais nous ne comprenons pas la question concernant la validation de l'efficacité des comprimés d'iodure de potassium.	Erreur de traduction. Une correction sera apportée au texte de la Recommandation 6 dans la version provisoire du plan d'action du personnel de la CCSN. Cette recommandation suggère l'efficacité de la gestion pour la distribution des comprimés d'iodure de potassium et non l'efficacité des comprimés d'iodure de potassium comme tel pour protéger la santé. En réalité, ceci s'applique surtout pour l'Ontario.
46	Gilles W. Grenier Agence de la santé et des services sociaux de la Mauricie et du Centre-du-Québec	Conclusion Nous espérons que ces commentaires sauront être utiles à l'élaboration de la version finale du rapport. Nous tenons également à mentionner à nouveau notre profonde satisfaction du travail accompli par l'équipe de la CCSN. Enfin, nous souhaitons que les recommandations de ce rapport permettent une amélioration tangible de notre préparation afin de faire face à d'éventuels accidents, autant dans la phase d'intervention que dans celle du post-	Merci d'avoir partagé vos commentaires avec la CCSN.

#	From	Intervener Comment	CNSC Response
		accidentel qui représente à elle seule un véritable défi pour les autorités hors site.	
47	Allison J. Stuart Emergency Management Ontario Ministry of Community Safety and Correctional Services	<p>We would like to take the opportunity provided to respond to the Task Force Report prepared in response to Fukushima by the Canadian Nuclear Safety Commission (CNSC).</p> <p>Emergency Management Ontario has reviewed the CNSC Fukushima Task Force Report (October 2011). We find it to be a very thorough examination of the Japanese accident as it pertains to the Canadian nuclear environment, including external hazards, the current regulatory framework and nuclear emergency management.</p> <p>Emergency Management Ontario welcomes the report's recommendations related to federal and provincial off-site nuclear emergency management. We look forward to working closely with CNSC staff, our federal nuclear emergency planning counterparts, and our partners in other provinces to respond to the Task Force recommendations in a consistent and systematic manner.</p>	Thank you for sharing this comment with the CNSC.
48	Sunil Nijhawan Prolet Inc.	<p>A Preliminary Review of the CNSC Fukushima Task Force Report – INFO 0824 – October 2011</p> <p>The following are some of my comments on the CNSC Fukushima Task Force Report:</p> <p>1. The main conclusion - “Task Force confirms that the Canadian regulatory framework is strong and effectively applied to the whole range of plant conditions, including severe accidents; that emergency preparedness and response measures are adequate; and that there are no significant gaps in nuclear emergency planning at the provincial or federal levels” is self congratulatory and delusional. The statement is also contradicted by many</p>	<p>An independent peer review recently performed by a team of senior regulators under the IAEA's International Regulatory Review Service rated the CNSC's response following the Fukushima accident as a “good practice”, concluding that the CNSC had systematically and thoroughly reviewed the lessons learned from the accident and had made full use of available information, including the review of actions taken by other international regulators.</p> <p>The comments from Dr. Nijhawan bring no new information.</p>

#	From	Intervener Comment	CNSC Response
		details of the report itself.	
49	Sunil Nijhawan Prolet Inc.	The most painful lesson that engineers will learn from reviews of the Fukushima disaster relates to the unacknowledged failure of Canadian regulators, designers and utilities in better retrofitting existing reactors in a timely manner to better withstand and mitigate known severe accident related challenges to PHWR reactor and containment integrity.	This comment is a statement of opinion. CNSC's requirements for reactor refurbishments are found in RD-360, <i>Life Extension of Nuclear Power Plants</i> . The Action Plan is intended to produce timely and effective enhancements to the already high level of safety achieved by Canadian NPPs.
50	Sunil Nijhawan Prolet Inc.	The Report fails to compare favourably with the technical depth of the US NRC and UK Office of Nuclear Regulation, IAEA and other competent authority reviews (such as the INPO report) and contains a number of inaccurate and incomplete assessments of the Fukushima events. The latter, however could have been influenced by the quality of information it received and the ability of its assigned personnel to understand severe accident progression in a non PHWR design, when they have not even yet acquired demonstrable ability for a reactor type they regulate regularly.	This comment is a statement of opinion. Industry has performed specific severe accident analyses in support of probabilistic safety assessments. CNSC has performed detailed reviews of these PSAs.
51	Sunil Nijhawan Prolet Inc.	If the purpose of the Report was to assess Canadian regulatory practices related to severe accident prevention, mitigation and management, the Report also fails to present the true picture of state of affairs and the apparent urgent need for change in the way Canadian nuclear power reactors are operated and regulated in regard to their severe accident prevention and mitigation capabilities. It just extrapolates the success of the Canadian PHWR designs under normal operating conditions and design basis accident safety reviews, to significantly more complex issues of a severe core damage accident.	This comment is a statement of opinion.
52	Sunil Nijhawan Prolet Inc.	Commercial nuclear power reactors have operated for over 50 years, and the first severe accident progression studies	The Action Plan is intended to produce timely and effective enhancements to the already high

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		and understanding of related phenomena began to mature over 30 years ago, when the US NRC accelerated its related efforts after the Three Mile Island accident. However, some very basic accident prevention, mitigation and management measures have not been required by the Canadian regulators and hence not initiated by the utilities that have also used favourable probabilistic or cost-benefit analysis tricks to resist and delay much required design enhancements and overhaul of anticipated emergency actions. The report does not acknowledge the lethargic ways in which even the minor design enhancements for design basis accidents such as those in the CNSC Generic Action Items have been addressed in Canada.	level of safety achieved by Canadian NPPs.
53	Sunil Nijhawan Prolet Inc.	The Report is not unique in its failures. In public reviews that inevitably followed, severe accidents in power reactors at TMI, Chernobyl and Fukushima have been often presented as site specific aberrations in design, operations, safety culture and acts of God beyond mortal imagination. The CNSC Fukushima Task Force report is no exception and while it does contain some good technical elements that recognize the severe accident related deficiencies in design, regulation and operation, the upfront conclusions have no basis in fact or find any real support in the report itself. Perhaps the hope was that most people would not read the report and be comforted by the glorious upfront conclusions of the adequacy of the Canadian nuclear power reactor regulatory regime.	This comment is a statement of opinion.
54	Sunil Nijhawan Prolet Inc.	There is no acknowledgment in report of the risk impact of the limited number of CANDU PHWR design, accident management and emergency preparedness deficiencies related to severe accidents it does recognize.	A number of sections of the Task Force Report speak to the risk impact of severe accidents. See section 6.1.2, 6.1.3, 6.3.7, 6.3.8, 6.4.1, 6.4.7, 6.5.1, and 6.5.11. The Action Plan is intended to produce timely and effective enhancements to the already high

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			level of safety achieved by Canadian NPPs.
55	Sunil Nijhawan Prolet Inc.	If a sincere soul searching, regulatory overhaul and actual, effective, timely and far reaching measures are not taken for operating reactors, the world is bound to witness recurring severe core damage scenarios followed by series of studies that will predictably conclude that such severe accidents can happen only in other jurisdictions and in other designs and that 'our' reactors are 'safe'. The CNSC Fukushima Task Force Report seems to have a serious dissociation between reality and its upfront conclusions.	This comment is a statement of opinion. The Action Plan is intended to produce timely and effective enhancements to the already high level of safety achieved by Canadian NPPs.
56	Sunil Nijhawan Prolet Inc.	Canada can ill afford a severe accident in a CANDU plant and if one was to occur the blame would shift to the operators or 'unanticipated' external or internal events, just as did at Fukushima where many say that the Japanese regulator failed to provide technical assistance in accident mitigation because no real accident management expertise existed just as it surely does not at CNSC. From years of denying the usefulness of understanding potential severe core damage accidents, for example by accident progression analysis by claiming that any analyses of severe accident progression would be 'speculative' and wasted years of not acquiring any in-house expertise, CNSC is no position today to claim that their regulatory framework is sound for severe accidents. CNSC must stop being a proponent of the status quo in Canadian nuclear industry but take the role of a regulator who intelligently guards public interest with evolving public expectations and information and lessons from Fukushima, Chernobyl and Three Mile Island disasters – all probably preventable by sound regulatory practices. The Report does not give any such indication or raise hopes that any real lessons were learnt by CNSC from the Fukushima disaster.	This comment is a statement of opinion. Several of the recommendations of the Task Force lead to improvements in the regulatory framework. The Action Plan is intended to produce timely and effective enhancements to the already high level of safety achieved by Canadian NPPs.

#	From	Intervener Comment	CNSC Response
57	Sunil Nijhawan Prolet Inc.	The Report failed to acknowledge the role played by regulators and other Canadian stakeholders in failure to ensure that the so-called residual risk from operating nuclear reactors is minimized in a timely manner. There are many very obvious examples of known deficiencies in CANDU PHWR designs that may exasperate a sustained loss of power, changing an otherwise recoverable outcome into significantly more severe consequences. Regulators have failed to develop strategies for potential design retrofits and failed to see the need for more open, concerted and cooperative efforts internationally in accident progression and consequence analyses and supporting experiments.	RD-360 gives CNSC's requirements for reactor refurbishments. These include reviews against modern standards and identify means of reducing the risk from, among other things, beyond design basis accidents. The Action Plan is intended to produce timely and effective enhancements to the already high level of safety achieved by Canadian NPPs.
58	Sunil Nijhawan Prolet Inc.	CNSC has failed to acknowledge in this report and anywhere else that there are certain elements of the current PHWR designs that actually exasperate the situation, accelerate the onset and progression of core damage and present substantially degraded opportunities for mitigation and control. In many cases, a sustained loss of power in a PHWR may cause a containment bypass with early and unacceptable off site consequences. Instead of defensive posturing, CNSC needs to address severe accident related technical issues more aggressively and openly.	The recommendations made by the Task Force in section 10.1, and the Action Plan developed from them, are intended to enhance safety in Canadian NPPs.
59	Sunil Nijhawan Prolet Inc.	CNSC has failed to require the utilities to engage in severe accident related activities and timely retrofits. This is not acknowledged in the Report. Their governance is on this matter is lethargic. Some related and important AECB/CNSC Generic Action Items, such as those pertaining to hydrogen mitigation have taken over 20 years and are not yet fully addressed in 2011 and where implementation is pending, the pace is slow. For example PARS being implemented at PLGS and later at Darlington are not designed to mitigate severe accident conditions but just the most severe of design basis accidents	The original CANDU plant design basis included accidents with significant core damage such as a loss of coolant accident with simultaneous failure of the emergency core cooling system (LOCA+LOECC (loss-of-coolant accident + loss of emergency core cooling)). Safety measures were implemented to provide the required protection. Additional measures – design enhancements, operational provisions, and analytical studies - were introduced based on the best national and

#	From	Intervener Comment	CNSC Response
		<p>(LOCA+LOECC) analyzed in a stylistic and not necessarily conservative manner. Hydrogen source term from severe accidents resulting from Zircaloy and steel reactions with steam and corium-concrete interactions has not been considered.</p>	<p>international practices. For example, PARS are being implemented or are already implemented at all Canadian NPP. The number of recombiners is well in excess of that required to cope with the hydrogen generated in the most severe of design basis accidents and will be adequate to mitigate the hydrogen source from the Zircaloy and steel reaction with steam.</p> <p>Current safety analyses of a loss of coolant accident with simultaneous failure of the emergency core cooling system (LOCA+LOECC) are very conservative. Moreover, they would be considered a beyond design basis accident in most countries.</p> <p>Recommendation 3 will lead to further improvements in modeling capability.</p>
60	Sunil Nijhawan Prolet Inc.	<p>2. Existing CANDU reactors do not meet present public expectations of risk from reactor operation</p> <p>a) CNSC does not recognize that public risk expectations of risk from operating plants are no different than that for new plants.</p> <p>b) Only very basic accident consequence analyses have been performed so far and not done for all stations. Ability to simulate accident progression pathways is pivotal to developing accident management capabilities.</p> <p>c) SAM guidelines developed so far are elementary and not comprehensive. They include no significant design changes.</p>	<p>These items are discussed point-by-point below.</p> <p>a) The public comments on the Environmental Assessments performed for reactor refurbishments do not support this assertion.</p> <p>b) Substantial work has been done on severe accident consequence analysis as part of level 2 Probabilistic Safety Assessments. Task Force recommendation 3 calls for further improvement.</p> <p>c) SAM guidelines are well developed. The industry, working together in the CANDU Owners' Group, produced generic CANDU SAMGs. These are based on the IAEA recommendations as well as in line with the best international practices. However, they</p>

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		<p>d) Risk from severe accidents is significantly greater than acknowledged and ability to predict accident progression is poor, bordering on criminal negligence.</p> <p>e) Existing PHWR designs did not consider even the simplest to model severe accident (sustained unit blackout) with consideration of consequential events such as fires.</p> <p>f) Existing designs have not even demonstrated an ability to maintain a sustained stable, cold depressurized, shutdown state even after design basis accidents and have not done so at all for severe accidents.</p> <p>g) Regulatory expectations for design features that facilitate accident mitigation and management are poor and ill defined. Utility interest in upgrading existing units is correspondingly lukewarm.</p> <p>h) Regulatory requirements for unit and station specific operator action capabilities are not well defined. This would have better defined external intervention capabilities.</p> <p>i) There is little pressure to install monitoring and mitigating systems in a timely manner. First re-combiners in a CANDU will be installed 30 years after initial start-up. Their design basis is poorly defined. Not all Canadian reactor units will have re-combiners by the</p>	<p>have not been full implemented and do not yet make specific provision for multi-unit stations. Task Force recommendations 1 and 9 address this point.</p> <p>d) CNSC staff disagrees that the risk from severe accidents is significantly greater than acknowledged. Systematic and repeated studies all indicate that the risk is within the internationally accepted goals. Nevertheless, implementation of several of the Task Force recommendations will reduce this risk still further.</p> <p>e) Recommendations 1 and 2 address this issue.</p> <p>f) Section 6.2.3 finding 3 addresses this issue for design basis accidents. For severe accidents, the Task Force Report section 6.3 covers the ability to provide the fundamental safety functions. Some enhancements to safety are identified in recommendation 1.</p> <p>g) Recommendation 9 addresses this issue.</p> <p>h) Recommendation 9 addresses this issue.</p> <p>i) The Action Plan is intended to produce timely and effective enhancements to the already high level of safety achieved by Canadian NPPs. Recommendation 1 addresses this issue.</p>

#	From	Intervener Comment	CNSC Response
		<p>time the US reactors do.</p> <p>j) Severe Accident Management capabilities at operating CANDU plants are woefully inadequate and the SAM guidelines developed so far are only a small first step.</p>	<p>j) SAM is developed to make the best use of the available capabilities, and supplement those where practicable. Further enhancements are identified in recommendations 1, 2, and 9.</p>
61	Sunil Nijhawan Prolet Inc.	<p>3. Emergency Response capabilities are inadequate and not practiced fully</p> <p>a) Agreements and commitments not in place with external organizations to offer assistance following a severe accident at any Canadian nuclear power plant.</p> <p>b) There are no expectations that the responders can effectively respond to multi-unit accidents</p> <p>c) There are no assurances that external responders can even respond under severe external event conditions (flood, tornado, fire, earthquake, sabotage, military action).</p> <p>d) There are no assurances that they function independently of plant personnel support</p> <p>e) There are no assurances their radios, dosimeters, vehicles work under external event hazards.</p> <p>f) There are no new provisions for external hookups. One of the lessons learnt from Fukushima is that without knowledge of in-reactor conditions emergency hookups may not work.</p> <p>g) Realistic and periodic exercises not mandated by regulators. Most exercises are in meeting rooms and on computer screens.</p> <p>h) There are no simulators for severe accident management training.</p>	<p>These items are discussed point-by-point below.</p> <p>a) Agreements are in place and will be enhanced. See section 7 and recommendations 4, 5 and 6.</p> <p>b) Enhancements to the response to multi-unit accidents are covered by recommendation 4.</p> <p>c) External emergency management organizations have their own measures for ensuring they can respond in a variety of emergency situations.</p> <p>d) This comment is unclear. Site information is essential to emergency management and is built into the procedures.</p> <p>e) No basis for this assertion is supplied. The licensees ensure that adequate functional equipment is available and this is verified by CNSC.</p> <p>f) Recommendations 1 and 9 cover this issue.</p> <p>g) Recommendations 4 and 6 cover this issue.</p> <p>h) CNSC staff disagrees with the implication of this comment. It is difficult to see what benefit a simulator would provide.</p>

#	From	Intervener Comment	CNSC Response
62	Sunil Nijhawan Prolet Inc.	<p>4. Off Site monitoring capabilities are inadequate</p> <ul style="list-style-type: none"> a) Regulatory requirements for field radiation monitoring are not defined in detail b) Need to monitor radiation at critical locations in real time with systems that function automatically and transfer information flawlessly. These are not available at any CANDU site. c) Requirements for monitoring of expected radioactive releases from a failed containment have not been properly defined. d) Ability to attempt to predict source terms from monitoring data in real time has not been fully developed. e) Definition of roles between different government agencies for monitoring and emergency response not well defined. f) Public alerting systems in potentially ever increasing off-site zones not available. g) Public access to some old style mitigating measures such as KI pills questionable (pills stocked at local pharmacies which may not be open when needed). 	<p>These items are discussed point-by-point below.</p> <ul style="list-style-type: none"> a) Recommendation 9 covers enhancements to the regulatory framework. b) Recommendation 5 identifies enhancements in this area. c) Recommendation 9 covers enhancements to the regulatory framework. d) Recommendation 5 identifies enhancements in this area. e) Recommendation 6 identifies enhancements in this area. f) Recommendation 6 identifies enhancements in this area. g) Recommendation 6 identifies enhancements in this area.
63	Sunil Nijhawan Prolet Inc.	<p>5. CNSC Regulatory Documents for severe accidents are inadequate and of poor quality</p> <ul style="list-style-type: none"> a) Guide 306 Severe Accident Management Programs for Nuclear Reactors is an example of failure of CNSC to define and enforce severe accident related expectations. b) The guide is very late, very flimsy in technical requirements and lacking in details. c) In January, 1989, the NRC Staff issued SECY 89-012, "Staff Plans for Accident Management Regulatory and Research Programs". CNSC document came 17 years later. d) Does not present a time table for preparation of SAM guidelines and actual accident management capabilities. 	<p>Task Force recommendation 9 covers enhancements to the regulatory framework.</p> <p>Regulatory guide G-306 was developed based on the best international practices, including those in the USA, and the IAEA recommendations. In fact, it is one of few regulatory documents internationally dedicated specifically to Severe Accident Management. G-306 is one of the documents that will be reviewed and supplemented if necessary. . The comments indicated that the intervener does not appreciate the difference between SAM which is</p>

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		<p>Actual delivery times by utilities are lax.</p> <p>e) Does not require additional design measures but emphasizes existing systems only</p> <p>f) Does not require simulators or other serious preparedness measures</p> <p>g) Did not specify specific measures : hydrogen control; core debris coolability; high-pressure core degradation; containment performance, (including the possible effects of molten core/coolant interactions); containment bypass including from steam generator tube ruptures; equipment survivability; instrumentation for severe accident monitoring, etc.</p> <p>h) Does not ask for specific accident management strategies related to depressurizing the primary system, due for example by the incorporation of severe accident related depressurization valves into designs. Such valves would reduce the risk from induced steam generator tube ruptures in high-pressure scenarios, as well as greatly mitigate the consequences of high-pressure core failures.</p> <p>i) Does not ask for hydrogen concentration monitoring; hydrogen control during and following degraded core or core melt</p> <p>j) Does not require that design must limit hydrogen concentrations in containment from a release of a 100% fuel clad-steam reaction and steel-steam interactions to less than 10% by volume, and maintain containment structural integrity and appropriate accident-mitigating features.</p> <p>k) Does not offer any guidance on development of error-tolerant designs and control rooms for severe accidents</p> <p>l) There are no mechanisms in place for confirmatory analyses by independent assessments</p> <p>m) Does not ask utilities to fix known design deficiencies relating to inadequacy or improper design of over pressure protection in many reactor systems that play an</p>	<p>an operational activity to manage an accident, and measures to enhance the design capabilities. Many of the concerns expressed, such as hydrogen control, debris coolability, containment features, etc, are addressed through the requirements for plant design. Note that in the regulatory document for plant design RD-337 is also undergoing revision</p> <p>The CNSC document approval process includes public comment and any remaining specific issues can be raised at that time.</p>

#	From	Intervener Comment	CNSC Response
		important role in containing debris and radioactivity under severe accident conditions. These include the PHTS, Calandria, Shield Tank/reactor vault and containment.	
64	Sunil Nijhawan Prolet Inc.	This review of the CNSC Fukushima Task force report is just a small example of the inadequacy of the efforts by the CNSC in respect to severe accidents. A more comprehensive review can be prepared with more time and resources but many are discouraged by their past interactions with CNSC where the CNSC staff have failed to understand even basic severe accident related concerns and continued to parrot the rosy picture presented by the utilities, even when the utilities were telling obvious lies, later withdrawn upon challenge.	The recommendations made by the Task Force in section 10 of the Report, and the Action Plan developed from them, are intended to enhance safety in Canadian NPPs.
65	Sunil Nijhawan Prolet Inc.	There is such good technical talent in the Canadian nuclear industry and they have the ability to undertake real, effective measures for severe accident prevention, mitigation and management but the impetus and sincere guidance from the CNSC is lacking.	The recommendations made by the Task Force in section 10 of the Report, and the Action Plan developed from them, are intended to enhance safety in Canadian NPPs.
66	Sunil Nijhawan Prolet Inc.	Ultimately, the Canadian public and the Federal government will realize that CNSC needs a severe overhaul of its leadership, regulatory practices and procedures and how effectively it interacts with those it regulates. Hopefully this will not be after a severe core damage at a Canadian nuclear power plant. At the minimum it needs to become technically competent in the field of severe accidents before the claims made in the CNSC Fukushima Task Force Report can have any justifiable basis. Its intensions may be noble but the CNSC capabilities for self assessment are poor as demonstrated by the disconnect between the conclusions and the meat of the CNSC Fukushima Task Force Report as well as some of my observations.	The recommendations made by the Task Force in section 10 of the Report, and the Action Plan developed from them, are intended to enhance safety in Canadian NPPs.
67	Chris Rouse	Please find our intervention and supporting documentation	The documents provided by Mr. Rouse are the

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	CCNB Action SJ Fundy Chapter	<p>on our thoughts on this matter. This was used in our intervention for Point Lepreau which the CNSC staff approved the licence. We do not feel any lessons have been learned.</p> <p>PDF Documents Attachment (6)</p>	<p>same as those previously submitted to the CNSC in respect to the December 1-2, 2011 Day-Two Commission Hearings on NB Power's re-licensing application of the Point Lepreau nuclear power plant, namely CMD 11-H12.33, CMD 11-H12.33A and CMD 11-H12.33B.</p> <p>These documents are now under review by the Commission pending its decision in the matter. CNSC staff responded to CCNB's concerns during the proceedings; as recorded in the official Hearing transcripts. Staff's position on these issues remains unchanged.</p>
68	Jenny Tang Member of public	<p>I am confident that the design and operation of our Ontario nuclear power stations have very high standards, and the geographical location the stations are much safer compare to Fukushima's physical location.</p> <p>However, since early 2000's outsourcing of a number of internal organizations of formerly Ontario Hydro, especially IT organization, which provides access to crucial data during emergency situation, reliability as a vital component for disaster recovery become questionable. Even though there is contractual constrains to ensure the availability of such data, a private company has different goal settings; it can have conflict interests of public safety versus corporate profit. I would suggest as a minimum that computer system logs be saved during each annual disaster recovery for occasional external audit.</p> <p>In addition, on a separate item. In 2003 North American Blackout, emergency recovery staff were contacted via telephones ran on Bell land lines, since cell phones stopped working. Now, most people only use cell phone to be contacted. Has the reliability of cell phone carriers in</p>	<p>CNSC staff routinely review NPP emergency programs, including contractual arrangements for services, to ensure there is a continuous state of readiness. Information from actual events is reviewed by CNSC staff to ensure the causes have been correctly identified and that subsequent corrective actions are implemented to prevent future occurrences.</p> <p>Through regular assessments of NPP emergency programs, CNSC staff verifies that the licensees maintain dependable primary (land lines) and backup communications systems (radios, cell phones and satellite phones) to ensure continuous communications are always available. This includes the backup power systems that are needed to keep those communication systems functional during loss of primary power. In addition, licensees also incorporate a separate paging system to alert emergency response staff in the event of an emergency. All systems are routinely tested to</p>

#	From	Intervener Comment	CNSC Response
		emergency situation been looked into? Or there is now another way to get hold of recovery staff?	ensure readiness and functionality.
69	John Froats University of Ontario Institute of Technology	<p>Thank you for the opportunity to review the CNSC report and provide constructive input. I found the report to be extensive and a good overall assessment of the issues related to Fukushima. I offer the following thoughts as input for consideration.</p> <p>1. The adequacy of Emergency Planning and Preparedness is clearly an important area and one that the report has considered. The current version of the report suggests requiring the Licencees to submit offsite emergency response plans. This appears, in my view, to be an indirect way of attempting to influence content of documents and accountabilities that are Municipal and Provincial Governments. Licencees have no direct control of these plans and cannot be held accountable for their content. I'd suggest a more direct method is needed to ensure that the various layers of Government are accountable to meet a clearly established standard of performance and response in a predictable manner.</p>	<p>CNSC has a responsibility under section 24(4) of the <i>Nuclear Safety and Control Act</i> to ensure that the licensee will make adequate provision for the protection of the environment and the health and safety of persons. Recommendation 7 is intended to allow CNSC to discharge that responsibility.</p> <p>The intent is not to directly or indirectly 'influence the content of documents and accountabilities that are Municipal and Provincial Governments', rather the intent is to ensure licensees' emergency plans and procedures are consistent with and complementary to those off-site emergency plans. The purpose for including these off-site plans is to provide evidence and documentation of the integration of both the licensees' emergency plans and of the off-site organizations' plans commensurate with the hazards and risks resulting from the licensing of the NPPs. The licensees' actions and participation with off-site stakeholders and legislators would then need to be verified and confirmed prior to licensing.</p> <p>As far as the CNSC providing input into the content of the off-site emergency plans of provinces and municipalities, there are means to accomplish this and the CNSC does provide comment when opportunities are presented.</p>
70	John Froats	2. Extreme environmentally induced events will almost	Agreed, this is a valid point, however, the reality

#	From	Intervener Comment	CNSC Response
	University of Ontario Institute of Technology	certainly impact surrounding communities and infrastructure as well as an affected Plant. Exercises have historically tended to separate the two. Events to date have consistently shown that technology infrastructure outside the Nuclear Power Plants (data telemetry, communications systems, computer networks, etc) are adversely affected or lost as a result of the events. These systems are not subject to the same rigorous qualification programs that equipment inside the Plants are. The current report makes some suggestions for additional technology solutions. While these may have some benefit in lesser events, their functionality is questionable in more severe events. Follow-up actions to the report need to carefully evaluate the wisdom of reliance on these non qualified external systems. It would seem that at some point, postulated events become so severe that a fundamentally different approach to Emergency Response and event mitigation is required.	is, the responsibility for the quality and survivability of off-site infrastructure clearly rests with the provinces and/or municipalities. Off-site systems and facilities for which the licensees are responsible are subject to assessment by the CNSC and those systems must meet regulatory requirements for robustness and redundancy like on-site systems, however, off-site infrastructure such as roads, power and water supply systems, etc. are the responsibility of the provinces and municipalities.
71	John Froats University of Ontario Institute of Technology	3. Places as far away as Hawaii exercised evacuations due to concerns re tsunami or other Fukushima related impacts. In some cases very conservative modeling or lack of modeling resulted in evacuation that proved unnecessary. Work on making sure that modeling predictions are available need also to consider that there is human safety and wellness implication of evacuation post a major event. Work needs to ensure the right balance in conservatisms and most likely estimation of consequence.	Plume modeling is done by both the licensees and the provinces, and although decisions making regarding protective actions for the public are a provincial/municipal responsibility, there is a network of experts beyond the provinces and licensees, including the CNSC and other federal departments, that provide input in the modeling predictions and subsequent public safety directions for citizens living in the vicinity of NPPs.
72	John Froats University of Ontario Institute of Technology	4. There was some speculation that reliance on multiple levels of approvals delayed critical decisions at Fukushima. Prompt decision making by competent individuals is an essential element of success in emergency response. There have been some events in	Off-site decision making is beyond the jurisdiction of the CNSC and/or the responsibility of the licensees, however, both provide expert input and advice to the off-site authorities to ensure they have the best

#	From	Intervener Comment	CNSC Response
		<p>the history of the Canadian Industry where decisions were impacted by requirements for offsite approvals. In the review of adequacy of the decision making framework, it would be prudent to review OPEX in this area and to assess if the qualification and experience requirements for decision makers where-ever they reside in the decision change are adequate. All positions within licensee organizations that have decision making roles in emergencies are highly regulated and reviewed by CNSC. It is not clear that this is the case that this is true throughout the complete infrastructure.</p>	<p>information upon which to base their decisions.</p> <p>This is recognized and relates to the finding in the Fukushima Task Force Report that suggests a National Exercise program that should be evaluated and exercised for government agencies.</p>
73	John Froats University of Ontario Institute of Technology	<p>5. The current report suggests the need to implement Periodic Safety Review. While the process is used in most other countries, perhaps it is more accurate to indicate that there is a need to periodically update the hazard assessments and design adequacy as the core issue. How it is done is probably still in need of discussion as to how to best achieve that goal.</p>	<p>While there was no one specific lesson learned from the Fukushima accident with regard to PSRs, it is recognized that strong periodic reviews, including those of the design, would further contribute to strong regulatory oversight.</p> <p><i>The Report of the Japanese Government to the IAEA Ministerial Conference on Nuclear Safety identified 28 key lessons learned from the Fukushima accident. Lesson 24 relates to "Establishment and reinforcement of legal structure, criteria and guidelines". While the text of this lesson does not specifically refer to Periodic Safety Review, CNSC staff is of the view that it would address many of the concerns identified. This was part of the basis for the recommendation in the CNSC Fukushima Task Force Report.</i></p>
74	John Froats University of Ontario Institute of Technology	<p>Again, I'd like to acknowledge the good work done by Licensees and the CNSC in Canada in response to the event and in preparation of this report. I hope the points above serve as useful input for consideration.</p>	<p>Thank you for your comments</p>
75	Charles de Vries	<p>The CNSC Fukushima Task Force Report focuses on</p>	<p>CNSC encourages licensees to be proactive in</p>

#	From	Intervener Comment	CNSC Response
	Atomic Energy of Canada Limited	<p>nuclear power plants (NPP), but makes recommendations that are more broadly applicable to the nuclear industry and to other licensed facilities. AECL's National Laboratories at Chalk River comprise Class 1A as well as other licensed facilities, and so will be affected by the Task Force's recommendations. Therefore, AECL offers the following comments on the CNSC Fukushima Task Force Report, from the perspective of AECL's licensed sites and facilities:</p> <ol style="list-style-type: none"> 1. In Section 10, the report states: "Overall, the CNSC Task Force concludes that Canadian NPPs are safe and pose a very small risk to the health and safety of Canadians or to the environment. The CNSC Task Force is confident that the recommendations in this report will further enhance the safety of nuclear power in Canada and will reduce the associated risk to as low as reasonably practicable." <p>Recommendations in Section 10.3 are related to improving the regulatory framework and processes. In light of the conclusion that NPPs are safe and pose a very small risk, it needs to be demonstrated that increases in regulatory requirements are justified, and that there are no equivalent or better approaches to achieve any necessary risk reductions (such as voluntary actions by licensees). That is, the report has not explored alternatives or addressed benefit-cost consistent with the spirit of Treasury Board guidelines. AECL believes that the nuclear industry has responded appropriately to the events at Fukushima, and that all recommendations to strengthen the regulatory framework should be scrutinized carefully to ensure they are essential. There is no evidence in the report that this has been done.</p>	<p>performing upgrades. To their credit, there is significant evidence that NPP licensees already do this. Any recommended upgrade that had already been implemented voluntarily by a licensee will be removed from the list of actions for that licensee.</p> <p>CNSC has a policy on consideration of cost-benefit information (P-242) and is always prepared to consider specific arguments presented by a licensee or applicant.</p>
76	Charles de Vries Atomic Energy of Canada	<ol style="list-style-type: none"> 2. Recommendation 8: "The CNSC should amend the Radiation Protection Regulations to be more consistent 	The regulation making process includes a cost benefit assessment of the proposed regulations.

#	From	Intervener Comment	CNSC Response
	Limited	<p>with the current international guidance and to describe in greater detail the regulatory requirements needed to address radiological hazards during the various phases of an emergency.”</p> <p>The report should clarify and justify any gaps in Canadian regulations relative to international practice, and should specify the specific international guidance being referenced. As discussed in the first comment, any proposed changes to the Regulations should be justified consistent with the spirit of Treasury Board Guidelines.</p>	At present, all that is proposed is to begin the process. If amendments to regulations are not justified, this will become clear.
77	Charles de Vries Atomic Energy of Canada Limited	<p>3. Recommendation 9: “The CNSC should update the regulatory document framework through:</p> <ul style="list-style-type: none"> a) updating selected design-basis and beyond-design-basis requirements and expectations, including those for: <ul style="list-style-type: none"> i. external hazards and the associated methodologies for assessment of magnitudes ii. probabilistic safety goals iii. complementary design features for both severe accident prevention and mitigation iv. passive safety features v. fuel transfer and storage vi. design features that would facilitate accident management b) developing a dedicated regulatory document on accident management c) strengthening the suite of emergency preparedness regulatory documents d) reviewing applicable Canadian Standards Association standards” <p>Consistent with comment 1, the report should state that any update of the regulatory document framework</p>	Individual regulatory documents are issued for public comment and those comments are dispositioned. The Commission considers the comment disposition before approving publication of regulatory documents. The time to argue the merits of specific changes to regulatory documents is when the proposed changes are published. A blanket consideration of changes before they have been written is neither practicable nor effective.

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		<p>should be done in consideration of the overall benefit-cost and consideration of whether there are alternatives to regulation. In particular, given the report's conclusions regarding the high overall level of safety of NPP's, it is important that consideration be given to:</p> <ul style="list-style-type: none"> a) Ensuring that new regulatory requirements do not add complexity to NPP design and/or operation that could actually reduce safety. b) Whether there would be meaningful risk reduction to warrant increased costs associated with new regulatory requirements. c) Whether it would be sufficient to embed in regulatory documents the types of improvements already made or committed by NPP's, to provide assurance that <ul style="list-style-type: none"> i. they will not be "undone" going forward and ii. there is no requirement to go beyond implemented or committed improvements deemed by the CNSC to be acceptable. 	
78	Charles de Vries Atomic Energy of Canada Limited	<p>4. Recommendation 11: "The CNSC should further enhance the regulatory oversight of nuclear power plants through implementation of a periodic safety review process."</p> <p>The Task Force report does not provide evidence to demonstrate that the events at the Fukushima Dai-ichi plant would have been avoided or mitigated if the plant had undergone a periodic safety review. Therefore, the need for periodic safety review should not be justified on the basis of it being a lesson learned from Fukushima.</p>	<p>While there was no one specific lesson learned from the Fukushima accident with regard to PSRs, it is recognized that strong periodic reviews, including those of the design, would further contribute to strong regulatory oversight.</p> <p><i>The Report of the Japanese Government to the IAEA Ministerial Conference on Nuclear Safety</i> identified 28 key lessons learned from the Fukushima accident. Lesson 24 relates to "Establishment and reinforcement of legal structure, criteria and guidelines". While the text of this lesson does not specifically refer to Periodic Safety Review, CNSC staff is of the view that it would address many of the concerns identified. This was part of the basis for the</p>

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			<p>recommendation in the <i>CNSC Fukushima Task Force Report</i>.</p>
79		<p>5. Recommendation 12: “The CNSC should review memoranda of understanding with regulatory counterparts in countries with CANDU reactors to outline what support, if any, they would require from the CNSC during a nuclear emergency.”</p> <p>Recommendation 13: “The CNSC should enhance cooperation with other nuclear regulators in addressing the lessons learned from the Fukushima accident and thus further strengthen the capability to respond efficiently to any nuclear emergency.”</p> <p>With respect to international cooperation in responding to a nuclear emergency, consideration should be given to a national effort to enhance cooperation with other countries, as opposed to agency by agency arrangements. For example, AECL’s National Laboratories has capability to support other countries in a nuclear emergency, and this and other potential support should be considered more broadly when engaging other countries on cooperation.</p>	<p>The suggestion is noted. The agency to agency memoranda are required as a necessary first step.</p>