Emergency Planning at the Point Lepreau Nuclear Generating Station

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Canadian Environmental Law Association
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Contents

Introduction

Introduction
About CELA (1)

- For nearly 50 years, CELA has used legal tools, undertaken ground breaking research and conducted public interest advocacy to increase environmental protection and the safeguarding of communities
- CELA works towards protecting human health and the environment by actively engaging in policy planning and seeking justice for those harmed by pollution or poor environmental decision-making

Introduction
About CELA (2)

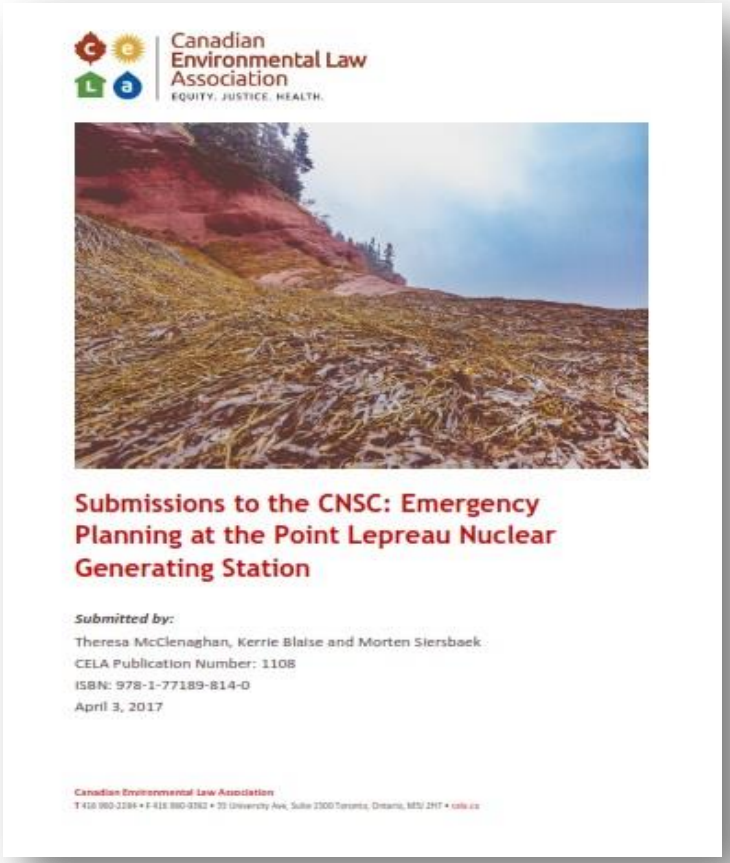
Several collections related to CELA's casework in this area include:

- Darlington Nuclear Generating Station Refurbishment
- Darlington New Build Joint Review Panel
- Pickering Nuclear Generating Station Life Extension
- Proposed Deep Geologic Repository for Nuclear Waste
- Shipping Radioactive Steam Generators in the Great Lakes

- These and other related publications are available at: http://www.cela.ca/collections/justice/nuclear-phase-out

Introduction
About CELA (3)

CELA's full submissions regarding the Point Lepreau Nuclear Generating Station licence renewal are available for download here



Introduction
Scope of Review (1)

Examine	Examine the emergency planning provisions relevant to the Application for re-licensing;
Provide input	Provide input to the CNSC in respect of the adequacy of said provisions; and,
Recommend	Provide recommendations for improvement.

Introduction
Scope of Review (2)

- Emergency planning aims to prevent and reduce radiation exposure to the public
- In the event of a nuclear accident, the main radiation exposure pathways are expected to be:
  - Initial high dose via inhalation of beta/gamma emitters during plume dispersion
  - I-131 for days/weeks after incident
  - External radiation from environmental contamination and exposure from ingesting contaminated crops/milk

Introduction
Documents Informing Review

The documents relied upon for CELA's review of emergency response and planning include:

1. **Planning Basis**
   Point Lepreau Generating Station: Technical Planning Basis – Radiation Emergency (NB Power)
2. **Onsite Emergency Response Plan**
   Point Lepreau Generating Station: Emergency Response Plan (NB Power)
3. **Offsite Emergency Response Plan**
   Point Lepreau Nuclear Off-Site Emergency Plan Volume I (Policy) and *Point Lepreau Nuclear Off-Site Plan Volume II (Procedures)*(NB EMO)

Introduction
Public Availability of Documents (1)

- None of the emergency response or planning basis documents for Point Lepreau are publicly available
- These documents can only be obtained through a disclosure request to NB Power, or an information request pursuant to the *Right to Information and Protection of Privacy Act*
- In comparison, these documents are publicly available in Ontario:
  - Provincial Nuclear Emergency Response Plan, Master Plan 2009
  - Radiation Health Response Plan

Introduction
Public Availability of Documents (2)

- A lack of access to documents, which form the basis of emergency planning and response, is an issue of significant public importance
- Lack of transparency and credible information can severely harm public confidence in the industry and the regulator
- CELA's full submission and the key planning documents received during disclosure are posted on our website: www.cela.ca

Recommendation

CELA submits that all CMDs for CNSC hearings or meetings should be posted in their entirety on the Commission's website. This will alleviate the burden on CNSC staff to respond to individual requests for documents, and allow any interested party to access the documents immediately, without delay.

I. Planning Basis – Emergency Response

I. Planning Basis (1)

- The “planning basis” is the magnitude of accident which serves as the foundation for emergency planning
- The planning basis chosen directly affects the ability of an emergency response plan to avert consequences and risks from a radiation release and dictates the level of resources and preparation necessary to respond
- The emergency management plans in Japan at the time of the Fukushima Daiichi accident “were inadequate to deal with the magnitude of the accident” (see National Academy of Science, “Lessons Learned from the Fukushima Nuclear Accident for Improving Safety of US Nuclear Plants” (2014))

I. Planning Basis (2)

- The Province of New Brunswick does not have its own planning basis or definition of type of release
- According to the New Brunswick Emergency Measures Organization (NB EMO), the operator (NB Power) is responsible for classifying the radiation emergency and the provincial authority "follows the notification procedure in accordance with the classification"

See CELA Submissions at page 5.

I. Planning Basis (3)

- The New Brunswick offsite emergency plan is based on a Design Basis Release (DBR)
  - A DBR level of accident is not of a sufficient scale to ensure emergency response preparedness in the event of a severe accident
  - The acceptance of a less severe accident is a fundamental error in energy policy

I. Planning Basis (4)

- Basing the capacity of emergency response on a DBR fails to ensure that New Brunswick is prepared to respond to the following during a severe accident:

    1. Timely public alerting and direction
    2. Prioritization of evacuations
    3. Radiation monitoring and, if necessary decontamination
    4. Medical assessment, treatment and planning

See CELA Submissions at page 5, 6.

I. Planning Basis (5)

- During an IAEA Regulator's Conference held in Canada in 2013 (at which CELA was an ENGO delegate), Toshimitsu Homma of the Japan Atomic Energy Agency noted that before the Fukushima accident:

"[t]here was an implicit assumption that such a severe accident [offsite] could not happen and thus insufficient attention was paid to such an accident by authorities."

I. Planning Basis (6)

- The lower level of preparedness which has until this point been accepted in New Brunswick is reminiscent of the statement made by Toshimitsu Homma of the Japan Atomic Energy Agency
- CELA requested NB Power's onsite "Severe Accident Management Guidelines" but they were not disclosed as they were marked "for internal use only"
- No offsite equivalent was located

See CELA Submissions at page 6.

Recommendation

CELA submits that the planning basis for a potential offsite nuclear accident in New Brunswick must be increased (with public input) to account for a catastrophic offsite accident.

At this time, and until such emergency plans are in place and proven to be effective for a catastrophic accident, CELA submits that the site should not be licensed for continued operation.

Recommendation

CELA recommends to the CNSC that it deny Point Lepreau's operating licence renewal on the basis that a detailed, robust emergency planning basis for catastrophic accidents has not been provided to the public, and furthermore that, to the extent the provincial offsite nuclear emergency plan has been revised, the public has been denied opportunity to provide rigorous review and input.

II. Emergency Response Preparedness

II. Emergency Response Preparedness
Jurisdiction and Responsibilities (1)

- It is the province's jurisdiction to provide for the safety of its citizens, and the CNSC's jurisdiction to ensure that sufficient protection is in place for nuclear emergency planning before granting approvals. As stated in the CNSC's Nuclear Emergency Response Plan – Master Plan:

> Provincial and territorial governments have the primary responsibility for protecting public health and safety, property, and the environment within their borders. They are also the primary authorities for informing the public about protective actions and offsite conditions.

II. Emergency Response Preparedness
Jurisdiction and Responsibilities (2)

- The New Brunswick *Emergency Measures Act* states at s.2(2) that

  > The Minister [of Justice and Public Safety] shall coordinate emergency measures plans within the Province and may delegate powers vested in him or her by or under this Act

- The *Nuclear Safety Control Act* at s.24(4)(b) requires the Commission ensure that the licensee:

  > will, in carrying on [the activity for which a license is sought], make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.

II. Emergency Response Preparedness
Jurisdiction and Responsibilities (3)

- *REGDOC-2.10.1 Nuclear Emergency Preparedness and Response* sets out the emergency preparedness requirements flowing from s.24(4) of the NSCA
- These requirements are not binding on the licence holder unless they are included as a condition under an approved licence

Recommendations

Because of its responsibilities under the NSCA, the CNSC must review and report on the sufficiency of the planning basis, the response plan and the province's readiness for large-scale radiation releases in New Brunswick as part of every licence application.

The provisions of REGDOC 2.10.1 should be incorporated into the Point Lepreau Licence Condition Handbook.

III. Emergency Response Planning

III. Emergency Response Planning
Currency of Existing Plan (1)

- New Brunswick has not yet publicly reviewed or upgraded its Offsite Plan since the Fukushima disaster
- The CEO of NB Power stated in a Global News item (Nov 16, 2015) that the nuclear disaster at the Fukushima Daiichi plant was a major teaching point for the industry and "we have done a lot of changes since [then]"
- It is not evident how changes implemented by NB Power post-Fukushima have been incorporated into the Offsite Plan.
- CELA requests records noting what public review of the Offsite Plan was undertaken and the consequent changes made

III. Emergency Response Planning
Currency of Existing Plan (2)

- The province states that the Offsite Plan is reviewed annually, however, there are a number of dates referenced in the Plan which are not current to 2017:
  - Point Lepreau Generating Station ELG Off-Site Response Plan – Emergency Management Plan is dated "June 21, 2013 (ongoing)"
  - Harbour Authority Contact Information is dated February 2015
  - Schools existing in the immediate area of Point Lepreau is current to September 2014
  - Point Lepreau Warden Map for emergency altering is current to March 2012
- CELA requests that prior to considering licence renewal, the CNSC must require evidence of public consultation and review of the Offsite Plan

See CELA Submissions at page 9.

Recommendation

CELA requests that prior to considering licence renewal, the CNSC require evidence of public consultation and transparency in the changes which have been made to nuclear emergency planning since the Fukushima accident.

The Offsite Plan should also be updated to include requirements for transparency, pro-active disclosure and regular public review.

III. Emergency Response Planning
Size of Emergency Response Zones (1)

The Point Lepreau emergency planning zones:

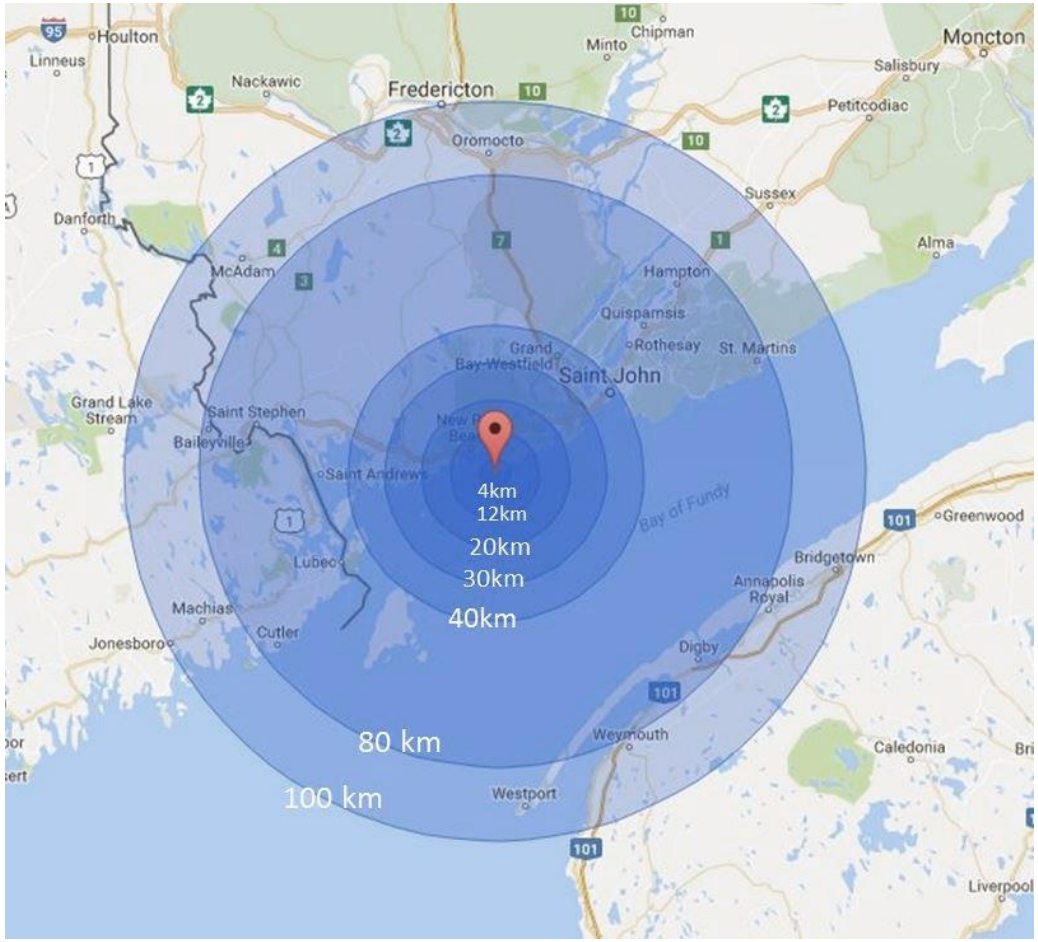
- Precautionary action zone (PAZ): 4 km
- Urgent protection action zone (UPZ): 12 km
- Longer-term protective action zone (LPZ): greater than 12 km
- Emergency Planning Zone (EPZ): 20 km

- CELA requests an explanation regarding the boundary delineations, how they were determined and the process by which they are reviewed or updated.

See CELA Submissions at pages 9, 10.

Emergency Planning Zones

Radial Distances



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III. Emergency Response Planning
Size of Emergency Response Zones (2)

- The emergency planning zones delineated for the Point Lepreau NGS do not meet the suggested emergency zone sizes set by IAEA Safety Guide GS-G-2.1.
- The IAEA recommends:
  - Precautionary action zone: 3 – 5 km
  - Urgent protective action planning zone: 5 – 30 km

Recommendation

CELA submits that the 4 km PAZ be extended to 5 km, the UPZ extended to 30 km and an explanation as to why the current emergency zones do not follow expert judgment and best practice be provided.

Recommendation

CELA recommends that in view of the experience at Chernobyl and Fukushima, the CNSC should request that the province immediately create a secondary emergency zone to a radial distance of 100 km, **extending beyond the province of New Brunswick.**

This should be done as part of detailed planning for severe accidents so that appropriate monitoring of food, agricultural products, milk, and water is established and in place in the event of such an accident.

III. Emergency Response Planning
Public Availability (1)

- There is a severe lack of documents geared to the public on the NB EMO website:
  - Most info on the website redirects to CNSC or Health Canada
  - Offsite Plan is not publicly available

- NB EMO's document *72 Hour Emergency Preparedness: Is Your Family Prepared* urges citizens to "know the risks" but does not mention or include nuclear or radiation based accidents

See CELA Submissions at page 13, 14.

III. Emergency Response Planning
Public Availability (2)

- Based on the info available on the NB EMO website, it is highly likely that members of the public are ill-informed of:
  - How to find accommodation with friends and family in case of evacuation
  - What it means to “self-decontaminate”
  - What transportation options are available if they do not have their own vehicles, and
  - How a family reunification should occur, in the event of evacuation scenarios in which members of a family are evacuated separately

See CELA Submissions at pages 13, 14.

Recommendation

To enhance transparency and accountability, the NB EMO must maintain a website dedicated to nuclear emergency response. This website must include documents and data that enable the easy access of information and incorporate a user-centred design.

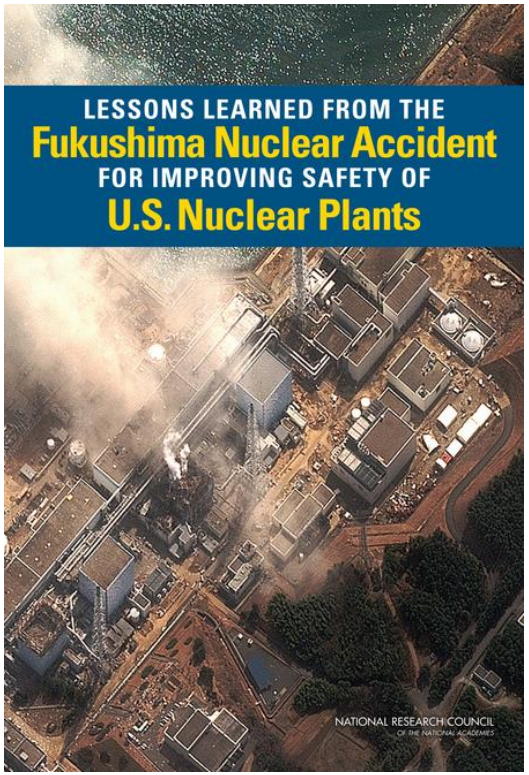
Recommendation

CELA submits that this licence should not be granted until the offsite emergency response plan is made public. Members of the surrounding communities must be able to understand what is in place, how effective it is, what has changed, and on what basis the regulator is judging the emergency plans to be in place.

III. Emergency Response Planning
Confluence of a Nuclear Emergency with Extreme Weather Events (1)

"The implementation of the existing nuclear emergency plans was overwhelmed by the extreme natural events that affected large regions, producing widespread disruption of communications, electrical power, and other critical infrastructure."

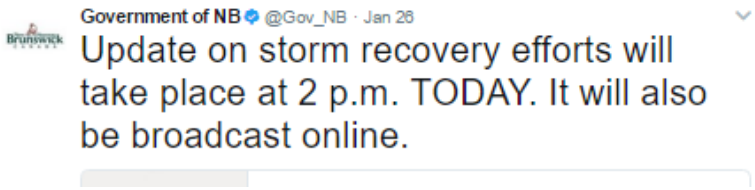
- National Academy of Science, p 215.

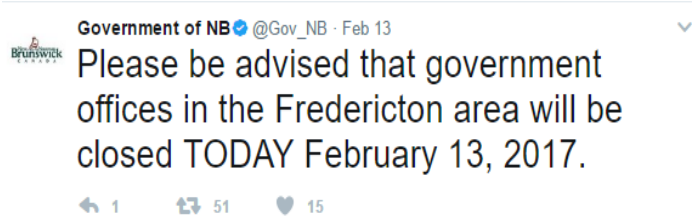


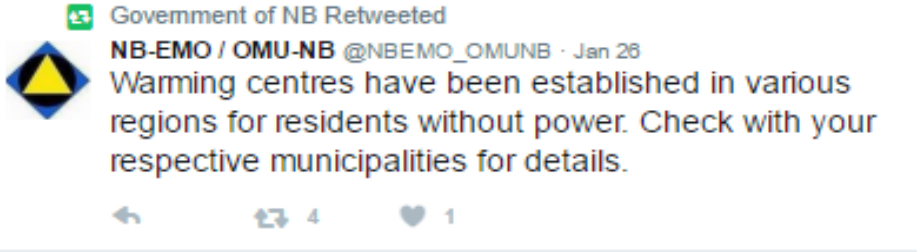
III. Emergency Response Planning
Confluence of a Nuclear Emergency with Extreme Weather Events (2)

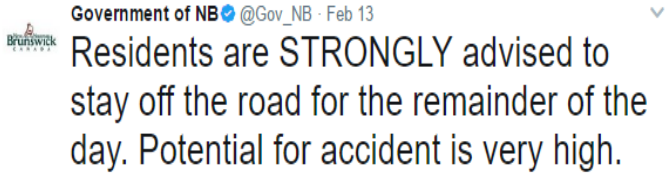
- The province's Offsite Plan is silent on the impact of extreme weather events, such as snow or ice storms, on emergency response procedures, their efficacy and operational ability:
  - During Part One (Jan 26) of the hearing on this very matter, there were wide-spread blackouts and power outages throughout New Brunswick due to severe weather
  - On another occasion, February 13, 2017, the province of New Brunswick had to close all government offices as a result of dangerous road and driving conditions caused by snow (this came to CELA's attention after contacting the NB EMO to request the Offsite Plan and being informed that government offices were closed)

III. Emergency Response Planning
Confluence of a Nuclear Emergency with Extreme Weather Events (3)









Recommendation

CELA recommends the Offsite Plan integrate extreme weather events into its emergency response measures. The efficacy of all response actions listed in the Offsite Plan must be considered in light of extreme weather events, which could result in widespread power outages, and inhibit the ability of the public to travel and access essential services.

Contingency plans for provincial emergency response and provincial staff responsibilities in carrying out the plan in case of accident at the Point Lepreau nuclear plant must be established to reflect the potential for very severe weather.

III. Emergency Response Planning
Marine Response (1)

- Point Lepreau, located within 100 metres of the Bay of Fundy, is Canada's only nuclear generating station on an ocean
- The Bay of Fundy is a designated UNESCO Biosphere Reserve
- The marine environment immediately around the plant has:
  - Over 70 species of fish and many commercially significant species like cod, lobster, scallops and dulse
  - Marine mammals like whales, porpoises, dolphins and seals
  - Colonial waterbirds
  - Federally protected species under the *Species at Risk Act*, including the north Atlantic right whale, blue whale and fin whale

III. Emergency Response Planning
Marine Response (2)

- The Offsite Plan lacks thorough consideration of marine life, the potential impact on fisheries and pollution dispersion by water in the event of a large radiation release. It only states:
  - The provincial Department of Agriculture, Aquaculture and Fisheries (DAAF) will "arrange for sampling [of] locally produced ... marine products"

III. Emergency Response Planning
Marine Response (3)

- *Continued*:
  - DAAF is to ensure the safety of fishermen at sea and the removal of craft from any threatened harbour
  - The Vessel Traffic Centre and the Canadian Coast Guard inform vessels by radio to proceed to a "safe harbour" or "decontamination area"
  - DAAF will determine the number of ships requiring decontamination and advise the Nuclear Control Group
  - The Coast Guard will evacuate all vessels from any "endangered area"

III. Emergency Response Planning
Marine Response (4)

- CELA does not believe these parameters are sufficient to safeguard the marine environment
- There are significant oversights in the Offsite Plan as it relates to the protection of the environment and human health in the Bay of Fundy. It assumes:
  - All boats have radio capabilities (recreational vessels under 20m are not required to have a VHF radio)
  - The Coast Guard has the capacity to alert all fishers and recreational vessels on the water

III. Emergency Response Planning
Marine Response (5)

- CELA requests that the province comment on the level of nuclear emergency awareness among the fisher community and additionally asks:
  - Will all commercial, in-shore and recreational fishers have the capacity (either through fuel or navigational skills) to access 'safe harbours' and the marine decontamination centres located in the Port of Saint John and Blacks Harbour?
  - Are fishers aware of how to test or dispose of their catch, if needed?
  - Is there a compensation fund available to the fishing community in the event of harm?

III. Emergency Response Planning
Marine Response (6)

- CELA submits the CNSC must review, what appears to be, an ad hoc marine response
- CELA requests that the CNSC consider the marine environment within its reading of "protection of the environment" and "safety of persons" per s 24(4) of the NSCA.

III. Emergency Response Planning
Marine Response – Example (7)

- For example, the UK's National Contingency Plan, *A Strategic Overview for Responses to Marine Pollution from Shipping and Offshore Installations*, ensures the "timely, measured and effective response to incidents" at sea
- It affirms the UK Government's recognition that "pollution of the coastal environment [is] a serious threat" and recognizes that a "high level of response preparedness" is required by all parties
- The plan has been amended in response to the recommendations and lessons learned from ocean-based pollution accidents, like the Deep Water Horizon in the Gulf of Mexico

Recommendation

CELA submits that this licence should not be granted until a marine-based offsite emergency plan is made public. The CNSC must ensure emergency response at sea allows for an effective response to accidents and demonstrates a high level of preparedness.

III. Emergency Response Planning
Readiness of Adjacent Provinces and States

- CELA submits that the CNSC must ensure neighbouring jurisdictions' readiness in the event of an emergency at Point Lepreau - particularly, Nova Scotia and Maine
- The community of Digby, NS, is approximately 60 km from Point Lepreau and various communities in Maine are even closer. Many studies recommend active planning, including KI distribution up to at least 100 km
- CELA requests the licencee provide information on whether emergency response information has been communicated to Nova Scotia and Maine, and whether KI pills have been distributed in those jurisdictions

IV. Emergency Response Measures

IV. Emergency Response Measures

- The appropriateness of emergency planning and preparedness must be judged on the ability of the plan to respond to a severe accident scenario and avoid health and safety consequences to the public, on-site workers and first responders resulting from a variety of exposure pathways
- Possible exposure pathways include:
  - General gamma radiation from the plume of radioactive materials airborne or deposited on ground and buildings
  - Inhalation of radioactive substances with subsequent radiation from internally deposited materials, skin deposition from externally deposited radioactive material on skin, hair, and clothes

IV. Emergency Response Measures

- The purpose of emergency planning and preparedness is to implement measures that allow the health and safety consequences of radiation exposure to be avoided
- Without adequate emergency response or protective actions, negative health consequences are likely to result from a catastrophic offsite nuclear accident

IV. Emergency Response Measures
Public Alerting (1)

- One of the earliest steps to take in a nuclear or radiological emergency with a potential, or actual, release of radionuclides to the environment is alerting of the public
- The provisions of the *IAEA International Safety Guide GS-G-2.1, Arrangements for Preparedness for a Nuclear or Radiological Emergency*, provide the following objectives relevant to alerting:

IV. Emergency Response Measures
Public Alerting (2)

- **Classify/Declare** the emergency and notify local authorities – within 15 minutes of the time at which conditions indicating that emergency conditions exist are detected;
- **Recommend urgent protection action to the public** on the basis of the emergency classification – within 30 minutes of the time at which the emergency is classified/declared;
- **Initially warn and inform the public** within the precautionary action zone (PAZ) and the urgent protective action planning zone (UPZ) of urgent protective actions required – within less than 1 hour from the time at which initial notification to local authorities was given by the facility

IV. Emergency Response Measures
Public Alerting (3)

- The New Brunswick Offsite Plan does not contain requirements which ensure the alerting times stipulated by the IAEA GS-G-2.1 are met
- The provincial Offsite Plan states that in the event of a nuclear incident, NB EMO will notify residents within the 20 km Emergency Planning Zone by means of:
  - **Mass notification system:** this notification system sends out safety messages to residents via phone, text, email or fax
  - **Point Lepreau Warden Service:** a voluntary organization tasked with alerting the public via vehicle loud speakers to "turn on their radios or TV sets to receive further information or instructions"

IV. Emergency Response Measures
Public Alerting (4)

The Offsite Plan states alerting will be complete within 45 minutes but this cannot be accomplished nor the IAEA guidelines met:

- The Offsite Plan does not guarantee that the alerts will be complete within 45 minutes from "the point at which an emergency is classified" but rather "upon receipt of instructions from the Director of EMO"
- The Offsite Plan provides that the Station Shift Supervisor has 30 minutes to make a recommendation for emergency protective action. NB EMO must make orders on implementation of protective measures within 15 minutes of recommendations from the Station

IV. Emergency Response Measures
Public Alerting (5)

- Therefore, there is the potential that alerting will not commence until 45 minutes after the emergency classification and, in actuality, not be completed until 90 minutes after the emergency is classified
  - The Offsite Plans' calculations do not allot time for warden briefing or contingencies for poor weather and road conditions
  - Shorter and clearer time limits should be set for alerting and the chain of communication should be explained in a single, comprehensive alerting chapter in the Offsite Plan

IV. Emergency Response Measures
Public Alerting (6)

- By way of example, in contrast to New Brunswick's Offsite Plan:
  - Ontario's Provincial Nuclear Emergency Response Plan, 2009 requires the operator notify the offsite authorities within 15 minutes "of the requirement for notification being recognized"
  - The Implementing Plan for Chalk River under PNERP, 2009, requires that the Towns of Laurentian Hills and Deep River make provisions or a public alerting system which shall ensure the PAZ population is alerted within 15 minutes of initiation

IV. Emergency Response Measures
Public Alerting (7)

- As CELA has routinely noted in its previous submissions on nuclear emergency planning, some people will be unable to use certain means of communication because of their location, status, or physical disability
- Limitations include:
  - People who are hearing impaired will not be alerted by the auditory warnings
  - While some people will not have cellphones, others will have cellphones but not landlines
  - Cellphone service can be lost or obstructed depending upon an individual's location

IV. Emergency Response Measures
Public Alerting (8)

Continued:

- Any communication device that requires individuals to be present and able to use them, also requires they be 'powered up' or charged
- Any auditory communication will need to account for non-English speakers
- Homeless people are particularly vulnerable as they do not have ready access to communication devices

See CELA Submissions at page 25.

Recommendation

As CELA has recommended in similar contexts in the past, the timeframes in the Offsite Plan should be compressed to alert the public in as short a time frame as possible, preferably less than 30 minutes from the onset of an accident.

Methods to compress the existing 90 minute time frame should be considered and tested, and their efficacy should be one of the points of evaluation by the CNSC in the licence.

Recommendation

CELA recommends that the NB EMO and designated municipalities maintain a list of people who would not be reachable through all of the proposed notification media, and for whom door-to-door notification should therefore be immediately undertaken.

Other emergency personnel should be immediately dispatched to evacuate homeless people and others who are not covered by existing notification systems.

Recommendation

CELA recommends that the CNSC refuse an extension of Point Lepreau's operating licence until it ensures, through thorough testing, that the alerting system in the emergency response zone is fully effective.

IV. Emergency Response Measures
Potassium Iodide (KI) Distribution (1)

- Potassium Iodide (KI) is important because its ingestion helps to block uptake of radioactive iodine in case of a severe accident
- Radioactive iodine isotopes are among the earliest radionuclides emitted from a nuclear power plant (through breach of containment or in controlled venting following an accident)
- Iodine thyroid blocking (ITB) is the method by which the thyroid gland's ability to absorb radioiodine is prevented or reduced, through the ingestion of KI before or shortly after exposure to radioiodine

IV. Emergency Response Measures
Potassium Iodide (KI) Distribution (2)

- The Offsite Plan notes that KI has been pre-distributed to each residence within 20 kilometres of Point Lepreau and, there is a combined KI inventory of approximately 55,000
- CELA requests information as to who maintains the currency of this stock and by what process it is updated (for example over time, or to account for new residents)

CELA Submissions at page 28.

IV. Emergency Response Measures
Potassium Iodide (KI) Distribution (3)

- There are a number of areas regarding KI distribution which must be reviewed prior to considering a renewal of NB Power's licence. For instance:

1. The IAEA recommends that ITB should be implemented if the projected equivalent dose to the thyroid exceeds 50 millisieverts (mSv). While the Offsite Plan states its emergency protective actions are "consistent with international guidance," its KI protective action has an intervention level starting at a 100 mSv instead of the IAEA's recommended 50 mSv

IV. Emergency Response Measures
Potassium Iodide (KI) Distribution (4)

2. The Offsite Plan is silent on whether KI tablets have been pre-distributed to the following types of institutions within the PAZ for the indicated number of days (in parentheses):
   - Schools (one day)
   - Daycares (one day)
   - Nursing homes and Long-Term Care Homes (three days)
   - Hospitals (three days)
   - Prisons and Detention Centres (three days)
   - Police and Fire Departments, Emergency Medical Services (three days)

IV. Emergency Response Measures
Potassium Iodide (KI) Distribution (5)

3. As the Offsite Plan only extends to the 20km range, it is silent on KI pre-distribution outside this boundary

4. The Offsite Plan states that the last KI distribution took place August – September of 2015. The next distribution is to occur before the expiration date on current tablets (August 2021). CELA requests information regarding what interim measures will be used during this six-year time span to ensure all residents have KI in their homes

Recommendation

CELA recommends that the CNSC require NB Power to ensure that stable KI is predistributed to all residents within the proposed secondary emergency zone as a condition of licensing.

Recommendation

CELA recommends that the CNSC require that NB Power, in conjunction with designated municipalities conduct outreach and notification to members of the public in the designated municipalities, as to the availability of KI and advice on where KI may be obtained.

The public should be provided with basic information on the benefits and risks associated with using KI, the importance of having an at-home supply, and the fact that other organs (bone marrow, lungs and other organs) are not protected by KI.

Recommendation

CELA recommends that section 2.3.4 of the Public Preparedness requirements of REGDOC 2.10.1, be incorporated into the Licence Condition Handbook.

IV. Emergency Response Measures
Sheltering in Place (1)

- The IAEA Safety Guide GS-G-2.1 describes sheltering in place as an urgent protective measure to consider following a nuclear emergency
- The Guide states that sheltering will provide "some protection against all of the major exposure pathways during the early phase of an emergency," but that the "effectiveness of sheltering varies greatly"

IV. Emergency Response Measures
Sheltering in Place (2)

- Variables that impact the effectiveness of sheltering include:
  - Type of release,
  - Type of construction of the building,
  - Exposure pathway
- After a few hours of sheltering, the reductions in doses are no longer evident and after that time, doses may become greater indoors, than those outside
- If some of the contaminants are “trapped in the shelter,” once the emission plume passes, the Guide suggests that shelters may then need to be aired out

IV. Emergency Response Measures
Sheltering in Place (3)

- The effectiveness of sheltering decreases with time for most structures, and it is difficult to keep people sheltered in place for an extended period of time
- Buildings constructed of wood or metal (as opposed to solidly constructed buildings) are not generally suitable for use as protective shelters against external radiation, and buildings that cannot be made substantially airtight are not effective in protecting against <u>any</u> exposures

IV. Emergency Response Measures
Sheltering in Place (4)

- As observed in CELA's previous submissions on nuclear generating station relicensing hearings, given the significant limitations of sheltering, there must be significant planning, attention, and resources given to outreach and education, in order to ensure rapid, timely evacuation
- It is very important that emergency planning officials and the public understand that, for example, in large early release scenarios, it may not be possible to prevent all exposures to the public because sheltering will not be fully effective and evacuation takes time

IV. Emergency Response Measures
Sheltering in Place (5)

- Despite the New Brunswick Offsite Plan recognizing "sheltering in place" as an emergency protective action and temporary measure, the Offsite Plan does not acknowledge:
  - The limitations set out above
  - The effectiveness of sheltering, as it relates to the type of building
  - How best to shelter (ie. close doors, dampers and windows and turn off furnaces and air conditioners, go to a basement or ground floor room with no windows)

CELA Submissions at page 31.

Recommendation

CELA recommends that the CNSC require the NB EMO, in conjunction with regional emergency response officials, include in its outreach material to the public, explanations about the capability of sheltering and its limitations as described in the IAEA Guide GS-G-2.1.

IV. Emergency Response Measures
Medical Treatment and Availability (1)

- The IAEA Safety Guide GS-G-2.1 states that there should be a referral hospital outside of the Urgent Protective Zone that can provide "highly specialized treatment for a limited number of exposed and/or contaminated persons"
- It is not currently possible for CELA to evaluate or comment upon the level of treatment available to the public in the event of a radiation release. Nor, is it possible for CELA to evaluate whether the treatment available in the event of an accident at Point Lepreau is in compliance with IAEA GS-G-2.1 as **the provincial health emergency plans are not publicly available**.

IV. Emergency Response Measures
Medical Treatment and Availability (2)

- An extensive search on New Brunswick provincial websites and a broader Google search revealed that, like the province's Offsite Plan, the Provincial Health Nuclear Emergency Plan is not publicly available. By contrast, Ontario's Radiation Health Response Plan is publicly available
- CELA also has outstanding questions about the emergency plan and whether it provides for sufficient ambulance capacity to transport more than two or three workers; and whether it has contemplated the consequences of taking ambulances out of service after transport due to radioactive contamination

Recommendation

CELA requests that the Provincial Health Nuclear Emergency Plan be made publicly available as it is incorporated by reference in the Offsite Plan. Without reviewing this document, CELA cannot fully comment on the medical treatment of injured and contaminated members of the public in the event of an emergency.

Recommendation

CELA recommends that the Point Lepreau operating licence should not be renewed without the Provincial Health Nuclear Emergency Plan being made publicly available.

IV. Emergency Response Measures
Evacuation (1)

- Evacuation is one of the most immediate actions to be taken in the event of a general emergency at any nuclear generating station
- The *International Commission on Radiological Protection (ICRP)* indicates that the purpose of evacuation is to provide "rapid, temporary removal of people from an area to avoid or reduce short-term radiation exposure in an emergency exposure situation" and evacuation is "most effective if it can be taken as a precautionary measure before there is any significant release of radioactive material."

See CELA Submissions at 33.

IV. Emergency Response Measures
Evacuation (2)

- CELA is concerned with the ability of people without cars to evacuate
- The U.S. Nuclear Regulatory Commission, explicitly requires population estimates of:
  - Permanent Residents and Transient Population
  - Transit Dependent Permanent Residents – no access to a vehicle, or are dependent upon help from outside the home
  - Special Facility Residents – residents of nursing homes, assisted living centers; those confined to hospitals, jails, etc.
  - Schools – all private and public educational facilities within the EPZ; colleges and universities should be assessed on a case-by-case basis

IV. Emergency Response Measures
Evacuation (3)

- The US Criteria also specifies that a summary of (1) the total number of vehicles available to support evacuation of transit dependent residents, as well as (2) people with disabilities and (3) those with access and functional needs not residing in special facilities, be provided
- The New Brunswick Offsite Plan states that Ambulance NB "may be required" to assist with evacuation transport and the Extra-Mural Program will also "assess the needs of their clients" in the evacuation zone and identify those requiring transportation. **These transportation options are not sufficient in light of the best practices identified above.**

IV. Emergency Response Measures
Evacuation (4)

- REGDOC 2.10.2 requires the licensee to "collaborate with the municipal or regional authorities to develop and maintain public evacuation time estimates based on current census data, and future population growth projections on a per-decade estimation until end of life of the facility"
- CELA requests this provision form part of the Point Lepreau licencing conditions

Recommendation

CELA recommends that the CNSC require that the public clearly understand what plans are in place to assist them with evacuation from the PAZ if they do not have their own transportation. What those plans are should be clearly specified and widely communicated to the public through outreach and education.

Recommendation

CELA recommends that the CNSC require the Province to update its emergency response plans to contemplate the needs of vulnerable members of the population, analogous to the requirements under Ontario's Radiation Health Response Plan evacuation scenarios.

Recommendation

As CELA has recommended in the past, the CNSC should require the designated municipalities and NB Power to communicate to the public in annual outreach and education, the fact that the nuclear emergency response plans expect the public to make their own arrangements in the event of evacuation, and for those who cannot, what is expected to be provided by the municipalities. The appropriateness of this approach should further be discussed with the public in terms of future nuclear emergency planning.

IV. Emergency Response Measures
Shadow Evacuations

- "Shadow evacuation" refers to the people who voluntarily leave an area following a nuclear incident or accident, beyond those who are asked by the authorities to do so
  - In the Fukushima accident, there were considerable "shadow evacuation" populations, especially of women and children
  - In the US, the Nuclear Regulatory Commission requires licensees to include a shadow evacuation of 20% of the public to a distance of 15 miles from the Nuclear Power Plant in its traffic estimates and planning
- Based on the provincial Offsite Plan, it is not apparent that the NB EMO has considered any shadow evacuation (the city of Saint John is within 40 km of Point Lepreau)

Recommendation

CELA submits that a similar recommendation to the one made by the US General Accounting Office to the US Nuclear Regulatory Commission is relevant in this case: that the CNSC require the applicant to conduct a study as to the awareness of Point Lepreau in people beyond the 20 km zone and their likely response in the event that a general emergency is declared and the EPZ is evacuated.

Recommendation

The CNSC should require the applicant to evaluate the impact of increased evacuation zones at radial distances of 30 and 40 km, on existing numbers of emergency workers required for evacuation management, the capacity of traffic routes and size of evacuation centres, and locations and capacity of Decontamination and Monitoring Units. These findings should be reported to the CNSC.

IV. Emergency Response Measures
Decontamination

- IAEA Guide GS-G-2.1 outlines some approaches to radioactive decontamination:
  - Apart from people who have been heavily contaminated, including individuals located on-site, it recommends that changing clothes, showering and washing exposed skin will reduce levels of contamination and prevent further spread of contamination in a nuclear emergency
- In New Brunswick, the Offsite Plan states:
  - In the event of a precautionary evacuation, decontamination centres "may not" be employed
  - During an evacuation due to hazard, decontamination centres "would" be activated

Recommendation

Because the Offsite Plan is not in the public domain or provided in an alternative format which may be user-friendly to the public, CELA urges the CNSC to require as a licence renewal-condition that NB Power conduct surveys in the community to gauge levels of public knowledge regarding decontamination and report back to the CNSC.

IV. Emergency Response Measures
Monitoring

- The CNSC's Fukushima Task Force recommended automatic boundary monitoring. The availability of this data is extremely important during emergencies and routine operations
- The National Academy of Science reiterates "radiation and security monitoring systems need to be hardened so that they continue to function during severe accidents"
- The New Brunswick Offsite Plan notes that "Emergency radiation monitoring will occur within a matter of hours following an accidental release"

See CELA Submissions at page 36.

Recommendation

CELA requests that the CNSC ensure that automatic gamma monitoring is in place at Point Lepreau and require the automatic exchange of such data with the regulator as suggested by the IAEA and Fukushima Task Force reports.

IV. Emergency Response Measures
Control of Agricultural Products (1)

- The IAEA Safety Guide GS-G-2.1 provides guidance to offsite officials, outlining how to ensure the public will not eat or drink potentially contaminated food, milk and water in the event of a major release
- This Guide notes that radiation induced thyroid cancers following the Chernobyl accident occurred mainly at distances **more than 50 km from the plant**, and that "the most effective protective action to prevent or reduce these thyroid cancers would have been to restrict the consumption of potentially contaminated food and milk"

IV. Emergency Response Measures
Control of Agricultural Products (2)

The *International Commission on Radiological Protection* outlines preventative agricultural actions to reduce or prevent doses:

- Banning the consumption of locally grown food
- Covering open wells
- Sheltering animals and animal feed
- Controlling milk and avoiding drinking of milk from animals grazing on potentially contaminated pasture
- Not eating fresh vegetables, fruit or other food that may have been outside during the release
- Monitoring drinking water particularly in case of run-off
- Continuing restrictions until a return to established limits

IV. Emergency Response Measures
Control of Agricultural Products (3)

- CELA notes that the Offsite Site plan in its "Ingestion Pathway Monitoring" section lists a chapter called Countermeasures. Unfortunately, this chapter only contains the words "To be completed later"
- CELA requests an update to this chapter be provided

Recommendation

CELA recommends that the CNSC require that the Offsite Plan's monitoring provisions and ingestion control zones extend from the existing 80 km ingestion route, to encompass a distance of 100 km from the NGS. Also, the CNSC must require the undertaking of appropriate measures to ensure that monitoring can be done following an accident within that 100 km zone for agricultural produce, foodstuffs, milk and water.

Recommendation

CELA recommends that the Offsite Plan explicitly outline the measures in respect of controlling ingestion food and water, including contingency planning for replacement of drinking water for all residents within 100 km of the Point Lepreau nuclear station that may be required in the case of a severe nuclear emergency of the type outlined by the International Commission on Radiological Protection.

IV. Emergency Response Measures
Worker Safety (1)

- The Offsite Plan defines emergency workers as those who "may be exposed in excess of occupational dose limits while performing actions to mitigate the consequences of an emergency"
- The Offsite Plan states that those engaged in decontamination operations should wear personal protective equipment and a "dose control program" must be undertaken for these workers
  - This dose control program is to include methods for tracking radiation dose to workers in real time, a dose control plan which keeps doses "as low as reasonably achievable," and defined dose limits

See CELA Submissions at page 38.

IV. Emergency Response Measures
Worker Safety (2)

- CELA requests that the licensee or province confirm if a dose control program has been put in place. The Offsite Plan is silent on whether one has been designed and implemented
- The Offsite Plan states that the protection of emergency workers "is the responsibility of the jurisdiction providing resources within the context of the regional plan" The NB Emergency Response Plan does not provide details
- CELA submits that if these programs are in existence, they be explicitly referenced and appended to the emergency response plans

Recommendation

Risks of exceeding maximum radiation exposure limits must be discussed with workers in advance of any accident. Methods to review risks and obtain consent to exceed those limits should be explicitly clarified in both the Onsite and Offsite Plans.

IV. Emergency Response Measures
Emergency Planning Drills (1)

- The Point Lepreau Licence Condition Handbook states:

  The licensee is required to conduct Emergency Exercises and Drills at least annually in most areas. A "site evacuation" drill is required every three years and non-NBP facilities (such as hospitals and off-site centers) are scheduled by mutual agreement annually. Participation by municipal and provincial emergency response groups is also scheduled by mutual agreement.

- The IAEA's Integrated Regulatory Review Service – Follow-up Mission to Canada (2011) recommended that Canada "conduct full scale emergency exercises on a periodic basis"

IV. Emergency Response Measures
Emergency Planning Drills (2)

- The last full scale drill for Point Lepreau was conducted in 2015. NB Power's CMD update on the 2015 Intrepid Exercise noted after their review of Intrepid that:
  - There is an opportunity to align the emergency zones, reducing the possibility of miscommunication and inconsistent prioritization
  - Clarify the roles and responsibility of (1) reception centres and (2) the Technical Advisory Group
  - Plan joint exercises to validate improvements
  - Look for opportunities to "exercise areas not normally exercised" regarding recovery and ingestion pathways
- CELA requests updates on these areas for improvement and whether they have been incorporated into the Offsite Plan

IV. Emergency Response Measures
Emergency Planning Drills (3)

- Drills must confirm that communication channels are working properly and emergency locations are fully operational and functional
- The CNSC should require inclusion of surrounding community and public interest organizations in order to increase input into, and confidence in the results
- CELA recommends that results from drills be made public, along with lessons learned, and improvements recommended as a result of the exercises
- The CNSC should require reporting of implementation of those improvements on an annual basis as part of their oversight with respect to offsite emergency planning

Recommendation

CELA recommends that the CNSC require annual conducting of exercises dealing with these types of full scale severe event or multi- unit accident scenarios with conclusive demonstration of their effectiveness as a licence condition for Point Lepreau in this application.

V. Best Practice and Regulatory Oversight

V. Best Practice and Regulatory Oversight
IAEA Standards for Preparedness and Response (1)

- The IAEA Standard, *Preparedness and Response for a Nuclear or Radiological Emergency, Series No. GSR Part 7 (2015) Safety Standards*, sets out expectations and responsibilities of the regulator
- It is the CNSC's responsibility as the regulator, to ensure the following:
  - The regulatory body shall require that arrangements for preparedness and response be in place for the on-site area for any practice or source that could necessitate an emergency intervention (s 4.13)

V. Best Practice and Regulatory Oversight
IAEA Standards for Preparedness and Response (2)

Continued:

- The regulatory body shall ensure that such emergency arrangements are integrated with those of other response organizations (s 4.14)
- The regulatory body shall ensure that such emergency arrangements provide a reasonable assurance of an effective response, in compliance with these requirements, in the case of a nuclear or radiological emergency
- Complete emergency arrangements shall be in place before the commencement of operation of the facility or commencement of the activity. The regulatory body shall verify compliance with the requirements for such arrangements (s 4.13)

V. Best Practice and Regulatory Oversight

IAEA Standards for Preparedness and Response (3)

Continued:

- In fulfilling its statutory obligations, the regulatory body shall establish or adopt regulations and guides to specify the principles, requirements and associated criteria for safety upon which its regulatory judgements, decisions and actions are based. These regulations and guides shall include principles, requirements and associated criteria for emergency preparedness and response for the operating organization (s 4.12)

V. Best Practice and Regulatory Oversight

IAEA Standards for Preparedness and Response (4)

Continued:

- The government through the regulatory body shall ensure that operating organizations review appropriately and, as necessary, revise the emergency arrangements (a) prior to any changes in the facility or activity that affect the existing hazard assessment and (b) when new information becomes available that provides insights into the adequacy of the existing arrangements (s 4.26)
- The government shall ensure the coordination of and consistency of national emergency arrangements with the relevant international emergency arrangements (s 4.4)

V. Best Practice and Regulatory Oversight

IAEA Standards for Preparedness and Response (5)

- The Offsite Plan relies on the IAEA's GS-R-2. However, this guide was replaced by GSR Part 7 in 2015. As the revised version states:
  - In 2011, the IAEA Secretariat, relevant international organizations and Member States began the review of IAEA Safety Requirements publication No. GS-R-2 on the basis of lessons identified in exercises and from the response to emergencies since its publication in 2002 (including the response to the accident at the Fukushima Daiichi nuclear power plant in Japan in March 2011), and in due consideration of recommendations of the International Commission on Radiological Protection

V. Best Practice and Regulatory Oversight
IAEA Standards for Preparedness and Response (6)

- As CELA has already submitted, there is little to no evidence of any amendments having been made to the Offsite Plan in light of the Fukushima disaster
  - The fact that the Offsite Plan has not been updated to reflect the amendments in GSR Part 7 (2015), further supports the view that insufficient efforts have been made to update the Offsite Plan

- CELA requests the CNSC ensure necessary amendments are made to Point Lepreau's emergency response capabilities, including its Offsite Plan, to confirm that the lessons learned are duly reflected

Recommendation

CELA submits that the CNSC should not renew Point Lepreau's operating license beyond the current licence period without verifying "through tests and assessments" the adequacy of the emergency plans in place for the station, both onsite and offsite, to respond to severe nuclear emergencies. The CNSC should furthermore require that the Offsite Plan be amended to reflect the capability requirements in the IAEA's GSR Part 7, rather than the out-dated requirements in GS-R-2.

V. Best Practice and Regulatory Oversight
Fukushima Task Force 2011 (1)

- In the Fukushima Task Force's review of Canada's nuclear regulatory framework, it was found that "federal and provincial nuclear emergency planning could be strengthened through establishing a formal, transparent, national-level oversight process for offsite nuclear emergency plans, programs and performance, and through scheduling of regularly planned full-scale exercises"
- REGDOC-2.10.1 was implemented in response to the Task Force's findings to strengthen licensees' emergency preparedness programs

V. Best Practice and Regulatory Oversight
Fukushima Task Force 2011 (2)

- CELA reminds the CNSC that the sufficiency of nuclear emergency planning must be reviewed before granting a license at new nuclear facilities
- Because the REGDOC excludes "existing facilities" in its scope of application, the entirety of REGDOC-2.10.1 must be incorporated by reference into the licence or licensing basis for it to have effect

Recommendation

CELA calls on the CNSC to incorporate the provisions of REGDOC-2.10.1 into the Point Lepreau Licence Condition Handbook.

Recommendation

CELA submits that the CNSC has jurisdiction to consider the adequacy of the emergency plans in place at Point Lepreau in deciding whether to renew the operating licence, and/or whether to impose additional requirements by way of licence conditions to better protect health, safety and the environment.

Recommendation

CELA urges the CNSC to further enhance regulatory oversight of emergency planning adequacy at Point Lepreau with detailed public reviews, aimed at increasing the adequacy of emergency plans in response to catastrophic offsite beyond design basis accidents.

VI. External Hazards: CCNB Report

VI. External Hazards
Overview

- Report by Real Daigle commissioned by the Conservation Council of New Brunswick, sought to review the following external hazards affecting Point Lepreau Generating Station:
  - Climate change
  - Probalistic Maximum Storm
  - Probalistic Tsunami
  - High Wind
  - Extreme Rainfall

VI. External Hazards
Findings - Climate Change

- Climate change will have impacts on places where citizens live. Proactively adapting to climate change is an essential part of ensuring our communities remain safe, resilient and sustainable
- No allowances have been made in the PLNGS plans with regards to the potential impacts of climate change. Sea-level rise is the most significant climate change parameter that will impact coastal locations
  - The most recent sea-level change estimates would result in a rise of slightly more than one metre near PLNGS by year 2100 (Daigle, 2014), hence an acceleration from the regional rate of increase of near 30 cm in the past century

VI. External Hazards
Other Findings

- The CCNB's Report did not discover any concerns affecting PLNGS related to the external hazards of Probalistic Maximum Storm, Probalistic Tsunami Assessment, High Wind Assessment and Extreme Rainfall Assessment

Recommendation

While it is understood that climate change will not significantly impact PLNGS during the upcoming 5-year licensing period, specific issues related particularly to sea-level rise should be considered in the longer time frames. It is recommended that the lens of Climate Change be applied to future reviews.

Decision Requested

Decision Requested (1)

- The adequacy of emergency planning preparedness and readiness is one of the most fundamental issues to be assessed by the CNSC in deciding the outcome of this application
- Based on the issues reviewed, **CELA submits that the application to renew Point Lepreau's operating licence should be denied until the recommendations in this submission are implemented to the standards required by REGDOC 2.10.1, current scientific studies, and international standards**

Decision Requested (2)

- Catastrophic accidents must be considered possible in the event that:

  (1) NB Power's probabilistic calculations err;

  (2) there is missing information;

  (3) defence in-depth and redundancies fail; or

  (4) a combination of unanticipated events lead to large radiation releases

- CELA submits the **ultimate test** that the CNSC must apply in deciding whether to renew Point Lepreau's operating license is whether an offsite, large radiation release and catastrophic accident currently serves as the planning basis for the Point Lepreau emergency response plans

Decision Requested (3)

Should the level of emergency response not match that required for a catastrophic accident, the licence renewal should be denied, or in the alternative, a one year operating licence granted on the condition that such amendments be carried out before any further license renewals.

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