



Canadian  
Environmental Law  
Association  
EQUITY. JUSTICE. HEALTH.

GREENPEACE

## ***Comments on REGDOC-1.1.1 Licence to Prepare Site and Site Evaluation for New Reactor Facilities***

November 14, 2016

Please accept the Canadian Environmental Law Association (CELA) and Greenpeace's comments on the *REGDOC-1.1.1, Licence to Prepare Site and Site Evaluation for New Reactor Facilities*.

Following the Fukushima Daiichi nuclear accident, the Canadian Nuclear Safety Commission (CNSC) committed to updating its various regulatory requirements in its *Integrated Action Plan on the Lessons Learned from the Fukushima Daiichi Nuclear Accident* for both existing and new nuclear power plants. The CNSC commitment included consulting the public on proposed amendments for *RD-346: Site Evaluation for New Nuclear Power Plants ("RD-346")* before submitting a revised guide to the Commission for approval before the end of December 2013.<sup>1</sup> REGDOC-1.1.1, however, was only released in August 2016.

### ***General Observations and Recommendations:***

In our view, the draft regulatory guide ignores lessons from the Fukushima disaster and the declining and unacceptable suitability of existing nuclear stations in Canada.

- These post-Fukushima siting requirements do not apply to existing facilities. The CNSC has provided no justification for not subjecting existing facilities to post-Fukushima siting guidance.
- The guidance provides no clear deterministic criteria for judging the suitability of a nuclear site over its life span.
- The CNSC's policy on the assessing accident consequences in environmental assessments is unaligned with social expectations, real-world experience and emergency planning requirements.
- The guidance lacks requirements for the applicant to provide proof that provincial authorities have established laws, policies and regulations to limit population growth and land-uses that would impede emergency measures.

---

<sup>1</sup> Canadian Nuclear Safety Commission, CNSC Integrated Action Plan on the Lessons Learned From the Fukushima Daiichi Nuclear Accident, August 2013, p 23

- The guide fails to acknowledge an inappropriate site could significantly increase the disruption of Canadian society in the event of a major accident. It thus has a responsibility under the *Nuclear Safety and Control Act (NSCA)* to assess site suitability.

## Detailed Requests

<b>Section/Issue</b>	<b>Concern Rationale</b>	<b>Recommendation</b>
Comment 1  Preface, pg i.	<p>The guide states that post Fukushima siting requirements do not apply to existing facilities. It states: “The requirements contained in this document do not apply unless they have been included, in whole or in part, in the license or licensing basis.” Documents obtained through Access to Information indicate that CNSC staff were debating whether existing facilities should be subjected to new siting requirements. The CNSC, however, refused to release its justification to not apply modernized siting standards to existing facilities. Specifically, Greenpeace was told: “These records form part of an internal consultation which is ongoing. Until the Regulatory Document is approved by the Commission for final publication, no internal discussions will be released.”<sup>2</sup> REGDOC-1.1.1, however, is supposed to provide a post-Fukushima update to the CNSC’s siting requirements. The CNSC has subjected existing nuclear facilities to many other new post-Fukushima regulatory requirements. In our view, the CNSC has not provided sufficient justification, transparency and intelligibility related to exempting existing facilities from its post-Fukushima siting guidance for public interveners to meaningfully participate in this consultation. Before proceeding with consultations and approvals on this guide, the CNSC needs to provide its justification and rationale for not applying post-Fukushima siting standards to existing facilities.</p>	<p><b>Recommendation:</b> The CNSC should release its rationale and justification for not subjecting existing sites to modernized siting standards.</p> <p><b>Recommendation:</b> The CNSC should establish transparent criteria for judging the acceptability of existing nuclear sites.</p>
Comment 2  Preface, pg i	<p>There is a lack of clarity on how the CNSC is evaluating the site suitability of existing nuclear stations. The assumptions</p>	<p><b>Recommendation:</b> Please provide the list of requirements and guidance</p>

<sup>2</sup> Nicholle Holbrook (Senior ATIP Advisor, CNSC) to S-P. Stensil (Greenpeace), A-2015-00125, January 13, 2016.

<p>General comment on existing site suitability standards.</p>	<p>underpinning the site suitability assessments must be clarified and potentially modified in light of Fukushima.</p> <p>Internal documents acquired by Greenpeace through Access to Information legislation indicate that even CNSC staff may be unclear on how site suitability is assessed for existing nuclear stations. Specifically, CNSC staff debating the life-extension requirements for the Darlington stated that the role of Integrated Safety Review is not “to rule definitively on the suitability of the site nor to definitely interpret results from DNNP [new reactor environmental assessment] work. <i>I think it is the EA’s job...</i>”<sup>3</sup></p> <p>However, the CNSC’s 2016 submission to the Convention on Nuclear Safety (CNS) indicates that it uses the accidents assessed during initial environmental assessments to evaluate site suitability.<sup>4</sup> To our knowledge, this has never been stated explicitly during an environmental review process. As well, to the best of our knowledge, this use of environmental assessments to judge the site suitability of existing nuclear stations has never been explicitly documented in CNSC guidance. Again, this points to a lack of clear justification, transparency and intelligibility of the CNSC’s site suitability for existing nuclear stations.</p> <p>This use of environmental assessments is also problematic because CNSC environmental assessment policies related to accident assessments aren’t aligned with public expectations, real-world experience or emergency planning requirements. As noted in its submission to the CNS, the CNSC</p>	<p>for assessing the site suitability of existing nuclear stations. Please indicate what document says environmental assessments inform site suitability.</p> <p><b>Recommendation:</b> If the CNSC is to use environmental reviews to assess site suitability for existing or future nuclear stations it needs to change its policy of excluding worst-case accidents from environmental reviews.</p> <p><b>Recommendation:</b> In light of Fukushima, REGDOC-1.1.1 should be amended to require site-suitability assessments include an assessment of whether in the event of a worst-case accident emergency measures would be impeded the surrounding area’s geography or population characteristics. Such assessments should continue over the life of the facility.</p>
--	--	---

<sup>3</sup> See Access to Information request A00036517\_93-000904

<sup>4</sup> Canadian National Report for the Convention on Nuclear Safety, Seventh Report, 2016, pg 154 - 161

	<p>does not consider worst-case accidents in environmental assessments and only reviews “accident sequences that could occur with a frequency greater than 10-6 per reactor-year of operation.”<sup>5</sup></p> <p>This policy, however, is unaligned with other information that should be factored into assessing site-suitability such as population density impeding the implementation of emergency measures.</p> <p>For example, the 10-6 cut-off is also not aligned with the Ontario’s current criteria for detailed off-site emergency planning, which remains the standard of 10-7 recommended by the RSC in 1996.<sup>6</sup></p> <p>Moreover, CNSC advised the province of Ontario earlier this year that the “...the purpose of emergency planning is to be prepared for scenarios worse than those of LRF or EA, but how much? International guidance from IAEA de-facto uses a 10-<sup>8</sup> frequency.”<sup>7</sup></p> <p>This points to a lack of intelligibility in the CNSC’s apparent use of environmental reviews to assess site suitability. Site suitability should assess whether emergency measures can adequately protect the public in the event of worst-case accidents. CNSC environmental assessments, however, don’t assess worst-case accidents.</p> <p>Notably, the CNSC’s Fukushima Task Force’s October 2011 observed that, “it may be useful for the environmental assessment</p>	
--	--	--

<sup>5</sup> Ibid. pg. 155.

<sup>6</sup> Royal Society of Canada and Canadian Academy of Engineering, Report to the Ministry of Energy and Environment Concerning Two Technical Matters in the Province of Ontario’s Nuclear Emergency Plan , November 1996, section 7.1, p 33

<sup>7</sup> E-Doc 4947176, Release in request A-2016-00027

	<p>process to include consideration of severe accidents, should this be regarded as responsive to public concerns”<sup>8</sup> Inexplicably, the CNSC never sought input on whether to change this policy, but notably the CNSC’s policy of excluding worst-case accidents from environmental assessments was a focal point of the 2012 environmental assessment hearings on Ontario Power Generation’s proposal to extend the operational life of the Darlington nuclear station.</p> <p>All this is to say, the CNSC’s policy of excluding worst-case accidents from environmental assessments is unaligned with social expectations, real-world experience and emergency planning requirements. It needs to be reviewed.</p> <p>What’s more, this continued policy raises questions about the acceptability of the CNSC’s current practices for assessing the site-suitability for existing nuclear stations.</p>	
<p>Comment 3 Preface, pg i.</p>	<p>The preface implies that this siting guidance will only be considered when an operator applies to build a new reactor site. This is problematic because population growth, land-use planning, or climate change could significantly impact the acceptability of a site during a reactors operation. A clear example of this is the Pickering nuclear station, which when sited was in an area with low-population density, but is now surrounded by millions of people. From a common sense perspective. The Pickering site would not be an acceptable location for building the station today, but there are no criteria in the current guide to prevent this from happening at future nuclear sites.</p>	<p><b>Recommendation:</b> The guide should be revised to require a regular re-assessment of site acceptability over the life of a project.</p>

<sup>8</sup> CNSC, Fukushima Task Force Report Draft (October 2011) p. 56.

<p>Comment 4</p> <p>2. Background pg. 4</p>	<p>The document states that the licensee has a responsibility to ensure continued suitability of the site. At present this has not been assured as the operator may not have jurisdiction or control over surrounding land uses. However the regulator, CNSC, does have jurisdiction over whether to issue a license to the operator at that site, and is obliged to discharge its public and environmental protection responsibilities under the <i>Nuclear Safety Control Act (NSCA)</i>.</p>	<p><b>Recommendation</b> The guide should be amended to clarify that all Class 1 nuclear licences are conditional on the continued suitability of the site for nuclear power operations over the operating life of the plant. The licensing basis should clearly state that compromise of site suitability will result in modification or revocation of the subsequent license to operate.</p>
<p>Comment 5</p> <p>2. Background pg. 5</p>	<p>The document states that it does not presuppose or limit an applicant’s intention to implement a particular kind of technology in future licensing phases. However, in many situations the particular technology – and its associated hazards - has implications for site suitability.</p> <p>This is clearly not the case in light of the increased hazard and risk posed by multi-unit sites and, in particular, multi-unit reactor designs. This fact is reflected in U.S. where the Nuclear Regulatory Commission has siting criteria, which acknowledges the increase hazard posed by multi-unit sites. Specifically:</p> <p style="padding-left: 40px;">“If the reactors are interconnected to the extent that an accident in one reactor could affect the safety of operation of any other, the size of the exclusion area, low population zone and population center distance shall be based upon the assumption that all interconnected reactors emit their postulated fission product releases simultaneously. This requirement may be reduced in relation to the degree of coupling between reactors, the probability of</p>	<p><b>Recommendation:</b> This statement should be removed from the document.</p>

	<p>concomitant accidents and the probability that an individual would not be exposed to the radiation effects from simultaneous releases. The applicant would be expected to justify to the satisfaction of the Commission the basis for such a reduction in source term.”<sup>9</sup></p>	
<p>Comment 6 2. Background Pg. 5.</p>	<p>Nuclear facilities pose a significant hazard to Canadian society. Chernobyl and Fukushima caused significant social disruption.</p> <p>Gregory B. Jaczko, the former Chairman of the Nuclear Regulatory Commission, has publicly acknowledged that while the Fukushima disaster is clearly a socially “unacceptable” event, it would not be considered “unacceptable” by risk models used by nuclear regulators internationally.<sup>10</sup></p> <p>Typically under nuclear safety standards, including the CNSC’s standards, a nuclear operator must meet safety goals that ensure in the event of a radiation release that emergency measure can ensure there are no immediate human deaths from radiation exposure. A lesson from Fukushima is that these safety goals, which are referenced in REGDOC-1.1.1, do not adequately minimize the possibility of social disruption in the event of a nuclear accident.</p> <p>Increasing the population density around a nuclear station increase the potential for social displacement in the event of a major nuclear accident. This is not properly addressed in REGDOC-1.1.1. Minimizing the extent of social disruption should be</p>	<p><b>Recommendation:</b> The following sentence should be added to the bulleted list of REGDOC-1.1.1’s primary purposes: “demonstrates that the surrounding region, including population centres, would not lead to unacceptable social disruption in the event of a worst-cast accident.”</p>

<sup>9</sup> <http://www.nrc.gov/reading-rm/doc-collections/cfr/part100/part100-0011.html>

<sup>10</sup> Speech, “Looking to the Future” The Honorable Gregory B. Jaczko Chairman U.S. Nuclear Regulatory Commission At Platts 8<sup>th</sup> Rockville, MD Annual Nuclear Energy Conference February 9, 2012. Available at: <http://pbadupws.nrc.gov/docs/ML1205/ML120540201.pdf>

	explicitly listed as an objective of the CNSC's post-Fukushima site-suitability guidance.	
Comment 7 1. Background pg. 5	It is important for the design basis of the facility to remain "current with changing environmental conditions or modification". This must be enforced in all subsequent licensing phases; however this has not been the practice to date vis-a-vis population growth, changes in land use, or the impacts of climate change in the areas of some of Canada's nuclear power plants.	<b>Recommendation:</b> As noted, all nuclear power plant licenses should be made conditional on the continued suitability of the site for nuclear power operations over the operating life of the plant. The licensing basis should clearly state that compromise of site suitability will result in modification or revocation of the subsequent license to operate.
Comment 8 4.1 General description of the project pg. 7	The document states that "Selection of a specific facility technology is not required when submitting a license to prepare the application." However, the CNSC should nevertheless require technology choice before proceeding with any of its licensing processes including site evaluation. The CNSC must apply its jurisdiction and expert judgment to the question of the suitability of a site in relation to the specific technology such as the design of the nuclear power plant, its inventory, its cooling methodology, its shut-down and containment systems, and its on-site emergency response mechanisms. These issues are integral to the question of potential off-site impacts and therefore are bound up within the question of the suitability of a particular site.	<b>Recommendation:</b> The CNSC must apply its jurisdiction and expert judgment to the question of the suitability of a site in relation to the specific technology. This provision should be reversed and the proponent should be required to specify specific technology when applying for a licence to prepare a site.
Comment 9 4.1 General description of the project pg. 7	The document refers to "bounding parameters that encompass all technologies under consideration". A "bounding" approach - does not allow for proper evaluation of the suitability of a site as it does not represent any potential actual set of conditions. Furthermore, the examples cited in the document are insufficient as there are additional examples of design characteristics and choices such as the type of operating system which has implications	<b>Recommendation:</b> Reference to "a bounding approach" should be eliminated from the document. Specific design information should be required at the stage of application to prepare a site in order to inform the CNSC in its duty to ensure that the site is suitable for a nuclear power plant, and to impose

	for source term and potential offsite impacts on the public and the surrounding environment.	appropriate conditions to ensure continued suitability of the plant.
Comment 10 4.3.1 General considerations pg. 9.	The document states that “for activities that may use radioactive or nuclear substances” the application should state whether they are encompassed by the license to prepare a site or another licence; however the guidance states that it is not expected that activities encompassed by the licence to prepare a site will involve handling or radioactive or nuclear substances.	<b>Recommendation:</b> Section 4.3.1 should be amended to state that a license to prepare a site will not encompass the handling of radioactive or nuclear substances.
Comment 11 6.1.1 Application for licence to prepare site where the selection of a specific facility design is deferred pg. 13	The title is about deferring specific facility design but the text is about using another organization. This is confusing.	<b>Recommendation:</b> The title and text should match. The portion of the paragraph referring to deferring reactor technology choice should be deleted (see above submission where it is submitted that the specific technology choice should be specified in the application to prepare a site.)
Comment 12 7. Operating Performance – Conduct of the Licensed Activity pg. 15	The document does not provide for the evaluation of the suitability of the site in terms of surrounding population numbers, density and demographics, land use, ability to execute strong emergency planning and other matters relevant to assessing the suitability of a site for nuclear emergency planning. It is the responsibility of the CNSC to evaluate the suitability of a site for nuclear power plant operations.	<b>Recommendation:</b> The document must specify evaluation criteria for the suitability of the site in terms of surrounding population numbers, density and demographics, land use, ability to execute strong emergency planning and other matters relevant to assessing the suitability of a site for nuclear emergency planning.
Comment 13 9.2 Description of the exclusion zone and proposed layout of structures within the zone	The document states that “the exclusion zone size is characterized based on a combination of dose limits, security and robustness design considerations, and emergency preparedness considerations that are affected by land use around the site. This is appropriate. However, these factors cannot be assessed no technology is	<b>Recommend:</b> Require the applicant to specify the technology to be used at the site when applying for a site preparation license, in order to characterize the exclusion zone. Include conditions within the license as to the

<p>pg. 16</p>	<p>selected, and the continued ability to control the exclusion zone is essential, which requires either controls on the future expansion of the population surrounding the plant or a clear and enforced intention by the regulator to modify or revoke a plant license if the integrity of the exclusion zone cannot be maintained. The same considerations apply to protective zones discussed later in the document.</p>	<p>continued establishment and suitability of the exclusion zone.</p>
<p>Comment 14 9.2 Description of the exclusion zone and proposed layout of structures within the zone pg. 16</p>	<p>The criteria used to determine the exclusion zone in section 9.2 ignores the possibility that multiple reactors could be sited at one site. It also overlooks the historic practice in Ontario for multi-unit nuclear stations to share safety systems, including containment.</p> <p>As noted, the U.S. Nuclear Regulator Commission’s siting criteria acknowledges that multi-unit nuclear stations and the degree to which reactors at a site share safety systems should inform the size of an exclusion zone and the surrounding emergency zones. Specifically, it states “If the reactors are interconnected to the extent that an accident in one reactor could affect the safety of operation of any other, the size of the exclusion area, low population zone and population center distance shall be based upon the assumption that all interconnected reactors emit their postulated fission product releases simultaneously.”<sup>11</sup></p> <p>A key lesson from the Fukushima disaster is that nuclear regulators must end their historic practice of ignoring the larger hazard posed by multi-unit nuclear stations. This includes other radiological hazards, such as waste storage facilities. This should be reflected in the CNSC’s post-Fukushima siting guidance.</p>	<p><b>Recommendation:</b> Section 9.2 should be amended to acknowledge that the increased hazard of multi-unit nuclear stations should be reflected in determining the exclusion zone.</p> <p><b>Recommendation:</b> The use of single-unit design-basis accidents to determine the exclusion should be abandoned in favour of accidents with a source term similar to real-world accidents such as Fukushima.</p>

<sup>11</sup> <http://www.nrc.gov/reading-rm/doc-collections/cfr/part100/part100-0011.html>

	<p>Moreover, the dose requirements for determining the exclusion zone are based on dose projections for a design-basis accident at only reactor. Under historic Canadian design specifications such accidents are typically limited to the release of noble gases. This is also inappropriate in light of historic nuclear accidents.</p>	
<p>Comment 15 9.4 Protective zones pg. 18.</p>	<p>Section 9.4 wrongly refers to a singular “protective zone” beyond the exclusion zone. The section also fails to acknowledge that provincial authorities establish off-site protective zones. The provincially established zones beyond the exclusion zone typically have different objectives.</p> <p>The second sentences of section 9.4 lists matters considered by the province’s in determining offsite protective measures. There are two notable omissions: social expectations for public safety and the consequences of malevolent events.</p> <p>Regarding social expectations of public safety, the Ontario government historically instructed advisory groups on the provincial planning basis for nuclear accidents to consider public perceptions of nuclear accident risks. Based on this mandate, Working Group #8 observed “The public expects measures to be taken to protect it against the worst case possible.”<sup>12</sup> This public expectation for effective emergency response for worst-case nuclear accidents needs to be acknowledged and factored into the CNSC’s assessment of site suitability.</p> <p>Similarly, Ontario government has historically asked advisory groups to</p>	<p><b>Recommendation:</b> Section 9.4 should be amended to acknowledge that the provinces establish offsite protective zones.</p> <p><b>Recommendation:</b> Section 9.4 should be amended to acknowledge that that there are typically multiple offsite protective zones with different objectives established by the provinces.</p> <p><b>Recommendation:</b> The second sentence of section 9.4 should be amended to include “societal expectations”.</p> <p><b>Recommendation:</b> The second sentence of section 9.4 should be amended to include “malevolent events”.</p> <p><b>Recommendation:</b> Section 9.4 should be clarified to state that “planning basis” includes the reference accident and source term</p>

<sup>12</sup> Report of Working Group # 8 – The Upper Limit for Detailed Nuclear Emergency Planning, June 1988, pg 24.

	<p>consider the effects of hostile actions in determining offsite protective actions, including emergency planning zones. Notably, the public expectation for public safety has increased significantly since September 11<sup>th</sup>. This also needs to be acknowledged in the CNSC’s siting guidance.</p> <p>Section 9.4 also lists factors that should be taken into account when establishing a protective zone. Again, the guide is wrongly referring to a singular zone. These include the planning basis, population characteristics, land use and other matters should be taken into account in establishing a protective zone. These factors are appropriate, but incomplete.</p> <p>For example, the first bullet refers to “the planning basis”. This concept needs to be expanded. Ontario, for example, has determined a planning basis based on a reference accident with an associated source term. Ontario’s current planning basis, for example, is based on the radioactive releases from Ex Plant Release Category-3 from the 1995 Pickering A probabilistic risk assessment. This reality needs to be clarified in the guidance. For example, it is reasonable to assume that the provincial planning basis may need to be modified in the event that additional reactors are added at a nuclear site.</p> <p>The list also population characteristics and “present and future use of land and resources” as factors to be considered in establishing protective zones. This is problematic because it overlooks what limits and restrictions are in place (or should be in place) to prevent undesirable population growth or land-use. Such policies are typically a provincial responsibility and not in the control of the licensee. This is directly</p>	<p>used to determine offsite protective zones.</p> <p><b>Recommendation:</b> Section 9.4 needs to be amended to require the provision of provincial policies, regulations and laws that may affect or impede the implementation of emergency preparedness.</p> <p><b>Recommendation:</b> The word “vulnerable” should be added before the word populations at the beginning of the fifth bullet point in section 9.4.</p> <p><b>Recommendation:</b> The document should provide that all subsequent licensing phases will be made conditional on the integrity of the surrounding protection zones.</p>
--	--	---

	<p>relevant to the following bullet related to the “ability” to maintain the effectiveness of offsite emergency measures.</p> <p>What’s more, the guide does not address what is to happen if these factors change over time and there is no longer an ability to maintain an appropriate protective zone; provide robust emergency planning and therefore assure public and environmental off-site protection.</p>	
<p>Comment 16 13.3 Effluent and emissions control and monitoring pg. 22</p>	<p>The document states that all reasonable precautions shall be taken to control and monitor the release of radioactive nuclear substances or hazardous substances to the environment. However there are no provisions as to contingency plans in the event of contamination of drinking water sources. The ability to provide for alternative drinking water sources is a critical aspect of the issue of a suitability of a site as a location for a nuclear power plant.</p>	<p><b>Recommendation:</b> The document should require demonstration of an ability to provide alternative sources of drinking water in the event that accident during subsequent operations phase were to impact drinking water sources. The license to prepare a site should require description of all drinking water sources potentially affected by plant operations, a description of the population reliant on them, and should specify contingency plans to replace drinking water should be provided and evaluated, along with financial assurances to support those contingency plans.</p>
<p>Comment 17. 14.2 Decommissioning pg. 25</p>	<p>The document provides that the site should be evaluated from a decommissioning perspective. This is appropriate. However the document does not address public input nor does it constrain future end states as a result of the nuclear power plant operations on the site as might be necessary.</p>	<p><b>Recommendation:</b> The document should include a requirement for public input and consultation about potential end states and future land uses. The document should require all potential end states to be</p>

	<p>Similarly, the guidance should require a discussion of the suitability of the site in the event that offsite sites are not available for long-term radioactive waste storage.</p>	<p>clearly stated and communicated throughout all subsequent licensing phases; a mechanism for this should be embedded as license conditions in all phases of licensing. The document should state that ongoing land use planning should be demonstrated to be consistent with the stated potential end state/s and with long term status of the site (eg long term presence of fuel waste or other radioactive waste; existence of contaminated soil or groundwater) and a license condition should be required in all subsequent phases that sets out these anticipated potential long term land use constraints.</p> <p><b>Recommendation:</b> The guide should be amended to require a discussion of long-term radioactive waste storage at the site.</p>
<p>Comment 18 16.1 Purpose pg 30.</p>	<p>The document states that site evaluation is a process that continues throughout the lifecycle of the proposed facility to ensure its design basis remains current with changing conditions. However this does not appear to have been the approach taken to date with existing plants.</p>	<p><b>Recommendation:</b> As noted the plants' license conditions in all phases should be conditional on the continued suitability of the site for nuclear power plant operation.</p>
<p>Comment 19 16.2 Scope pg. 30.</p>	<p>The document states that "site selection is not regulated under the <i>Nuclear Safety and Control Act (NSCA)</i>". On the contrary, the CNSC has the jurisdiction – and no other entity has the jurisdiction – to ensure that licences are not issued unless it is satisfied that the public and the environment will be protected.</p>	<p><b>Recommendation:</b> The CNSC must exercise its jurisdiction and fulfill the federal constitutional jurisdiction over site approval or it can never properly exercise its responsibility to ensure public and environmental</p>

	Indeed, the NSCA requires the CNSC to limit risk to Canadian society. As seen with past nuclear accidents, such as Fukushima, societal disruption is a key effect of nuclear accidents. It goes without saying that the siting of a nuclear station in a highly populated area increases the potential societal disruption in the event of an accident. The CNSC, therefore, has a clear responsibility under the NSCA to assess the potential for a site to exacerbate social disruption in the event of a nuclear accident.	protection. No amount of subsequent regulatory action short of license termination can adequately protect the public if an unsuitable site is selected.
Comment 20 16.3 Overview pg. 31	The document states that site evaluation is to be carried through to subsequent facility lifecycle phases, including the license to operate. This is appropriate. However, the document does not specify any criteria or thresholds as to whether a site is acceptable for nuclear power plant operation; or as to whether a site becomes unacceptable at a later stage due to for example population increase, in the event that these issues cannot be addressed by "design modifications" or "updates to operations".	<b>Recommendation:</b> The document must specify that all facility lifecycle phases will be conditional upon continued suitability of the site for nuclear power plant operation.
Comment 21 16.4 Site evaluation methodology pg. 33	The document states that site characteristics and effects of external events are integral considerations in the site evaluation process. This is appropriate. However emergency preparedness and security needs should be mandatory and central to the analysis of suitability of the site; not merely "anticipated".	<b>Recommendation:</b> The document should be altered to specify that emergency preparedness and security needs should be mandatory and central to the analysis of suitability of the site; not merely "anticipated."
Comment 22 16.4 Site evaluation methodology pg. 33	The document states that the degree of focus given to external events depends on their probability and severity. This is far too vague. External events must be a critical consideration in evaluating the suitability of the site.	<b>Recommendation:</b> The document should specify that external events must be a critical consideration in evaluating the suitability of the site.
Comment 23	The document states that "submission of site evaluation information on rejected sites is not necessary or expected in future EAs	<b>Recommendation:</b> The document should specify that alternate sites that were

<p>16.4 Site evaluation methodology pg. 33</p>	<p>or in future licensing phases under the NSCA.” For EA traceability this is incorrect advice. Alternate sites that were investigated and rejected should be detailed in an EA along with the criteria used.</p>	<p>investigated and rejected should be detailed in any related EA along with the criteria used.</p>
<p>Comment 24 16.4 Site evaluation methodology pg. 33</p>	<p>The document provides a list of considerations that site evaluation “takes into account.” The phrase “takes into account” is far too vague.</p>	<p><b>Recommendation:</b> The document should specify how the site would be considered suitable or not on each of the listed factors.</p>
<p>Comment 25 16.4 Site evaluation methodology pg. 33</p>	<p>The document states that one consideration includes characteristics of the protective zone insofar as they may affect implementation of the emergency response measures – this consideration should also apply to broader zones than the current protective zones in case of changing standards in the future, or in case of the occurrence of more severe events than currently subject to detailed planning - for example given these characteristics what would be the ability to evacuate a zone of 50 km around the plant.</p>	<p><b>Recommendation:</b> The document should include a requirement to consider the ability to implement emergency response measures in a further zone beyond the protective zones, to a distance of 50 kilometers around the plant, given population and the other listed characteristics.</p>
<p>Comment 26 17. General Criteria for Site Evaluation pg. 34</p>	<p>The document states that site evaluation shall include a number of factors such as external hazards, site characteristics, the range of technologies to be considered and others. However there are no evaluation criteria provided. The document simply asks the applicant to "prioritize" and to "document" these matters.</p>	<p><b>Recommendation:</b> The document should specify evaluation criteria for site suitability for nuclear power plant operation.</p>
<p>Comment 27 17. General Criteria for Site Evaluation pg. 34</p>	<p>The document states that “the main objective of site evaluation is to ensure that a reactor facility constructed and operated at the site will not create an unreasonable risk to the public or to the environment. However there is no definition of unreasonable risk, no evaluation criteria, and no threshold at which the site becomes unsuitable for any of the factors described in the document.</p>	<p><b>Recommendation:</b> The document should define unreasonable risk. It should specify evaluation criteria. It should specify thresholds in relation to population numbers, characteristics and density, and in relation to capacity to implement offsite emergency response in either</p>

	Again, the social disruption caused by a Fukushima-scale accident could vary considerably depending on a sites proximity to population centres or even drinking-water supplies. The CNSC has a responsibility to establish clear criteria for judging such risks.	qualitative or quantitative terms.
Comment 28 17. General Criteria for Site Evaluation pg. 35	The document provides that the characteristics of natural and human induced hazards, demographic, meteorological and hydrological conditions of relevance should be monitored over the nuclear installation’s lifetime. The document does not provide any response in the event that these characteristics change.	<b>Recommendation:</b> The document should specify that if these conditions change and the site becomes unsuitable for nuclear power plant operation, then the license in any subsequent phase may be modified or revoked; subsequent licences should contain the same condition.
Comment 29 17. General Criteria for Site Evaluation pg. 35	The document provides for periodic review of site specific hazards. However it does not specify any response if the review discloses factors, changes or implications that are serious for public safety.	<b>Recommendation:</b> As noted above, the document should specify that if these conditions change and the site becomes unsuitable for nuclear power plant operation, then the license in any subsequent phase may be modified or revoked; subsequent licences should contain the same condition.
Comment 30 17.1 Evaluation against safety goals from a site perspective pg. 35	The document says that reactor facility designs shall be evaluated against applicable safety goals and refers to part A section 9.3 in part for requirements and guidance. However, Part A section 9.3 has little set out in terms of such requirements and guidance for accidents and malfunctions.	<b>Recommendation:</b> The document should provide more extensive and specific requirements for evaluation of reactor facility designs against safety goals in the context of site characteristics and other factors listed in the document. The document should omit the reference to bounding approaches and bounding limits. The document should require evaluation of a specific reactor technology as

		specified in a license application to prepare a site.
Comment 31 17.2 Consideration of the evolution of natural and human-induced factors pg 35	The document provides that “the evolution of natural and human-induced factors in the environment that may have a bearing on safety and security shall be evaluated across a time period that encompasses the projected lifetime of the reactor facility. However, the document does not specify what would be the import of such evaluation of 'evolution' of factors.	<b>Recommendation:</b> The document should specify evaluation criteria for site suitability for nuclear power plant operation. In the event that factors are predicted to evolve in such a way that the site would not be suitable for nuclear power plant operation then the license should be denied.
Comment 32 17.3 Evaluation of hazards associated with external events pg. 36	The document provides for identifying and assessing external natural and human-induced events. However it fails to specify how they are to be assessed – i.e. as to what criteria or threshold? The document does not specify what potential consequences would render a site unacceptable?	<b>Recommendation:</b> The document should specify evaluation criteria for site suitability for nuclear power plant operation.
Comment 33 17.3 Evaluation of hazards associated with external events pg. 36	The document states that evaluation shall consider foreseeable changes in land use for the projected lifetime of the reactor facility, in order to assess and plan for mitigation of new external hazards introduced by changes in land use. This is appropriate. However, licensing a new site should require sufficient control over surrounding land uses or sufficient irrevocable commitment from local or provincial authorities to prevent incompatible changes in land use	<b>Recommendation:</b> The document should specify that licensing of a new site will require as a condition, sufficient control over surrounding land uses or sufficient irrevocable commitment from local or provincial authorities to prevent incompatible changes in land use over the lifespan of the facility.
Comment 34 17.3 Evaluation of hazards associated with external events pg. 36	CELA and Greenpeace have prepared an in-depth brief on the weaknesses of siting in relation to provincial land-use and population growth policies. It highlights that the CNSC’s historic practice of ignoring provincial oversight of offsite land-use planning has lead to a decline in the site suitability of existing nuclear stations in Ontario. Indeed, the province has been aware that its growth policies increase risk around the Pickering station. It is	<b>Recommendation:</b> The CNSC should review and consider the information provided in Appendix A.  <b>Recommendation:</b> REGDOC-1.1.1 should be amended to require applicants to show that provincial policies are in place to limit and restrict land-use around Canadian

	attached to this submission as appendix A, as part of our submissions to be considered in relation to this proposed REGDOC-1.1.1.	nuclear facilities over the life of the facility.
Comment 35 17.3 Evaluation of hazards associated with external events pg. 36	The document provides an exception to obtaining site-specific data to determine hazards. On this whole this should not be permitted. The document should require site specific data to be obtained.	<b>Recommendation:</b> The document should omit the references to data from similar regions and simulation. Site specific data should be required.
Comment 36 17.3 Evaluation of hazards associated with external events pg. 36	The document states that prehistoric, historic and other types of data should be collected and analyzed. However it does not state how the data is to be evaluated, what it is to be analyzed for, and what decision criteria apply to the results of the analysis.	<b>Recommendation:</b> More specific guidance is required as to what data is to be analyzed for, how it is to be used in decision-making, and against what decision-making criteria or thresholds.
Comment 37 17.4 Determining the potential impact of the site on the environment pg. 37.	The document provides that considerations such as table 17.1 “shall be taken into account” during site evaluation to minimize potential impact of the site’s interaction with the environment. "taken into account" is vague terminology. This type of terminology continues the problem noted earlier of vagueness and lack of systematic evaluation criteria.	<b>Recommendation:</b> REGDOC-1.1.1 must specify what would make a site suitable for a nuclear power plant facility or not, as noted in submissions earlier in this document.
Comment 38 17.4 Determining the potential impact of the site on the environment pg. 38.	The document states that selection of land should be balanced between the needs associated with the facility, and those of other land users around the facility. The use of the term “balanced” is vague and does not provide sufficient guidance, nor is it consistent with the CNSC’s regulatory responsibilities for public and environmental protection. This term implies that it could lead to decisions to accept increased risk to surrounding populations of residents and workers in order to allow for certain continued surrounding land uses for commercial and other reasons. Again, site suitability should also consider the potential for social disruption.	<b>Recommendation:</b> The paragraph containing this phrase should be deleted from the document.

<p>Comment 39</p> <p>17.5.1 Exclusion zones and protective zones pg. 39</p>	<p>In Section 17.5.1 I on refers a “protective zone” beyond the CNSC-defined exclusion zone. This imprecise language may hinder the ongoing assessment of site suitability and the effectiveness of emergencies.</p> <p>Typically, the provinces have established precautionary, urgent and extended emergency zones. In Ontario, the “precautionary zone” is referred to as the “Contagious Zone” and the “Urgent zone” as the “Primary Zone”</p> <p>At a minimum, post-Fukushima siting guidance needs to consider the viability of offsite evacuation within the urgent or primary zones. Limiting such assessments to the Contagious Zone may allow undesirable population growth. Specific criteria should be added to the definition of protection zone - that are linked to the ability to protect the population</p>	<p><b>Recommendation:</b> The guide should clarify that there are multiple emergency planning zone beyond the exclusion zone.</p> <p><b>Recommendation:</b> The guide should be revised to require the applicant to demonstrate that provincial authorities have measures in place to restrict population growth and the siting of facilities for vulnerable communities over the life of the project in, at a minimum, both the precautionary action zone and the urgent action zone or their equivalent.</p>
<p>Comment 40</p> <p>17.5.2 Planning considerations pg. 39</p>	<p>The document states that the evaluation of the site should take into account the planning basis. However REGDOC 2.10.1 does not specify a planning basis; it merely requires that there be one. CNSC should mandate the planning basis based on its regulatory and constitutional jurisdiction. The planning basis should be at least as severe an accident as the Chernobyl and Fukushima accidents.</p>	<p><b>Recommendation:</b> CNSC should mandate the planning basis based on its regulatory and constitutional jurisdiction. The planning basis should be at least as severe an accident as the Chernobyl and Fukushima accidents.</p>
<p>Comment 41</p> <p>17.5.2 Planning considerations pg. 39</p>	<p>The document states that present and future land and resource use should be taken into account. As noted earlier, it is necessary to ensure reliable control over future land uses and population changes as a condition of a site licence and subsequent licenses.</p>	<p><b>Recommendation:</b> Site licenses should include a condition of reliable control over future land uses and population changes within protective zones as a condition of a site licence and subsequent licences.</p>
<p>Comment 42</p>	<p>The document describes confirming implementation of municipal, provincial and</p>	<p><b>Recommendation:</b> The document should specify</p>

<p>17.5.2 Planning considerations pg. 39</p>	<p>neighbouring jurisdictions' emergency plans for the lifecycle of the project. However it does not specify evaluation criteria as part of the process of approving and issuing a site license.</p>	<p>what level of preparedness and response must be demonstrated in order to obtain a license to prepare a site. For example, the document should define criteria and all subsequent license phases should include as conditions, demonstration of the ability to evacuate all population of residents and workers within 20 km of the plant with 3 hours of the onset of a nuclear emergency in severe weather conditions regardless of direction of wind; and to demonstrate the ability to provide alternate sources of drinking water to the entire population within 30 km of the proposed site within X hours of initiation of a nuclear emergency.</p>
<p>Comment 43  17.5.2 Planning considerations pg. 40</p>	<p>The document discusses the necessity to "initiate discussions" in the pre-licensing phase as to emergency response matters, but does not specify how the public is involved in these "discussions".</p> <p>Notably, the International Commission on Radiological Protection (ICRP) also recommends public engagement in developing emergency plans. The Commission states:</p> <p><i>"During planning, it is essential that the plan is discussed, to the extent practicable, with relevant stakeholders, including other authorities, responders, the public, etc. Otherwise, it will be difficult to implement the plan effectively during the response. The overall protection strategy and its constituent individual</i></p>	<p><b>Recommendation:</b> The document should require mechanisms for public input and inclusion in the inter-jurisdictional and agency "discussions" as to emergency response during the pre-licensing phase.</p>

	<i>protective measures should have been worked through with all those potentially exposed or affected, so that time and resources do not need to be expended during the emergency exposure situation itself in persuading people that this is the optimum response. Such engagement will assist the emergency plans by not being focused solely on the protection of those at greatest risk early in an emergency exposure situation”<sup>13</sup></i>	
Comment 44  17.6 Consideration of future life-extension activities	The document lists consideration of future life-extension activities. However the document is very vague and lacks criteria as to whether the site would remain suitable in the event of any life-extension activities.	<b>Recommendation:</b> Because of the potential for future life-extension activities, the document should specify that long-term land use control should be required as a precondition to licensing, to a satisfactory distance around the plant.
Comment 45  18. Gathering Baseline Data	The document states “where possible” baseline data should take into account archeological, paleontological and prehistoric data...	<b>Recommendation:</b> The words "where possible" should be deleted. These types of data should always be required. Furthermore, rather than “take into account”, the document should specify how the data will be used in evaluating the site.
Comment 46  18.1 Atmospheric and meteorological data pg. 42	The document provides a mandatory list of basic meteorological variables. However this requirement should be coupled with a description of how this data would affect decision making as to site suitability. For example, winter wind speeds in certain frequency storms should drive analysis of potential evacuation distances and thus	<b>Recommendation:</b> This requirement should be coupled with a description of how this data would affect decision making as to site suitability.

<sup>13</sup> International Commission on Radiological Protection, Publication 109: Application of the Commission’s Recommendations for the Protection of People in Emergency Exposure Situations, Approved by the Commission in October 2008.

	feed into evaluation of suitability of the site; the expected performance and thresholds should be specified.	
Comment 47 19.1 Climate change pg. 44	The document mandates evaluation of potential climate change in relation to external natural events over the lifetime of the facility. This is appropriate. However, again, the criteria by which these factors are evaluated and used in decision making in relation to the suitability of the site must be specified.	<b>Recommendation:</b> The criteria by which climate change impact on natural external events are evaluated and used in decision making in relation to the suitability of the site must be specified.
Comment 48 19.2.2 High winds pg. 46	The document provides as “guidance” potential factors to be used in the assessment of high winds. These factors (wind and pressure loading effects; wind-propelled missiles; effects on emergency plan execution; and possibility of affecting releases from the reactor facility into the environment) should all be part of the mandatory assessment of high winds.	<b>Recommendation:</b> The factors listed as “guidance” under High winds should be moved to be part of the mandatory assessment of high winds.
Comment 49 19.3.1 Floods pg. 47	The document requires assessment of flooding potential and determination of the design-basis flood. In light of Fukushima, there is an acknowledgement that nuclear facilities needed to be designed to resist external events well-beyond what was previously included in a nuclear station’s design-basis.	<b>Recommendation:</b> The document should require assessment of a beyond "design basis" flood to determine, if the design basis is exceeded, how the facility would be affected and whether there are potential consequences to the surrounding population; the results should be compared to specified evaluation criteria.
Comment 50 20.1 Aircraft crashes pg. 51.	The document requires assessment of aircraft crash potential on the site. Only if “an unreasonable risk” of an aircraft crash is revealed is further assessment of associated hazards required.  Aircraft risk assessments typically don’t factor in the potential for malevolent aircraft crashes at a nuclear site. This underlines the need for a deterministic review of aircraft crash effects in the event	<b>Recommendation:</b> "Unreasonable risk" of aircraft crash on the site should be defined. In any event, the associated hazards of an aircraft crash should be assessed for all facilities as a mandatory requirement. The potential effects of aircraft crash and associated hazards should be evaluated

	of a malevolent act. This should be carried whether or not aircraft crashes are found to be “unreasonable”	according to specified evaluation criteria; not merely “considered” as the document presently states.
Comment 51 Pgs 44 – 52.	The hazards outlined in sections 19 and 20 of Appendix B are not situated in a decision making context. Evaluation criteria must be specified in order to determine if the site is suitable or unsuitable for a nuclear facility.	<b>Recommendation:</b> The document should specify that the hazards outlined in section s19 and 20 of Appendix B must be assessed against defined criteria established in the document. Thresholds as to whether the suite is suitable or unsuitable based on this evaluation must be pre-defined in the document.
Comment 52 21.1.1 Remote areas pg 53	The document provides that remote sites should be evaluated with respect to the anticipated time required to implement essential response services. However the document does not provide any minimum expectation in terms of response time.	<b>Recommendation:</b> The document should specify a minimum required response time for essential response services for remote areas and this requirement should be used to evaluate site suitability.
Comment 53 A.4.2 Proposed management system for site evaluation Pg 61	The document states that a management system is expected to govern the conduct of site evaluation activities. However, the criteria for evaluation of the site is obscured by the requirement for such a "management system" which is itself not defined as to evaluation criteria. It is unclear whether such a management system will be required to be transparent or include public participation.	<b>Recommendation:</b> Ensure that utilization of a management system is not a substitute for clear evaluation criteria as to the factors relevant to site suitability which should be specified in this document as we submit above.
Comment 54 B.3.1 Baseline climate, meteorological data and air quality data Pg 69	The document states that baseline information should include one year of onsite meteorological data for the most recent one-year period. One year is insufficient to encompass severe events or may present anomalous data therefore the document must require collection and analysis of a longer time frame for the meteorological base-line..	<b>Recommendation:</b> Require more than one year data collection for meteorological baseline.

<p>Comment 55 B.3.8 Baseline land use data Pg. 84.</p>	<p>The document notes that baseline land-use information should include future changes in land use to predict effects on proposed site operations and as a factor in determining the suitability of the site and appropriate size of the site’s proposed exclusion zone.</p>	<p><b>Recommendation:</b> See submission earlier in this document: a condition of licensing should be the adequate control of future land use in both exclusion and protective zones.</p>
<p>Comment 56 B.5.1.1 Decision-making considerations Pg. 93</p>	<p>The document states that a decision by the Commission may be made with design information from a range of reactor designs without specifying the technology to be constructed. This should be altered to require specification of the technology to be constructed since site evaluation is affected in myriad ways by the technology choice across a number of factors and hazards.</p>	<p><b>Recommendation:</b> Remove all statements that the technology need not be specified for the application to prepare a site. Remove references to “bounding” design parameters. Require the applicant to specify the technology to be constructed, and to prepare the application and gather information for the application based on that specified technology.</p>
<p>Comment 57 B.5.1.3 Criteria for level of design detail for an application for a licence to prepare site Pg. 94</p>	<p>The document specifies information required to support site evaluation around the assessment of accidents and malfunctions. The requirements should be mandatory. The description of accidents must include planning basis accidents akin to the releases that occurred at Chernobyl and Fukushima.</p>	<p><b>Recommendation:</b> The requirements for evaluation of accidents and malfunctions should be mandatory. The description of accidents must include planning basis accidents akin to the releases that occurred at Chernobyl and Fukushima.</p>