

NORTHWATCH

September 28, 2018
Canadian Nuclear Safety Commission
P.O. Box 1046, Station B
280 Slater Street
Ottawa, ON, Canada K1P 5S9

Sent by email: cnscconsultation.ccsn@canada.ca.

Re. **Northwatch Comments on [Draft] REGDOC-1.1.5
Licence Application Guide: Small Modular Reactor Facilities**

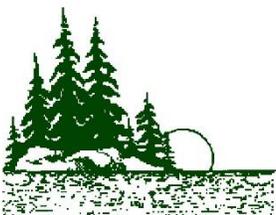
On July 31 2018 the Canadian Nuclear Safety Commission posted on their web site a notice that draft [REGDOC-1.1.5 Licence Application Guide: Small Modular Reactor Facilities](#) was “open for consultation” until September 28th, thus indicating that the public could provide comments in writing.

The CNSC notice included the following summary in the notice:

REGDOC-1.1.5 is intended to be used in conjunction with consultations with CNSC staff, as well as within the context of other licence application guides. Licence applications for small modular reactors (SMRs) have to address both design and safety and control measures to support the safety case; REGDOC-1.1.5 will assist proponents in developing risk-informed proposals that take CNSC expectations into account.

Along with the release of REGDOC-1.1.5 for public consultation, the CNSC is also posting the [Stakeholder Workshop Report: Application of the Graded Approach in Regulating Small Modular Reactors](#) as a companion to the draft regulatory document. This report summarizes a workshop held with stakeholders on November 24, 2017 and provides specific examples of how the CNSC would apply the graded approach to SMRs.

This is concurrent with an initiative announced in February 2018 by Natural Resources Canada, with the launch of the “[SMR Roadmap](#)”. Purportedly, a Small Modular Reactor (SMR) Roadmap Secretariat has been established with the intent of “engaging partners and stakeholders, as well as Indigenous representatives, to understand priorities and challenges related to the development and deployment of SMRs in Canada”. A Summary Report for the Roadmap is expected to be completed by fall 2018.



We would note that despite Northwatch being a well-established regional environmental non-governmental organization operating in northern Ontario, and despite being active in energy planning, mine project reviews and policy, and nuclear matters, Northwatch has been excluded from the stakeholder workshops convened by the Canadian Nuclear Safety Commission and has been excluded from whatever communications or engagements have been undertaken by so-called Small Modular Reactor (SMR) Roadmap Secretariat. We would further note that to our knowledge no other civil society or environmental non-governmental organization has been approached or engaged in these interactions.

General Comments

As a first principle, the regulation of nuclear technologies in Canada must be done in an open, transparent, traceable and accountable fashion. This principle very much applies to the development – and the subsequent application, should the occasion ever actually arise – of a regulatory regime for small modular reactors, including the development of a regulatory framework and regulatory documents.

In addition, the regulators, rule-makers and decision-makers – including and particularly the Canadian Nuclear Safety Commission and Natural Resources Canada – must be clear and consistent in their terminology, accountable in the scope of their considerations and conclusions, and transparent and inclusive in their consultation and engagement practices.

As guidance, we reference both the Mandate Letter for the Minister of Natural Resources at the commencement of the current Parliament, and the purposes of the Nuclear Safety Control Act. They include the following directives:

We have also committed to set a higher bar for openness and transparency in government. It is time to shine more light on government to ensure it remains focused on the people it serves. Government and its information should be open by default. If we want Canadians to trust their government, we need a government that trusts Canadians. It is important that we acknowledge mistakes when we make them. Canadians do not expect us to be perfect – they expect us to be honest, open, and sincere in our efforts to serve the public interest...

Work ... to regain public trust and introduce new, fair processes that will:

- *restore robust oversight and thorough environmental assessments of areas under federal jurisdiction, while also working with provinces and territories to avoid duplication;*
- *ensure that decisions are based on science, facts, and evidence, and serve the public's interest;*
- *provide ways for Canadians to express their views and opportunities for experts to meaningfully participate, including provisions to enhance the engagement of Indigenous groups in reviewing and monitoring major resource development projects; and*
- *require project proponents to choose the best technologies available to reduce environmental impacts.¹*

and,

¹ Minister of Natural Resources Mandate Letter (November 12, 2015), <https://pm.gc.ca/eng/minister-natural-resources-mandate-letter>

*Nuclear Safety and Control Act**3 The purpose of this Act is to provide for**(a) the limitation, to a reasonable level and in a manner that is consistent with Canada's international obligations, of the risks to national security, the health and safety of persons and the environment that are associated with the development, production and use of nuclear energy and the production, possession and use of nuclear substances, prescribed equipment and prescribed information; and**(b) the implementation in Canada of measures to which Canada has agreed respecting international control of the development, production and use of nuclear energy, including the non-proliferation of nuclear weapons and nuclear explosive devices**and**Objects Mission**9 The objects of the Commission are**(a) to regulate the development, production and use of nuclear energy and the production, possession and use of nuclear substances, prescribed equipment and prescribed information in order to**(i) prevent unreasonable risk, to the environment and to the health and safety of persons, associated with that development, production, possession or use,**(ii) prevent unreasonable risk to national security associated with that development, production, possession or use, and**(iii) achieve conformity with measures of control and international obligations to which Canada has agreed; and**(b) to disseminate objective scientific, technical and regulatory information to the public concerning the activities of the Commission and the effects, on the environment**and on the health and safety of persons, of the development, production, possession and use referred to in paragraph (a).²*

In the case of the CNSC program which the CNSC generally describes as one of developing a regulatory framework for “small modular reactors”, these objectives have not been met to date.

Definition of Terms / Scope and Subject of REGDOC-1.1.5

At its starting point, the CNSC is unclear in its terminology. Subsequently, it is reasonable to conclude that the CNSC is also unclear in the scope of application for the regulatory regime it is attempting to develop, which it is now packaging in a regulatory document which it has titled – perhaps erroneously – as being with respect to “small modular reactors”.

Over several related documents, the CNSC describes the subject of the regulatory gap they are seeking to fill – the licensing provisions for small modular reactors – in various ways, including as follows:

Over the past several years, a number of technology developers have expressed interest in the possible construction and deployment of small modular reactors (SMRs) in Canada. They have sought to understand how the Canadian Nuclear Safety Commission (CNSC) is establishing a state of readiness to regulate activities that would utilize SMRs. Canadian

² Nuclear Safety and Control Act, Version Last amended on January 1, 2017

government agencies, science and technology institutions, utilities, industry associations, other nuclear regulators and interested members of the public have also expressed interest in the CNSC's readiness preparations.

New technologies being developed (which include SMRs and advanced reactors) vary significantly in size, design features and cooling types. In addition, the locations at which they might be sited could potentially be different from past nuclear power plant (NPP) projects.³ CNSC DIS-16-04, May 2016

In recent years, novel reactor technologies have emerged to supply power to smaller electrical grids or remote, off-grid areas. These technologies are commonly referred to as small modular reactors (SMRs). The electrical output of existing or proposed SMR facilities varies from less than a megawatt from non-grid-connected sites to several hundred megawatts from grid-connected sites.⁴ What We Heard Report – DIS-16-04, September 2017

In recent years, novel reactor technologies, such as small modular reactors (SMRs) and advanced reactor technologies have emerged to supply power to smaller electrical grids or remote, off-grid areas with electrical output ranging from less than one megawatt for non-grid-connected sites to several hundred megawatts for grid-connected sites.⁵ Stakeholder Workshop Report, November, 2017

Finally, in the draft regulatory document itself, the terms “small modular reactors” and “novel” reactors are not defined. The glossary in Draft REGDOC-1.1.5 is comprised of a link to REGDOC-3.6, “Glossary of CNSC Terminology” wherein the most closely relevant terms are defined as follows:

small reactor (petit réacteur)

A reactor with a power level less than approximately 200 megawatts thermal. Some examples of small reactor use are research, isotope production, steam generation or electricity production.

*SMR (version de maintenance systématique [VMS] or local de surveillance)
scheduled maintenance release OR See security monitoring room.⁶*

As set out in the various descriptions found in the directly related CNSC documents, the CNSC has mixed and mingled various terminologies and reactor types and descriptions including:

- small modular reactors
- “advanced reactors” and “advanced” reactor technologies
- novel reactors

The CNSC has also variously described the range in output of reactor technologies that the CNSC would classify or consider to be “small modular reactors”, including as follows:

³ DIS-16-04, Small Modular Reactors: Regulatory Strategy, Approaches and Challenges, May 2016

⁴ What We Heard Report – DIS-16-04, Small Modular Reactors: Regulatory Strategy, Approaches and Challenges, September 2017

⁵ CNSC. Stakeholder Workshop Report: Application of the Graded Approach in Regulating Small Modular Reactors, Held on November 24, 2017

⁶ REGDOC-3.6, Glossary of CNSC Terminology

- In the 2016 Discussion paper, all within the single document, the CNSC described small modular reactors as being:
 - below, for example, 300 megawatt electric (MWe) per facility⁷
 - in the range of 2 to 30MWe⁸
 - 3 to 25 MWe⁹
 - 3 to 35 MWe (per unit)¹⁰
- In Appendix A of the 2016 Discussion Paper the CNSC provides a listing of SMR vendors who have requested regulatory information from the CNSC. In that listing, reactor technologies with outputs ranging from 3 to 300 MWe. The majority are listed as having outputs of more than 100 MWe and several are 200 or 300 MWe.¹¹

The 2016 Discussion Paper use of language implies that “small” and “novel” are interchangeable terms.

It also sets out some of the issues with regulation and operation of “novel” nuclear technologies. For example, it states:

Novel approaches can affect the certainty of how the plant will perform under not only normal operation, but also in accident conditions, in which predictability is paramount to safety. These novel approaches and their corresponding uncertainties raise regulatory questions during the licensing process.¹²

From a safety and regulatory perspective – and from the viewpoint of public concern – the issue is less that they are “small” than and far more that they are “novel”.

“Small”, at least in the CNSC discussions of “small modular reactors”, has been rendered as rather meaningless. A significant concern for Northwatch is that by cloaking these first-of-a-kind and experimental nuclear technologies with the term “small”, the proponents and their fellow-travelers will seek to reduce the level of regulatory scrutiny, thus setting the stage for increasing risk to the public and the environment and for proliferation of nuclear technologies and materials across a broad landscape.

More at issue and of greater commonality across this very diverse and quite varied grouping of novel nuclear technologies is that they are untried, untested, undeveloped, and in many cases still un-designed. Despite this notion of “small modular reactors” being a recurring theme, rising and falling and rising again over the decades, the technology remains undeveloped and unproven.

⁷ Section 1 – 2016 discussion paper

⁸ Section 1 – 2016 discussion paper

⁹ Section 2.5 – 2016 Discussion paper

¹⁰ Page 17 – 2016 Discussion Paper

¹¹ DIS-16-04, Small Modular Reactors: Regulatory Strategy, Approaches and Challenges, May 2016, Appendix A

¹² DIS-16-04, Small Modular Reactors: Regulatory Strategy, Approaches and Challenges, May 2016, page 3

What exactly is this technology that is being proposed and for which a license is or may be sought at some point in the medium or more distant future?

REQUEST: That the CNSC should reframe its current REGDOC development effort. The first step should be to assess – with public input - the need for additional regulatory tools in order to assess new and emerging technologies, including “novel” and first-of-a-kind reactor designs, such as those being described as “small modular reactors” and “advanced” reactors and reactor technologies.

REQUEST: That in future publications, the CNSC should include a history of this reactor class, and of any past deliberations of regulatory actions or initiatives with respect to “small”, “novel” or “advanced” reactors.

RECOMMENDATION: That the CNSC should prepare and release for public comment a discussion paper on Canada’s non-proliferation commitments and obligations, and how these commitments and obligations are supported by policies, guidelines or regulations with respect to the reprocessing of used nuclear fuel, and how potential use of enriched uranium fuel and / or reprocessing spent fuel waste as fuel for new reactor designs would intersect with Canada’s non-proliferation commitments and obligations and/or with Canadian policies, guidelines or regulations that support Canada’s non-proliferation commitments and obligations

Transparency in Regulatory Developments and Vendor Reviews

While the Canadian Nuclear Safety Commission makes numerous and frequent claims of transparency, in this and other cases transparency is clearly lacking.

Northwatch acknowledges that not having made comments on the 2016 discussion paper could be – and presumably is being – used by the CNSC as rationale for excluding Northwatch from the 2017 stakeholder workshops, despite Northwatch’s interests, as described above. However the issues around transparency and the absence of transparency in the development of a regulatory framework for novel/small modular reactors are larger.

A case in point is the pre-licensing vendor design reviews. According to the 2016 discussion paper, the CNSC has been in discussions with potential vendors since approximately 2011:

The following list of topics was developed based on approximately five years of interaction with SMR vendors, utilities, government agencies and other interested stakeholders who have stated that these are important to the discussion¹³

However we find no evidence that those discussions were disclosed prior to the 2016 discussion paper, and we observe that very little information about these interactions is available even now, in the midst of a regulatory framework discussion.

¹³ May 2016 DIS-16-04, Small Modular Reactors: Regulatory Strategy, Approaches and Challenges page 5

The CNSC included in the 2016 discussion paper a list of potential vendors which they describe as having contacted them for more information about the regulatory process, but they provide no indication of the maturity of these proposals or the depth of their discussions.

The title of the relevant section in the 2016 discussion paper is *Appendix A: Overview of Design Concepts for Small Modular Reactors* but the appendix provides no overview of the design concepts; it provides no information about the designs that have had been the subject of five years of discussion between the CNSC and proponents. It provides a listing of “concepts” with country of origin, proponent, type and output identified, and two no-longer-functioning links to presumably related International Atomic Energy Agency (IAEA) documents.

Currently, on the CNSC web page about reactors, the CNSC provides a link to a separate web page titled “[Pre-Licensing Vendor Design Review](#)” which describes the Pre-Licensing Vendor Design Review as “an optional service provided by the CNSC when requested by a vendor”.¹⁴

The page includes a table, again described as presenting “an overview of vendors who have applied for pre-licensing engagement with the CNSC using the vendor design review process for their new reactor designs”. But, again, rather than providing an overview the table provides a listing, providing information that is similar – in brevity and categories – to that in the 2016 discussion paper. It is also similar in the paucity of information provided.

The introductory paragraph describes the review process as follows:

*Vendor design review is described in guidance document GD-385, Pre-licensing Review of a Vendor's Reactor Design. The duration of each review is estimated based on the vendor's proposed schedule. A Phase 1 review typically takes 12–18 months and a Phase 2 review takes 24 months. At the end of the review for each phase, an executive summary of the project report will be posted on this Web page.*¹⁵

In combination, the 2016 Discussion Paper and the Vendor page on the CNSC web site identify 20-25¹⁶ different reactor “concepts” which fall within the very broad definition of “small modular reactors” variously described by the CNSC.

Proponent	Model	Output	Source
Advanced reactor concepts	ARC-100	100 MWe	Disc-Paper
Advanced Reactor Concepts Ltd.	ARC-100 Liquid Sodium	100	Website
CNNC	ACP-100	100 MWe	Disc-Paper
Elysium Industries	Unnamed	size not yet determined	Disc-Paper
Gen4Energy	Gen4 Module Transportable	25 MWe	Disc-Paper
Generation mPower/B&W USA	mPower	200 MWe	Disc-Paper
Hitachi-GE	DMS	300 MWe	Disc-Paper

¹⁴ <https://nuclearsafety.gc.ca/eng/reactors/power-plants/pre-licensing-vendor-design-review/index.cfm>

¹⁵ <https://nuclearsafety.gc.ca/eng/reactors/power-plants/pre-licensing-vendor-design-review/index.cfm>

¹⁶ There are 25 reactor concepts listed; two to four of these appear to be the same concept listed in each source, but there is insufficient information to confirm this with any certainty.

Holtec	Holtec Module	130 MWe	Disc-Paper
KAERI	SMART	100 MWe	Disc-Paper
LeadCold Nuclear	SEALER Transportable	3 MWe	Disc-Paper
LeadCold Nuclear Inc.	SEALER Molten Lead	3	Website
Moltex Energy	Moltex Energy Stable Salt Reactor Molten Salt	300	Website
Northern Nuclear Industries	LEADIR-PS100	39 MWe	Disc-Paper
NuScale Power	NuScale Module	45 MWe	Disc-Paper
NuScale Power, LLC	NuScale Integral Pressurized Water Reactor	50	Website
SMR, LLC. (A Holtec International Company)	SMR-160 Pressurized Light Water	160	Website
StarCore Nuclear	StarCore Module Transportable	10 MWe	Disc-Paper
StarCore Nuclear	StarCore Module High-Temperature Gas	10	Website
Terrestrial Energy	IMSR 300 and 600	100 MWe and 200 MWe	Disc-Paper
Terrestrial Energy	IMSR 60	28 MWe	Disc-Paper
Terrestrial Energy	IMSR 400	400	Phase I Complete
Terrestrial Energy Inc.	IMSR Integral Molten Salt Reactor	200	Website
Transatomic power	Unnamed (size not yet determined)	Unnamed (size not yet determined)	Disc-Paper
Ultra Safe Nuclear Corporation / Global First Power	MMR-5 and MMR-10 High Temperature Gas	5-10	Website
URENCO	U-Battery High-Temperature Gas	4	Website
Westinghouse	Westinghouse SMR	225 MWe	Disc-Paper
Westinghouse Electric Company, LLC	eVinci Micro Reactor Solid core and heat pipes	Various outputs up to 25 MWe	Website
X-Energy	Xe-100	50 MWe	Disc-Paper

Of these, there is a completed vendor pre-licensing vendor design reviews report available for only one of these “concepts”, that being for Terrestrial Energy Inc. “IMSR 400” concept:

*Phase I Executive Summary: Pre-Project Review of Terrestrial Energy’s 400-thermal-megawatt integral molten salt reactor (IMSR400) (PDF, November 2017)*¹⁷

We have reviewed that single summary document. We found that in the less than two pages devoted to describing Terrestrial Energy Inc.’s “IMSR 400” concept (including a portion more generally describing regulatory application to molten salt reactor technology) we found no information with respect to the reactor design, components, or associated systems. Of note, we also found no information with respect to the following key issues:

¹⁷ <https://nuclearsafety.gc.ca/eng/reactors/power-plants/pre-licensing-vendor-design-review/index.cfm>

- Fuel
- Waste
- Siting
- Accidents
- Emergency Response
- Transportation
- Decommissioning

Presumably the “vendor” has provided information in all these areas to the CNSC. For the CNSC role in the “Vendor Review Program” to have adequate transparency, this information must be publicly available. In the absence of such disclosure, there is no means by which the public can have confidence in the review process or be deemed to have been provided a fair and reasonable opportunity to engage in subsequent or concurrent regulatory development processes (such as the review of a draft regulatory document).

Draft Regulatory Document REGDOC-1.1.5¹⁸ includes a brief description of the Vendor Review program, as follows:

1.2 Background

The CNSC recognizes that it is a significant undertaking to design an SMR, or to apply for a licence to prepare site for, to build or to operate an SMR. To help with these processes, the CNSC offers two types of pre-licensing engagement:

- 1. *Pre-licensing review of a vendor’s reactor design:*** *This is commonly referred to as the vendor design review (VDR) process and is discussed briefly in section B.1 of appendix B, and in depth in CNSC regulatory document GD-385, Pre-licensing Review of a Vendor's Reactor Design. This process involves a CNSC review of a vendor’s design in order to identify and resolve potential regulatory or technical issues that could arise later in the licensing process. A VDR is intended to help a vendor understand regulatory requirements while completing an SMR design, and takes place before a proponent would submit a licence application using the particular design.*
- 2. *Pre-licensing engagement:*** *In pre-licensing engagement (detailed in B.2), the CNSC works with a potential applicant to:*
 - *Establish an appropriate licensing strategy.*
 - *Offer guidance on preparing a licence application for submission to the CNSC.**Both of these pre-licensing activities (VDR review and pre-licensing engagement) are intended to provide regulatory clarity to a licence applicant. These activities incorporate the risk considerations (described in appendix A) that the CNSC uses when assessing how activities or SMR designs comply with its requirements*

REQUEST: That draft Regulatory Document REGDOC-1.1.5, if and when it goes further in the regulatory development process, should be revised to significantly increase the level of transparency and to include forums for open and transparent technical testing of information provided by proponents / vendors. Such testing of information should include public forums, with opportunities for independent technical experts, including experts retained by independent entities and public interest organizations, to examine the reliability and adequacy of information provided.

¹⁸ Draft REGDOC-1.1.5 Licence Application Guide: Small Modular Reactor Facilities, July 2018

REQUEST: That the CNSC should develop a draft outline of the information required of a vendor as part of the technical description provided to the CNSC in the course of the pre-licensing vendor review program. This draft outline should be the subject of public review and comment.

REQUEST: That Draft Regulatory Document REGDOC-1.1.5 should be revised to include a section which clearly sets out the steps in any pre-licensing vendor review which might be provided by the CNSC. The pre-licensing vendor review process should include an independent examination of the technical information provided by a vendor, multiple opportunities for public engagement, and transparency throughout.

Regulatory Approach / Graded Approach

What CNSC describes as their standard “regulatory approach” may not be appropriate in this context¹⁹, given the large variety of vendors, applications and designs the CNSC has identified, and the fact that these “novel” reactor designs each come with their own set of technical uncertainties and unknowns, which have incumbent and undetermined levels of associated risk. A reasonable position for the CNSC to adopt is that each of these unproven – and some still undesigned – reactor concepts has a high level of risk associated with it, given the untested nature of the technology and the inherent risks in applications of nuclear technologies and exposures to and releases of radionuclides. As the CNSC has acknowledged, those reactor technologies being dubbed “SMRs” are a class of diverse and novel nuclear technologies. A precautionary approach must take precedence over the CNSC’s proponent-led approach to date.

In the 2016 discussion paper, the CNSC described their regulatory approach as follows:

The Canadian regulatory approach is built on a long-established foundation of risk-informed regulation. Regulatory tools and decision-making processes are structured to enable a licence applicant for a reactor facility to propose alternative ways to meet safety objectives. CNSC requirements set safety performance objectives that applicants must meet and these objectives can be achieved in various ways. However, proposals must demonstrate, with suitable information, that they are equivalent to or exceed regulatory requirements. CNSC requirements and guidance for reactor facilities are generally articulated to be technology neutral and where possible permit the use of the graded approach. The graded approach enables applicants to establish the stringency of design measures, safety analyses and provisions for conduct of their activities commensurate with the level of risk posed by the reactor facility.²⁰

As noted above, the CNSC regulatory approach is proponent-led, and seeks to adapt the regulatory process to the proponent/licensee’s proposed set of requirements. In the context of the

¹⁹ This observation is made without prejudice to Northwatch’s longer standing reservations with respect to the appropriateness and reliability of CNSC’s “regulatory approach” with respect to already licensed reactor units.

²⁰ DIS-16-04, Small Modular Reactors: Regulatory Strategy, Approaches and Challenges, May 2016, Executive Summary

so-called SMRs which are anticipated to be the subject of future regulatory review, the overall approach is problematic on at least three counts:

- It is the responsibility of the regulator, rather than the prerogative of the potential licensee, to establish the stringency of safety measures and analyses
- It is impractical to establish a regime where potentially dozens of prospective licensees are creating their own proponent-led regulatory approach; this is impractical from a staffing perspective (unless staff and resources are unlimited – a highly improbable scenario in today’s fiscal environment) and irresponsible from a regulatory perspective
- Such a regime would wholly lack predictability, consistency and reliability

The 2016 discussion paper sets out what CNSC identified as “factors to be considered in the graded approach” including:

- reactor power
- source term
- amount and enrichment of fissile and fissionable material
- spent fuel elements, high pressure systems, heating systems and the storage of flammables, which may affect the safety of the reactor
- type of fuel elements
- type and the mass of moderator, reflector and coolant
- amount of reactivity that can be introduced and its rate of introduction, reactivity control and inherent and additional features
- quality of the confinement structure or other means of confinement
- utilization of the reactor
- siting, which includes proximity to population groups or extent of isolation from emergency responders²¹

It is unclear from the discussion paper or from the draft regulatory document itself what the effect of “considering” these factors would have on where a particular reactor “concept” is placed within the gradient of potential approaches.

Noticeably absent from this list are the degree to which the concept is “novel” (untried, untested, undemonstrated, without precedent), the anticipated or potential/design “life” of the reactor operation, the operational experience and track record of the proponent / vendor / potential licensee, the attendant flight risk associated with the potential proponent / vendor / licensee / operator, and the level of social acceptance or conformity of such a project with the social fabric of the proposed location and region of operation.

The CNSC-identified “factors to be considered in the graded approach”, combined with the additional factors identified in the preceding paragraph, plus an examination of issues related to siting, transportation, waste, decommissioning, and site remediation will provide a reasonable starting point for the scoping of an environmental assessment for each project. The CNSC-identified “factors to be considered in the graded approach” do not provide a basis for a reduction of regulatory scrutiny via a “graded” approach.

²¹ May2016 DIS-16-04, Small Modular Reactors: Regulatory Strategy, Approaches and Challenges, pages 4-5

The draft regulatory document itself introduces the notion of a graded approach in its opening paragraphs, and returns to the notion in the first page of the body of the document.²² In the preface, the draft REGDOC proclaims that the “*use of a graded approach is not a relaxation of requirements, but rather the application of requirements in a manner commensurate with the risks and characteristics of a facility or activity*” but we were unable to trace this bold proclamation to any supporting arguments or even further discussion of this matter in any later section of the document. The topic of the “graded approach” appears again on Page 1, but simply as a reference to Appendix A of the document.

Appendix A, while largely devoted to the topic of a “graded approach”, is very much a dissertation on “how-to”, rather than an explanation of “how-come?”

The draft REGDOC summarizes the “graded approach” with respect to SMRs as follows:

*When applying for a licence to prepare site for, to construct or to operate a small modular reactor facility (SMR), the applicant is to address CNSC requirements in a manner that is commensurate with the novelty, complexity and potential for harm that the activity represents.*²³

The REGDOC then goes on to describe the “graded” approach in such a manner as to make it wholly unclear the degree to which the CNSC considers the “novelty” of the proposed reactor technology to be the dominant feature.

Not only is the CNSC listing up to 25 different reactor designs in what they have deemed to be a grouping of “SMRs”, but this group of designs is more broadly recognized as being largely unproven and untested; indeed, unproven and untested is the fundamental nature of these “novelty” reactors.

The draft REGDOC further sets out three broad categories by which – using a graded approach – the CNSC would determine where on the gradient of regulatory scrutiny any given novelty reactor would land in terms of the required level of analysis, the depth of documentation and the scope of actions necessary to comply with requirements. Even if based only on assigning the listing of characteristics of SMRs as outlined in CNSC’s 2016 discussion paper to the categories identified by the CNSC in the draft REGDOC, Northwatch would assert that these novelty reactor technologies should be subject to an absolutely rigorous course of regulatory scrutiny, with full transparency and public involvement.

A.1 Applying a graded approach

The graded approach is a method or process by which elements such as the level of analysis, the depth of documentation and the scope of actions necessary to comply with requirements are commensurate with the following:

1. The relative risks to health, safety, security, the environment, and the implementation of international obligations to which Canada has agreed
2. The characteristics of a facility or activity

The REGDOC’s description of how the CNSC makes “independent and objective decisions to ensure that risks are managed to a reasonable level” is problematic, particularly in the context of making decisions with respect to this novel group of nuclear technologies.

The following elements are at issue:

Risks are managed to a reasonable level	Reasonable is a subjective term. While CNSC Glossary REGDOC-3.6 uses the terms “reasonable” and “unreasonable”, that REGDOC does not define the term. Oxford Dictionary
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²² Draft REGDOC-1.1.5 Licence Application Guide: Small Modular Reactor Facilities, July 2018, Preface page i, Page 1

²³ Draft REGDOC-1.1.5 Licence Application Guide: Small Modular Reactor Facilities, July 2018, page 14

	defines it as “ <i>Having sound judgement; fair and sensible; As much as is appropriate or fair; moderate</i> ”, definitions which support Northwatch’s characterization of the term as subjective, and in the context of regulatory decisions about risk associated with novel reactors, it reinforces that the judgement of “reasonable” is more a policy or social judgement than a technical one, and so one most appropriately dealt with in an environmental assessment process, in conjunction with an examination of need, purpose, alternatives, and social acceptance.
Taking into consideration regulatory requirements	The absence of clearly set out regulatory requirements is at issue. This reinforces the need for a rigorous and clearly set out regulatory regime.
Best available information from regulatory or credible third-party research and all information provided by applicants/licensees, stakeholders, Indigenous peoples and staff	In the case of novel reactor technologies, “best available information” may be insufficient; there may simply not be sufficient information and operational experience available to assess the project to a sufficient degree, particularly in the case of experimental designs and/or fuels. For the process to rely on information provided by “stakeholders”, the process must be transparent and open, and stakeholders – including public interest organizations – must have access to the technical information being presented and have the ability to test this evidence in a credible manner (such as through technical sessions that include an exchange of written questions in advance and direct questioning of the evidence in session, with dispositioning of comments and responses).
The role of professional judgment, particularly in areas where no objective standards exist	The “role of professional judgement” must be accorded equitably, i.e. that it is not just the CNSC staff and the proponents’ judgement which is being given weight (see above). Professional judgement is not a replacement for objective standards; professional judgement can assist in applying objective standards, but it cannot be a substitute for it. If no objective standard exists, the review must be suspended until such time as an applicable objective standard has been developed, with appropriate public input and the involvement of Indigenous peoples.
Independence and transparency in decision making	Agreed. Regrettably, this has not been a characteristic of the CNSC and other government processes with respect to SMR/novel reactor technologies to date. See earlier comments.
Supported by fair, open, transparent and predictable regulatory processes	

The REGDOC’s description of how the CNSC carries out all of its activities in the context of risk-informed decision making is also problematic in the context of making decisions with respect to this novel group of nuclear technologies. The following elements are at issue when the assertion is that these elements will provide a sufficient information base:

Operational experience	There is little or no operational experience for these novel reactor technologies.
Licensee performance	While some potential proponents may have experience in operating other reactor units, there is no performance record with these technologies. While the information has not been provided in the series of CNSC related documents, Northwatch’s preliminary assessment is that the majority of vendors listed by the CNSC have no previous experience in operating reactors of any design, and so would have

Safety assessments	There are no developed safety assessments that are publicly available and so by which a commenter could assess the adequacy.
Expert judgment	The role of “expert judgement” must be accorded equitably, i.e. that it is not just the CNSC staff and the proponents’ judgement which is being given weight (see above). Expert judgement is not a replacement for objective standards, and is not a demonstration of safety or a replacement of operational experience or performance assessments.

REQUEST: That the CNSC should develop a regulatory approach for small modular reactors / advanced reactors / novel reactor technologies which provides a highly rigorous examination, has a clear and predictably methodology for assessing full life cycle environmental and human costs, impacts and risks for a proposed technology, has a sound program for public and Indigenous involvement, had a sound program for testing technical information in an evidence-based manner, and informs an environmental assessment process under the prevailing federal and provincial legislation at the time. This regulatory approach should replace the proponent-led and graded approach proposed in draft REGDOC 1.1.5 for Small Modular Reactors.

REQUEST: That the CNSC should set out within the next three months their intentions with respect to any further developments in the regulatory framework as it may apply to small / novel reactor technologies.

REQUEST: That Northwatch and other commenters on draft REGDOC 1.1.5 be provided with a full dispositioning of their comments.

In closing, Northwatch acknowledges that the CNSC is not the decision-maker in Canadian energy policy, and that there are additional forces at work and pressures at play. However, as Canada’s nuclear regulator, the CNSC has an essential role to play as an impartial and independent agency whose interest is to serve the Canadian public rather than the domestic and international nuclear industry.

All of which is respectfully submitted.



Brennain Lloyd
 Northwatch Project Coordinator
 On behalf of Northwatch