Northwatch Comments on Canadian Nuclear Safety Commission DIS-16-03, Radioactive Waste Management and Decommissioning

September 12, 2016

The Canadian Nuclear Safety Commission (CNSC) announced on May 13, 2016 that it was accepting comments from the public on discussion paper DIS-16-03, Radioactive Waste Management and Decommissioning until September 12, 2016.

As described by the CNSC:

> *This discussion paper seeks stakeholder feedback on proposals to update and clarify the CNSC's waste regulatory framework. Comments are being sought on opportunities to incorporate Canadian and international best practices and to update CNSC documents with more modern terminology. In addition, the CNSC is seeking to improve clarity and predictability for applicants and other stakeholders by clearly indicating the information that licence applicants are expected to submit.*

Our comments begin with general observations, include comments on each of the seven general areas as delineated by the paper's author(s), and close with concluding remarks.

A. General Observations

One of the challenges in commenting on this paper is that it coincides with CNSC and CSA consultations on a number or related matters, and many of the concepts presented in the paper and for which comment is sought largely rely on other documents which may or may not be referenced and which are only available to varying degrees. Further, the CNSC view of the relationship between the various policy / regulatory / guidance pieces is not clearly set out, nor is the manner or degree to which the various moving parts are potentially the subject of change as a result of the review outlined in DIS-16-03.

Generally, the paper places disproportionate emphasis on the definition of waste types relative to other key issues, such as end-state goals for decommissioning

The Discussion Paper's reference to the IAEA findings from its Integrated Regulatory Review Service[i] is puzzling at best; wilfully misleading is the other possible interpretation.

DIS-16-03 states that "*in 2011, at the CNSC's request, the International Atomic Energy Agency (IAEA) performed a peer review of selected aspects of the CNSC's operations. One specific recommendation, R11, from its Integrated Regulatory Review Service (IRRS) was that the CNSC should improve its regulatory framework, including regulatory documents and guides for radioactive waste management to ensure that radioactive waste is managed consistently. The CNSC committed to reviewing its regulatory framework in response to this IRRS recommendation, and this discussion paper is a part of that review.*"

It is relevant to note that the recommendation referenced, R11, is a recommendation from 2009 which indicated that the "*CNSC should improve its regulatory framework*

including regulatory documents and guides with respect to radioactive waste management to ensure that radioactive waste is managed in a consistent manner."

One of the findings of the 2011 mission was that this recommendation could be closed, based on CNSC staff reports of followup actions, including a report from the CNSC that "*A draft proposal on the revision of the radioactive waste classification has been completed… It will be circulated for review both by CNSC staff and affected stakeholders according to a structured approach*."

Let us review: in 2009, the IRRS mission recommended improvements to the CNSC's regulatory framework for radioactive waste; in the 2011 IRRS mission review CNSC reported that the 2009 recommendation had been acted upon and that a draft proposal on the revision of radioactive waste classification had been completed; in 2016, the CNSC released DIS-16-03 to invite "*early feedback from stakeholders"* on waste classification.

DIS-16-03 is also puzzling in that it states that the "*nuclear sector is looking at new options for waste disposal*" but does not clarify what options are being looked at. Are they additional to the "new" options for which environmental assessments are being pursued by Ontario Power Generation and Canadian Nuclear Laboratories? If so, what are they? If it is the current proposals for a deep geologic repository for low and intermediate level radioactive wastes and for in situ reactor decommissioning and for near-surface engineered disposal facilities, how does the current regulatory gap interact with these review processes? If the industry is looking at additional "options" what are they?

The discussion paper indicates that "*the CNSC sees value in proceeding with separate waste management and decommissioning regulations to consolidate and clarify waste management requirements and to update expectations and guidance in regulatory documents*". We agree. Further to that, we make the following recommendations:

R.1 – The CNSC should set out a draft of their regulatory framework and / or proposal for the development of a framework for public comment.

R.2 – The draft framework should clearly indicate the proposed contents / modules and a draft timeline, and /or outline options in terms of the scope of the framework.

R.3 – The draft framework should clearly indicate the relationship of DIS-16-03 to other components of the draft framework.

R.4 – The draft framework should clearly indicate the relationship of related CSA standards (including but not limited to N292.0-14, General principles for the management of radioactive waste and irradiated fuel, N292.1-16, Wet storage of irradiated fuel and other radioactive materials, N292.2-13: Interim dry storage of irradiated fuel, and N292.3-14, Management of low- and intermediate-level radioactive waste) to the proposed regulatory framework.

R.5 – The eventual regulatory framework should supersede the CSA standards (including but not limited to N292.0-14, General principles for the management of radioactive waste and irradiated fuel, N292.1-16, Wet storage of irradiated fuel and other radioactive materials, N292.2-13: Interim dry storage of irradiated fuel, and N292.3-14, Management of low- and intermediate-level radioactive waste).

R.6 – Upon completion of the regulatory framework for waste management and decommissioning, the CNSCS should discontinue its current practice of delegating the development and maintenance of standards and guidelines to the CSA.

R.7 – The CNSC should establish a repository of documents related to or which will be referenced in the development and eventual deployment of the regulatory framework for radioactive waste management.

R.8 – The CNSC should by public notice confirm that funds are available through the Participant Funding Program to support public participation in the development and review at each milestone of the regulatory framework for radioactive waste.

B. Discussion Areas

B.1 Defining waste types

As summarized in DIS-16-03:

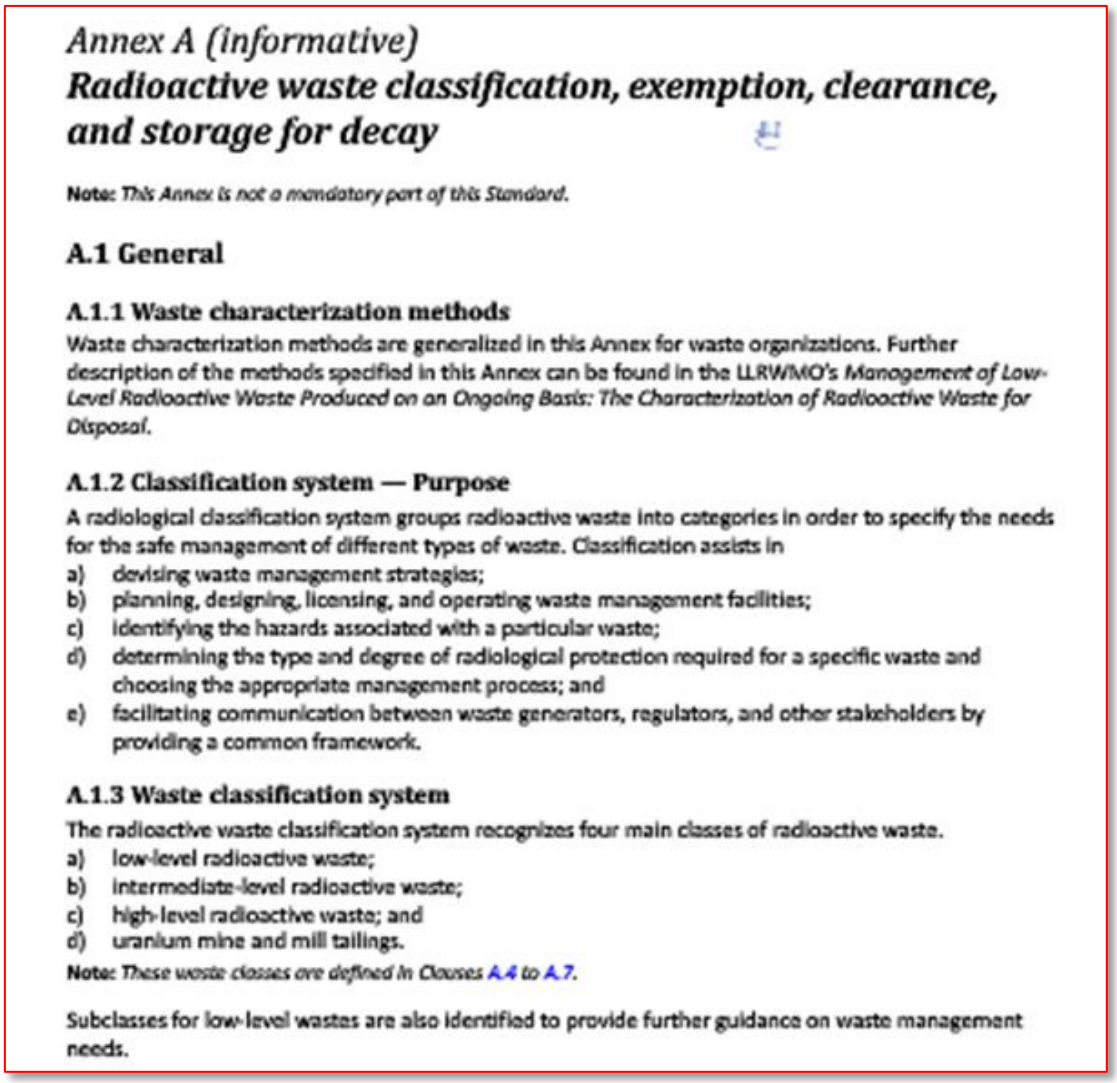
> *In the context of this document, "radioactive waste" is material containing nuclear substances for which a licence from the CNSC is required, which falls within the CNSC's mandate and that is considered to be waste by its owner. For clarity, the CNSC is considering adopting four main categories of waste as proposed in CSA N292.0-14, which are in turn, based on the International Atomic Energy Agency's (IAEA) GSG-1 Classification of Radioactive Waste. The proposed categories are low-level, intermediate-level and high-level radioactive waste, and uranium mine and mill tailings. These categories are based on the radioactive characteristics of the waste, as opposed to the source. Stakeholders are being asked for input on whether these definitions align well with the Canadian nuclear sector, to describe any impacts that formally adopting these definitions may have on their operations, or if there is an interest in greater clarity in any area.*

This section suffers from some of the same failures that other CNSC documents have exhibited when making general and sometimes inaccurate references to other documents, as if seeking credibility through those means. In this case, the discussion paper references CSA N292.0-14, stating that "*To increase clarity and consistency, the CNSC is proposing to formally adopt the waste categories as defined in CSA N292.0-14, General Principles for the Management of Radioactive Waste and Irradiated Fuel, for use in its regulatory framework. CSA N292.0-14*

reflects international guidance from the IAEA, including IAEA General Safety Guide GSG-1, Classification of Radioactive Waste."

This very general reference to a very general document is frustrating to any effort to actually clarify or understand the intent of the CNSC efforts to define waste categories. On a practical basis, the CSA standards are difficult to access, and even when accessed are available on a read-only on-line basis, with no options – outside of paying several hundred dollars per standard – for downloading the documents or even printing as a single document. On a substantive basis, the CSA standards are extremely general and largely repetitive, and generally do not provide rationale or basis for those directions which they do provide.

By "waste categories as defined in CSA N292.0-14" we speculate that the reference is to the "waste classification system" as set out in Appendix A of CSA N292.0-14:



Annex A (informative)

Radioactive waste classification, exemption, clearance, and storage for decay

Note: *This Annex is not a mandatory part of this Standard.*

A.1 General

A.1.1 Waste characterization methods

Waste characterization methods are generalized in this Annex for waste organizations. Further description of the methods specified in this Annex can be found in the LLRWMO's *Management of Low-Level Radioactive Waste Produced on an Ongoing Basis: The Characterization of Radioactive Waste for Disposal.*

A.1.2 Classification system — Purpose

A radiological classification system groups radioactive waste into categories in order to specify the needs for the safe management of different types of waste. Classification assists in

a) devising waste management strategies;
b) planning, designing, licensing, and operating waste management facilities;
c) identifying the hazards associated with a particular waste;
d) determining the type and degree of radiological protection required for a specific waste and choosing the appropriate management process; and
e) facilitating communication between waste generators, regulators, and other stakeholders by providing a common framework.

A.1.3 Waste classification system

The radioactive waste classification system recognizes four main classes of radioactive waste.

a) low-level radioactive waste;
b) intermediate-level radioactive waste;
c) high-level radioactive waste; and
d) uranium mine and mill tailings.

Note: *These waste classes are defined in Clauses A.4 to A.7.*

Subclasses for low-level wastes are also identified to provide further guidance on waste management needs.

The discussion paper references IAEA GSG-1 Classification of Radioactive Waste, purporting that the paper's proposed four categories of waste are based on referenced IAEA documents waste categories, but offering no bridge between the IAEA's six categories and the DIS-16-03's four categories, although CSA N292.0-14 Appendix A, Clauses A.5-2 and A.5-3 somewhat bridge that gap, if one is to assume that the terms "types", "classes" and "categories" are being used interchangeably.

We offer the following general comments on this section of DIS-16-03:

- The discussion is unclear in its use of language and terminology, particularly in its reference to external documents
- The clarification that uranium tailings "often have other chemical hazards associated with them" would be more accurate without the qualifier of "often"; we are unaware of any instance with there is not a toxicity hazard associated with uranium
- The clarification that uranium tailings "often have other chemical hazards associated with them" also applies to other waste types; it is unclear why this is not a more general statement about the chemical hazards that are "often" associated with all radioactive waste types
- The term "fuel cycle" suggests that the nuclear fuel chain is a closed loop, and that radioactive wastes are recycled / reprocessed; this is not the case in Canada, and even in countries where reprocessing occurs, it is only to extract some radionuclides, and is not a closed loop as may be the case with other non-radioactive materials under robust product stewardship programs; the use of the term "fuel cycle" is relatively common within the nuclear industry, presumably for political or promotional purposes, but is particularly inappropriate in documents produced by the federal regulator
- The paper casually references "delay and decay", and states that "*this meets the 3R principle of "reduce" and helps licenses to appropriately manage contaminated wastes*"; this reference and statement warrant closer examination:
    - The term "delay and decay" is used in industry discussions of the predisposal management of radioactive waste, and generally travels in a trio of 'delay and decay', 'concentrate and contain' and 'dilute and disperse'.
    - According to the IAEA standard for the Predisposal Management of Radioactive Waste[ii] "'*Delay and decay' involves holding the waste in storage until the desired reduction in activity has occurred through radioactive decay of the radionuclides contained in the waste. 'Concentrate and contain' means reduction of volume and confinement of the radionuclide content by means of a conditioning process to prevent or substantially reduce dispersion in the environment. 'Dilute and disperse' means discharging effluent to the environment in such a way that environmental conditions and processes ensure that the concentrations of the radionuclides are*

reduced to such levels in the environment that the radiological impacts of the released material are acceptable."

- While we would generally support a "delay and decay" approach, including in decommissioning of nuclear facilities, we note that there is public concern – which we share – with the "concentrate and contain" strategies of Ontario Power Generation and Cameco and the impacts of incinerating radioactive waste in Kincardine and Blind River and a debate about "dilute and disperse" public opposition to an earlier proposal to "recycle" radioactive steam turbines; we expect that a strategy of "dilute and disperse" would be unacceptable to the public. We are concerned by the casual insertion of "delay and decay" out of context and without explanation or even quotation marks, and wish to indicate quite clearly that the larger IAEA described package of "predisposal strategies" includes elements which are not acceptable, despite IAEA claims that "*the approach 'dilute and disperse' is a legitimate practice in the management of radioactive waste*",[iii] legitimacy has certainly not been bestowed on this practice in a Canadian context
- See comments in Section B.2 with respect to the reference in this section on "the 3Rs principle".

- The lack of references in the paper in general and this section in particular is frustrating; for example, what is the source of the statements in each of the waste categories about volume, percentage of radioactivity?
- We make no comment on the proposed characterization based on alpha, beta/gamma and dose rates at this time; this is a matter of considerable import, and we are reluctant to comment at this time given the otherwise noted limitations of this discussion paper, our recommendations for a development process for the regulatory framework for waste management, and the current limit to our organizational resources which precluded our retaining technical assistance for this portion of our review of DIS-16-03
- The categorization system is flawed if the only wastes that are characterized as "high-level" are irradiated fuel waste; the category "high level" waste should include those wastes such as higher-level refurbishment wastes and higher-level decommissioning wastes, and other wastes of similarly high levels of radioactivity
- The descriptions of the waste categories, particularly of high-level waste and of uranium mine and mill tailings are overly generalized and lack sufficient detail
- The description of high-level waste should include a more detailed discussion of the hazards associated with these wastes, the requirements of active storage (i.e. in the irradiated fuel bays) and the risk of loss of institutional control when the waste is in an active storage state, and should include a more detailed discussion of the dry-storage systems in use and options for improving those systems / conditions in terms of achieving a more robust or "hardened" facility, and should summarize/outline options for extended on-site storage of existing and predicted waste volumes
- The description of uranium mine and mill tailings should clarify that the description of the wastes includes waste rock, and should be expanded to include uranium-including mines, mills, tailings and waste rock that are generated in operations where uranium is present but no necessarily the target material (i.e. in rare earth mining operations)

R.9 – The CNSC should present a stand-alone and complete draft set of definitions of waste categories, taking into account comments received during this review of DIS-16-03 but without avoidance-by-reference of detailed descriptions and definitions.

B.2 Making "reduce, reuse, recycle" a requirement

As summarized in DIS-16-03:

> *While CNSC regulatory documents require licensees to minimize waste, the CNSC is considering a new regulatory requirement for licensees to apply the principle of "reduce, reuse, and recycle" (the 3R) in their waste management programs. Including this principle in regulation would reinforce the CNSC's view that responsible waste management is an overarching guiding principle for licensees conducting nuclear operations.*

There are certain standard principles of waste management that certainly should apply, such as waste avoidance, and the "proximity principle" of managing the waste as close to source as possible.[iv] However, the standard approach of "reduce, reuse, recycle" does not apply as evenly to radioactive materials as it does to other materials, given that the radioactive properties may persist through the waste processing. "Reduction" or "Recycling" are not appropriate when the hidden fourth "R" of "Release" of radioactivity into the environment or into the market place will subsequently come into play. Certainly the waste "reduction" strategies employed at the OPG and Cameco incinerators are also in part strategies of "dilute and disperse", and these are not acceptable. Nor is the release of metals contaminated with radioactive elements into the market place acceptable.

R.10 – The CNSC should develop terminology that avoids confusion with the standard terminology of "the 3Rs", given the very different considerations for radioactive materials.

R.11 – The CNSC should develop guidance for waste avoidance strategies in nuclear facilities, and embed requirements into license condition handbooks.

R.12 – The CNCS should include the recycling sector (i.e. metal recyclers) and the solid waste management sector in consultations with other stakeholders (public interest groups, health organizations, consumer organizations, waste generators) about any aspects of radioactive waste management regulatory framework that could increase the amount of materials being "cleared" of classifications as radioactive and "free released" into the market place or into conventional waste disposal facilities.

B.3 Establishing record-keeping requirements

As summarized in DIS-16-03:

> *The CNSC is requesting feedback on a proposal that record-keeping requirements for waste management, storage and disposal operations for all licences should be consistent with Class I facilities; i.e., 10 years past the expiry of the last licence*.

There is a regulatory need and a public right-to-know with respect to wastes generated by the nuclear operations and the manner in which it is being managed.

R.13 – Similar to the way in which industrial facilities are required to report on their releases, the nuclear industry (including mineral exploration in a uranium-bearing area, operation of uranium mines, mill, refineries, conversion facilities and fuel fabricators and nuclear power plants) should report their "release" – including the release of wastes to storage systems – on the National Pollutants Release Inventory or an equivalent on-line system

R.14 – Similar to the way in which an operating mine must have a closure plan available at the mine gate for public review, all nuclear facilities (including uranium mines, mill, refineries, conversion facilities and fuel fabricators and nuclear power plants) should make available in a publicly accessible reading room on their premises a full set of records on the wastes generated each quarter, the total volume of wastes generated through operations to date, the wastes currently in any form of storage or management on-site, and a description of the characteristics, hazards and volumes of the waste by waste type and the system by which each waste type is being contained and/or stored, and any emissions from the waste storage systems.

R.15 – A central repository which is publicly accessible and is both hard copy and digital format should be created to consolidate the information identified in Recommendations 13 and 14.

B.4 Licensing waste management and decommissioning operations

As summarized in DIS-16-03:

> *Currently, waste management facilities are licensed under the Class I Nuclear Facilities Regulations, waste management activities under the Nuclear Substances and Radiation Devices Regulations, and other applicable regulations. The CNSC believes that the existing framework can be clarified. Clarity and consistency will result from further codifying existing practices as they relate to waste management licensing. These may include developing comprehensive waste management regulations. Stakeholders are requested to provide feedback on these proposed options.*

In the discussion paper, the CNSC is seeking comment on a range of issues related the licensing of waste management and decommissioning operations, but provides no discussion of decommissioning operations in the discussion paper, with the exception of a very general discussion in Section 2.7 about "Release from licensing after decommissioning or remediation". Given this, seeking input on license requirements for decommissioning operations under this section is premature, at best. Further, in absence of a more detailed discussion of the broader regulatory framework for waste management, the public's ability to comment on the questions posted to stakeholders is limited; our input is correspondingly limited:

- Yes, licence requirements should be clarified
- No, the current system does not adequately distinguish between various facilities and their design, reporting and monitoring requirements

R.1 – The CNSC should set out a draft of their regulatory framework and / or proposal for the development of a framework for public comment.

B.5 Waste management program requirements

As summarized in DIS-16-03:

> *The CNSC proposes to better clarify waste management program requirements in regulations and regulatory documents. This would underscore the importance of the principles of sound waste management and bring Canada fully in line with international approaches for overseeing waste management. Stakeholders are being requested to provide feedback on possible consolidations and updates to CNSC requirements and guidance for waste management programs.*

While we hesitate to enter into a debate of principles versus objectives, we must; on page 10 of DIS-16-03 the paper author(s) writes:

> *While the details of individual waste management programs may vary to address site-specific conditions, all are designed to meet the same common principles namely the need for waste minimization, re-use and recycling. Additionally, the overall objective of a waste management program remains the same: the protection of people and the environment from the potential hazards arising from waste production and management, both in the present and for the future.*

The paper, in this paragraph and elsewhere, implies that the principle of the "3Rs" takes precedence over the objective of protecting people and the environment. We disagree with this implication, we believe it contravenes the Nuclear Safety Control Act, and we are of the view that it is absolutely contrary to the public interest. This is even more the case when the "principles" of the "3Rs" are being used to veil an objective of cost reduction and avoidance of full responsibility for the wastes that the use of nuclear technologies have generated.

The paper indicates that the CNSC is planning to consolidate P-290, RD/GD-370 and G-320, and update their information; for example, by clarifying waste definitions and categories.

In our view, this is a reasonable and timely step, and is consistent with an overall plan to develop a regulatory framework for radioactive waste management. Many of earlier recommendations apply to this CNSC intention, in addition to those that follow.

R. 16 – The CNSC should proceed with a consolidation of P-290, RD/GD-370 and G-320, and should do so in the context of development of a renewed regulatory framework for radioactive waste management.

R.17 – The CNSC should provide additional and specific notice of a consultation on the consolidation of P-290, RD/GD-370 and G-320.

R.18 – The CNSC should include in their documents related to the consolidation of P-290, RD/GD-370 and G-320 a legally based clarification of how and when policies, guidelines and regulations apply. This clarification should specifically address past instances of CNSC staff providing inconsistent advice on the application of P-290, RD/GD-370 and G-320.

B.6 Regulating remediation activities

As summarized in DIS-16-03:

> *The CNSC is considering how remediation differs from decommissioning in that it is often done outside of lifecycle planning. To date, the CNSC has successfully regulated remediation activities within its existing framework. However, discussions with licensees conclude that the current process is unnecessarily time-consuming with respect to the risks associated with the activities. Furthermore, as international experience has grown, including the International Commission on Radiological Protection's development of the concept of "reference levels", the CNSC is looking to update its policies and guidance associated with regulating existing situations and accidents.*
>
> *Another challenge related to remediated sites will be their long-term care and maintenance. The CNSC is seeking stakeholder feedback on the need for additional clarity in this area*.

It is not fully clear how the summary from the executive summary, immediately above, relates to the section of the paper, particularly in terms of the reference to discussions with licensees, which are not described – or even referenced – in the corresponding section of the paper.

As a general statement, the issue over remediating sites for which information is lost or less information is available should be limited, if there is an effective regulatory framework now in place. If additional sites to those now within the nuclear liabilities program are being remediated in a "reactive" manner in the future, it will be because the regulator of today has failed.

The standards of care for remediation and for decommissioning should be consistent, and should reflect international best practice and have as the primary objective the protection of people and the environment.

R.18 – The CNSC should consult directly and specifically on desired / required end states for sites that have been remediated after a nuclear operation (including but not limited to mineral exploration in a uranium-bearing area, operation of uranium mines, mill, refineries, conversion facilities and fuel fabricators and nuclear power plants)

B.7 Releasing facilities and activities from CNSC licensing after decommissioning or remediation

As summarized in DIS-16-03:

> *Licences to abandon are used to release certain nuclear facilities from CNSC regulatory oversight after licensed activities are completed. To some, the term "abandonment" may not accurately reflect the appropriate release from CNSC licensing after a facility has undergone significant work to responsibly dispose of nuclear substances and to mitigate the hazards of a previously licensed activity. Additionally, issuing a licence to release a licensee from CNSC regulatory oversight may seem counter-intuitive to some stakeholders. The CNSC is interested in stakeholder views on whether it should consider other mechanisms.*

In advance of any decommissioning plan having been completed for any uranium processing facility or nuclear power plant and in the absence of any definition of required end-state for the remediation of a nuclear site, development of a regulatory framework would be timely and prudent; requirements for decommissioning and definition of required end-states should be part of a framework on waste management and decommissioning.

The following principles should be first and foremost:

- Perpetual care (versus abandonment)[v]
- Precautionary Principle, and
- Polluter pay

If the Canadian Nuclear Safety Commission intends to release a licensee from their responsibilities for a site, then "abandonment" is the correct term. It is not, however, the correct action.

R.19 – The CNSC should consult directly and specifically on desired / required end states for sites undergoing decommissioning after a nuclear operation (including but not limited to mineral exploration in a uranium-bearing area, operation of uranium mines, mill, refineries, conversion facilities and fuel fabricators and nuclear power plants)

R.20 – The future regulatory framework should reflect that achievement of the required end-state as a result of decommissioning work at a site does not presume a release from license but a potential change in license conditions.

C. Conclusions

Northwatch has a continued interest in the isolation of radioactive wastes from the environment, and the protection of the human health and environment from the potential harmful effects of failed containment of radioactive wastes. Given this, we appreciate the opportunity to comment on this discussion paper, and look forward to future participation in the development of a robust framework for radioactive waste management and decommissioning which is protective of human health and the

environment, engages the public in its development and implementation, and is developed and delivered in a manner that is transparent and accountable.

D. Summary of Recommendations

R.1 – The CNSC should set out a draft of their regulatory framework and / or proposal for the development of a framework for public comment.

R.2 – The draft framework should clearly indicated the proposed contents / modules and a draft timeline.

R.3 – The draft framework should clearly indicate the relationship of DIS-16-03 to other components of the draft framework.

R.4 – The draft framework should clearly indicate the relationship of related CSA standards (including but not limited to N292.0-14, General principles for the management of radioactive waste and irradiated fuel, N292.1-16, Wet storage of irradiated fuel and other radioactive materials, N292.2-13: Interim dry storage of irradiated fuel, and N292.3-14, Management of low- and intermediate-level radioactive waste) to the proposed regulatory framework.

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R.20 – The future regulatory framework should reflect that achievement of the required end-state as a result of decommissioning work at a site does not presume a release from license but a potential change in license conditions.

REFERENCES

[i] Reference is in the second paragraph of Section 1 of DIS-16-03, IRRS report is online at http://nuclearsafety.gc.ca/eng/pdfs/irrs/2011-IRRS-Follow-up-Mission-to-Canada-Report-IAEA-NS-IRRS-2011-08-eng.pdf; see discussion beginning at page 39

[ii] Predisposal Management of Radioactive Waste, IAEA, 2009, as found online at http://www-pub.iaea.org/MTCD/publications/PDF/Pub1368_web.pdf

[iii] Predisposal Management of Radioactive Waste, IAEA, 2009, as found online at http://www-pub.iaea.org/MTCD/publications/PDF/Pub1368_web.pdf, page 15

[iv] See http://www.epa.nsw.gov.au/wasteregulation/proximity-principle.htm or http://www.sustainabilityexchange.ac.uk/principles_of_waste_management or http://www.gov.scot/Publications/2011/01/20114928/2

[v] See http://www.sehn.org/Volume_17-2.html and https://www.ceaa-acee.gc.ca/050/documents/p17520/95710E.pdf