

Submissions Received during Public Consultation of
CNSC Discussion Paper DIS-12-01
Protection of Groundwater at Nuclear Facilities

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June 30, 2012

VIA EMAIL

Mr. Mark Dallaire, Director General
Canadian Nuclear Safety Commission
P.O. Box 1046, Station B
280 Slater Street
Ottawa, Ontario K1P 5S9

Dear Mr. Dallaire:

Re: Comments on Protection of Groundwater at Nuclear Facilities in Canada – Discussion Paper DIS-12-01

At AREVA Resources Canada Inc. (AREVA), our environmental policy recognizes that continued economic and social development depend on a healthy environment and incorporates environmental considerations into all company activities to ensure sustainable development. AREVA is committed to continually improve approaches and technology to minimize the effects of its activities on the environment.

We would like to thank the Canadian Nuclear Safety Commission (CNSC) for the opportunity to comment on the Discussion Paper DIS-12-01: *Protection of Groundwater at Nuclear Facilities in Canada*. AREVA supports the CNSC efforts to engage industry, increase transparency, and improve consistency.

Within this context, we provide Schedule A attached on the above referenced discussion document.

Again, thank you for the opportunity to provide comment on this discussion paper. Should you wish to further discuss the enclosed comments, please do not hesitate to contact us.

Regards,

A handwritten signature in blue ink that reads 'Lambalgen'.

Tammy Van Lambalgen
Vice President, Regulatory Affairs & General Counsel

cc: L. Mooney
H. Kleb
Enclosure: Schedule A

Introduction:

As you are aware, at our operating, and planned future facilities, AREVA has undertaken extensive programs to characterize sources of contaminants of potential concern (COPCs), and has developed management strategies to control such sources to minimize effects on groundwater and to protect current and potential groundwater end-uses. These management strategies are supported by site-specific groundwater contaminant transport modelling which incorporates local geological and hydrogeological characterization, and groundwater monitoring results. Such management strategies, supported by contaminant transport modelling and site characterization programs, are typically outlined as part of our environmental assessment documentation, and/or in support of licensing applications. Such assessments are undertaken in a conservative manner, and are often subject to follow-up programs to verify the accuracy of the assessments and to determine the effectiveness of the management strategies.

GENERAL COMMENTS

Terminology:

Comment:

Throughout the document, several important terms and/or phrases appear to be used somewhat interchangeably. Some examples include:

- Prevent;
- Control measures to prevent;
- Controlling releases;
- Prevention or minimization of releases;
- Prevention is achieved by implementing measures to control releases; and
- Control to ensure that the groundwater resource is protected based on its defined use.

The discussion document should clearly outline that the fundamental concept is to control sources to ensure that the groundwater resource is protected based on its defined end-use. Means of control include prevention and minimization.

Similarly, the term “release” and its associated adjectives also need to be clarified.

- Unauthorized release
- Unplanned release
- Uncontrolled release

Clearly some unplanned/uncontrolled releases such as containment failure, and/or spills have implications to groundwater protection, and the intent of the discussion paper is clear regardless of the precise adjective, although clarification would be helpful.

Clarity is also required with respect to the longer term performance of some types of nuclear facilities. For example, there is potential for longer term releases of COPCs to the groundwater from decommissioned facilities for waste rock and tailings facilities, and in future when permanent disposal facilities are developed in Canada for other types of radioactive wastes. Environmental protection in these circumstances has or will have been thoroughly assessed at the EA and licensing stages and it is likely that a follow-up program, including groundwater monitoring is, or will be, in place to validate the performance predictions for the decommissioned facility. AREVA's view is that an unplanned (or unauthorized or uncontrolled) release would be defined by performance which is shown, or projected, to be outside the performance defined by the approved EA and licensing documents.

COMMENTS BY SECTION

2. Context

Comment:

The bullet, "clarify expectations for the protection of groundwater" is duplicated in the last paragraph on page 4.

3.2 Assessing end-use and vulnerability

End-use Assessment

Comment:

We strongly support the concept of identification of end-use and the formalization of this consideration into an end-use assessment.

Discussion:

As outlined above, our groundwater assessments are based on current and potential end-uses and are typically outlined in environmental assessment documentation. Such documentation is subjected to review by a variety of federal, provincial and/or territorial regulatory authorities. To date, however the consideration of end-use has been implicit in the analyses undertaken, and has not been formalized explicitly with federal, provincial and/or territorial authorities in an

end-use assessment. Formalization of the end-use assessment would add transparency to the assessment process and is viewed as a positive evolution of the current regulatory framework.

Comment:

Re-phrase sentence: "Groundwater that is identified by municipal, provincial or territorial authorities as a current or potential source of drinking water must be protected, in order to ensure that its quality remains within drinking water quality standards."

Discussion:

A groundwater source identified as a current or potential source of drinking water may not necessarily meet drinking water quality standards. For example, baseline groundwater quality can often not meet drinking water quality standards. Furthermore, the CCME drinking water quality guidelines apply to water as it emerges from the tap. It states:

"These guidelines are not intended to be applied directly to source waters. In fact, since modern water treatment technologies can produce high-quality drinking water from even heavily contaminated sources, numerical limits are not usually proposed for the quality of raw water sources used for drinking water." (Community Water Supplies, CCME CEQG, 1999)

Comment:

The concepts of "...the protection of the aquatic and/or terrestrial environment." and "biological communities that can be affected by the quality of groundwater that discharges to surface waters and wetlands" should be harmonized with the concept of Valued Ecosystem Components (VECs) that are the common basis of environmental assessment processes in the nuclear industry.

Comment:

Change phrase, "water quality criteria" to "groundwater conditions" in the following sentence: "In this case, the water quality criteria should ensure the protection of the aquatic and/or terrestrial environment."

Discussion:

There is generally no requirement for concentration based groundwater quality criteria unless a comparison is needed to the quality criteria for a specified use. A parameter such as COPC flux to the surface environment (i.e., COPC concentration in groundwater multiplied by groundwater discharge rate, frequently called loading) is typically used in risk assessment

(e.g., to derive COPC concentrations in surface water). A broader term such as “groundwater conditions” is thus required in this sentence.

Vulnerability Assessment

Comment:

This section considers geological zones and saturated and unsaturated materials within the context of the vulnerability of groundwater to contamination.

Discussion:

Such considerations may be more appropriate under the heading of Site Characterization rather than grouped with end-use assessment.

3.3 Site Characterization

Comment:

This section outlines that the primary objectives of site characterization are to obtain “sufficient” information

Discussion:

Consideration should be given to introducing the concept of a “tiered approach” to source and site characterization to ensure that the resultant activities are proportional to the potential risks associated with the designated end-use.

3.5 Implementing a groundwater monitoring program

Comment:

This Groundwater Monitoring Program (GMP) should focus on the physical and chemical characteristics relevant to the hydrogeological setting (flow, conductivity, rate of chemical change), and the designated end-use. Within this context, the introduction of the concept of the biological characteristics of groundwater is misplaced.

Groundwater is identified as a component of the environmental monitoring programs at Class I nuclear facilities and uranium mines and mills in CSA Standard N288.4. We recommend that the CNSC

support the Canadian Standards Association Nuclear Program to develop a separate standard to address the details of the design of a groundwater assessment and monitoring program at Class I nuclear facilities, uranium mines and mills, and nuclear waste management facilities to meet the regulatory expectations outlined in this discussion document.



AECL
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EACL
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du Canada limitée

**Programs & Nuclear Oversight
Environmental Protection Program**

ENVP-ACNO-12-0011-L

EnvP 12-094

UNRESTRICTED

2012 June 29

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Canada

**CNSC DISCUSSION PAPER DIS-12-01: PROTECTION OF GROUNDWATER AT NUCLEAR
FACILITIES IN CANADA**

Dear Mr. Dallaire,

The purpose of this letter is to provide comments on CNSC's Discussion Paper DIS-12-01 "*Protection of Groundwater at Nuclear Facilities in Canada*".

AECL has a mature and well established Groundwater Monitoring Program which has evolved since the early 1960's. The evolution of the groundwater monitoring program has been commensurate with the nature of our operations and facilities and potential risks that they pose. Over time this has meant that the program has expanded and has generated a wealth of studies and data in support of Environmental Assessments and Facility Safety Assessments. AECL maintains experienced hydrogeologists on staff as well as a dedicated drill rig and a trained and experienced drill crew. AECL is fully committed to the protection of the groundwater resources and the environment at our sites.

Finally, over the past decade, the CNSC has provided comment and suggestions to our groundwater monitoring program through document reviews as well as Inspections. This input has helped to further improve the groundwater monitoring program.

With these points in mind, we have the following comments on the Discussion Paper, which we believe are reflective of the industry as a whole.

1. Use of the Canadian Standards Association (CSA) Process.

The existing CSA system provides a strong and proven process through which a consensus based methodology could be developed for protection of groundwater at Nuclear Facilities. The CSA process has been used extensively and with good success in recent years with the development of:

- CSA N288.4 Environmental monitoring programs at Class I nuclear facilities and uranium mines and mills; and,

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- N288.5 Effluent monitoring programs at Class I nuclear facilities and uranium mines and mills; and,
- N288.6 Environmental risk assessments at Class I nuclear facilities and uranium mines and mills.

AECL would support an effort using the Canadian Standards Association (CSA) process.

2. Remediation Requirement

While AECL agrees that remediation may be an outcome of a groundwater contamination finding we are aware that there is already a well developed and systematic suite of guidance and regulatory documents to address contaminated sites once an issue is identified. As such, the inclusion of remediation in the scope of the proposed regulatory framework appears to be an example of unnecessary duplication. The focus of any new guidance on groundwater monitoring should be on closing any systemic gaps, and reducing risk, instead of duplicating existing guidance.

3. Regional information and assessments

AECL has concerns regarding several inferences in the Discussion Paper to the licensee having to generate "regional" level information or conduct "regional" assessments for current and potential groundwater uses and vulnerability. We feel that groundwater protection or contamination issues tend to be very site specific, and rarely regional in nature. We believe it is more appropriate to use existing regional information on both vulnerability and potential end-uses where it is available, and if there is a specific issue present then address it. Furthermore, the use of the CSA process would work through such concerns.

Please feel free to call Christine Gallagher at extension 43203 or myself at extension 44311 if you have any questions.

Yours Truly,



George M. Dolinar,
AECL's Environmental Protection Program Authority

GD/np

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June 28, 2012

NK21-CORR-00531-09644
NK29-CORR-00531-10163
NK37-CORR-00531-01904

Mr. M. Dallaire
Director General, Regulatory Policy Directorate
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Dear Mr. Dallaire:

Bruce Power Comments on CNSC Discussion Paper
DIS-12-01 – Protection of Groundwater at Nuclear Facilities in Canada

This letter provides Bruce Power comments on CNSC Discussion Paper DIS-12-01: Protection of Groundwater at Nuclear Facilities in Canada (Reference 1). The letter highlights three main points:

1. Groundwater protection and monitoring program guidance is best suited to the Canadian Standards Association (CSA) N288 series of standards.
2. A program scope that includes regional assessments and contaminated site remediation is too broad and duplicates other regulatory jurisdictions.
3. The proposed program format is too rigid and inflexible and does not lend itself well to a site-specific, risk based program.

Bruce Power already operates mature, well managed groundwater monitoring, contaminated sites management, spill mitigation, and hazardous materials management programs that satisfy existing Federal and Provincial environmental regulatory requirements and support an environmental management system that is ISO 14001 certified and S-296 compliant. Most nuclear facilities operate similar programs, but we agree that there are some inconsistencies amongst the practices, potentially creating misconceptions about the impact of those differences. We support the need for a consistent set of expectations among similar facilities, but have some significant concerns with several of the proposed program concepts in this discussion paper.

Attachment A discusses specific concerns related to groundwater modeling, regional versus site-specific assessments, end-use determination, receptor and exposure pathway selection, and contaminated site remediation in more detail, but first we propose an alternate approach.

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NK21-CORR-00531-09644
NK29-CORR-00531-10163
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Groundwater protection and monitoring program (Program) requirements must be consistent with the level of risk posed by the potential substance of concern. The Program should be risk based and consistent with the risk based approach used in the CSA N288.4 (environmental monitoring), N288.5 (effluent monitoring), and N288.6 (environmental risk assessment) standards. We believe a similar CSA standard for groundwater protection and monitoring programs at nuclear facilities would ensure the development of a comprehensive methodology that could form part of the licensing basis.

A new CSA standard in this area ought to include the following components:

- **how** to complete a risk assessment of potential contaminants on site
- **what, when and where** to monitor based on the risk assessment,
- **how** to monitor based on site risk and geology and
- **how** to structure a groundwater protection program.

CNSC would establish requirements for Licensees to implement a Program with the necessary monitoring and reporting requirements based on the risk assessment.

The discussion paper describes an approach to groundwater protection at a conceptual level; however, as the Program details are expanded upon, the paper captures a much broader scope. Requiring characterization and assessments of regional groundwater use and vulnerability are onerous and unnecessary. We recommend that CNSC guidance explicitly state that the Licensee need only be concerned with onsite groundwater protection and monitoring; only by exception would the regional aspects of groundwater protection need to be revisited. A CSA standard could define regional and site requirements as well as when, where, and how these requirements are triggered.

Similarly, the paper goes well beyond setting groundwater protection and monitoring expectations by including contaminated site remediation expectations. Acknowledging remediation relates to groundwater protection, remediation is addressed thoroughly through existing Provincial and Federal acts, regulations, and guidelines. This highlights our fundamental concern of duplication of regulation and lack of harmonization amongst regulators. We recommend that the CNSC focus only on groundwater protection and monitoring and address remediation only in areas not governed by other jurisdictions. A CSA standard could identify the relevant governing documents to reference when identifying remediation requirements and developing remediation strategies.

The paper describes requirements for hydrogeological modeling related to developing a site model for site characterization. The qualification of "site" is not clearly defined, thus open for interpretation as a requirement for detailed computer modeling for the entire facility, again an onerous and expensive undertaking with varying degrees of benefit. While groundwater modeling is a tool that often assists in the assessment and prediction of groundwater impacts, the paper implies that this modeling is a necessity for adequate site characterization. CNSC guidance must acknowledge, and allow for, the significant uncertainty in hydrogeological characterization and that not all data can be obtained reliably or in a timely manner. We recommend that the groundwater modeling be limited to local areas identified as significant environmental concern and that mitigation be commensurate with the risk posed by the potential chemicals of concern. Again, a CSA standard could describe how to determine the level of modeling required.



In closing, we would reiterate these three points:

- Development of a groundwater protection and monitoring program aligns well with the existing CSA N288 series of standards and we support the development of such a standard to enhance this series.
- CNSC's groundwater protection guidance must eliminate the potential for duplication of regulatory oversight and we stress the need for enhancing regulatory harmonization, especially as this proposed document relates to regional assessments and contaminated site remediation.
- Guidance on the development of a groundwater protection and monitoring program must provide sufficient flexibility to allow each facility to tailor its program to their site-specific needs.

As would be expected, the high-level discussion in this paper does not allow a proper impact analysis, thus any changes require further detailed discussion with industry and other interested stakeholders before decisions are made.

If you require further information or have any questions regarding this submission, please contact Mr. Maury Burton, Department Manager, Regulatory Affairs, at (519) 361-5291.

Yours truly,

Frank Saunders
Vice President Nuclear Oversight and Regulatory Affairs
Bruce Power

cc: CNSC Bruce Site Office (Letter only)

R. Lojk	CNSC
R. Jammal	CNSC
G. Rzentkowski	CNSC
P. Thompson	CNSC
T. Jameison	CNSC

Attach.

Reference:

1. CNSC Discussion Paper DIS-12-01, Protection of Groundwater at Nuclear Facilities in Canada

Attachment A

Detailed Bruce Power Comments on CNSC Discussion Paper DIS-12-01 – Protection of Groundwater at Nuclear Facilities in Canada

The following comments are more specific in nature and are grouped with respect to the relevant section of the discussion paper.

General

DIS-12-01 outlines an approach to a groundwater protection and monitoring program - control of potential releases, assessment of ground water end-use, site characterization, release source characterization, groundwater monitoring, site investigation, and remediation of unauthorized releases. Certain aspects of the proposed program and the corresponding action to take upon discovery of groundwater contamination already exist in Provincial/Federal Regulation/Guidance. Any CNSC guidance would need to harmonize with these.

The CSA has been a very successful venue to develop standards related to environmental protection at nuclear facilities such as CSA N288.1 (derived release limits), CSA N288.4 (environmental monitoring), CSA N288.5 (effluent monitoring) and CSA N288.6 (environmental assessment). We recommend that the same CSA venue be used for the development a groundwater protection and monitoring standard to ensure consistency at all nuclear facilities. The proposed groundwater protection and monitoring standard would capture, but not be limited to, the following scope:

- Defining the objectives of a program.
- Determining the criteria to establish the need for a program.
- Guidance on the design, development, and elements of a risk based program.
- Guidance on identification of Potential Areas of Concern (PAOC) and Potential Chemicals of Concern (PCOC).
- Development of representative sampling frequency and quality.
- Guidance on interpretation of data, development and evaluation of mitigating strategies.
- Guidance on documentation, program assessment, staffing qualification and training.

To this end, the CSA N288.7 for groundwater protection and monitoring programs is on the CSA N288 Technical Committee 10 year plan and the project scope and timeline are under development. This approach would be similar to other CSA environmental and effluent monitoring standards, would ensure a consistent approach, and would allow site-specific requirements to be included.

Context

The Discussion Paper defines groundwater as

“water that flows under the land surface or through soil, sand, gravel, or layers of permeable rock.”

For the purposes of groundwater protection and monitoring, there is potential uncertainty in this definition. Water exists below surface, but above the water-table (referred to as pore water within the vadose zone) that could be classed as groundwater under this definition. However, this “pore water” is effectively not available for use, and thus not amenable to consideration in framework that is based on end-use. The CNSC should provide clarification as to whether or not pore water is to be considered as groundwater. This may have very significant implications in context of the influence of atmospheric tritium on groundwater. The pore water is an intermediate medium in this pathway, generally exhibiting levels of tritium that are much higher than those in the underlying water table. Alternatively, the CNSC could limit the groundwater protection and monitoring program to groundwater within an aquifer or below the phreatic surface and exclude groundwater within the vadose zone.

There is no explicit statement that CNSC guidance will adhere/defer to the existing provincial and/or municipal characterization and/or assessment of the local groundwater use. There are several references in the discussion paper to “potential” use. The paper needs to state explicitly “potential” use would be as designated by the municipality or province, and could not be expanded to include a hypothetical use not otherwise identified. This is an important concept, and critical, because protective standards can vary significantly pending the designated use (or potential use). It must be very clear that the protective standards are to be use-based, or in the absence of a specified use then a default use (i.e., drinking water). Furthermore, protective standards must be clearly defined as dose-based where the use leads to human exposure (e.g., drinking, immersion).

The paper does not have clarity on the receptor selection process nor does it recognize that all facilities currently utilize an endorsed CSA process for identifying the site-specific receptors and exposure pathways through the implementation of N288.1 and N288.6. Receptor identification is one of the fundamental elements of developing any environmental monitoring program and can be driven by ecological receptors as well as (or instead of) human receptors. The paper appears biased towards human exposure pathways. CNSC guidance must be consistent with the CSA N288 processes.

While the paper recognizes each site is unique and that groundwater protection programs would be developed based on site-specific characterization and requirements, the main issue is the level of understanding that the CNSC may require, particularly concerning the detail of site-specific modeling and quantity of monitoring data. At present, there is nothing limiting the CNSC from imposing very onerous modeling and monitoring requirements on a licensee to “confirm the absence of contamination” related to possible sources of groundwater contamination. We recommend acceptance of the commonly used tiered weight-of-evidence (phased) approach to identify environmental impacts. Groundwater modeling and monitoring should be limited to site-specific areas identified as significant environmental concerns and mitigation must be commensurate with the risk posed by the potential contaminants of concern and supported by a cost/benefit evaluation of the proposed mitigation program.

Groundwater Protection Proposal

The discussion paper does not clearly define the scope of the licensing activities that would trigger the completion of the regional, local, and/or site-specific groundwater end-use and vulnerability assessments. The requirement to provide CNSC with the regional, local, and/or local groundwater end-use and vulnerability assessments should be commensurate with and limited to situations where the proposed project may potentially change the regional, local, or site groundwater condition, respectively.

This paper references "regional" groundwater vulnerability as a key consideration in the development of groundwater protection and monitoring programs. While an important aspect of groundwater protection, numerous regional assessments and vulnerability studies already exist and are adequate sources of reference for the Licensee to use in the development of a facility-specific groundwater protection and monitoring program. Regional scale is not appropriate for site-specific assessments. A much smaller scale is appropriate, and scale should be determined on a site-specific basis. Where regional groundwater vulnerability studies have been completed, then this information could be used to support the development of a facility's program. It should not be an expectation that a licensee should conduct a regional assessment. The CNSC should provide clarification on the intent with respect to regional-scale assessment.

Similarly, regional (>10 km) and local (1-10 km) hydrology, geology, and hydrogeology characteristics do not change with time relative to site-specific (<1 km) characteristics. These regional and local characterizations are documented at many of the facilities through various licensing and environmental assessment activities. The CNSC should explicitly acknowledge that these previous characterizations are adequate reference sources to support facility groundwater protection and monitoring programs and that additional investigations, site characterizations, and follow-up investigations would utilize tiered site-specific assessments.

Numerical modeling may be a useful tool, but not all sites are well suited for complex modeling depending on the site condition. Development of a site model should not become a mandatory requirement, as the need to conduct a numerical model to aid the site characterization should be determined on a site-specific basis. For example, the Bruce Power nuclear facilities are situated on more than 900 hectares and representative site characterization and hydrogeological modeling to any degree of accuracy would require extensive resources with very little added certainty or value to the protection of the groundwater beneath the site. The CNSC needs to acknowledge that groundwater protection and monitoring programs will allow for significant uncertainty in hydrogeological characterization, and recognize not all data can be reliably obtained in the desired period. Models developed for a site will very likely have significant uncertainties that need to be accepted and effectively considered. Lastly, facilities that have multiple operators on the same site, as occurs at the Bruce Power facility, further complicates any requirement to model the entire site.

Contaminated site remediation is a well-documented and regulated subject, both provincially and federally. Provinces have existing contaminated site regulations complemented by Federal guidance from the Canadian Council of the Ministers of Environment (CCME). The tiered weight-of-evidence approach to groundwater protection and environmental site characterization proposed in this letter is consistent with the existing regulations and guidance. With respect to the paper's stated expectation for the licensee to remediate the site, we recommend that CNSC defer to

the existing provincial regulations and Federal guidance allowing the implementation of remediation on a site-specific basis depending on the level of risk to the environment. The CNSC should limit its guidance to gaps in existing site remediation legislation (e.g. for the remediation of nuclear substances in soil and groundwater).



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June 27, 2012

VIA EMAIL

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Dear Mr. Dallaire:

Discussion Paper DIS-12-01: Protection of Groundwater at Nuclear Facilities in Canada

Further to Discussion Paper DIS-12-01: Protection of Groundwater at Nuclear Facilities in Canada (the Discussion Paper), please find comments prepared by Cameco Corporation (Cameco) below. We would be pleased to respond to any further questions the Canadian Nuclear Safety Commission (CNSC) may have.

Introduction

Cameco's commitment to environmental protection is defined in our safety, health, environment and quality policy. Cameco recognizes protection of the environment as one of our highest corporate priorities during all stages of our activities. As such, protection of the environment is one of our four measures of success. Cameco strives to be a leading performer in the areas of safety culture, environmental leadership and operational excellence. Cameco is committed to preventing pollution and continually improving overall performance.

To this end, Cameco has measures in place to protect groundwater as part of our overall environment management program at each of our sites. As part of each site's environment management program, Cameco's current groundwater protection activities are approved by the CNSC. Further, activities specific to groundwater monitoring in Saskatchewan are subject to review and approval by both the CNSC and the Saskatchewan Ministry of the Environment

(SMOE). Similarly, Cameco's operations in Ontario have groundwater protection activities, including detailed monitoring, that are subject to review and acceptance by the CNSC and the Ontario Ministry of the Environment (OMOE).

While Cameco questions the need for a new regulatory document to address groundwater protection for reasons which will be discussed below, Cameco does not disagree with the main principles of the groundwater protection proposals outlined in the Discussion Paper. The proposal requires licensees to: implement controls to ensure that groundwater is protected; conduct end-use analyses to set appropriate criteria for groundwater protection; and implement appropriate groundwater monitoring programs. Cameco's current environmental protection programs incorporate each of these three requirements.

In addition, Cameco has reservations regarding specific aspects of the Discussion Paper. To summarize, Cameco's concerns are as follows:

1. As mentioned above, Cameco questions the utility of an additional groundwater protection standard. There is nothing unique about the nuclear industry that necessitates a separate groundwater protection standard.
2. A fundamental aspect of a groundwater protection framework that should be included in this discussion is that site-specific protection and monitoring programs must be consistent with the level of risk posed by the contaminants being monitored.
3. The framework suggests that in the absence of an identified end use, the standard should be protective of the aquatic or terrestrial environment. While Cameco currently assesses the impact of groundwater on the aquatic or terrestrial environment, Cameco is concerned that the Discussion Paper may be interpreted as requiring some type of groundwater specific criteria to be derived from the risk to the aquatic environment.
4. The expectation for a "model" should be clarified so as to be commensurate with the potential risk.
5. The definition of "biological communities" should be clarified to ensure it is not a departure from the concept of valued ecosystems components (VECs).

Discussion

1. No Need for an Additional Groundwater Standard

As discussed above, Cameco's sites protect and monitor groundwater quality as part of their overall environmental protection programs, which are approved by the CNSC as part of the licensing process. Further, comprehensive contaminated site standards, which deal with site characterization and monitoring program design, exist at both federal and provincial level and provide guidance in this regard.

This is why Cameco is of the view there is nothing unique to the nuclear sector that requires further regulation or guidance.

However, if the CNSC intends on implementing groundwater protection standards for the nuclear industry, these standards should be – at the very least - informed by the Canadian Standards Association (CSA) N288 standards. In fact, Cameco is of the view that the better route would be for the CNSC to use the CSA process to develop a groundwater standard.

2. Site-specific Protection and Monitoring Programs Should be Risk-based

The Discussion Paper requires that a site characterization be completed in order to obtain an understanding of: how the facility may influence the environment; the geologic and hydrogeologic factors that control the mitigation of actual or potential releases to the environment; and the risk of actual or potential releases.

Cameco suggests that site characterization must also include an assessment of site baseline and background water chemistry in order to determine whether it is possible to meet groundwater quality standards. In Cameco's experience, it is not unusual for concentrations of certain naturally occurring chemical constituents to exceed water quality standards.

Furthermore, a groundwater protection program should be specific to each site and the contaminants located on site and reflect the actual degree of risk the contaminants pose to groundwater and the environment. Such an approach would be consistent with the CNSC's Regulatory Policy, P-223, *Protection of the Environment*.

P-223 provides that environmental protection measures should be commensurate with the likelihood and significance of adverse environmental effects and recognizes that variability exists in potentially adverse environmental effects as a consequence of differences in regulated activities, substances, equipment, facilities, the environment and its human components.

Cameco agrees that in circumstances where there is a high likelihood of contaminants interacting with a VEC, an environmental risk assessment should be conducted to determine the degree of risk. Simply relying on general standards for groundwater contamination does not reflect the fact that even though an objective may be exceeded, this may not necessarily result in any significant degree of risk to the environment or human health.

Further, it is not clear how the Discussion Paper would align with existing groundwater protection and monitoring measures in place at previously assessed and approved facilities at current operating sites. This would include facilities such as tailings management areas or waste rock stockpiles that were engineered to minimize impacts to groundwater, and approved because they were not expected to result in any significant adverse effects. Such conditions are already subject to regular monitoring, oversight and reporting to the CNSC and a change in regulatory expectations would lead to unnecessary cost and processes associated with previously assessed and approved environmental effects.

The degree of risk should also be factored into the determination on whether any steps, such as measures to contain or minimize the spread of contamination, monitoring measures or remedial measures, are necessary in the event of a release.

3. End use Assessment

The Discussion Paper requires that groundwater end use be determined by consulting with municipal, provincial or federal authorities. It then requires that if groundwater is identified as a source of drinking water or irrigation water, sites must protect groundwater to ensure that it meets applicable standards and remains of sufficient quality. If there is no end use identified by provincial authorities, then the Discussion Paper would require that ground water conditions ensure the protection of the aquatic and/or terrestrial environment.

Cameco supports the use of directly applicable end use quality standards to guide the design of groundwater monitoring and protection programs. However, in the absence of an identified end use, the Discussion Paper would impose surface water quality standards for the protection of the aquatic environment. Cameco submits that if there is no identified end use for groundwater, the standard should be applied to the point of potential interaction with the receiving aquatic environment.

Therefore, the Discussion Paper should clarify that if there is no identified end use for groundwater, then the risk assessment to show that the aquatic and terrestrial environment is protected should be applied at and beyond the point of discharge of groundwater back to the surface environment.

4. The Requirements for “Model” Development Lack Clarity

The Discussion Paper states that the development of a hydrological and hydrogeologic model of the site is an important tool in understanding the site’s characteristics. However, the degree and type of modelling required as part of a groundwater protection program is not clearly defined in the Discussion Paper.

Cameco has models in place at each of our sites and we believe that these models are sufficient. Cameco is concerned that “model” may be interpreted as “one size fits all” so as to require an advanced computer model at all sites, regardless of site complexity of risk. Often the model for the purpose of designing a simple monitoring system in a uniform setting can be effectively addressed at a conceptual level. Cameco suggests that the CNSC provide some context and clarity around the expectation for modelling and that this be scalable so as to be commensurate with the potential risk to the environment and human health.

5. The Definition of “Biological Communities” Lacks Clarity

Although the Discussion Paper uses the term “biological communities,” it does not define it. Cameco is concerned that “biological communities” may be straying from the widely accepted approach of using VECs during the environmental risk assessment process and may be interpreted to include micro-organisms and other bacteria.

Cameco suggests that “biological communities” be limited to fish and other biota, or alternatively, be defined so as to reflect the concept of VECs.

Conclusion

In conclusion, Cameco recognizes the importance of protecting groundwater quality and already has groundwater protection and monitoring programs in place at each of our sites. Consequently, Cameco questions the need for an additional regulatory standard on groundwater protection. Having said that, Cameco does not take issue with the general principles of a groundwater protection and monitoring program as outlined in the Discussion Paper. In the event the CNSC determines that an additional regulatory standard is necessary, Cameco encourages the CNSC to use the CSA process, and most importantly, ensure that groundwater protection and monitoring programs be designed to meet the actual risks of a release at each specific site.

We would be pleased to respond to any further questions. Please contact the undersigned at (306) 956-6685 or liam_mooney@cameco.com.

Sincerely,



Liam Mooney
Vice-President
Safety, Health, Environment, Quality & Regulatory Relations
Cameco Corporation

LH:sc

c: P. Thompson, P. Elder, J. LeClair, B.R. Ravishankar - CNSC
Regulatory Records – Cameco



June 30, 2012

Mr. Mark Dallaire, Director General
Canadian Nuclear Safety Commission
Regulatory Policy Directorate
280 Slater Street, P.O. Box 1046, Station B
Ottawa, ON K1P 5S9

Attention: Mark Dallaire

Re: Response to Discussion Paper DIS-12-01: *Protection of Groundwater at Nuclear Facilities in Canada*

The Canadian Nuclear Association (CNA) has approximately 100 members, representing over 71,000 Canadians employed directly, or indirectly, in exploring and mining uranium, generating electricity, and advancing nuclear medicine. Included among our members are the Class I nuclear facilities, uranium mines and mills and nuclear waste management facilities that will be subject to the requirements and guidance outlined in the *Protection of Groundwater at Nuclear Facilities in Canada* Discussion Paper DIS-12-01 [1].

CNA members are committed to environmental stewardship: protecting the land, air and water, both in the communities where they live and work, and globally. To fulfill this commitment, they monitor human health and the environment 365 days of the year, ensuring that both people and the environment (water, air, plants, animals and fish) are protected. They recognize the need to monitor groundwater quality and appreciate the opportunity to comment on Discussion Paper DIS-12-01 [1].

Our members support the general principles of the groundwater protection and monitoring program outlined in Discussion Paper DIS-12-01. Nevertheless, they would like to offer the following specific recommendations (see Attachment for details):

- I. **The Need for Additional Groundwater Protection Requirements is Unclear:** CNA members question the need for additional groundwater protection requirements, given that their facilities are already subject to groundwater protection requirements. There is considerable existing federal and provincial guidance on contaminated site remediation, especially for hazardous substances. If additional guidance is required to promote consistency of approach, our members would recommend that it be developed through the Canadian Standards Association (CSA) N288 series of standards.

- II. **Site-Specific Groundwater Protection and Monitoring Programs Should be Risk-Based:** The requirement to remediate and the screening criteria for appropriate actions should be case- and site-specific. Site-specific monitoring and protection programs should be consistent with the level of risk posed by the contaminants being monitored. Guidance in this area could be developed through the aforementioned CSA groundwater protection standard.
- III. **The Development of a Site Model Should not be Mandatory:** The need to develop a numerical model to aid the site characterization should be determined on a case-by-case basis. It should also be clarified that a conceptual model is required, rather than an advanced model. This and other clarifications could also be provided through the CSA groundwater protection standard.
- IV. **The Requirement to Provide the End-Use Vulnerability Assessment Should be Clarified:** The framework suggests that in the absence of an identified end use, the standard should target the protection of the aquatic, or terrestrial environment. It should be clarified that this is not a requirement for groundwater-specific criteria to be derived from risks to the aquatic, or terrestrial environments. This could be clarified through the CSA groundwater protection standard.

As indicated, the need for an additional regulatory requirement for groundwater protection is questionable. However, in the event that the Canadian Nuclear Safety Commission (CNSC) determines that an additional standard is required, CNA members would encourage the CNSC to ensure that the required groundwater protection and monitoring program be proportionate to the risk. Our members would also ask that the CNSC continue the dialogue with industry stakeholders as the standard is being developed.

Please feel free to contact me (613-237-4262) if you require any additional information.

Sincerely,



Heather Kleb, M.Sc.
 Director, Regulatory Affairs
 Canadian Nuclear Association

Cc.
 Denise Carpenter, CNA President and CEO
 Matthew Hickman, CNA Regulatory Affairs Officer

References

- [1] Canadian Nuclear Safety Commission, 2012. *Protection of Groundwater at Nuclear Facilities in Canada*, Discussion Paper DIS-12-01.

Attachment: Detailed Comments

I. The Need for Additional Groundwater Protection Requirements is Unclear

CNA members question the need for and purpose of further regulatory requirements with respect to groundwater protection at nuclear facilities (Class I), uranium mines and mills and nuclear waste management facilities.

There is nothing unique to the nuclear industry that would require regulation or guidance beyond the comprehensive contaminated site requirements that already exist at both the federal and provincial levels. However, if the CNSC intends to develop and implement groundwater protection requirements for the nuclear industry, the requirements should be informed by the CSA N288 standards. In fact, our members would recommend that the CNSC use the CSA process to develop the groundwater protection and monitoring standard.

It is also unclear how the proposals stated in the Discussion Paper would align with the groundwater protection and monitoring measures that are in place at previously assessed and approved, licensed facilities. Such facilities are already subject to groundwater monitoring, reporting and oversight as part of approved environmental protection programs. A change in regulatory requirements would lead to unnecessary process costs for what are previously assessed and approved groundwater protection and monitoring programs.

II. Site-Specific Groundwater Protection and Monitoring Programs Should be Risk-Based

The Discussion Paper requires that a site characterization be completed to achieve an understanding of: how the facility may influence the environment; the geologic and hydrogeologic factors that control the migration of actual or potential releases to the environment; and the risk of actual or potential releases [1]. CNA members recommend that site characterization also include an assessment of the site baseline and the background water chemistry, to determine whether it is possible to meet the groundwater quality limits. A groundwater protection program should be specific to each site, including site contaminants that are naturally elevated, and proportionate to the risk that the contaminants pose to groundwater and the environment.

CNA members agree that in circumstances where there is a high likelihood of contaminants interacting with Valued Ecosystem Components (VECs), an Environmental Risk Assessment should be conducted to determine the degree of risk. The degree of risk should be factored into the development of targets in site-specific groundwater protection programs. General requirements for groundwater protection do not acknowledge that even though a limit may be exceeded, there is not necessarily a significant risk to the environment or human health. The degree of risk should also be factored into the determination on whether any steps, such as

measures to contain or minimize the spread of contamination, monitoring measures, or remedial measures, are necessary.

III. The Development of a Site Model Should Not be Mandatory

The Discussion Paper states that the development of a hydrological and hydrogeologic model of the site is an important tool in understanding the site characteristics. However, the degree and type of modelling required as part of a groundwater protection program is not clearly defined in the Discussion Paper. CNA members recommend that the CNSC provide some context and clarity around the use of the required modelling.

Similarly, the Discussion Paper does not define “biological communities”. As alluded to above, CNA members are concerned that “biological communities” may be straying from the widely accepted approach of using VECs, such as those used during the environmental assessment process, and including micro-organisms and other bacteria in the consideration of biological communities. CNA members recommend that “biological communities” be limited to fish and other biota, or alternatively, be defined in the context of VECs.

Other phrases and terms, such as “control measures to prevent” and “release” could also benefit from further clarification. It should be clearly outlined that the fundamental concept is to control sources to ensure that the groundwater resource is protected based on its defined end-use and that means of control include prevention and minimization. Authorized (per the environmental assessment findings and decision) and unauthorized releases could also be more clearly distinguished.

IV. The Requirement to Provide the End-Use Vulnerability Assessment Should be Clarified

The Discussion Paper requires that groundwater end use be determined by consulting with municipal, provincial or federal authorities. It then requires that if groundwater is identified as a source of drinking water or irrigation water, sites must protect groundwater to ensure that it meets applicable standards and remains of sufficient quality. If there is no end use identified by provincial authorities, then the Discussion Paper would require that groundwater conditions ensure the protection of the aquatic and / or terrestrial environment.

CNA members support the use of directly applicable end use quality standards to guide the design of groundwater monitoring and protection programs. However, in the absence of an identified end use, the Discussion Paper would impose surface water quality standards for the protection of the aquatic environment. Our members suggest that if there is no identified end use for groundwater, the standard should be applied to the point of potential interaction with the receiving aquatic environment. Therefore the Discussion Paper should clarify that if there is

no identified end use for groundwater that the risk assessment to show protection of aquatic and terrestrial environment be applied at and beyond the point of discharge of ground water back to the surface environment.

From: ole@nrtco.net [<mailto:ole@nrtco.net>]
Sent: Saturday, June 30, 2012 11:59 PM
To: Info
Subject: Comments on Discussion Papers DIS-12-01 and DIS-12-02

Dear Sir or Madam,

Please find attached comments submitted on behalf of Concerned Citizens of Renfrew County on Discussion Papers DIS-12-01 and DIS-12-02.

Thank you for the opportunity to provide comments.

Ole Hendrickson
Researcher, Concerned Citizens of Renfrew County

DIS-12-01 Protection of Groundwater at Nuclear Facilities in Canada

Comments from Concerned Citizens of Renfrew County

June 30, 2012

With regard to the Executive Summary, and the overall intent of this initiative on *Protection of Groundwater at Nuclear Facilities in Canada*, CCRC agrees that regulatory action taken by the CNSC should “ensure that all Class I nuclear facilities, uranium mines and mills, and nuclear waste management facilities have well-designed and robust programs for protecting and monitoring groundwater.”

With regard to the third sentence in the fourth paragraph of the Executive Summary, CCRC agrees that all Class I nuclear facilities, uranium mines and mills, and nuclear waste management facilities should:

- develop site descriptions so as to understand how unauthorized releases of nuclear substances or hazardous substances could contaminate groundwater and negatively impact the use of this valuable resource;
- put in place measures to identify when contaminants may be entering groundwater; and
- have identified practices to remediate contamination, should it occur.

As this applies generally, we ask that this sentence, which begins, “In general, licensees should...” be changed to read “Licensees should...” This will promote a consistent regulatory approach and avoid ambiguity as to whether there might be circumstances under which licensees would not be required to take these steps.

We ask that two additional bullets be added to this list, namely,

- implement a groundwater monitoring program, and report regularly on results; and
- implement remediation practices in the event of unacceptable contamination.

Groundwater that has been contaminated to unacceptable levels should be remediated. We note that this topic is addressed in section 3.6 of the discussion paper.

The final paragraph of the Executive Summary explains that the purpose of the Discussion Paper is to “develop an informed Regulatory Document/Guidance Document to formalize its requirements related to groundwater protection.” This phrase creates ambiguity as to whether the CNSC will develop a regulatory document, with mandatory elements that licensees or applicants must meet; or a guidance document, which “provides direction to licensees and applicants.” Given the importance of groundwater protection, the CNSC should clearly state its intent to develop a regulatory document.

With regard to section 3.1, on Controlling Releases, the discussion paper states that “a fundamental principle of environmental protection is pollution prevention”. CCRC agrees with this statement. The paper goes on to state that “A licensee should therefore implement adequate and reasonable measures to control the potential releases of contaminants to groundwater. The adequacy of such measures should ensure that the risk of contamination is as low as reasonably achievable (ALARA).”

The precautionary principle should be referenced in section 3.1 in the context of controlling releases of nuclear substances or hazardous substances to groundwater. The discussion paper should acknowledge that many aspects of groundwater are imperfectly understood. Similarly, not all nuclear and hazardous substances that may be released from nuclear facilities have been fully characterized with regard to health impacts. Irreversible health hazards are possible. The precautionary principle is applicable to management of risks associated with releases from nuclear facilities, as it compels decision-makers towards action in situations where a serious or irreversible health hazard is a possibility, although the exact probability of the suspected hazard is imperfectly understood. In this context, it should be noted that the *Canadian Environmental Protection Act (CEPA)* contains several references to the precautionary principle. For example, Section 76.1(c) of CEPA states that “When the Ministers are conducting and interpreting the results of an assessment whether a substance specified on the Priority Substances List is toxic or capable of becoming toxic, the Ministers shall apply a weight of evidence approach **and the precautionary principle** [emphasis added].

In section 3.5, on Implementing a Groundwater Monitoring Program, the discussion paper should address the issue of reporting. A licensee should be required to report regularly on results of the groundwater monitoring program, and reports should be made public.

Similarly, reporting should be addressed in section 3.6, on Investigating and Remediating Unauthorized Releases. A licensee should be required to report promptly on any unauthorized or uncontrolled release, and to report on results of an environmental investigation. These reports should be made public.

We note that the discussion paper does not address possible contamination of groundwater arising from improper or illegal disposal of substances originating from nuclear facilities. The concern in this regard is with nuclear substances that are not taken to a licensed nuclear waste management facility. It should be noted in the discussion paper that licensees can have responsibilities for products that they manufacture; hence, the issue of protection of groundwater is may extend beyond the nuclear facilities in a geographic sense. The definition of nuclear facility in the discussion paper includes the phrase “any system for the management, storage or disposal of a nuclear substance.” Nuclear substances contained in products may remain hazardous after the product is no longer in use. In general, licensees involved in distribution of products that contain nuclear substances should identify all pathways by which contaminants may be entering groundwater, and manage risks arising, taking into account the “life cycle” aspects of these products.

Finally, although the discussion paper does not address individual potential groundwater contaminants from nuclear facilities, we would note that the most widespread nuclear contaminant, and the most difficult to control, is tritium.

In the matter of the level of tritium in groundwater, the maximum level should be set at 20 Bq/L, in line with recommendations of the *Ontario Drinking Water Advisory Council, contained in the Report and Advice on the Ontario Drinking Water Quality Standard for Tritium, May 21, 2009*. The Council recommended that the Ontario Drinking Water Quality Standard for tritium should be revised to 20 Bq/L, recognizing that:

- 20 Bq/L relates to health effects from long-term, chronic exposure from drinking water over a life time of exposure of 70 years;
- 20 Bq/L is within the range of the variations considered by the Council (7 Bq/L to 109 Bq/L), for a 10⁻⁶ risk level; and
- 20 Bq/L, based on an annual average, is achievable in drinking water, without significant cost to the nuclear power industry, according to the Canadian Nuclear Association.

Please find attached compiled comments from Environment Canada on two CNSC Discussion Papers:

- February-17-2012-DIS-12-01 - Protection of Groundwater at Nuclear Facilities in Canada

Please contact me if you have any questions regarding the attached comments. Thank you for the opportunity to provide input to the discussion papers.

Regards
Nardia

Nardia Ali
Manager Compliance Promotion and Expert Support
Environmental Protection Operations Division
Environment Canada, Ontario Region
4905 Dufferin Street, Toronto (Ontario) M3H 5T4
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Telephone 416-739-5884 Facsimile 416-739-4405
Government of Canada

DOCUMENT #1: Protection of Groundwater at Nuclear Facilities in Canada:- Discussion Paper DIS-12-01

General comments:

For a uranium mine or mill regulated under the *Metal Mining Effluent Regulations* (MMER), appropriate measures with respect to the control and collection of seepage from tailings, waste rock, and other parts of the operations area¹ must be undertaken to enable operation in compliance with the Regulations.

All seepage from the operations area¹ of a uranium mine or mill that contains any concentration of the substances listed in Schedule 4 of the MMER – arsenic, copper, cyanide, lead, nickel, zinc, suspended solids or radium 226 – would be considered effluent in accordance with the MMER and would be subject to the monitoring and reporting requirements of the Regulations.

¹ “operations area” means all the land and works that are used or have been used in conjunction with a milling or mining activity, including

- (a) open pits, underground mines, heap leaching areas, solution mines, buildings, ore storage areas and waste rock dumps;
- (b) tailings impoundment areas, lagoons and treatment ponds; and
- (c) cleared or disturbed areas that are adjacent to the land and works that are not included in paragraph (a) or (b).

In accordance with subsection 28(1) of the MMER, all effluent and seepage from a tailings impoundment area (TIA) must be discharged through a final discharge point and the quality and flow of effluent and seepage must be monitored on a weekly basis. To be able to operate in compliance with the Regulations, appropriate seepage collection and control measures must be implemented.

An effective seepage control and collection plan is an integral component of any uranium mine or mill design. In the absence of an effective plan, potential issues related to seepage migration from the operations area¹, waste rock, and from tailings dams and impoundments and resulting water quality may occur in the uranium mine and mill operations area¹ and further downstream.

Examples of best practices for seepage control and collection include installation of liners beneath the entire impoundment, constructing drains for seepage collection, constructing seepage collection and pump back/treatment systems, low permeability barriers, construction of low permeability embankments and embankment barriers (i.e. cores and liners), dewatering of tailings prior to deposition, and decreasing hydraulic head by locating the free-water pond away from the embankment. Uranium mines and mills are expected to adopt the option(s) that would make the best environmental and technical sense as part of a good seepage management plan in their mine and mill design.

It is recommended that DIS-12-01 be revised where appropriate to reflect the proper application of the definitions of “effluent” and “deleterious substance” as described in the MMER.

Comments stem not only from Environment Canada’s mandate under the pollution prevention provisions of the *Fisheries Act* and our responsibilities with respect to the MMER, but also from our mandate to preserve and enhance the quality of the natural environment, including water, soil, flora and fauna; conserve Canada’s renewable resources and conserve and protect Canada’s water resources.

Section 2: Context, a well designed groundwater protection program should include “control measures to prevent the release of nuclear and/or hazardous substances to groundwater.” The comment is that in addition to nuclear and/or hazardous substances, the CNSC should also consider the application of and the substances listed in Annex 1 of the “Guidelines for the Assessment of Alternatives for Mine Waste Disposal (September 2011)”.

Section 3: Groundwater Protection proposal, “a facility would be required to have a groundwater monitoring program.” The comment is that the monitoring program for uranium mines and mills regulated by the Metal Mining Effluent Regulations (MMER) must be designed and undertaken in accordance with the MMER.

Section 3.2: “Assessing end-use and vulnerability”.

For your information, Health Canada has expanded its requirements for environmental quality guidelines where drinking water is a consideration. The new requirements include the potential for future drinking water use of an aquifer.. Health Canada's current practice is to compare groundwater to drinking water quality guidelines unless:

- the most likely groundwater aquifer within 500 m of the site has a hydraulic conductivity of less than 1×10^{-6} m/s or yield equal to or less than 1.3 L/min.; or
- natural TDS is greater than 10,000 mg/L; or
- the depth of groundwater is below that which groundwater is naturally non-saline, having a natural concentration of total dissolved solids that is greater than or equal to 4000 milligrams per litre; or
- the "aquifer" is a peat deposit and/or muskeg; or
- the area is industrial and located adjacent to the coastal shoreline; or
- the local municipality or upper-tier municipality has provided a written statement that it concurs with the application of non-potable groundwater criteria to the site (or equivalent response).

Section 3.3: Gathering additional information.

This section should include:

- Collection of current groundwater quality as baseline information to be used to judge level(s) of contamination.
- the physical and geological properties of the media through which the groundwater flows
- Sufficient number of wells appropriately located, as well as proper depths for monitoring wells

Section 3.4 "Characterizing Sources of Releases"

For characterizing sources of releases, a number of potential sources for contaminants are listed. In addition to the sources included in 3.4, the CNSC should consider for Uranium mines and mills, specifically identifying the components that make up the operations area as defined by the MMER. This includes: open pits, underground mines, heap leaching areas, lagoons, and treatment ponds.

The report states, "*Understanding the type of contaminants that might be released to the environment and where they could enter the environment, is essential when designing a groundwater monitoring program (GMP)*".

It should be noted that it is also important to understand the types of indicator contaminants which may be daughter products of sources with relatively short half lives. This will help in the interpretation of the monitoring results to enable a quick response when a 'indicator contaminant is detected.

It may also be necessary to expect some reaction products that may result from contaminant reacting with another chemical in the ground.

Environment Canada just developed a groundwater monitoring plan for the oil sands, it would seem logical to ensure that the recommendations that are being suggested for both industries are consistent, even when the contaminants vary. Greg Bickerton (905-336-4597 or greg.bickerton@ec.gc.ca) worked on the groundwater monitoring program GMP for the oilsand and can be contacted for more information.

Section 3.5: Implementing a groundwater monitoring program

Well depth is an important consideration in ground water monitoring EC therefore recommends that the sentence “*Such a program may require groundwater monitoring wells, the number of which would depend on the site’s geological complexity*”, be modified to read “*Such a program may require groundwater monitoring wells, **the number and depths** of which would depend on the site’s geological complexity*”

4.0: Implementation and Evaluation

There should be a CNSC notification requirement and a requirement for an adaptive management plan to remediate & then update the GMP as more monitoring data are acquired.



Le 27 juin 2012

« **CONFIDENTIEL** »

Monsieur François Rinfret
Directeur
Division du Programme de la réglementation
de Gentilly-2
Commission canadienne de sûreté nucléaire
280, rue Slater
C.P. 1046, succursale B
Ottawa (Ontario) K1P 5S9

Hydro-Québec
Centrale nucléaire de Gentilly-2
4900, boul. Bécancour
Bécancour (Québec)
G9H 3X3

Objet : Commentaires sur le document de travail DIS-12-01 intitulé : Protection des eaux souterraines aux installations nucléaires du Canada

Monsieur,

Le but de cette lettre est de fournir les commentaires d'Hydro-Québec sur le document de travail DIS-12-01 « Protection des eaux souterraines aux installations nucléaires du Canada ».

Avant d'émettre nos commentaires, nous voudrions souligner le fait qu'Hydro-Québec est consciente de l'importance de protéger les eaux souterraines sur le site de Gentilly-2 et l'a démontré par l'implantation d'une infrastructure qui peut contenir les déversements accidentels de contaminants potentiels.

Dans le but de s'assurer de l'efficacité des systèmes, Hydro-Québec a développé un programme de surveillance environnementale radiologique et conventionnel qui couvre les eaux souterraines de la zone contrôlée et de l'extérieur du site. Ce programme a évolué avec le temps pour incorporer le suivi environnemental des nouvelles structures qui ont été ajoutées ainsi que les résultats des nombreuses études qui ont été réalisées au cours des années, telles les évaluations environnementales et les études hydrogéologiques sur la nappe phréatique.

La convenance de ce programme a été validée par l'étude sur l'évaluation des risques écotoxicologiques et toxicologiques (ERET) qui a confirmé que les risques liés à l'exploitation de Gentilly-2, concernant la possibilité de contaminer les eaux souterraines, étaient couverts par le programme de surveillance environnementale. De plus, il y a un seuil d'intervention qui est lié aux souterraines de Gentilly-2 et qui est fixé à 7000 Bq/l.

La CCSN est informée des résultats radiologiques et conventionnels des échantillons prélevés dans les eaux souterraines au moyen du rapport annuel de surveillance de l'environnement du site de Gentilly.

Compte tenu de tous les arguments qui viennent d'être mentionnés, nous voudrions vous faire part de nos commentaires sur le document de travail DIS-12-01, qui reflètent bien la position de l'industrie nucléaire canadienne.

Commentaires

La gestion des eaux souterraines est déjà bien encadrée par des lois provinciales et fédérales. Pour répondre à leurs exigences, Hydro-Québec informe les instances gouvernementales par la publication du rapport annuel. En voulant s'approprier le volet des eaux souterraines, la CCSN va créer un dédoublement qui n'apporterait rien, en ce qui concerne la réduction des risques.

Plus spécifiquement, il y a plusieurs guides canadiens qui prônent la surveillance environnementale tels S-296 de la CCSN, les standards de la CSA N288.4 (surveillance environnementale), N288.5 (surveillance des effluents) et N288.6 (évaluation des risques environnementaux), ainsi que la Loi sur la qualité de l'environnement qui est sous la juridiction provinciale.

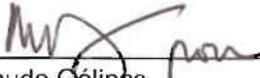
S'il y a un écart à combler dans l'ensemble de l'industrie nucléaire, nous croyons qu'il serait beaucoup plus pertinent de développer un nouveau standard de la série CSA N288.

En ce qui concerne les mesures correctives à prendre en cas de contamination des eaux souterraines, dont vous faites mention dans le document de travail, elles sont incluses dans le règlement sur la protection et la réhabilitation des terrains du MDDEP. Encore une fois, la CCSN va créer un chevauchement et un dédoublement inutile.

Plusieurs études qui ont été réalisées par des consultants font état de la caractérisation des eaux souterraines sur le site de Gentilly-2, de la direction des courants ainsi que de la vitesse de déplacement. Il n'est donc pas requis tel que vous le mentionnez dans le document de travail DIS-12-01 d'évaluer la vulnérabilité des eaux souterraines à la contamination dans la région autour de l'installation.

Nous demeurons disponibles pour toute question supplémentaire à ce sujet.

Recevez, Monsieur, nos salutations distinguées.



Claude Gélinas
Chef Centrale
Centrale nucléaire de Gentilly-2
RL/CG/cf

c.c.: Patricia Veillet
Jean Bélisle
Suzanne Benoît
Robert Boisvert
Patrice Desbiens
Mario Désilets
Stéphane Chapdelaine

Isabelle Gingras (CCSN - Ottawa)
Charles Moreau (CCSN - Ottawa)
Jean-Baptiste Robert (CCSN - Ottawa)
Bureau de la CCSN - G2
Bureau du chef de quart
Dossier actif
Richard Laporte

From Mr. Steve P. Staniek

June 30, 2012

Re: DIS-12-01 Effluent Release Limits and Groundwater Protection at Nuclear Facilities

To: CNSC staff,

I am retired from McMaster University after serving in the Health Physics Department for 37 years. In response to the CNSC's recent proposed initiative for groundwater monitoring programs at nuclear facilities I submit the following comments, which I also submitted in the appropriate sections in the on-line form.

COMMENTS:

1. This initiative comes very late in the nuclear game. Residents living in communities where nuclear facilities are located will be shocked, as was I, to hear that the nuclear regulator has failed to exercise its mandate to protect the environment (groundwater), and by extension the host communities, against potentially significant and unnecessary radiological releases from nuclear facilities into the groundwater by not implementing gmps at nuclear sites several decades ago. It raises the question of competence and wisdom at the AECB-CNSC.

2. The McMaster Nuclear Reactor should be one of the first facilities to initiate a gmp, immediately. There is sufficient evidence to suggest that the containment may have lost its integrity over time to the point where primary pool water containing long-lived isotopes could have escaped through a network of tiny hairline cracks in the base, allowing radioactive contamination to entered Hamilton's groundwater.

- a) groundwater monitoring should be conducted UNDER THE STRUCTURE itself, as well as prescribed distances from the facility.
- b) even if no evidence of radioactive contamination is detected at this time the gmp requirement should remain in place due to the venerable age of the containment building, and proximity of large population on and off campus.
- c) in addition, to protect pedestrians walking the McMaster campus near the MNR, GROUND LEVEL air monitoring should supplement rooftop monitoring. The close placement of campus buildings in labyrinth geometry can, under the right weather conditions, channel airflows away from rooftop sampling stations, rendering them largely ineffective. People walking between buildings could be exposed to volatile radioactive species that have combined with dust or water particles in the atmosphere, and fall back down into the breathing zone of pedestrians.

Thank you for your attention,

Sincerely,

Steve Staniek.



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ADMINISTRATION

2012 MAY 15 AM 8:10



4.05.02
37-26-0-0
Elder, P.

Peter H. Elder, Director General
Canadian Nuclear Safety Commission
Directorate of Nuclear Cycle and Facilities Regulation
280 Slater Street, PO Box 1046, Station B
Ottawa, Ontario K1P 5S9

May 10, 2012

Re: Port Hope Consideration for CNSC Discussion Paper, DIS-12-01, *Protection of Groundwater at Nuclear Facilities in Canada*

Dear Mr. Elder,

The Municipality of Port Hope has reviewed the discussion paper, DIS-12-01, *Protection of Groundwater at Nuclear Facilities in Canada*. Overall, it was found to be a very well thought out and presented paper. The Municipality is please to see that the CNSC is considering protection of groundwater resources within the vicinity of Class 1 facilities. I realize that the comment period on the report is closed, however, as host to several current and future Class 1 Nuclear Facilities (Cameco, and Port Hope Area Initiative Long Term Waste Disposal Site) as well as our unique history and involvement in the nuclear industry, we are very interested in the progression of this topic and have some general comments for consideration.

While this report appears to be well done and addresses groundwater contamination from Class 1 nuclear facilities, it does not appear to cover the situation in Port Hope or other existing contaminated areas that have resulted from past nuclear practices. As such, we recommend that the paper and future guideline be expanded to include "materials specific to the full nuclear fuel chain" not just the nuclear energy cycle. We also suggest that risk assessment criteria for remediation be only used within the boundaries of the nuclear facilities, with normal Health Canada and / or Provincial standards to be applied outside of the facilities' boundaries. This approach would provide not only the maximum protection of the groundwater resource, but also regular citizens that live near nuclear facilities. It will also help to address potential stigma that may develop associated with not only the impacts, but the perception of special or unique areas/zones in the vicinity of facilities.

The Municipality of Port Hope looks forward to the evolution and resulting actions taken by the CNSC in regards to this discussion paper and future guidelines.

If you have any questions, please do not hesitate to contact me at the Municipality of Port Hope, 905-885-4544.

Yours Sincerely,

A handwritten signature in black ink, appearing to read 'R. Cannon', with a long horizontal flourish extending to the right.

R. Carl Cannon, CAO

Cc: Linda Thompson, Mayor
Dave Hardy, Principal, HSAL
Anthony E. Hobbs, MPRT



Énergie NB Power

Nucléaire Nuclear

Point Lepreau Generating Station
PO Box 600, Lepreau, NB
E5J 2S6

TU 06374
PICA 12-1798

June 27, 2012

Mr. Francois Rinfret, Director (Acting)
Point Lepreau Regulatory Program Division
Canadian Nuclear Safety Commission
P.O. Box 1046, Station B
Ottawa, Ontario
K1P 5S9

Dear Mr. Rinfret:

Subject: CNSC Discussion Paper DIS-12-01: Protection of Groundwater at Nuclear Facilities in Canada

The purpose of this letter is to provide NB Power comments on CNSC's Discussion Paper DIS-12-01 "*Protection of Groundwater at Nuclear Facilities in Canada*".

To put our comments in context, we wish to emphasize that NB Power is fully committed to the protection of the groundwater resources at Point Lepreau, and has well developed systems for containing and collecting potential contaminants, and preventing spills of potential contaminants.

To ensure the efficacy of these systems, NB Power has a well established and mature groundwater monitoring program that covers both the onsite and offsite areas at Point Lepreau. This program has evolved over time, expanding as required to reflect new structures and facilities, and incorporates the input of the many studies conducted over the life of the station, including several environment assessments, geotechnical investigations, and related work.

The appropriateness of this program was confirmed through an Ecological Risk Assessment which confirmed that the monitoring program was appropriate for the risks, and that there were no additional environmental protection measures required for the contaminants of concern at Point Lepreau.

.../2

Finally, over the past several years, the Commission has implicitly and explicitly accepted the current programs at Point Lepreau, both through the most recent Environmental Assessment decision, and through the licence renewal process. With these points in mind, we have the following comments on the Discussion Paper, which we believe are reflective of the industry as a whole.

General need

Given the existing federal and provincial regulatory framework related to groundwater issues it is not clear to us that there is a need for a new CNSC document related to groundwater. If a new CNSC regulatory document is produced, we are concerned it will lead to regulatory duplication and overlap with no significant reduction in risk.

Specifically, there is existing directly related guidance from the Canadian Council of Ministers of the Environment, under several CNSC documents (notably S-296 “Environmental Protection Policies, Programs ...”), through the ISO14001 Standard, and through CSA N288.4 (environmental monitoring), N288.5 (effluent monitoring), and N285.6 (environmental risk assessment) standards, as well as in provincial requirements.

If a systemic gap is identified, we feel that the preferred process would be to develop a new CSA N288 document, using a risk based approach, and referencing existing CSA standards including N288.6 (environmental risk assessment), CSA N288.4 (environmental monitoring) and CSA N288.5 (effluent monitoring).

Remediation

We feel that there is already a well developed and systematic suite of guidance and regulatory documents to address contaminated sites once an issue is identified. As such, the inclusion of remediation in the scope of the proposed regulatory framework appears to be an example of un-necessary duplication and overlap, in particular with provincial requirements. As noted above, CNSC should focus on closing any systemic gaps, and reducing risk, instead of duplicating existing regulatory regimes.

Regional information and assessments

There are several inferences in the Discussion Paper to the licensee having to generate regional level information or conduct “regional” assessments for current and potential groundwater uses and vulnerability. Except in very exceptional cases, any groundwater protection or contamination issues are very site specific, and not regional in nature. Suggesting that the scope of the licensee's obligations regarding groundwater should automatically go beyond the site boundary is unduly onerous and, in some instances inappropriate. We feel it is more appropriate to use existing regional information on both vulnerability and potential end-uses where it is available, and if there is a specific issue that needs to be addressed, to do so under the existing provincial framework, or as part of a CSA document.

Site model

The development of a **site model** should not become a mandatory requirement, rather the need should be based on risk and considered on case-by-case basis. Guidance as to when numerical model would be beneficial could be established as part of a **CSA document** on groundwater monitoring program.

If you require additional information, please contact Charles Hickman at 506-659-7061 or CNHickman@nbpower.com.

Sincerely,



Wade J. Parker
Station Director

WJP/CNH

cc. Mark Dallaire, Pierre Belanger, Jeff Ramsay, CNSC Site Office,
consultation@cnscc.gc.ca (CNSC)

Wayne Woodworth, Charles Hickman, Matt Gorman, Joe McCulley, Scott Robertson,
Kathy McRae (NBPN)



NUCLEAR WASTE MANAGEMENT ORGANIZATION SOCIÉTÉ DE GESTION DES DÉCHETS NUCLÉAIRES

June 12, 2012

Regulatory Framework Division
Canadian Nuclear Safety Commission
280 Slater Street
Ottawa , Ontario
K1P 5S9

NWMO Comments on Discussion Paper DIS-12-01

Attached are comments on the discussion paper DIS-12-01 "Protection of Groundwater at Nuclear Facilities in Canada" on behalf of Nuclear Waste Management Organization (NWMO) staff. These comments are mainly from the perspective of applicability to Deep Geologic Repositories.

Please contact me at 647-259-3027 if you have any questions on these comments.

Sincerely,

Atika Khan
Director,
Regulatory Affairs

Attach.

Attachment

NWMO Comments on CNSC Discussion Paper DIS-12-01 Protection of Groundwater at Nuclear Facilities in Canada

1.0 Introduction

- There needs to be an acknowledgement of the different types of Nuclear Facilities and their association with groundwater systems. Surface or near-surface nuclear facilities pose a potentially greater risk to existing and future ground/surface water resources than does a deep geologic repository.
- The purpose and expectations for a groundwater monitoring system should be outlined in the discussion document – impacts should include both quality and quantity.

2.0 Context

- The definition of groundwater as related to the proposed GD/RD needs clarification – operationally it should include potable and non-potable water in the subsurface that under a gradient could flow. “Immobile water in low-permeability bedrock” should not be included in the definition of groundwater referred to as “a valuable natural resource for all Canadians” in the first paragraph under “Context”. Water residing in the pore space of low permeability rock that is effectively immobile should be referred to as porewater.
- Based on the above comment, the Groundwater Protection Program (GPP) and the Groundwater Monitoring Program (GMP) should be clearly stated as being applicable to “groundwater resource” with the exception of immobile groundwater, such as in low-permeability bedrock.
- There needs to be improved clarity with respect to the roles and purpose of a GPP and the GMP. The former seems to represent an assessment of waste structure containment, integrity and monitoring for release (water borne/air borne). The latter, direct sampling of groundwater at the site perimeter to allow objective assessment of groundwater quality/quantity impacts, if any, arising from waste facilities operation.
- First 5-points on page 4
 - o ‘Clarify expectations for the protection of groundwater’ - stated twice (in 2nd and 5th bullet)
 - o Issue of Federal/provincial water quality standards/objectives expected for use by licensee not addressed
 - o Issue of point of measurement for GMP not mentioned (e.g. where are measurements required - inside licensed facility, boundary of licensed facility, boundary of a designated or protected area; point of impingement)
 - o Issue with respect to the overall design of a groundwater monitoring system - but more specifically the monitoring well network to allow detection of operational influences - not addressed
 - o Should ideally separate points related to GPP and GMP by section or underline – this would avoid confusion.
- Last three points – need to be improved such that they reflect the development (through site characterization) of a conceptual understand of the groundwater system to identify sub-surface pathways (aquifers) for potential lateral offsite contaminant migration and points within the

- groundwater system requiring routine monitoring to yield reliable measures of site performance/impact.

3.0 Groundwater Protection Proposal

- The document seems repetitive noting similar concepts and expectations as in proceeding section, for example, the description of the GPP. Please edit.
- Section 3.0 , par. 3 provides first indication that GMP is part of a GPP – this should be clarified earlier in the document using the 6 elements listed. The GPP elements listed on page 5 are not identical to those listed on pg. 3 – should check to ensure consistency
- Section 3.1 - It would seem that the principle of pollution prevention (i.e., source containment) be part of the facility licensing not the GPP. Please clarify.
- Section 3.1 - It is not clear that the last paragraph relates to the issue of controlling releases – please check
- Section 3.2 - There needs to be an explanation of expectations to assess groundwater system ‘vulnerability’. This is not well explained in the vulnerability section (2 sentences) or the glossary definition.
- Section 3.2 - Need to clarify statement ‘select the level of groundwater protection required’ – if there are graded levels these should be stated.
- Section 3.2 - It is not clear that all bullets would be associated with an ‘end-use’ study assessment – see bullets 4 and 5 – please check.
- Should state the purpose of an ‘end-use’ assessment (i.e., identify potential receptors in the vicinity of the nuclear facility) and how it could relate to expectations for the design of the groundwater monitoring system.
- Section 3.3, par 1 bullet 2 – spelling - ‘hydrogeologic’
- Section 3.3 - There needs to be improved clarity on expectations for site characterization studies necessary to sufficiently understand groundwater system(s) intersected by the waste management facility such that an effective GMP could be rationalized and proposed. The 3 bullets at the end of the section are inadequate.
- Section 3.3 - It is not clear why terminology routinely used in discussion of groundwater protection is not referred to in this document – for example ‘aquifer’.
- Section 3.3 - What is meant by the ‘Development of a site model’ – conceptual, numerical, both or other?
- Section 3.5, par. 1 - Implies that a GMP could be implemented without groundwater monitoring wells. Please explain.
- Section 3.5, par. 2 - Expectations for a groundwater system need to be explained to ensure proper design and implementation (i.e. the correct data are collected at the correct points at the correct frequency to allow detection of natural/operational groundwater quality/quantity influences)
- Section 3.5 - The stated CSA standard sections provide only broad guidelines for environmental monitoring program, sample collection and data interpretation – this should be stated. Ideally, the CNSC with the licensee would agree on requirements for these issues perhaps using the principles listed in the CSA standard.
- Section 3.6 - This section is vague on expectations for operating targets, based on receptor and regulatory criterion that should be established to understand the degree of impact and nature of environmental investigation/response that is required. There needs to be clarity on how to establish operating targets for a site-specific groundwater monitoring program.

Also, it can be clarified in this Section that contaminant release from a deep geologic repository into surrounding low permeability rock can be considered in the Normal Evolution safety case basis without it being classed as an "unauthorized or uncontrolled release".

4.0 CNSC Implementation and Evaluation

- Section 4.0 - The objectives of a GPP (as noted) are not listed – please check
- Section 4.0 - CNSC implementation suggests that routine assessment of the GMP/GPP by the CNSC is not required – Is this correct?

5.0 Feedback and Questions

- Section 5.0 - The document discusses concepts for a GPP/GMP but does not provide guidelines/expectation that offer clarification on how to devise an appropriate groundwater monitoring program - this needs to be improved in future drafts. The following points should be considered:
 - Purpose and objectives of a GPP and a GMP need to be clearly stated
 - Design guidelines for a GMP need to be stated – including design of a groundwater monitoring well network to detect potential operational influences
 - Appropriate use of Federal/Provincial groundwater quality standards needs to be stated
 - Development of operation targets that govern environmental response in a GMP need to be stated
 - QA/QC expectations should be noted

Ministry of the Environment

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Ministère de l'Environnement

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May 15, 2012
Canadian Nuclear Safety Commission
P.O. Box 1046, Station B
280 Slater Street
Ottawa, Ontario
K1P 5S9

Dear Sir/Madam:

Re: Comments from the Ontario Ministry of the Environment Eastern Operations Division on the Canadian Nuclear Safety Commission Discussion Papers DIS-12-01 & DIS-12-02

Thank you for the opportunity to provide comments on the two (2) recently released discussion papers (Papers DIS-12-01 and DIS-12-02).

The Ontario Ministry of the Environment Eastern Region Operations Division has been involved with conducting abatement activities and providing review of hydrogeological and hydrological assessment reports for several nuclear related facilities or projects in Eastern Ontario. These projects include the Port Hope Area Initiative clean-up, the Cameco Conversion and Fuel Manufacturing facilities in Port Hope, as well as several former uranium mines located in Eastern Ontario that continue to be regulated by the CNSC. The MOE Eastern Region Technical Support Section is pleased to provide the following comments.

Generally speaking, the approach taken by the CNSC is acceptable. However there are some concerns with respect to the level of cooperation with other jurisdictions expressed in the documents. Many jurisdictions have specific regulations, guidelines and/or policies in place to deal with releases to the environment and protection of groundwater, surface water and air. There should be an inherent understanding in these documents that when the CNSC is dealing with releases or is establishing compliance limits for the protection of groundwater at their facilities, local, provincial or other federal regulators should be consulted.

Discussion Paper DIS-12-02 Process for Establishing Release Limits and Action Levels at Nuclear Facilities

1. The release limits and action limits proposed to be used at nuclear facilities do not take into account other relevant jurisdictions. For example, releases into the natural environment may have impacts on other parties covered under provincial jurisdiction. Many provinces have release limits and action levels that should be considered when setting limits/levels at nuclear facilities, particularly for non-radiological parameters (i.e. bulk uranium, ammonia/nitrate, fluoride, etc.).
2. The use of BATEA (Best Available Technology Economically Achievable) is an MOE approved method when designing effluent treatment systems. However, the MOE has specific requirements in policies on how to develop and what is acceptable BATEA. It is important in these cases that the relevant provincial regulations/policies be contemplated by the CNSC when developing action levels and release limits.
3. The CNSC document proposes to use mixing zones when establishing release limits for hazardous substances. The MOE has specific policies dealing with how to develop and when mixing zones can be used. These should also be contemplated by the CNSC. Further, other regulations/acts such as the Fisheries Act and the Ontario Water Resources Act will not allow mixing zones for certain hazardous substances.

If you have any questions regarding these comments please do not hesitate to contact me at 613- 540-6884 or at peter.g.taylor@ontario.ca

Yours truly,

Peter Taylor
Manager, Technical Support Section, Eastern Region

PT/gl
c: Hope Boehm

June 29, 2012

File No: N-00531 (P)
CD# N-CORR-00531-05756

OPG Proprietary

Mr. Mark Dallaire
Director General
Regulatory Policy Directorate

Canadian Nuclear Safety Commission
280 Slater Street
Ottawa ON
K1P 5S9

Dear Mr. Dallaire:

OPG Comments on CNSC Discussion Paper DIS-12-01, "Protection of Groundwater at Nuclear Facilities in Canada"

- Reference 1. CNSC Information Bulletin 12-06, "Invitation to comment on Discussion Paper DIS-12-01, Protection of Groundwater at Nuclear Facilities in Canada", February 17, 2012.
- Reference 2. CNSC Information Bulletin 12-10, "Extension of deadline to comment on Discussion Papers DIS-12-01, Protection of Groundwater at Nuclear Facilities in Canada and DIS-12-02, Process for Establishing Release Limits and Action Levels at Nuclear Facilities", March 19, 2012.

The purpose of this letter is to provide OPG Nuclear's comments on the CNSC Discussion Paper DIS-12-01, "Protection of Groundwater at Nuclear Facilities in Canada", as requested in References 1 and 2.

OPG supports CNSC's proposal to clarify and formalize its requirements related to groundwater protection through the development of a guidance document. A guidance document would set expectations with respect to the essential elements of a groundwater protection program and ensure consistency in groundwater protection practices at all nuclear facilities.

OPG believes the expectations with respect to a groundwater protection program should be established through the Canadian Standard Association (CSA) process. CSA has been very successful in developing standards related to environmental protection at nuclear facilities, including CSA N288.1, .4, .5 and .6. The CSA process provides an effective mechanism for obtaining input from affected stakeholders, its process is efficient and the resulting standards are of high quality. OPG would support and participate in the

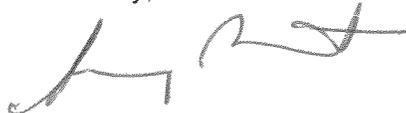
development of a groundwater protection program through the CSA process. It should be noted that CSA N288.7, on groundwater protection programs is currently on the CSA 10-year plan.

In setting the expectations and requirements for a groundwater protection program, OPG urges the CNSC to consider the following:

1. The program should be based on risk and consistent with the risk based approach used in CSA N288.6, .4 and .5.
2. The requirements to provide the end-use and vulnerability assessments should be evaluated and established as part of the development of the groundwater monitoring program by the CSA process.
3. With respect to the expectation to remediate the site by the licensee, the requirements to remediate and the screening criteria for appropriate actions are site and case specific, and as such OPG recommends that they be developed as part of a CSA standard on a groundwater protection programs.
4. The development of a site model should not be a mandatory requirement. The need to conduct a numerical model to aid in site characterization should be determined on a case-by-case basis and should be established as part of a CSA standard on a groundwater protection programs.

OPG respectfully requests an opportunity to discuss these comments with the CNSC prior to their final disposition.

Sincerely,



Barry Fleet For.
Richard MacEacheron
Director, Nuclear Regulatory Affairs