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THE CONTAMINATED LANDS EVALUATION AND ASSESSMENT NETWORK PROGRAM

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ABSTRACT

The (Contaminated Lands Evaluation and Assessment Network) CLEAN Program is a very large undertaking by the recently established Canadian Nuclear Safety Commission (CNSC), replacing the Atomic Energy Control Board (AECB). The scope of the program has changed since its inception, but the overlying justifications and methodology have not. The program was developed as a systematic way to approach the evaluation of regulatory requirements for contaminated sites that were not licensed under the old Atomic Energy Control Act (AEC Act) for various reasons.

The program requires the Commission and Commission staff to exercise new powers, or old powers in new ways. This requires interpretation of the Act and Regulations. Many of the issues being addressed by the program are evolving and complex. This requires both a clear vision of the mandate of the program and the ability to be flexible in developing solutions, within the regulatory framework of the Commission, which do not place undue hardship on the potential proponent.

The mandate of the program is to recommend regulatory solutions which will ensure that contaminated sites, previously unlicensed by the AECB, do not pose undue risk to workers, the public or the environment.

Background

On May 31, 2000 the Nuclear Safety and Control Act (NSC Act) came in to force, replacing the Atomic Energy Control Act of 1946. This modern Act and its associated legislation was designed to ensure that the public, workers and the environment experiences no undue risk associated with nuclear activities in Canada. As a result of the NSC Act the Atomic Energy Control Board (AECB) has become the CNSC.

Of all the changes associated with the new Act, 5 in particular combine to require previously unlicensed contaminated sites to be evaluated under the new regulatory regime.

1. The NSC Act now binds the crown (federal and provincial government departments and agencies).

2. The change of the licensing trigger from a soil concentration of 1SQ/kg (scheduled quantity per kilogram) to a total inventory of 1EQ (exemption quantity).

3. The public dose limit changed from 5 mSv/a to 1 mSv/a.

4. The NSC Act requires licensees to control all risks (radiological and non-radiological) associated with their activities, where previously the AEC Act only addressed radiological impacts of licensed activities.

5. The NSC Act contains specific requirements for the possession, use and control of nuclear substances on contaminated lands.

These changes impacted on approximately 500 sites which were previously identified as contaminated, but were not licensed by the AECB. These sites now required assessment, and verification of the appropriate level of regulatory control to be exercised under the NSC Act. Furthermore, regulatory positions need to be redrafted regarding municipal and industrial landfills, scrap metal yards, deep well injection, and abandoned mine sites.

The Program

In order to keep track of the sites being evaluated and to assure consistency in the approach, and ultimately the recommendations and their application, a program has been developed called the Contaminated Lands Evaluation and Assessment Network (CLEAN). This program involves numerous divisions within the CNSC and liaison with other government agencies.

Phase one of the evaluation process requires verification of, often dated, information on file and site assessments using basic criteria related to radiological inventory and dose. Phase two requires recommendations on the level of regulatory control to be made. These will be communicated to the appropriate authority. Phase three will be the implementation of the recommendations and verification of all actions.

The objective is to complete the process for all major sites by December 1, 2001. The sites should be brought into compliance with the NSC Act shortly there after.

The challenges associated with this program include questions of ownership; responsibility for licensing and remediation; projecting future land use; native lands claims; remoteness of some sites; budget and planning considerations; and the number of sites involved. Complicating the process are various issues of physical scale versus hazard, the lack of information for some sites, and the inevitable perception problems associated with any changes in the application of the law.

The forces working toward the timely completion of the program include the fact that the major sites were previously, relatively well characterized; the program is based on the changes in the regulatory regime, not correcting past actions; the program fits into a number of ongoing programs from other

departments; and the generally positive outcome of the program from the perspective of many stakeholders.

Preliminary results for some types of sites indicate that a minimum number of additional CNSC licenses will be required, most sites will require some form of institutional control to assure control and containment of mildly contaminated materials, and some sites may be exempted from the licensing process all together. A very few sites will receive orders for immediate remediation.

The Sites

It was recognized very early in the program that complex factors would make it difficult to apply exactly the same evaluation process to all of the sites. Complicating factors included geographical distribution of some sites; the magnitude of the radiological inventory; the form of the contamination; the potential for off-site impacts; accessibility of the sites; site ownership; other agencies programs; ongoing remediation work.

These factors tend to exert themselves similarly at similar sites. Therefore the best approach to take was to group the sites into 'sectors'. Each sector could be approached in a tailored way, with overall consistency between sectors being based on health and safety. The sectors identified for this program were:

1. Historic contaminated lands sites
2. Idle mine sites
3. Deep well injection sites
4. Municipal landfills (modern)
5. Municipal landfills (closed/historic)
6. Industrial landfills
7a. Scrap metal yards (with portals)
7b. Scrap metal yards (sans portals)
8. Radium licensing sites
9. Radium possession sites
10. Waste disposal facilities

The Triggers

As listed above, five potential regulatory triggers exist. Often more than one trigger exists. In these cases the impact on the program is usually to increase the complexity of appropriate solutions.

1. The NSC Act now binds the crown.

This change impacts primarily on Provincial governments, since most federal departments voluntarily accepted regulatory control under the AEC Act. Contaminated lands under the control of Provincial governments are almost exclusively idle mine sites.

2. The change of the licensing trigger from a soil concentration of 1SQ/kg (scheduled quantity per kilogram) to a total inventory of 1EQ (exemption quantity).

This change impacts primarily on historic contaminated lands sites. These sites were identified during the 1970's and 1980's as a result of Federal / Provincial joint programs on radioactive contamination. Many of the more northern contaminated lands were identified as a result of other Federal government programs including health studies and the search for components of the Cosmos 954 satellite crash in 1978.

Previously some sites were remediated to the upper limit of local background. Many other sites were not remediated, for lack of resources and the fact that they did not exceed 1SQ/kg.

3. The public dose limit changed from 5 mSv/a to 1 mSv/a.

This change had little impact on the identification of sites. The 1mSv/a limit was being informally applied to site evaluation long before it was made into law. However, this limit plays a strategic role in evaluating the level of regulatory control exerted on a site.

4. The NSC Act requires licensees to control all risks (radiological and non-radiological) associated with their activities, where previously the AEC Act only addressed radiological impacts of licensed activities.

Although this has required many adjustments to existing approaches to licensed facilities, it has not generated any new sites that were not already triggered by either 1,2 or 3 above. It is, however, an important consideration in the final regulatory dispositioning of sites identified under this program.

5. The NSC Act contains specific requirements for the possession, use and control of nuclear substances on contaminated lands.

This has not generated any new sites that were not already triggered by either 1,2 or 3 above. It is, however, an important consideration in the final regulatory dispositioning of sites identified under this program. Specifically, if the site is likely to be perceived by the public as a hazardous site, it is important to (a) have the site rigorously characterized by the potential licensee, and (b) disposition the site early in the final stages of this program.

The Process: Phase 1

Each site will proceed through three phases. At any point in time, different sites may be in any of the three phases. Where appropriate sites are being considered as sectors and will undergo "class assessments".

As explained below, the trigger for evaluation is a radiological inventory of more than 1EQ. This applies to sites which were not previously licensed under the AEC Act.

Section 26 of the NSC Act restricts virtually all activities, subject to the regulations, to licensed activities. Specifically:

> 26. Subject to the regulations, no person shall, except in accordance with a licence,
>
> (a) possess, transfer, import, export, use or abandon a nuclear substance, prescribed equipment or prescribed knowledge;
> (b) mine, produce, refine, convert, enrich, process, reprocess, package, transport, manage, store or dispose of a nuclear substance;
> © produce or service prescribed equipment;

and Section 5(1) of the Nuclear Substance and Radiation Devices Regulations states:

> 5.(1) Subject to subsections (2) and (3), a person may carry on any of the following activities without a licence to carry on that activity:
>
> (a) possess, transfer, import, export, use, mine, produce, refine, convert, enrich, process, reprocess, manage or store a nuclear substance, if the quantity of the nuclear substance does not exceed its exemption quantity;

It is Section 5(1) which triggers the evaluation process for most sites. The previous requirement of 1 Scheduled Quantity (1SQ) per kilogram allowed many mildly contaminated sites to go unlicensed regardless of their inventories.

Once triggered, the next step is to determine whether or not the site conditions, under reasonable circumstances, could lead to an exposure to a member of the public of more than 1 mSv/a. If this is the case one of two options exist, there is a need to either issue an order for remediation under Section 46 of the NSC Act, or inform the party in control of the wastes that a licence is required for possession of the radionuclides on site. Orders will be discussed below. The licensing option allows the CNSC to establish and monitor conditions at the site which meet the ALARA requirements of the Commission.

If the site will not, under reasonable circumstances, lead to an exposure to a member of the public of more than 1 mSv/a it will still be examined for potential future risk, and risk to the environment from associated non-radiologic materials. This assessment needs to account ALARA, and the current level of regulatory control by other regulators.

If as a result of the assessment the site could pose an unreasonable risk to workers, the public or the environment two options can be considered. The first is a short-term licence to allow mitigation of the risks to take place. The second is an order under Sections 46 and 47 of the NSC Act. This section states:

> 46.(3) Where, after conducting a hearing, the Commission is satisfied that there is contamination referred to in subsection (1), the Commission may, in addition to filing a notice under subsection (2), order that the owner or occupant of, or any other person with a right to or interest in, the affected land or place take the prescribed measures to reduce the level of contamination.

Even if no imminent risk exists, two options can be considered. Section 7 of the NSC Act allows the Commission to exempt the site from regulatory control. This can be used to permanently exempt a site or to exempt from licensing with some conditions. The second exemption could include restrictions on land use, or transferring some regulatory authority to another regulatory agency.

The Process: Phase 2

After a site has been evaluated under Phase 1, the results of the evaluation will be discussed with the party in control ("owner") of the site. If possible, efforts will be made to resolve any requirements to minimize undue hardship on the owner. The intent of the program is to assure that no undue risk to people or the environment exists at the site. The specific details of how this is achieved should be determined by the owner. The CNSC will provide benchmarks and standards to be met. If practical, technical assistance can be provided through the licensing process.

After the owner has been informed, regulatory recommendations will be drafted for CNSC consideration. These recommendations will be communicated to senior management or the Commission as appropriate. Each recommendation will contain documented justification and will be related to recommendations for similar sites to demonstrate consistency in regulatory approach.

With concurrence from senior management, the process will proceed to Phase 3, implementation.

The Process: Phase 3

Implementation of the recommendations will require a variety of tools, some previously alluded to. Issuing licences will follow the standard licensing track. Issuing orders requires the exercising of powers described in the NSC Act. The process is described in the NSC Act and guides have been drafted. Exempting sites requires approvals from the Commission. The process for obtaining these approvals is detailed in the CNSC Rules of Procedure. Placing notes on the Land Registry or imposing land use zoning restrictions requires the cooperation of other levels of government. Possible transferring of regulatory responsibility for a site requires the Commission to exercise new powers granted under the NSC Act and the cooperation of other Federal and Provincial government agencies.

Lessons Learned

It is difficult to discuss conclusions in mid-stream. Reporting on practical experience gained to date is more appropriate. As of this writing, the program is on track. Phase one is nearly complete for many sectors.

The greatest obstacle to on-time implementation of solutions will be financing. Many of the "owners" of the contaminated lands operate on pre-approved budgets and have very limited access to special funding. This will lead to interim measures being imposed to ensure safety and control.

Private property (individual households) issues are extremely difficult to deal with under this program. It is unreasonable to assume that a private landowner can comply with licensing requirements or financially support remediation. In most cases a Federal program already exists to perform remediation, but has limited financing. A temporary exemption may be required in order to allow other programs to budget and plan for requirements under this program.

The status quo is based on decisions made in the past. Communication of new requirements often involves questions of policy that predate the NSC Act by decades. This discussion needs to be handled delicately since most of the people involved are not available and hind-sight interpretation is usually inaccurate. Simply repeating that the program is completely the result of requirements under the new Act and Regulations is the most productive approach.