FOURTH REVIEW MEETING OF THE JOINT CONVENTION ON THE SAFETY OF SPENT FUEL MANAGEMENT AND ON THE SAFETY OF RADIOACTIVE WASTE MANAGEMENT

CANADA'S RESPONSES TO QUESTIONS TO ITS FOURTH NATIONAL REPORT

MAY 2012

Joint Convention – Responses to Questions Posted to Canada in 2012

Q. No. 1	Country Romania	Article Article 12	Ref. in National Report Section H, Page 90
Question/ Comment	What are nuclear power plants doing with spent molecular sieve used inside driers?		
Answer	The removal of spent drier desiccant is scheduled periodically and the waste is sampled and analyzed, then packaged in drums and sent to the Western Waste Management Facility for storage as low-level radioactive waste.		
Q. No. 2	Country Romania	Article Article 11	Ref. in National Report Section H, Page 90
Question/ Comment	Which are the practical criteria used for waste clearance within power plants?		
Answer	Workers classify waste as either “active” or “likely clean”. Active waste is further segregated (incinerable, compactable, non-processable, etc.), packaged, and shipped to the Western Waste Management Facility. Likely clean waste (waste that the worker judges as not contaminated) is collected, surveyed and verified to be free of radioactivity using approved procedures and then unconditionally transferred offsite as not radioactive.		
Q. No. 3	Country Romania	Article Article 4	Ref. in National Report Section G, Page 79
Question/ Comment	1. What is the predicted actual life of MACSTORE storage? 2. What is the document that analyses the extension of the life beyond the initial 50 years value?		
Answer	1. MACSTOR modules are designed to store spent fuel reliably for at least 50 years. This service life is achieved through regular inspection and maintenance of the modules. 2. There is no document specifically intended to analyze the reliability and safety of operating MACSTOR modules beyond the expected operational design life; however, a process for managing aging effects on concrete structures, such as MACSTOR modules, is being developed by Hydro-Québec. MACSTORs, the first of which came into service in 1995, are subject to periodic inspections to ensure their structural integrity, thereby providing for the protection of the public, workers and the environment. Although the design life was 50 years, it is recognized that some containers may have a shorter or longer operating life.		

Q. No. 4	Country United Kingdom	Article Article 15	Ref. in National Report Section 5.1.7.1.1, Page 175
Question/ Comment	Waste Management Area A: The report notes that 'Groundwater monitoring data collected to date have encountered total beta, gross alpha and strontium-90 in some of the sample wells.' 1. What levels of total beta, gross alpha and strontium-90 are found in groundwater? 2. Has this information been used to inform any long-term safety assessment or remediation strategy?		
Answer	1. Groundwater monitoring data indicate that the quality of groundwater at Waste Management Area A (WMA A), at Chalk River Laboratories (CRL), has remained stable since many parameters show stable or improving conditions; however, the groundwater quality does remain affected by past operations at CRL. The levels of total beta, gross alpha and strontium-90 (Sr-90) vary depending on the locations of the monitoring wells. In general, the levels of total beta range from 10 to 7,740 Bq/L, and the range of Sr-90 is from 5 to 3,800 Bq/L. The levels of gross alpha are between 0.13 and 2.5 Bq/L. 2. The groundwater monitoring data are used for making risk assessments and planning site remediation actions. For example, some waste materials have been removed from WMA A in recent years. All waste retrieval work is subject to detailed planning and safety assessments that are directed at maintaining safe waste retrieval, characterization, and waste packaging and processing requirements. In addition, a project is currently underway to intercept and remove Sr-90 from the plume at WMA A.		
Q. No. 5	Country United Kingdom	Article Article 16	Ref. in National Report Annex 7, Page 197
Question/ Comment	Decommissioning Activities: Several reactors such as Gentilly-1, Douglas Point and the Pool Test Reactor are identified as in Stage 2 of decommissioning. What is the anticipated duration of Stage 2 and what is the indicative timescale for completion of Stage 3 such reactors?		
Answer	The current planned duration of phase 2 decommissioning (storage-with-surveillance) for the Gentilly-1 reactor is greater than 30 years, and the estimated duration of phase 3 (final decommissioning) is approximately 10 years. For the Douglas Point reactor, the current planned duration of phase 2 decommissioning is between 50 and 60 years, and the anticipated duration of phase 3 is approximately 10 years. For the Nuclear Power Demonstration (NPD) reactor, the anticipated duration of phase 2 decommissioning is greater than 30 years, and the estimated duration of phase 3 is approximately seven years.		

	The current planned phase 2 durations were based on having a long-term radioactive waste management facility available for the low- and intermediate-level radioactive waste produced from the decommissioning activities. Reassessments of the phase 2 and phase 3 durations have been initiated. For the Pool Test Reactor, phases 2 and 3 of decommissioning were completed in early 2012.		
Q. No. 6	Country United Kingdom	Article Article 15	Ref. in National Report Section 5.1.7.1.19, Page 181
Question/ Comment	Whiteshell Laboratories: The report notes that 'The WL site is near the northeast boundary of the plains area of Manitoba. The WMA site is located about 10 metres above the normal Winnipeg River level, and is well above any recorded flood levels (river levels are also controlled by nearby hydroelectric dams).' Has there been any assessment of the possible affect on the site of a failure of one of the hydroelectric dams, and if so, have any mitigating measures been put in place?		
Answer	A comprehensive study of Whiteshell Laboratories (WL) was conducted in 2001, and it was determined that the unlikely failure of one of the hydroelectric dams might affect the shoreline, but would not flood the WL site. The WL site is approximately 10–12 metres above the mean level of the Winnipeg River, whereas the peak flood after a dam break would be approximately 7 metres. Therefore, the main WL site would not be flooded, and no mitigation measures would be required. The shoreline effects of a potential flood would be minor river bank erosion.		
Q. No. 7	Country United Kingdom	Article Article 15	Ref. in National Report Section 5.1.7.1.12, Page 179
Question/ Comment	Waste Tank Farm: The last transfer of solution to the storage tanks occurred in 1968. 1. What monitoring arrangements are in place to identify possible corrosion problems before any leakage can occur? 2. What are the plans for long-term management of the liquid waste contained in the tanks?		
Answer	1. Monitoring arrangements for storage tanks at the Waste Tank Farm include periodic camera inspections of the tanks to help identify possible corrosion problems before any potential leakage. A preliminary camera inspection was conducted on the tanks in 2003–2004, and no potential corrosion problem was identified. Additionally, the majority of the tanks have one form of secondary containment or another, mostly in the form of bunds. Any leak of the primary containment would be identified by the inter-spatial/sump monitoring. 2. The long-term management of liquid waste contained in the storage tanks at the Waste Tank Farm includes retrieval and cementation of the liquid waste for storage in the CRL Waste Management Area and processing of		

	the liquid from selected tanks at the Waste Treatment Centre at CRL.		
Q. No. 8	Country United Kingdom	Article Article 16	Ref. in National Report Section K.7, Page 129
Question/ Comment	Other contaminated lands: It is good that the CNSC has reviewed contaminated lands against the need for regulatory control but what has happened since the review was completed. What actions have been taken to bring such contaminated land within regulatory control?		
Answer	All contaminated sites identified under Canada's Contaminated Lands Evaluation and Assessment Network (CLEAN) program are under some form of regulatory control. Sites identified as posing a risk to the public or the environment have been remediated. Where remediated sites have still required controls, they have either been brought under licence (all historic uranium mines with tailings) or placed under institutional control (uranium mines without tailings, very low-level uranium-contaminated lands associated with historic practices).		
Q. No. 9	Country United Kingdom	Article Article 13	Ref. in National Report Section K.6.2.2, Page 125
Question/ Comment	Laying the groundwork for subsequent phases of the strategy: It is noted that progress is being made with investigations to assess the feasibility of the bedrock at AECL's Chalk River Laboratory (CRL) site to host a proposed Geologic Waste Management Facility (GWMF). In the report, it says that: 'The GWMF, if constructed, would be the final enabling facility (i.e., storage location) to safely manage CRL's non-fuel nuclear wastes'. Does this imply the GWMF is not intended as a disposal facility and any low- and intermediate-level solid radioactive waste emplaced in the proposed GDMF would be retrieved at some future time?		
Answer	The GWMF, if constructed, is planned as a long-term radioactive waste management facility for CRL's non-spent fuel and would be designed as a repository that allows for waste retrieval.		
Q. No. 10	Country United Kingdom	Article Article 14	Ref. in National Report Section K.6.1, Page 120
Question/ Comment	Proposed low- and intermediate-level waste deep geological repository at the Bruce nuclear site: OPG and NWMO are achieving considerable success in implementing the programme for a geological repository at the Bruce nuclear site but it is noted that the repository is intended only for disposal of OPG's low- and intermediate-level wastes. 1. What is the proposed approach for disposal of low- and intermediate-level wastes from Canada's other nuclear operators? For example, the wastes being stored by: a) Hydro-Quebec in its Solid Radioactive Waste Management Facility (Section K.6.2.1). b) New Brunswick Power Nuclear in its Solid Radioactive Waste Management Facility.		

<table>
<tr><td>Answer</td><td colspan="3">Canada’s 1996 Policy Framework for Radioactive Waste provides the national context for radioactive waste management and a set of principles to ensure that this management is carried out in a safe, environmentally sound, comprehensive, cost-effective and integrated manner. The framework states that waste owners are responsible for funding and managing their own wastes.

NB Power and Hydro-Québec have implemented volume reduction programs to maximize storage capacity at existing licensed facilities and will continue to work with federal government authorities and other utilities to identify long-term solutions for the disposal of low- and intermediate-level radioactive wastes.</td></tr>
<tr><td>Q. No. 11</td><td>Country
United Kingdom</td><td>Article
Article 13</td><td>Ref. in National Report
Section K.4.4.2, 112</td></tr>
<tr><td>Question/ Comment</td><td colspan="3">Site selection: The Adaptive Phased Management project offers a highly flexible and responsive approach to taking forward Canada’s geological disposal programme for spent fuel. The report notes significant progress in initiating the site selection process but give no indication of the anticipated timescale of the site selection process or the programme as whole. What are the indicative timescales for site selection and first waste emplacement that the Nuclear Waste Management Organization uses as a basis for identifying its future human resource requirements and aid financial planning?</td></tr>
<tr><td>Answer</td><td colspan="3">For financial planning purposes, 2035 is the reference planning assumption for an in-service operating repository.
For internal project management and resource planning, the Nuclear Waste Management Organization (NWMO) has a reference planning timeline including the following system design phases and milestones:

Site selection and preparing for construction (2010–2024)
The site selection process was initiated in 2010 and is expected to take 10 years or more. Today, 15 communities remain actively involved in the process. Up to now, initial screening studies have been completed and some feasibility studies (including desktop studies followed by preliminary field investigations) have been initiated. This will be followed by detailed site investigations (surface and subsurface) at candidate sites. Throughout this phase of the project, the APM technical program is also evolving through generic design and safety case updates and design development studies.

A licence application will be submitted to the regulator (Canadian Nuclear Safety Commission (CNSC)) for the selected site along with the supporting information to demonstrate compliance with regulatory requirements and to complete an environmental assessment. This phase will conclude with the issuance of a licence for the APM facility.</td></tr>
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	Site preparation and construction (2025–2034) On receipt of the licence to prepare the site and construct the facility, the site will be prepared for construction by clearing, site grading, installation of fencing, installation of temporary construction services, and establishment of a storm water management system. Construction will include excavating the shafts and constructing an underground demonstration facility, a full-scale underground repository and associated surface facilities. During the last few years of this phase, an application to operate the facility will be submitted to the CNSC. This phase will conclude with a constructed facility and a licence to operate the APM facility. **Operation (2035–2134)** Operation will consist of receiving spent fuel transported to the site, repackaging the spent fuel into long-lived containers, placing the containers in the repository, and continuing underground development. For the reference spent fuel inventory of 3.6 million spent CANDU fuel bundles, the operational activities are expected to last about 30 years. The actual duration will depend on the total inventory to be managed and the timing of its production, transportation considerations and other operational factors. Following placement of the spent fuel in the repository, a period of monitoring is assumed to continue for an extended period of time (up to 70 years). **Decommissioning (2135–2160)** Decommissioning will only begin once a licence to decommission has been issued. The decommissioning of the facility will include sealing of access tunnels and shafts and the removal of surface facilities. The site will be restored to a defined end-state that will depend largely on future plans for the site. A formal licence to abandon the facility could be obtained once the decommissioning and monitoring results have confirmed that it is acceptable to release the facility from CNSC regulatory control.

Q. No. 12	Country United Kingdom	Article Article 11	Ref. in National Report Section J, Page 105
Question/ Comment	Disused sealed sources: It is clear from this section that Canada has developed an effective approach to control of sealed sources that fall within the current regulatory system. The report does not mention any arrangements for managing orphan sources such as old ‘medical’ sources that in the past were available to the public and have never been under regulatory control, or sources that have been inadvertently included in consignments of scrap metal arriving from		

	overseas. 1. What approach does Canada adopt to dealing with such sealed sources? 2. Has Canada had any programme for taking old sealed sources such as early 'medical' sources out of circulation?
Answer	1. Recently, the CNSC has strengthened its risk-informed regulatory strategy for dealing with the discovery of orphan sources based on three pillars: regulatory oversight, promotion and communication and, finally, response and recovery. The regulatory oversight includes licensing of the possession, use and import/export of sealed sources, the mandatory tracking of high-risk sealed sources, and control of the licensee's inventory. The CNSC is also developing a financial guarantees program that will apply to all licensees to ensure that funds are available for the proper disposal of sources. In terms of promotion and education, the CNSC has also published a poster and associated brochure for industry entitled "Alarm Response Guidelines for Radiation Portal Monitoring Systems". These documents are available on the CNSC Web site and can be ordered free of charge. A cross-Canada outreach was done with the scrap metal industry. In addition, there is ongoing development of procedures to facilitate the transport of municipal waste containing medical isotopes, and new regulatory provisions will be proposed in the *Packaging and Transport of Nuclear Substances Regulations* to facilitate the movement of such material. With regard to response and recovery, the CNSC has recently published an internal document titled "Orphan Source Response Procedure" which details the CNSC staff's role when a found source is reported to the CNSC. In general, the "finder" is responsible for managing or disposing of the source. Onsite assistance and/or recovery by CNSC staff or other contractors may be required when: • the source is Category 1, 2 or 3 • special circumstances are present, including but not limited to: o unavailable resources on location to ensure safety o high media interest o political interest o general public involvement o bankruptcy/insolvency situations

	Canada is actively working with international partners, including the International Atomic Energy Agency (IAEA), to enhance global radiological security. This effort includes strategic support through expert input into IAEA plans and priorities, as well as funding for radiological source security. 2. The CNSC has a program for dealing with historic radium luminous devices. The Atomic Energy of Canada Limited (AECL) Low-Level Radioactive Waste Management Office (LLRWMO) continues to provide technical advice to stakeholders and members of the public on the identification and management of radium, including historic radium luminous devices found on public and private properties throughout Canada. The LLRWMO will accept, on a case by case basis, radium luminous devices for transfer to a CNSC-licensed waste management facility. The majority of this work is part of a cooperative program with the CNSC. Orphan radium medical sources are recovered as part of the Artifacts Recovery Program of the LLRWMO and placed in temporary storage at CRL Area D buildings. Non-radium sources are handled case by case as determined by the CNSC and Natural Resources Canada (NRCan).		
Q. No. 13	Country United Kingdom	Article Article 15	Ref. in National Report Section H.10.3, 99/100
Question/ Comment	Example of the development of institutional control for decommissioned uranium mines and mills in Saskatchewan: The proposed institutional control programme appears to be an appropriate response to managing past activities in the long-term and, in particular, providing funding for monitoring and unforeseen events. Under these arrangements, how long is the period that the institutional controls are anticipated to apply?		
Answer	Decommissioned mine sites, by their nature, require indefinite passive institutional controls such as land registries to control activities on the sites. The time period of active institutional control, during which active monitoring of the site is required, is established case by case basis, and ends once it has been demonstrated that the site has become sufficiently stabilized and monitoring results are within predicted values and effects.		
Q. No. 14	Country United Kingdom	Article Article 15	Ref. in National Report Section H.10.1.1, Page 85
Question/ Comment	Regulatory body requirements: The report says that ‘The CNSC must be satisfied that the abandonment of the nuclear substance and the prescribed equipment or information does not pose an unreasonable risk to the environment or the health and safety of persons ...’ What are the criteria CNSC uses to determine whether or not an unreasonable risk to people or the environment exists?		

Answer	The CNSC currently deals with the disposal or abandonment of nuclear substances case by case, through special conditions in licences or, in some instances, through the issue of a distinct disposal or abandonment licence. The criteria are that all releases and doses to the public and environment are kept ALARA (as low as reasonably achievable). The CNSC is responsible for the regulation of both nuclear and hazardous substances. For hazardous substances, federal and/or provincial environmental quality criteria [1] are used to identify contaminants of concern and/or cleanup objectives. Generally, these values are extremely conservative and represent levels that would be considered to be of no regulatory concern. There are also various federal/provincial contaminated land cleanup criteria that apply less restrictive values, depending on the proposed end-use of the site (e.g., industrial versus residential). There are no specific federal/provincial criteria for the protection of non-human biota from nuclear substances. The CNSC addresses this issue through the use of radiological risk assessments. The generic approach taken by CNSC staff is outlined in the "Non-human Biota Radiation Dose Assessment" procedure that was prepared for CNSC staff review of submissions for new nuclear power reactors in Canada. The general principles in this document are applied to all CNSC radionuclide risk assessments including those associated with decommissioning. This document is public and available at nuclearsafety.gc.ca/eng/licenseesapplicants/powerplants/newapplicants/staff_review_procedures/cnsc_staff_review_procedures_list.cfm. [1] ccme.ca/publications/ceqg_rcqe.html		
Q. No. 15	Country United Kingdom	Article Article 9	Ref. in National Report Section G.13.3, Page 85
Question/ Comment	Environmental monitoring experience: What information and data are available to support the statement that 'Experience shows that spent fuel dry storage facilities in Canada operate safely and within prescribed regulatory limits.'?		
Answer	Throughout the licence period, the licensee is required to report on their operations (including environmental releases) at prescribed times. These reporting requirements are set out in the specific facility licence. Licensees must also report any events in accordance with section 29 of the *General Nuclear Safety and Control Regulations*, and CNSC staff conduct routine compliance inspections at the facilities. The information from these sources supports the conclusion that spent fuel dry storage facilities continue to operate safely and within prescribed regulatory limits.		

<table>
<tr><td></td><td colspan="3">Additionally, the responsibility for the safety of spent fuel containers rests with the licensee. Throughout their operating life, the containers are monitored and maintained to ensure their structural integrity, thereby providing for the protection of the public, workers and the environment. Although the design life is 50 years, it is recognized that some containers may have a shorter or longer operating life. The structural integrity of the spent fuel containers is assessed and, should the structural integrity be compromised, the spent fuel can then be transferred to a new spent fuel container.</td></tr>
<tr><td>Q. No. 16</td><td>Country
United Kingdom</td><td>Article
Article 8</td><td>Ref. in National Report
Section G.13.1, Page 84/85</td></tr>
<tr><td>Question/ Comment</td><td colspan="3">Leak tightness verification experience: The report notes that ‘aging management activities provide assurance that the container condition and weld integrity are not compromised and that helium cannot leak out.’
1. What are the ageing management activities?
2. What procedures are in place to deal with cases where a helium leak is found?</td></tr>
<tr><td>Answer</td><td colspan="3">1. The following chart describes dry storage container aging-management activities.

<table>
<tr><th>Critical dry storage container (DSC) component</th><th>DSCs selected</th><th>Aging-management activity</th><th>Frequency of activity</th></tr>
<tr><td>• Lid closure weld and heat affected zone (HAZ)
• Vent/drain welds and HAZ
• Coating
• Outer shell</td><td>• Selected DSCs</td><td>• Visual inspection of condition of coating and/or evidence of corrosion</td><td>• Annually</td></tr>
<tr><td>• Base plate</td><td>• Baseline DSCs</td><td>• Video inspection of underside of base plate.</td><td>• Periodic re-inspections of baseline DSCs to monitor for any changes in their condition.</td></tr>
<tr><td>• Outer shell and base plate</td><td>• Representative DSCs and floor locations (e.g., near</td><td>• Chloride sampling analysis</td><td>• Every five years</td></tr>
</table>
</td></tr>
</table>

		doors/louvres, rust marks on floor)		
• Inner liner/vent and drain	• One DSC	• Embed corrosion sensors in a DSC	• Program not yet initiated. Monitoring being planned for a two-year period.	

2. For Ontario Power Generation (OPG) facilities, when helium leaks are found, the leak site is identified, the leak site is repaired and the DSC is retested to ensure no leaking. Routine helium leak tests after DSCs are placed into storage are not performed.

   For AECL-designed facilities, the aging-management activities associated with AECL-designed fuel baskets and concrete canisters are achieved in a variety of ways. Leak tightness is ensured by the placement of fuel bundles in sealed stainless-steel baskets, which are inserted within a steel liner inside the concrete canister. The inner liner is also sealed after the canister is filled. Air is routinely sampled from the liner cavity and monitored for radioactive contamination and excess humidity. Radioactive contamination would indicate a leakage in the fuel baskets, whereas excess humidity would indicate water leaking into the canister. The exterior surfaces of the canisters are routinely inspected for visible signs of deterioration, and radiation fields are monitored, to determine if there is any evidence of shielding deterioration. This is typically done on a quarterly basis. Canisters have been in use at Whiteshell Laboratories (WL) for over 30 years and for less time at the other sites, such as Douglas Point (DP), Gentilly-1 (G-1) and Chalk River Laboratories (CRL). During this time, there has been no visual evidence of deterioration or leakage from the fuel baskets.

   A life management program for the concrete structures at Douglas Point was undertaken in 2004 and included the evaluation of the concrete canisters. The inspection showed no serious damage, but raised concerns that moisture, which freezes during the winter in cracks, may lead to more serious damage. The addition of a protective coating paint was recommended, to keep moisture out of the cracks. This concern was only identified for Douglas Point canisters. The study also concluded that the routine inspection of the canisters, as described above, is adequate, as shown by their good condition.

Q. No. 17	Country United Kingdom	Article Article 8	Ref. in National Report Section G.6, Page 79
Question/ Comment	Storage of spent fuel: In the final paragraph, the reports notes that 'At the time of licence renewal, the CNSC examines the operational performance of the dry storage facility to determine whether it can continue to operate safely for another licensing term – again, typically for a five year period.' 1. Has CNSC identified any concerns when renewing the license for the dry storage facility? 2. Has the CNSC imposed additional conditions within an operator's licence because of reservations about operational performance?		
Answer	1. The CNSC has not identified any concerns to date that have affected the licence renewal for dry storage facilities in Canada. 2. The CNSC has not imposed additional conditions on an operating licence for a dry storage facility due to operational performance. When the CNSC Commission Tribunal issues or renews a licence, it may request that the proponent return at certain points during the licence period to update the Commission Tribunal on the facility's operations and performance. The mid-term reports (or status reports) provide the Commission Tribunal with an opportunity to examine the performance. These reports cover all safety areas, which typically include operations, radiation protection, environmental monitoring, and maintenance programs. Reviewing the safety areas in the mid-term or status reports allows the decision makers to stay informed about the facility's operations and performance. Throughout the licence period, the licensee is also required to report on their operations at prescribed times and report any events in accordance with section 29 of the *General Nuclear Safety and Control Regulations*; CNSC staff also conduct routine compliance inspections at the facilities. If any areas of concern are identified, CNSC staff can request additional information from the licensee, or increase the frequency of compliance inspections or reporting requirements.		
Q. No. 18	Country United Kingdom	Article Article 32	Ref. in National Report Section D.3, Page 29/32
Question/ Comment	Radioactive waste inventory Radioactive waste management facilities: In tables D.3 and D.5, the volumes of ILW and LLW at Chalk River Laboratories are provided but there is no indication of the activity associated with these wastes (activity column marked 'N/A'). 1. Does Canada know the activity associated with this waste?		

<table>
<tr><td></td><td colspan="3">2. If not, does Canada have any plans to determine it?</td></tr>
<tr><td>Answer</td><td colspan="3">1. The activity inventory associated with intermediate-level waste (ILW) and low-level waste (LLW) at CRL cannot accurately be determined due to general uncertainty of the nature of the wastes from early operations at CRL. Radioactive wastes have been stored at CRL since 1945. Due to the limitations associated with waste characterization practices in the past and to the loss of waste-receipt records predating 1956 due to a fire in February 1956, the total activity of waste inventories in these two classifications is not well defined.

2. Through the Nuclear Legacy Liabilities Program (NLLP) at AECL, a project is underway to verify legacy waste data in the log books that were processed, stored or dispositioned at CRL from April 1956 to June 1995. The project will record the verified legacy waste data in a database, with an expected completion date of December 2014. Since the mid-1990s, a waste inventory system has been developed and implemented to record waste inventory information, and all current waste is tracked in this system.</td></tr>
<tr><td>Q. No. 19</td><td>Country
Germany</td><td>Article
Article 28</td><td>Ref. in National Report
Section J.4, Page 107</td></tr>
<tr><td>Question/ Comment</td><td colspan="3">1. Which measures are implemented in Canada to avoid illicit trafficking of disused orphan sources?
2. To which extent are conventional scrap yards and melting facilities equipped with radiation detection devices to discover orphan radioactive sources in scrap material?
3. Are the border crossings equipped with such detectors?</td></tr>
<tr><td>Answer</td><td colspan="3">1. The following measures are implemented in Canada to avoid illicit trafficking of disused orphan sources:
▪ Possession and movement of high-risk radioactive sealed sources are regulated by the CNSC.
▪ The CNSC manages Canada’s national inventory of high-risk radioactive sealed sources. The National Sealed Source Registry (NSSR) helps the CNSC track the locations of all high-risk radioactive sealed sources in Canada and increases the security and safety of those sources.
▪ Close monitoring of the movement of sealed sources through a national registry complies with the IAEA’s Code of Conduct on the Safety and Security of Radioactive Sources. This Code aims to enhance the safety and security of radioactive sources internationally.
▪ The Sealed Source Tracking System (SSTS) tracks the receipt, transfer, import and export of high-risk radioactive sources, thereby preventing the unauthorized possession or trafficking of radioactive sources within Canada. The SSTS is the first system of its kind.

2. The CNSC does not regulate the use of radiation detection equipment at scrapyard and melting facilities;</td></tr>
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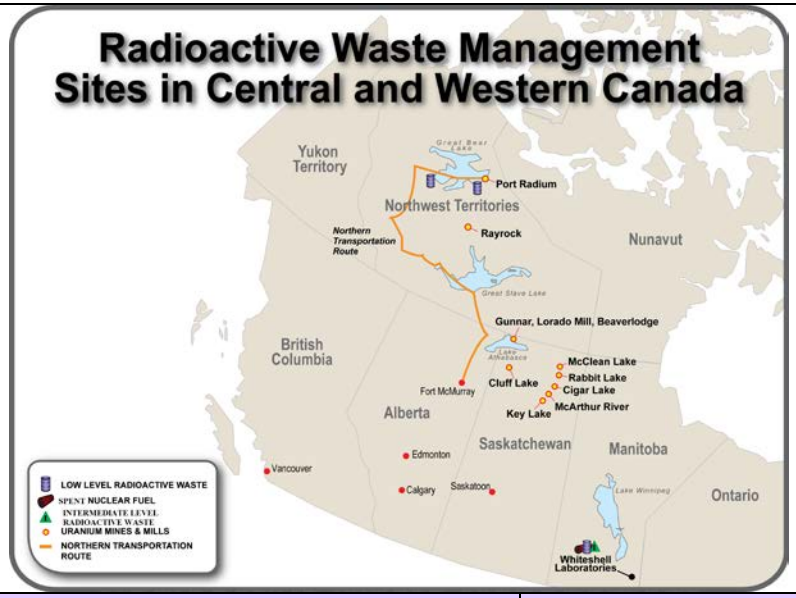
	therefore the CNSC is not aware of the actual number of facilities that have these devices. However, in the CNSC's outreach activities with the scrap metal facilities, it was apparent that the larger facilities that do sorting generally have detection equipment. All steel mills and foundries in Canada also monitor materials going in and out of their facilities. 3. Canada's major marine ports are equipped with such devices. For more information please visit cbsa-asfc.gc.ca/security-securite/detect/rad-eng.html.		
Q. No. 20	Country Germany	Article Article 26	Ref. in National Report Section F.8, Page 74
Question/ Comment	In the report it is mentioned that a preliminary decommissioning plan must be filed with the Canadian Nuclear Safety Commission (CNSC) as early as possible in the lifecycle of the activity or facility, and that the decommissioning plan must be kept up to date throughout the lifecycle. 1. Does that mean that the decommissioning plan needs not necessarily be a part of the license application for the construction and operation of a facility? 2. If so, are there any binding requirements for the time when the preliminary or final decommissioning plan must be available?		
Answer	1. A preliminary decommissioning plan (PDP) should be filed with the CNSC as early as possible in the lifecycle of the licensed activity and reviewed and updated as new information is obtained. Development of a PDP provides an opportunity to consider decommissioning in the design, construction and operation of the facility so that eventual decommissioning can be carried out in a cost-effective manner. For a nuclear facility, the PDP must be submitted to the CNSC before a licence to construct can be issued. Specific references to and requirements for decommissioning can be found in the *Nuclear Safety and Control Act* (NSCA) and the CNSC regulations for Class I nuclear facilities, Class II nuclear facilities and uranium mines and mills. 2. A PDP should be filed with the CNSC as early as possible in the lifecycle of the licensed activity and reviewed and updated as new information is obtained. For a nuclear facility, the PDP must be submitted to the CNSC before a licence to construct can be issued. A final decommissioning plan must be developed for licensed nuclear facilities for CNSC approval prior to		

	decommissioning and, if possible, one year prior to the scheduled shutdown of the facility. Once approved by the CNSC, the final decommissioning plan is incorporated into a licence authorizing the decommissioning. The decommissioning of licensed nuclear facilities must be conducted only in accordance with the requisite licence. The transition from operational to decommissioning status must be as prescribed by the regulatory authority. Typically, this is done by revoking the operating licence and issuing a decommissioning licence.		
Q. No. 21	Country Germany	Article Article 22	Ref. in National Report Section F.4.3, Page 64
Question/ Comment	According to the report, licensees of spent fuel and radioactive waste management facilities as well as uranium mines and mills must provide guarantees that adequate financial resources are available for the decommissioning of these facilities and managing the resulting radioactive wastes, including spent fuel. Are the measures of the licensees controlled continuously by the regulatory body during the operational period of the facilities in order to ensure their adequacy?		
Answer	The licensee shall provide a financial guarantee that remains valid, in effect and adequate to fund the future decommissioning of the facility and shall be reviewed and updated every five years, or when requested by the Commission Tribunal or a person authorized by it. Licensees who are owners of multiple operating facilities report annually to the CNSC and must demonstrate that their financial guarantee remains valid, in effect and adequate to fund the future decommissioning of the facility.		
Q. No. 22	Country Germany	Article Article 19	Ref. in National Report Section E.3.2, Page 44
Question/ Comment	At several places the report mentions the terms Class I or Class II Nuclear Facilities. The definition on page 44 only refers to radioactive waste management facilities. 1. Is there a broader definition that also applies to reactors or nuclear fuel cycle facilities? 2. Could you please provide such a definition or some examples to illustrate the difference between the two classes?		
Answer	1. Nuclear power reactors are Class IA facilities. 2. There are two types of Class I facilities: Class IA and Class IB. a) Class IA means any of the following nuclear facilities: (a) a nuclear fission or fusion reactor or subcritical nuclear assembly (b) a vehicle that is equipped with a nuclear reactor		

<table>
<tr><td></td><td colspan="3">b) Class IB means any of the following nuclear facilities:
(a) a facility that includes a particle accelerator, other than a particle accelerator described in paragraphs (d) and (e) of the definition “Class II prescribed equipment” in section 1 of the Class II Nuclear Facilities and Prescribed Equipment Regulations
(b) a plant for the processing, reprocessing or separation of an isotope of uranium, thorium or plutonium
(c) a plant for the manufacture of a product from uranium, thorium or plutonium
(d) a plant, other than a Class II nuclear facility as defined in section 1 of the Class II Nuclear Facilities and Prescribed Equipment Regulations, for the processing or use, in a quantity greater than 10^{15} Bq per calendar year, of nuclear substances other than uranium, thorium or plutonium
(e) a facility for the disposal of a nuclear substance generated at another nuclear facility
(f) a facility prescribed by paragraph 19(a) or (b) of the General Nuclear Safety and Control Regulations.

A “Class II nuclear facility” means a facility that includes Class II prescribed equipment.
“Class II prescribed equipment” means:
(a) an irradiator that uses more than 1,015 Bq of a nuclear substance
(b) an irradiator that requires shielding which is not part of the irradiator and that is designed to deliver a dose of radiation at a rate exceeding 1 cGy/min at a distance of 1 m
(c) a radioactive source teletherapy machine
(d) a particle accelerator that is capable of producing nuclear energy and has a beam energy of less than 50 MeV for beams of particles with a mass equal to or less than 4 atomic mass units
(e) a particle accelerator that is capable of producing nuclear energy and has a beam energy of no more than 15 MeV per atomic mass unit for beams of particles with a mass greater than 4 atomic mass units
(f) a brachytherapy remote afterloader</td></tr>
<tr><td>Q. No. 23</td><td>Country
Germany</td><td>Article
Article 32.2.1</td><td>Ref. in National Report
Section D.4, Page 36</td></tr>
<tr><td>Question/ Comment</td><td colspan="3">Figures D.1 and D.2 are identical. Could you please allocate also a map of radioactive waste management sites in Central and Western Canada?</td></tr>
</table>

<table>
<tr><td>Answer</td><td colspan="3"> 
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<tr><td>Q. No. 24</td><td>Country
Russia</td><td>Article
Article 32</td><td>Ref. in National Report
Section B.7.3, Page 17</td></tr>
<tr><td>Question/ Comment</td><td colspan="3">1. What kind of aggregate states refer to the term «established clearance levels and exemption quantities» (mentioned in Section B.7.3 for the definition of Low-level radioactive waste (LLW)?
2. What are their numerical values for SRW, LRW and GRW?
3. Do all liquid and gaseous wastes containing radionuclides (that cannot be released under controlled discharges) refer to LRW and GRW in case the numerical values cannot be applied to LRW and GRW?

Comment:
Separate definitions of LRW and GRW are not presented in the Report.</td></tr>
</table>

Answer	1. The Schedule 2 values, referred to as unconditional clearance levels, are intended to be used as "default" values for solids or non-effluent liquids, e.g., negligibly contaminated oil being considered for incineration or recycling. They apply to the disposal of quantities of materials greater than 1 tonne/year per nuclear facility[1]. 2. There are no defined numerical values for aggregate types outlined in the CSA document describing Canada's formal radioactive waste classification system. 3. Values for solids and non-effluent liquids are captured in exemption, unconditional or conditional clearance levels. Gaseous effluents are facility-specific.		
Q. No. 25	Country Russia	Article Article 32	Ref. in National Report Section B.5, Page 15
Question/ Comment	1. Is this criterion a numerical criterion and is it used to assign wastes to radioactive wastes? 2. If so, how does it correlate with the definition of RW? Comment: The definition of RW is provided in Section B.5 of the Report: «The policy statement in regulatory policy P-290 defines radioactive waste as any form of waste material that contains a nuclear substance defined in the NSCA». According to the NSCA (Nuclear Safety and Control Act): «nuclear substance» means (a) deuterium, thorium, uranium or an element with an atomic number greater than 92; (b) a derivative or compound of deuterium, thorium, uranium or of an element with an atomic number greater than 92; (c) a radioactive nuclide;		

[1] Nuclear facility is defined in the *Nuclear Safety and Control Act* as "nuclear facility" means any of the following facilities, namely, (a) a nuclear fission or fusion reactor or subcritical nuclear assembly, (b) a particle accelerator, (c) a uranium or thorium mine or mill,
(d) a plant for the processing, reprocessing or separation of an isotope of uranium, thorium or plutonium, (e) a plant for the manufacture of a product from uranium, thorium or plutonium, (f) a plant for the processing or use, in a quantity greater than 10^{15} Bq per calendar year, of nuclear substances other than uranium, thorium or plutonium, (g) a facility for the disposal of a nuclear substance generated at another nuclear facility, (h) a vehicle that is equipped with a nuclear reactor, and (i) any other facility that is prescribed for the development, production or use of nuclear energy or the production, possession or use of a nuclear substance, prescribed equipment or prescribed information, and includes, where applicable, the land on which the facility is located, a building that forms part of, or equipment used in conjunction with, the facility and any system for the management, storage or disposal of a nuclear substance.

	(d) a substance that is prescribed as being capable of releasing nuclear energy or as being required for the production or use of nuclear energy; (e) a radioactive by-product of the development, production or use of nuclear energy; and (f) a radioactive substance or radioactive thing that was used for the development or production, or in connection with the use, of nuclear energy. Thus, as it is mentioned in the Report, wastes containing «nuclear substances» in any quantities are considered as RW. On the other hand, the definition of very-low-level radioactive waste (VLLW) (provided in Section B.7.3 of the Report) refers to «the criteria for exemption».		
Answer	1. There are no numerical values for radioactive waste in P-290. It is a policy statement regarding the measures to regulate radioactive waste. 2. Radioactive waste means any material (gaseous, liquid, solid) that contains a radioactive nuclear substance and which the owner has declared to be waste. It may also contain non-radioactive hazardous substances.		
Q. No. 26	Country Russia	Article Article 24	Ref. in National Report Section H.3.4, Page 91
Question/ Comment	1. What are the major principles for defining «insignificant radioactivity levels»? 2. Provide an example of the value of «insignificant radioactivity level» for 60Co. Comments: Radioisotope production and use generate a variety of radionuclides for commercial use, such as cobalt-60 for sterilization and cancer therapy units, and molybedenum-99 or other isotopes for use as tracers for medical research, diagnoses and therapy. A number of waste management facilities process and manage the wastes that result from the use of radioisotopes for research and medicine. In general, these facilities collect and package waste for shipment to approved storage sites. In some cases, the waste is incinerated or allowed to decay to insignificant radioactivity levels and then discharged into the municipal sewer system or municipal garbage system.		
Answer	1. An insignificant level of radioactivity refers to radioisotopes that are less than exemption quantities or their clearance levels as identified in Schedule 1 and Schedule 2 of the *Nuclear Substances and Radiation Devices Regulations*. The associated radioactively presents such a low risk that control by regulatory process is not warranted. Note that exempt and cleared waste material may still be subject to other regulations (e.g., transportation). 2. An example of exemption levels is Co-60 < $1x10^5$ Bq.		
Q. No. 27	Country	Article	Ref. in National Report

	Russia	Article 24	Section F.6.3, Page 67
Question/ Comment	1.What is the typical value of the Action Level for tritium oxide in waste waters at plants in Canada? 2. What is the value of this level for "a) Point Lepreau and b) Gentilly 2"?		
Answer	1. Regulatory guide G-228, *Developing and Using Action Levels*, has been published by the CNSC to provide guidance on developing action levels in accordance with the *Radiation Protection Regulations*. Current action levels for tritium in effluent at CNSC-licensed facilities are a small percentage of the derived release limit (see section F.6.2 of the National Report for an explanation of derived release limits). Consequently, action levels are also dependent on specific factors at each site. In general, action levels for liquid releases of tritium at nuclear power plants in Canada range from 10^{15} to less than 10^{17} Bq/month. Action levels for liquid tritium releases at other facilities are typically much lower than those for nuclear power plants. 2. The action level for tritium in liquid effluents at: a. Point Lepreau is $1.3x10^{17}$ Bq/month. b. Gentilly-2 is $6.0x10^{13}$ Bq/day.		
Q. No. 28	Country Russia	Article Article 24	Ref. in National Report Section H.2, Page 89
Question/ Comment	What is the Canadian policy in respect of liquid wastes containing tritium in concentrations and quantities which do not allow to discharge these wastes into the environment?		
Answer	Releases of liquid wastes containing tritium are limited by the *Radiation Protection Regulations*, which ensure that the amount of radioactive material released in effluent from nuclear facilities does not exceed the public dose limit of 1 mSv/yr. The effluent limits for tritium are therefore derived from the public dose limit, and are referred to as "derived release limits" (DRLs). The nuclear sector sets operating targets or administrative limits that are typically a small percentage of the derived release limits. These targets are based on the ALARA principle and are unique to each facility, depending on the factors at each site. The current standard for determining derived release limits follows CSA standard N288.1-1987, *Guidelines for Calculating Derived Release Limits for Radioactive Material in Airborne and Liquid Effluents for Normal Operation of Nuclear Facilities*. The CNSC has recently released a discussion paper proposing the use of a dose constraint for the calculation of DRLs and standardizing the methodology for calculating action levels. This paper can be obtained at nuclearsafety.gc.ca/eng/lawsregs/comment/d-12-02.cfm.		
Q. No. 29	Country	Article	Ref. in National Report

	Russia	Article 26	Section F.8, Page 74
Question/ Comment	1. What decommissioning options (immediate dismantling after shut down, delayed dismantling, other) are permitted by the national regulator for different facilities? 2. Who makes the final decision?		
Answer	1. The development of a decommissioning strategy should be based on one or a combination of the following: • prompt decommissioning • deferred decommissioning • in situ confinement When determining the appropriate decommissioning strategy, the following should be considered and prioritized, with due regard to regulatory requirements: • public input • forms and characteristics of radioactive and hazardous contamination • the integrity of containment and other structures over time • the availability of decontamination and disassembly technologies • the potential for recycling or reuse of equipment and materials • the availability of knowledgeable staff • potential environmental aspects • potential worker and public radiological doses • end-state objectives and site redevelopment plans • potential revenues, costs and available funding • the availability of waste management facilities and disposal capacity • other political, social and economic considerations Once the physical decommissioning planning envelopes have been defined in the preliminary planning stage, and before the individual work packages are identified, the licensee should map out the basic strategic approach to decommissioning within each envelope. The licensee must include a preferred decommissioning strategy or strategies in the preliminary decommissioning plan. The strategy, in light of current knowledge, represents a technically feasible, safe and		

	environmentally acceptable approach. A different preferred strategic approach may be used for different planning envelopes. 2. As part of the licence application or renewal, it is up to the licensee to propose the decommissioning strategy. CNSC staff evaluate the reasonableness of the preferred strategy based on its technical feasibility, safety and environmental acceptability and make recommendations to the Commission Tribunal or a person authorized by it – a CNSC designated officer. Whether it is made by the Tribunal or CNSC designated officer, the overall licensing decision is either a licence or a letter of refusal. If a licence is issued, the licensee must maintain a preliminary decommissioning plan (including a strategy) that is reviewed and updated every five years, or in light of operational experience and technological advances, or when requested by the Tribunal or a person authorized by it.		
Q. No. 30	Country Russia	Article Article 19	Ref. in National Report Section E.3
Question/ Comment	1. Are there RW acceptance criteria (WAC) established for the long-term storage? 2. If yes, could the WAC for long term storage be transformed to WAC for disposal?		
Answer	1. There are no defined radioactive waste acceptance criteria for the long-term storage of radioactive waste. It is up each licensee (or licence applicant) to submit and provide justification on their waste acceptance criteria for CNSC approval. Please see section 6.0 of Regulatory Guide G-320 “Assessing the Long Term Safety of Radioactive Waste Management” for more information on defining acceptance criteria.		
Q. No. 31	Country United States of America	Article Article 32	Ref. in National Report Section B.10, Page 21
Question/ Comment	The report states that the Low-Level Radioactive Waste Management Office (LLRWMO) is preparing a strategy to address historic waste along the Northern Transportation Route. Please provide an update on the strategy.		
Answer	Implementation of the strategy aimed at resolving Northern Transportation Route contamination issues is progressing. As stated in section B.10, adjustments to the approach are made to suit each community that becomes involved in the work. Remediation has been completed in the communities of Tulita and Fort Smith in this reporting period. Section K.6.3.2 identifies the locations remaining to be remediated. The practice of ongoing institutional control is applied at these sites. Dialogue is going on in the Sahtu and South Slave regions with four First Nation communities (see sections 8.2.2.1 and 8.2.2.2). Steady progress, in cooperative planning and site characterization, has been made		

	since the Third Review Meeting. The strategy is proceeding at the pace permitted by community dialogue and federal funding resources. A key issue that must be resolved before full resolution of the contamination problem is the confirmation of a location or locations for long-term management facilities for the remaining in situ and temporarily consolidated waste. Full resolution of this problem remains a federal government priority.		
Q. No. 32	Country United States of America	Article Article 28	Ref. in National Report Section J.4.2, Page 107
Question/ Comment	The National Sealed Source Registry continues to be expanded since being implemented in 2006. Additional expansion is reported for 2011 to include electronic registry and reporting of all Categories 3, 4, and 5 sealed sources in Canada. 1. Is this expansion complete? 2. Please address any challenges of tracking these lower-risk sources in the National Sealed Source Registry if they are subject to a lesser level of requirements for import and export then Category 1 and 2 sources.		
Answer	1. The CNSC is still collecting information on Category 3, 4 and 5 sources for all CNSC licensees. These inventories are verified annually when inventories are submitted as part of licensee annual compliance reports (ACRs). The CNSC is currently also developing an ACR system through which licensees will be able to submit their inventories to the CNSC online. 2. Tracking of Category 1 and 2 sealed sources is mandatory in Canada and is achieved through a licence condition. This is done through the SSTS interface. As for categories 3, 4 and 5, these lower-risk sources are not tracked in the same manner as Category 1 and 2 sources. The intent is simply that they be captured in a registry that allows the CNSC to search for a source owner if a source is found out of regulatory control. It can also be a useful tool for determining the number of sealed sources of a certain type in Canada. This information is not directly included in the NSSR due to inconsistency in the data available regarding these lower-risk sources (manufacturers, serial numbers, calibration dates, etc). A review is going on to verify this information, which is currently stored in a separate database.		
Q. No. 33	Country United States of America	Article Article 27	Ref. in National Report Section I.4, Page 104
Question/ Comment	The national report states that Canadian Nuclear Safety Commission and Department of Foreign Affairs and International Trade perform their own reviews of export applications. 1. If the assessments disagree on the outcome to the licensing action, how are the differences resolved?		

	2. Please also explain the process by which imports and exports are evaluated when there is no Nuclear Cooperation Agreement as per non-proliferation policy, including what constitutes a "small quantity and/or non-nuclear use."		
Answer	1. Differences on the outcome of an export licence application are extremely rare. Should a divergent view occur, technical and management consultations take place. Such consultations serve to clarify the reasoning behind the divergent view and may, for example, introduce supporting information that one party may not have had access to in developing its respective technical assessment. Finally, while the regulations that both the CNSC and DFAIT use are based upon NSG Guidelines Parts 1 and 2, the regulations administered by the CNSC are slightly broader in scope and coverage according to its mandate. 2. The process for evaluating whether an item is controlled for import or export is the same regardless of whether or not an item is subject to a nuclear cooperation agreement (NCA). The only difference is that additional measures are taken when the item is subject to an NCA specific to the requirements of bilateral nuclear cooperation. Regarding the second part of this question, "small quantity" refers to a quantity of controlled nuclear substances that is viewed to have minimal to no proliferation risk. "Non-nuclear use" is a term used where the end-use of the item has no nuclear application whatsoever.		
Q. No. 34	Country United States of America	Article Article 24	Ref. in National Report Section F.4.3, Page 65
Question/ Comment	The report notes that Canadian Nuclear Safety Commission plans to issue a revised version of environmental monitoring standard/guide N288.4, pending results of a meeting with licensees to determine timelines for implementing the action plan. What progress has been made in issuing the revised standard/guide and implementing the action plan?		
Answer	To clarify, the CSA N288.4 is a document that was developed by the Canadian Standards Association, not the CNSC. However, the CNSC participated in the development of this standard. The revised version was published in June 2010. An action plan was established by the CNSC and communicated to the licensees. The implementation is ongoing.		
Q. No. 35	Country United States of America	Article Article 22	Ref. in National Report F.4.3, Page 65
Question/ Comment	The report states that Canadian Nuclear Safety Commission (CNSC) issued the draft discussion paper DIS-11-01 to address implementation of financial guarantees for licensees. The draft paper was to be considered by the Commission Tribunal in December 2011. Please explain how CNSC anticipates this will affect licensees' financial guarantee requirements (e.g., amount of guarantee or financial instruments that will be acceptable to ensure funding).		

Answer	Please note that the comment period for DIS-11-01, *Implementation of Financial Guarantees for Licensees*, did not close until November 30, 2011. It was anticipated that the matter would be brought to the Commission Tribunal in April 2012. However, due to comments received, this has been postponed. At this time, the CNSC is continuing to review the comments received and working with stakeholder groups to determine if there are suitable alternative strategies. There is no defined timeline for completion of this project.		
Q. No. 36	Country United States of America	Article Article 20	Ref. in National Report Section E.8.2.3, Page 58
Question/ Comment	The report describes the 2009 Integrated Regulatory Review Services mission and notes that the follow-up was scheduled for November 2011. Please provide an update on the needs analysis conducted to determine the need for radioactive waste and decommissioning regulations.		
Answer	The CNSC reviewed the regulatory framework for radioactive waste management and a gap analysis was documented. Short-term and long-term recommendations were captured in the regulatory framework five-year plan, specifically the requirement for regulatory and guidance documents for waste management. A high-level needs analysis was completed in March 2012. Currently, CNSC staff are drafting an internal discussion paper to be presented in June 2012 to the CNSC's Regulatory Steering Committee. Once internally vetted, the CNSC will prepare a formal discussion paper for public comment. The paper will outline the CNSC's proposed high-level requirements regarding radioactive waste and decommissioning regulations and it is expected to be on the CNSC's public Web site by the end of 2012. At that time, the public will have 120 days to comment on the discussion paper. In drafting the requirements for radioactive waste and decommissioning, the CNSC will consider comments received by industry and interested stakeholders. The development of separate regulations for radioactive waste and decommissioning is at an early stage. After pre-consultation with industry and stakeholders, via various means including the discussion paper, CNSC staff require approval to proceed from the Commission Tribunal and the Government of Canada prior to commencing the formal Government of Canada process for implementing regulations.		
Q. No. 37	Country United States of America	Article Article 20	Ref. in National Report Section 3.1.(d), Page 5
Question/ Comment	The report states that the Government of Canada recently created the Major Projects Management Office (MPMO) within Natural Resources Canada (NRCan) as a mechanism to provide a single "window" for project management		

<table>
<tr><td></td><td colspan="3">across the federal government.
1. Please clarify whether MPMO is fully integrated into NRCan, including how staffing and budget resources are provided (human resources for NRCan are not discussed in the report).
2. Please also describe what mechanisms are available to MPMO to ensure that project agreements remain on schedule and other aspects are met.</td></tr>
<tr><td>Answer</td><td colspan="3">1. The Major Projects Management Office (MPMO) is a sector within Natural Resources Canada (NRCan). The MPMO’s staff are employees of NRCan. Funding for the office, however, comes from the broader government-wide MPMO initiative, which from 2007 to 2012 provided $150 million to key regulatory departments and agencies to improve the efficiency and effectiveness of the federal regulatory review system.

The MPMO leads this initiative by providing project management, coordination and policy leadership across the Government of Canada for the regulatory review of major resource projects. As a result, strictly within its mandate, the MPMO operates semi-autonomously from the rest of the department.

2. The MPMO uses a number of tools and governance structures to ensure that target timelines outlined in project agreements are met throughout the federal environmental assessment and regulatory review processes:
• Executive leadership and oversight: A committee of deputy heads from partner departments and agencies meets monthly and addresses issues identified by the MPMO and others during the course of a project review
• Management controls:
• weekly status reports to deputy heads on the progress of all active project reviews
• an early warning system to identify potential issues</td></tr>
<tr><td>Q. No. 38</td><td>Country
United States of America</td><td>Article
Article 19</td><td>Ref. in National Report
Section E.4.2.2, Page 49</td></tr>
<tr><td>Question/ Comment</td><td colspan="3">The report states that Canadian Nuclear Safety Commission (CNSC) invites other federal, provincial, and territorial agencies to participate in regulatory reviews, as appropriate, to ensure their concerns are taken into account.
1. Please describe how the perspectives of these agencies are taken into account by the Commission Tribunal (for example, whether other agencies have veto power or the ability to modify license conditions).
2. Where is the line drawn between CNSC and provincial officials and regulations in dispute resolution?
3. Which agency has final approval/disapproval authority?</td></tr>
</table>

Answer	1. The CNSC, as lead federal authority responsible for regulating the use of nuclear material in Canada, including the nuclear fuel cycle, invites other federal and provincial regulatory agencies to participate in the licensing process, when their areas of responsibility could impact the proposed nuclear facility. This procedure ensures that the legitimate concerns of federal, provincial and territorial agencies are considered in the regulatory process (Commission Tribunal) and are reflected, as appropriate, in the licence in the form of site-specific requirements. 2. The CNSC is the lead federal authority responsible for regulating the use of nuclear material in Canada, including the nuclear fuel cycle. Although the nuclear sector is subject to federal jurisdiction through the NSCA, the CNSC uses a harmonized or joint review approach with other federal departments in areas such as health, environment, transport and labour. However, at the end of the day the onus is on the applicant/licensee to meet all regulations, whether municipal, provincial, federal or territorial. Due to harmonization, disputes rarely (if ever) arise. However, if one were to occur it would be discussed between both agencies. Such consultations serve to clarify the reasoning behind the divergent view and may, for example, introduce supporting information that one agency/department may not have had access to in developing its respective technical assessment. 3. The CNSC is the lead federal authority responsible for regulating the use of nuclear material in Canada, including the nuclear fuel cycle. The CNSC regulates the use of nuclear energy and materials to protect the health, safety and security of Canadians and the environment, and to implement Canada's international commitments on the peaceful use of nuclear energy. Under the NSCA, the Commission Tribunal or person authorized by it makes the licensing decision.		
Q. No. 39	Country United States of America	Article Article 19	Ref. in National Report Section E.4.1, Page 47
Question/ Comment	Although the Environmental Assessment (EA) plays an important role in the Canadian Nuclear Safety Commission (CNSC) licensing process and CNSC is responsible for establishing the scope of the EA and for ensuring that an EA is prepared, it is not clear who is responsible for actually preparing the EA, which agencies other than CNSC must review it, or at what level it must be approved (e.g., by CNSC staff or by the Commission Tribunal). Please clarify these points.		
Answer	Under the *Canadian Environmental Assessment Act* (CEAA), other federal departments, such as Fisheries and Oceans Canada, may be required to conduct an environmental assessment (EA) and make a decision on a project. Federal departments such as Environment Canada or Health Canada may be required to provide technical expertise based on their mandates. When multiple departments are involved, one department acts as the Federal Environmental Assessment Coordinator (FEAC) so that there is one coordinated review, one EA report, and coordinated timing for each department’s EA decisions.		

	For a CNSC screening-level EA, the proponent (licence applicant) is responsible for preparing and submitting an environmental impact statement (EIS) on the proposed project to the CNSC for technical review. The CNSC coordinates the technical review of the EIS and acts as the FEAC, coordinating the review by other federal departments that need to make an EA decision or provide expert advice. A coordinated screening EA report is then prepared by CNSC staff with input from other departments and then approved by both the Commission Tribunal and the other departments involved, as required under the CEAA. The approval level for the EA decision depends on the department and type of EA. For screening-level EAs, the CNSC decision is made by the Commission Tribunal, but approval levels can vary at other departments as they are dependent on departments' internal policies. The Minister of the Environment makes the final EA decision for Comprehensive Studies, and the Governor in Council makes the final decision for panel reviews regardless of the departments involved.		
Q. No. 40	Country China	Article Article 24	Ref. in National Report Section F.6.6, Page 68
Question/ Comment	It is stated that "The requirements of an environmental management system (EMS) include the following tasks: Establish, implement and maintain an EMS Conduct internal audits at planned intervals so that all elements of the EMS are audited on at least a five-year cycle." Whether every radioactive waste management unit shall have EMS certificate?		
Answer	If required as part of a licence condition, the licensee must establish, implement and maintain an environmental management system that meets the requirements set by the Canadian Standards Association's ISO-14001:2004. However, the CNSC does not consider that certification to ISO-14001 by an authorized register or independent third party meets the requirements of the ISO-14001 standard. Therefore, the CNSC, in exercising its responsibilities as outlined in the *Nuclear Safety and Control Act* (NSCA), will conduct its own evaluation of the licensee's programs in relation to the requirements of the ISO-14001 standard. With respect to certification by radioactive waste management unit: based on ISO-14001, it could be administered at the corporate or unit level. However, the EMS elements should focus on the activity/business to be certified.		
Q. No. 41	Country China	Article Article 24	Ref. in National Report Section F.6.2, Page 66
Question/ Comment	It is stated that "Some nuclear facilities release small quantities of gaseous radioactive material in a controlled manner into the atmosphere. The nuclear sector sets separating targets or administrative limits that are typically a small		

	percentage of the derived release limits (DRLs)." 1. Are there the relevant targets or administrative limits to have been set for each of tailing management facilities (TMFs) to meet the derived release limits? 2. What are the targets or administrative limits?		
Answer	For TMFs, derived release limits and associated administrative limits for gases coming out of these facilities are not required by the CNSC. This is because the effects of gas emissions (exhalation of radon gas and long-lived radioactive dust) are very low, essentially not detectable or comparable to background radiation. These calculations are performed in environmental impact assessments at the initial licensing stage and verified throughout a facility's lifecycle. Predictions are based on the properties of the tailings and configuration of the TMF, and are made through air dispersion modelling (e.g., the U.S. Environmental Protection Agency's ISC3 and similar models). Predicted concentrations at various distances and for critical human exposure locations and scenarios are also used in quantitative human health risk assessment to explicitly estimate dose to a member of the public. This is done to demonstrate that the CNSC's *Radiation Protection Regulations* limiting public dose from all sources to 1 mSv are being met and will be met in the future. As with environmental concentrations, predicted doses arising from gaseous emissions from TMFs are extremely low. To verify that operations are meeting predictions based on modelling, comprehensive environmental monitoring programs are in place at and around TMF facilities for radon in air and radioactivity in suspended particulates (e.g., uranium, radium-226, lead-210 and polonium-210). Results are summarized on an annual basis and compared against background radiation identified from current regional and local reference data, as well as any pre-mining, baseline data.		
Q. No. 42	Country China	Article Article 24	Ref. in National Report Section F.6.1, Page 66
Question/ Comment	1. What are the requirements on the doses management to worker in the radioactive waste management facility? 2. How has it been conducted periodically to assess the doses to worker in the radioactive waste management facility?		
Answer	1. Every licensee, including radioactive waste management facilities, must implement a radiation protection (RP) program that meets the requirements of the CNSC's *Radiation Protection Regulations*. The RP program must ensure doses are maintained below regulatory dose limits and ALARA (as low as reasonably achievable) through the implementation of management control over work practices, personnel qualification and training, control of occupational and public exposure to radiation, and planning for unusual situations. To effectively		

	manage radiation exposures and doses to workers ALARA, licensees use a combination of engineered controls, work planning, tools and personal protective equipment. 2. Every licensee, including radioactive waste management facilities, must ascertain and record doses for each worker, in accordance with section 5 of the CNSC's *Radiation Protection Regulations*. External dosimetry devices are worn by workers involved in all tasks in the radioactive waste management facilities. Depending on the radiological hazards in a facility, internal dosimetry may be required as well. The *Radiation Protection Regulations* require the licensee to keep records of occupational exposure, which are verified by the CNSC during compliance activities. Also, ALARA dose targets are typically established and occupational dose expenditures arising from operations are monitored and assessed against these dose targets.		
Q. No. 43	Country China	Article Article 19	Ref. in National Report Section D.3, Page 31
Question/ Comment	It is showed in the Table D.4 that most of the contaminated soils are in situ and consolidated storage, above ground mound, or stored in the buildings after packaged, and some of the contaminated soils are buried in the trench. How will the contaminated soils being stored be disposed of in the future? a) AECL b) Cameco c) Deloro		
Answer	a) AECL sites and b) Cameco sites Contaminated soil and debris in Port Hope and Port Granby will be excavated and transported to two engineered mounds that will serve as the long-term waste management facilities (LTWMF). The contaminated soils at the historic contaminated sites will be excavated and transported to other LTWMF for long-term management. Confirmation of a location or locations for long-term management facilities for the in situ and temporarily consolidated waste remains a federal government priority. c) Deloro The Ontario Ministry of the Environment is the current licence holder for the Deloro mine site. Contaminated soils located at the Deloro mine site will be excavated and consolidated in waste containment cells located on site for in situ		

	disposal. The estimated completion date for the waste consolidation project is 2016. Due to the presence of non-radiological hazards that will remain hazardous indefinitely, it is not anticipated that the site will ever be released from institutional control provided there is a supporting provincial government.		
Q. No. 44	Country China	Article Article 19	Ref. in National Report Section D.3, Page 28
Question/ Comment	In CANDU NPPs, the specificity activity of C-14 in MOD resin is much higher than PHT resin. 1. Whether the MOD resin and other resin are managed according to classification? 2. Whether the MOD resin and other resin are stored and treated separately? 3. What is the future plan for the resin management?		
Answer	NPPs located in the province of Ontario are managed as follows: 1. Moderator and heat transport resins (and other active resins) are managed separately. 2. Active resins may be either low-level or intermediate-level radioactive waste. Low-level waste is stored in low-level storage buildings (LLSBs). Intermediate-level radioactive waste (moderator, heat transport, or other resins meeting intermediate-level radioactive waste criteria) are shipped and stored in separate containers, but may be placed in an in-ground storage structure with other containers of intermediate-level radioactive waste. 3. Future plans are to continue to ship spent resins to the Western Waste Management Facility where they will be stored using in-ground storage structures (or low-level storage buildings) until a future date when they will be placed in Ontario Power Generation's Deep Geologic Repository (DGR) for long-term management.		
Q. No. 45	Country China	Article Article 28.2	Ref. in National Report Section J.4, 107
Question/ Comment	It is mentioned that the Sealed Source Tracking System (SSTS) was developed and implemented in 2006. 1. What functions does SSTS have? 2. What information need be input in SSTS? 3. Please briefly introduce the operation conditions of SSTS. 4. If it is happened that sealed radioactive source lost, how will the related emergency response be implemented?		
Answer	1. The SSTS is a secure information management computer program used to populate the NSSR and allows licensees to report their source transfers online. The NSSR enables the CNSC to build an accurate and secure inventory of sealed sources in Canada, starting with those that are classified as high risk. The information is as		

current as the reporting timeframes required by the licence (e.g., reporting within two days of receipt and seven days in advance of any transfer).

The SSTS tracks movements of high-risk radioactive sealed sources from one location to another. Licensees can report receipt, transfer, import and export. Reporting can be done using a paper system, an electronic system or online.

2. Licensees using the system are required to provide:
    - the date of transaction
    - the serial number of source
    - isotope information
    - the reference date
    - the activity of the source on the reference date
    - where the source is coming from – CNSC licence number (if applicable) and address
    - where the source is going – CNSC licence number (if applicable) and address
    - the model name/serial number of prescribed equipment (such as a radiography camera, irradiator, teletherapy machine)
    - the model/name of source assembly (for a radiography camera)

Records on sources newly manufactured in Canada must also be created in the system prior to any movement of the source. Transfers and exports must be reported at least seven days before the actual shipment takes place. Receipts and imports must be reported within 48 hours of reception. Prior to issuing an export licence, the exporter's information is verified against the licence number and address provided by the licensee. Any discrepancies are resolved with the licensee prior to entering the information in the SSTS. Electronic export transactions are verified by comparing the export report generated by the SSTS against the export licences issued by the CNSC. In 2010, the CNSC started to request that licensees confirm source exports by email. This email serves as confirmation that the export has really occurred and that the shipment is now the responsibility of the importing country.

3. The online system:
    - alerts the shipper if the recipient is not licensed by the CNSC

- alerts the shipper if the receiving location is not authorized
- helps the CNSC to monitor the possession and movement of sealed sources and to prevent any unauthorized possession of sources which could harm Canadians

The NSSR and SSTS are essential to the maintenance of the safety and security programs for high-risk sealed sources. It is important for the CNSC to track and assist with the licensee's mitigation of all events involving sealed sources. Current CNSC regulations require all licensees to immediately report lost or stolen nuclear substances to the CNSC, with written descriptions of any actions taken or proposed for recovering the missing material. When any high-risk or moderate-risk sealed sources are lost or stolen, the licensee must also work with local police and other authorities, to inform the public and to obtain any required additional resources to assist with the search and recovery. The CNSC investigates and follows up all events involving sealed sources, to ensure the licensee is taking all necessary actions to mitigate the event. If an event involves the loss or theft of a sealed source or radiation device, the CNSC informs national and international stakeholders, so they can assist with the recovery.

4. If a source is lost or stolen, the licensee is responsible for emergency response and must immediately report the event to the CNSC. If the lost or stolen source is a Category 1–4 sealed source or is an open source exceeding 100 times the exemption quantity of that nuclear substance, the CNSC's Directorate of Nuclear Substance Regulation (DNSR) notifies the following groups:
   - CNSC Nuclear Security Division (responsible for appropriately notifying the IAEA)
   - U.S. Nuclear Regulatory Commission (NRC)
   - Transport Canada–CANUTEC
   - Canadian Steel Producers Association (CSPA)
   - Canadian Association of Recycling Industries (CARI)
   - Federal Provincial Territorial Radiation Protection Committee (FPTRPC)

   The CNSC ensures that the licensee has taken all measures possible to get the source located and returned to its secure storage location. The CNSC follows internal documented procedures and takes steps to ensure that the licensee is mitigating the event and examining the root cause of the event. All events are documented in a DNSR event database and tracked until the event is closed. The CNSC also provides assistance with communications if a press release is deemed necessary to attempt to find a source. All lost and stolen sources

	are published on the CNSC Web site in a lost/stolen/found report within three days of the event.		
Q. No. 46	Country Hungary	Article Article 10	Ref. in National Report Section K.4.4.4, Page 115/116
Question/ Comment	In the subsection K.4.4.4 (Funding of NWMO) it is mentioned that further development of the funding formula is planned. Will it address the problem of newly built nuclear power plant units, and if so, what are the main features of the calculations?		
Answer	The funding formula, based partly on projections of spent fuel to be generated by each waste owner, allocates liabilities to each of the corporations for their portion of the estimated total cost. It identifies trust fund contributions by each spent fuel owner for their portion of the estimated total cost. Discussions were held with a number of stakeholders regarding the development of a funding formula that could apply to possible new radioactive-waste owners and spent fuel from new reactors. The results of the discussions are summarized below: 1) The principles used in the approved funding formula are reasonable and should apply to new owners and new reactors. 2) Fixed and variable costs and investments made to date need to be considered in any new funding formula for new owners and new reactors. 3) The characteristics of new fuel types must be considered. 4) The existing funding formula should be developed when specific circumstances are clear for new reactors and new owners. 5) The changes in the funding formula for new owners of new reactors may be different from the changes for an existing owner with new reactors. The above principles will be applied to specific circumstances related to new owners and new reactors when they arise.		
Q. No. 47	Country Hungary	Article Article 16	Ref. in National Report Section H.4, Page 93
Question/ Comment	16 decommissioned steam generators have been transported to Sweden, to process them and to recycle the clean steel shell and reduce the volume of waste by 90 percent. The remaining contaminated steel will be sent back to Canada where it will be stored safely. The licence is valid for a period of one year from February 4, 2011 until February 3, 2012. 1. What will the recycled steel be used for? 2. Where will the remaining steel be stored and how large is its activity?		

Answer	After the CNSC authorized the shipment, Bruce Power delayed plans to ship the 16 steam generators to Sweden for recycling so as to allow further discussion with First Nations, Métis and others seeking additional information. No date was set for the shipment. The required licences to allow the shipment have since expired; Bruce Power will need to reapply for new ones prior to any shipment. 1. The recycled steel would have been released following the free-release procedure for metals originating from the nuclear industry in accordance to the European Commission's RP89 section 3.1, which includes a final and mandatory re-melt by contracted external foundries before the metal can enter the open market as raw material. The re-melt, as stipulated by the recycling company, results in a metal concentration of maximum 10 percent content of "previous nuclear" metal by co-melting with other non-nuclear metal scrap. 2. The total activity of the radionuclides in the steam generators totals 3.67 TBq (as of June 2010, there will be slightly less activity now due to decay). The plan was for the entire radionuclide inventory contained on the remaining steel waste that could not be decontaminated to be shipped back to Canada and stored at the Bruce site in Ontario Power Generation's Western Waste Management Facility.		
Q. No. 48	Country Hungary	Article Article 26	Ref. in National Report Section F.8, Page 74
Question/ Comment	"In accordance with regulatory guide G-219, Decommissioning Planning for Licensed Activities, the CNSC requires Class I facilities and uranium mines and mills licensees to keep decommissioning plans up to date throughout the lifecycle of a licensed activity. The CNSC also requires licensees to prepare a preliminary decommissioning plan and detailed decommissioning plan for approval." What is the time period for updating the preliminary decommissioning plans?		
Answer	The licensee must maintain a preliminary decommissioning plan that is reviewed and updated every five years, or in light of operational experience and technological advances, or when requested by the Commission Tribunal or a person authorized by the Commission Tribunal.		
Q. No. 49	Country Hungary	Article Article 9	Ref. in National Report Section G.2, Page 77
Question/ Comment	"Each nuclear power plant in Canada has enough storage space to store all the spent fuel produced during the operating life of the station."		

	Would the capacity of the storages be still sufficient in case of a future time extension of the NPPs? a) OPG b) NP Power c) HQ		
Answer	a) Dry fuel storage facilities (Pickering Waste Management Facility, Darlington Waste Management Facility and Western Waste Management Facility) have sufficient storage space to accommodate all spent fuel produced at their respective nuclear stations (including additional spent fuel arising from plant life extension). New buildings are constructed as required to house all spent fuel produced from station operations. b) As part of the life extension project at NB Power's Point Lepreau Nuclear Generating Station, future onsite spent fuel storage capacity was addressed by preparing and licensing additional space to allow used fuel storage facilities to be constructed as needed. c) Hydro-Québec currently operates nine MACSTOR modules, which are sufficient to meet current spent fuel storage requirements. Hydro-Québec is authorized to construct and operate an additional 11 MACSTOR modules which would be sufficient to meet spent fuel storage requirements for the reactor's operating life.		
Q. No. 50	Country Hungary	Article Article 9	Ref. in National Report Section G.6, Page 79
Question/ Comment	"Dry storage facilities are licensed for a limited period. Licences issued by the CNSC are generally valid for a five- to 10-year period. At the time of licence renewal, the CNSC examines the operational performance of the dry storage facility to determine whether it can continue to operate safely for another licensing term; again, typically for a five-year period." What are the main steps of the CNSCs licensing process?		
Answer	All licences are issued after a case-specific evaluation. At the CNSC, staff from the licensing division has the primary responsibility for making sure that all appropriate reviews are conducted. The licensing division make use of technical support divisions within the CNSC to conduct the review of safety documentation. This documentation is assessed and compared against regulatory requirements, including federal and provincial legislation, national and international		

	standards, requirements, and best practices and guidance. The licensing process begins when the CNSC receives an application. All new licence applications or amendments to existing licences require the approval of the Commission Tribunal or a person authorized by it – such as a CNSC designated officer. The Commission Tribunal is notified when an application that requires a decision from them has been filed. The preparation of a licence application considers all regulatory criteria as defined by the *Nuclear Safety and Control Act*, relevant regulations, CNSC requirements and expectations, international and domestic standards, and applicable international obligations. An assessment plan and a timeline are then developed for each individual application. The assessment plan identifies the scope and depth of the licensing technical assessment needed to evaluate the application. It takes historical licensing information, licensing experience, performance and compliance reports, and staff recommendations into account. During this stage, the CNSC undertakes a variety of technical assessments to ensure that each application complies with its corresponding regulatory requirements. This is a rigorous process – the scope and duration of each assessment will vary depending on the type of licence or certification requested. Peer reviews are sometimes used, when additional rigour is needed. The licensing technical assessment also considers all regulatory criteria as defined by the *Nuclear Safety and Control Act*, relevant regulations, CNSC requirements and expectations, international and domestic standards, and applicable international obligations. At the end of this process, CNSC staff make a recommendation for a decision on the licence application, through an integrated assessment report. A recommended compliance plan for each licence is also developed, and the mitigation measures contained in the follow-up program, if applicable, are included in the licence. This is the final step in the licensing process, during which all CNSC staff recommendations related to a licence application are reviewed and decided upon by either the Commission Tribunal or a person authorized by it. When the decision is to be made by the Commission Tribunal, public hearings may be held to take into account the views, concerns and opinions of interested parties and intervenors. This is an important part of the process of

	establishing regulatory policy, making licensing decisions and implementing programs. Whether it is made by the Tribunal or a person authorized by it, the decision is either a licence or a letter of refusal.		
Q. No. 51	Country Hungary	Article Article 19	Ref. in National Report Section E8.2.3, Page 57-58
Question/ Comment	In 2009, the CNSC requested an IAEA Integrated Regulatory Review Services (IRRS) mission to Canada. What was the recommendation of the IRRS mission which made Canada modernize the current regulatory framework with respect to the requirements for spent fuel and radioactive waste.		
Answer	In the IRRS Mission Report, recommendation number 11 (R11) stated: "[the] CNSC should improve its regulatory framework including regulatory documents and guides with respect to radioactive waste management to ensure that radioactive waste is managed in a consistent manner." Further details on the CNSC's path forward are on page 58 of Canada's Fourth National Report. CNSC has also made the IRRS reports public. For example the IRRS 2009 Peer Review Report and CNSC's Management Response and follow up reports are publicly accessible from the CNSC Web site; http://www.nuclearsafety.gc.ca/eng/about/international/irrt/index.cfm		
Q. No. 52	Country Hungary	Article Article 32	Ref. in National Report Section B.7.2, Page 17
Question/ Comment	Please clarify the definition of long-lived and short-lived radioactive waste more exactly.		
Answer	It is up to each licensee to classify their own intermediate-level radioactive waste. However, long-lived intermediate-level radioactive waste generally contains long-lived radionuclides that require isolation and containment for periods beyond several hundred years. Examples of long-lived intermediate level radioactive waste: • spent moderator resin • spent heat transport resin Examples of short-lived intermediate level radioactive waste:		

	• waste with a high cobalt-60 content • generic waste with a half-life of less than 30 years		
Q. No. 53	Country Japan	Article Article 32	Ref. in National Report Section K.6.2.2, Page 125
Question/ Comment	Section K.6.2.2 states that this equipment will crush the concrete to a form that permits final clearance and becomes a valuable product suitable for reuse on site. 1. Is the crushed concrete reused only on site? 2. If so, could Canada provide an example(s) of things reused?		
Answer	1. Crushed concrete is reused only onsite at CRL. 2. For crushed concrete at CRL, the cleared concrete aggregates are used as a sub-base for roads and parking lots, as reinforcement for embankments and, with further refinement, as top cover for roads. CRL has also cleared and reused approximately 500 m^3 of crushed concrete to enhance the concrete lay-down area of its Waste Analysis Facility (WAF).		
Q. No. 54	Country Japan	Article Section 18	Ref. in National Report Section E.3.2, Page 44
Question/ Comment	Section E.3.2 states that there are two forms of clearance: unconditional and conditional clearance. 1. Could Canada provide an example(s) of conditional clearance? 2. Is clearance level for conditional clearance different from clearance levels set in BSS?		
Answer	Conditional clearance applies to specified types of materials and disposition routes. As such, conditional clearance levels are developed by licensees and submitted to the CNSC for review and approval. Submissions for conditional clearance have been received by the CNSC, for example, for the managing, processing and disposal of low-level radioactive hazardous wastes at appropriately licensed (by regulatory bodies other than the CNSC) hazardous waste management and disposal facilities. In support of such requests, licensees submit a pathways analysis to prospectively assess doses to workers and the public from cleared materials so that conditional clearance levels are established on the same basis as that used in establishing exemption levels in the Basic Safety Standards. The conditional clearance levels are therefore specific to each submission for specified types of materials and disposition paths. They are not the same as those set out in the 2011 BSS.		
Q. No. 55	Country Korea	Article Article 28	Ref. in National Report Section J, Page 105

Question/ Comment	Section J describes the storage facility for disused sealed sources. 1. What is the long-term management plan for disused sealed sources? 2. Which organization is responsible for the management of radioactive wastes except for wastes generated from nuclear utilization facilities?		
Answer	1. In Canada, there is no dedicated repository for disused sealed sources. There are several options for the management of disused sealed sources, including the following: i) the disused sealed source is managed by the owner in a dedicated waste management facility; ii) the disused sealed source is returned to the manufacturer for long-term management; or iii) the sealed sources are transferred to CRL for management. If a sealed source has decayed below its exemption quantity or its clearance levels – as identified in Schedule 1 and Schedule 2 of the NSRDR – it may also be released from CNSC regulatory control, under section 5.1 of the NSRDR. In addition, if allowed under the licence, sealed sources may contain short-lived radionuclides that can be stored for a decay period and subsequently allowed unconditional clearance. Although the sealed sources may no longer be under CNSC regulatory control; persons must still follow applicable federal, provincial and/or municipal regulations. The sealed sources with long-lived radionuclides will be managed with other low- and intermediate-level waste in future long-term management facilities. 2. In accordance with the 1996 Government of Canada Policy Framework on Radioactive Waste, the owners are responsible for developing and implementing solutions for managing their own radioactive waste. In addition, radioactive waste owners are also responsible for all costs associated with safe and secure management of their radioactive waste. In some cases, the owner of the disused source is known (e.g., the purchaser of the product), while in other cases it may not be known. When there is no owner that can be held liable, the Government of Canada takes on the responsibility for managing the radioactive waste. There is no dedicated storage facility for disused sealed sources in Canada. Current management practices are discussed in the reply above.		
Q. No. 56	Country Korea	Article Article 11	Ref. in National Report Section H.4, Page 93
Question/	Section H.4 states that the steam generator replaced in the Bruce reactor will be transferred to Sweden for		

Comment	decontamination and decommissioning and some parts of them will be recycled and the contaminated part of them will be back to Canada. What are the important safety considerations in relation to this?
Answer	The CNSC considers the processing of old steam generators to be an excellent application of the internationally accepted and environmentally friendly "three R" principles of waste management: reduce, reuse and recycle. The CNSC endorses implementation of the three R principles at Canadian nuclear facilities. It ensures that the management of radioactive waste is carried out by following the highest standards for health, safety, security and environmental protection. Radioactive waste minimization is a key principle in the CSA standard *Management of Low- and Intermediate-level Radioactive Waste*, which specifically refers to the development of a waste management program to reduce the overall volume of radioactive waste requiring long-term management. In Canada, the responsibility for ensuring safe transport of nuclear substances, including radioactive waste, is jointly shared between the CNSC and Transport Canada. The CNSC issues transport licences for nuclear substances only once it is convinced that the shipment will be completed safely, without posing risks to the health, safety and security of Canadians and the environment. In granting the licence to transport the steam generators to Sweden, the Commission Tribunal was satisfied that: • the risk to the health and safety of the public and the environment posed by the shipment was negligible • the potential environmental impacts of the proposed shipment were examined during an environmental review under the *Nuclear Safety and Control Act* • *Packaging and Transport of Nuclear Substances Regulations* requirements for a special arrangement were met or exceeded • the proponent would be taking all necessary precautions and was fully qualified to undertake the activity The process described in the answer to question 47, would result in recycling the clean steel shell and reducing the volume of waste by 90 percent. Read about the decision at nuclearsafety.gc.ca/eng/mediacentre/releases/news_release.cfm?news_release_id=381

	Note that the licence granted for this shipment expired on February 4, 2012, and Bruce Power did not re-apply. Please see the reply to question 47 for Bruce Power's steps after the licence was issued.		
Q. No. 57	Country Korea	Article Article 11	Ref. in National Report Section H.4, Page 93
Question/ Comment	Section H.4 states that - Canadian licensees follow various forms of waste minimization, depending upon site and operational specifics. - As an example, OPG is implementing a number of waste minimization activities. Specific initiatives include the following: development of five-year radioactive waste minimization plan What are the plans of specific minimization, and what are the outcomes in each stage according to the minimization plan?		
Answer	The Pickering and Darlington Five-Year Solid Waste Minimization Plans (2011–2015) propose waste minimization initiatives comparable to the ones stated in section H.4 page 93 of the 2011 National Report. These include: • establishment of a waste minimization culture • establishment of a clean zone area for de-packaging materials • exclusion of unnecessary materials in zoned areas • use of reusable equipment and materials as much as possible It has been shown that the amount of waste generated is proportional to the number of station outage days and the amount of project work, a factor which is taken into account in setting targets. It has also been noted that as the station ages, waste production increases. Waste reduction initiatives strive to counteract these factors. The implementation of washable Tyvek oversuits and overshoes in 2005 saw a significant decrease in the amount of waste produced at both Pickering and Darlington. Pickering and Darlington have improved their waste generation targets in recent years.		
Q. No. 58	Country Korea	Article Article 5	Ref. in National Report Section G.2, Page 77
Question/ Comment	Section G.2 states that - After several years in the bays – six to 10 years, depending on site-specific needs and organizational administrative controls – and when the associated heat generation has diminished, the spent fuel can be transferred to an onsite dry		

	storage facility. Section G.6 states that - The engineered structures, canisters, MACSTOR and OPG dry storage containers were originally designed for a 50-year lifetime. - Licenses issued by the CNSC are generally valid for a five- to 10-year period. 1. Does the license requirement quantitatively specify the minimum cooling period before the transfer? 2. What are the safety evaluation items preponderantly reviewed during the renewal of the license?		
Answer	1. The applicant must propose a minimum cooling period supported by a safety assessment. Once accepted by CNSC staff, this minimum period becomes part of the licensing basis and a regulatory requirement in the licence. 2. The safety areas reviewed during licence renewal include the management system, human performance management, operating performance, safety analysis, physical design, fitness for service, radiation protection, conventional health and safety, environmental protection, emergency management and fire protection, waste management, security, safeguards, and packaging and transport.		
Q. No. 59	Country Korea	Article Article 26	Ref. in National Report Section F.6, Page 74
Question/ Comment	In the nuclear facilities decommissioning licensing process, 1. What is the regulatory standard for site release after the completion of decommissioning? 2. Is the participation of the public required in the decommissioning licensing process? 3. If the public participates in the process, how can they participate? 4. What is the relationship between the termination of the facilities operation license and the approval of the decommissioning plan?		
Answer	1. Typically, there are two end-state objectives associated with decommissioning; a) complete dismantlement and restoration of grounds and b) decontamination of the structures and reuse of the structures for other purposes, ones that do not need licensing. For a), this includes complete dismantlement of the facility and removal of all prescribed information, materials and wastes (including conventional, hazardous and nuclear). With this approach the grounds also have to be restored after structures have been removed to an environmentally stable,		

uncontaminated state. For b), decommissioning entails complete removal of all prescribed information, materials and wastes, including conventional, hazardous and nuclear, from the structures. Any structures not dismantled have to be fully decontaminated to meet CNSC regulatory expectations to allow full, unrestricted use.

In both cases, any residual nuclear substances have to meet the CNSC's exempted or clearance levels established by the *Nuclear Substances and Radiation Devices Regulations* to allow for release from regulatory control. For non-nuclear contamination associated with the facility, other standards are adopted. These relate to hazardous wastes and other non-nuclear contamination (as set by agencies such as Environment Canada and Canada's provincial ministries of the environment). In addition, the licensee has to meet municipal requirements regarding release to sewage for any effluents associated with the decommissioning program. Subsurface contamination, including contaminated soils or contaminated groundwater plumes, also have to meet the CNSC's clearance criteria, prior to the site being released from regulatory control.

2. At the CNSC, major licensing decisions are made at public hearings. Public participation is not required, but it is invited as part of the public hearing process. For a decommissioning project, a public hearing would be required in relation to a decision on the environmental assessment for the project, and in the issuance of a decommissioning or abandonment licence. The environmental assessment process itself sets out expectations for public involvement and consultation prior to the initiation of the public hearing process.

3. During the public hearing process, members of the public have opportunities to receive copies of the hearing submissions, attend the hearing, provide written interventions (either positive or negative) to the Commission Tribunal and make an oral presentation during the hearing itself. All public hearings are transcripted, recorded and broadcast (Web cast) over the Internet.

4. When a licensee is anticipating the cessation of operations and the start of decommissioning at a nuclear facility, they apply for a decommissioning licence. Until such a licence is issued, decommissioning of the facility cannot start and the operating licence remains in effect. (Although the licensee does not need to operate the facility, they need to maintain all safety programs associated with the operating licence.) As part of the application for a decommissioning licence, the applicant has to submit a detailed decommissioning plan. This plan is evaluated by CNSC staff and only if the plan is found to be acceptable does the matter proceed to the

<table>
<tr><td></td><td colspan="3">Commission Tribunal for a licensing decision on the issuance of a decommissioning licence. If a decommissioning licence is issued, the operating licence is also revoked (if required) in the same decision.</td></tr>
<tr><td>Q. No. 60</td><td>Country
Korea</td><td>Article
Article 32</td><td>Ref. in National Report
Section D.3, Page 31</td></tr>
<tr><td>Question/ Comment</td><td colspan="3">Section D.3(Table D.4) states that “soil waste is stored in situ and consolidated storage”.

1. What is method for the soil waste stored in situ and consolidated storage?
2. What is the contaminated nuclide and the contamination level of the soil waste stored in each site?</td></tr>
<tr><td>Answer</td><td colspan="3">1. The method of in situ management (without or preceding removal) is characterization, delineation, and regular inspection/monitoring. In some locations, fencing, intrusion barriers and signage may be added.

Consolidated storage is monitored and maintained in engineered mounds or covered waste piles. Waste piles usually have an asphalt or high-density polyethylene (HDPE) base and a top cover of fabric, vinyl or HDPE. Engineered mounds have multi-layer top covers and may have a single base-delineating layer or a multi-layered fully engineered base. Both mounds and piles are inspected and monitored for deterioration, and waste or emissions migration, on a regular basis.

2. The soil waste in situ and consolidated storage listed in table D.4 has nuclide contamination levels as follows:
a) Port Hope: Uranium-238 series with a total estimated activity of 29.5 GBq
b) Welcome WMF: Uranium-238 series with typical concentrations for uranium of 6.3 mg/g and for Ra-226 of 310 Bq/g
c) Port Granby: Uranium-238 series with average concentrations for U-238 of 8.9 Bq/g and for Ra-226 of 25.1 Bq/g
d) Northern Transportation Route: Uranium ore with average activity concentration of 0.2 Bq/g
e) Fort McMurray: Uranium ore with average activity concentration of 0.06 Bq/g
f) Toronto area: Ra-226 with average activity concentration of 0.08 Bq/g
g) Chalk River Waste Management Area D: Co-57, Ra-226, Am-241, Nat-Th, Nat-U with a total estimated activity of 22.2 GBq</td></tr>
<tr><td>Q. No. 61</td><td>Country
France</td><td>Article
Article 32</td><td>Ref. in National Report
Section K, Page 113</td></tr>
</table>

Question/ Comment	It is mentioned that a number of studies are underway to better define the waste processing, treatment and long-term management facilities required to deal with the wide variety of legacy waste types at Atomic Energy of Canada Limited (AECL) sites. This will help to define, for example, the volume reduction and waste immobilization technologies to be used, the extent to which buried waste can be managed in place over the long term, and the available options for the long-term management of the waste that needs to be recovered. Could Canada indicate if there is a deadline for submitting these studies?		
Answer	At this time there is no definitive overall schedule. Technically feasible options are being identified and assessed at a high level during 2012 and 2013, but option selection will involve consultations with a wide range of stakeholders, including the public, and no schedule has yet been set for this phase of the work. AECL is implementing decisions on technologies for waste characterization, immobilizing legacy liquids and implementing environmental improvements/remediations, as required, to support health, safety and environmental objectives.		
Q. No. 62	Country France	Article Article 26	Ref. in National Report Executive Summary, Page 2 Section K, Page 122
Question/ Comment	In 2011, the CNSC was notified of the completion of decommissioning activities at the Dalhousie University's SLOWPOKE-2 Reactor (DUSR) facility and received an application for a Licence to Abandon. Could Canada clarify the link between the concepts of "abandonment" and of "conditional and unconditional clearance"?		
Answer	Within the context of the NSCA and its regulations, "abandonment" of a nuclear facility means that it is released from CNSC regulatory control and licensing. This can happen in only two situations. The first is when any residual nuclear substances that remain on site are below conditional or unconditional clearance levels established by the NSCA and defined through the *Nuclear Substances and Radiation Devices Regulations* (NSRDR). The other is when alternative arrangements in place with other levels of government that ensure that the requirements of the NSCA and its regulations are being met (administrative controls). With respect to Dalhousie University's SLOWPOKE-2 Reactor facility, after decommissioning it met the conditional clearance levels established by the NSRDR.		
Q. No. 63	Country France	Article Article 9	Ref. in National Report Executive Summary, Page 2 Section K, Page 122
Question/	Canada's nuclear legacy liabilities comprise various facilities (mainly laboratories and shutdown prototype reactors)		

Comment	which are partially decommissioned and are currently in the long-term storage-with-surveillance phase of a deferred decommissioning program. The storage-with-surveillance phase is currently envisaged to be 30 years or longer (a major factor influencing the length of the phase is the availability of long-term waste management facilities). 1. a) Could Canada provide further information concerning surveillance phase (environmental surveillance, leakage detections, structural surveillance and inspections...) and b) specify the regulatory requirements? 2. Could Canada indicate if any PSR of the facilities is required by regulation in force during this phase?
Answer	1. (a) AECL has several facilities currently in the storage-with-surveillance decommissioning phase, including the Douglas Point (DP), Gentilly-1 (G-1), and Nuclear Power Demonstration (NPD) prototype reactors, and research reactors and other nuclear facilities at AECL's sites. Within the scope of storage-with-surveillance, inspection and maintenance programs are in effect, particularly for those safety-related systems such as ventilation, fire protection, and security monitoring. Environmental surveillance ensures that radioactive materials are contained within designated areas to prevent the release of contaminants to the public and environment, and that releases and effluents are treated and monitored per the storage-with-surveillance plan. This includes maintaining the structural integrity of the building and physical containment boundaries for radioactive materials, monitoring groundwater, and removing accumulated water from sumps so that internal structures are protected. 1. (b) Regulatory requirements for nuclear facilities with an active inventory of 10^{15} Bq are listed under the *Class I Nuclear Facilities Regulations*. Specifically, sections 3 and 6 of the Regulations describe the required programs, which include, but are not limited to: community information program, decommissioning plan, operations program, maintenance program, occupational health and safety program, quality assurance program, safety analysis, emergency preparedness program, environmental protection program, environmental monitoring program, radiation protection program, waste management program, security program and safeguards program. As an example, License Condition 4.3 of the Chalk River Laboratories (CRL) operating licence, NRTEOL-01.00/2016 and criterion 4.3 (1) and (2) of the associated CRL Handbook (LCH) require AECL CRL (the licensee) to undertake maintenance, monitoring and surveillance activities for nuclear facilities in storage-with-surveillance state in accordance with documented plans and procedures.

The CNSC document G-219, *Decommissioning Planning for Licensed Activities*, is the governing document that provides guidance on the preparation of decommissioning plans for activities licensed by the CNSC. Storage with surveillance is a planned stage during a decommissioning program.

The storage-with-surveillance plans must be accepted by the Commission Tribunal or a person authorized by it before the facility is transitioned to a storage-with-surveillance state.

During the storage-with-surveillance phase (SWS), also License Condition 4.3 of the CRL operating licence, NRTEOL-01.00/2016 and criterion 4.3 (1) 6 of the associated CRL Handbook require the licensee to perform care, maintenance, inspections, testing and surveillance activities as documented in the storage-with-surveillance plans which should contain as a minimum:

a) a description of the process of transitioning the facility from an operational state to a safe-storage state
b) provisions for care and maintenance during the safe-storage state
c) provisions for inspections, testing and surveillance during the safe-storage state

2. Canadian regulations associated with the NSCA do not specifically require periodic safety reviews. However, it is expected that the documentation supporting a licence is provided at the time of a licence application or updated at the time of licence renewal.

   For AECL CRL, there is no licence condition in the CRL Licence and associated LCH that explicitly requires AECL/CRL to undertake periodic safety reviews for facilities under the SWS phase. However, section 10 of the CRL Handbook identifies environmental protection requirements for AECL CRL facilities in general, with the objective of protecting the environment and the health and safety of persons by taking all reasonable precautions, including identifying, controlling and monitoring the release of radioactive and/or hazardous substances to the environment. AECL CRL must also report unplanned events taking place at the CRL site, and appendix H of the CRL LCH explains these requirements. The CNSC regulatory document S-296, *Developing Environmental Protection Policies, Programs and Procedures at Class I Nuclear Facilities and Uranium Mines and Mills*, requires the licensee to establish adequate provisions for the protection of the environment.

Q. No. 64	Country	Article	Ref. in National Report

	France	Article 32	Executive Summary, Page 1 Section K, Page 122
Question/ Comment	In the Executive Summary, it is mentioned that in implementing the APM program, an important focus will be to build relationships with communities and regions potentially interested in, or affected by the APM site selection process for the deep geological repository for spent fuel and the transportation of spent fuel. The organization regarding consultation, information and participation of the public in site selection process is described in the Report, and notably in Section K. Could Canada explain how the transportation of spent fuel is taken into account in this step?		
Answer	Transportation is an important consideration in the site selection process. For a site to be considered technically safe, a transportation route must be identified, or be capable of development, by which used nuclear fuel can safely and securely be transported to the site from wherever it is currently stored. Social considerations are also important in terms of identifying and assessing effects of transportation on community well-being. Various activities are in progress and being planned for addressing transportation: - The NWMO is engaging early with regulatory authorities to understand safety and security requirements for transportation. - The NWMO has established a transportation working group with federal/provincial government departments with transportation responsibilities, to allow for advance planning on public communications and ensure coordination in roles and responsibilities. - Additional transportation communications materials for the public are under development. In 2012, a new booklet on transportation will be developed. Opportunities to expand transportation DVDs will be explored. - Transportation will be featured in new series of “Ask the NWMO” columns issued in local and regional papers in areas where communities have entered the siting process. - Best practices from other jurisdictions will continue to be monitored. - At the current stage of the site selection process, the NWMO is: o addressing transportation considerations in the preliminary assessments (feasibility studies) presently underway at the request of eight communities, to explore potential suitability of those communities and sites o working with the potentially interested host communities, neighbouring communities, Aboriginal people and regional opinion leaders to understand questions and concerns about transportation. - In a future phase of the site selection process, the following will take place as part of more detailed site		

	investigations: o The NWMO will engage surrounding communities, Aboriginal people and different levels of governments in a study it is conducting of environmental, social, economic and cultural effects of the APM project at the broader regional level. This study will address effects that may be associated with transportation and potential modes and routes. o Through this study, the NWMO will invite discussion around preferred modes and transportation routes with the potential host communities and those potentially affected in the region and transport corridors. The NWMO will engage with them as a large group with a shared interest, to address their questions and concerns in the process. Funding will be made available to communities along the transportation route as a large group with a shared interest to seek independent advice to assist them in formulating questions and concerns. Transportation is a topic that is of great public interest in Canada. It is addressed regularly in NWMO briefings and discussions of the APM project. The NWMO will need to demonstrate the safety and security of any transportation system to the satisfaction of regulatory authorities and citizens before transportation can begin.		
Q. No. 65	Country France	Article Article 32	Ref. in National Report Executive Summary, Page 1
Question/ Comment	1. Canada considers that an important aspect of the Adaptive Phased Management (APM) Program is the avoidance of prescribed timelines for development of the deep geological repository for spent fuel. That means that there is no fixed timetable for the in-service date of this facility. 2. Could Canada confirm that this policy will have no impact (e.g. in terms of capacities of the storage facility or regarding ageing of equipments and installations...) in the safe management of spent fuel waiting for deep geological disposal?		
Answer	1. Canada's 2002 *Nuclear Fuel Waste Act* (NFWA) provides the framework for the development and implementation of a long-term strategy for the management of spent fuel. A key principle of the NFWA is that the owners of spent fuel are responsible for its management, which includes funding, constructing and operating a long-term radioactive waste management facility. The NWMO, established by the nuclear energy corporations as required by the NFWA, is responsible for		

	implementing the Adaptive Phased Management (APM) approach for the long-term management of all spent fuel in Canada. For financial planning and internal project planning, reference assumptions are based on an assumption of an in-service repository by 2035. For such planning purposes, the NWMO has the following project phases and timelines associated with the implementation of Canada's plan (further details provided in response to Q11): - siting and preparing for construction (2010–2024) - site preparation and construction (2025–2034) - operation (including an extended monitoring period) (2035–2134) - decommissioning (2135–2160) Canada's spent fuel is currently safely and securely stored at licensed facilities in Ontario, Quebec, New Brunswick and Manitoba. Each licensee is responsible for safely managing this spent fuel. As part of its study to recommend Canada's approach, the NWMO assessed the option of storing the spent fuel at the reactor sites. This was found to be technically possible with ongoing maintenance and refurbishment of the storage facilities. It should also be noted that for each of the current radioactive waste management facilities, licence renewal applications are prepared and assessed on an established licensing cycle. As described in sections G.12 and G.13 of the Canadian report, aging-management provisions are continuously assessed as part of the licensees' programs and ongoing regulatory compliance activities that support the licensing. 2. Dry fuel storage facilities (Pickering Waste Management Facility, Darlington Waste Management Facility and Western Waste Management Facility) have sufficient storage space to accommodate all spent fuel produced at their respective nuclear stations (this includes additional spent fuel arising from plant life extension). New buildings are constructed as required to house all spent fuel produced from station operations. The aging-management program for dry storage containers (DSCs) is to ensure the design life of 50 years. In the event that the containers are required for more than 50 years and the existing DSCs are not sufficient, then compensatory actions will be taken that may include moving the fuel into a different container. The current policy has no material impact on Hydro-Québec or NB Power's long-term strategy for management of spent fuel. Dates have been established to allow calculation of spent fuel management funding requirements, and these dates are reviewed on a regular basis.

Q. No. 66	Country France	Article Article 28	Ref. in National Report Executive Summary, Page 2 Section J, Page 105
Question/ Comment	In Section J, it is mentioned that, in 2011, the National Sealed Source Registry (NSSR) will continue to be expanded to include the electronic registry and reporting of all Category 3, 4 and 5 sealed sources in Canada. Nevertheless, in 2009, answering to question asked by France, Canada reported that the main issue of concern is that there are hundreds of low-risk sources that have been manufactured by licensees for their own use. Most of theses sources have generic identifications, rather than unique identifications. This tends to result in multiple sources with identical identifications. Canada added that this problem was currently under review. Could Canada provide information on the feedback of this review?		
Answer	The CNSC is still collecting information on Category 3, 4 and 5 sources for all CNSC licensees. These inventories are verified annually when inventories are submitted as part of licensee annual compliance reports (ACRs). The CNSC is currently also developing an ACR system through which licensees will be able to submit their inventories to the CNSC online. The issue is not strictly related to “homemade” sources but also to old sources where information is no longer available on the source and paperwork no longer exists. No additional information is available at this time. No solution has been found for this issue.		
Q. No. 67	Country France	Article Article 9	Ref. in National Report Preface
Question/ Comment	It is mentioned that, given the timing of the earthquake and tsunami in Japan, the national report does not take into consideration actions taken by the CNSC with Class I Nuclear Facilities, mines and mills which include spent fuel bays and radioactive waste facilities. The CNSC requested all Class 1 licensed facilities in Canada to review initial lessons learned from the incident in Japan and to confirm that their overall safety cases remain strong. All licensees provided the requisite initial responses, identifying their proposed plans and schedules to meet the CNSC’s request. Could Canada provide some detailed information specifically on spent fuel and radioactive waste facilities (as CNSC information on the website relates mostly to nuclear power plants)?		
Answer	Section 12(2) of the *General Nuclear Safety and Control Regulations* places an obligation on licensees to respond to a		

request from the Commission Tribunal, or a person who is authorized by it, to "conduct a test, analysis, inventory or inspection in respect of the licensed activity or to review or to modify a design, to modify equipment, to modify procedures, or to install a new system or new equipment".

Under this section, the CNSC sent a written request (called a 12(2) letter) to the radioactive waste management facility licensees which met the definition of a Class IB nuclear facility in accordance with paragraph 19(a) of the *General Nuclear Safety and Control Regulations* to:

1. review initial lessons learned from the earthquake in Japan and re-examine the safety cases, in particular the underlying defence-in-depth concept, with the focus on:
    - external hazards such as seismic, flooding, fire and extreme weather events
    - measures for prevention and mitigation of severe accidents
    - emergency preparedness
2. report on implementation plans for short-term and long-term measures to address any significant gaps

As a result of the 12(2) letter, licensees provided initial responses, noting that they had re-examined their safety cases, defence-in-depth concepts and emergency preparedness in their facilities, and confirmed that there were no significant issues requiring immediate corrective or compensatory measures. Although no compensatory actions were identified during these reviews, licensees identified some possible improvements and enhancements. Licensees will continue to provide updates to the CNSC and have committed to align with the approach being taken by the CNSC Task Force, in order to continue to meet regulatory expectations for the review of the impacts of the Fukushima accident.

To illustrate, Ontario Power Generation (OPG) reviewed the initial lessons learned from the earthquake in Japan and re-examined the safety cases for the Pickering Waste Management Facility, the Darlington Waste Management Facility, and the Western Waste Management Facility, particularly the underlying defence-in-depth concepts, listed above.

No significant gaps and no compensatory actions were identified during these reviews. However, some possible improvements and enhancements were identified during the review process, for which further details are provided below.

Status of possible improvements and enhancements

	In the review of the safety cases for the lessons learned from the Japanese earthquake, OPG identified actions with the objective of improving defences and mitigating the consequences for both design-basis events and beyond-design-basis events, should they occur at its waste management facilities. *Design-basis events* A number of areas for improvement were identified during the safety cases review process and are being addressed as items to be completed in the short term. Examples include the need to develop procedures for post-event worker response. *Beyond-design-basis events* For beyond-design-basis events, the planned actions fall into two broad categories as discussed below: 1. Improvements to emergency response capability This category of actions includes the revision of internal programs and procedures to improve the post-event response, a review of the need for additional contracts for external emergency services, and the purchase of additional emergency equipment. An example from this category is an action to assess whether additional fire service contracts are required, in addition to the fire response from the Bruce Power Emergency Response Team at the Western Waste Management Facility. 2. Technical studies The undertakings in this category include the assessment of various waste management systems and structures under post beyond-design-basis event conditions requiring further evaluation. These beyond-design-basis actions contain both short- and long-term actions.		
Q. No. 68	Country France	Article General	Ref. in National Report N/A
Question/	For the Q&A of the 3rd review meeting, Canada provided very comprehensive answers to questions asked, in particular		

Comment	very interesting information concerning the concrete actions undertaken by Canada. These answers have not been included in the 4th report.		
Answer	Canada's responses to questions are available on the CNSC Web site at: nuclearsafety.gc.ca/eng/readingroom/reports/jointconvention/		
Q. No. 69	Country Norway	Article Article 9	Ref. in National Report Section G.6, Page 79
Question/ Comment	Dry storage facilities are described as being licensed for a limited period. At the time of renewal, it is determined whether the storage can continue to operate safely for another licensing term. What would happen if a storage facility was found not to be able to operate safely for a new licensing term?		
Answer	If a storage facility was found not to be able to operate safely for a new licensing term, the spent fuel in the containers where the structural integrity had been compromised would be transferred to new spent fuel containers. The remaining spent fuel containers, whose structural integrity was not compromised, as well as the new spent fuel containers, would undergo regulatory assessment for a new licensing term.		
Q. No. 70	Country Norway	Article Article 3	Ref. in National Report Section C.3, Page 25
Question/ Comment	Even though details of Canadian medical isotope production are protected from disclosure under Article 36, could any additional information about the safe handling of the waste arising from this activity be described without revealing confidential information?		
Answer	The waste produced from medical isotope production at Chalk River Laboratories (CRL) is safely managed and stored in AECL CRL licensed waste storage facilities. External commercial organizations that produce medical isotopes have the option to ship their radioactive wastes to CRL for safe storage on a fee-for-service basis. The fee includes the processing, storage and future disposition costs.		
Q. No. 71	Country Finland	Article Planned Activities	Ref. in National Report Section 5.1.7.1
Question/ Comment	At Chalk River there are several historical waste disposal facilities/areas, which do not necessarily comply with current requirements for disposal. This has resulted in release of contaminants to the environment. 1. Are there any plans for remediation of the historical areas? 2. What kind of criteria to decide if remediation needed are used in Canada?		
Answer	1. AECL has implemented the Nuclear Legacy Liabilities Program (NLLP), funded by National Resources Canada		

	(NRCan), to strategically prioritize and address legacy waste, decommission facilities, and restore lands affected by AECL's early operations. The decommissioning strategy for the waste management areas (WMAs) will use various approaches, such as in situ disposal, immobilization of legacy liquid waste, full recovery or partial recovery of waste. To support and facilitate the decommissioning strategy development of each WMA, various waste burials require characterization and assessment. Appropriate remedial actions will be taken, as required, based on the results of the characterization and assessment initiatives to meet the current defined end-state (e.g. industrial use). Suitable long-term management (including final disposal) solutions will be implemented for recovered waste. 2. The need for remediation will be triggered, case by case, by risk assessments of the affected facilities/lands if there are impacts on human and ecological health. In conjunction with this risk assessment work, all stakeholders will be engaged in determining the acceptability of the proposed end-state of the site, including the public, local councils, Aboriginal people, and regulators.