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

CANADA'S RESPONSES TO QUESTIONS

APRIL 2006

Convention on Nuclear Safety
Questions Posted To Canada in 2006

Seq. No	Country	Article	Ref. in National Report
1	Australia	General	A.2

Question/ Comment	Is it correct that, for the purposes of activities regulated under the Nuclear Safety Control Act, the Canadian Nuclear Safety Commission is the licensing body under both the NSCA and the Canadian Environmental Assessment Act?
Answer	No. The application of the *Canadian Environmental Assessment Act* (CEAA) and application of the *Nuclear Safety and Control Act* (NSCA) and its associated regulations are two separate functions. The federal environmental assessment process is triggered when a federal body has specific decision-making responsibilities with respect to a project. With respect to the Canadian Nuclear Safety Commission (CNSC), environmental assessments are required when the CNSC, pursuant to Subsections 24(2) or 37(2) of the NSCA, issues or amends a licence or grants an approval under a licence for the purpose of enabling a project to be carried out. The CNSC is required by law to ensure that the requirements of the CEAA are met. Therefore, the CNSC conducts environmental assessments in accordance with the CEAA. However, the environmental assessment process is not a licensing process. At the end of the environmental assessment process, if the CNSC concludes that the project is not likely to cause significant adverse environmental effects, taking into account the appropriate mitigation measures, licensing can proceed. The CNSC will proceed with licensing projects in accordance with the NSCA and its associated regulations.

Seq. No	Country	Article	Ref. in National Report
2	Australia	General	Planned Activity K.4

Question/ Comment	What were the principal strategies used by the NWMO to engage with the public in relation to the recommendations in its 'Choosing A way Forward' Report? Were there specific strategies used to the engage Aboriginal people?
Answer	The process through which the NWMO sought to elicit societal direction at each major step was designed to be responsive to what Canadians had said an appropriate study process should embody: • the study process must be grounded in knowledge and expertise; • the study must solicit and consider a wide range of perspectives; • the Nuclear Waste Management Organization (NWMO) should "think out loud" and engage citizens in dialogue at multiple points in the process; • the process must be fair, transparent and trustworthy;

- the process must make information accessible to members of the public who currently know little about this issue; and
- the process must use a variety of methods to engage citizens.

The NWMO designed its three-year study as dialogue conducted over four phases. Each of these phases was centered on a key decision in the evolution of the study and iterative development of the preferred approach. The four phases were supported by a series of public discussion documents designed to:

- share what the NWMO had heard from Canadians to date;
- describe how the NWMO was incorporating that direction in conducting the study phase; and
- solicit input to shape and direct subsequent steps in the study.

Citizens were asked to provide direction on:

- the questions to be asked and answered in the study;
- the key issues to be addressed in the assessment of the management approaches;
- the range of technical methods to be considered in the NWMO study;
- the risk, costs and benefits of each management approach; and
- the design of the overarching management structure and implementation plans for each management approach considered in the study.

Over the course of the dialogue, a broad range of engagement and dialogue initiatives were used, including traditional and more innovative approaches. In order to elicit the range of social and ethical considerations which citizens bring to bear on the issue, the NWMO used nation-wide surveys, focus groups, issue-focused workshops and roundtables, e-dialogues and deliberative surveys, and public information and discussion sessions. The selection of techniques was tailored to the "community of interest" targeted for involvement and included:

- **Specialist papers and topical workshops**: More than 70 papers were contributed by specialists in order to begin creating the information foundation for dialogue, and to help understand the state of knowledge and technologies available. A series of workshops were also conducted.
- **Scenarios Exercise**: A major scenarios exercise involving a diverse group of 26 individuals took place over a period of six months. The purpose was to explore a range of plausible conditions which might be faced when managing used nuclear fuel over the long term, and add the questions those scenarios raised to the study.
- **National citizens' dialogue on values**: Deliberative dialogue sessions were held across the country, with a representative cross-section of citizens, to explore the values which should drive decision-making on this

issue.

- **Workshops with highly engaged individuals and groups**: A series of workshops were conducted throughout the study to speak with citizen groups involved in this issue, and individuals and organizations with an interest in public policy at both national and regional levels.
- **E-dialogues**: These four e-dialogues involved panels of experts, open question and answer sessions, and e-roundtables among students in an open forum.
- **Public information and discussion sessions**: There were 120 public information and discussion sessions across Canada where interested Canadians met to discuss the second discussion document.
- **A program of Aboriginal dialogues**: More than 150 meetings were designed, conducted and reported on by Aboriginal Peoples involving more than 2,500 participants.
- **Public attitude research**: Three nation-wide telephone surveys and more than 50 focus groups were conducted throughout the study.
- **Submissions: Several** hundred written submissions were made by mail or through the Web site; and
- **A Roundtable on Ethics:** A roundtable of specialists in ethics met over the course of the study to help identify the ethical issues associated with both the issue and the conduct of the study.

Some of these techniques were used to hear from a statistically representative cross-section of citizens, including those who would not otherwise involve themselves in the study. Some were used to elicit the concerns of those directly interested in the issue, while others were used for more in-depth conversations among those with a specialized interest. Throughout, a Web site served as a platform for making reports commissioned by the NWMO publicly available. Through this Web site Canadians were invited to comment on the topics, and what was said was also shared. Each dialogue initiative was conducted, and reported on, by third parties in order to ensure the accuracy and transparency of the reporting.

Individual dialogue initiatives were, for the most part, designed to bring together people from a diversity of perspectives to work through issues, create shared meaning, and identify common ground. Participants in these initiatives (and more broadly, interested Canadians) were encouraged to examine their own thinking and learn through talking with each other, and listening to and understanding perspectives which are different from their own. Dialogue initiatives were designed to identify areas of common ground among diverse perspectives while identifying and acknowledging differences from which an integrated view could emerge.

The NWMO exchanged dialogue with the Aboriginal community to share information on the issue of managing used nuclear fuel over the long term. This helped the NWMO to understand how this information is processed by the

Aboriginal community and to learn from the reactions, insights and concerns that were expressed. Efforts were made to involve Aboriginal peoples in all NWMO activities.

From the beginning of the study, the NWMO has provided support to Aboriginal organizations in helping them design and implement dialogue processes according to what they believe would work most effectively. Process design and implementation were determined and managed by the Aboriginal organizations within the constraint of respecting key NWMO study milestones. Initially, agreements were struck with national organizations as a means of achieving the broadest exposure possible. As the dialogue evolved, it became apparent that direct interaction with regional and local organizations was also important and thus initiated. In all, collaborative agreements were struck with six national Aboriginal organizations and eight regional and local organizations. In addition, an outreach program was initiated to develop relationships with groups from First Nations of Ontario, Quebec, New Brunswick, and Saskatchewan (the provinces involved in the nuclear fuel cycle). The NWMO supported these activities with direct financial resources, and through information sharing, briefings, and training. The NWMO also sponsored a workshop on the important topic of Traditional Knowledge, and towards the close of the three year study, an Elders' Forum.

Seq. No	Country	Article	Ref. in National Report
3	Belgium	General	

Question/ Comment: What are the actions taken to keep the memory (for hundreds en hundreds of years) of the disposal locations (deep geological disposal sites) and the contaminated soils…?

Answer: The following are examples of Canadian initiatives for various waste streams:

i) NWMO's Proposed Repository for the Long-Term Management of Used Nuclear Fuel

The Nuclear Waste Management Organization's (NWMO) recommendation of Adaptive Phased Management for the long-term management of used nuclear fuel is presently with the Government of Canada for review and consideration. Following a government decision on a management approach, the NWMO proposes to commence a process through which the many implementation issues may be addressed.

The transfer of knowledge over time to future generations is one of many issues that the Government of Canada anticipates significant societal interest in, and in which citizens must have confidence in order for implementation to proceed. Under Adaptive Phased Management, the pace and manner of implementation would be influenced by the extent to which society has confidence in the resolution of such key matters.

In its final study, the NWMO has proposed an open and collaborative process for

addressing implementation issues. It will be important to ensure that the decision-making that unfolds over many years to come is supported by continued citizen engagement in a way that allows issues to be addressed and worked out collaboratively. It is NWMO's intent to ensure that issues of broad societal interest ,such as the transfer of knowledge, are fully examined as part of the preparatory work for implementation.

ii) OPG's Deep Geological Repository (DGR) for Low and Intermediate Radioactive Waste

Regarding OPG's Deep Geological Repository (DGR), it is expected that there would be a monitoring period after closure to confirm that the repository was behaving as expected. Further activities following closure might include institutional controls to prevent public access to the site, limited land use, and continual monitoring at a reduced level. All documents will be properly archived. At the current stage of the DGR program, specific details of these activities have yet to be defined.

iii) Port Hope Area Initiative – Low-Level Radioactive Waste (contaminated soils)

The long-term management of radiologically contaminated soils in Canada has not been studied beyond 500 years. In the case of the Port Hope Area Initiative, the 500-year time frame considers government stewardship of the facilities including ongoing public involvement to keep the public aware.

Seq. No 4	Country Belgium	Article General	Ref. in National Report

Question/ Comment: What is the frequency (required by the authorities) to update the EIA during the exploitation of a deep geological disposal? (Large time scale)

Answer: Environmental assessments are only conducted at the conceptual stage of a project. As part of the environmental assessment, the proponent proposes a follow-up program and the results of this program are used to confirm or validate any assumptions or uncertainties that were identified in the environmental assessment.

With respect to a deep geological disposal site, an environmental assessment in the form of a screening, comprehensive study or panel would be undertaken early in the conceptual stage. The environmental assessment would examine the impacts this project may have on human health and the environment. In addition, it would assess the social component. As part of the environmental assessment, the proponent would propose a follow-up program that would assess and confirm any assumptions presented in the environmental assessment. The results of the follow-up program would be used to update the information contained in the environmental assessment and modify the conceptual design.

Therefore, there is no predetermined frequency for updating environmental assessments.

Seq. No	Country	Article	Ref. in National Report
5	Belgium	General	

Question/ Comment: Did the event of 11 September modify the strategy of above ground interim storage?

Answer: Prior to September 11, 2001, physical protection measures for above ground interim storage in Canada were based on the existing *Nuclear Security Regulations*, which took into account international recommendations. Immediately following the events of September 11, 2001, using a risk-informed approach, additional physical protection measures were put into place to increase security of above ground storage areas. These measures included:

- enhanced security screening of employees and contractors who require access to these areas (including background, police and security checks);
- protection against forced vehicle penetration to the immediate area;
- utilizing screening equipment for searching of personnel and vehicles for weapons and explosives, and;
- a response force who is capable making an effective intervention.

Furthermore, the *Nuclear Security Regulations*, which address physical security protection measures, including the unauthorized removal of nuclear substances and/or sabotage, were subject to a complete review that has resulted in amendments coming into effect in the near future.

Seq. No	Country	Article	Ref. in National Report
6	Belgium	General	

Question/ Comment: Does the CNSC foresee a stepwise approach for the licensing process of a deep geological disposal?

Answer: A deep geological disposal facility would be considered as a Class 1 nuclear facility and must therefore conform to the requirements of the *Nuclear Safety Control Act* and its associated regulations, in particular the *Class 1 Nuclear Facilities Regulations*. These regulations prescribe a stepwise approach to the licensing of a Class 1 nuclear facility. The type of licences prescribed by these regulations include a licence to prepare site, a licence to construct, a licence to operate, a licence to decommission, and a licence to abandon. Typically a licence to prepare site and to construct may be jointly issued.

The regulations can be viewed at www.nuclearsafety.gc.ca.

Seq. No	Country	Article	Ref. in National Report
7	Euratom	General	

Question/ 1) IAEA Classification of Radioactive Waste is based upon the half-life. The

Comment criterion is half-life of 30 years. Please, confirm, since it is not explicitly given in the report.
2) The report indicates that Canadian categorisation is based on origin of the waste, i.e. spent fuel, which is called nuclear fuel waste, low level radioactive waste, and uranium mine and mill tails are the categories they use. Is it a more practical approach ion comparison with IAEA classification?
3) The dose limit for pregnant worker is 4 mSv, as indicated in E.4.2.1. Please verity and explain.

Answer 1& 2) As reported in section B.7 of Canada's National Report, radioactive wastes are classified into one of three categories based on origin and radiological hazard: nuclear fuel waste, low-level radioactive waste, and uranium mine and mill tailings. This classification system has worked well for Canada, and as such Canada has not imposed more complex, national, classification system, such as the International Atomic Energy Agency (IAEA) Waste Classification System.

Individual licensees are free to utilize more detailed classification systems for their own waste management programs. An example of such a classification is the one used by Ontario Power Generation (OPG) for the Western Waste Management Facility. OPG's non-fuel radioactive waste falls within the low-level radioactive waste class described in the Canadian National Report (section B.7). Similar to other waste facility operators, OPG has found it useful to create sub-categories of these definitions for operational management purposes. The OPG sub-categories are described as follows: (Note that these may be different from the definitions used by other operators in Canada.)

- Low-Level Waste (LLW) - Radioactive waste in which the concentration or quantity of radionuclides is above the clearance levels established by the regulatory body, the Canadian Nuclear Safety Commission (CNSC). This waste does not necessarily require disposal in a deep geologic repository. It contains primarily short-lived radionuclides (half-lives shorter than or equal to the 30-year half-life of Cs-137). For interim storage purposes, low level waste is that which does not require substantial shielding.

- Intermediate-Level Waste (ILW) - Radioactive non-fuel waste, containing sufficient quantities of long-lived radionuclides (generally refers to half-lives greater than the 30-year half-life of Cs-137). Deep geological disposal is a suitable alternative for providing isolation from the environment in the long-term. For interim storage purposes, intermediate level waste requires substantial shielding. Intermediate level waste includes most ion exchange resins; moderator and primary system water filters, and irradiated reactor core components.

There is currently an initiative by the Canadian nuclear industry to examine and possibly incorporate a classification system into a standard produced and

coordinated by the Canadian Standards Association (CSA). The introduction of a classification system into a CSA standard will be reviewed in conjunction with other standards such as the IAEA classification system. The CSA standard is anticipated to be finalized and published in 2007.

3) Section 13 of the *Radiation Protection Regulations* sets a dose limit of 4 mSv for a pregnant worker, in contrast to the 2 mSv dose limit recommended by ICRP 60.

When the predecessor of the CNSC, the Atomic Energy Control Board (AECB), issued draft regulations which reflected the ICRP 60 (1990) recommendations, the proposed 2 mSv dose limit* was criticized by some stakeholders as being unnecessarily low. The critics noted that doses at this level, especially those from the internal component, would be difficult to measure and compliance would be difficult to demonstrate. It was feared by workers who submitted comments that some employers might conclude that the only effective method of compliance with the dose limit of 2 mSv would be to remove a pregnant worker from working with radiation. If no other work was available, this could result in a lay-off, and could lead to discrimination against the hiring of women for some types of radiation work.

In response to these comments, the AECB initiated their own review of the literature. This review indicted that the risk to the fetus, presented by a dose of 4 mSv to the mother, is very small and not much greater than the dose limit recommended by the ICRP. Based on this and the consultations with the stakeholders, the AECB set the dose limit for pregnant workers at 4 mSv.

*It was not clear in ICRP 60 whether the external dose limit was to be in addition to the internal limit. The AECB interpreted the recommended dose limit of 2 mSv as a combination of a 1 mSv limit for external radiation and a 1 mSv limit for the effect of intakes of radioactive material by the mother during her pregnancy.

Seq. No	Country	Article	Ref. in National Report
8	France	General	Section K.6.2 P. 95

Question/ Comment	Is there a limit in time to institutional control of consolidated historic wastes?
Answer	There is no time limit established for institutional controls of consolidated historic waste sites in Canada. The Government of Canada has accepted responsibility for the management of Canada's historic waste, in the absence of another responsible owner. The reliance on institutional controls in the management of these historic wastes over time is determined on a case-by-case basis depending on the circumstances of the site. For some historic waste sites, institutional controls are expected to remain in place over the long term. For other sites, however, they are considered to be temporary measures pending the implementation of appropriate long-term waste management solutions.

Seq. No	Country	Article	Ref. in National Report
9	Germany	General	p. 39 (F.3)

Question/ Comment: Do the Nuclear Fuel Waste Act funds (NFWA funds) finance all long-term waste management activities or only the long-term waste management of spent fuel?

Answer: The *Nuclear Fuel Waste Act* addresses the funding for the long-term management of nuclear fuel waste (spent fuel) only. As for the long-term management of radioactive waste, the funding is provided by the licensee. An example of this is the deep geologic repository proposed by Ontario Power Generation (OPG) at the Bruce Nuclear Power Development site.

Seq. No	Country	Article	Ref. in National Report
10	Germany	General	p. 52 (G.8.2)

Question/ Comment: Is the post-operational phase after the final shutdown of a nuclear installation covered by the operating licence or is it part of the decommissioning licence? Are there different statutory provisions for the operation and decommissioning of NPPs?

Answer: With the introduction of the *Nuclear Safety and Control Act* in May 2000, a provision was introduced for the issuance of a licence to decommission. When the licensee announces that a nuclear facility has reached the end of its life, it is anticipated that the licensee will apply for a licence to decommission. The licence to decommission will then replace the licence to operate. The decommissioning licence would then cover all activities pertaining to the decommissioning and dismantlement of the facility, including any deferred storage periods. An application for a licence to decommission must contain the following information:

1. the proposed schedule;
2. the nuclear and hazardous substance and all structures, land, systems and equipment;
3. procedures for decommissioning;
4. measures to comply with the safeguards agreement;
5. the nature and extent of any radioactive contamination;
6. the effects on the environment, and the health and safety of persons living in the area, and the measures to prevent or mitigate them
7. the proposed location of points of release, maximum quantities and concentrations, and the anticipated volume and flow rate of releases into the environment, including their physical, chemical and radiological characteristics;
8. the proposed measures to control releases;
9. the proposed measures to prevent or mitigate the effects of accidental releases;
10. the qualifications and training of workers; and
11. the end state objective.

The *Class 1 Nuclear Facility Regulations* provide greater detail on the above. These regulations can be viewed at the Canadian Nuclear Safety Commission's

Web site at www.nuclearsafety.gc.ca.

Seq. No	Country	Article	Ref. in National Report
11	Ireland	General	B.6 Draft Regulatory

Question/ Comment	In is noted that Regulatory Guide G-320 does not address social acceptability or economic feasibility of long-term management methods, or the assessment of facility operations. How will these issues be addressed?
Answer	The intended purpose of draft Regulatory Guide G-320, *Assessing the Long Term Safety of Radioactive Waste Management*, is to assist licensees and applicants in assessing the long term safety of storage and disposal of radioactive waste. The Guide describes typical ways to assess the impacts that radioactive waste storage and disposal methods have on the environment and on the health and safety of people. It addresses topics that include: • assessment methodologies; • the level of detail of assessments; • confidence placed in assessment results; • applying radiological and non-radiological criteria; • defining critical groups for impact assessments; • selecting time frames for impact assessments; • setting post-decommissioning objectives; • long-term care and maintenance considerations; and • the use of institutional controls. Economic feasibility is not part of the Canadian Nuclear Safety Commission (CNSC) mandate and is not considered within draft Regulatory Guide G-320. It is the concern of the licensee/applicant, with the exception of the economics for financial guarantees for decommissioning and long-term management, which is a requirement under the regulations. Social acceptability is also not addressed in draft Regulatory Guide G-320. In part, it is addressed within the *Canadian Environmental Assessment Act* (CEAA) and through stakeholder intervention in the CNSC licensing process. An environmental assessment conducted under the CEAA requires public consultation of the proposed project. The concerns of the public are considered in the overall proposed project and may result in a re-assessment of the design. During the CNSC licensing process, citizens are encouraged to participate in licensing hearings for major nuclear facilities. Public licensing hearings are set up so that the Commission can hear the concerns and opinions of those who have an interest, which is key to the decision-making process. With respect to the long-term waste management of nuclear fuel waste (spent fuel), the *Nuclear Fuel Waste Act* requires that the Nuclear Waste Management Organization consider socio-economic effects on a community's way of life or on

its social, cultural or economic aspirations.

Seq. No	Country	Article	Ref. in National Report
12	Ireland	General	B.7 Classification o
Question/ Comment	While Canada's informal system for classifying radioactive waste has proven adequate for the management and regulation of radioactive waste in Canada, are there any plans to use the IAEA classification system?		
Answer	No. As reported in section B.7 of Canada's National Report, radioactive wastes are classified into one of three categories based on origin and radiological hazard: nuclear fuel waste, low-level radioactive waste, and uranium mine and mill tailings. This classification system has worked well for Canada, and as such Canada has not imposed nationally a more complex classification system, such as the International Atomic Energy Agency (IAEA) Waste Classification System. Individual licensees are free to utilize more detailed classification systems for their own waste management programs. There is currently an initiative by the Canadian nuclear industry to examine and possibly incorporate a classification system into a standard produced and coordinated by the Canadian Standards Association (CSA). The introduction of a classification system into a CSA standard will be reviewed in conjunction with other standards such as the IAEA classification system. The CSA standard is anticipated to be finalized and published in 2007.		

Seq. No	Country	Article	Ref. in National Report
13	Ireland	General	B.8 Operational Resp
Question/ Comment	What, if any, are the contingency plans if the proposed OPG, deep geologic repository to dispose of low-level radioactive waste in Kincardine, Ontario is not approved?		
Answer	In the event the proposed Deep Geological Repository (DGR) does not obtain regulatory approval, Ontario Power Generation (OPG) will consider alternatives, while continuing to manage and store low- and intermediate-level waste safely. The existing facilities at the Western Waste Management Facility have space for future expansion of the interim storage, if required.		

Seq. No	Country	Article	Ref. in National Report
14	Ireland	General	B.9 Management Pract
Question/ Comment	Can Canada provide details on the reported 'recommendations to the Government of Canada (November 15, 2005) on the method for long-term management of nuclear fuel waste, and to implement the option selected by the government'. In particular has there been a Government decision on a particular option?		
Answer	The Nuclear Waste Management Organization (NWMO) completed a study of approaches for long-term management of Canada's nuclear fuel waste. The final study (*Choosing a Way Forward The Future Management of Canada's Used Nuclear Fuel*) and a recommendation were submitted to the Government of Canada on November 3, 2005. The recommendation was Adaptive Phased		

Management, a risk management approach with the following characteristics:

- centralized containment and isolation of the spent fuel in a deep geological repository in suitable rock formations, such as the crystalline rock of the Canadian Shield or Ordovician sedimentary rock;
- flexibility in the pace and manner of implementation through a phased decision-making process, supported by a program of continuous learning, research and development;
- provision for an optional step in the implementation process in the form of shallow, underground storage of spent fuel at the central site prior to final placement in a deep repository;
- continuous monitoring of the spent fuel to support data collection and confirmation of the safety and performance of the repository; and
- the potential for retrieving the spent fuel for an extended period, until a future society makes a decision on the final closure, and the appropriate form and duration of post-closure monitoring.

The Government of Canada has not yet decided on the preferred approach for long-term management of Canada's nuclear fuel waste.

Following a decision by the Government, the NWMO would implement the approach, and would:

- meet or exceed all applicable regulatory standards and requirements for protecting the health, safety and security of humans and the environment;
- provide financial surety through funding by nuclear energy corporations (currently Ontario Power Generation Inc., Hydro-Québec and NB Power Nuclear) and Atomic Energy of Canada Limited, according to a financial formula as required by the *Nuclear Fuel Waste Act* (2002); and
- seek an informed, willing community to host the central facilities.

The site must meet the scientific and technical criteria chosen to ensure that multiple engineered and natural barriers will protect human beings, other life forms and the biosphere. Implementation of the approach will:

- respect the social, cultural and economic aspirations of the affected communities;
- focus site selection for the facilities on those provinces that are directly involved in the nuclear fuel cycle;
- sustain the engagement of people and communities throughout the phased process of decision and implementation; and
- be responsive to advances in technology, natural and social science research, Aboriginal traditional knowledge, and societal values and expectations.

Seq. No	Country	Article	Ref. in National Report
15	Ireland	General	C.3 Reprocessing of
Question/ Comment	Canada has stated that because of its large natural resources of uranium 'reprocessing of spent fuel has not been deemed necessary at this time'. Is this		

likely to remain the case for some time to come??

Answer In Canada, neither the regulatory regime nor existing policy specifically prohibits the reprocessing of spent fuel, so the possibility exists that at some time in the future reprocessing may take place. The existing reprocessing technology is more costly than producing fuel from freshly mined uranium, of which Canada has in abundance. It therefore appears unlikely at this time that spent fuel reprocessing will be considered in Canada in the near future.

Seq. No	Country	Article	Ref. in National Report
16	Ireland	General	K.3 Development and

Question/ Comment We note that Canada is currently embarked on a document improvement initiative which anticipates taking several years (approximately 4 years) to produce regulatory policies, standards and guides. Are there any plans for an IAEA inspection/review mission at the end of this process?

Answer The Canadian Nuclear Safety Commission (CNSC) is currently embarking on several initiatives as part of its continuous improvement effort. Recently, Canada has officially submitted a letter to the International Atomic Energy Agency requesting hosting of an International Regulatory Review Team (IRRT) mission. The CNSC has requested that the scope of the IRRT mission for general requirements and management systems be corporate-wide, while the regulatory functions be focused on power reactor regulation. The Regulatory Documents Program is included in the scope of the IRRT mission.

Seq. No	Country	Article	Ref. in National Report
17	Ireland	General	J.4.2 Sealed Source

Question/ Comment Could Canada provide some details of their ‘Sealed Source Tracking System (SSTS) and comment on how it has performed since it came into operation?

Answer The Sealed Source Tracking System has been implemented since January 1, 2006. Canadian Nuclear Safety Commission (CNSC) licensees, which are authorized to possess high-risk sealed sources (category 1 and 2 in the International Atomic Energy Agency (Tec-Doc 1344), are required by appropriate licence conditions to report in writing to the CNSC on the details of the movement of their sources. The CNSC is developing a significant software enhancement for our licensing database to enable the recording of the movement of sealed sources.

In the first two months of the implementation (January and February 2006), the CNSC received information on 490 sources, for which 1406 transactions were recorded (transaction means creation, transfer, receipt, export and import). The majority of the reports (99 per cent) dealt with radiography sources. Based on the analysis of the reporting on the movement of sources manufactured in Canada, the compliance in reporting was more than 85 per cent in the first month and 100 per cent in the second.

The reporting of the movement of sources, and annual reporting of the source inventory, will enable the establishment of an accurate national sealed source

inventory. The CNSC expects to implement the SSTS by June of 2006. The Web-based reporting, which will be available to the CNSC licensees by June 1, 2006, will greatly facilitate the tracking of sealed sources.

Seq. No	Country	Article	Ref. in National Report
18	Japan	General	p85,Line1,Sec.K

Question/ Comment

It is very impressive and interesting to know that the NWMO, technical specialists, 15,000 interested Canadians and 2,000 Aboriginal people reached a consensus on the long-term management of spent fuel which spanned more than 300 years.
Could you indicate how the NWMO succeeded to engage Canadians in a wide-ranging dialogue? By a series of questionnaire, a series of public hearing, seminars on various topics or large convention?

Answer

Throughout the Nuclear Waste Management Organization's (NWMO) public consultations over the past three years, Canadians expressed a wide range of values and comments on options for the long-term management of nuclear fuel waste. The Government of Canada noted that although "consensus" is not the goal as different values must be respected. Final consultation did reveal a broad level of increased public confidence in the NWMO recommended APM approach.

The process through which the NWMO sought to elicit societal direction at each major step was designed to be responsive to what Canadians said an appropriate study process should embody:

1. the study process must be grounded in knowledge and expertise;
2. the study must solicit and consider a wide range of perspectives;
3. the NWMO should "think out loud" and engage citizens in dialogue at multiple points in the process;
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- solicit input to shape and direct subsequent steps in the study.

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or through the Web site; and

- **A Roundtable on Ethics:** A roundtable of specialists in ethics met over the course of the study to help identify the ethical issues associated with both the issue and the conduct of the study.

Some of these techniques were used to hear from a statistically representative cross-section of citizens, including those who would not otherwise involve themselves in the study. Some were used to elicit the concerns of those directly interested in the issue, while others were used for more in-depth conversation among those with a specialized interest. Throughout, a Web site served as a platform for making reports commissioned by the NWMO publicly available. Through this Web site Canadians were invited to comment on these topics and what was said was also shared. Each dialogue initiative was conducted, and reported on, by third parties in order to ensure the accuracy and transparency of the reporting.

Individual dialogue initiatives were, for the most part, designed to bring together people from a diversity of perspectives to work through issues, create shared meaning, and identify common ground. Participants in these initiatives (and more broadly, interested Canadians) were encouraged to examine their own thinking and learn through talking with each other, and listening to and understanding perspectives which are different from their own. Dialogue initiatives were designed to identify areas of common ground among diverse perspectives while identifying and acknowledging differences from which an integrated view could emerge.

The NWMO exchanged dialogue with the Aboriginal community to share information on the issue of managing used nuclear fuel over the long term. This helped the NWMO to understand how this information is processed by the Aboriginal community and to learn from the reactions, insights and concerns that were expressed. Efforts were made to involve Aboriginal peoples in all NWMO activities.

From the beginning of the study, the NWMO has provided support to Aboriginal organizations in helping them design and implement dialogue processes according to what they believe would work most effectively. Process design and implementation were determined and managed by the Aboriginal organizations within the constraint of respecting key NWMO study milestones. Initially, agreements were struck with national organizations as a means of achieving the broadest exposure possible. As the dialogue evolved, it became apparent that direct interaction with regional and local organizations was also important and thus initiated. In all, collaborative agreements were struck with six national Aboriginal organizations and eight regional and local organizations. In addition, an outreach program was initiated to develop relationships with an expanded group from First Nations of Ontario, Quebec, New Brunswick, and Saskatchewan (the provinces involved in the nuclear fuel cycle). The NWMO

supported these activities with direct financial resources, and through information sharing, briefings, and training. The NWMO also sponsored a workshop on traditional knowledge, and towards the close of the three year study, an elder's forum.

Seq. No	Country	Article	Ref. in National Report
19	Japan	General	p96,l12;Sec.K.6.4

Question/ Comment: It is indicated that an indefinite exemption from CNSC licensing was granted by the CNSC for federally and provincially permitted landfill sites receiving nuclear substances legally released from licensed facilities, and that there are sufficient municipal and provincial regulatory measures in place to identify and address any potential risk.
Could you indicate whether the CNSC decision to grant exemption might be overturned by any municipal or provincial regulatory measures? In other words, are the methods of federal, provincial and municipal regulatory assessment of radiological risks coordinated?

Answer: There is no formal coordination with respect to regulatory assessments of radiological risks at the various levels of government. However, there is a clear division of authority where the federal government regulates nuclear substances being used for their radiological properties. The provincial and territorial governments regulate naturally occurring nuclear substances, including incidental wastes. Municipal governments (and private companies) manage landfills under permit from the provincial government. A lower level of government could not overturn the exemption granted by the Canadian Nuclear Safety Commission. However, they could impose their own restrictions under their permits.

Seq. No	Country	Article	Ref. in National Report
20	Korea, Republic of	General	P. iv (3.0)

Question/ Comment: The report states that the Ontario Power Generation (OPG) has signed an agreement with the host municipality for a deep geological repository. a) What is the current status of it? b) And how long is it expected to need for each step of the administration and the licensing process before the repository receives radioactive waste?

Answer: a) The host community agreement between OPG and the Municipality of Kincardine regarding the repository is in place. Under the terms of this agreement, payments have been made to Kincardine and to surrounding municipalities, and OPG is proceeding with the regulatory process, including plans to develop further the design of the DGR, and to carry out detailed site characterization and safety assessment. A project description has been submitted to the Canadian Nuclear Safety Commission (CNSC) to enable them to proceed with the environmental assessment process as required under the *Canadian Environmental Assessment Act* (CEAA). OPG is also consulting with the CNSC on plans for site characterization. Consultation is continuing with stakeholders in local communities.

b) Currently, the projected completion of the environmental assessment process for the DGR is expected in 2009. The issuance of a CNSC licence permitting

construction is expected to start by 2013. And an operating licence is expected to be issued by 2018, so that wastes can be received at the DGR in that same year.

Seq. No	Country	Article	Ref. in National Report
21	Switzerland	General	pages 84ff, K.4

Question/ Comment: When is the government expected to take a decision regarding the long-term management of spent fuel recommended by NWMO? The implementation process proposed by NWMO appears very long (up to 300 years or more, see p.85). Does NWMO assume a continued use of nuclear energy for the proposed implementation process? Have the scientific and technical safety criteria required for the selection of a disposal site been established yet? If yes, what are these criteria?

Answer: The Nuclear Waste Management Organization ‘s (NWMO) final study (*Choosing a Way Forward The Future Management of Canada’s Used Nuclear Fuel*) and a recommendation were submitted to the Government of Canada on November 3, 2005. The Government of Canada has not yet made a decision on the approach for long-term management.

The NWMO has assumed a reference scenario for the future production of used nuclear fuel in Canada. The reference spent fuel scenario was prepared by Canadian nuclear utilities and is based on an average nuclear reactor life of 40 years, which would correspond to the continued use of nuclear energy in Canada until 2033.

The NWMO is committed to developing and implementing a siting process collaboratively with affected communities of interest. The siting process, and the engagement process to support it, will be the subject of a specific dialogue following a decision by the Government on the way forward.

Presently, the NWMO has identified a number of scientific and technical factors that could be considered when siting a central facility for long-term management. These scientific and technical factors include:

1. the location in suitable rock, such as the crystalline rock of the Canadian Shield or in the Ordovician sedimentary rock formations;
2. the absence of known potential economic resources at depth;
3. sufficient surface area for receipt facilities and associated infrastructure;
4. a seismically stable region with known low or projected frequency of high magnitude earthquakes;
5. low frequency of major groundwater conducting fracture zones, features or faults at repository depth;
6. a geotechnical, suitable host rock formation near the surface for shallow rock cavern vaults;
7. a geotechnical, suitable host rock formation at least 200 metres below the surface with a preference for a suitable host rock formation between 500 and 1,000 metres below the surface for the underground characterization

facility and the deep geological repository;
8. a geochemical, suitable (e.g., reducing) conditions in groundwater at repository depth;
9. evidence of rock mass homogeneity and stability at repository depth;
10. low hydraulic gradient and low permeability; and
11. diffusion controlled transport of dissolved minerals at repository depth.

In order for the site to be acceptable, it would need to address scientific and technical siting factors to ensure that any facility is likely to protect human beings, including future generations, other life-forms and the biosphere as a whole, into the indefinite future. Any facility would be subjected to regulatory oversight to ensure that the site is acceptable from a safety perspective.

Based on these principles, the siting process will seek to:

- be open, inclusive and fair to all parties giving everyone with an interest in the matter an opportunity to have their views heard and taken into account;
- ensure groups most likely to be affected by the facility are given full opportunity to have their views heard and taken into account, and are provided with the forms of assistance they require to present their case effectively(including transportation, if required);
- include special attention to Aboriginal communities that may be affected. In particular, the NWMO will respect Aboriginal rights, treaties and land claims;
- be free from conflict of interest, personal gain or bias among those making the decisions and/or formulating recommendations;
- be informed by a combination of knowledge from natural science, social science, Aboriginal traditional knowledge, and ethics relevant to making the decisions and/or formulating recommendations;
- be in accord with the precautionary approach, which first seeks to avoid harm and risk of harm. If harm or risk of harm is unavoidable, the burden of proving that the harm or risk is ethically justified would rest on those making the decision to impose it;
- ensure, in accordance with the doctrine of informed consent, that those who could be exposed to harm or risk of harm (or other losses or limitations) are fully consulted and are willing to accept what is proposed for them;
- take into consideration, as much as it is possible to do so, the costs, harms, risks, and benefits of the siting decision, including not just financial costs but also physical, biological, social, cultural, and ethical costs (harm to our values); and
- ensure that those who benefit most from nuclear power (past, present and perhaps future) are bearing the potential costs and risks of managing used fuel and other nuclear materials.

Seq. No	Country	Article	Ref. in National Report
22	Switzerland	General	pages 90ff

Question/ Comment	The description in Section K-5-2 suggests that the nuclear regulatory body CNSC has not been involved in the public discussions regarding the proposed repository. Is this correct? Did the municipality express no interest for technical expertise from CNCS?
Answer	Under the Memorandum Of Understanding (MOU), the work plan calls for Kincardine and Ontario Power Generation (OPG) to conduct an independent assessment of the possible long-term management options for low- and intermediate-level waste at the WWMF. A consultant was retained by Kincardine and OPG to conduct the Independent Assessment Study (IAS), which included a review of several technologies for long-term, low- and intermediate-level waste management. Also under the terms of the MOU, some members of the Kincardine Nuclear Waste Steering Committee toured low- and intermediate-level waste management facilities in Europe and the United States and spoke with the host municipalities and the facility management. Negotiations have also taken place between OPG and the Municipality. The Canadian Nuclear Safety Commission (CNSC) was not involved at this stage, as it would have been inappropriate for the regulator to be involved in any technical discussions that might pre-judge a future licensing application. The CNSC has now received OPG's official notice of application for a licence for the DGR project, and is proceeding with the environmental assessment of the project.

Seq. No	Country	Article	Ref. in National Report
23	Switzerland	General	pages 91ff

Question/ Comment	Will the DGR at Kincardine accept all decommissioning wastes?
Answer	The host community agreement signed by the Municipality of Kincardine and Ontario Power Generation (OPG) includes provisions for decommissioning waste to be placed in the proposed Deep Geological Repository (DGR). Decommissioning waste is not included in the scope of the project description submitted for environmental assessment purposes because there is no definitive plan for decommissioning at this time, or for the management of decommissioning waste.

Seq. No	Country	Article	Ref. in National Report
24	Belgium	Article 4	§ G.16, page 61

Question/ Comment	The storage structure will be engineered to last at least 50 years. What is the design life limit?
Answer	Section G.16 of the Canadian National Report refers to the new dry storage option proposed by Atomic Energy of Canada Limited. This option will replace about 100 tile holes that contain research fuels which are vulnerable to degradation. The array has been designed for a 50-year design life. It is anticipated that a long-term nuclear fuel waste repository will be in place by that time.

During the operational life of the new array, a monitoring program, approved by the regulatory body, will be conducted to ensure that the structural integrity of the array is not compromised.

Seq. No	Country	Article	Ref. in National Report
25	Belgium	Article 4	Annex 4.3, page 123

Question/ Comment: What was the strategy adopted in regards with intrusion, fall of plane for above ground interim storage?

Answer: An above-ground interim dry storage facility is assessed for normal and abnormal operating conditions, and for credible accident conditions. Conservative estimates of public dose rates due to releases resulting from hypothetical failure of an assumed fraction of fuel elements are considered.

The assessment of the safety of the facility is reviewed to identify abnormal operating conditions and credible accidents, such as an airplane crash, in which fuel sheath failures and subsequent fission product releases could potentially occur as a result of physical damage. Bounding (worst-case) accident scenarios are conservatively identified even if they are unlikely to occur, and the results of off-site dose consequence calculations are then compared against the regulatory annual dose limit.

For above-ground interim storage in Canada, these bounding accident scenarios have been assessed and submitted to the CNSC. It was demonstrated that above-ground interim storage in Canada met the applicable sections under the NSCA and its associated regulations.

Seq. No	Country	Article	Ref. in National Report
26	Japan	Article 4	p51,l11;Sec.G.6

Question/ Comment: In the report, it is indicated that all spent fuel is stored at the site where it was produced.
How long storage periods are expected at those sites?
Please show the design base storage period at those facilities.

Answer: Spent fuel is presently stored in either storage bays or in dry storage facilities at the location where it was produced. The only exception to this is the spent fuel produced at the closed NPD nuclear facility. The spent fuel from this facility was transferred to the Chalk River Laboratories where it was placed in a dry storage facility.

The engineered structures, canisters, MACSTOR and OPG dry storage containers, were originally designed for a design life of 50 years. The actual life of the structures could be much longer. These structures are vigorously monitored, and in the event of a failure of the structure the spent fuel can be removed and transferred to a new structure.

The dry storage facility is licensed for a limited period. Currently, licences issued by the regulatory body in Canada are generally for a five-year period. At the time a licence renewal, the Canadian Nuclear Safety Commission examines

the operational performance of the dry storage facility and whether it can continue to operate safely for another licensing term - again typically for a five year period. This situation may continue until a long-term management facility becomes available.

Seq. No	Country	Article	Ref. in National Report
27	Ukraine	Article 4	G.7.1, page 51

Question/ Comment	What is the approach, accepted by the regulatory authority, to ensure the integrity of spent fuel over the required storage period? What is the approach to storage of damaged spent fuel?
Answer	In Canada, damaged spent fuel remains stored in wet storage bays within the nuclear generating stations. No visibly damaged fuel is permitted to be sent to spent fuel dry storage. For the dry storage of spent fuel, the Canadian Nuclear Safety Commission requires the licensee to take a “defence-in-depth” approach for storage, represented by multiple independent barriers between the fuel and the environment. The storage design must be capable of being monitored to verify its containment. The licensee is also required to provide a safety assessment conservatively estimating the doses to workers and the public from postulated failures of fuel elements and storage containers for normal and abnormal operating conditions and credible accident conditions.

Seq. No	Country	Article	Ref. in National Report
28	Korea, Republic of	Article 6	G.10(p.55)

Question/ Comment	What are the licensing procedures and expected licensing time frame for an abandonment license for spent fuel management facilities? Please explain the difference of the abandonment license from the decommission license?
Answer	For a nuclear facility, including spent fuel management facilities, the sequence of licensing is as follows: • licence to prepare site; • licence to construct; • licence to operate; • licence to decommission; and • licence to abandon. A licence to decommission will authorize the licensee to take actions, in the interest of health, safety, security and protection of the environment, to retire a licensed activity/facility permanently from service and render it to a predetermined end-state condition. A licence to abandon is an indication that the nuclear substance, the prescribed equipment, or the prescribed information is moving from a licensed to an unlicensed state. Before issuing a licence to abandon, the Canadian Nuclear Safety Commission (CNSC) must be satisfied that no undue risk would result. Pursuant to Section 8 of the *Class I Nuclear Facilities Regulations*, an application for a licence to abandon a Class I nuclear facility, which includes

spent fuel management facilities, shall contain the following information:

- the name and location of the land, buildings, structures, components and equipment that are to be abandoned;
- the proposed time and location of the abandonment;
- the proposed method of and procedure for abandonment;
- the effects on the environment, and the health and safety of persons that may result from the abandonment, and the measures that will be taken to prevent or mitigate those effects;
- the results of the decommissioning;
- the results of the environmental monitoring;
- any other information required by the regulatory body;

The expected licensing timeframe for the issuance of an abandonment licence for spent fuel management facilities would be dependant upon several factors, including completeness of supporting documentation. The regulatory body must be satisfied that the abandonment of the nuclear substance, the prescribed equipment or the prescribed information does not pose an unreasonable risk to the environment or the health and safety of persons, pose an unreasonable risk to national security or result in a failure to achieve conformity with measures of control and international obligations to which Canada has agreed.

Seq. No	Country	Article	Ref. in National Report
29	United States of America	Article 6	85

Question/ Comment

The Canadian Program exhibits a high level of awareness in regard to importance of input from interested public citizens for decision-making. During your national presentation, please consider discussing the perceived importance of such input and describing pertinent lessons learned about the most efficient ways of involving citizen stakeholders in the decision-making process as possible guidance for other countries who may face this issue.

Answer

The Government of Canada gives much importance to public consultations and this is demonstrated by incorporating the requirements to carry forth public consultations into legislation. For example, the *Nuclear Fuel Waste Act* contains several requirements for public consultations and the Nuclear Waste Management Organization (NWMO) is required to comply with these requirements.

The NWMO began its study with the understanding that, as a public policy issue, all citizens are stakeholders in a decision about how used nuclear fuel will be managed over the long term and have a right to participate in this decision. The NWMO also began with the understanding that the views of Canadian society, in judging benefits or risks, and assessing the social implications of various approaches for long-term management, are critical to the development of a socially acceptable recommendation. Over the course of our study, we heard that

Canadians expect that the best scientific and technical knowledge be considered when identifying and understanding the source and nature of risk and the ways in which safety can be assured. However, the decision as to whether safety has been assured to a sufficient degree to warrant implementation is a societal one, affected by social judgments of what constitutes risk and safety and the thresholds to be met.

In seeking to develop a socially acceptable approach, the NWMO designed its study process to ensure that not only the best scientific and technical knowledge was brought to the study, but also that the values and objectives of citizens were identified and understood, and formed the road map for both the study and recommendation.

Over the course of its study the NWMO, in conjunction with a variety of independent contractors, tried a number of innovative approaches of engaging specialists and citizens. We are currently in the process of assessing the effectiveness of the many methodologies and dialogue initiatives which we employed. However, one of the things which are clear to us from the study is that engagement of the public needs to be an important component of the implementation plan for any management approach going forward. This engagement itself needs to be iterative and adaptive both to the evolving circumstances in which important decisions will need to be made, and to new learning which continues to develop around effective collaborative decision-making processes. Phasing and adaptation of any management approach going forward will require continued active engagement of both specialists and citizens, and ongoing exploration of how to best engage citizens and incorporate new learning to evolve the process of engagement over time.

Seq. No	Country	Article	Ref. in National Report
30	Korea, Republic of	Article 7	G.8.5(p.53)
Question/ Comment	The report states that one of the main principles for generic design and operations of spent fuel management facility is the use of administrative controls and procedures to augment and monitor the performance of the engineered barriers. How can the administrative controls be achieved? What are the detailed procedures to augment and monitor the performance of the engineered barrier?		
Answer	In section G.8.5 of the Canadian National Report, there are two main principles for generic design and operations: • the use of multiple, engineered barriers; and • the use of administrative controls and procedures. The first principle provides a physical fixed barrier to provide containment and isolation. The second principle is the use of administrative controls such as the Aging Management Program, monitoring programs for structural integrity, etc.		
Seq. No	Country	Article	Ref. in National Report

31	Ukraine	Article 7	G.8.5, page 53,

Question/ Comment	Articles 7,8, Ref: G.8.5, page 53, G.13.2, page 58 What is the minimal number of barriers permitted in storage of spent fuel, and can claddings of intact fuel be considered a barrier? Is the integrity of barriers obligatory monitored in operation of the storage facility?
Answer	The dry storage safety philosophy in Canada embodies the "defence-in-depth" approach to keep radionuclide emissions below regulatory limits and As Low As Reasonably Achievable (ALARA). This defence-in-depth approach is represented by multiple barriers between the used fuel, or radioactive waste and the public. Each barrier independently provides a measure of safety toward preventing the release of radioactive materials. In the case of used fuel, the barriers identified are as follows: • the uranium dioxide matrix which effectively contains the radionuclides present in cooled used fuel, except for the free fractional inventory of tritium (in vapour form) and krypton-85 (which is a gas); • the fuel cladding additionally contains the free fractional inventory of tritium and krypton-85 that would otherwise be available for release; • the seal-welded container provides an additional barrier against the release of tritium and krypton-85 in the event of fuel cladding failure; and • the reinforced concrete of the containers (base, lid and concrete walls) provides effective shielding for gamma radiation from used fuel. The regulatory body does not prescribe a minimal number of barriers to be used. The proponent must demonstrate, through the use of the multiple-barrier-concept, that the health, safety, security and the environment are adequately protected during both normal and abnormal conditions. The proponent must also demonstrate that the containers are performing as designed. An inspection and maintenance program of the containers, approved by the regulatory body, must be designed and implemented by the proponent that will demonstrate the continued integrity of the containers and containment of the radionuclides.

Seq. No	Country	Article	Ref. in National Report
32	Korea, Republic of	Article 9	G.13(p.57)

Question/ Comment	What are the standards particularly for non-human biota with respect to monitoring spent fuel dry storage facilities?
Answer	Radiation dose criteria to non-human biota: total radiation dose must be less than 0.2 Gy/yr to fish, 1 Gy/yr to mammals and terrestrial and aquatic plants, and 2 Gy/yr to terrestrial and aquatic invertebrates. It should be recognized that spent fuel dry storage facilities are part of nuclear power plant site operation. The site conducts an environmental monitoring

program as a whole. The regulatory requirement is that the effects value for both nuclear and hazardous substances must remain below the threshold of effects.

Seq. No	Country	Article	Ref. in National Report
33	Korea, Republic of	Article 9	G.16(p.60)

Question/ Comment	How seriously the spent fuel and fuel containers stored in the “Tile Hole” have been corroded? What was the main reason for such corrosion occurred?
Answer	The fuel that was initially loaded into these storage structures, between the period of 1963 and 1983, was research reactor prototype fuel and included uranium metal fuel that has less corrosion resistance than modern alloy fuels. While these fuels are safety stored, monitoring and inspection of these older fuel types have shown that some of the fuel containers and fuels are corroding. Although the corrosion is not serious, continued corrosion of these fuels, due to condensation in the storage structure, will increase the hazards of storing and handling the fuel, as well as the decommissioning of the storage structures. Therefore, before the corrosion seriously hampers the possible retrieval of the fuels, it will be recovered and stored in a new dry storage system.

Seq. No	Country	Article	Ref. in National Report
34	Korea, Republic of	Article 9	Annex4.5.2(P.128)

Question/ Comment	The report states that in 2004, radioactivity less than 0.001GBq to air and 0.12GBq to water was released from the used fuel dry storage area and re-tube components storage area of the Pickering Waste Management Facility (PWMF). What was the main reason for this release to the environment? And what kinds of measures were taken to curb this unexpected release of radioactive material from the PWMF to the environment?
Answer	There is a very small risk of airborne emissions as a result of Dry Storage Container (DSC) processing operations such as welding and vacuum drying. Surface contamination on DSC exterior surfaces is effectively controlled through preventative measures and decontamination at the station’s irradiated fuel bays. Nevertheless, small quantities of fixed surface contamination may become airborne during welding operations. In addition there is potential for contamination from the outside of fuel cladding and, hypothetically, from a very small percentage of undetected failed fuel elements to become airborne during vacuum drying of the DSC cavity. The vacuum pump discharge is directed to an active ventilation system, where particulate contamination is removed by HEPA filters. Monitoring of the stack sampler has routinely demonstrated no significant levels of particulates in the active ventilation exhaust. Some liquid effluents originate in the dry fuel storage area from the occasional ingress of precipitation. Such liquids are sampled and pumped into the station’s radioactive liquid waste management system. Monitoring results show no significant levels of activity in radioactive drainage effluent transferred to the station system. Similarly, quarterly monitoring of the Retube Components Storage Facility (RCSF) catch basins has demonstrated that there are generally no detectable levels of activity in surface water runoff from the RCSF yard.

The Nuclear Waste Management Division (NWMD) of OPG utilizes the Loss Control Managed System as an effective method of managing risks associated with loss due to:

- personal injury and illness;
- property/equipment damage;
- process loss;
- work environment damage;
- natural environment damage; and
- regulatory non-compliance.

Program activities and performance measures have been developed based upon the requirements of the International Safety Rating System (ISRS) and the International Environment Rating System (IERS) audit protocol. The Nuclear Waste Management Organization's program meets ISO 14001 and IERS level 8.

Seq. No	Country	Article	Ref. in National Report
35	Korea, Republic of	Article 9	Annex4.5.4(p.129)

Question/ Comment	In 2004, according the report, the Western Waste Management Facility (WWMF) released 32,900.3 GBq to air and 20.5 GBq to water. And the report states that those released activity was less than 2% of the total activity released from the BNPD site. What caused this release of 32,900 GB to air from the WWMF and what was the total activity released from BNDP site in 2004?
Answer	Airborne emissions from the Western Waste Management Facility include emissions from the radioactive waste incinerator stack, and from active ventilation systems in the transport package maintenance, waste processing, and dry storage processing building. Airborne emissions consist primarily of tritiated water vapour, and in 2004 were a total of 0.02 per cent of the derived release limit. Similarly, waterborne emissions are primarily tritiated water, and in 2004 were a total of 0.006 per cent of the derived release limit. Waterborne emissions are measured for surface run-off and building drainage systems. Total reported airborne emissions from the Bruce Power site in 2004 were 900,000 GBq, plus 100,000 GBq-MeV noble gases. Total waterborne emissions were 584,000 GBq. For more information visit Bruce Power's Web site at: www.brucepower.com/uc/GetDocument.aspx?docid=996

Seq. No	Country	Article	Ref. in National Report
36	Czech Republic	Article 11	

Question/ Comment	Can you explain how is controlled (what instruments are used for control of) the fulfillment of requirements on minimization of radioactive waste?
Answer	Canadian licensees follow various forms of waste minimization depending upon site and operational specifics. As an example, Ontario Power Generation (OPG) has implemented a number of waste minimization activities. Specific initiatives

include the following:

- establishment of a “waste minimization culture” at OPG;
- work planning – individual work plans are required to consider the following principles:
- material exclusion: take as little material into zoned areas as possible, particularly packaging;
- use reusable equipment and materials as much as possible;
- segregate waste into waste and recycling at collection points;
- use of washable protective equipment to replace disposable items, including rubber gloves, reusable booties, redesigned washable hoods, reusable bags, plastic wrapping, and washable mops;
- minimizing of material entering zoned areas;
- all unnecessary packaging is removed before entering plant;
- increasing the use of returnable/reusable containers and metal skids;
- warehouse depackaging;
- use of clear plastic waste bags for waste collection;
- segregation of waste into “radioactive” and “likely clean” at many collection points for further monitoring and characterization of “likely clean” waste;
- additional waste characterization;
- use of industry best practices related to free release standards and segregation; and
- development of suitable metrics to monitor improvements.

Atomic Energy of Canada Limited is also undertaking similar activities, and has a project underway to design, construct, and operate a facility to enhance its capability to effectively utilize free release standards and segregation.

Seq. No	Country	Article	Ref. in National Report
37	France	Article 11	Section H.3 P 67&69

Question/ Comment	How is managed, from a regulatory viewpoint, the discharge into municipal sewer or municipal garbage system of waste resulting from radioisotope production and use and from research reactors?
Answer	The Canadian Nuclear Safety Commission (CNSC) assesses licence applications and licensed activities on a case-by-case basis. Accordingly, it considers the appropriateness of the licensed activity within the context of the respective circumstance. The CNSC will ensure compliance with an approved licensed activity by conducting compliance inspections of the facility and operations, and by conducting compliance audits of the programs governing the licensed activity, such as radiation protection quality assurance.

Seq. No	Country	Article	Ref. in National Report
38	Korea, Republic of	Article 11	H(p.147-148)

Question/ Comment: In Appendix 5.1.7.1.2 and 5.1.7.1.3, the report deals with the waste stored at the management area A and B. What kinds of Waste Accentance Criteria are required to receive the waste into the area A and B? Which conditioning methods are being used for the stored waste?

Answer: Waste Management Area (WMA)'A' is closed and no new waste is accepted in this area.

WMA 'B' currently operates two types of storage structures: cylindrical concrete bunkers and tile holes. Waste deposited into concrete bunkers are in accordance with the following seven categories:

1. bagged iodine waste
2. bagged alpha waste
3. bagged tritiated and gamma-emitting waste
4. baled waste
5. drummed bituminized waste
6. beta/gamma waste
7. alpha waste

The cylindrical bunker waste must have gamma radiation fields less than 50 mSv/h on contact and less than 1 mSv/h at 1 m, and beta fields of less than 200 mSv/h on contact. The bunker loading must be within approved criticality limits.

There are currently six types of tile holes in use at WMA 'B'.

1. Irradiated Fuel Element (IFE) tile holes are used to store irradiated fuel rods. The total loading is constrained by criticality limits and heat load. The total heat load is to be less than 400 W.
2. Irradiated Material Disposal (IMD) tile holes are for the storage of irradiated material. The tile hole can accommodate up to seven loop bundle cans or one can containing a Battelle equipment rod.
3. Cell Waste (CW) tile holes are used for the storage of solidified waste. Each tile hole can hold six 15-gallon cans. The radiation fields are to be less than 0.25 Sv/h on contact.
4. Cell Filters (CF) tile holes were originally intended for the storage of cell filters. They are now also used for the storage of pressure tube end-fillings. Each tile hole can hold seven HEPA filters or seven end-fittings standing on end.
5. Irradiated Rod Parts (IRP) tile holes are used for the storage of irradiated rod parts and can hold nine, five-gallon cans.
6. Reverse Osmosis Disposal (ROD) tile holes are typically used for the storage of bituminized waste contained in 45-gallon drums. Each tile hole can hold four 45-gallon drums of solidified liquid waste.

The maximum waste loading in a tile hole is determined by the radiation field on the outside of the flask, the criticality limit, the IFE tile hole heat load limit, and the volume of the tile hole.

Seq. No	Country	Article	Ref. in National Report
39	Korea, Republic of	Article 11	G.8.4(p53)

Question/ Comment: The report mentions dose limit and ALARA as one of generic performance requirements for spent nuclear fuel and radioactive waste management facilities. what is the dose/risk constraint(s) for disposal facilities, if any?

Answer: Doses from existing long-term waste management facilities are typically a fraction of a millisievert and the Canadian Nuclear Safety Commission has found that the dose limits and ALARA (As Low As Reasonably Achievable) have been sufficient to minimize dose.

With respect to future disposal facilities, draft Regulatory Guide G-320, *Assessing the Long-Term Safety of Radioactive Waste Management* (see section B.6 of the Report) will assist licensees and applicants in assessing long-term safety of storage and disposal of radioactive waste. The Guide describes typical ways to assess the impacts that radioactive waste storage and disposal methods have on the environment and on the health and safety of people. It addresses topics that include:

- assessment methodologies;
- level of detail of assessments;
- confidence to be placed in assessment results;
- applying radiological and non-radiological criteria;
- defining critical groups for impact assessments;
- selecting time frames for impact assessments;
- setting post-decommissioning objectives;
- long-term care and maintenance considerations; and
- use of institutional controls.

Seq. No	Country	Article	Ref. in National Report
40	Korea, Republic of	Article 11	H.2(p.66)

Question/ Comment: The fifth paragraph of section H.2 states that solid waste volume is reduced by incineration and compaction. What is the treatment of the incineration ash? What is the volume reduction factor and operation pressure of the compactor? What is the volume reduction method of ion exchange resin containing C-14 from the CANDU reactor?

Answer: At Ontario Power Generation (OPG), incinerator ash (bottom ash and fly ash) is collected and placed in metal storage boxes. The ash is not further conditioned prior to storage. Ash boxes are stored on the Low Level Storage Buildings at the Western Waste Management Facility (WWMF). Ash boxes are included among the wastes to be placed in the proposed Deep Geological Repository (DGR) at the WWMF site.

The volume reduction for compaction at OPG is typically five to one. The compaction force is 200 tons in a standard B-25 waste box.

At OPG, ion exchange resins classified as low-level waste are planned to be incinerated and the ash stored as described above. The C-14 bearing resins are classified as intermediate-level waste. These are not volume-reduced but are stored dewatered in 3 m^3 steel resin containers in shielded storage structures.

Seq. No	Country	Article	Ref. in National Report
41	Korea, Republic of	Article 11	H.3.1(p.66)

Question/ Comment: The report states that waste volume has been reduced by conversion of waste materials into by-products. What is the method for the conversion of waste materials into by-products?

Answer: There are several methods used for the conversion of waste materials into by-products. In the uranium refining and conversion facilities, the following methods are used to convert waste streams into by-products:

1. by precipitation of residual uranium from liquid ammonium nitrate produced at the UO_2 production plan for sale as a liquid fertilizer;
2. by drying the raffinate waste slurry produced at the UO_3 production refinery into solids for shipping. This by-product is shipped to uranium mills for recovering uranium;
3. by drying the calcium fluoride slurry produced at the UF_6 production plant into solids for shipping this by-product to uranium mills for recovering uranium;
4. by incinerating uranium contaminated combustible wastes and shipping the bottom ash to uranium mills for recovering uranium; and
5. by high pressure washing, chemical treatment or sand-blasting of uranium contaminated metals for shipping the decontaminated metals to metal recyclers.

Seq. No	Country	Article	Ref. in National Report
42	Korea, Republic of	Article 11	H.3.1(p.66)

Question/ Comment: What quantity of wastes, for each type, is generated from the fuel manufacturing process?

Answer: The following is an example of the **approximate** amount of by-product/waste generated from fuel manufacturing during the fourth quarter of 2005 at Cameco's Port Hope Uranium Processing Facility.

Type of By-product/Waste	Volume per Quarter	Notes
Fluoride By-Product from UF6 plant	120 tons	An outlet has been developed for the recovery of uranium from this material at a uranium mill in the United States. The amount of material shipped this quarter was 616 x 205 L

Ammonium Nitrate solution from UO2 plant	436 tons	Sold to an agricultural supply company during the quarter
Scrap lumber	15 tons	Released to companies for material recovery and/or utilization
Scrap Metals (carbon steel, copper and other metals)	138 tons	Forwarded to local scrap dealer
Contaminated non-combustible	519 x 205 L	Sent to Cameco's Blind River Refinery for processing wastes
Incinerator ash	28 x 205 L	
Aluminum and copper pieces	48 x 205 L	
Fiberglass insulation	21 x 205 L	
Grit blast dust	28 x 205 L	
Built-up roofing material	44 x 1 m^3 totes	
Drums of oil	25 x 205 L	
Solvent	15 x 205 L	
Oil filters (used)	100 L	Released to companies for material recovery and/or utilization
Tires	890 kg	
Lubricating oil	8160 L	
Concrete pieces	15 m^3	
Asphalt pieces	105 m^3	
Paint cans	3 m^3	
Lead-acid batteries	1750 kg	
Carbon anode off-cuts	1400 kg	
Wooden wire spools	30	
Waste liquid chemicals	3200 L	Sent to a waste management company for treatment and disposal.
Solid waste chemicals	600 kg	

Seq. No	Country	Article	Ref. in National Report
43	Switzerland	Article 11	pages 65ff

Question/ Comment: Is it a correct understanding that Articles 5-7 of the Class-I Nuclear Facility Regulation, when addressing the effects of the facility on the environment and the health and safety of persons, include the consideration of biological, chemical and other hazards associated with radioactive waste management as required in the Convention, Article 11, Clause v?

Answer: Section 3(j) of the *General Nuclear Safety & Control Regulations* stipulates that an applicant shall provide information on the name, quantity, form, origin and volume of any radioactive waste or hazardous waste that may result from the activity to be licensed. Hazardous substance or hazardous waste in the regulations means a substance or waste, other than a nuclear substance, that is used or produced in the course of carrying on a licensed activity, and that poses a risk to the environment or the health and safety of persons.

The *Class I Nuclear Facilities Regulations*, under article 5 "Licence to

Construct"; article 6 "Licence to Operate"; and article 7 "Licence to Decommission", requires that the applicant demonstrate how it will protect the environment and the health and safety of persons from nuclear substances and hazardous substances.

Furthermore, according to Regulatory Policy P-290, *Managing Radioactive Waste*, when making a regulatory decision concerning the management of radioactive waste, it is the policy of the Canadian Nuclear Safety Commission (CNSC) to consider the extent to which the owners of the waste have addressed several principles. One of the principles is that, "…b) the management of radioactive waste is commensurate with its radiological, chemical and biological hazard to the health safety of persons and the environment and to national security;.."

Therefore, Canada is of the opinion that the current provisions provided by CNSC regulations take into account the biological, chemical and other hazards associated with radioactive waste management as required by Article 11, clause v of the Joint Convention.

Seq. No	Country	Article	Ref. in National Report
44	United States of America	Article 12	70

Question/ Comment	On page 65 of Section K of the 1st Canadian National Report, it is stated that all Canadian low-level radioactive waste is currently in storage, there are no low-level radioactive waste disposal facilities under construction or operation in Canada, and there has been no pressing need in Canada for early disposal since the radioactive waste is "being safely stored on an interim basis." However, in response to a question on the 1st National Report regarding the performance of concrete bunkers and tile holes at the facility operated by AECL at CRL, it was stated that some bunkers and tile holes are "not meeting their intended purposes" regarding the exclusion of water, and that as a consequence "there has been a degradation of some packaging, corrosion of fuel and surficial contamination." It was further indicated that initiatives were underway to relocate wastes from the problematic structures and to clean up the affected areas. In the discussion of "past practices" on page 70 of the 2nd National Report, it is indicated that past practices such as in-ground burial are continuously under review by the CNSC and that it was concluded in a 2005 mid-term staff report that an Environmental Effects Review had demonstrated that risk to the environment at CRL is "predominately low." Please provide further details regarding the nature of the cleanup at CRL. Is the CNSC staff's conclusion regarding the predominately low environmental risk at CRL based upon the cleanup efforts to date or on an expectation of future results? What type of extended storage is being used for the wastes relocated from the degraded tile holes and bunkers?
Answer	In order to place everything into context, it should be noted that Waste Management Area (WMA) "C" was used for in-ground burial of extremely low-level radioactive solid waste. This practice terminated in 2005. Atomic Energy of Canada Limited (AECL) is currently developing a safety case for in-situ

disposal at this site. All solid waste that was placed into WMA "C" is now stored in metal storage boxes and the storage boxes are placed in a modular Above-Ground Storage Building (MAGS).

WMA "B" is currently used for the storage of a variety of solid wastes in engineered facilities. The site was put into service in 1953, with the burial of "sand trenched" radioactive solid waste into unlined sand trenches. The use of sand trenches terminated in WMA "B" in 1963. Storage of waste in engineered facilities began in 1955 and development has continued since that time to the cylindrical concrete bunkers and tile holes currently in use today. With respect to waste relocated from the tile holes, there is currently a program underway to recover some metallic fuels currently stored in 100 tiles. The proposal is to construct and operate a new dry storage system for these problematic fuels. The proposal will stabilize the fuel by removing waste and storing the fuel in a controlled atmosphere. The new storage system will also incorporate features that provide enhanced barriers to environmental releases from the packaged fuels. In addition there are"special burials" (i.e. bottled cribs), which are being recovered.

A decommissioning plan has been prepared by AECL, which outlines an extensive series of activities that will be directed at decommissioning the various waste management areas on the CRL site. Some of the major activities involve covering all or parts of waste management areas with barriers to reduce advection, extensive recoveries of special burials and waste in trenches, the long-term treatment of contaminated groundwater, an extensive groundwater monitoring program, and on-going field inspections of storage facilities.

An ecological effects review of the AECL's CRL site was conducted in 2003. It was determined that there were no observable impacts on non-human biota. The impacts were determined to be predominately low, based on current practices. It was also concluded that future impacts may be observed if no remediation of the site is to be undertaken.

Seq. No	Country	Article	Ref. in National Report
45	United States of America	Article 12	70

Question/ Comment	The first Canadian National Report indicated that radioactive waste from past practices, such as direct in-ground burial, are safely stored. Given that all the low-level radioactive waste in Canada is going to be stored for the foreseeable future, how are the waste forms, waste packaging, and waste storage facilities designed to prevent their long-term degradation and concomitant potential release of radioactive material into the environment? What specific features do the waste forms and packaging possess to accommodate the future need to transfer the waste to a permanent disposal site?
Answer	The practice of direct in-ground burial at the Atomic Energy of Canada Limited's (AECL) CRL site has, in fact, led to regions of contaminated groundwater that are now being treated. These plumes are in part due to the fact that no special waste forms, waste packaging or waste storage facilities designed to prevent their

long-term degradation and potential release of radioactive material into the environment were employed. These practices are now being discontinued, and are being replaced by (i) modular above-ground storage, and (ii) new dry storage systems for used fuels and other high-level wastes.

AECL's current strategy for managing wastes involves seven components, whereby each component must be addressed and managed to meet the corporate and waste management program objectives. The seven components are:

1. Waste Generation – initiatives focused on waste generation must address two objectives: (i) minimization of waste volumes, and (ii) minimization of radioactive and hazardous waste content.
2. Waste Characterization – this includes all the actions required to characterize, qualify, and record waste volumes and properties.
3. Waste Processing (including stabilization and packaging) – includes processing, stabilization and packaging as well as all those actions taken to pace waste into an optimal form/state for (i) storage or disposal, and/or (ii) handling and transfer.
4. Waste Storage (including transportation and retrieval) – storage includes all those actions taken to isolate and contain wastes until they can be released from regulatory control or be transferred to disposal facilities.
5. Monitoring and Inspection – these activities are extremely important in determining the requirement for, and nature, of remediation.
6. Remediation - this includes actions that are required or taken to specifically address situations where there are undesirable or uncontrolled releases of contamination to the environment, or where there are health or safety concerns.
7. Disposal – it includes all those actions taken to place wastes into a state such that future retrieval and/or treatment/handling of the wastes should not be required.

Seq. No	Country	Article	Ref. in National Report
46	Korea, Republic of	Article 13	K.5.2(p.91)

Question/ Comment: Has the CNSC involved in the project of the Deep Geological Repository (DGR) in any form or been officially informed of the project from the Ontario Power Generation (OPG)? When does the Canadian regulatory authority officially get involved in the siting process?

Answer: Yes, the Canadian Nuclear Safety Commission (CNSC) has received Ontario Power Generation's official notice of application for a licence for the Deep Geological Repository (DGR) project, and is proceeding with the environmental assessment of the project.

The CNSC can become involved once a notice of an application for a licence is received. Under the *Class I Nuclear Facilities Regulations*, which apply to the DGR, licences from the CNSC are required for site preparation, construction, operation, decommissioning and abandonment. The CNSC has no official

involvement in the siting process, beyond providing guidance on the licensing process that will follow. The performance and safety standards of the facility must be meet licensing criteria.

Seq. No	Country	Article	Ref. in National Report
47	Slovakia	Article 15	

Question/ Comment: What is the role as well as utilization of probabilistic methods in the frame of long-term performance assessment for near surface disposal facility?Is such approach used for evaluation of intrusion scenarios at least?

Answer: In draft Regulatory Guide G-320, *Assessing the Long Term Safety of Radioactive Waste Management*, it is indicated that probabilistic models can account for uncertainty arising from the data used in the assessment model predictions. The aggregated risk calculated by a probabilistic model cannot be compared directly to a safety indicator target, unless that target is expressed as a risk. On its own, the aggregated risk calculated by probabilistic models is not likely adequate for regulatory purposes. The results of probabilistic assessments should also be presented and discussed as the magnitude of a consequence and the likelihood of that magnitude of the consequence occurring.

Seq. No	Country	Article	Ref. in National Report
48	Japan	Article 16	p73, H11

Question/ Comment: On page 73, the elements of typical monitoring program for a radioactive management facility are shown.
Are these elements of typical monitoring program applied to the disposal facilities? If so,
how is the duration of the monitoring program for disposal facilities?

Answer: Under the Canadian regulatory regime, a safety case for a disposal facility could be based on several assumptions. During the operational life of a disposal facility, it is anticipated that monitoring will be conducted in order to confirm any assumptions proposed in the safety case. The operator of the disposal facility must submit, for regulatory approval, a monitoring program that will:

1. protect health, safety, security and the environment;
2. demonstrate that the disposal will function as predicted; and
3. provide useful information that will aid in the development of institutional controls, if required.

The approved monitoring program will be implemented for the operational life of the facility.

Seq. No	Country	Article	Ref. in National Report
49	Korea, Republic of	Article 16	Appendix 5.1.2(p.139

Question/ Comment: The report shows the discharged radioactivity, in terms of % Derived Release Limits (DRLs), from some radioactive waste management facilities such as the Western Waste Storage Facility (WWMF). a) How often is radioactive release

based upon the DRL evaluated for each facility? b) Do the licensees or regulators periodically assess more realistic dose impact of the radioactive effluent on the critical group(s)?

Answer

a) The frequency for assessing radioactive release against the DRL depends on the waste activities engaged in at a waste facility. Where waste processing occurs, such as incineration at the WWMF, the licensee typically examines continuous stack monitoring results against the DRL on a weekly basis, and releases are reported to the regulator in accordance with conditions in the licence, and usually on a quarterly basis. For example, Ontario Power Generation's (OPG) radioactive emissions are reported as a percentage of the DRL on a weekly basis for airborne emissions and on a monthly basis for emissions to water. Where a waste facility is for storage only, licensee monitoring would typically be less frequent and may be reported to the regulatory body on a semi-annual or annual basis, in accordance with conditions in the licence.

b) Waste facilities are typically associated with large nuclear facilities, such as nuclear generating stations or research facilities such as Chalk River, or at uranium mines and processing facilities. These locations have environmental monitoring programs associated with the facility that provides for the assessment of dose to the critical group based on local and regional environmental sampling. These annual assessments would include the releases from the site as a whole, including releases that might be associated with waste management. The regulator may also require additional sampling adjacent to the waste management facility for an ecological effects review. Such assessments have been conducted at such places as, mine processing and tailings management areas, WWMF, and Chalk River.

In the case of OPG, more realistic dose impacts due to emissions are assessed and reported on an annual basis. The annual assessment uses environmental measurements in addition to emissions data. However, the results reflect emissions, and any contribution from direct radiation, from all facilities on the sites. OPG's waste management facilities are all located on nuclear generating sites and doses due to waste management cannot be separated out for a more realistic assessment.

Seq. No	Country	Article	Ref. in National Report
50	Switzerland	Article 16	pages 71 and 72

Question/ Comment

Are there programmes in place to collect and analyse relevant operating experience, and is it ensured that the results are acted upon where appropriate?

Answer

Within Ontario Power Generation (OPG), the Nuclear Waste Management Division (NWMD) is committed to an industry Operating Experience (OPEX) Program that effectively and efficiently uses lessons learned from both industry-wide and an NWMD operating experience to improve plant safety and reliability. The OPEX Program includes provisions for collecting, evaluating, and

exchanging the results of relevant internal NWMD and industry experience, together with action tracking and closeout, for the purpose of effecting continuous improvement to NWMD business.

NWMD processes, such as weekly management review meetings to review station condition records (internal event reports, i.e. written reports documenting the circumstances related to an event or condition, and initial actions taken or planned), weekly leadership meetings, monthly facility project meetings, and the NWMD Station Condition Record and Corrective Action Program ensure that OPEX results are acted upon where appropriate.

Seq. No	Country	Article	Ref. in National Report
51	Finland	Article 17	H. 10

Question/ Comment: With reference to this Section: who is responsible for the long-term management program for closed tailings facilities and for how long that program will be carried out?

Answer: Responsibility for the long-term management of tailings facilities is the responsibility of the uranium producers or property owners. In cases where producers and owners no longer exist, the responsibility falls jointly on the federal and provincial governments.

Once decommissioned tailings facilities demonstrate through monitoring that they are stable and performing as designed, long-term management responsibilities will likely be transferred to the provincial government. The province of Saskatchewan has developed an institutional control framework, under which such properties could be transferred to provincial control. The province of Ontario is in the process of developing such a policy.

Management responsibilities for closed mines in the Northwest Territories, where uranium producers or property owners no longer exist, are the responsibility of the federal government.

The background paper on Saskatchewan Institutional Control framework (ICMF) can be viewed at www.se.gov.sk.ca/environment/protection/land/ICMF%20-%20Backgound_paper.pdf

Seq. No	Country	Article	Ref. in National Report
52	Japan	Article 17	p.72, H.10

Question/ Comment: Concerning Paragraphs H.10,
“Canada does not currently have a disposal facility in operation. Any proposal for the operation of a disposal facility must satisfy the requirement of the NSCA and associated regulations.”

1. What kinds of legislation or nuclear safety regulation are envisaged to ensure sustaining sound institutional measures in the longer term? Nuclear regulation, Environmental protection or others?

2. What sorts of institutional measures are taken into consideration as regulatory effective credits for safety? Before and after withdrawal of institutional measures, respectively.
An example we have in our mind is that by setting protective area to exclude from human activities such as excavation.

Answer

1) Current nuclear regulations in Canada, namely the *Nuclear Safety and Control Act*, require Canadian Nuclear Safety Commission (CNSC) oversight for nuclear inventory at disposal facilities. This implies perpetual licensing from the CNSC, unless the risks are very minimal and oversight by another regulatory/governmental body allows the Commission to exempt the site indefinitely from pursuing a CNSC licence (to be determined on a case-by-case basis).

Several requirements are imposed by the Act and its regulations, including;

1. a licence from the CNSC must be held in order to possess and use nuclear substances;
2. persons and the environment must be protected from unreasonable risk arising from the production, possession and use of nuclear substances, and the development, production and use of nuclear energy; and
3. conformity with international obligations to which Canada has agreed (such as the commitments in the Joint Convention Report).

Draft Regulatory Guide-320, *Assessing the Long Term Safety of Radioactive Waste Management*, will assist licensees and applicants in assessing long-term safety of storage and disposal of radioactive waste. The Guide describes typical ways to assess the impacts that radioactive waste storage and disposal methods have on the environment and on the health and safety of people. It addresses topics that include:

- assessment methodologies;
- level of detail of assessments;
- confidence to be placed in assessment results;
- applying radiological and non-radiological criteria;
- defining critical groups for impact assessments;
- selecting time frames for impact assessments;
- setting post-decommissioning objectives;
- long-term care and maintenance considerations; and
- use of institutional controls.

The CNSC is a federal authority under the *Canadian Environmental Assessment Act* (CEAA). The CNSC may insist that an environmental assessment be performed to assess the potential for significant environmental impacts before it

exercises its regulatory authority.

2) There are three levels of institutional controls envisaged: nuclear regulation; government ownership; and finally, government controls. The Canadian regulatory body, the CNSC, would not relinquish oversight unless it is convinced of the long-term safety of the facility by either technical means or institutional controls. Relinquishing oversight would also be dependant upon the hazard of the waste and the protection measures needed. For facilities and disposal sites on Crown land, the Government would be responsible (i.e. uranium mine sites with tailings disposal facilities) While privately owned land contaminated with nuclear substances could employ passive government controls such as land use restrictions, notes on land titles, periodic inspections or site verification, depending on the risk.

Seq. No	Country	Article	Ref. in National Report
53	Japan	Article 17	p72, Sec.H-10

Question/ Comment: Please explain the vision concretely about institutional measures after closure of low-level waste storage or disposal facilities in terms of long-term safety ensuring. It is stated about long-term management for low-level radioactive waste in the Sec. K-5, but it is recognized as management activities before closure.

Answer: Current Canadian regulations do not allow the removal from licence control (abandonment) without the explicit exemption by the regulatory body – the Canadian Nuclear Safety Commission (CNSC). A safety case demonstrating the long-term safety employing engineering design and barriers and/or other forms of institutional controls, including periodic site verification, would be required. The CNSC would examine the proposed institutional controls for assurance of adequate long-term safety, for cost (for financial guarantee), for consequences of failure of the institutional controls, and for reliability of the institutional controls, on a case-by-case basis. 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, or pose an unreasonable risk to national security or result in a failure to achieve conformity with measures of control and international obligations to which Canada has agreed.

Draft Regulatory Guide-320, *Assessing the Long Term Safety of Radioactive Waste Management*, will assist licensees and applicants in assessing long-term safety of storage and disposal of radioactive waste. The Guide describes typical ways to assess the impacts that radioactive waste storage and disposal methods have on the environment, and on the health and safety of people. It addresses topics that include:

- assessment methodologies;
- level of detail of assessments;
- confidence to be placed in assessment results;
- applying radiological and non-radiological criteria;
- defining critical groups for impact assessments;
- selecting time frames for impact assessments;

- setting post-decommissioning objectives;
- long-term care and maintenance considerations; and
- use of institutional controls.

Seq. No	Country	Article	Ref. in National Report
54	Switzerland	Article 17	page 72

Question/ Comment: Have there steps been taken to ensure the preservation of records of the properties of a closed disposal facility, as required in Article 17, Clause i, of the Convention?

Answer: Pursuant to Section 8 of the CNSC *Class I Nuclear Facilities Regulations*, an application for a licence to abandon a Class I nuclear facility, which includes spent fuel management facilities, shall contain the following information:

- the name and location of the land, buildings, structures, components and equipment that are to be abandoned;
- the proposed time and location of the abandonment;
- the proposed method of, and procedure for abandonment;
- the effects on the environment and the health and safety of persons that may result from the abandonment, and the measures that will be taken to prevent or mitigate those effects;
- the results of the decommissioning; and
- the results of the environmental monitoring.

According to the *General Nuclear Safety and Control Regulations*, every person is required to keep a record by the *Nuclear Safety and Control Act* (NSCA), shall retain the record for the period specified in the applicable regulations and no person shall dispose of a record referred to in the NSCA unless the person is no longer required to keep the record by the NSCA or has notified the regulatory body of the date of disposal and of the nature of the record at least 90 days before the date of disposal.

In terms of an abandonment license or an exemption from licensing, the records may also be required to be archived or stored under the oversight of another government or regulatory body, indefinitely.

Seq. No	Country	Article	Ref. in National Report
55	United States of America	Article 17	72

Question/ Comment: How long will HLW and LLW repositories be considered to be “waste management facilities” after they are filled, thus requiring monitoring, before it is deemed to be a “disposal facility” for which human intervention, surveillance, or monitoring is not required?

Answer: High- and low-level waste repositories are considered to be waste management facilities until the Canadian Nuclear Safety Commission is convinced it is safe to remove the waste management facility from licensing oversight. This judgment is

based on the performance of the facility as proven by monitoring results, as well as long-term predictions of performance and safety, cost/benefits of continuing monitoring, public acceptance of abandonment, and the need for any other institutional control measures that may be necessary based on the overall risks.

Seq. No	Country	Article	Ref. in National Report
56	United States of America	Article 17	95

Question/ Comment: Will sites where historic wastes have been consolidated remain under institutional controls indefinitely, or has a time duration for the controls been established?

Answer: There is no time limit established for institutional controls of consolidated historic waste sites in Canada. The Government of Canada has accepted responsibility for the management of Canada's historic waste, in the absence of another responsible owner. The reliance on institutional controls in the management of this historic waste over time is determined on a case-by-case basis, depending on the circumstances of the site. For some historic waste sites, institutional controls are expected to remain in place over the long term. For other sites, however, they are considered to be temporary measures pending the implementation of appropriate long-term waste management solutions.

The regulatory body has not specified a time limit on the application of institutional controls. It has taken the position that site safety should not rely solely on institutional controls beyond the engineered design life of surface and near surface facilities unless long-term care and maintenance, and periodic site verification activities are costed out and planned for.

In February 2006, the Canadian Nuclear Safety Commission (CNSC) granted an exemption under the *Nuclear Safety and Control Act* (NSCA) to four government controlled, mildly contaminated, consolidation cells across Canada. They were exempted from the requirement to hold a licence for the possession, management, and storage of nuclear substances until December 31, 2009. This exemption was granted while the federal government considers its long-term options for the disposition of these sites. The sites are being managed under the exemption until a decision is made on whether to licence these sites based on site specific safety assessments and the implications of potentially changing regulations.

An additional privately owned consolidated near-surface cell has been granted the same exemption.

One property is currently undergoing an environmental assessment. The Commission granted the property an exemption from licensing until December 31, 2007. It is expected that a licence will be issued to the Ontario Government before the exemption date.

The final consolidation site, controlled by a local government, was granted a licence, by the CNSC on January 1, 2006, to possess, manage and store nuclear substances This licence may be revoked in the future if a decision is made based on

site specific safety assessments and regulatory requirements not to licence these small sites.

It is expected that these sites will continue to be managed under institutional controls, including land use restrictions, until a permanent solution is designed based on national priorities.

Seq. No	Country	Article	Ref. in National Report
57	United States of America	Article 17	72

Question/ Comment: What measures will be taken to assure that records of location, design, and inventory are preserved?

Answer: The following are examples from Canadian initiatives:

i) NWMO's proposed repository for the long-term management of used nuclear fuel

The NWMO's recommendation of Adaptive Phased Management for the long-term management of used nuclear fuel is presently with the Government of Canada for review and consideration. Following a government decision on a management approach, the NWMO proposes to commence a process through which the many implementation issues may be addressed.

The management and preservation of records and documentation relating to the long-term waste management of used nuclear fuel is one of many issues in which we anticipate significant societal interest and in which citizens must have confidence in order for implementation to proceed. Under Adaptive Phased Management, the pace and manner of implementation would be influenced by the extent to which society has confidence in the resolution of such key matters.

In its Final Study, the NWMO has proposed an open and collaborative process for addressing implementation issues. It will be important to ensure that the decision-making that unfolds over many years to come is supported by continued citizen engagement in a way that allows issues to be addressed and worked out iteratively and collaboratively. It is NWMO's intent to ensure that issues such as the preservation of records, an issue of broad societal interest, are fully examined as part of the preparatory work for implementation and are addressed in full compliance with all regulatory requirements.

ii) OPG's Deep Geological Repository (DGR) for low and intermediate radioactive waste

Regarding OPG's proposed DGR: all documents will be properly archived. At the current stage of the proposed DGR program, specific details of these and any additional activities have yet to be defined.

The following are examples of regulatory requirements:

Regulatory Requirements

According to the *General Nuclear Safety and Control Regulations*, every person is required to keep a record by the *Nuclear Safety and Control Act* (NSCA) shall retain the record for the period specified in the applicable regulations and no person shall dispose of a record referred to in the NSCA unless the person is no longer required to keep the record by the NSCA or has notified the regulatory body of the date of disposal and of the nature of the record at least 90 days before the date of disposal. In terms of an abandonment license or an exemption from licensing, the records may also be required to be archived or stored under the oversight of another government or regulatory body indefinitely.

Seq. No	Country	Article	Ref. in National Report
58	United States of America	Article 17	72

Question/ Comment: a) Will access restrictions continue after closure of a disposal facility? b) If so, how will they be enforced?

Answer: a) The following are examples from Canadian initiatives:

i) The Nuclear Waste Management Organization's (NWMO) Proposed Repository for the Long-Term Management of Used Nuclear Fuel

The NWMO final study (*Choosing a Way Forward The Future Management of Canada's Used Nuclear Fuel*) and a recommendation was submitted to the Government of Canada on November 3, 2005. The recommended approach, adaptive phased management, includes centralized containment and isolation of spent fuel in a deep geological repository in a suitable rock formation.

After a decision is made to close the deep repository, there is a provision for post-closure monitoring of the facility. Public access may be restricted to secure post-closure monitoring activities. The precise nature and duration of post-closure monitoring and any requirements to restrict access to the area would be developed collaboratively during the implementation process, taking advantage of technological developments. This is a decision to be made by a future society.

ii) Ontario Power Generation's (OPG)Deep Geological Repository (DGR) for Low and Intermediate Radioactive Waste

Regulatory approval processes following closure of a disposal facility and dismantling of the surface facilities may require implementation of institutional controls to prevent the public from accessing the site for some period of time. For OPG's proposed DGR, it is expected that unrestricted access could be allowed eventually, with all activities permitted except

deep drilling (subject to any ongoing use of the site for nuclear activities). Restrictions could be put on zoning and land use. At the current stage of the DGR program, specific details of these and any additional activities have yet to be defined.

b) Under the current legislation provided by the *Nuclear Safety and Control Act*, the removal from licence control (abandonment) without the explicit exemption by the Canadian Nuclear Safety Commission is not allowed. A safety case demonstrating the long-term safety employing engineering design and barriers and/or other forms of institutional controls, including periodic site verification, would be required. The CNSC would examine the proposed institutional controls for assurance of adequate long-term safety, for cost (for financial guarantee), for consequences of failure of the institutional controls, and for reliability of the institutional controls on a case-by-case basis. 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, or pose an unreasonable risk to national security or result in a failure to achieve conformity with measures of control and international obligations to which Canada has agreed.

Seq. No	Country	Article	Ref. in National Report
59	Belgium	Article 18	§ E.5.1, page 32

Question/ Comment: It should be interesting to get an idea of the distribution of the merited ratings?

Answer: The table below provides an example of the assessment ratings for nine safety areas.

Program Area	Program	Implementation	Trend
Operations	B	B	→
Quality Assurance	B	C	↗
Radiation Protection	B	B	→
Environmental Protection	B	B	→
Non-radiological Health and Safety	B	B	→
Emergency Preparedness	B	B	→
Nuclear Security	B	B	→
Safeguards	B	B	→
Public Information	B	B	→

Definition of Ratings

1. A – Exceeds requirements

A rating of ‘A’ is merited when assessment topics or programs meet and consistently exceed applicable Canadian Nuclear Safety Commission (CNSC) requirements and performance expectations. Any problems or issues that arise are promptly addressed such that they do not pose an unreasonable risk to the maintenance of health, safety, security, environmental protection, or conformance with international obligations to which Canada has agreed.

2. B – Meets requirements

A rating of ‘B’ is merited when assessment topics or programs meet the intent or objectives of CNSC requirements and performance expectations. There is only minor deviation from requirements or the expectations for the design and/or execution of the programs, but these deviations do not represent an unreasonable risk to the maintenance of health, safety, security, environmental protection, or conformance with international obligations to which Canada has agreed. That is, there is some slippage with respect to the requirements and expectations for program design and execution. However, those issues are considered to pose a low-risk to the achievement of regulatory performance requirements.

3. C – Below requirements

A rating of ‘C’ is merited when either performance deteriorates and falls below expectations, or assessment topics or programs deviate from the intent or objectives of CNSC requirements, to the extent that there is a moderate risk that the programs will ultimately fail to achieve expectations for the maintenance of health, safety, security, environmental protection, or conformance with international obligations to which Canada has agreed. Although the risk of failing to meet regulatory requirements in the short term remains low, improvements in performance or programs are required to address identified weaknesses. The licensee or applicant has taken, or is taking appropriate steps.

4. D – Significantly below requirements

A rating of ‘D’ is merited when assessment topics or programs are significantly below requirements, or there is evidence of continued poor performance, to the extent that whole programs are undermined. Without corrective action, there is a high probability that the deficiencies will lead to an unreasonable risk to the maintenance of health, safety, security, environmental protection, or conformance with international obligations to which Canada has agreed. Issues are not being addressed effectively by the licensee or applicant. The licensee or applicant has neither taken appropriate compensating measures nor provided an alternative plan of action.

5. E – Unacceptable

A rating of 'E' is merited when there is evidence of an absence, total inadequacy, breakdown, or loss of control of an assessment topic or a program. There is a very high probability of an unreasonable risk to the maintenance of health, safety, security, environmental protection, or conformance with international obligations to which Canada has agreed. An appropriate regulatory response, such as an order or restrictive licensing action has been or is being implemented to rectify the situation.

Seq. No	Country	Article	Ref. in National Report
60	Australia	Article 19	E.7
Question/ Comment	How does the CNSC policy on managing radioactive waste define the term 'radioactive waste' to ensure that the policy does not otherwise apply to radioactive material for which a continued use is foreseen? If so, what is the CNSC's definition of 'radioactive waste'?		
Answer	Regulatory Policy P-290, *Managing Radioactive Waste*, relies upon the owner of the material containing nuclear substances, to have it declared as waste. If there is a continued use foreseen, it is expected that the material would not be declared a waste (which, of course, does not remove the material from regulatory control under the *Nuclear Safety and Control Act* (NSCA), it just means it is not treated as a waste). In the case of waste material which is disposed of and then recovered for some purpose, the material would then be considered a resource, not a waste. For example, if technological advances make it economic to reprocess uranium tailings, the tailings would be considered similar to a uranium ore deposit instead of a waste, and regulated accordingly.		
Seq. No	Country	Article	Ref. in National Report
61	Bulgaria	Article 19	
Question/ Comment	Would you provide more details on the requirements for "abandonment" of nuclear facility? What are the main documents required by CNSC for issuing abandonment license? What criteria are applied to the final state of the site and the buildings remaining on-site?		
Answer	In accordance with the *Nuclear Safety and Control Act* and its associated regulations, an application for a licence to abandon must include:		

- the name and location of the land, buildings, structures, components and equipment that are to be abandoned;
- the proposed time and location of the abandonment;
- the proposed method of, and procedure for abandonment;
- the effects on the environment and the health and safety of persons that may result from the abandonment, and the measures that will be taken to prevent or mitigate those effects;
- the results of the decommissioning;
- the results of the environmental monitoring program; and

- any other information required by the regulatory body.

The regulations also define abandonment as moving a nuclear substance, prescribed equipment or information, from a licensed to an unlicensed state. Before issuing a licence to abandon, the Canadian Nuclear Safety Commission 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, or pose an unreasonable risk to national security or result in a failure to achieve conformity with measures of control and international obligations to which Canada has agreed.

Seq. No	Country	Article	Ref. in National Report
62	Finland	Article 19	E.4.1 and H.5
Question/ Comment	With reference to Sections E.4.1 and H.5: are there any constrained doses defined in the regulations for the design of radioactive waste management and disposal facilities?		
Answer	There are no constraints other than the public dose limit (1 mSv) and the ALARA (As Low As Reasonably Achievable) requirement in the regulations.		
Seq. No	Country	Article	Ref. in National Report
63	France	Article 19	Section E.5 Page 31
Question/ Comment	Are the discharge authorizations re-evaluated when renewing a license on a periodical basis?		
Answer	Yes, they are re-evaluated during the re-licensing period, incorporating new requirements that evolve from new regulations and technologies.		
Seq. No	Country	Article	Ref. in National Report
64	Germany	Article 19	p. 30
Question/ Comment	The Canadian licensing system appears very well structured and the limitation of license validity to a fixed period of time provides the possibility of regular safety upgrades of facilities. Could you give some examples of safety re-assessments performed during the license renewal of a spent fuel or radioactive waste storage facility which ensure, in combination with the monitoring measures in these facilities described in chapters G.13 and H.11, the long-term safety of spent fuel and radioactive waste interim storage?		
Answer	For licence renewals, the licensee is required to address the requirements for a renewal application as identified in Section 5 of the *General Nuclear Safety Regulations.* The Regulations requires the licensee to address the information required for the *Class I Nuclear Facility Regulations* and identify changes to the information from previous submissions. This ensures that renewals are based on up-to-date and revised information which would include information related to modifications or amendments made during the licensing period in response to requests from the licensee, and such safety programs as revised ALARA (As Low As Reasonably Achievable) programs based on the results of radiation monitoring and revised DRL's, in response to updated pathways analysis.		

It should be noted that the Canadian Nuclear Safety Commission can, under the *General Nuclear Safety and Control Regulations*, request that the licensee conduct tests, analysis, reviews, or inspections of licensed activities. Therefore, re-assessments of safety cases need not only be related to licence renewals or amendment requests.

Seq. No	Country	Article	Ref. in National Report
65	France	Article 20	Section F.2.4 Page 3

Question/ Comment	Does CNSC rely on an independent technical support organization (TSO) for performing safety assessment of licensing documentation?
Answer	No, the Canadian Nuclear Safety Commission (CNSC) does not rely on independent technical support organizations to perform safety assessments of licensing documentation. In October 2001, the CNSC dissolved its Advisory Committee on Nuclear Safety and its Advisory Committee on Radiological Protection. The CNSC concluded that a more effective and efficient means of obtaining independent scientific and technical advice was needed and would be sought. Currently, the CNSC Research and Support Program provides access to independent advice, expertise, experience, information and other resources via contracts placed in the private sector and with other agencies and organizations in Canada, as well as in other countries. Its mission is to generate knowledge and information to support CNSC staff in its regulatory mission. The CNSC Research and Support Program is mainly used for obtaining specific expertise and independent advice. The CNSC does not conduct or commission significant research and development in the sense of experimental or developmental work. In addition, external consultants are directly contracted to provide specific expertise or to provide independent advice. The CNSC participates actively in many international groups. High-level groups include the Committee on Nuclear Regulatory Activities and the International Nuclear Regulators Association. The CNSC also has bilateral links with many countries and is an active participant within the International Atomic Energy Agency.

Seq. No	Country	Article	Ref. in National Report
66	France	Article 20	Section F Page 43

Question/ Comment	Is the precaution of transport prohibition during rain or snow events connected to potential contamination dispersion? Could Canada provide typical and maximum figures of external cask contamination?
Answer	Spent fuel is not transferred during periods of rain or snow in order to reduce probability of a traffic accident during on-site transfer. There is a requirement for *zero* loose contamination for on-site transfers, so the spread of contamination is not a factor. The external surfaces of DSCs in storage are routinely checked, and have demonstrated to be free from loose contamination.

Seq. No	Country	Article	Ref. in National Report
67	United States of America	Article 20	111

Question/	There is a significant amount of discussion regarding the role and responsibilities of

Comment the government and CNSC's function. Please elaborate on the personnel competencies and training.

Answer Within the Canadian Nuclear Safety Commission (CNSC), there is a Learning Management System (LMS) which profiles knowledge and skills required. The LMS was established for all divisions in 2004 and individual profiles were set up with accompanying learning plans. Profiles include technical, administrative and soft skill requirements. Learning plans can also contain developmental targets. Some position-specific profiles have been set up. For example, for management, administrative and inspector positions. Each employee's learning plan is reviewed by the manager as staff complete training or developmental activities. Plans are reviewed annually for staff during the performance review process.

Government departments take a similar approach through the use of learning plans for all employees that are reviewed annually.

Seq. No	Country	Article	Ref. in National Report
68	Belgium	Article 21	§ F.3, page 39

Question/ Comment Does the government of Canada intend to sign an agreement with other provinces than Ontario? Why just Ontario with no abandoned mine sites at this time?

Answer An agreement with the province of Saskatchewan, similar to the existing Canada - Ontario agreement on abandoned uranium mines, is currently under development. Management responsibilities for closed mines in the Northwest Territories, where uranium producers or property owners no longer exist, are the responsibility of the federal government. These are the only jurisdictions in Canada with uranium mine tailings.

Seq. No	Country	Article	Ref. in National Report
69	Belgium	Article 21	§ F.6, page 45

Question/ Comment Does Canada have any territorial surveillance to detect external (other countries) nuclear events and to be able to react on time?

Answer **1) The Comprehensive Nuclear-Test-Ban Treaty Monitoring Network**

Since 1998, Health Canada has been contributing to the International Monitoring System (IMS), an element of the verification regime overseen by the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO).

Canada is responsible for the installation and operation of fifteen monitoring stations across the country and a radionuclide laboratory. Health Canada's Radiation Protection Bureau is responsible for the radionuclide laboratory and four radionuclide monitoring stations. These are located in Resolute (N.U.), Yellowknife (N.W.T), Vancouver (B.C.), St. John's (Nfld.). These installations, along with 11 other stations, using seismic, hydro acoustic and infrasound technology, collect and transmit monitoring data to the CTBTO to monitor for evidence of any nuclear explosion.

Further information can be found on the Health Canada Web site at: http://www.hc-sc.gc.ca/ewh-semt/contaminants/radiation/nuclea/index_e.html

2) Canadian Radiological Monitoring Network

The **Canadian Radiological Monitoring Network** (CRMN) is a national network of monitoring stations that routinely collect air, precipitation, external gamma dose, drinking water, atmospheric water vapour, and milk, for radioactivity analysis. The CRMN was initiated in 1959 to monitor environmental releases of radioactivity from atmospheric nuclear weapons testing and accidental releases from nuclear facilities. Currently, the network provides information on natural background radiation levels, and provides a mechanism for measuring routine or accidental releases of radioactivity in the environment. There are 26 environmental monitoring stations, plus additional sites in the vicinity of nuclear reactor locations.

The CRMN established additional sites for monitoring in the vicinity of Canadian nuclear power plants and regional population centres. Monitoring consists of sampling equipment to measure tritium in atmospheric water vapour, and thermoluminescent dosimeters (TLDs) to measure external gamma dose rate. The monitoring consists of real-time measurements of doses to the public from atmospheric gamma radiation. There are 12 of these stations.

The current reactor monitoring network consists of sites in the vicinity of Gentilly (five sites) and Point Lepreau (six sites), and a new site in the Greater Toronto Area (GTA). This site was added in June 1996, to maintain a sampling site location in the GTA. The Ottawa site, located on the roof of the Radiation Protection Bureau building, was added in 1991 to act as a test-bed site, and to monitor background tritium levels.

Further information can be found at the Health Canada Web site at: http://www.hc-sc.gc.ca/ewh-semt/contaminants/radiation/crmn-rcsr/index_e.html.

Seq. No	Country	Article	Ref. in National Report
70	Japan	Article 22	p39, F3;p48,F7
Question/ Comment	The financial resources should based on the “producer liability”. However, is the finance covered by the government budget for the disposal of radioactive waste or decommissioning of the facilities those are owned or operated by governmental organization? Is there any system or plan to assure the finance in the government?		
Answer	Different approaches are taken by different jurisdictions, whether they are a provincial government or the federal government. In some cases, funds are set aside today to cover the costs of future decommissioning and waste management activities. In other cases, the future costs are recognized as a liability on government accounts to establish provisions to pay the decommissioning and waste management costs when they occur in the future. The *Nuclear Safety and Control Act* and its associated regulations require that applicants and licensees make adequate provisions for the safe operation and decommissioning of existing or proposed operations. Safe operation and decommissioning include the development of acceptable decommissioning plans, the		

provision of credible estimates of the costs of implementing such decommissioning plans, the provision of corresponding measures to ensure that the costs of decommissioning will be met, and ultimately, the implementation and completion of accepted decommissioning plans. Financial guarantees must be sufficient to cover the cost of decommissioning work resulting from licensed activities that have taken place prior to the licence period, or will take place under the current licence.

To be acceptable to the Canadian Nuclear Safety Commission (CNSC), a funding measure must provide assurance that adequate resources will be available to fund decommissioning activities based on information provided to the CNSC. The financial guarantee must be at arm's length from the licensee, and the CNSC must be assured that it or its agent can, upon demand, access or direct adequate funds if a licensee is not available to fulfill its obligations for decommissioning. Examples of acceptable financial guarantees are cash, irrevocable letters of credit, surety bonds, insurance and expressed commitments from a government (either federal or provincial).

For facilities not owned by private industry, there are three levels of government in Canada that could apply - federal, provincial, and municipal. Expressed commitments from a government, federal or provincial, are considered to be an adequate form of financial guarantee by the CNSC. For municipal governments, financial guarantees would take the form of other accepted forms of financial guarantees that apply to private industry.

The CNSC reviews the systems put in place by all licensees to cover future decommissioning and waste management costs, including government organizations, and determines their acceptability based on published regulatory requirements and guidance.

With respect to nuclear fuel waste (spent fuel), the *Nuclear Fuel Waste Act* requires that all owners (public and private) establish trust funds and make regular deposits in order to cover the costs for the long-term management of nuclear fuel waste.

Seq. No	Country	Article	Ref. in National Report
71	Germany	Article 24	p. 41

Question/ Comment	Can you give some more details concerning the application of clearance levels and the release of very low level radioactive waste from nuclear supervision?
Answer	Exemption from licensing requirements is currently addressed in the *Nuclear Substances and Radiation Devices Regulations*, but there is currently no explicit provision for clearance levels in the regulations. A project to amend these regulations is currently underway, which will include a provision for clearance levels. These proposed amendments will better align Canada's approach to exemption and clearance levels with current international recommendations. The amendments consider the International Atomic Energy Agency's (IAEA) Basic Safety Standards, as well as the most recent guidance from the IAEA on the concepts of exemption, exclusion and clearance (IAEA-RS-G-1.7). The proposed

amendments have undergone public consultation in the fall of 2005.

The current *Nuclear Substance and Radiation Devices Regulations* do not incorporate the concepts of conditional and unconditional clearance. Also, municipal landfill sites have received an exemption from licensing from the Canadian Nuclear Safety Commission (CNSC). Under the current regulatory framework, contaminated material may be removed from further regulatory control if:

- it is disposed of in a municipal landfill, provided the licensee complies with landfill disposal criteria;
- the amount of material does not exceed exemption quantities specified in the *Nuclear Substance and Radiation Devices Regulations*; or
- the amount of material exceeds exemption quantities specified in the *Nuclear Substance and Radiation Devices Regulations* and the organization receiving the material has been exempt from licensing from the CNSC on the basis that its possession of the material does not pose an unreasonable risk to the environment or the health and safety of persons, pose an unreasonable risk to national security or result in a failure to achieve conformity with measures of control and international obligations to which Canada has agreed.

Although there is no specific provision for clearance levels in the current regulations, there is a mechanism for obtaining regulatory approval of clearance activities where the risks are negligible, for example, case-specific approval by the CNSC. This process can be unduly onerous on licensees and as a result, in some cases, licensees choose not to remove slightly contaminated material from regulatory control.

The amendments to the *Nuclear Substances and Radiation Devices Regulations*, which will better align Canada's approach to exemption and clearance with current international approaches, are expected to be finalized in early 2007, The current version of the proposed regulations contain provisions for conditional release. The amended regulations will consider the International Atomic Energy Agency's (IAEA) Basic Safety Standards, as well as the most recent guidance from the IAEA on the concepts of exemption, exclusion and clearance. A multi-disciplinary team of CNSC staff are developing a regulatory guide on demonstrating compliance within these new requirements. The guide is also expected to be published in 2007.

Seq. No	Country	Article	Ref. in National Report
72	Switzerland	Article 24	page 42, F.5.2
Question/ Comment	Which assumptions or models have been used to derive the discharge limits which ensure that the annual dose limit for the population is not exceeded?		
Answer	Derived Release Limits (DRL) have been traditionally calculated using Canadian Standards Association's (CAN/CSA-N288.1-M87) *Guidelines for Calculating Derived Release Limits for Radioactive Material in Airborne and Liquid Effluents for Normal and Operation of Nuclear Facilities* (1987 - under revision). Different licensees use either site-specific, or the conservative default parameters included in		

the standard for the DRL calculations.

Seq. No	Country	Article	Ref. in National Report
73	Korea, Republic of	Article 25	F.6(p.44)

Question/ Comment: In Canada, according to the report, individual provinces have their own nuclear emergency responsibility. Please describe the mechanism, if any, of informing and co-operating among the provinces in the case of accidents.

Answer: In Canada, nuclear emergency preparedness and response is a multi-jurisdictional responsibility shared by all levels of government, and licensees of the Canadian Nuclear Safety Commission. This collective responsibility encompasses a wide range of contingency and response measures to prevent, respond to, and mitigate nuclear or radiological accidents, abnormal situations, and emergencies.

How the system works

If the individual/licensee cannot cope with the emergency, municipal services respond. Mayors and other elected heads of local governments are responsible for ensuring that emergency plans exist within their municipalities, and that such plans are exercised regularly. Most emergencies occur in, and are dealt with effectively by, a municipality.

If a municipality cannot manage to respond effectively, the province or territory is expected to come to the municipality's aid. Provincial and territorial governments are responsible for coordinating with municipalities.

If a province or territory needs help, they must formally request federal government aid, usually but not necessarily through the national coordinator known as Public Safety and Emergency Preparedness Canada (PSEPC). The federal government intervenes only at the request of a province of territory, in a national emergency, or when the emergency clearly impacts on areas of federal jurisdiction.

The federal government will coordinate efforts with respective organizations in the United States and through various Conventions which Canada has signed with the International Atomic Energy Agency.

Seq. No	Country	Article	Ref. in National Report
74	Korea, Republic of	Article 25	F.6(p.45)

Question/ Comment: To prepare to deal with emergency situations, what kinds of emergency exercises are taken by licensees, provinces and the government?

Answer: In preparation for their annual emergency exercise, licensees will conduct a series of drills and exercises regularly to test the response capabilities of their staff at the site and at other locations. These consist mostly of medical, fire, chemical and radiation drills and exercises.

Licensees usually hold a full-scale exercise every year. This may involve all, or in

some cases, some of the federal, provincial or municipal authorities who have a role to play during a nuclear emergency.

Canada conducts national-level, no-fault exercises every three or four years to test and evaluate national contingency plans designed to deal with the effects of possible emergencies. These tests are part of the family of exercises termed as Canadian National Exercises (CANATEX).

Canada also participates in international nuclear drills and exercises known as INEX and CONVEX. These are organized and coordinated by the Nuclear Energy Agency of the Organization for Economic Cooperation and Development (OECD) and the International Atomic Energy Agency (IAEA).

Uranium Mining and Milling sites are unique because of the remote locations. Consequently all sites have emergency response teams, drawn from site staff. They also have dedicated equipment, including both personnel protective equipment (PPE) and major equipment such as fire trucks, ambulances and spill recovery trucks (vacuum trucks). Extensive training, including exercises to simulate emergency situations, is carried out for the full spectrum of potential emergencies, including mine rescue, fire fighting, first aid and environmental spill containment and clean up. The Provincial Mining Association in Saskatchewan also organizes an annual competition at a central location, where mine rescue teams from all mines in the province compete in demonstrating proficiency in responding to a series of simulated accident scenarios. Emergency response programs at uranium mining/milling sites are regularly assessed by the Canadian Nuclear Safety Commission and provincial regulators. The emphasis is on operational response, however emergency response plans also include plans for both internal and external communications, including to regulatory agencies and provincial authorities. These aspects are also tested through exercises and, on occasion, through performance in response to actual events.

At Ontario Power Generation’s waste management sites, emergency procedures and emergency response services have been established to ensure that there will be an appropriate response to unexpected, or accidental events, including radiation, medical, fire incidents, and spills. These procedures include initial and refresher training, and periodic drills with follow-up evaluation. Periodic drills are carried out for employee assembly procedures for a radiation incident and for medical and fire emergencies.

Seq. No	Country	Article	Ref. in National Report
75	Slovenia	Article 25	Page 45
Question/ Comment	Who supports the Commissioner of Emergency Management of Ontario with information for decision making in case of nuclear emergency?		
Answer	The Ministry of Community Safety and Correctional Services maintains the physical and economic security of Ontario, through the Commissioner of Emergency Management. They do this by coordinating public safety initiatives among municipal and fire and emergency services organizations within and outside of Ontario.		

	During a nuclear or radiological emergency, the Provincial Emergency Operations Centre in Toronto would be activated. Operational and technical staff from various organizations, including the Canadian Nuclear Safety Commission, would gather at this centre to assess the safety significance of the event and provide recommendations to the Chief of Emergency Management Ontario (EMO). The Chief of EMO reports to the Commissioner of Emergency Management of Ontario.		
Seq. No 76	Country Switzerland	Article Article 25	Ref. in National Report page 45
Question/ Comment	"Due to the variance in risk associated with radioactive waste facilities in Canada, some facilities require detailed emergency preparedness and response plans while others require internal emergency procedures only." What are the criteria requiring detailed emergency preparedness?		
Answer	If a facility falls under the Canadian Nuclear Safety Commission's *Class I Nuclear Facilities Regulations*, detailed emergency plans and procedures are required. In Canada this would include nuclear power plants, waste management facilities that have a quantity greater than 10^{15} Bq per calendar year, and nuclear research laboratories.		
Seq. No 77	Country United States of America	Article Article 25	Ref. in National Report 48
Question/ Comment	This Section describes emergency response plans and conventions that Canada signed and ratified. To what extent have international arrangements been modified in response to actions taken by the government of the United States of America (U.S.) for incident response and emergency preparedness? What actions have been taken relative to the U.S. National Response Plan?		
Answer	Under the Conventions on Early Notification of a Nuclear Accident and on Assistance in the case of a nuclear accident or radiological emergency, there is an ongoing initiative to strengthen international preparedness and response systems for nuclear and radiological emergencies. To manage issues, concerns and points of interest, six regional groups were formed representing authorities worldwide. One of them is the North America Group and it consists of representatives from Canada, USA and Mexico. Recommendations are discussed at this level. If they are deemed to improve systems of cooperation between States, representatives will discuss these recommendations at a national level to ensure they reflect in their National Response Plan. The Canada-United States Joint Radiological Emergency Response Plan (JRERP) establishes the basis for cooperative measures to deal effectively with a potential or actual peacetime radiological event involving the United States, Canada or both countries. The last meeting took place in May 2005, in Ottawa, to review the Plan, to identify any gaps, and to make changes where necessary. Individuals from the Department of Homeland Security (DHS), Department of Energy (DOE), Environmental Protection Agency (EPA), Nuclear Regulatory Commission (NRC), HHS, and the Department of State were in attendance to discuss with Canadian		

counterparts, the JRERP, the radiological/nuclear annex of the U.S. National Response Plan, and Canada's National Emergency Response System.

Seq. No	Country	Article	Ref. in National Report
78	Germany	Article 26	p. 48

Question/ Comment: Does the Canadian strategy and legal framework towards decommissioning prefer safe enclosure or immediate dismantling? If there is a preference, what are the reasons?

Answer: Canada does not have a stated national policy on the timing of decommissioning. It is recognized that internationally, there is a growing trend toward selecting an immediate dismantling approach. As such, the Canadian Nuclear Safety Commission (CNSC) expects licensees, when proposing a decommissioning approach for a facility, to give due consideration to the immediate dismantling approach. General guidelines on the decommissioning process are described in G-219.

Ontario Power Generation (OPG) plans to decommission all of its 20 CANDU reactors and three radioactive waste management facilities located at the Pickering, Darlington and Bruce sites after they have been permanently shut down. Various options were considered for decommissioning during the initial stages of planning. The current reference plan for these nuclear generating stations is to decommission them using deferred dismantling after a 30-year safe storage period, and dispose of the radioactive waste at an off-site disposal facility. Reasons for preferring this strategy include:

- radiation hazards from activated structures will decrease during storage period;
- buildings can be made to remain intact with moderate maintenance for an 80-year life cycle;
- radioactive waste disposal facilities will be available; and
- technology will be more developed.

Since there are no activated structures in radioactive waste storage facilities, OPG's current reference plan for these facilities is to dismantle them immediately after all the radioactive waste from dismantling at an off-site disposal facility has been removed and disposed of.

For uranium mining and milling sites, both the strategy and the legal framework favour decommissioning upon completion of operations. There are several reasons for this, including:

- there are no intense radiation sources, and given the long half-lives of natural uranium series radionuclides, no benefit would be realized from a waiting period for radioactive decay of residual contamination;
- availability of qualified staff with knowledge of the operation;

- activities such as water collection and treatment need to be continued while the major physical decommissioning activities are completed; and
- the key long-term consideration is the performance of tailings and waste rock disposal facilities. So a substantial period of monitoring is required after closure and reclamation activities have been completed. There is no technical, social, or economic reason for delaying these activities, and obvious benefits to having them carried out by the licensee, to the satisfaction of regulatory agencies, on the earliest practical schedule.

Current practice is to incorporate "design for decommissioning" into the initial design and assessment of the facilities, and to progressively carry out reclamation activities as operations conclude at portions of the facilities.

Seq. No	Country	Article	Ref. in National Report
79	Germany	Article 26	p. 48

Question/ Comment: Could you please specify how financing is secured for those installations under decommissioning which are not owned by private industry?

Answer: Different approaches are taken by different jurisdictions, whether they are a provincial government or the federal government. In some cases, funds are set aside today to cover the costs of future decommissioning and waste management activities. In other cases, the future costs are recognized as a liability on government accounts and they must establish provisions to pay the decommissioning and waste management costs when they occur in the future.

The *Nuclear Safety and Control Act* and its associated regulations require that applicants and licensees make adequate provisions for the safe operation and decommissioning of existing or proposed operations. Safe operation and decommissioning includes the development of acceptable decommissioning plans, the provision of credible estimates of the costs of implementing such decommissioning plans, the provision of corresponding measures to ensure that the costs of decommissioning will be met, and ultimately, the implementation and completion of accepted decommissioning plans. Financial guarantees must be sufficient to cover the cost of decommissioning work resulting from licensed activities that have taken place prior to the licence period, or will take place under the current licence.

To be acceptable to the Canadian Nuclear Safety Commission (CNSC), a funding measure must provide assurance that adequate resources will be available to fund decommissioning activities based on information provided to the CNSC. The financial guarantee must be at arm's length from the licensee and the CNSC must be assured that it or its agent can, upon demand, access or direct adequate funds if a licensee is not available to fulfill its obligations for decommissioning. Examples of acceptable financial guarantees are cash, irrevocable letters of credit, surety bonds, insurance and expressed commitments from a government (either federal or provincial).

For facilities not owned by private industry, there are three levels of government in Canada that could apply - federal, provincial and municipal. Expressed commitments from a government, federal or provincial, are considered to be an adequate form of financial guarantee by the CNSC. For municipal governments, financial guarantees would take the form of other accepted forms of financial guarantees that apply to private industry.

The CNSC reviews the systems put in place by all licensees to cover future decommissioning and waste management costs, including government organizations, and determines their acceptability based on published regulatory requirements and guidance.

Seq. No	Country	A rticle	Ref. in National Report
80	Japan	Article 26	P48, F7

Question/ Comment
1. Are “Operational radiation protection” and “Emergency preparedness” for the decommissioning based on F.5 or F.6?
2. As to the regulatory activities/requirements (inspections, recordkeeping etc.) for decommissioning stage, are there any special treatment or reduced countermeasures in comparison to those for the operational stage?

Answer
1) Yes. During decommissioning, the licensee is required to maintain a radiation protection program that factors in the ALARA (As Low As Reasonably Achievable) principle, derived release limits, dose limits and actions levels, measures to prevent or mitigate the effects of unplanned releases, and the protection of the environment. With respect to nuclear emergency management, a plan is required during decommissioning. The plan is based on the risk associated with the facility at the time of decommissioning.

2) No. Compliance inspections/audits conducted by the Canadian Nuclear Safety Commission will continue to be conducted.

Seq. No	Country	Article	Ref. in National Report
81	Japan	Article 26	P48, F7

Question/ Comment
What is the steps for the keeping the records of information important to decommissioning?

Answer
The *Class 1 Nuclear Facility Regulations* require that every licensee who operates a nuclear facility shall kept a record of the following:

1. operating and maintenance procedures;
2. the results of the commissioning program;
3. the results of the inspection and maintenance programs;
4. the nature and amount of radiation, nuclear substances and hazardous substances within the nuclear facility; and
5. the status of each worker’s qualifications, re-qualification and training.

Also every licensee who decommissions a Class 1 nuclear facility shall keep a record

of the following:

1. the progress achieved in meeting the schedule;
2. the implementation and results of the decommissioning;
3. the manner in which, and the location at which any nuclear or hazardous waste is managed, stored, disposed of or transferred;
4. the name and quantity of any radioactive nuclear substances, hazardous substances and radiation that remain at the nuclear facility after completion of the decommissioning; and
5. the status of each worker's qualifications, re-qualifications and training.

These regulations can be viewed at the Canadian Nuclear Safety Commission's (CNSC) Web site at: www.nuclearsafety.gc.ca.

The following are examples;

Documentation and records related to Ontario Power Generation's (OPG) nuclear facilities and their decommissioning will be maintained in accordance with OPG's record management requirements. These records include:

- design of facilities and buildings included in the decommissioning plan;
- details of the initial design, configuration of the facility, and the modifications made to the facility over its operating lifetime;
- descriptions of the nature and location of hazardous materials in the facility and the disposition of hazardous materials that have been removed;
- records of the workers' health and safety, including information required by applicable regulations and doses of ionizing radiation received by workers from the decommissioning work;
- details of spills, releases of radioactive materials or environmentally hazardous substances that may have occurred during the facility's operational lifetime;
- records will be kept in storage for use at the time of the decommissioning;
- duplicate copies will be maintained; and
- records will be assembled and maintained in secure storage.

For uranium mining and milling, records of various types (for example, operational performance and environmental monitoring) are maintained by the licensee during operation, and reports as required by licences and/or regulations are routinely submitted to regulatory agencies.

As part of the decommissioning planning process, this information is reviewed and relevant aspects incorporated into the documentation required for formal approval of both preliminary and final decommissioning plans. A preliminary plan, which serves as the basis for the decommissioning financial assurance provided by the licensee, is required by regulatory agencies prior to the start of construction and operations. A detailed decommissioning plan is developed as operations approach completion, and

this serves as the basis for environmental assessments, and subsequently licensing, of the decommissioning activities. The detailed plan includes a description of the records and information which are to be permanently retained, and of the reports which are to be submitted to regulatory agencies.

Responsibility for retention of specified records and information remains with the licensee, typically through the corporate office as the need for on-site staff diminishes. Reports submitted to regulatory agencies will be retained in accordance with the agencies procedures.

It is noted that licensing by the CNSC continues for inactive or closed uranium mining/milling sites, unless the risks are very minimal and oversight by another regulatory/government body allows the CNSC to exempt the site indefinitely from a licence (still to be determined on a case-by-case basis).

An alternative mechanism is being developed in Saskatchewan, where an Institutional Control Management Framework (ICMF) is being developed by the Province for decommissioned mines on Crown (owned by government) land. The proposed ICMF will provide a mechanism whereby the licensee may transfer the site to a provincial registry, upon satisfactory completion of decommissioning, and by providing the funds for perpetual ongoing care of the site. The Province will operate the registry, including retention of records and implementation of any applicable land use controls and performance of monitoring and maintenance activities, to the extent required.

The background paper on Saskatchewan's ICMF can be viewed at: www.se.gov.sk.ca/environment/protection/land/ICMF%20-%20Backgound_paper.pdf

Seq. No	Country	Article	Ref. in National Report
82	Korea, Republic of	Article 26	F.7 (p.48)

Question/ Comment: What are the criteria for decommissioning in the design stage of nuclear facilities?

Answer: In accordance with Regulatory Guide G-219, *Decommissioning Planning for Licensed Activities*, the Canadian Nuclear Safety Commission (CNSC), Canada's regulatory body, requires that planning for decommissioning takes place throughout a licensed activity's life-cycle, and that both a preliminary decommissioning plan and a detailed decommissioning plan be prepared for approval by the regulatory body.

The preliminary decommissioning plan is filed with the regulatory body as early as possible in the life-cycle of the activity or facility. In the case of nuclear facilities, specific requirements for decommissioning planning are set out in the CNSC regulations for uranium mines and mills, and Class I and II nuclear facilities.

The preliminary plan documents the preferred decommissioning strategy and end-state objectives. The preliminary plan should be sufficiently detailed to assure that

the proposed approach is, in the light of existing knowledge, technically and financially feasible and appropriate in the interests of health, safety, security and protection of the environment. The plan defines areas to be decommissioned and the general structure and sequence of the principle decommissioning work packages envisioned.

The regulations and regulatory guide can be viewed on the Canadian Nuclear Safety Commission's (CNSC) Web site at: www.nuclearsafety.gc.ca.

Seq. No	Country	Article	Ref. in National Report
83	Korea, Republic of	Article 26	F.7(p.48)

Question/ Comment: Are there any regulation rules or standards specific to the management of waste from decommissioning?

Answer: There are no regulations or regulatory standards specific to the management of waste from decommissioning. Wastes resulting from decommissioning are managed in the same manner as radioactive waste resulting from operations. The waste from decommissioning is managed and will be commensurate with its radiological, chemical and biological hazards to the health and safety of persons and the environment and to national security.

Seq. No	Country	Article	Ref. in National Report
84	Korea, Republic of	Article 26	F.7(p.48)

Question/ Comment: Is there any regulation of keeping records on the facility design, construction and operation important to decommissioning?

Answer: The *Class 1 Nuclear Facility Regulations* requires that every licensee who operates a nuclear facility shall kept a record of the following:

1. operating and maintenance procedures;
2. the results of the commissioning program;
3. the results of the inspection and maintenance programs;
4. the nature and amount of radiation, nuclear substances and hazardous substances within the nuclear facility; and
5. the status of each worker's qualifications, re-qualifications and training.

Also every licensee who decommissions a Class 1 nuclear facility shall keep a record of the following:

- the progress achieved in meeting the schedule;
- the implementation and results of the decommissioning;
- the manner in which, and the location at which any nuclear or hazardous waste is managed, stored, disposed of or transferred;
- the name and quantity of any radioactive nuclear substances, hazardous substances and radiation that remains at the nuclear facility after completion of the decommissioning; and
- the status of each worker's qualifications, re-qualifications and training.

According to the *General Nuclear Safety and Control Regulations*, every person is required to keep a record by the *Nuclear Safety and Control Act* (NSCA) shall retain the record for the period specified in the applicable regulations and no person shall

dispose of a record referred to in the NSCA unless the person is no longer required to keep the record by the NSCA or has notified the regulatory body of the date of disposal and of the nature of the record at least 90 days before the date of disposal.

These regulations can be viewed on the Canadian Nuclear Safety Commission's (CNSC) Web site at: www.nuclearsafety.gc.ca.

Seq. No	Country	Article	Ref. in National Report
85	Romania	Article 26	Section F page 39-40

Question/ Comment: It is mentioned that" financial guarantees must be sufficient to fund all approved decommissioning activities. These activities include not only dismantling, decontamination and closure, but also any post-decommissioning monitoring or institutional control measures that may be required as well as subsequent long-term management or disposal of all wastes including spent fuel". Could you enter in details in order to explain "sufficient"? Would you be kind to give details regarding the structure and actual values regard the fund for some NPP's, for example Gentilly/Hydro Quebec and Point Lepreau/New Brunswick Power Nuclear Corporation

Answer: The *Nuclear Safety and Control Act* and its associated regulations require that applicants and licensees make adequate provisions for the safe operation and decommissioning of existing or proposed operations. Safe operation and decommission includes the development of acceptable decommissioning plans, the provision of credible estimates of the costs of implementing such decommissioning plans, the provision of corresponding measures to ensure that the costs of decommissioning will be met, and ultimately, the implementation and completion of accepted decommissioning plans. Financial guarantees must be sufficient to cover the cost of decommissioning work resulting from licensed activities that have taken place prior to the licence period, or will take place under the current licence.

To be acceptable to the Canadian Nuclear Safety Commission (CNSC), a funding measure must provide assurance that adequate resources will be available to fund decommissioning activities based on information provided to the CNSC. The financial guarantee must be at arm's length from the licensee and the CNSC must be assured that it or its agent can, upon demand, access or direct adequate funds if a licensee is not available to fulfill its obligations for decommissioning. Examples of acceptable financial guarantees are cash, irrevocable letters of credit, surety bonds, insurance and expressed commitments from a government (either federal or provincial).

In the case of the Point Lepreau Generating Station and the associated waste management facility, the cost of decommissioning have been estimated at approximately $454 million (CAD-2001), not including disposal of spent fuel. The current estimate of the additional cost of disposal of the spent fuel that will have been generated by December 31, 2005 is $367 million (CAD-2001). The licensee has established segregated funds to cover the cost of decommissioning. Under the terms of the financial agreement, the licensee will be obligated to make additional

contributions to the funds if the plans, schedules, or estimated costs of decommissioning change in a way that result in an increase in the estimated present value of the costs for decommissioning.

Seq. No	Country	Article	Ref. in National Report
86	Ukraine	Article 26	F.7, page 48

Question/ Comment: What documents establish requirements for keeping records on decommissioning?

Answer: The *Class 1 Nuclear Facility Regulations* requires that every licensee who operates a nuclear facility shall kept a record of the following:

1. operating and maintenance procedures;
2. the results of the commissioning program;
3. the results of the inspection and maintenance programs;
4. the nature and amount of radiation, nuclear substances and hazardous substances within the nuclear facility; and
5. the status of each worker's qualifications, re-qualifications and training.

Also, every licensee who decommissions a Class 1 nuclear facility shall keep a record of the following:

- the progress achieved in meeting the schedule;
- the implementation and results of the decommissioning;
- the manner in which, and the location at which any nuclear or hazardous waste is managed, stored, disposed of or transferred;
- the name and quantity of any radioactive nuclear substances, hazardous substances and radiation that remain at the nuclear facility after completion of the decommissioning; and
- the status of each worker's qualifications, re-qualifications and training.

According to the *General Nuclear Safety and Control Regulations*, every person is required to keep a record by the *Nuclear Safety and Control Act* (NSCA) shall retain the record for the period specified in the applicable regulations and no person shall dispose of a record referred to in the NSCA unless the person is no longer required to keep the record by the NSCA or has notified the regulatory body of the date of disposal and of the nature of the record at least 90 days before the date of disposal.

These regulations can be viewed on the Canadian Nuclear Safety Commission's (CNSC) Web site at: www.nuclearsafety.gc.ca.

Seq. No	Country	Article	Ref. in National Report
87	United States of America	Article 26	48

Question/ Comment: The report is very explicit in the requirement that documentation and recordkeeping associated with sealed sources is logged and maintained. It is not clear from the report that records of information important to decommissioning are kept or maintained. Please elaborate.

Answer: The *Class 1 Nuclear Facility Regulations* requires that every licensee who operates a nuclear facility shall kept a record of the following:

1. operating and maintenance procedures;
2. the results of the commissioning program;
3. the results of the inspection and maintenance programs;
4. the nature and amount of radiation, nuclear substances and hazardous substances within the nuclear facility; and
5. the status of each worker's qualifications, re-qualifications and training.

The numbering system seems to be off. This is the third time I've seen this???

Also, every licensee who decommissions a Class 1 nuclear facility shall keep a record of the following:

- the progress achieved in meeting the schedule;
- the implementation and results of the decommissioning;
- the manner in which and the location at which any nuclear or hazardous waste is managed, stored, disposed of or transferred;
- the name and quantity of any radioactive nuclear substances, hazardous substances and radiation that remain at the nuclear facility after completion of the decommissioning; and
- the status of each worker's qualifications, re-qualification and training.

Furthermore, according to the *General Nuclear Safety and Control Regulations*, every person is required to keep a record by the *Nuclear Safety and Control Act* (NSCA) shall retain the record for the period specified in the applicable regulations and no person shall dispose of a record referred to in the NSCA unless the person is no longer required to keep the record by the NSCA or has notified the regulatory body of the date of disposal and of the nature of the record at least 90 days before the date of disposal.

These regulations can be viewed on the Canadian Nuclear Safety Commission's (CNSC) Web site at: www.nuclearsafety.gc.ca

Seq. No	Country	Article	Ref. in National Report
88	Australia	Article 27	
Question/ Comment	What laws and administrative arrangements has your country put in place to address the authorised transboundary movement of spent fuel and radioactive waste under Article 27.1.(1)H of the Convention .		
Answer	The legislative basis as described in Canada's 2005 Report remains valid for the authorized transboundary movement of spent fuel and radioactive waste.		
Seq. No	Country	Article	Ref. in National Report
89	France	Article 28	Section J.4.1 Page 8
Question/ Comment	How are controlled the brokerage firms collecting sealed sources, in order to make sure that safety is met at each stage of the process and that all the sealed sources reach their assigned destination? Are such firms licensed?		
Answer	Brokerage firms which collect sealed and unsealed sources are licensed by the Canadian Nuclear Safety Commission (CNSC). Each licensee is required to obtain		

regulatory approval for any program incorporated into the operation of a facility. The licensee must provide the regulatory body with the details of the proposed program. The details may include such information as the types of radionuclides, the characteristics of the waste, the methods of processing, and the method of disposal. Additionally, the licensee is required to provide a quality assurance program that will ensure the inadvertent release of radioactive waste.

During the course of the licensing period, the CNSC conducts compliance inspections of the facility and compliance audits of its programs. Changes to the delay and decay program may be required as a result of the findings of the compliance inspection/audit.

Seq. No	Country	Article	Ref. in National Report
90	Korea, Republic of	Article 28	J.4(p. 80)

Question/ Comment	According to the report, the Sealed Source Tracking System (SSTS) is a system that will enable the CNSC to maintain an accurate national inventory of radioactive sealed sources as well as facilitate the tracking of all high risk (Category 1 or 2) sealed sources that are transferred. What is the composition of the SSTS? And who else, aside from CNSC, could use the SSTS?
Answer	There are two basic components of the Sealed Source Tracking System (SSTS) - the National Sealed Source Registry (NSSR) and the NSSR interface, which enables the recording of the movements of high-risk sealed sources. The Canadian Nuclear Safety Commission (CNSC) has been developing significant software enhancements (database and Web applications) of its licensing database to enable the tracking of high-risk sealed sources. The database application enables the CNSC to record the transactions reported by licensees who use fax and e-mail. Licensees will be able to use a web-based application, when it becomes available in June 2006, to record the movements of high-risk sealed sources. This will streamline and greatly facilitate the process of reporting. Constant monitoring and built-in safeguards will ensure high fidelity and security of SSTS information. At present, only the CNSC has full access to the SSTS.

Seq. No	Country	Article	Ref. in National Report
91	Australia	Article 32	B.4

Question/ Comment	As part of its broader regulatory framework, does Canada have a national strategy for gaining or regaining control over orphan sources?
Answer	The Sealed Source Tracking System (SSTS) will enable better monitoring of the possession of high-risk sources. Within the framework of the SSTS, the Canadian Nuclear Safety Commission (CNSC) included an elaborate system of automatic alerting and reporting to CNSC staff, which is designed to prevent loss of regulatory control over possession of high-risk sources. Another system is set up to record any loss or theft of sources. Regular reports on loss or stolen sources are intended to alert CNSC staff, who must take regulatory action and then follow up with a licensee.

Seq. No	Country	Article	Ref. in National Report
92	Belgium	Article 32	§ 3.0, page iv

Question/	- Is NWMO to be seen as a private organisation fully financed by the nuclear

Comment industry?
- What is the independence degree of this organisation?
- What is the nuclear industry weight on the proposals made by NWMO?
- Is NWMO only competent for spent fuel long term management views or also for radioactive waste management views?

Answer The *Nuclear Fuel Waste Act* requires that the nuclear energy corporations establish the Nuclear Waste Management Organization (NWMO).
Accordingly, the three nuclear energy corporations set up the NWMO in 2002. The NWMO was established under the *Canada Corporations Act*, without share capital, to operate on a non-profit basis in fulfilling its mandate set out in the *Nuclear Fuel Waste Act*.

The founding members (shareholders) of the NWMO are: Ontario Power Generation Inc., Hydro-Québec and NB Power. These are the Canadian companies that currently produce used nuclear fuel as a by-product of electricity generation. These three corporations are currently represented on the NWMO Board of Directors. The Board of Directors is responsible for the overall governance of the NWMO and annual budgetary provisions.

Presently, the NWMO's annual operations are fully financed by the nuclear energy corporations. Consistent with the *Nuclear Fuel Waste Act*, the major waste owners (nuclear energy corporations and Atomic Energy of Canada Limited) have established, and make, regular deposits to trust funds that will finance the long-term management approach that is selected by government.

The *Nuclear Fuel Waste Act* (NFWA) mandated the creation of an Advisory Council to the NWMO. This Council provides independent comment on the NWMO's studies and reports. The Council's comments are submitted to the Minister of Natural Resources Canada and made available to the public.

The federal government has continuing oversight of the NWMO through NWMO's ongoing reporting requirements to the Minister of Natural Resources Canada. The NWMO must submit to the Minister and make public its annual reports and triennial reports.

<u>Independence</u>

In leading the study, the NWMO sought to direct the comparative assessment of management options in an objective, fair and balanced manner. The NWMO retained its neutrality in undertaking the study of management approaches. It was not the NWMO's role to act as advocate for the nuclear industry or future energy policy directions.

The NWMO study process was driven by societal direction. Through a collaborative process, the NWMO's acted as a facilitator of dialogue in an open forum in which multiple perspectives were welcomed and Canadians had access to information and

research findings. NWMO's dialogues were designed, conducted and reported on by third parties to ensure accuracy and transparency.

Throughout the NWMO's three-year study process, the nuclear industry was among the many communities of interest who participated in the NWMO's broad public engagement program and stakeholder dialogues, convened to invite comments on the management options and the proposed recommendation.

The nuclear industry was also represented on the NWMO Board of Directors, as described above.
The Board remained neutral on the assessment of approaches, providing the necessary financial resources to the NWMO to undertake objective and comprehensive assessment of the range of options required by study in legislation (deep geological disposal in the Canadian Shield, storage at nuclear reactor sites, centralized storage above or below ground) and any other options that the NWMO identified for study. The Board sought to ensure that its priorities of safety, environmental protection, social responsibility and financial viability were carefully considered in the study of management approaches. As owners of used fuel, the Board sought to ensure that the best approach was recommended, irrespective of future policy decisions on nuclear power.
The Board undertook to ensure the integrity of the process, and NWMO's compliance with its study requirements specified in the NFWA, which include full reporting on comments from the general public, Aboriginal peoples and the NWMO's Advisory Council.

The Board endorsed the NWMO's recommendation and approved the final study that the NWMO submitted to the Government of Canada in November, 2005.

NWMO's Mandate

The NWMO's responsibility is restricted to the long-term management of used nuclear fuel, defined by legislation to include "irradiated fuel bundles removed from a commercial or research nuclear fission reactor".

Seq. No	Country	Article	Ref. in National Report
93	Belgium	Article 32	§ 3.0, page iv

Question/ Comment

a) What was the site selection procedure for the deep geological repository for which an agreement has been signed with OPG?
b) What was the decision and licensing process?
c) What is the content of the agreement?
d) Does each operator decide for its own waste long-term management program?
e) What is the national view on the waste long-term management?

Answer

a) The Municipality of Kincardine approached Ontario Power Generation (OPG) in 2002, seeking to study the feasibility of locating a long-term low- and intermediate-level waste management facility in Kincardine, at OPG's Western Waste

Management Facility (WWMF) at the Bruce nuclear site. Currently, low- and intermediate-level waste from the Bruce, Pickering and Darlington nuclear generating stations in Ontario, is processed and stored at the WWMF. A Memorandum of Understanding between OPG and the Municipality outlined an approach to the study via the Independent Assessment Study (IAS). The IAS studied three long-term management technologies, and included a geotechnical feasibility assessment, a preliminary safety assessment, an assessment of technical and construction feasibility, and studies of cost, public attitude, social and economic effects, and environmental protection. The IAS concluded that it would be feasible to implement any of the three technologies at the Bruce site. Based on existing information, summarized in the geotechnical feasibility assessment, favourable geological and hydrogeological conditions for a DGR, conducive to the development of a robust safety case, exist at the Bruce site.

Following completion of these studies, the DGR was identified by the municipality as the preferred long-term management approach for low- and intermediate-level waste at the site. A telephone poll of Kincardine residents, conducted by an independent company on behalf of Kincardine, confirmed that a majority of residents supported the Council's decision. After the community demonstrated support for the DGR in the poll, OPG and Kincardine negotiated a hosting agreement.

The exact location of the DGR within the Bruce site will be determined after consideration of a number of factors, including geotechnical and hydrogeological conditions, construction impacts, traffic, material flows, interaction with current operations, and potential environmental impacts.

b) The Canadian Nuclear Safety Commission (CNSC) has now received OPG's official notice of application for a licence for the DGR project, and is proceeding with the environmental assessment of the project. If the CNSC concludes that the project is not likely to cause significant adverse environmental effects, taking into account the appropriate mitigation measures, licensing can proceed. Therefore, no regulatory decision has been taken on the DGR at this point. Based on the information provided by the proponent for the proposed DGR, the repository will require licensing by the CNSC under the *Class I Nuclear Facilities Regulations* that require site preparation, construction, operation, decommissioning, and abandonment licences addressing the life-cycle of the proposed repository.

c) The Host Community Agreement is available on the OPG Web site at: www.opg.com/ops/N_waste_man.asp It sets out the terms and conditions under which the Municipality of Kincardine would continue to support the DGR.

The agreement includes the following items:

- community support for the DGR and for OPG's low- and intermediate-level waste through the regulatory approvals process;
- payments to the Municipality of Kincardine and adjacent communities totaling CAN$35M (US$30M) (2004) over 30 years. The amount increases if

new reactors are built; and
- DGR is for low- and intermediate-level waste and will not accept spent fuel.

The Agreement was subject to endorsement by residents. Polling took place in early 2005 with a positive result.

d) Under the *Nuclear Waste Management Act*, the Nuclear Waste Management Organization (NWMO) is responsible for recommending, to the federal government, a proposed method for the long-term management of spent fuel in Canada for government. The NWMO is funded by the producers of spent fuel waste in Canada. The approach of producer responsibility follows the NSCA. Licensees holding licences issued under the *Uranium Mines and Mills Regulations* and the *Class I Nuclear Facilities Regulations* are ultimately responsible, through a life-cycle approach to licensing, for ensuring the safe, long-term management of their wastes.

e) Canada's radioactive waste policy framework requires individual waste owners and producers to fund, organize, manage and operate the disposal facilities and other facilities required to manage their wastes. The Government of Canada did, however, recognize that a national solution was required for Canada's nuclear fuel waste, and put in place the *Nuclear Fuel Waste Act* to ensure waste owners worked together to develop and implement an appropriate long-term management plan. With regard to low-level radioactive waste, two government entities: Ontario Power Generation (OPG) and Atomic Energy of Canada Limited (AECL), own approximately 98 per cent of the low-level radioactive waste in Canada. Both organizations are developing disposal programs for their low-level radioactive wastes, and other waste owners may approach either OPG or AECL regarding the feasibility of them accepting other low-level radioactive waste on a fee-for-service basis. OPG's agreement with the Municipality of Kincardine is specific to low- and intermediate-level waste generated by OPG at their nuclear generating stations in Ontario and requires the parties to agree to an amendment for any acceptance of low- and intermediate-level waste other than that.

Seq. No	Country	Article	Ref. in National Report
94	Belgium	Article 32	§ B.5, page 7
Question/ Comment	What were the reasons to involve the public in a consultation for the policy P-290? How was the consultation organized and what was the impact?		
Answer	The Regulatory Documents Program was established by the Canadian Nuclear Safety Commission (CNSC) to help meet the objectives of the Commission to regulate nuclear energy, nuclear substances, prescribed equipment and prescribed information, and to disseminate objective scientific, technical, and regulatory information to the public. This program also ensures consistency and reliability in the regulatory documents produced by the CNSC, and is a key element of the CNSC's regulatory framework and part of the CNSC logic model. Through regulatory documents, the CNSC establishes its philosophies, expectations, and guidance information on the requirements set out through the *Nuclear Safety and Control Act*		

(NSCA) and its associated regulations.

The Regulatory Standards and Research Division (RSRD) staff are responsible for the ongoing success of the Canadian Nuclear Safety Commission's (CNSC) Regulatory Documents Program. RSRD staff work in collaboration with other CNSC divisions to ensure coordinated document prioritization, planning, development, and publication. Comprehensive internal and external consultation processes have been established within the program to ensure the technical, legal, and editorial soundness of all regulatory documents published by the CNSC. RSRD staff has expertise in coordinating and managing regulatory document projects, defining work processes and standards, and developing various tools to continuously enhance the quality and effectiveness of the program.

The draft regulatory document is published on the CNSC Web site and/or mailed to interested stakeholders. The comments received are assessed and could result in a modification the regulatory document.

Public consultation is an important element of the Government of Canada's Federal Regulatory Policy and is one of the guiding principles of the CNSC's Regulatory Documents Program. Consultation is built into the regulatory document development process.

Regulatory Policy P-290, *Managing Radioactive Waste*, was widely distributed to licensees, other interested stakeholders and was made publicly available for comment on the CNSC's Web site. In total, approximately 2,800 information bulletins inviting comments were distributed and 18 responses were received, containing a total of 98 comments. No significant changes were made to the document as a result of the comments.

Seq. No	Country	Article	Ref. in National Report
95	Belgium	Article 32	§ B.6, page 9

Question/ Comment: What were the reasons to involve the public in a consultation for the regulatory guide G-320?
How was the consultation organized and what is the impact?

Answer: The Regulatory Documents Program was established by the Canadian Nuclear Safety Commission (CNSC) to help meet the objectives of the Commission to regulate nuclear energy, nuclear substances, prescribed equipment and prescribed information, and to disseminate objective scientific, technical, and regulatory information to the public. This program also ensures consistency and reliability in the regulatory documents produced by the CNSC, and is a key element of the CNSC's regulatory framework and part of the CNSC logic model. Through regulatory documents, the CNSC establishes its philosophies, expectations, and guidance information on the requirements set out through the *Nuclear Safety and Control Act* (NSCA) and its associated regulations.

The Regulatory Standards and Research Division (RSRD) staff is responsible for the ongoing success of the Canadian Nuclear Safety Commission's (CNSC) Regulatory

Documents Program. RSRD staff work in collaboration with other CNSC divisions to ensure coordinated document prioritization, planning, development, and publication. Comprehensive internal and external consultation processes have been established within the program to ensure the technical, legal, and editorial soundness of all regulatory documents published by the CNSC. RSRD staff has expertise in coordinating and managing regulatory document projects, defining work processes and standards, and developing various tools to continuously enhance the quality and effectiveness of the program.

The draft regulatory document is published on the CNSC Web site and/or mailed to interested stakeholders. The comments received are assessed and could result in a modification the regulatory document.

Public consultation is an important element of the Government of Canada's Federal Regulatory Policy and is one of the guiding principles of the CNSC's Regulatory Documents Program. Consultation is built into the regulatory document development process.

Regulatory Guide G-320, *Assessing the Long Term Safety of Radioactive Waste Management*, was widely distributed to licensees, other interested stakeholders and was made publicly available for comment on the CNSC's Web site. In total, approximately 2,800 information bulletins inviting comments were distributed and 15 responses, containing 341 comments were received. The document was significantly revised to reflect the majority of the comments, which were related to the basic fundamental approach to assumptions governing the determination of long-term waste aspects.

Seq. No	Country	Article	Ref. in National Report
96	Belgium	Article 32	§ B.7, page 9

Question/ Comment	This classification is informal: does it mean that it is not validated by the authorities? Who have set up the classification? What were the reasons to remove the intermediate and high level wastes from the classification? Some clarifications seem useful as different mentions are made to projects related to intermediate level waste and that that level seems to have been removed ?(Examples are WLILWSF and LIRW also mentioned many times?) What is then the range of low level and intermediate level?
Answer	Canada's classification system for radioactive waste was confirmed by the Government of Canada in its 1996 Radioactive Waste Policy framework. As reported in Section B.7 of Canada's National Report, radioactive wastes are classified into one of three categories based on origin and radiological hazard: nuclear fuel waste, low-level radioactive waste, and uranium mine and mill tailings. Individual licensees are free to utilize more detailed classification systems for their own waste management programs. As such, some licensee programs and initiatives refer to an intermediate-level waste category, with the category definition being set by the individual licensee, based on their specific classification needs.

Individual licensees are free to utilize more detailed classification systems for their own waste management programs. An example of such a classification is the one used by Ontario Power Generation (OPG) for the Western Waste Management Facility. OPG's non-fuel radioactive waste falls within the low-level radioactive waste class described in the Canadian National Report (Section B.7). Similar to other waste facility operators, OPG has found it useful to create sub-categories of these definitions for operational management purposes. The OPG sub-categories are described as follows: (Note that these may be different from the definitions used by other operators in Canada.)

Low-Level Waste (LLW) - Radioactive waste in which the concentration or quantity of radionuclides is above the clearance levels established by the regulatory body - the Canadian Nuclear Safety Commission (CNSC). This waste does not necessarily require disposal in a deep geologic repository. It contains primarily short-lived radionuclides (half-lives shorter than or equal to the 30-year half-life of Cs-137). For interim storage purposes, low-level waste does not require substantial shielding.

Intermediate-Level Waste (ILW) - Radioactive non-fuel waste, containing sufficient quantities of long-lived radionuclides (generally refers to half-lives greater than the 30 year half-life of Cs-137). Deep geological disposal is a suitable alternative for providing isolation from the environment in the long-term. For interim storage purposes, intermediate-level waste requires substantial shielding. Intermediate-level waste includes most ion exchange resins, moderator and primary system water filters, and irradiated reactor core components.

Seq. No	Country	Article	Ref. in National Report
97	Belgium	Article 32	Annex 3 3.9,page 116

Question/ Comment	Work the CNSC staff alone for all the assessment, inspection and control activities? What is, if it exists, the relation with external and independent organizations for controls?
Answer	The Canadian Nuclear Safety Commission (CNSC) includes external and independent organizations in its various regulatory processes as advisors, responsible authorities and stakeholders. This includes formal agreements (Memorandums of Understanding) with some government agencies at the federal and provincial levels. Some of this consultation is mandated as part of Canada's environmental assessment legislation. For each of its waste management licences, the CNSC leads a Joint Review Group (JRG) which is a team of contacts from various government agencies with requirements at the licensed site. In some instances, the JRG also includes local government representatives and non-government organizations. The CNSC coordinates the reviews and inspections and provides a single response to the licensee. On occasion, if no expertise exists within the JRG, the CNSC may seek expert input from others, including nationally or internationally recognized experts.

Seq. No	Country	Article	Ref. in National Report
98	Finland	Article 32	B.7

Question/ Comment: In this Section, a classification system distinguishing three main categories of radioactive waste is given. a) Is there any further categorization of low-level waste by waste producers for disposal purposes, for making distinction e.g. between short-lived and long-lived waste? b) Further, are clearance levels defined?

Answer: As reported in Section B.7 of Canada's National Report, radioactive wastes are classified into one of three categories based on origin and radiological hazard:

1. nuclear fuel waste;
2. low-level radioactive waste; and
3. uranium mine and mill tailings.

Several licensees have chosen to further subdivide the categories to meet their specific waste management and classification needs.

Individual licensees are free to utilize more detailed classification systems for their own waste management programs. An example of such a classification is the one used by Ontario Power Generation (OPG) for the Western Waste Management Facility. OPG's non-fuel radioactive waste falls within the low-level radioactive waste class described in the Canadian National Report (Section B.7). Similar to other waste facility operators, OPG has found it useful to create sub-categories of these definitions for operational management purposes. The OPG sub-categories are described as follows: (Note that these may be different from the definitions used by other operators in Canada.)

Low-Level Waste (LLW) - Radioactive waste in which the concentration or quantity of radionuclides is above the clearance levels established by the regulatory body - the Canadian Nuclear Safety Commission (CNSC). This waste does not necessarily require disposal in a deep geologic repository. It contains primarily short-lived radionuclides (half-lives shorter than or equal to the 30-year half-life of Cs-137). For interim storage purposes, low-level waste does not require substantial shielding.

Intermediate-Level Waste (ILW) - Radioactive non-fuel waste, containing sufficient quantities of long-lived radionuclides (generally refers to half-lives greater than the 30 year half-life of Cs-137) . Deep geological disposal is a suitable alternative for providing isolation from the environment in the long-term. For interim storage purposes, intermediate-level waste is that requiring substantial shielding. Intermediate-level waste includes most ion exchange resins, moderator and primary system water filters, and irradiated reactor core components.

There is currently an initiative by the Canadian nuclear industry to examine and possibly incorporate a classification system into standards produced and coordinated by the Canadian Standards Association (CSA). The introduction of a classification system into a CSA standard will be reviewed in conjunction with other standards such as the International Atomic Energy Agency (IAEA) classification system. The

CSA standard is anticipated to be finalized and published in 2007.

b) Exemption from licensing requirements is currently addressed in the *Nuclear Substances and Radiation Devices Regulations*. A project to amend these Regulations is currently underway. These proposed amendments will better align Canada's approach to exemption and clearance with current international recommendations. The amendments consider the IAEA's Basic Safety Standards as well as the most recent guidance from the IAEA on the concepts of exemption, exclusion and clearance (IAEA-RS-G-1.7). The proposed amendments underwent a public consultation in the fall of 2005.

The draft definitions being currently considered for inclusion in the amended regulations are:

Unconditional clearance - Means the removal of radioactive nuclear substances that are associated with a licensed activity from any further regulatory control by the CNSC, taking into account all reasonably possible exposure routes and types of materials irrespective of how the material is used and to where it may be directed.

Conditional clearance - Means the removal of radioactive nuclear substances that are associated with a licensed activity from any further regulatory control by the CNSC, taking into account only reasonably possible exposure routes applicable to the fate and type of the material being considered.

The amendments to the *Nuclear Substances and Radiation Devices Regulations*, which will better align Canada's approach to exemption and clearance with current international approaches, are expected to be finalized in early 2007. The amended regulations will consider the IAEA's Basic Safety Standards as well as the most recent guidance from the IAEA on the concepts of exemption, exclusion and clearance. A multi-disciplinary team of CNSC staff are developing a regulatory guide on demonstrating compliance with these new requirements. The guide is also expected to be published in 2007.

Seq. No	Country	Article	Ref. in National Report
99	France	Article 32	Section B.7 Page 9
Question/ Comment	How is managed the release of the mentioned by-products (e.g. rocks) on nuclear centers, including mines an milling facilities?		
Answer	There are several methods used for the conversion of waste materials into by-products in addition to extracting uranium from high-, low- or waste-grade feed at uranium mills.		

A mill receives ore and waste rock from a uranium mine and processes and treats the ore to extract and package for shipment off-site a uranium concentrate. Mill facilities usually contain process-related equipment such as grinding mills, chemical extraction processes, drying and packaging units, as well as water treatment facilities. Mills may or may not be near a mine facility. After the uranium is chemically removed,

the remaining material, the uranium tailings, is disposed of and stored in engineered tailings management facilities (above or below ground) for long-term storage.

In uranium refining and conversion facilities, the following methods are used to convert waste streams into by-products:

- precipitation of residual uranium from liquid ammonium nitrate produced at the UO_2 production plan for sale as a liquid fertilizer;
- drying the raffinate waste slurry produced at the UO_3 production refinery into solids and shipping this by-product to uranium mills for recovering uranium;
- drying the calcium fluoride slurry, produced at the UF_6 production plant, into solids and shipping this by-product to uranium mills for recovering uranium.
- incinerating uranium contaminated combustible wastes, and shipping the bottom ash to uranium mills for recovering uranium.
- high pressure washing, chemical treatment or sand-blasting of uranium contaminated metals and shipping the decontaminated metals to metal recyclers.

Seq. No	Country	Article	Ref. in National Report
100	Germany	Article 32	p. 20 and 21

Question/ Comment: The second report demonstrates Canada's intention to develop a long-term approach for its low- and intermediate-level radioactive waste. Do you have an idea about the time-frame of long-term storage?
In the report several storage facilities are described. Do you have the intention to use all storage facilities for long-term storage? Do you plan to harmonise or standardise waste acceptance requirements with regard to a future deep geological repository?

Answer: First, with respect to the development of a long-term approach for its low- and intermediate-level radioactive waste, it should be noted that each producer of waste, in accordance with the 1996 Policy framework, is responsible for the management of the waste they produce. At present the only producer which has initiated the development of a long-term approach for its low- and intermediate-level radioactive waste is Ontario Power Generation (OPG). This initiative is intended to address only LILRW produced by OPG. Currently, the projected completion of the environmental assessment process for the DGR is expected in 2009; the issuance of a Canadian Nuclear Safety Commission licence permitting construction is expected to start by 2013; and the issuance of an operating licence is expected by 2018, so that wastes can be received at the DGR in that same year.

With respect to the use of current storage facilities for long-term storage, no plans have been submitted to the regulatory body to date. The original safety cases presented to the regulatory body were to use these storage facilities as an interim measure until disposal was available.

Seq. No	Country	Article	Ref. in National Report
101	Germany	Article 32	p. 19

Question/ Comment: The report provides detailed information on installations undergoing decommissioning in Annex 7. However, in the main part an overview of such installations in accordance with Article 32.2.v would be helpful. Could you please provide a summary of installations under decommissioning?

Answer: The nuclear facilities listed in Annex 7 are currently undergoing some phase of decommissioning, but currently retain an operating licence. It is the intent of the Canadian Nuclear Safety Commission (CNSC) to revoke the operating licences and issue a decommissioning licence. However, before this can occur, the licensee is required to request that their operating licence be revoked and subsequently submit an application (a detailed decommissioning plan) for a decommissioning licence. Therefore, these nuclear facilities were included in Table D.3 along with other operational facilities. It is anticipated that in the Third Annual Report, a separate table dealing with decommissioning waste will be included.

Seq. No	Country	Article	Ref. in National Report
102	Germany	Article 32	p. 126

Question/ Comment: According to the Canadian report, research programmes on the behaviour of spent fuel during long-term storage have shown that CANDU fuel bundles can be safely stored in dry storage conditions for up to 100 years or more. In Section E.5 (p. 30) it is mentioned that typical licence periods for nuclear facilities are from two to five years. Does this also apply to dry storage facilities?

Answer: Yes, this also applies to dry storage facilities. Short licensing periods allow the regulatory body the opportunity to review all licensing information in order to assure the continued safe operations of the nuclear facility. The applicant must demonstrate that the continued operation of the facility will protect health, safety, security and the environment.

Seq. No	Country	Article	Ref. in National Report
103	Japan	Article 32	p137, Annex5.1

Question/ Comment: Page 137. Annex 5.1, it says “All RW produced in Canada are placed into Storage with Surveillance ----“, would you explain about the Surveillance? For example, how often is the surveillance and what methods are used in surveillance? And what is the regulatory base for these requirement?

Answer: a) All radioactive waste currently produced in Canada, except for short-lived waste from institutions, such as nuclear medicine departments in hospitals and universities, is placed into an interim storage facility or in storage with surveillance, awaiting eventual disposal.

b) & c) The interim storage is required, pursuant to the Canadian Nuclear Safety Commission’s *General Nuclear Safety and Control Regulations*, to have various monitoring programs in place that will protect the health and safety of persons and the protection of the environment. The level and frequency of monitoring will be dependant upon the level of risk of the storage facility. Some elements of a safety and environmental monitoring program could consist of:

- occupational radiological safety management;
- effluent monitoring;
- ALARA (As Low As Reasonably Achievable), and occupational radiological risks and safety management; and
- occupational non-radiological environment, and safety and health management

In addition to the monitoring performed by the licensee, the regulatory body conducts compliance inspections of the facility and compliance audits of the various programs in place.

Seq. No	Country	Article	Ref. in National Report
104	Japan	Article 32	P7, B5

Question/ Comment: NWMO's Draft Recommendation "Adaptive Phased Management Approach" for the long-term care of Canada's used nuclear fuel is very much interesting. In the Phase II after Phase I, the form of shallow underground storage of used nuclear fuel at the central site is proposed as an ieterim step. What is the reason, thinking or base for this option? And, is there any concept or idea of collecting data continuously in Phase III upto the time of closure for the help of decision making of the closure of the repository ?

Answer: The Nuclear Waste Management Organization's (NWMO) final study (*Choosing a Way Forward The Future Management of Canada's Used Nuclear Fuel*) and a recommendation was submitted to the Government of Canada on November 3, 2005. The recommended approach, adaptive phased management, includes the provision for an optional step in the implementation process in the form of shallow, underground storage of spent fuel at the central site prior to final placement in a deep repository. This provision was developed for several reasons:

- First, it provides contingency in the event of unplanned circumstances. For example, there may be a need to move the spent fuel from one or several of the current interim storage facilities before the safety of the deep repository has been sufficiently demonstrated. The shallow facility, located at the central site to minimize additional transportation of the spent fuel, might then be used to safely and securely store this fuel in the interim period.
- Second, it provides flexibility in the timing of movement of the spent fuel from the reactor sites, accommodating regional differences in priorities and the status of particular operations. For example, the owners of spent fuel may have different business planning assumptions about when the spent fuel is moving away from their reactor sites.

Furthermore, these are just options. During the first phase of implementation, a decision will be required as to whether or not to exercise the option. That decision will occur at a time when there will be greater certainty about Canada's nuclear program, and the NWMO will also likely have the knowledge of further progress in the repository programs in other countries.

During the final phase of adaptive phased management, spent fuel would be packaged

in long-lived containers and placed in a deep geological repository for final containment and isolation. Monitoring to, and access of the deep repository would continue for an extended period of time in order to collect data and to assess the safety and performance of the repository system. The engineered and natural barriers are provided by the geosphere.

The extended monitoring activities in this final phase would include environmental monitoring, monitoring of spent fuel container performance, and monitoring rock mass behaviour. The monitoring data would be used to confirm the long-term safety of the repository and provide the basis for decommissioning and closure of the facility.

After closure of the repository, post-closure monitoring of the facility would likely take place from the surface, if necessary.

Seq. No	Country	Article	Ref. in National Report
105	Japan	Article 32	P7, B5

Question/ Comment: NWMO's Draft Recommendation "Adaptive Phased Management Approach" for the long-term care of Canada's used nuclear fuel is reported. Canadian government will review this Recommendation. Concerning to the implementation of the policy and regulation for long-term safety of radioactive waste management, (shown in page 7-8 as policy P-290), what are the important things that the Canadian government recognizes, considering the opinions of general public and experts in Canada?

Answer: The Government of Canada is presently reviewing the recommendations submitted by the Nuclear Waste Management Organization (NWMO). The Government will consider the opinions of the general public and experts in Canada in its review.

Seq. No	Country	Article	Ref. in National Report
106	Japan	Article 32	p9,B.7.2; p12,B.10

Question/ Comment: In page 9. B.7 2. LLRW, it says “Canada does not have an intermediate level radioactive waste category.” and in page 12. B.10 Management Practice for LLRW, it refers of “Western Low- and Intermediate-Level Waste Management Facility” and in section H.3.2 and K.5.2 intermediate level radioactive waste are referred also.
a) Would you explain about the intermediate level radioactive waste? b) Does the referred facility accept intermediate level radioactive waste and whether there exist any intermediate level radioactive waste?

Answer: As reported in Section B.7 of Canada’s National Report, radioactive wastes are classified into one of three categories based on origin and radiological hazard:

1. nuclear fuel waste;
2. low-level radioactive waste; and
3. uranium mine and mill tailings.

Individual licensees are free to utilize a more detailed classification system for their own waste management programs. As such, some licensee programs and initiatives refer to an intermediate-level waste category, with the category definition being set by the individual licensee, based on their specific classification needs.

An example of such a classification is the one used by Ontario Power Generation (OPG) for the Western Waste Management Facility. OPG's non-fuel radioactive waste falls within the low-level radioactive waste class described in the Canadian National Report (Section B.7). Similar to other waste facility operators, OPG has found it useful to create sub-categories of these definitions for operational management purposes. The OPG sub-categories are described as follows: (Note that these may be different from the definitions used by other operators in Canada.)

Low-Level Waste (LLW) - Radioactive waste in which the concentration or quantity of radionuclides is above the clearance levels established by the regulatory body – the Canadian Nuclear Safety Commission (CNSC). This waste does not necessarily require disposal in a deep geologic repository. It contains primarily short-lived radionuclides (half-lives shorter than or equal to the 30-year half-life of Cs-137). For interim storage purposes, low-level waste does not require substantial shielding.

Intermediate-Level Waste (ILW) - Radioactive non-fuel waste, containing sufficient quantities of long-lived radionuclides (generally refers to half-lives greater than the 30 year half-life of Cs-137). Deep geological disposal is a suitable alternative for providing isolation from the environment in the long-term. For interim storage purposes, intermediate-level waste is that requiring substantial shielding. Intermediate-level waste includes most ion exchange resins, moderator and primary system water filters, and irradiated reactor core components.

The proposed DGR will be designed to receive both low- and intermediate-level waste, as defined above, from OPG's reactors. A waste acceptance criteria document will be developed to control what waste can be placed into the repository. The criteria will be consistent with the safety assessment supporting the operating licence for the repository.

There is currently an initiative by the Canadian nuclear industry to examine and possibly incorporate a classification system into a standard produced and coordinated by the Canadian Standards Association (CSA). The introduction of a classification system into a CSA standard will be reviewed in conjunction with other standards such as the International Atomic Energy Agency classification system. The CSA standard is anticipated to be finalized and published in 2007.

Seq. No	Country	Article	Ref. in National Report
107	Korea, Republic of	Article 32	P. 9 (B.7.1)

Question/ Comment	The report states that Canada has small quantities of high-level radioactive waste stored at the Chalk River Laboratories, including 280 m3 of liquid high-level waste. What is the plan for final disposal of this high-level radioactive waste?
Answer	At the Chalk River Laboratories, Atomic Energy of Canada Limited (AECL) possesses site radioactive liquid wastes that have accumulated over a period of 50 years. These wastes include approximately 280 m^3 of intermediate- and high-level radioactive liquid. In order to address this waste, AECL has initiated the Liquid

Waste Transfer and Storage Project. The purpose of this project is to consolidate the liquid waste, currently in tanks constructed before 1980, into a storage system that meets current standards for design and construction, and that has improved systems for waste sampling and retrieval. As well, to condition the high-level liquid medical isotope production wastes to reduce critical safety constraints and monitor requirements during storage. The Liquid Waste Transfer and Storage Project initiative will enable substantial progress to be made toward the ultimate solidification of the waste.

Seq. No	Country	Article	Ref. in National Report
108	Korea, Republic of	Article 32	P. 13 (B.10)

Question/ Comment: The report states that after holding low-level radioactive waste, such as that from hospital nuclear medicine departments, until the radioactivity has decayed, it can be treated through conventional means. Please describe the regulatory process of such low-level radioactive waste from its custody to its disposal.

Answer: Each licensee is required to obtain regulatory approval for any program incorporated into the operation of a facility. The licensee must provide the Canadian Nuclear Safety Commission (CNSC) with the details of the proposed delay and decay program. The details may include such information as the types of radionuclides, the characteristics of the waste, the decay period, and the method of disposal. Additionally, the licensee is required to provide a quality assurance program that will ensure the inadvertent release of radioactive waste.

During the course of the licensing period, the CNSC conducts compliance inspections of the facility and compliance audits of the programs. Changes to the delay and decay program may be required as a result of the findings of the compliance inspection/audit.

Seq. No	Country	Article	Ref. in National Report
109	Korea, Republic of	Article 32	P. 21(Table D.3)

Question/ Comment: What is the difference between concrete bunkers and concrete trenches in the “storage structures” column?

Answer: These storage structures, although different in size and shape, serve essentially the same purpose. The rectangular concrete bunker has dimensions of 60 m long, 1.8 m wide, and 1.8 m deep, divided into 12-m long bays by cross-walls. The cylindrical bunkers replaced rectangular bunkers as an engineered facility for radioactive solid waste because it was more economical to build, and provided better resistance against outside soil pressure. The cylindrical bunkers are formed with 25-cm-thick corrugated reinforced concrete walls on a 15-cm-thick concrete pad by using removable metal forms. The bunkers have a 6.1 m inside diameter and are 3.8 m deep.

Seq. No	Country	Article	Ref. in National Report
110	Korea, Republic of	Article 32	P. 21(Table D.3)

Question/ What are the methods for storing and treating the liquid waste generated in the

Comment Whiteshell Laboratories?

Answer Low-Level, Liquid Radioactive Waste (LLLW), generated at Whiteshell Laboratories, is collected at the source and sent to the Active Liquid Waste Treatment Centre (ALWTC), also at Whiteshell Laboratories, under the terms and conditions of the Canadian Nuclear Safety Commission site license. The waste is analysed to ensure that it meets radiological and chemical release criteria, treated if required (for example, pH-adjusted), and released to the nearby Winnipeg River.

Medium-Level Liquid Waste (MLLW) is similarly collected at the source and sent to the ALWTC. This waste is concentrated by evaporation, and solidified by encapsulation in a water-extendable polyester resin. This waste is solidified in metal drums and then transferred to the Whiteshell Laboratories waste management area for storage. Any liquid waste that may not be releasable as LLLW is transferred to the MLLW system and processed accordingly.

Three types of higher-activity radioactive liquid waste (less than a total of approximately 1000 L) are being solidified in a cementitious material, following which, the solid waste will be transferred to the waste management area for storage. They include an Amine solution resulting from a CANDU fuel processing experiment, a solution resulting from a thorium fuel reprocessing experiment (TFRE), and a uranium/thorium solution (UTS).

Seq. No	Country	Article	Ref. in National Report
111	Switzerland	Article 32	pages 9 and 10

Question/ Comment Are all wastes from decommissioning classified as low-level waste? Is the alpha-toxicity considered in the categorization? In various parts of the text, there is still reference to low- and intermediate-level radioactive waste. Should these always be thought of as "low-level waste"?

Answer Canada’s classification system for radioactive waste was confirmed by the Government of Canada in its 1996 Radioactive Waste Policy Framework. As reported in Section B.7 of Canada’s National Report, radioactive wastes are classified into one of three categories based on origin and radiological hazard:

1. nuclear fuel waste;
2. low-level radioactive waste; and
3. and uranium mine and mill tailings.

Individual licensees are free to utilize a more detailed classification system for their own waste management programs. As such, some licensee programs and initiatives refer to an intermediate-level waste category, with the category definition being set by the individual licensee based on their specific classification needs.

a) In the context of Canada’s classification system for radioactive waste, any decommissioning wastes that is not nuclear fuel or uranium mine and mill tailings would be classified as low-level radioactive waste.

b) CNSC regulates radioactive waste based on its radioactive, chemical, biological characteristics, including alpha-toxicity.

c) In the context of Canada's classification system for radioactive waste low and intermediate waste should be thought of as low-level waste.

There is currently an initiative by the Canadian nuclear industry to examine and possibly incorporate a classification system into standards produced and coordinated by the Canadian Standards Association (CSA). The introduction of a classification system into a CSA standard will be reviewed in conjunction with other standards such as the International Atomic Energy Agency classification system. The CSA standard is anticipated to be finalized and published in 2007.

Seq. No 112	Country Switzerland	Article Article 32	Ref. in National Report page 24
Question/ Comment	What is the reason for not listing in Section D the nuclear facilities currently in the decommissioning stage (cf. Annex 7)?		
Answer	The nuclear facilities listed in Annex 7 are currently undergoing some phase of decommissioning, but currently retain an operating licence. It is the intent of the Canadian Nuclear Safety Commission to revoke the operating licences and issue a decommissioning licence. However, before this can occur, the licensee is required to request that their operating licence be revoked and subsequently submit an application (detailed decommissioning plan) for a decommissioning licence. Therefore, these nuclear facilities were included in Table D.3 along with other operational facilities. It is anticipated that in the Third Annual Report, a separate table dealing specifically with decommissioning waste will be included.		

Seq. No 113	Country United States of America	Article Article 32	Ref. in National Report 165
Question/ Comment	The Underground Research Laboratory (URL) at Whiteshell is also being decommissioned, but is not mentioned here. Please describe any decontamination or cleanup activities planned for the URL as part of Whiteshell's decommissioning.		
Answer	The Underground Research Laboratory (URL), located near AECL's Whiteshell Laboratories in Manitoba, Canada, is an underground, experimental facility used for research into controlled blasting techniques, rock mechanics and hydrological studies associated with potential deep underground disposal of spent nuclear fuel, and the behaviour of various materials under the conditions of storage in deep rock formations. No spent fuel, or high-level radioactive materials were ever placed in the URL. Two underground radioisotope laboratories (using low-levels of tracer isotopes) were licensed by the Canadian Nuclear Safety Commission (CNSC) under its *Nuclear Substances and Radiation Devices Regulations*. These laboratories were closed and decontaminated several years ago. This has been confirmed by CNSC staff during an inspection conducted prior to the revocation of the CNSC operating license in 2003. The URL is thus no longer considered a CNSC-licensed site and		

requires no further radiological decommissioning. The present URL Decommissioning Project is much more closely related to a mine shutdown than a nuclear decommissioning project, and is follows the requirements of the Province of Manitoba Mines Act and Regulations.

Seq. No	Country	Article	Ref. in National Report
114	United States of America	Article 32	

Question/ Comment: The proposed deep geologic repository at Kincardine is described as having two shafts. The U.S. Waste Isolation Pilot Plant (WIPP) has four shafts, each having critical functions. WIPP could provide valuable insights on design, construction, and operation of a deep repository.

Answer: Ontario Power Generation (OPG) is familiar with the designs of various low- and intermediate-level waste repositories in operation around the world, and readily-available information about these facilities has been used in the preparation a conceptual design for the proposed Deep Geologic Repository (DGR).

During the next phase of design development, OPG plans to review more detailed information about operating experiences at selected repositories in other countries. The information obtained from this review will be used to advance the conceptual design for the proposed DGR facility.

Seq. No	Country	Article	Ref. in National Report
115	United States of America	Article 32	174

Question/ Comment: Please describe how radioactive waste from the decommissioning of Whiteshell is being managed.

Answer: The majority of spent nuclear fuel at the Whiteshell Laboratories (WL) is stored in above-ground dry storage facilities- Concrete Canister Storage Facility (CCSF). The CCSF is licensed and inspected by the Canadian Nuclear Safety Commission (CNSC), and all spent fuel is maintained under standard International Atomic Energy Agency safeguards, seals, and inspections. The CCSF includes such security features appropriate to the storage of spent nuclear fuel, as regulated by the CNSC. This spent fuel will be transferred to a national spent fuel disposal repository, whenever such a facility is established in Canada. A small fraction of the spent fuel at WL was also historically stored in in-ground standpipes. Planning for the recovery of this material and its transfer to above-ground dry storage is in progress.

All low- and intermediate-level solid, radioactive wastes from the decommissioning of the Whiteshell Laboratories are, and will continue to be, stored in above-ground, or near-surface (depths less than five meters) storage facilities at the WL Waste Management Area (WMA) - a CNSC-licensed and inspected facility. The storage facilities consist principally of concrete bunkers. These wastes are being stored until they may be transferred to a low- or intermediate-level waste disposal repository,

when available. The decommissioning plan prepared by Atomic Energy of Canada Limited envisions low- and intermediate-level waste arising from the decommissioning of the WL site and being transported to the CRL site for disposal, in a CRL geological disposal facility.