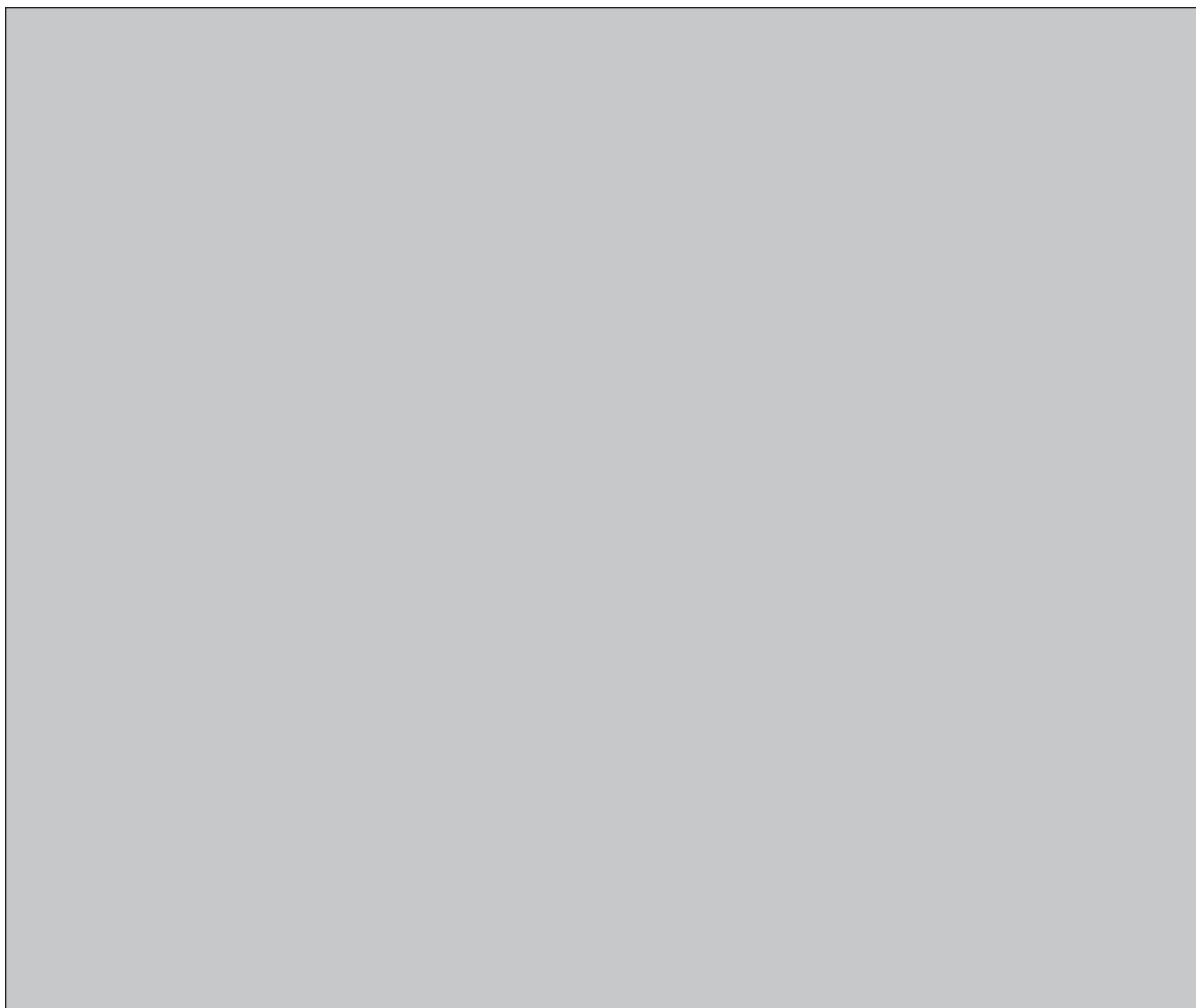


NWMO BACKGROUND PAPERS**7. INSTITUTIONS & GOVERNANCE****7-10 REVIEW OF THE LEGAL AND ADMINISTRATIVE ASPECTS OF THE
NON-PROLIFERATION TREATY IN RELATION TO SPENT NUCLEAR
FUEL MANAGEMENT****Mark Madras & Stacey Ferrara, Gowling Lafleur Henderson LLP**

NWMO Background Papers

NWMO has commissioned a series of background papers which present concepts and contextual information about the state of our knowledge on important topics related to the management of radioactive waste. The intent of these background papers is to provide input to defining possible approaches for the long-term management of used nuclear fuel and to contribute to an informed dialogue with the public and other stakeholders. The papers currently available are posted on NWMO's web site. Additional papers may be commissioned.

The topics of the background papers can be classified under the following broad headings:

1. **Guiding Concepts** – describe key concepts which can help guide an informed dialogue with the public and other stakeholders on the topic of radioactive waste management. They include perspectives on risk, security, the precautionary approach, adaptive management, traditional knowledge and sustainable development.
2. **Social and Ethical Dimensions** - provide perspectives on the social and ethical dimensions of radioactive waste management. They include background papers prepared for roundtable discussions.
3. **Health and Safety** – provide information on the status of relevant research, technologies, standards and procedures to reduce radiation and security risk associated with radioactive waste management.
4. **Science and Environment** – provide information on the current status of relevant research on ecosystem processes and environmental management issues. They include descriptions of the current efforts, as well as the status of research into our understanding of the biosphere and geosphere.
5. **Economic Factors** - provide insight into the economic factors and financial requirements for the long-term management of used nuclear fuel.
6. **Technical Methods** - provide general descriptions of the three methods for the long-term management of used nuclear fuel as defined in the NFWA, as well as other possible methods and related system requirements.
7. **Institutions and Governance** - outline the current relevant legal, administrative and institutional requirements that may be applicable to the long-term management of spent nuclear fuel in Canada, including legislation, regulations, guidelines, protocols, directives, policies and procedures of various jurisdictions.

Disclaimer

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**REVIEW OF THE LEGAL AND ADMINISTRATIVE ASPECTS OF THE
NON-PROLIFERATION TREATY IN RELATION TO
SPENT NUCLEAR FUEL MANAGEMENT**

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EXECUTIVE SUMMARY

This paper provides a review of the legal and administrative aspects of the Treaty for the Non-Proliferation of Nuclear Weapons (“Non-Proliferation Treaty” or “NPT”), particularly in relation to spent nuclear fuel management. The purpose of this review is to assess the implications of the NPT on the various methods that the Nuclear Waste Management Organization (NWMO) might consider for the management of Canada’s spent nuclear fuel. This issue arises in the context of the NWMO’s mandate to investigate approaches for managing Canada’s used nuclear fuel with a view to submitting proposed approaches and a recommended approach to Canada’s Minister of Natural Resources.

The Treaty on the Non-Proliferation of Nuclear Weapons

The NPT is an agreement among nations to prevent the proliferation of nuclear weapons. The State Parties to the NPT, of which Canada is one, have agreed to accept safeguard measures to prevent the proliferation of nuclear weapons. Their commitments extend not only to nuclear weapons and nuclear explosive devices, but also to source and special fissionable materials as well as equipment and material designed or prepared for the processing, use or production of special fissionable material.

The NPT recognizes the benefits of peaceful applications of nuclear technology and such uses are subject to safeguards to verify that nuclear material is not diverted to non-peaceful uses. These safeguards apply broadly to nuclear materials, including spent nuclear fuel.

Canada’s Safeguards

The International Atomic Energy Agency (IAEA) is the body designated in the NPT with whom safeguard agreements are to be negotiated and concluded by State Parties for the purpose of verifying the fulfillment of their obligations under the NPT.

Canada’s safeguard commitments under the NPT are contained in agreements made with the IAEA: the *Agreement Between the Government of Canada and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons* (“Safeguards Agreement”) and the *Protocol Additional to the Agreement Between Canada and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons* (“Additional Protocol”).

Pursuant to the foregoing safeguard agreements, Canada has committed to maintain records and submit reports to the IAEA regarding nuclear materials involved in peaceful uses within Canada’s boundaries or under Canada’s control in other jurisdictions. Canada has also committed to provide IAEA inspectors access to records and nuclear materials and facilities for the purposes of verification of Canada’s submitted reports. Canada must also submit related

information identified in the Additional Protocol to the IAEA in the form of a declaration. Reporting requirements apply to spent nuclear fuel.

Canada's safeguards requirements with respect to nuclear material are terminated when the nuclear material is consumed or diluted and is no longer usable for any nuclear activity that requires safeguards or when the nuclear material has become practically irrecoverable. Nuclear material of specified concentrations and weights may also be exempt from safeguards. Safeguard responsibilities are transferred during international transfers of nuclear material. Canada and the IAEA may also negotiate circumstances that will allow the termination of safeguards with respect to nuclear material used in non-nuclear activities that both Parties agree is practicably irrecoverable.

Canada's regulator of nuclear material, the Canadian Nuclear Safety Commission (CNSC), has the task of monitoring the use, storage and flow of nuclear material at Canadian nuclear facilities to ensure that all nuclear material in Canada is adequately reported and accounted for.

The Role of the International Atomic Energy Agency

In the context of the NPT, the IAEA has the responsibility of providing the international community with a credible assurance that any nuclear material involved in a peaceful use is not being diverted to nuclear weapons or other nuclear explosive devices. Under the Safeguards Agreement, the IAEA has an obligation to ensure that safeguards are applied to nuclear material that is involved in peaceful uses within Canada's boundaries and in other jurisdictions in which nuclear material is under Canada's control. To this end, the IAEA receives reports and other information submitted by Canada in order to ensure that nuclear materials are not being diverted to non-peaceful uses. Information regarding spent nuclear fuel in Canada is included in the information submitted to the IAEA.

Activities pursued by the IAEA for the implementation of the safeguards are limited to the exclusive purpose of verifying that such material is not diverted to nuclear weapons or other nuclear explosive devices and may include a review of records, conducting inspections and collection of samples and measurements. Furthermore, it is the IAEA that determines when safeguards are terminated.

IAEA safeguards serve to both deter and detect any diversion of nuclear material from peaceful uses to nuclear weapons or explosive devices. It is the information that Canada and other Party States supply to the IAEA through established safeguards agreements that allows the IAEA to inform the world whether nuclear material is being diverted to nuclear weapons or other nuclear explosive devices.

Activities of the Canadian Nuclear Safety Commission

As the regulator of Canada's use of nuclear material, it is the CNSC that is the domestic agency responsible for the implementation of Canada's commitment to NPT safeguard measures. This

function is performed in cooperation with the IAEA to ensure that Canada's nuclear materials, including spent nuclear fuel, are not diverted to non-peaceful uses.

The Role of the Department of Foreign Affairs and International Trade

The Department of Foreign Affairs and International Trade (DFAIT) is active in pursuing Canada's longstanding policy objective to stop the proliferation of nuclear weapons and other weapons of mass destruction and represents Canada at NPT Party Conferences. While representing Canada's interests before other NPT Member States at the most recent Review Conference held in 2000, DFAIT identified nuclear safety and the storage and disposal of nuclear fuel waste as important issues facing peaceful nuclear cooperation and actively encouraged the Conference to embrace a principle adopted at the 1995 Review Conference that encouraged nuclear safety in waste management practices. Furthermore, Canada's non-proliferation policy requires that nuclear material exported to another State requires Canadian approval for retransfers, reprocessing and storage and subsequent use.

The Role of Natural Resources Canada

Natural Resources Canada (NRCan) develops policies to ensure that operational and funding responsibilities imposed by Canada's waste plans are met throughout Canada's management of nuclear waste. NRCan is not the lead agency with respect to the NPT. Accordingly, none of NRCan's publications discussing the long-term management of nuclear waste make reference to the NPT.

Implications of the Non-Proliferation Treaty for the Mandate of the NWMO

The NPT itself does not expressly prefer one method of spent nuclear fuel management to another, as long as the methods considered do not constitute a breach of Canada's undertakings not to possess, acquire or manufacture nuclear weapons and to accept safeguards with respect to source and fissionable material.

Assuming that all nuclear waste management options to be considered by the NWMO meet these criteria, the NPT is neutral with respect to possible approaches for nuclear waste management. The methods under consideration by the NWMO may be analyzed with respect to cost and ease of compliance with Canada's safeguards obligations at the appropriate time.

Canada's Safeguard Agreement provides several circumstances for the termination of the safeguards that may be relevant, depending upon the possible approaches to be considered.

The NPT requires that Canada's method of nuclear waste management must not permit the proliferation of nuclear weapons and must allow Canada to meet its obligations to report and provide access for inspection in accordance with its safeguards agreements unless the circumstances allow the termination of safeguards.

Subject to these conditions, the NWMO may pursue its nuclear fuel waste management objectives and Canada, as a nation, may pursue its nuclear non-proliferation policy objectives with respect to the management of nuclear waste, whether through bilateral agreements with other nations regarding the management and return of spent Canadian-origin fuel, other multilateral treaties concerning nuclear risk management, or through unilateral domestic security regulations.

INTRODUCTION – THE SCOPE OF THIS REVIEW

This paper provides a review of the legal and administrative aspects of the Treaty for the Non-Proliferation of Nuclear Weapons (“Non-Proliferation Treaty” or “NPT”), particularly in relation to spent nuclear fuel management. The purpose of this review is to assess the implications of the NPT on the various methods that the Nuclear Waste Management Organization (NWMO) might consider for the management of Canada’s spent nuclear fuel. This issue arises in the context of the NWMO’s mandate to investigate approaches for managing Canada’s used nuclear fuel with a view to submitting proposed approaches and a recommended approach to Canada’s Minister of Natural Resources.

In order to fulfil its purpose, this review will answer various questions including: What is the NPT? What are Canada’s obligations under the NPT? How is Canada currently meeting these obligations? How does the NPT address the management of spent nuclear fuel? What are Canada’s responsibilities for internationally transferred nuclear material? What trends are emerging with respect to Canada’s views towards and actions under the NPT? What are the perceptions of relevant regulatory bodies and government departments?

As a Party to the NPT, Canada has renounced the possession, acquisition and manufacture of nuclear weapons and other nuclear explosive devices and has undertaken to keep records and submit reports to the International Atomic Energy Agency (IAEA) to account for Canada’s nuclear material. It is the submission of this information that allows the IAEA to ensure that Canada’s nuclear materials are being used for peaceful purposes and are not subject to diversion for non-peaceful purposes. Canada’s reporting obligations extend to nuclear materials in all phases of the nuclear fuel cycle, including spent nuclear fuel. Regardless of the means of storage or disposal, the reporting and verification requirements of the NPT will continue to apply to Canada’s spent nuclear fuel unless the conditions for the termination of safeguards obligations are met.

Part I describes the scope and application of the NPT with reference to its relevance to the management of spent nuclear fuel.

Part II discusses the terms and application of Canada’s safeguards agreements under the NPT and the related implications for Canada’s management of nuclear materials with a specific look at the management of spent nuclear fuel.

Part III outlines the role of the IAEA with respect to Canada’s obligations under the NPT.

Part IV highlights the activities of the Canadian Nuclear Safety Commission, Canada’s regulator of the use of nuclear materials, as dictated by the NPT.

Part V examines the role of the Government of Canada’s Department of Foreign Affairs and International Trade (DFAIT) and discusses DFAIT’s perspectives on the application of the NPT to Canada’s management of spent nuclear fuel.

Part VI inspects the role of Natural Resources Canada (NRCan), a department of the Government of Canada, in an attempt to determine NRCan’s outlook on the application of the NPT to Canada’s management of spent nuclear fuel.

PART I – THE TREATY ON THE NON-PROLIFERATION OF NUCLEAR WEAPONS

After being opened for signature on July 1, 1968, the Non-Proliferation Treaty entered into force on March 5, 1970 with forty-three (43) original Parties.¹

The Scope of the Non-Proliferation Treaty

(a) To Whom Does it Apply?

The NPT applies to the States concluding the Treaty, referred to as the “Parties to the Treaty,” and any subsequent signatory States that have ratified the Treaty.

NPT Membership has significantly increased since 1970 as there are currently one hundred and eighty-seven (187) State Parties. Five (5) of these States are nuclear weapon state (“NWS”) Parties which are defined as “one which has manufactured and exploded a nuclear weapon or other explosive device prior to 1 January, 1967.”²

Worldwide, only four (4) countries are not Parties to the NPT: India, Israel, Pakistan, and North Korea, which withdrew its membership to the NPT on April 10, 2003.

Canada is a non-nuclear weapon state (“NNWS”) Party to the NPT.

(b) To What Does It Apply?

Both NWS and NNWS Parties have made commitments with respect to nuclear weapons and other nuclear explosive devices and related equipment and material.

Safeguards that NNWS Parties have undertaken to accept under the NPT impose reporting requirements with respect to “all source or special fissionable material in all peaceful nuclear activities within the territory of such State, under its jurisdiction, or carried out under its control anywhere...whether it is being produced, processed or used in any principal nuclear facility or is outside any such facility.”³

¹ Treaty on the Non-Proliferation of Nuclear Weapons, *came into force* March 5, 1970, 6839 T.I.A.S. 483, 729 U.N.T.S. 161, online: IAEA <http://www.iaea.org/Publications/Documents/Infcircs/Others/infcirc140.pdf>. (date accessed: 19 November 2003).

² *Ibid.*, Article IX.

³ *Ibid.*, Article III.

“Special fissionable materials” are defined in the Statute of the IAEA⁴ as:

plutonium-239, uranium-233, uranium enriched in the isotopes 235 or 233⁵; any material containing one or more of the foregoing; and such other fissionable material as the Board of Governors shall from time to time determine; but the term “special fissionable material” does not include source material.⁶

“Source material” is defined as:

uranium containing the mixture of isotopes occurring in nature; uranium depleted in the isotope 235; thorium; any of the foregoing in the form of metal, alloy, chemical compound, or concentrate; any other material containing one or more of the foregoing in such concentration as the Board of Governors shall from time to time determine; and such other material as the Board of Governors shall from time to time determine.⁷

All Parties have also undertaken to facilitate exchanges of equipment, materials and scientific and technological information for the peaceful uses of nuclear energy.

The Purpose of the Non-Proliferation Treaty

The NPT was established to address the risk to international safety arising from the use of nuclear materials. The NPT is described by the Center for Nonproliferation Studies as “a result of the global acknowledgement that atomic energy could be used both for peaceful and for destructive purposes, and of the growing risk of diversion of nuclear materials from peaceful to military purposes.”⁸ This is illustrated by the contents of the Preamble of the NPT, which cautions that the proliferation of nuclear weapons would seriously enhance the danger of nuclear war. The potential benefits of the peaceful application of nuclear technology are recognized and Parties are entitled and encouraged to cooperate to develop peaceful applications of nuclear technology and participate in the exchange of related scientific information. The Preamble also

⁴ Multilateral Statute of the International Atomic Energy Agency, *entered into force*, July 29, 1957, 8 U.S.T. 2410, T.I.A.S. No. 3873, 276 U.N.T.S. 3, online: IAEA http://www.iaea.org/About/statute_text.html (date accessed: 18 November 2003).

⁵ “Uranium enriched in the isotopes 235 or 233” is defined as “uranium containing the isotopes 235 or 233 or both in an amount such that the abundance ratio of the sum of these isotopes to the isotope 238 is greater than the ratio of the isotope 235 to the isotope 238 occurring in nature,” *Ibid.*, Article XX, para. 2.

⁶ *Supra* note 4, Article XX, para. 1.

⁷ *Supra* note 4, Article XX, para. 3.

⁸ Center for Nonproliferation Studies, *Treaty on the Non-Proliferation of Nuclear Weapons: History*, online: Monterey Institute of International Studies http://cnsdl.miss.edu/ntp/ntp_3/history.htm (date accessed: 17 November 2003).

reflects the intention of the Parties to the NPT to end the nuclear arms race and work towards nuclear disarmament.⁹

Methods of Implementation for the Non-Proliferation Treaty

Under the NPT, NWS Parties are obligated to ensure that nuclear weapons and other nuclear explosive devices are not transferred to NNWS Parties. The five NWS Parties (the US, the Russian Federation, the UK, France and China) must also refrain from assisting, encouraging or inducing any NNWS Parties towards activities involved in the manufacture or acquisition of nuclear weapons or other nuclear explosive devices.¹⁰

Correspondingly, all NNWS Parties have undertaken not to receive the transfer of nuclear weapons or other nuclear explosive devices. NNWS Members are also prohibited from seeking or receiving assistance in the manufacture of nuclear weapons or other nuclear explosive devices.¹¹

All NNWS Parties have undertaken to negotiate and accept IAEA safeguards. The text of the NPT explicitly states that the IAEA safeguards system is implemented for the purpose of preventing the diversion of nuclear materials from peaceful uses to nuclear weapons or explosive devices. The scope of these safeguards is described as follows:

Procedures for the safeguards required by this Article shall be followed with respect to source or special fissionable material whether it is being produced, processed or used in any principle nuclear facility or is outside any such facility. The safeguards required by this Article shall be applied on all source or special fissionable material in all peaceful nuclear activities within the territory of such State, under its jurisdiction, or carried out under its control anywhere.¹²

All Parties retain the right to develop, research, produce and use nuclear energy for peaceful purposes. The exchange of equipment, materials and scientific and technological information related to the peaceful uses of nuclear energy among all Parties is also encouraged. Co-operative efforts are encouraged to further develop applications of nuclear energy for peaceful purposes worldwide, with due consideration for the needs of developing nations.¹³ NNWS Members are

⁹ *Supra* note 1, Preamble.

¹⁰ *Supra* note 1, Article I.

¹¹ *Supra* note 1, Article II.

¹² *Supra* note 1, Article III.

¹³ *Supra* note 1, Article IV.

also promised access to any benefits discovered from peaceful applications of nuclear explosions.¹⁴

Both NWS and NNWS Parties agreed to negotiate in good faith to end the nuclear arms race at an early date and to achieve nuclear disarmament. This obligation is often associated with the NWS Parties since nuclear weapons are in their possession. An advisory opinion issued by the International Court of Justice described the NWS Parties' obligations in this respect as "an obligation to pursue in good faith and bring to a conclusion negotiations leading to nuclear disarmament in all its aspects under strict and effective international control."¹⁵

Duration of the Non-Proliferation Treaty

Pursuant to paragraph 2 of Article X of the NPT, a decision regarding the continuance of the NPT was required after twenty-five (25) years. At the 1995 Conference of the Parties, the NPT was extended indefinitely.¹⁶

Relevance to Spent Nuclear Fuel

As noted above, the safeguards that NNWS Parties to the NPT have undertaken to accept apply to nuclear material in "all peaceful nuclear activities...whether it is being produced, processed or used in any principal facility." The broad scope of the application of these safeguards captures nuclear materials within all stages of the nuclear-fuel cycle, including resulting waste. Spent nuclear fuel is therefore subject to safeguards requirements.

¹⁴ *Supra* note 1, Article V.

¹⁵ Legality of the Threat or Use of Nuclear Weapons, 35 I.L.M. 809 (July 8, 1996), online: International Court of Justice <http://www.icj-cij.org/icjwww/icasess/iunan/iunanframe.htm> (date accessed: 18 November 2003).

¹⁶ NPT, 1995 Review Conference, *Extension of the Treaty on the Non-Proliferation of Nuclear Weapons*.

Summary of The Treaty on the Non-Proliferation of Nuclear Weapons

The NPT is an agreement among nations to prevent the proliferation of nuclear weapons. The State Parties to the NPT, of which Canada is one, have agreed to accept safeguard measures to prevent the proliferation of nuclear weapons. Their commitments extend not only to nuclear weapons and nuclear explosive devices, but also to source and special fissionable materials as well as equipment and material designed or prepared for the processing, use or production of special fissionable material.

The NPT recognizes the benefits of peaceful applications of nuclear technology and such uses are subject to safeguards to verify that nuclear material is not diverted to non-peaceful uses. These safeguards apply broadly to nuclear materials, including spent nuclear fuel.

PART II – CANADA’S SAFEGUARDS

Pursuant to the NPT, Canada and the IAEA have negotiated safeguards agreements to allow the IAEA to verify compliance with the NPT and prevent the diversion of nuclear material to non-peaceful purposes. The IAEA’s model safeguards agreement¹⁷ and additional protocol¹⁸ provided the foundation for Canada’s safeguards.

The Scope of Canada’s Safeguards Obligations

The *Agreement Between the Government of Canada and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons*¹⁹ (“Safeguards Agreement”) establishes a safeguards system that focuses on the verification of nuclear materials and activities that have been declared by Canada.

Canada’s safeguards system has recently been strengthened through adoption of the *Protocol Additional to the Agreement Between Canada and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons* (“Additional Protocol”).²⁰ The focus of the Additional Protocol is the detection of nuclear materials and activities that have not been declared by Canada. The IAEA has stated that the principal goal behind strengthening the safeguards system was “to enable the system to provide assurance about both declared and possible undeclared activities.”²¹

¹⁷ *The Structure and Content of Agreements Between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons*, INFCIRC/153, online: IAEA <http://www.iaea.org/Publications/Documents/Infcircs/Inf153.shtml> (date accessed: 18 November 2003).

¹⁸ *Model Protocol Additional to the Agreement(s) Between the State(s) and the International Atomic Energy Agency for the Application of Safeguards*, INFCIRC/540 (Corrected), online: IAEA <http://www.iaea.org/Publications/Documents/Infcircs/1998/infirc540corrected.pdf> (date accessed: 19 November 2003).

¹⁹ *Entered into force* 21 February 1972, INFCIRC/164, online: IAEA <http://www.iaea.org/Publications/Documents/Infcircs/Inf164.shtml> (date accessed: 19 November 2003).

²⁰ *Entered into force* 8 September 2000, INFCIRC/164/Add./1, online: IAEA <http://www.iaea.org/Publications/Documents/Infcircs/2000/infirc164a1.pdf> (date accessed: 19 November 2003).

²¹ IAEA, *Non-Proliferation of Nuclear Weapons & Nuclear Security: IAEA Safeguard Agreements and Additional Protocols* (2002).

(a) To What Does it Apply?

As allowed by the NPT, the scope of the Safeguards Agreement extends to “all source or special fissionable material in all peaceful nuclear activities within the territory of Canada, under its jurisdiction or carried out under its control anywhere.”²² Canada is therefore responsible for meeting safeguards requirements for all nuclear materials within Canada as well as for nuclear materials that are under Canada’s control that are located in other jurisdictions.

(b) Canada’s Undertaking

Both the Safeguards Agreement and the Additional Protocol are based on Canada’s undertaking to accept safeguards:

The Government of Canada undertakes, pursuant to paragraph 1 of Article III of the [NPT], to accept safeguards, in accordance with the terms of this Agreement, on all source or special fissionable material in all peaceful nuclear activities within the territory of Canada, under its jurisdiction or carried out under its control anywhere, for the exclusive purpose of verifying that such material is not diverted to nuclear weapons or other nuclear explosive devices.²³

IAEA safeguards require Canada to maintain records and submit reports. Canada is also obligated to allow access to IAEA inspectors to nuclear materials and facilities referred to in reports for verification. Details of safeguards requirements are provided in Canada’s Safeguards Agreement and Additional Protocol.

Canada’s Safeguards Obligations

(a) Accounting and Control System

The IAEA must be provided with information addressing all nuclear material that is subject to the Safeguards Agreement as noted above. Canada is therefore required to establish and maintain a system of accounting and control for nuclear material within the scope of the Safeguards Agreement. This accounting and control system is required to be based on a structure of material balance areas. “Material balance areas” are defined as:

an area in or outside of a facility such that:

- a. The quantity of nuclear material in each transfer into or out of each material balance area can be determined; and

²² *Supra* note 20, Article 1.

²³ *Supra* note 20, Article 1.

- b. The physical inventory of nuclear material in each material balance area can be determined when necessary, in accordance with specified procedures, in order that the material balance for Agency safeguards can be established.²⁴

Specific components of the accounting and control system are detailed in Canada's Subsidiary Arrangement, a confidential document negotiated by Canada and the IAEA.²⁵ Specified facility design information and descriptions of organizational responsibility for material accountancy and control for Canada's existing facilities should have been provided during the negotiation of the Subsidiary Arrangement.²⁶ The IAEA must be kept informed of any relevant modifications following the finalization of the Subsidiary Arrangement.²⁷

The use of nuclear material outside of a facility also requires the submission of information to the IAEA including a description of the material, its location and any applied or proposed accountancy and control procedures that the material may be subject to. The IAEA should also be notified of any changes to this information on a timely basis.²⁸

(b) Maintain Records & Submit Reports

According to the Safeguards Agreement, Canada is required to maintain accounting and operating records for each material balance area.²⁹ These records must be retained for at least five (5) years³⁰ and are expected to provide the basis for the accounting and special reports that Canada is required to submit to the IAEA.³¹ An initial accounting report addressing all nuclear material subject to the safeguards agreement is required.³² Updates must include an inventory change report and a material balance report including listed contents.³³ Statements of book inventory of nuclear material subject to safeguards must be provided to the IAEA semi-

²⁴ *Supra* note 20, Article 98, para. M.

²⁵ *Supra* note 20, Article 32.

²⁶ *Supra* note 20, Articles 42-44.

²⁷ *Supra* note 20, Article 45.

²⁸ *Supra* note 20, Article 49.

²⁹ *Supra* note 20, Article 51 & 54.

³⁰ *Supra* note 20, Article 53.

³¹ *Supra* note 20, Articles 59 & 61.

³² *Supra* note 20, Article 62.

³³ *Supra* note 20, Articles 63, 64 & 67.

annually.³⁴ Special reports must be submitted to the IAEA immediately following an unusual incident or circumstance(s) that lead to the belief that a loss of nuclear material may have occurred or an unexpected change in the containment of nuclear material occurs.³⁵ Amplifications and clarifications of the contents of a report must be provided to the IAEA upon request.³⁶

The IAEA must also be informed of certain intended international transfers of nuclear material. Regardless of whether the nuclear material is being imported into or exported out of Canada, the threshold for IAEA notification is the transfer of more than one (1) “effective kilogram,” either in a single shipment, or through several separate shipments within a period of three (3) months.³⁷ Effective kilogram is defined as follows:

a special unit used in safeguarding nuclear material. The quantity in effective kilograms is obtained by taking:

- a. For plutonium, its weight in kilograms;
- b. For uranium with an enrichment of 0.01 (1%) and above, its weight in kilograms multiplied by the square of its enrichment;
- c. For uranium with an enrichment below 0.01 (1%) and above 0.005 (0.5%), its weight in kilograms multiplied by 0.0001; and
- d. For depleted uranium with an enrichment of 0.005 (0.5%) or below, and for thorium, its weight in kilograms multiplied by 0.00005.³⁸

“Enrichment” is defined as “the ratio of the combined weight of the isotopes uranium-233 and uranium-235 to that of the total uranium in question.”³⁹

According to the terms of the Additional Protocol, Canada is required to provide the IAEA with a declaration regarding various aspects of Canada’s use of nuclear materials. Information to be submitted to the IAEA includes the location of nuclear fuel cycle-related research and development activities in Canada that do not involve nuclear material but are funded, specifically authorized or controlled by, or carried out on behalf of Canada.⁴⁰ “Nuclear fuel cycle-related research” is defined as follows:

³⁴ *Supra* note 20, Article 66.

³⁵ *Supra* note 20, Article 68.

³⁶ *Supra* note 20, Article 69.

³⁷ *Supra* note 20, Article 92 & 95.

³⁸ *Supra* note 20, Article 98, para. G.

³⁹ *Supra* note 20, Article 98, para. H.

⁴⁰ *Supra* note 21, Article 2, para. a (i).

those activities which are specifically related to any process or system development aspect of any of the following:

- conversion of nuclear material;
- enrichment of nuclear material;
- nuclear fuel fabrication;
- reactors;
- critical facilities;
- reprocessing of nuclear fuel;
- processing (not including repackaging or conditioning not involving the separation of elements, for storage or disposal) of intermediate or high-level waste containing plutonium, high enriched uranium or uranium-233,

but do not include activities related to theoretical or basic scientific research or to research and development on industrial radioisotope applications, medical, hydrological and agricultural applications, health and environmental effects and improved maintenance.⁴¹

The IAEA may identify information on operational activities relevant to safeguards to include in Canada's declaration. Details of operational activities within and outside of facilities where nuclear material is customarily used, site maps and descriptions of each building on each site, and a description of the scale of operations for activities listed in Annex I are also required to be included in Canada's declaration. Information addressing the location, operational status and estimated annual production capacity of mines and concentration plants in Canada must also be included. Specified information regarding certain source material is also required to be submitted as well as the quantities, uses and locations of nuclear materials exempted from safeguards measures.⁴²

The location(s) of nuclear waste is also explicitly included in the list of information to be submitted to the IAEA:

Canada shall provide the [IAEA] with a declaration containing:

...

- (viii) Information regarding the location or further processing of intermediate or high-level waste containing plutonium, high

⁴¹ *Supra* note 21, Article 18, para. a.

⁴² *Supra* note 21, Article 2, para. a (ii)-(vii).

enriched uranium or uranium-233 on which safeguards have been terminated pursuant to Article 11 of the Safeguards Agreement. For the purpose of this paragraph, “further processing” does not include repackaging of the waste or its further conditioning not involving the separation of elements, for storage or disposal.⁴³

Canada must also submit details and confirmation of any exports of specified equipment and non-nuclear material listed in Annex II. General plans for the development of the nuclear fuel cycle in Canada for the succeeding ten-year period must also be included in the declaration.⁴⁴

Canada must also make every reasonable effort to provide the IAEA with a general description and location of nuclear fuel cycle-related research and development activities that are specifically related to enrichment, reprocessing of nuclear fuel or processing of intermediate or high-level waste containing plutonium, high enriched uranium or uranium-233 that are carried out within Canada’s boundaries but are not funded, specifically authorized or controlled by, or carried out on behalf of Canada. Similar to the exemption carved out in paragraph a (viii) of Article 2 reproduced above, “processing” in this provision does not include “repackaging of the waste or its conditioning not involving the separation of elements, for storage or disposal.”⁴⁵

The IAEA may also identify activities off-site for which Canada must make every reasonable effort to provide a general description of the activities and the identity of the person or entity carrying out these activities.⁴⁶ Canada must provide amplifications or clarifications regarding submitted information upon request⁴⁷ and must adhere to the timelines specified for the submission of information to the IAEA.⁴⁸

(c) Allow IAEA Access for Inspection

Canada must allow the IAEA to verify the information submitted under the Safeguards Agreement and the Additional Protocol. According to the Safeguards Agreement, Canada is required to facilitate the IAEA’s examination of the records that provide the basis for submitted accounting and special reports⁴⁹ and provide IAEA inspectors with necessary visas⁵⁰ and

⁴³ *Supra* note 21, Article 2, para. a (viii).

⁴⁴ *Supra* note 21, Article 2, para. a (ix)-(x).

⁴⁵ *Supra* note 21, Article 2, para. b (i).

⁴⁶ *Supra* note 21, Article 2, para. b (ii).

⁴⁷ *Supra* note 21, Article 2, para. c.

⁴⁸ *Supra* note 21, Article 3.

⁴⁹ *Supra* note 20, Article 52.

⁵⁰ *Supra* note 20, Articles 9 & 86 ; *Supra* note 21, Article 12.

privileges and immunities.⁵¹ The Additional Protocol also requires Canada to provide IAEA inspectors with a means to communicate with IAEA Headquarters and/or Regional Offices as required.⁵²

The Additional Protocol also specifies the circumstances under which Canada must allow the IAEA access to any place on a site, certain locations identified in Canada's declaration and decommissioned facilities or locations outside of facilities where nuclear material was customarily used.⁵³ Access requirements are limited, as the IAEA may not seek to mechanistically or systematically verify the information submitted by Canada in its declaration.⁵⁴ These access provisions are not exhaustive as IAEA access is not limited to only those sites and facilities listed in the Additional Protocol.⁵⁵

Upon Canada's request, IAEA access to Canadian sites may be managed "in order to prevent the dissemination of proliferation sensitive information, to meet safety or physical protection requirements, or to protect proprietary or commercially sensitive information."⁵⁶

(d) Termination of Safeguards

Canada's safeguard requirements with respect to nuclear material are terminated when the nuclear material is deemed by the IAEA to be consumed or diluted and is no longer usable for any nuclear activity that requires safeguards. Safeguards are also terminated for nuclear material that has become "practically irrecoverable,"⁵⁷ a term which is not defined in the Safeguards Agreement. In the event that these conditions are not met but Canada considers the recovery of nuclear material to be impracticable or undesirable, Canada and the IAEA may negotiate the appropriate safeguards.⁵⁸ Upon Canada's request, nuclear material of specified concentrations and weights will also be exempt from safeguards.⁵⁹ Canada and the IAEA may also agree on circumstances that will allow the termination of safeguards with respect to nuclear material used in non-nuclear activities⁶⁰ but Canada and the IAEA must first agree that the nuclear material in

⁵¹ *Supra* note 20, Article 10 & 16.

⁵² *Supra* note 21, Article 14.

⁵³ *Supra* note 21, Articles 4 & 5.

⁵⁴ *Supra* note 21, Article 4.

⁵⁵ *Supra* note 21, Article 8.

⁵⁶ *Supra* note 21, Article 7, para. a.

⁵⁷ *Supra* note 20, Article 11.

⁵⁸ *Supra* note 20, Article 35, para. a.

⁵⁹ *Supra* note 20, Articles 36 & 37.

⁶⁰ *Supra* note 20, Article 13.

question is “practicably irrecoverable,” also a term which is not defined in the Safeguards Agreement.⁶¹

International transfers of nuclear material also result in the termination of Canada’s safeguards requirements. Under these circumstances, Canada’s safeguards obligations cease at the time that the recipient State assumes responsibility for the transferred nuclear material.⁶² The time of transfer of responsibility for nuclear materials that are transferred internationally is determined on a case-by-case basis, according to the agreement reached between Canada and the other State(s) involved in each individual transfer. However, the Safeguards Agreement dictates that the time of transfer of responsibility can be no later than the time that the nuclear material reaches its destination.⁶³

This transfer of responsibility suggests that exporting States do not have a continuous responsibility for transferred nuclear material. There is also no reference to an obligation to have spent nuclear fuel or other by-products of peaceful uses of nuclear material returned to the export State for long-term management. An agreement negotiated to require the exporting State to reassume responsibility for the transferred nuclear material at a later date would therefore be subject to the NPT treatment of the international transfer of nuclear materials and corresponding safeguards responsibilities. The IAEA must also be notified of specified transfers out of or into Canada in order to provide an opportunity to conduct an ad hoc inspection.⁶⁴

Purpose of the Safeguards

Pursuant to the NPT, Canada has negotiated safeguards agreements with the IAEA “for the exclusive purpose of verification of the fulfillment of its obligations assumed under [the NPT] with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons and other nuclear explosive devices.”⁶⁵ The objective of the specific procedures implemented is “the timely detection of diversion of significant quantities of nuclear material from peaceful nuclear activities to the manufacture of nuclear weapons or other nuclear explosive devices or for purposes unknown, and deterrence of such diversion by the risk of early detection.”⁶⁶ Material accountancy is therefore fundamentally important to the successful implementation of safeguards while containment and surveillance measures are important complementary measures.⁶⁷ It is

⁶¹ *Supra* note 20, Article 35, para. b.

⁶² *Supra* note 20, Article 12.

⁶³ *Supra* note 20, Article 91.

⁶⁴ *Supra* note 20, Articles 92, 93, 95 & 96.

⁶⁵ *Supra* note 1, Article III ; reiterated in the Preamble to the Safeguards Agreement, *Supra* note 20.

⁶⁶ *Supra* note 20., Article 28.

⁶⁷ *Supra* note 20, Article 29.

within the Government of Canada's discretion to establish and implement measures for the containment and surveillance of nuclear material that are consistent with the NPT as the Treaty does not impose specific mandatory containment and surveillance measures.

Canada's Compliance Efforts

The Canadian Nuclear Safety Commission (CNSC) is the Canadian regulator of the use of nuclear materials. One part of the CNSC's four-part mandate is the implementation of measures respecting international control of the use of nuclear energy and substances. The scope of this mandate explicitly includes the implementation of measures respecting the non-proliferation of nuclear weapons.⁶⁸ It is therefore the CNSC that implements measures required by Canada's NPT commitment to the non-proliferation of nuclear weapons and other nuclear explosive devices.

The CNSC has the task of monitoring the use, storage and flow of nuclear material at Canadian nuclear facilities for the purposes of cooperating with the IAEA to ensure that all nuclear material in Canada is adequately reported and accounted for. Tasks that were completed by the CNSC in the past year in conjunction with Canada's NPT obligations include preparing and providing relevant reports, negotiating safeguards implementation approaches in Canada, managing the access and activities of IAEA inspectors and managing the installation and maintenance of IAEA safeguards equipment. In keeping with obligations established by Canada's Additional Protocol, the CNSC also coordinated complementary access for IAEA inspectors to various sites across the country.⁶⁹

Relevance to Spent Nuclear Fuel

Canada's Safeguards Agreement establishes reporting requirements with respect to Canada's nuclear material. The agreement's definition of "nuclear material" encompasses the definitions of source and special fissionable material as provided in the Statute of the IAEA discussed above.⁷⁰ Nuclear facilities are also subject to reporting requirements. The Safeguards Agreement defines "facility" as:

⁶⁸ Canadian Nuclear Safety Commission, *What is the CNSC? Mission*, online: CNSC <http://www.nuclearsafety.gc.ca/eng/whois/mission/> (last modified: 26 June 2003).

⁶⁹ CNSC, *Annual Report, 2002-2003*, online: CNSC http://www.nuclearsafety.gc.ca/eng/whois/PDF/AR0203_e.pdf (date accessed: 19 November 2003).

⁷⁰ "Nuclear material means any source or any special fissionable material as defined in Article XX of the Statute [of the IAEA]. The term source material shall not be interpreted as applying to ore or ore residue. Any determination by the Board under Article XX of the Statute after the entry into force of this Agreement which adds to the materials considered to be source material or special fissionable material shall have effect under this Agreement only upon acceptance by Canada," *supra* note 20, Article 98, para. O.

- a. A reactor, a critical facility, a conversion plant, a fabrication plant, a reprocessing plant, an isotope separation plant or a separate storage installation; or
- b. Any location where nuclear materials in amounts greater than one effective kilogram is customarily used.⁷¹

These broad definitions of “nuclear material” and “facility” result in the requirement to implement safeguards on spent nuclear fuel. As noted above, the Additional Protocol also requires the location of nuclear waste to be reported to the IAEA in Canada’s declaration.

Summary of Canada’s Safeguards

The International Atomic Energy Agency (IAEA) is the body designated in the NPT with whom safeguard agreements are to be negotiated and concluded by State Parties for the purpose of verifying the fulfillment of their obligations under the NPT.

Canada’s safeguard commitments under the NPT are contained in agreements made with the IAEA: the *Agreement Between the Government of Canada and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons* (“Safeguards Agreement”) and the *Protocol Additional to the Agreement Between Canada and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons* (“Additional Protocol”).

Pursuant to the foregoing safeguard agreements, Canada has committed to maintain records and submit reports to the IAEA regarding nuclear materials involved in peaceful uses within Canada’s boundaries or under Canada’s control in other jurisdictions. Canada has also committed to provide IAEA inspectors access to records and nuclear materials and facilities for the purposes of verification of Canada’s submitted reports. Canada must also submit related information identified in the Additional Protocol to the IAEA in the form of a declaration. Reporting requirements apply to spent nuclear fuel.

Canada’s safeguards requirements with respect to nuclear material are terminated when the nuclear material is consumed or diluted and is no longer usable for any nuclear activity that requires safeguards or when the nuclear material has become practically irrecoverable. Nuclear material of specified concentrations and weights may also be exempt from safeguards. Safeguard responsibilities are transferred during international transfers of nuclear material. Canada and the IAEA may also negotiate circumstances that will allow the termination of safeguards with respect to nuclear material used in non-nuclear activities that both Parties agree is practicably irrecoverable.

⁷¹ *Supra* note 20, Article 98, para. I.

Canada's regulator of nuclear material, the CNSC, has the task of monitoring the use, storage and flow of nuclear material at Canadian nuclear facilities to ensure that all nuclear material in Canada is adequately reported and accounted for.

PART III – THE ROLE OF THE INTERNATIONAL ATOMIC ENERGY AGENCY

Canada's Safeguards Agreement and Additional Protocol also establish responsibilities for the IAEA.

The Scope of the IAEA's Safeguard Obligations

(a) To What Does it Apply?

As discussed above, the scope of the Safeguards Agreement extends to “all source or special fissionable material in all peaceful nuclear activities within the territory of Canada, under its jurisdiction or carried out under its control anywhere.”⁷² Under Canada's Safeguards Agreement, the IAEA is therefore responsible for implementing safeguards with respect to all nuclear materials within Canada as well as nuclear materials in other jurisdictions in which nuclear material is under Canada's control.

(b) IAEA's Obligation

Both the Safeguards Agreement and the Additional Protocol are based on Canada's undertaking to accept safeguards as discussed above. Canada's undertaking is complimented by IAEA rights and obligations established in the Safeguards Agreement:

The [IAEA] shall have the right and the obligation to ensure that safeguards will be applied, in accordance with the terms of this Agreement, on all source or special fissionable material in all peaceful nuclear activities within the territory of Canada, under its jurisdiction or carried out under its control anywhere, for the exclusive purpose of verifying that such material is not diverted to nuclear weapons or other nuclear explosive devices.⁷³

The IAEA is required to perform its responsibilities in such a manner as to avoid hampering Canada's economic and technological development and international cooperation in the field of peaceful nuclear activities. The IAEA must also avoid undue interference in Canada's peaceful nuclear activities and be consistent with prudent management practices related to the economic and safe conduct of nuclear activities.⁷⁴ The IAEA has an obligation to take every precaution to protect commercial and industrial secrets and other confidential information,⁷⁵ take full account

⁷² *Supra* note 20, Article 2.

⁷³ *Supra* note 20, Article 1.

⁷⁴ *Supra* note 20., Article 4.

⁷⁵ *Supra* note 20, Article 5; *Supra* note 20, Article 15, para. a.

of technological developments, and make all efforts possible to ensure optimum cost-effectiveness in their activities.⁷⁶ The Additional Protocol also requires the IAEA to implement a regime that includes (i) general principles and measures for handling confidential information, (ii) conditions for staff employment related to the protection of confidential information, and (iii) procedures to be followed in situations of a breach or alleged breach of confidentiality.⁷⁷

IAEA's Safeguards Obligations

(a) Receive Reports

All of the information submitted as a result of Canada's reporting requirements imposed by the Safeguards Agreement and the Additional Protocol is submitted to the IAEA in order to allow the IAEA to verify that there has been no diversion of nuclear material to non-peaceful uses.⁷⁸

As explained above, information submitted to the IAEA includes facility design information and descriptions of organizational responsibility for material accountancy and control for Canada's existing facilities. This information is used by the IAEA to (a) identify features of facilities and nuclear material that should be subject to safeguards, (b) determine material balance areas for accounting purposes and identify measurement points, (c) establish timing and procedures for future inventory reviews, (d) set records and reporting requirements and related evaluation procedures, (e) determine procedures for verification of quantity and location of nuclear material, and (f) test containment and surveillance methods on-site.⁷⁹

Information regarding nuclear material used outside of a facility discussed above is also submitted to the IAEA.⁸⁰ The IAEA receives Canada's accounting and special reports.⁸¹ The declaration required by Canada under the Additional Protocol discussed above is also submitted to the IAEA.⁸²

The IAEA is required to establish a unified inventory of all nuclear material in Canada from the information reported by Canada.⁸³

⁷⁶ *Supra* note 20, Article 6.

⁷⁷ *Supra* note 20, Article 15.

⁷⁸ *Supra* note 20, Article 7.

⁷⁹ *Supra* note 20, Article 46.

⁸⁰ *Supra* note 20, Article 49.

⁸¹ *Supra* note 20, Article 59.

⁸² *Supra* note 21, Article 2.

⁸³ *Supra* note 20, Article 41.

(b) Verification

The IAEA may implement a variety of measures in order to verify that Canada's nuclear material is not being diverted to non-peaceful uses.⁸⁴ The IAEA has a right to access to Canada's accounting and operating records that were used to create the accounting and special reports submitted to the IAEA.⁸⁵ IAEA inspectors are allowed access to Canada's facilities and nuclear materials and other locations referred to in the information submitted by Canada yet the circumstances of access are limited. Inspectors may not seek to mechanistically or systematically verify the information submitted by Canada in its declaration.⁸⁶

IAEA inspectors may conduct ad hoc inspections, routine inspections and special inspections. Ad hoc inspections address information contained in Canada's initial report to the IAEA or allow for the verification of the quantity and composition of nuclear material involved in a transfer into or out of Canada.⁸⁷ A routine inspection addresses the consistency between reports and records, the location, quantity and composition of nuclear material, and information submitted describing the possible causes of nuclear material unaccountability.⁸⁸ Special inspections are conducted in order to verify the information contained in special reports and address Canada's submission of inadequate information.⁸⁹

The degree of an inspector's access to facilities in Canada is determined by the nature of the inspection.⁹⁰ The IAEA must limit the number, intensity and duration of routine inspections to the minimum required for the effective implementation of the safeguards.⁹¹ To this end, nuclear material associated with facilities or activities outside of facilities totalling less than five (5) effective kilograms may be subject to one routine inspection per year.⁹² The frequency of inspections for total amounts of nuclear material exceeding five (5) effective kilograms is determined according to the type and use of the nuclear material.⁹³ The criteria considered in determining the number, intensity, duration, timing and mode of routine IAEA inspections includes: (a) the form of the nuclear material, (b) the effectiveness of Canada's accounting and

⁸⁴ *Supra* note 20, Article 7.

⁸⁵ *Supra* note 20, Article 52.

⁸⁶ *Supra* note 21, Article 4.

⁸⁷ *Supra* note 20, Article 71.

⁸⁸ *Supra* note 20, Article 72.

⁸⁹ *Supra* note 20, Article 74.

⁹⁰ *Supra* note 20, Articles 76 & 77.

⁹¹ *Supra* note 20, Article 78.

⁹² *Supra* note 20, Article 79.

⁹³ *Supra* note 20, Article 80

control system, (c) characteristics of Canada's nuclear fuel cycle, (d) international interdependence, and (e) technical developments in the field of safeguards.⁹⁴

The amount of advance notice required to advise Canada of an upcoming IAEA inspection varies according to the type and purpose of the inspection.⁹⁵ Under the terms of the Additional Protocol, advance notice of access is required to be submitted in writing and include a specification of the reasons for access and the activities that the IAEA expects to administer during access. The time required for advance notice of access is also specified in the Additional Protocol.⁹⁶ Unannounced inspections may be conducted in order to collect random samples with IAEA inspectors taking special care to minimize any resulting inconvenience to Canada and its facility operators.⁹⁷

Dependant upon the nature of the location being accessed by the IAEA, while on-site, the IAEA may undertake some of the following activities: visual observation, collection of environmental samples, utilization of radiation detection and measurement devices, application of seals and other identifying and tamper indicating devices, item counting of nuclear material, non-destructive measurements and sampling, examination of relevant records, and other objective measures that have been demonstrated to be technically feasible.⁹⁸ Inspectors may ensure that measurement and sampling procedures being implemented in Canada are proper and may also use the IAEA's equipment for independent measurement and surveillance.⁹⁹

IAEA inspectors are expected to avoid hampering or delaying the construction, commissioning or operation of facilities or affecting the safety of a facility. Inspectors are explicitly prohibited from operating a facility or directing the staff of a facility to carry out any operation. Instead, inspectors are expected to make requests for the performance of any desired operation.¹⁰⁰ Canada is, in turn, expected to entertain such requests.¹⁰¹

The IAEA has an obligation to inform Canada of the results of inspections and the conclusions reached through verification procedures performed.¹⁰² The Additional Protocol requires that the results of activities undertaken by the IAEA with respect to questions or inconsistencies that were brought to Canada's attention are reported to Canada as soon as possible and, at the latest,

⁹⁴ *Supra* note 20, Article 81.

⁹⁵ *Supra* note 20, Article 83.

⁹⁶ *Supra* note 21, Articles 4 & 5.

⁹⁷ *Supra* note 20, Article 84.

⁹⁸ *Supra* note 21, Article 6.

⁹⁹ *Supra* note 20, Article 75.

¹⁰⁰ *Supra* note 20, Article 87.

¹⁰¹ *Supra* note 20, Article 88.

¹⁰² *Supra* note 20, Article 90.

within thirty (30) days of the results being established by the IAEA. Furthermore, conclusions that the IAEA draws from activities undertaken pursuant to the Additional Protocol must be provided to Canada annually.¹⁰³

(c) Require Canadian Activity

The IAEA may request that Canada submit amplifications or clarifications of reports¹⁰⁴ or declarations.¹⁰⁵ The IAEA may also require Canada to take immediate action that is required to ensure verification that nuclear material is not diverted to nuclear weapons or other nuclear explosive devices.¹⁰⁶ In the event that such verification cannot be secured, the IAEA may take appropriate measures as authorized by the NPT.¹⁰⁷

(d) Terminate Safeguards

It is the IAEA that determines whether nuclear material has been consumed or adequately diluted or is practically irrecoverable. As discussed above, the presence of these circumstances would allow the termination of safeguards.¹⁰⁸ Canada and the IAEA may also agree on circumstances that will allow the termination of safeguards with respect to nuclear material used in non-nuclear activities¹⁰⁹ but Canada and the IAEA must first agree that the nuclear material in question is practicably irrecoverable.¹¹⁰

Relevance to Spent Nuclear Fuel

As discussed above, Canada's Safeguards Agreement establishes reporting requirements that apply to spent nuclear fuel while the Additional Protocol requires the location of nuclear waste to be reported to the IAEA in Canada's declaration. The IAEA is therefore required to ensure that

¹⁰³ *Supra* note 21, Article 10.

¹⁰⁴ *Supra* note 20, Article 69.

¹⁰⁵ *Supra* note 21, Article 2, para. c.

¹⁰⁶ *Supra* note 20, Article 18.

¹⁰⁷ *Supra* note 20, Article 19.

¹⁰⁸ *Supra* note 20, Article 11.

¹⁰⁹ *Supra* note 20, Article 13.

¹¹⁰ *Supra* note 20, Article 35, para. b.

safeguards are applied to spent nuclear fuel in order to verify that such material is not diverted to non-peaceful uses.

Canada's Safeguards Agreement establishes that routine IAEA inspections are subject to limitations on frequency, intensity and duration. As noted above, the frequency of inspections for total amounts of nuclear material exceeding five (5) effective kilograms is determined according to the type and use of the nuclear material.¹¹¹ Sealed storage installations are allotted fifty (50) hours.¹¹²

The amount of advance notice required to advise Canada of an upcoming IAEA inspection also varies according to the type and purpose of the inspection.¹¹³ Canada's Safeguards Agreement explicitly indicates that inspections of "sealed storage installations containing plutonium or uranium enriched to more than 5%"¹¹⁴ require at least twenty-four (24) hours notice.

Summary of the Role of the International Atomic Energy Agency

In the context of the NPT, the IAEA has the responsibility of providing the international community with a credible assurance that any nuclear material involved in a peaceful use is not being diverted to nuclear weapons or other nuclear explosive devices. Under the Safeguards Agreement, the IAEA has an obligation to ensure that safeguards are applied to nuclear material that is involved in peaceful uses within Canada's boundaries and in other jurisdictions in which nuclear material is under Canada's control. To this end, the IAEA receives reports and other information submitted by Canada in order to ensure that nuclear materials are not being diverted to non-peaceful uses. Information regarding spent nuclear fuel in Canada is included in the information submitted to the IAEA.

Activities pursued by the IAEA for the implementation of the safeguards are limited to the exclusive purpose of verifying that such material is not diverted to nuclear weapons or other nuclear explosive devices but may include a review of records, conducting inspections and collection of samples and measurements. Furthermore, it is the IAEA that determines when safeguards are terminated.

IAEA safeguards serve to both detect and deter any diversion of nuclear material from peaceful uses to nuclear weapons or explosive devices. It is the information that Canada and other Party States supply to the IAEA through established safeguards agreements that allows the IAEA to inform the world whether nuclear material is being diverted to nuclear weapons or other nuclear explosive devices.

¹¹¹ *Supra* note 20, Article 80

¹¹² *Supra* note 20, Articles 80, para. a & 98, para. L.

¹¹³ *Supra* note 20, Article 83.

¹¹⁴ *Supra* note 20, Article 83, para. c.

PART IV – ACTIVITIES OF THE CANADIAN NUCLEAR SAFETY COMMISSION

As mentioned above, the CNSC is Canada's regulator of the use of nuclear materials. The role of the CNSC is reflected in its mission statement, which is "to regulate the use of nuclear energy and materials to protect health, safety, security and the environment and to respect Canada's international commitments on the peaceful use of nuclear energy."¹¹⁵ The CNSC is also responsible for the dissemination of information to the public regarding its own activities and the effects of Canada's nuclear energy activities on the environment and on the health and safety of persons.

One part of the CNSC's four-part mandate is the implementation of measures respecting international control of the use of nuclear energy and substances. The scope of this mandate explicitly includes the implementation of measures respecting the non-proliferation of nuclear weapons.¹¹⁶ It is therefore the CNSC that implements measures required by Canada's NPT commitment to the non-proliferation of nuclear weapons and other nuclear explosive devices.

CNSC Activities and Responsibilities

As a result of its mandate, the CNSC has the task of monitoring the use, storage and flow of nuclear material at Canadian nuclear facilities for the purposes of cooperating with the IAEA to ensure that all nuclear material in Canada is adequately reported and accounted for. To this end, activities of the CNSC in the past year included preparing and providing relevant reports, negotiating safeguards implementation approaches in Canada, managing the access and activities of IAEA inspectors, and managing the installation and maintenance of IAEA safeguards equipment. In keeping with obligations established by Canada's Additional Protocol, the CNSC also coordinated complementary access for IAEA inspectors to various sites across the country.¹¹⁷

Internationally scoped activities undertaken by the CNSC throughout the year also included participation in technical consultations with various countries addressing the possible implementation of bilateral cooperation agreements. The CNSC also participated in negotiations regarding the guidelines and application of multilateral nuclear export control mechanisms.¹¹⁸

¹¹⁵ Canadian Nuclear Safety Commission, *What is the CNSC: Mission*, online: <http://www.nuclearsafety.ca/eng/whois/mission/> (last modified: 26 June 2003).

¹¹⁶ *Ibid.*

¹¹⁷ CNSC, *Annual Report, 2002-2003*, online: CNSC http://www.nuclearsafety.gc.ca/eng/whois/PDF/AR0203_e.pdf (date accessed: 19 November 2003).

¹¹⁸ *Ibid.*

In its most recently released *Annual Report*, the CNSC acknowledges that the current international concern over terrorism and proliferation threats have led to an increase in Canada's attention towards the physical security of nuclear facilities and materials, the verification of nuclear materials in Canada and close scrutiny of the export of proliferation-significant nuclear and nuclear-related dual-use items. This is illustrated in increased security measures that have recently been adopted by the CNSC¹¹⁹ as well as the Government of Canada's recent proposals to amend the *Nuclear Security Regulations*¹²⁰ to tighten security requirements at nuclear facilities.¹²¹ A further discussion of the CNSC's responsibilities is provided in the NWMO Background Paper entitled *The Status of Legal and Administrative Arrangements for High-Level Radioactive Waste Management (HLRWM)*.¹²²

Perspective on the NPT's Relevance to Spent Nuclear Fuel

The CNSC's commentary prepared for the *Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management* in its 2003 *Canadian National Report* acknowledges the application of NPT safeguards to safety requirements for spent fuel and radioactive waste management facilities in Canada. The CNSC's administration of Canada's Safeguards Agreement and Additional Protocol requirements is reported under the heading "Safety of Spent Fuel and Radioactive Waste Management: Safety Requirements: Physical Security and Safeguards."¹²³

Summary of Activities of the Canadian Nuclear Safety Commission

As the regulator of Canada's use of nuclear material, it is the CNSC that is the domestic agency responsible for the implementation of Canada's commitment to NPT safeguard measures. This function is performed in cooperation with the IAEA to ensure that Canada's nuclear materials, including spent nuclear fuel, are not diverted to non-peaceful uses.

¹¹⁹ *Security Programs for Category I or II Nuclear Material or Certain Nuclear Facilities*, Regulatory Guide G-274, (adopted March 2003), online: CNSC http://www.nuclearsafety.gc.ca/pubs_catalogue/uploads/G-274_e.pdf (date accessed: 19 November 2003).

¹²⁰ S.O.R./2000-209.

¹²¹ *Canada Gazette, Part I*, vol. 137, No. 43, at p. 3375, online: Canada Gazette <http://canadagazette.gc.ca/partI/2003/20031025/pdf/g1-13743.pdf> (date accessed: 19 November 2003).

¹²² M. Madras & S. Ferrara, *Institutions and Governance Background Paper 7.3* (July 2003); online: NWMO <http://www.nwmo.ca/Default.aspx?DN=247,211,199,20,1,Documents> (date accessed: 4 December 2003).

¹²³ CNSC, *National Report for the Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management*, (May 2003), at p. 39, online: CNSC http://www.nuclearsafety.gc.ca/eng/safety/pdf/0738_E1.pdf (date accessed: 19 November 2003).

PART V – THE ROLE OF THE DEPARTMENT OF FOREIGN AFFAIRS AND INTERNATIONAL TRADE

The Non-Proliferation, Arms Control and Disarmament Division within DFAIT describes its role in Canada’s non-proliferation efforts with an emphasis on the link to Canada’s national security:

Our work contributes to strengthening Canada’s national security by formulating, advocating and negotiating effective non-proliferation, arms control, and disarmament policies, strategies and agreements. In so doing, we ensure that nuclear disarmament and non-proliferation is fully integrated into the development and conduct of Canadian national security policy.¹²⁴

DFAIT pursues Canada’s longstanding policy objective to stop the proliferation of nuclear weapons and other weapons of mass destruction with a long-term goal to reduce, and eventually eliminate, such weapons.¹²⁵

Perspective on the NPT’s Relevance to Spent Nuclear Fuel

While representing Canada’s interests before other NPT Member States at the most recent Review Conference held in 2000, DFAIT assumed an active role and encouraged the Conference to embrace a principle adopted at the 1995 Review Conference that encouraged nuclear safety in waste management practices.¹²⁶ Canada’s statement to Main Committee III addressed physical security and related issues as follows:

Mr. Chairman, nuclear safety and the storage and disposal of nuclear fuel waste are two of the most important issues facing peaceful nuclear cooperation and key factors influencing public acceptance of nuclear energy. We encourage the Conference to reaffirm the objective adopted in 1995 that all States should, through rigorous national measures and international cooperation, maintain the highest practicable levels of nuclear safety, including nuclear fuel waste

¹²⁴ DFAIT, *Nuclear Disarmament and Non-Proliferation*, online: DFAIT <http://www.dfait-maeci.gc.ca/arms/nuclear-en.asp> (last modified: 7 October 2002).

¹²⁵ DFAIT, *Nuclear Disarmament and Non-Proliferation: Canadian Policy*, online: DFAIT <http://www.dfait-maeci.gc.ca/arms/nuclear2-en.asp> (last modified: 14 November 2003).

¹²⁶ “All States should, through rigorous national measures and international cooperation, maintain the highest practicable levels of nuclear safety, including in waste management, and observe standards and guidelines in nuclear materials accounting, physical protection and transport of nuclear material.” NPT, 1995 Review Conference, *Decision on Principles and Objectives for Nuclear Non-Proliferation and Disarmament*, para. 18.

management, and observe standards and guidelines in nuclear materials accounting, physical protection and transport of nuclear materials.¹²⁷

Canada's submissions characterized international cooperation in the context of nuclear safety as indispensable yet also acknowledged that nuclear safety is a national responsibility. It is therefore each individual State that is responsible for ensuring the physical security of nuclear material during transportation and at storage and disposal sites. The balance of Canada's submissions regarding international cooperation with respect to nuclear safety and waste management encouraged worldwide participation in a variety of other international instruments including the *Convention on Nuclear Safety*¹²⁸ and the *Joint Convention on the Safety of Spent Fuel Management and the Safety of Radioactive Waste Management*.¹²⁹

DFAIT's activities are based on Canada's current non-proliferation policy¹³⁰ which was established by Canada's Federal Cabinet in 1974 and 1976 and was more recently reaffirmed in the *Government Response to the Recommendations of the Standing Committee on Foreign Affairs and International Trade on Canada's Nuclear Disarmament and Non-Proliferation Policy*.¹³¹ The two major objectives of the policy are described as follows:

1. to ensure that Canadian nuclear exports are used only for peaceful, non-explosive end-uses and that they do not contribute in any way to the development of a nuclear explosive device;
2. to promote an effective and comprehensive international nuclear non-proliferation regime.

Each of these objectives reflect Canada's commitments made when becoming a NNWS Party to the NPT: to stop the proliferation of nuclear weapons while encouraging the exchange of information regarding peaceful uses of nuclear material. Canada's international nuclear cooperative efforts are described in a Government of Canada Statement addressing non-proliferation as follows:

¹²⁷ DFAIT, *Nuclear Disarmament and Non-Proliferation – NPT Statements and Working Papers: Statement by Canada to Main Committee III of the Sixth Review Conference of the States Parties to the Treaty on the Non-Proliferation of Nuclear Weapons*, online: DFAIT <http://www.dfait-maeci.gc.ca/arms/MCIII-Can2000-en.asp> (last modified: 7 October 2002).

¹²⁸ INFCIRC/449, entered into force 24 October 1996, online: <http://www.iaea.org/Publications/Documents/Infcircs/Others/inf449.shtml> (date accessed: 19 November 2003).

¹²⁹ INFCIRC/546, opened for signature 29 September 1997, online: <http://www.iaea.org/Publications/Documents/Infcircs/1997/infcirc546.pdf> (date accessed: 19 November 2003).

¹³⁰ *Bilateral Nuclear Cooperation and Canadian Nuclear Non-Proliferation Policy*, online: DFAIT <http://www.dfait-maeci.gc.ca/nndi-agency/non-proliferation-en.asp> (last modified: 28 March 2003).

¹³¹ (1999), online: DFAIT <http://www.dfait-maeci.gc.ca/nucchallenge/ANNEXB-en.asp> (last modified: 17 February 2003).

The Government is prepared, therefore, to cooperate with other countries that want to benefit from Canadian expertise in order to enjoy the peaceful uses of nuclear energy for use in power generation, as well as in applications in areas such as medicine, agriculture and industry. Canada is strongly committed to ensuring that such cooperation is only for peaceful, non-explosive purposes.¹³²

Canada's non-proliferation policy establishes the criteria that other countries must meet in order for Canada to consider any means of nuclear cooperation. In practice, Canada will only consider entering into nuclear cooperative efforts with another NNWS that has made a legally binding commitment to nuclear non-proliferation by becoming a Party to the NPT or an equivalent agreement, and has accepted the full scope of IAEA safeguards on all current and future nuclear activities. Canada also requires that a Nuclear Cooperation Agreement ("NCA"), a legally-binding bilateral agreement, is made between itself and the cooperating country.

These NCAs require the cooperating State to make a variety of commitments and defines the terms of the transfer of nuclear material. It is the terms of each NCA that allows Canada to maintain control over various aspects of the management of transferred nuclear material including retransfers, reprocessing and storage and subsequent use for verification of non-proliferation. The reprocessing of Canadian-origin nuclear materials by a cooperating State requires Canada's approval to ensure that proposed reprocessing activities are being undertaken for peaceful-uses only. The IAEA safeguards system is used to verify that cooperating States are meeting their commitment that Canadian nuclear exports are used only for peaceful, non-explosive end-uses yet, in the event that IAEA safeguards cannot be applied, Canada is permitted to implement bilateral safeguards.

Canada's nuclear non-proliferation policy and individual NCAs are silent with respect to the management of spent nuclear fuel, extended producer responsibilities, and the repatriation of transferred nuclear materials.¹³³

Summary of the Role of the Department of Foreign Affairs and International Trade

DFAIT is active in pursuing Canada's longstanding policy objective to stop the proliferation of nuclear weapons and other weapons of mass destruction and represents Canada at NPT Party Conferences. While representing Canada's interests before other NPT Member States at the most recent Review Conference held in 2000, DFAIT identified nuclear safety and the storage and disposal of nuclear fuel waste as important issues facing peaceful nuclear cooperation and actively encouraged the Conference to embrace a principle adopted at the 1995 Review Conference that encouraged nuclear safety in waste management practices. Furthermore, Canada's non-proliferation policy requires that nuclear material exported to another State requires Canadian approval for retransfers, reprocessing and storage and subsequent use.

¹³² DFAIT, *Nuclear Disarmament and Non-Proliferation: Advancing Canadian Objectives*, online: <http://www.dfait-maeci.gc.ca/nucchallenge/POLICY-en.asp> (last modified: 17 February 2003).

¹³³ *Supra* note 129.

PART VI – THE ROLE OF NATURAL RESOURCES CANADA

Within the context of Canada’s responsibility for ensuring that the long-term management of radioactive waste is carried out in a safe, environmentally sound, comprehensive, cost-effective and integrated manner, it is the role of NRCAN to develop policies to ensure that operational and funding responsibilities are met as defined by Canada’s waste plans.¹³⁴

Canada has adopted an approach to radioactive waste management that holds the producers and owners of radioactive waste responsible for the funding, organization, management and operation of disposal and other facilities required for their wastes. It is therefore the producers and owners of radioactive waste that are responsible for establishing the institutional and financial arrangements to implement the long-term management and/or disposal of such wastes.¹³⁵ This is reflected in the *Nuclear Fuel Waste Act*¹³⁶ (“NFWA”) as well as the *Policy Framework for Radioactive Waste*¹³⁷ and the *Government of Canada Response to Recommendations of the Nuclear Fuel Waste Management and Disposal Concept Environmental Assessment Panel*¹³⁸ written by NRCAN. None of these sources make reference to the NPT.

The Nuclear Fuel Waste Bureau (“Bureau”) is a branch of NRCAN that was established to administer the *NFWA* and monitor and review the legislative compliance of the nuclear industry’s activities under the *NFWA*. The Bureau does not play an active role in the administration of the NPT. The NPT is absent from the Bureau’s website discussion on international activities in the area of long-term management of nuclear fuel waste¹³⁹ and is also absent from the list of international instruments in the “Legislation and Documents” section of the website.¹⁴⁰

¹³⁴ NRCAN, Energy Resources Branch, *Radioactive Waste*, online: <http://www2.nrcan.gc.ca/es/erb/english/View.asp?x=494> (last modified: 10 June 2003).

¹³⁵ *Ibid.*

¹³⁶ S.C. 2002, c. 23.

¹³⁷ Natural Resources Canada, *Radioactive Policy Framework* (1996) as duplicated in NRCAN, *Government of Canada Response to Recommendations of the Nuclear Fuel Waste Management and Disposal Concept Environmental Assessment Panel* (December 1998), online: NRCAN <http://www2.nrcan.gc.ca/es/erb/CMFiles/engp98b87QAC-8162002-9142.pdf> (date accessed: 19 November 2003).

¹³⁸ *Ibid.*, *Government of Canada Response to Recommendations of the Nuclear Fuel Waste Management and Disposal Concept Environmental Assessment Panel* (December 1998).

¹³⁹ NRCAN, Nuclear Fuel Waste Bureau, *International Activities*, online: <http://www.nfwbureau.gc.ca/english/View.asp?x=647> (last modified: 28 March 2003).

¹⁴⁰ NRCAN, Nuclear Fuel Waste Bureau, *Legislation and Documents*, online: <http://www.nfwbureau.gc.ca/english/View.asp?x=625> (last modified: 24 July 2003).

Summary of the Role of Natural Resources Canada

NRCCan develops policies to ensure that operational and funding responsibilities imposed by Canada's waste plans are met throughout Canada's management of nuclear waste. NRCCan is not the lead agency with respect to the NPT. Accordingly, none of NRCCan's publications discussing the long-term management of nuclear waste make reference to the NPT.

CONCLUSIONS – THE FINDINGS OF THIS REVIEW

Implications of the Non-Proliferation Treaty for the Mandate of the NWMO

The NPT's implications for a method of nuclear waste management or disposal must be assessed in light of Canada's NPT commitments and safeguard agreement obligations. The NPT itself does not expressly prefer one method to another, as long as the methods considered do not constitute a breach of Canada's undertakings not to possess, acquire or manufacture nuclear weapons and to accept safeguards with respect to source and fissionable material.

Assuming all nuclear waste management options to be considered by the NWMO meet these criteria, the NPT is neutral with respect to possible approaches for nuclear waste management. The methods under consideration by the NWMO may be analyzed with respect to cost and ease of compliance with Canada's safeguards obligations at the appropriate time.

Canada's Safeguard Agreement provides several circumstances for the termination of the safeguards:

1. A determination by the IAEA that nuclear material:
 - (a) has been consumed; or
 - (b) has been diluted in such a way that it is no longer usable for any nuclear activity relevant from the point of view of safeguards; or
 - (c) has become practically irrecoverable;
2. Transfer of nuclear material out of Canada;
3. Nuclear material to be used in non-nuclear activities that is practicably irrecoverable.

The absence of safeguard requirements is an important factor to be considered if a method of waste management investigated by the NWMO meets the criteria required for the termination of safeguards.

In conclusion, the NPT requires that Canada's method of nuclear waste management must not permit the proliferation of nuclear weapons and must allow Canada to meet its obligations to report and provide access for inspection in accordance with its safeguards agreements unless the circumstances allow the termination of safeguards.

Subject to these conditions, the NWMO may pursue its nuclear fuel waste management objectives and Canada, as a nation, may pursue its nuclear non-proliferation policy objectives with respect to the management of nuclear waste, whether through bilateral agreements with other nations regarding the management and return of spent Canadian-origin fuel, other multilateral treaties concerning nuclear risk management, or through unilateral domestic security regulations.

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