

# Convention on Nuclear Safety 7<sup>th</sup> Review Meeting – 2017



**International Atomic Energy Agency IAEA, Vienna**

## **Country Review Report for CANADA**

**Drafted by Country Group 3**

**Bangladesh, Belarus, Ghana, Japan, Latvia, Myanmar,  
Nigeria, Pakistan, Moldova, Romania and Turkey**

Rapporteur: Mr. John Pule

Version: Final

*DISCLAIMER: Per INFCIRC 571, Revision 7, Para. 16-19 and Annex IV, Contracting Parties were invited to comment on the implementation of the CNS reporting guidance. Contracting Parties were also encouraged to submit proposed Good Practices, Challenges, and Suggestions prior to the Review Meeting. The draft Country Review Report documents the preliminary observations identified by the Contracting Parties. The Country Review Report is the result of the CNS Review Process and was agreed by consensus by the Country Group.*

## Glossary

*The Glossary provides here the definitions of “Challenges”, “Suggestion” and “Good Practice” according to Annex IV of INFCIRC/571/Rev. 7. The definition of “Area of Good Performance” was agreed upon by the Officers of the 7<sup>th</sup> CNS Review Meeting at the CNS Officers’ Meeting on 3-4 October 2016.*

A **Challenge** is “a difficult issue for the Contracting Party and may be a demanding undertaking (beyond the day-to-day activities); or a weakness that needs to be remediated.”

A **Suggestion** is “an area for improvement. It is an action needed to improve the implementation of the obligations of the CNS.”

A **Good Practice** is “a new or revised practice, policy or programme that makes a significant contribution to nuclear safety. A Good Practice is one that has been tried and proven by at least one Contracting Party but has not been widely implemented by other Contracting Parties; and is applicable to other Contracting Parties with similar programmes.”

An **Area of Good Performance** is “a practice, policy or programme that is worthwhile to commend and has been undertaken and implemented effectively. An Area of Good Performance is a significant accomplishment for the particular CP although it may have been implemented by other CPs.”

## Executive Summary

Canada has 22 nuclear power reactor units. 19 are in operation, 3 have been shut down and 4 units are planned. The types of nuclear power reactors are pressurised heavy water reactor of CANDU design.

4 out of 6 Challenges from the 6<sup>th</sup> Review Meeting have been closed.

The Country Group highlights the following measures to improve safety in Canada's national nuclear programme:

- An excellent safety record with no events above INES 0.
- An elaborated system of PSR, also for licence renewal.
- All post Fukushima Actions completed.
- Emergency preparedness improvements following full-scale, national emergency exercises.
- A comprehensive approach to Counterfeit Fraudulent and Suspect Items (CFSI).

The Country Group highlights the following results of international peer review missions of Canada.

- OSART missions have been conducted at the Bruce B facility in late 2015 and at Pickering in September 2016.
- Canada intends to invite further OSART missions and an EPREV mission has been requested.

The Country Group identified the following Challenges for Canada:

Challenge 1: Publish the drafted amendments to the *Class I Nuclear Facilities Regulations* and the *Radiation Protection Regulations* that address lessons learned from Fukushima.

Challenge 2: Complete the transition to the improved regulatory framework (CNSC regulatory documents).

Challenge 3: Formalize the planned approach to end-of-operation of multi-unit NPPs.

In addition the country group identified 1 Suggestion, 8 Areas of Good Performance and one Good Practice.

The Country Group concluded that Canada:

- Submitted a National Report, and therefore complies with Article 5 and in time following Rule 39 of INFCIRC/573 Rev. 6.
- Attended the 7<sup>th</sup> CNS Review Meeting, and therefore complies with Article 24.1.
- Held a national presentation and answered questions, and therefore complies with Article 20.3.

## **1. Basic Information on Canada's Nuclear Programme**

Canada has 22 nuclear power reactor units. 19 are in operation, 3 have been shut down and 4 units are planned. The types of nuclear power reactors are pressurised heavy water reactor of CANDU design.

## 2. Follow-Up from previous CNS Review Meeting

### 2.1 Challenges

Canada provided the following updates on Challenges identified during the 6th CNS Review Meeting:

Challenge 1: Complete the implementation of the CNSC Integrated Action Plan in response to the Fukushima accident

- The Fukushima action items (FAIs), as specified in the CNSC Action Plan and implemented by NPP licensees, address safety improvements aimed at strengthening defence in depth and enhancing onsite emergency response. The NPP licensees addressed the implementation of the 36 FAIs at their stations under aggressive timelines, with all actions completed by December 31, 2015. Verification of implementation is integrated into licensing and compliance processes.
- The CNSC Action Plan also included enhancements to the CNSC's nuclear regulatory framework. Updates to regulatory documents were completed during the reporting period. Work is ongoing to amend the Class I Nuclear Facilities Regulations and the Radiation Protection Regulations.

Follow up status: Closed

Challenge 2: Probabilistic safety assessment (PSA) to consider multi-units and to consider irradiated fuel bays (spent fuel pools)

All licensees have PSAs that are compliant with CNSC regulatory document S-294 (PSA for NPPs). All irradiated fuel bays (IFBs) meet applicable seismic requirements. Canada addressed specifics of the challenge by the CNSC publishing regulatory document REGDOC-2.4.2, Probabilistic Safety Assessment (PSA) for Nuclear Power Plants, in May 2014. This document introduced new requirements in light of the lessons learned from the Fukushima accident related to multi-units, irradiated fuel bays, and consideration of potential combinations of external events. REGDOC-2.4.2 is being introduced in the licensing basis of operating NPPs. All licensees are expected to be fully compliant by 2020. The licensees, as part of the CANDU Owners Group (COG) effort, submitted a Whole-site PSA methodology including a general safety goal framework. The pilot application of a whole-site PSA methodology to the Pickering Nuclear Generating Station is expected to be completed by end of 2017.

Follow up status: Closed

Challenge 3: Establish guidelines for the return of evacuees post-accident and to confirm public acceptability of it.

To address the challenge, the CNSC was involved in a number of post-accident recovery phase initiatives, including participation in the IAEA's Modelling and Data for Radiological Impact Assessments Programme.

Further, the CNSC has carried out benchmarking on recovery and, in collaboration with Health Canada, is developing a discussion paper on a proposed guideline that will address this matter. The main purpose of the paper is to elicit early feedback and engagement with stakeholders, including federal and provincial governments, on plans for the guideline to describe roles and responsibilities for recovery, as well as important considerations to be addressed before and during the recovery phase. The discussion paper was reviewed by government stakeholders beginning in 2016. Both the discussion paper and guidelines will undergo an external consultation process prior to publication. The goal is to publish the guidelines during the next reporting period.

Follow up status: Open

**Challenge 4: Invite an IAEA emergency preparedness review (EPREV) mission**

To address the challenge, Health Canada has completed the current series of exercises to validate the Federal Nuclear Emergency Plan and worked with stakeholders to implement the lessons learned from the 2014 national full-scale Exercise Unified Response. In addition, Health Canada and the CNSC continue their planning for a future EPREV mission, which includes participating in external EPREV missions to observe best practices for hosting a peer review and conducting a national self-assessment in 2017. An invitation for an EPREV mission was sent in 2017. The target date for the mission is early 2019.

Follow up status: Closed

**Challenge 5: Update emergency operational interventional guidelines and protective measures for the public during and following major and radiological events**

To address the challenge, Health Canada is finalizing, following consultation, an update to the Canadian Guidelines for Protective Actions During a Nuclear Emergency, which address protective measures for the public, including evacuation, sheltering and iodine thyroid blocking, and include operational intervention levels and well as guidelines for water and food consumption. The guidelines were released in 2014 for public consultation, followed by a second round of consultation in June 2016. After consideration of the feedback and possible revisions, the guidelines will be finalized and published by the end of 2017.

Follow up status: Open

**Challenge 6: Transition to decommissioning approach**

Canada has addressed the challenge by;

The CNSC establishing a licensing strategy for decommissioning NPPs in the context of the 2016 licence renewal for Gentilly-2. Hydro-Québec applied in 2015 to replace its current licence with a 10-year power reactor decommissioning licence, subject to renewal. The activities to complete the transition of the reactor to the safe storage state have been completed. Transfer of irradiated fuel to dry storage modules is continuing in accordance with the existing regulatory requirements. CNSC continues to provide oversight, adapting its compliance program to the decommissioning phase.

Follow up status: Closed

## **2.2 Suggestions**

No suggestions were made for Canada, hence this section does not apply.

### 3. Measures to improve safety

#### 3.1 Changes to the regulatory framework and the national nuclear programme

Since the last Review Meeting, the Country Group took note of the following changes to the regulatory framework and the national nuclear programme

- The Canadian Parliament passed the Nuclear Liability and Compensation Act in 2015 to replace the Nuclear Liability Act, the Act came into force January 1, 2017. The regulations under the Nuclear Liability and Compensation Act were published in Canada Gazette II on May 18, 2016.
- The Administrative Monetary Penalties Regulations (CNSC) was published as well as CNSC regulatory document REGDOC-3.5.2, Administrative Monetary Penalties, Version 2. This tool has been used to enhance the CNSC's effectiveness and flexibility in enforcement.
- The Class I Nuclear Facilities Regulations and the Radiation Protection Regulations are being amended to further enhance the safety of nuclear facilities and it is anticipated that the amendments to the Class I Nuclear Facilities Regulations to address lessons learned from Fukushima will be published in 2017. One of the amendments to the Class I Nuclear Facilities Regulations, originally proposed to address a lesson learned from Fukushima, has been withdrawn from consideration. The CNSC determined, after discussion with the stakeholders, including NPP licensees and other regulatory authorities, that the current process for the review of offsite emergency plans is adequate and there is no need to amend the regulations to further facilitate the review.
- During the reporting period, the CNSC published a number of regulatory documents that clarify requirements in the areas of accident management, aging management, security, and compliance and enforcement.
- During the reporting period, the CNSC continued to update its regulatory framework for new NPPs and CNSC has published regulatory documents related to small reactor facilities.

#### 3.2 Safety improvements for existing nuclear power plants

The Country Group took note of the following implemented and planned safety measures for existing nuclear power plants in Canada.

- The Canadian NPP licensees completed all Fukushima action items resulting from the CNSC Action Plan by December 31, 2015. CNSC continue to monitor the implementation of planned measures at the NPPs through the station-specific action items as part of its ongoing compliance verification program, as discussed in Section 2.1 under Challenge 1.
- Canada reviewed its actions in response the DG-IAEA report and concluded that its actions in response to the Fukushima Daiichi accident are compatible with and address the lessons learned that were identified in the DG-IAEA Report.
- The CNSC and Health Canada are drafting the post-accident recovery guidelines addressing the elements of the DG-IAEA Report with regard to offsite measures related to the transition from emergency response to recovery. The guidelines will specifically address guidelines for the post-accident return of evacuees, which is discussed in Section 2.1 under Challenge 3.
- OPG is executing a major refurbishment of all units at Darlington, which will extend their operating lives by approximately 30 years while making various upgrades in alignment with modern codes, standards, and practices, to the extent practicable.

Numerous other safety improvements were made at the Canadian NPPs during the reporting period, including:

- Verification of pressure tube fitness-for-service beyond the assumed design life of 210,000 equivalent full-power hours of operation at Darlington, Pickering B, Bruce A and Bruce B
- Emergency preparedness improvements following from full-scale, national emergency exercises at NPPs involving all levels of government and other institutions (Exercise Unified Response 2014, Exercise Intrepid 2015)
- Distribution of potassium iodide pills to all residences, businesses and institutions within the plume exposure emergency planning zone (typically 8 to 16 km from the NPP).
- Completion of the transition to safe storage for Gentilly-2
- Completion of environmental assessment and integrated safety review for Darlington.

### 3.3 Response to international peer review missions

The Country Group took note of the following implemented or planned measures in response to the results of international peer review missions:

The Fukushima review during the IRRS follow-up mission identified two recommendations. One of the recommendations pertained to the review and assessment of the offsite emergency plans for NPPs (IRRS recommendation RF7). It has been addressed through workshops that were hosted by CNSC, Health Canada, and Public Safety Canada. These workshops, which included all levels of government and industry, helped ensure that offsite emergency plans are comprehensive and that the participating organizations are capable of fulfilling their respective duties.

The second recommendation was that Canada should assure that full-scale exercises of offsite emergency plans be held on a periodic basis, involving licensees and municipal, provincial, and federal organizations (IRRS recommendation RF8).

- In response to this recommendation, Exercise Unified Response, a full-scale, national nuclear exercise with participation from all levels of government and NPP licensees, was held at Darlington in May 2014. It was determined to be a success and enabled those involved (operator, regulator, emergency services at all levels of government and industry) to exercise their emergency plans and response capabilities.
- Furthermore, Canada also held Exercise Intrepid held at Point Lepreau in November 2015 which simulated an event which progressed into a severe accident with offsite implications, and was the first full-scale exercise for this NPP utilizing emergency mitigating equipment and other Fukushima related modifications. Subsequent exercises of different scope have also been held since that time as part of the ongoing exercise schedule.
- Health Canada established, through its nuclear emergency management committees, an ongoing nuclear exercise program and calendar. Exercises that include all offsite response authorities are incorporated into this nuclear exercise calendar, which is shared with Public Safety Canada's Federal Exercise Working Group for inclusion in a national all-hazards emergency exercise calendar, and endorsement by all relevant federal organisations.

An OSART mission was conducted at the Bruce B facility from November 30 to December 17, 2015. The OSART team identified 10 good practices, five recommendations, 12 suggestions and 25 good performances. Good practices were identified in planning for refurbishment and asset management, new tooling, safety, training, communications and emergency preparedness.



## Country Review Report for Canada

Canada has invited the IAEA to conduct OSART missions at several facilities over the next few years. An OSART was also conducted at Pickering in September, 2016.

Canada will host an EPREV mission during the next reporting period.

The NPP licensees are members of World Association of Nuclear Operators (WANO) and during the reporting period all operating NPPs were peer reviewed by WANO with focus on safety and reliability. Some WANO peer reviews are planned for the next reporting period.

## 4. Implementation of the Vienna Declaration on Nuclear Safety (VDNS)

“On 9 February 2015, the Contracting Parties adopted INFCIRC 872, “Vienna Declaration on Nuclear Safety”, which is a commitment to certain principles to guide them in the implementation of the CNS’ objective to prevent accidents and mitigate their radiological consequences, should they occur. The Contracting Parties agreed to discuss the principles of the Vienna Declaration on Nuclear Safety in their National Reports and in the subsequent Review Meetings.”

### 4.1 Implementation of the VDNS’s principle on new nuclear power plants

The first principle of the VDNS is:

“New nuclear power plants are to be designed, sited, and constructed, consistent with the objective of preventing accidents in the commissioning and operation and, should an accident occur, mitigating possible releases of radionuclides causing long-term off site contamination and avoiding early radioactive releases or radioactive releases large enough to require long-term protective measures and actions.”

Canada answer that the CNSC does not have a formal definition for a new NPP. However, in general, a new NPP can be defined as a plant with no previous operation.

Canada reports, that its national requirements and regulation incorporate appropriate technical criteria and standards to address;

- the objective of preventing accidents in the commissioning and operation of new nuclear power plants and;
- the objective of mitigating against possible releases of radionuclides causing long-term offsite contamination and avoiding early radioactive releases or radioactive releases large enough to require long-term protective measures and actions by,

The development of CNSC regulatory document REGDOC-2.5.2, Design of Reactor Facilities: Nuclear Power Plants, was published in May 2014, superseding regulatory document RD-337, Design of New Nuclear Power Plants. It sets out requirements and guidance for the design of new, water-cooled NPPs. To a large degree, REGDOC-2.5.2 represents the CNSC’s adoption of the tenets set forth in the IAEA safety standards document SSR-2/1, Safety of Nuclear Power Plants: Design, and the adaptation of those tenets to align with Canadian practices. The IAEA safety requirements have been confirmed to address the technical objectives of the VDNS.

REGDOC-2.5.2 sets requirements on defence in depth and it address; prevention of deviation from normal operation as well as failures of SSCs, detecting and intercepting deviations, providing inherent safety features, fail-safe designs, ensuring radioactive releases are kept low, and mitigation of the radiological consequences.

It also address the use of proven technology, requires application of defence in depth to all organizational, behavioural and design-related safety and security activities, interfaces between NPP design and other topics, such as environmental protection, safeguards, and accident and emergency response planning.

REGDOC-2.5.2 provides the design requirements on designing structures, systems and components (SSCs), interfacing engineering aspects, NPP features and facility layout, design for reliability integrating safety assessments into the design process and utilizing safety principles in the design.

Canada answer that the primary means of preventing accidents (and mitigating the consequences if they do occur) is the application of the defence-in-depth approach throughout the design and operation of an NPP. This approach requires a series of levels of defence to be in place to prevent accidents from occurring and to ensure appropriate protection in the event that prevention fails.

If a failure were to occur, the defence-in-depth approach allows the failure to be detected and then compensated for or corrected.

Per REGDOC-2.5.2, the design for a new NPP should provide:

- levels of defence in depth that are addressed by individual structures, systems and components (SSCs)
- supporting analysis and calculation
- evaluation of operating procedures

To ensure the different levels of defence are independently effective, any design features that aim to prevent an accident should not belong to the same level of defence as those that aim to mitigate the consequences of the accident.

For example, REGDOC-2.5.2 states:

“The ability of the containment system to withstand loads associated with DEC’s shall be demonstrated in design documentation, and shall include the following considerations:

1. various heat sources, including residual heat, metal-water reactions, combustion of gases and standing flames
2. pressure control
3. control of combustible gases
4. sources of non-condensable gases
5. control of radioactive material leakage
6. effectiveness of isolation devices
7. functionality and leak tightness of airlocks and containment penetrations
8. effects of the accident on the integrity and functionality of internal structures

“The design authority shall demonstrate that complementary design features have been incorporated that will:

- prevent a containment melt-through or failure due to the thermal impact of the core debris
- facilitate cooling of the core debris
- minimize generation of non-condensable gases and radioactive products
- preclude unfiltered and uncontrolled release from containment”.

The Country Group made the following observations:

- *A nuclear power plant is considered to be new as long as it has not been operated.*
- *Design requirements for new nuclear power plants are defined in REGDOC-2.5.2.*

## 4.2 Implementation of the VDNS's principle on existing nuclear power plants

The second principle of the VDNS is:

“Comprehensive and systematic safety assessments are to be carried out periodically and regularly for existing installations throughout their lifetime in order to identify safety improvements that are oriented to meet the above objective. Reasonably practicable or achievable safety improvements are to be implemented in a timely manner.”

Canada reports, that its national requirements and regulation:

- Address the application of the principles and safety objectives of the Vienna Declaration to existing NPPs in the following way:
  - The CNSC regulations and regulatory documents align with the IAEA safety standards, including those used for design and construction of NPPs such as REGDOC-2.5.2.
  - Life-extension projects have provided an opportunity to upgrade the existing CANDU NPPs to align with REGDOC-2.5.2 and other new standards. Integrated safety reviews (ISRs) were conducted for life-extension projects.
- Require the performance of periodic comprehensive and systematic safety assessments of existing NPPs.
- Require reasonably practicable/achievable safety improvements to be implemented in a timely manner. The recently introduced periodic safety reviews (PSRs) require the licensee to determine reasonable and practical modifications to enhance the safety of the facility to a level approaching that described in modern standards.

Canada answers that the licence renewal process facilitates the imposition of new requirements on existing NPPs, including requirements to continually re-assess safety and to implement reasonably practicable and achievable safety improvements in a timely manner.

The licence renewal process facilitates the imposition of new requirements on existing NPPs, including requirements to continually re-assess safety and to implement reasonably practicable and achievable safety improvements in a timely manner.

Licence renewals have also been used to impose requirements for the conduct of integrated safety reviews (ISRs) when NPPs have proposed major refurbishments (which typically occur after approximately 30 years of operation). ISRs are equivalent to periodic safety reviews (PSRs) but are named differently because they are not periodic. The ISRs that have been conducted so far have involved comparisons with the latest applicable regulatory documents and standards. Reasonably practicable safety improvements were required via conditions in the renewed licence that required the completion of an integrated improvement plan (IIP).

REGDOC-2.3.3 aligns with the requirements provided in IAEA Safety Standards Series, Specific Safety Guide SSG-25, Periodic Safety Review for Nuclear Power Plants. It requires the review to be conducted against applicable modern national and international codes, standards and practices.

Licence conditions also require licensees to execute the IIP resulting from its assessment.

Canada is currently implementing PSRs as the operating licences for existing NPPs are renewed. ISRs, which are effectively the same as PSRs (as explained in the response to Question 4), have already been conducted by licensees – and the execution of the resulting IIPs has been confirmed via CNSC inspections and desktop reviews. IIPs that result from PSRs will be ensured in the same way.

Specific risk and engineering objectives and limits are provided in the list of modern codes, standards

and practices that have formed the basis for ISRs and will form the basis for PSRs.

An example is the installation of a containment filtered venting system at Point Lepreau Generating Station. The benefits for such a system were identified as part of the plant's ISR, while the probabilistic safety assessment identified that such a system would help reduce the consequences of severe accidents (identified as reductions in predicted release frequencies).

The Country Group made the following observations:

- PSRs are based on former ISRs and comprehensive requirements are contained in a number REGDOCs.

#### **4.3 Taking into account IAEA Safety Standards and other international Good Practices in the national requirements and regulations addressing the VDNS principles**

The third principle of the VDNS is:

“National requirements and regulations for addressing this objective throughout the lifetime of nuclear power plants are to take into account the relevant IAEA Safety Standards and, as appropriate, other good practices as identified *inter alia* in the Review Meetings of the CNS.”

Canada reports that its national requirements and regulation take into account the relevant IAEA Safety Standards and international good practices identified throughout the life-time of a nuclear power plant. The referenced IAEA publications are given in annex 7.2(i)(b) but also additional IAEA publications were considered in the development of the CNSC regulatory documents and CSA standards. Further, the revisions made to the CNSC's regulations and regulatory documents and CSA standards in response to the Fukushima accident have further aligned the national regulatory framework with the IAEA safety standards.

The Country Group made the following observations.

- National requirements and regulations take into account the relevant IAEA Safety Standards and international good practices.

#### **4.4 Issues faced by Canada in the implementation of the VDNS**

Canada answers:

- There are no impending issues related to the application of Principle 1 of the VDNS, which relates to new build. Canada's requirements for new build have been updated based on the lessons learned from the Fukushima Daiichi accident. Furthermore, as explained in the seventh Canadian report, these requirements are aligned with IAEA safety standards, which themselves fully address the VDNS principles.
- Regarding Principle 2, the implementation of ISRs and now PSRs, as imposed by licence requirements, has introduced comprehensive, systematic safety assessments and IIPs. Canada already has extensive experience in conducting and overseeing ISRs and IIPs. As the execution of a PSR is effectively the same as that of an ISR, it does not pose an unknown challenge.
- The transition from 5-year to 10-year operating licences will obviously involve less frequent

major licensing decisions. This will be balanced by enhanced reporting to the Commission (the decision-making body) to ensure there are sufficient performance assessments, updates and opportunities for the Commission and the NPP licensees to exchange information. This challenge will be addressed by, among other things, enhancements to the annual regulatory oversight report (and associated processes) to the Commission.

- Regarding Principle 3, the seventh Canadian report explains how CNSC regulatory documents and CSA standards comprehensively take into account relevant IAEA safety standards. Those safety standards have been confirmed to adequately address the VDNS principles. Furthermore, Canada has in place rigorous processes to ensure that its regulations, regulatory documents and standards continue to reflect IAEA safety standards, where applicable. Therefore, no specific issues are anticipated in continuing to satisfy Principle 3 of the VDNS.

## 5. Results of the Review

### 5.1 General Quality of the National Report

Contracting Parties and officers were invited to provide general comments on the Canada's implementation of the obligations of the CNS (e.g., report submitted on time), addressed all articles, addressed the Vienna Declaration on Nuclear Safety, and addressed all Challenges and Fukushima lessons learned, the general quality of its National Report, transparency issues, and the compliance with the CNS guidance documents and special peer review topics identified in the previous CNS Review Meeting or specified by the President of the CNS (use of the templates for articles 17 and 18 and reporting on *the management of spent fuel on site and radioactive waste on site - especially for CPs not signatories of the Joint Convention*).

With regards to the general quality of the National Report and transparency issues, the members of the Country Group made the following observations:

- The National Report of Canada is written in a legible, generally understandable and very well structured manner. Each article of the convention is comprehensively and thoroughly addressed giving the reader a clear picture of nuclear safety in Canada.
- The review of the report reveals that the principles of Vienna Declaration are already being implemented/ followed by Canada.
- The report provides detailed information about the measures taken in response to the challenges identified during the Sixth Review Meeting for Canada.
- Canada did not explicitly follow the National Report template template for Articles 17 and 18 but did provide a detailed mapping of its regulatory framework to the IAEA safety standards.

With regards to the compliance with the requirements of the CNS and its Guidelines, the members of the Country Group made the following observations:

- The Report was submitted on the deadline of 15 August 2016.
- The Report has been made publicly available.

### 5.2 Participation in the Review Process

With regards to Canada's participation in the Review process, the members of the Country Group made the following observations. Canada

- posted questions to Contracting Parties .
- delivered answers to the questions of Contracting Parties on time.
- delivered its national presentation.

### 5.3 Challenges

The Country Group identified the following Challenge(s) for Canada.

Challenge 1: Publish the drafted amendments to the *Class I Nuclear Facilities Regulations* and the *Radiation Protection Regulations* that address lessons learned from Fukushima.

Challenge 2: Complete the transition to the improved regulatory framework (CNSC regulatory documents).

Challenge 3: Formalize the planned approach to end-of-operation of multi-unit NPPs.

### 5.4 Suggestions

The Country Group identified the following Suggestion(s) for Canada.

- Suggestion 1: Canada should address any CANDU safety issues that is Category 3 referenced in the 7<sup>th</sup> national report and provide a report to the 8<sup>th</sup> CNS review meeting.

### 5.5 Good Practices and Area of Good Performance

During the peer review of Canada's National Report, the Contracting Parties were invited to recommend Good Practices and to highlight Area of Good Performance.

The Country Group identified the following Good Practices:

- Good practice 1: The CNSC fosters openness and transparency in its regulatory process for which it has in particular launched a participant funding programme, which gives the public, aboriginal groups and other stakeholders the opportunity to request funding from the CNSC to participate in its regulatory process. The participants present their results directly to Commission members. The awarding of participant funding is done by a Board independent of the licensing and technical support branch of the regulator. The participant funding contributes to increasing safety by providing additional information to the Commission.

The following Area of Good Performance of Canada were commended by the Country Group:

- Area of Good Performance 1: It is noted that the CNSC also continued to modernize its approach to documenting its regulatory requirements and expectations, moving to a single document type (referred to as a regulatory document (REGDOC)) that includes both regulatory requirements and guidance in the same document for ease of understanding and cross-referencing.
- Area of Good Performance 2: The use of discussion papers early in the regulatory process dealing with regulatory initiatives, giving stakeholders an early opportunity to present their positions on regulatory initiatives, underlines the CNSC's commitment to a transparent consultation process.
- Area of Good Performance 3: The CNSC is commended for developing their Inspector Training and Qualification Program.
- Area of Good Performance 4: The use of simulators that accurately mimic the field conditions such as the fuel handling simulator (at Bruce Power and NB Power), the dynamic learning activities (DLAs) used at Bruce Power, Ontario Power Generation and NB Power for all staff, including plant managers, and the use of mock-ups at the refurbishment training facility Darlington Energy Complex.
- Area of Good Performance 5: Independent environmental monitoring programme (IEMP), established by CNSC and the results are made available on the public website.



- Area of Good Performance 6: Outreach activities by licensees in the local communities as well as nationally and internationally.
- Area of Good Performance 7: Vendor design review by CNSC for a new innovative designs including small modular reactors.
- Area of Good Performance 8: Facilitation of an international weekly screening committee composed of COG utility members that reviews low level operating experience and identifies actions for further follow up by utilities.

## **6 Fulfilment of CNS Review Requirements**

The Country Group concluded that: Canada

- Submitted a National Report, and therefore complies with Article 5 and in time following Rule 39 of INFCIRC/573 Rev. 6.
- Attended the 7<sup>th</sup> CNS Review Meeting, and therefore complies with Article 24.1
- Held a national presentation and answered questions, and therefore complies with Article 20.3