# Convention on Nuclear Safety
# 7th Review Meeting – 2017

**International Atomic Energy Agency IAEA, Vienna**

# Country Review Report for

# FINLAND

**Drafted by Country Group No. 5**

(Brazil, Cambodia, China, Finland, Iceland, Libya, Oman, Senegal, Spain, United Arab Emirates, Viet Nam)

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Final Version

*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 7th 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

Finland has four nuclear power reactor units in operation, which are 2 PWR units of VVER-440 type in Loviisa site, and 2 BWR-type units in Olkiluoto site. One PWR unit of EPR-type is under construction in Olkiluoto site and the operator submitted operating licence application in April 2016. One PWR unit of VVER-type in Hanhikivi site has granted Decision-in-Principle (DiP) in September 2014. Licensing process for construction is in progress. Finland also operates a research reactor of TRIGA Mark II of 250 kW since 1962, and now is under preparation for decommissioning.

3 out of 3 Challenges from the 6th Review Meeting have been closed.

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

- The Nuclear Energy Act that was amended in 2015 giving STUK a mandate to issue more binding STUK Regulations. On the 1st of January 2016 STUK then issued Regulations on: the Safety of NPPs; Emergency Response Arrangements at NPPs; the Security in the Use of Nuclear Energy; the Safety of Disposal of Nuclear Waste; and, on the Safety of Mining and Milling Operations aimed at Producing Uranium or Thorium;
- The experiences from the Fukushima nuclear accident were addressed in the renewed regulation and Finnish Regulatory Guides (YVL Guides) of 2013, which has requirements that are legally binding while preserving the licensee's right to propose an alternative procedure or solution. The Guides are applied to new nuclear facilities. The procedure to apply new guides to existing nuclear facilities and to facilities under construction is such that a separate decision is made on the implementation of the a new or revised guide and possible improvement measures and exemptions;
- The first PSR in the current licence period of Loviisa plant was sent to STUK for approval in 2014–2015, where the evaluation of the documents was performed by STUK in 2015–2016. As the summary, STUK noted that the prerequisites for safe operation of Loviisa NPP have been met. STUK received the Olkiluoto plant in the end of 2008, and approved it in 2009;
- The current radiation protection legislation (Act and Decree), which is based on the ICRP Publication 60, is currently under overall reform caused by the implementation of revised Basic Safety Standard Directive (2013/59/EURATOM) among other things;
- The largest ongoing improvement is the renewal of the plant I&C system, where the safety classified parts of the project are intended to be completed in 2018;
- Installation of independent air-cooled cooling units for decay heat removal from the reactor core and from the spent fuel pools; The utility has acquired new mobile equipment (aggregates, pumps);
- Installation of diverse water supply to the spent fuel pools that will be completed by 2017, and improvement of flood protection that will be implemented by 2018. The modification to ensure operation of the auxiliary feed water system pumps independently from the availability of the sea water cooling systems has been implemented in 2014 and still in progress;
- Diverse cooling water supply to the spent fuel pools have been completed in 2015. To improve monitoring of the water temperature and level in the spent fuel pools is in progress and will be completed in 2016; and
- Additional safety improvements have also been initiated for the OL-3 design.

The Country Group highlights the following results of international peer review missions of Finland:

- Finland regularly hosts international peer reviews and also offers its experts for the review in other countries. Finland also supports activities to improve peer review services and has already participated in the development of IAEA's peer review services (e.g. IRRS the OSART missions); and,

- The 2015 follow-up IRRS mission team concluded that STUK is a competent and highly credible regulator and is open and transparent, and that the recommendations and suggestions from the 2012 IRRS missions have been taken into account systematically by a comprehensive action plan. The IRRS team determined that 7 out of 8 recommendations and 19 of 21 suggestions made by the 2012 IRRS mission had been effectively addressed and therefore could be considered closed. One of the recommendations left open deals with the STUK's position in the Government. STUK's current position administratively under the Ministry of Social Affairs and Health continues to have the potential for STUK's decision-making to be unduly influenced by an entity that has interests in the medical applications of radiation. One of the suggestions left open is related to STUK's management system. Two new recommendations were raised to amend the legislation to clarify that decommissioning of a nuclear installation and closure of a disposal facility require a licence amendment; and to address the arrangements for research in radiation safety. STUK has updated its action plan and taken actions to complete the open issues.

After the Finland national presentation, the Country Group discussed the following topics:

- independence of SUK with regard to health facility with radiation sources around;
- licensing process of new nuclear and radiation facility;
- management of spent fuel and radioactive waste repository facility;
- education and training in nuclear safety;
- funding of the regulatory body;
- regulatory research and development;
- impact or potential impact of low electricity price;
- application of graded approach in regulatory process;
- interfacing between safety, security and safeguards in regulatory process;
- understanding in 'economically and practically reasonable', and the use of PRA;
- regulatory process for providing exemption to new YVL guide requirements (implementing the updated regulation in the existing plants);
- design standardization; and
- plant improvement based on stress test results.

The Country Group believes that there are two topics might be discussed in the plenary session:

- Impact of the current economic situation of the licensee and the low electricity price on decision for safety improvement; and
- Availability of supplier willing to provide equipment to nuclear standard for all safety classes components because of 'too conservative (?) requirements'.

The Country Group identified the following Challenges for Finland:

- **Challenge 1**: Managing simultaneously the oversight of many on-going activities in different life-cycle phases of nuclear facilities. (This is a situation that STUK had never dealt with before)
    - Provision for plant ageing; I&C and other systems modernisation carried out at the existing NPPs (incl. safety improvements); ageing management programs are in place and re-reviewed in PSRs;
    - Commissioning of Olkiluoto unit 3, review of the OL application, commissioning tests, and start of operation;
    - Regulatory review of CL application of Hanhikivi unit 1; and
    - Decommissioning of the FiR 1 research reactor.

In addition, the country group identified 1 Suggestion, and 3 Areas of Good Performance.

The Country Group concluded that Finland:

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

# 1. Basic Information on Finland Nuclear Programme

According to Finland's Report:

- Finland has four nuclear power reactor units in operation. These are: 2 PWR units of VVER-440 type in Loviisa site; and 2 BWR-type units in Olkiluoto site;
- One PWR unit of EPR-type is under construction in Olkiluoto (OL) site and the operator submitted operating licence application in April 2016;
- One PWR unit of VVER-type in Hanhikivi site has granted Decision-in-Principle (DiP) in September 2014. Licensing process for construction is in progress;
- Governments DiP was negative for extension of the validity time of the DiP applied for Olkiluoto-4. Hence, the Olkiluoto-4 project ended in June 2015 since the operator did not submit an application for construction licence; and,
- Finland also operates a research reactor of TRIGA Mark II of 250 kW since 1962, and now is under preparation for decommissioning.

# 2. Follow-Up from previous CNS Review Meeting

## 2.1 Challenges

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

**Challenge 1**: Regulatory oversight of existing NPPs (aging management) and OL-3 (contractors and subcontractors, digital I&C, operating license review).

For ageing management issue, Finland addressed this Challenge by:

- implementing STUK Regulation (STUK Y/1/2016) stating that the design, construction, operation, condition monitoring and maintenance of an NPP shall provide for the ageing of systems, structures and components (SSCs) important to safety throughout the service life of the facility; and Guide YVL A.8, which requires the licensee to submit to STUK the ageing management programme for approval;
- reviewing the first PSR of Loviisa in 2014-2016. It's been identified that ageing management was one of the key issues, especially the embrittlement margins of Loviisa-2 reactor pressure vessel before the expected end of life in 2030. By the end of 2016 the operator will send STUK the documents concerning the actions to increase the embrittlement margins. For Loviisa-1 reactor pressure vessel core area was annealed in 1996;
- performing Early replacement of entire piping systems of OL-1 & OL-2 plants for mitigating inter-granular stress corrosion cracking (IGSCC); and,
- ensuring that ageing management is taken into account at the design and construction phase of the OL-3.

For contractors and subcontractors, digital I&C, operating license review issues of OL-3, Finland addressed this Challenge by:

- implementing STUK Regulation (STUK Y/1/2016) stating that the organisations participating in the design, construction, operation, and decommissioning of a NPP are required to apply safety culture and employ a management system. In the end of 2013, STUK also published Guide YVL A.5, which states that during construction and modification projects at existing NPPs the licensee must ensure that the contributing parties are able to perform according to safety requirements and there must be training on safety culture issues for the personnel taking part in the activities;

- ensuring the operator of OL NPPs to follow up the competence of contractors that work at the plant regularly or for longer terms. These contractors have to complete the same basic training as NPP's own personnel. The licensee regularly audits and evaluates contractors and suppliers to ensure that they fulfil the regulatory and safety requirements. STUK has participated as observer in the licensee's and vendor's quality audits at the subcontractors;
- having STUK reviewed the licensing documents related to the I&C modernisation project of the Loviisa-1 and -2 and the construction project of the OL-3. The individual I&C systems were tested in test bay in Erlangen. As the tests indicated no major deficiencies in the design, STUK allowed the shipment of the systems to OL site. Installation and testing of the I&C on site is currently ongoing;
- performing regulatory oversight with Construction Inspection Programme during the construction of OL-3; and,
- conducting safety assessment of OL-3 following the Fukushima nuclear accident. The topics included the preparedness against loss of electric power supply, loss of ultimate heat sink and extreme natural phenomena. STUK required the licensee to carry out additional assessment and present an action plan for safety improvements. Severe Accidents Management (SAM) has been considered in the original design of the OL-3. STUK has reviewed the overall SAM strategy and the approach has been accepted.

Follow Up Status: This challenge may be considered as **Closed** as the relevant processes have been set in place.

**Challenge 2**: Preparation for new build projects (OL4, Hanhikivi-1)

Finland addressed this Challenge by:

- making decisions on applications of Decision-in-Principle (DiP) for both NPP in September 2014. Governments DiP was positive for Hanhikivi-1 project and negative for extension of the validity time of the DiP applied for OL-4. Hence, the OL-4 project ended in June 2015 since the operator did not submit an application for construction licence;
- having STUK organised seminars with licence applicants on construction licence application requirements in relation to the plant design processes and shared the lessons learned from the OL-3 construction project. Process system and plant engineering (layout) design maturity in PSAR phase is dominating factor for successful construction licence application review; and,
- responding to Construction License Application (CLA) filed for Hanhikivi-1 NPP on 30 June 2015 to the Government; and responding to the submission of the first batch of safety, security and safeguards documentation to STUK for regulatory review and assessment. STUK has started the CLA review and also the inspection programme on the operator, Plant Vendor ROSATOM, and its main sub-suppliers. STUK conducted five management system inspections to the operator and one to the General Designer JSC Atomproekt, St Petersburg, Russia, during 2015 and shall conduct 12 inspections on the operator and ROSATOM main design organisations during 2016 to support its document review and assessment.

Follow Up Status: Many relevant efforts have been set in place. Hence, this challenge might be considered as **Closed**.

**Challenge 3**: Maintaining and improving competence / ensuring resources.

Finland addressed this Challenge by:

- implementing the Nuclear Energy Act and the STUK Regulation Y/1/2016 and Guide YVL A.4, which are providing requirement and guideline on training and qualification for significant safety functions personnel, including persons responsible for safeguards, and emergency preparedness; management and leadership competencies for responsible director;

- adopting a competence management system in STUK, and emphasising nuclear safety and regulatory competencies in STUK's strategy. Implementation of the strategy is reflected into the annual training programmes, on the job training and new recruitments;
- establishing and implementing human resource planning for the Loviisa NPP which is based on a ten-year plan, and is subject to annual management review and updating. The training activities and procedures at the Loviisa NPP are constantly developing;
- updating the personnel plan regularly according to the phases of OL-3 construction. TVO uses an IT-system that supports the managers e.g. in defining and following up individual development plans, and training requirements for each position or job that will automatically be included in the new recruited person's development plan;
- having personnel and human resources related issues included in STUK's periodic and construction inspection programmes at the NPPs. STUK also participates in examinations of shift personnel, and approves the appointment of certain key personnel, such as the responsible director and his/her deputies;
- setting up Doctoral programme for nuclear engineering and radiochemistry in three universities in Finland during 2012-2015, funded by Academy of Finland, the universities and nuclear industries. During the programme 21 new doctors have been graduated;
- develop and organise annual basic professional training course on nuclear safety, approximately 6 weeks, for students and staff members of STUK, the licensees, VTT, University, and Ministry of Employment and the Economy. Over 800 persons have participated in the course; and,
- having the Ministry of Employment and the Economy set up a working group to prepare an R&D strategy in the use of nuclear energy at the end of January 2013. The implementation of working group's recommendations has started. These activities ensure the financing for the enhancement of the nuclear safety research infrastructure.

Follow Up Status: Many relevant processes have been set in place, hence this Challenge might be considered as **Closed**.

### 2.2 Suggestions

No suggestions.

## 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 Nuclear Energy Act that was amended in 2015 giving STUK a mandate to issue more binding STUK Regulations. On the 1st of January 2016 STUK then issued Regulations on: the Safety of NPPs; Emergency Response Arrangements at NPPs; the Security in the Use of Nuclear Energy; the Safety of Disposal of Nuclear Waste; and, on the Safety of Mining and Milling Operations aimed at Producing Uranium or Thorium;
- The experiences from the Fukushima nuclear accident were addressed in the renewed regulation and Finnish Regulatory Guides (YVL Guides) in December 2013. The safety requirements in YVL Guides are legally binding, while preserving the licensee's right to propose an alternative procedure or solution. New YVL Guides are applied to new nuclear facilities. The procedure to apply new guides to existing nuclear facilities and to facilities under construction is such that a separate decision is made on the implementation of the a

new or revised guide and possible improvement measures and exemptions. Systematic training on application of new YVL Guides has been provided in English by STUK to the licensees and other stakeholders;

- The first PSR in the current licence period of Loviisa plant was sent to STUK for approval in 2014–2015, where the evaluation of the documents was performed by STUK in 2015–2016. As the summary, STUK noted that the prerequisites for safe operation of Loviisa NPP have been met. The PSR of the Olkiluoto plant was submitted to STUK in the end of 2008. STUK's decision in October 2009; and,
- The current radiation protection legislation (Act and Decree), which is based on the ICRP Publication 60, is currently under overall reform caused by the implementation of revised Basic Safety Standard Directive (2013/59/EURATOM) among other things.

### 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 Finland:

- The largest ongoing improvement is the renewal of the plant I&C system, where the safety classified parts of the project are intended to be completed in 2018;
- Installation of independent air-cooled cooling units for decay heat removal from the reactor core and from the spent fuel pools; The utility has acquired new mobile equipment (aggregates, pumps);
- Installation of diverse water supply to the spent fuel pools that will be completed by 2017, and improvement of flood protection that will be implemented by 2018. The modification to ensure operation of the auxiliary feed water system pumps independently from the availability of the sea water cooling systems has been implemented in 2014 and still in progress;
- Diverse cooling water supply to the spent fuel pools have been completed in 2015. To improve monitoring of the water temperature and level in the spent fuel pools is in progress and will be completed in 2016; and,
- Additional safety improvements have also been initiated for the OL-3 design.

### 3.3 Response to international peer review missions

- Finland regularly hosts international peer reviews and also offers its experts for the review in other countries and for improving peer review service system.
- The latest peer reviews in Finland are: The IRRS follow-up mission in 2015; WANO follow-up peer review at Loviisa in March 2015, and WANO corporate review in January 2016; and, at Olkiluoto NPP in May 2014 and in October 2016.
- The Government of Finland has requested the IAEA to carry out four OSART missions: For Olkiluoto 1&2 in February-March 2017; for Loviisa in March 2018; and, Pre-Operational OSART mission for OL-3 in April 2018, and Hanhikivi-1 in 2022.

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

- The 2015 follow-up IRRS mission team concluded that STUK is a competent and highly credible regulator and is open and transparent, and that the recommendations and suggestions from the 2012 IRRS missions have been taken into account systematically by a comprehensive action plan. The IRRS team determined that 7 out of 8 recommendations and

19 of 21 suggestions made by the 2012 IRRS mission had been effectively addressed and therefore could be considered closed. One of the recommendations left open deals with the STUK's position in the Government. STUK's current position administratively under the Ministry of Social Affairs and Health continues to have the potential for STUK's decision-making to be unduly influenced by an entity that has interests in the medical applications of radiation. One of the suggestions left open is related to STUK's management system. Two new recommendations were raised to amend the legislation to clarify that decommissioning of a nuclear installation and closure of a disposal facility require a licence amendment; and to address the arrangements for research in radiation safety. STUK has updated its action plan and taken actions to complete the open issues.

# 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."

- Finland National Report does not explicitly define what it considers a "new" NPP. Finland stated that the YVL Guide is applied for 'new" NPP, which defined as NPP without construction license. This should refer to Hanhikivi unit-1 with AES-2006 design that has granted DiP in September 2014, but not for OL-3 with EPR design that is under construction.

Finland 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 by applying STUK Regulation (STUK Y/1/2016) stating that:
    - In the design, construction and operation, proven or otherwise carefully examined high quality technology shall be employed to reduce the probability of operational transients and accidents and to mitigate their consequences. An NPP shall encompass systems by means of which operational transients and accidents can be quickly and reliably detected and the aggravation of any event prevented;
    - Inherent safety features attainable by design shall be primarily utilised. Otherwise, passive and fail-safe functions shall be applied;
    - An NPP shall be provided with systems for shutting down the reactor and maintaining it in a subcritical state, for removing decay heat generated in the reactor, and for

retaining radioactive materials within the plant. Design of such systems shall apply redundancy, separation and diversity principles;

- Common-cause failures shall only have minor impacts on plant safety;
- An NPP shall have reliable off-site and on-site electrical power supply systems. The plants must have equipment and procedures to ensure that decay heat from nuclear fuel in the reactor and in spent fuel pools can be removed for a period of three days independent of external electricity and external water supplies; and,
- The possibility of human errors shall be taken into account in the design of the NPP and in the planning of its operation and maintenance. The impacts of human error shall be reduced by using various safety design methods, including defence-in-depth, redundancy, diversity and separation.

- 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:
  - Applying STUK Regulation (STUK Y/1/2016) stating that: Effective technical and administrative measures shall be taken for the mitigation of the consequences of an accident. The design of an NPP shall be such that accidents leading to extensive releases of radioactive materials must be highly unlikely. Dispersion of radioactive materials from the fuel of the nuclear reactor to the environment shall be prevented by means of successive physical barriers which are the fuel and its cladding, the cooling circuit of the nuclear reactor and the containment building. Provisions for ensuring the integrity of the fuel, primary circuit and containment are included; The plant shall also be provided with SSCs for controlling and monitoring severe accidents. These shall be independent of the systems designed for normal operational conditions anticipated operational occurrences and postulated accidents. Systems necessary for ensuring the integrity of the containment building in a severe accident shall be safety-classified, qualified for the environmental conditions and capable of performing their safety functions, even in the case of a single failure of an active component; and
  - Implementing Nuclear Energy Act 1988/161 section 22b, to limits radiation exposure and releases of radioactive substances addressing also severe accidents. The release of radioactive substances arising from a severe accident shall not necessitate large scale protective measures for the public nor any long-term restrictions on the use of extensive areas of land and water. In order to restrict long-term effect, the limit for the atmospheric release of cesium-137 is 100 TBq. The possibility of exceeding the set limit shall be extremely small. The possibility of a release requiring measures to protect the public in the early stages of the accident shall be extremely small.

The Country Group made the following observation: Finland has adopted the First Principle of VDNS in their national regulatory framework.

### 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."

Finland reports, that it's national requirements and regulation:

- address the application of the principles and safety objectives of the Vienna Declaration to existing NPPs in the following way:
    - Finnish regulations state that a periodic safety review (PSR) shall be conducted at least every ten years; and,
    - The Nuclear Energy Act states that the safety shall be maintained as high as practically possible. For further development of safety, measures shall be implemented that can be considered justified considering operating experience and safety research and advances in science and technology;
- require the performance of periodic comprehensive and systematic safety assessments of existing NPPs; and,
- require reasonably practicable/achievable safety improvements to be implemented in a timely manner.

The Country Group made the following observation: Finland has adopted the Second Principle of VDNS in their regulatory system.

### 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."

- Finland reports that its national requirements and regulation take into account the relevant IAEA Safety Standards and international Good Practice throughout the life-time of an NPP.

The Country Group made the following observation: Finland has adopted the Third Principle of VDNS in their national requirements and regulation.

### 4.4 Issues faced by Finland in the implementation of the VDNS

Finland has not reported any specific challenges in applying the Vienna Declaration principles and safety objectives to its existing fleet or new builds of NPPs.

## 5. Results of the Review

### 5.1 General Quality of the National Report

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

- The Report is qualified to be comprehensive, very well written, transparent and very well structured. The 7th National Report of Finland addresses in due details all aspects of the obligations of the Convention;
- Finland made the voluntary use of the National Report template for Articles 17 and 18; and,

- Finland reported in detail about the activity of international review missions; the results of the Follow-up IRRS Mission held in 2015 and the efforts to response the recommendations and suggestions.

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 before the deadline of 15 August 2016;
- The content and structure of Finland National Report complies with the CNS guidance;
- The directions of the Summary Report of 6th Review Meeting were taken into consideration; and,
- The directions given by the President of the 7th Review Meeting were mostly followed.

## 5.2 Participation in the Review Process

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

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

## 5.3 Challenges

The Country Group identified the following Challenge for Finland:

- **Challenge 1**: Managing simultaneously the oversight of many on-going activities in different life-cycle phases of nuclear facilities. (This is a situation that STUK had never dealt with before)
    - Provision for plant ageing; I&C and other systems modernisation carried out at the existing NPPs (incl. safety improvements); ageing management programs are in place and re-reviewed in PSRs;
    - Commissioning of Olkiluoto unit 3, review of the OL application, commissioning tests, and start of operation;
    - Regulatory review of CL application of Hanhikivi unit 1; and,
    - Decommissioning of the FiR 1 research reactor.

## 5.4 Suggestions

The Country Group identified the following Suggestion for Finland:

- **Suggestion 1**: To finalize STUK strategic communication plan for raising public awareness and knowledge in risk related to radiation and nuclear utilization.

## 5.5 Good Practices and Area of Good Performance

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

The following Area of Good Performance of Finland was commended by the Country Group:

- **Area of Good Performance 1**: Intensive application of Probabilistic Risk Analysis (PRA), such as: Requirements for full-scope (internal events, fires, floods, seismic events, harsh weather and other external events) PRA at Levels 1 and 2 for power operation and low-power and shut-down states; Preliminary PRA required in CL phase, final PRA required in OL phase, during operation updated PRA; Several risk-informed PRA applications required and in use (plant modifications, in-service inspection program, in-service testing, Tech Specs, preventive maintenance during power operation, event analysis risk follow-up, safety classification, staff training, development of EOPs and other procedures); Several risk informed plant modifications implemented at NPPs;
- **Area of Good Performance 2**: Practice for continuous improvement, such as: Updated regulatory guides are applied as such to new reactors, some separate implementation decisions for the operating NPPs or NPPs under construction (all reasonably practicable measures shall be made); Overall safety is also discussed during PSRs and in large plant modifications; New urgent safety information might also lead to direct improvement measures (e.g. Fukushima issues); and, several plant modifications done based on PRA results; and,
- **Area of Good Performance 3**: Backfitting of severe accident management systems, i.e.: Existing requirements on Severe Accident Management systems (shall be safety classified, independent, and single failure tolerant).

# 6 Fulfilment of CNS Review Requirements

The Country Group concluded that: Finland:

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