



Consultancy Meeting to prepare an INPRO Dialogue Forum on Licensing and Safety Issues for Small and Medium-sized Nuclear Power Reactors

17-19 December 2012, IAEA Headquarters

Minutes

Subject: Consultancy Meeting to prepare an INPRO Dialogue Forum on Licensing and Safety Issues for Small and Medium-sized Nuclear Power Reactors

Place of Meeting: VIC F0814, IAEA Headquarters, Vienna, Austria

Date of Meeting: 17-19 December 2012

PTAEO:

Meeting Chairman: Mr Stewart Magruder, Mr Djarot Sulistio Wisnubroto

Scientific Secretary: Mr Pill-Hwan Park, Mr Russell Anthony Gibbs, Mr M. Hadid Subki

Participating countries: Bangladesh, Canada, Finland, India, Indonesia, Kenya, Malaysia, Republic of Korea, Russian Federation, South Africa, Spain, United Kingdom, United States of America (13 Member States)

List of Participants

Bangladesh	Mr Md. Ali Zulquarnain (BAEC)
Canada	Mr Marcel deVos (CNSC)
Finland	Ms Kristiina Soderholm (FORTUM)
India	Mr A. Ramakrishna (AERB)
Indonesia	Mr Djarot Sulistio Wisnubroto (BATAN)
Kenya	Mr Collins Gordon Juma (MOE)
Malaysia	Dr Mohamad Puad Haji Abu (MNA)
Republic of Korea	Mr Young Jong Chung (KAERI)
Russian Federation	Mr Mikhail Miroshnichenko (Rostekhnadzor)
	Mr Alexey Utenkov (Rostekhnadzor)
	Mr Nikolay Kuznetsov (Rostekhnadzor)
	Mr Mikhail Lankin (SEC NRS)
South Africa	Mr Andre Botha (NNR)
Spain	Mr Palmiro Villalibre (PR to IAEA)
United Kingdom	Mr John Jones (ONR)
United States of America	Mr Stewart Magruder (NRC)

IAEA Participants

Mr J.E. Lyons, Director – NSNI
Mr V. Kuznetsov, Acting Head, INPRO Group
Mr R.A. Gibbs, Scientific Secretary
Mr H. Subki, Scientific Secretary
Mr P.H. Park, Scientific Secretary
Mr H. Khartabil, NSNI
Mr H.K. Kim, SSCS
Mr K.R. Qureshi, NPTDS-NENP

1. Background

In October 2011 an INPRO Dialogue Forum was held on Common User Considerations for Small and Medium-sized Nuclear Power Reactors.

The most recent meeting among a series of conferences, workshops, technical and consultancy meetings facilitated by IAEA's Nuclear Power Technology Development Section on the topic of SMR's was the workshop on Technology Assessment of Small and Medium-sized Reactors (SMRs) for Near Term Deployment in December 2011.

The main conclusions in regard to safety and licensing of SMRs are as follows:

- Many newcomers have expressed interest in SMRs, but are still in favour of 'proven' technology; so they want SMR technology to be first deployed in the country of origin to minimize licensing and performance risks.
- Nine countries are developing several new SMR designs with a large diversity of designs, applications, and range of unit power, and in different stages of development. In the light of the Fukushima accident the technology users paid particular attention to the implications of multi-module plants in relation to extreme natural events.
- Since many innovative SMRs contain a certain degree of 'first-of-kind' engineering systems and components, licensing and regulatory issues must be addressed.

2. Purpose

The objectives of the consultancy meeting (CM) are:

- To prepare a proposal to convene an INPRO Dialogue Forum in 2013 on licensing and regulatory aspects for Small and Medium sized Nuclear Power Reactors (SMRs).
- To share experiences of SMR development, licensing and deployment among Member States of technology holder and technology user countries.
- To discuss possibility of setting up so-called an "International SMR Regulator's Forum" among Member States.

3. Work done and results achieved

3.1. Overview

Summary of main work done by participants of the meeting is as follows:

- Introductory presentations by IAEA staffs: 1) Introduction to INPRO; 2) A draft prospectus of the 6th Dialogue Forum on licensing and safety issues of SMRs; 3) global trends, prospects and challenges for SMRs deployment; 4) licensing process for nuclear installations - considerations for SMR technology; and 5) safety assessment requirements for nuclear installations.
- MS presentations from Canada, India, Korea, Russia, USA on status of deployment and licensing of SMRs: examples from technology holder and technology user countries.
- MS presentations from Bangladesh, Indonesia, Kenya, Malaysia, and UK on their regulatory concerns and safety issues for SMRs: technology user perspectives.

- Discussions on the preparation of the 6th INPRO Dialogue Forum and the proposal of setting up an International SMR Regulator's Forum made by USA.
- Brainstorming session to identify topics and key issues to be discussed at the next Dialogue Forum on SMR licensing and safety issues.
- Produced a revised draft prospectus of the 6th Dialogue Forum on licensing and safety issues for SMRs and the list of key issues to be discussed at the Forum.

3.2. Opening and introduction

The meeting was opened by Mr V. Kuznestov, Acting Head, INPRO Group and Mr R. A. Gibbs, NSNI. In their opening remarks they welcomed the participants and highlighted the importance of this consultancy which is organized to prepare an INPRO Dialogue Forum on Licensing and Safety Issues for Small and Medium-sized Nuclear Power Reactors (SMRs).

The agenda of the CM was adopted as attached (Annex A). Mr S. Magruder of the USA was elected as a Chairman of the meeting. Mr D. Wisnubroto of Indonesia was elected as a co-Chairman and Mr M. A. Zulquarnain was elected as a rapporteur to assist the Chairman.

Mr. V. Kuznestov, IAEA made a presentation on the introduction of INPRO projects and activities to the CM participants and then Mr P.H. Park, a Scientific Secretary gave presentation on the draft prospectus (TOR) of the 6th INPRO Dialogue Forum on Licensing and Safety Issues of SMRs. These were followed by a series of presentations by IAEA staffs on important topics as given below:

- Licensing process for nuclear installations: This presentation, which was presented by Mr. Mr R.A. Gibbs, gave an overview on licensing process of nuclear installations. The presentation also partly covered present status of development of SMRs in countries like Argentina, Russia, India and the USA.
- Global trend, prospects and challenges of innovative SMRs deployment: In this presentation, Mr. H. Subki focused on status of SMR development and deployment around the globe. It also highlighted salient features of various innovative SMRs being developed by the technology developers.
- IAEA safety assessment requirements for nuclear installations: Mr. H. Khartabil of IAEA made this presentation. He highlighted various safety requirements of IAEA in connection with different aspects of nuclear installations.

3.3. Country presentations and discussions

Eleven participants, seven (Canada, India, Russian Federation, Unites States of America, India, United Kingdom and Republic of Korea) from technology holder countries and four (Indonesia, Kenya, Malaysia and Bangladesh) from newcomer countries made presentations in the CM. The technology holder countries presented the status on deployment and licensing of SMRs in their countries while the newcomer countries presented their concerns about issues like licensing, technology maturity, economic competitiveness, etc. for the SMRs.

All the meeting materials including PowerPoint presentations are available on the INPRO website: <http://www.iaea.org/INPRO/meetings/index.html>.

After each presentation, Chairperson asked the participants to give their views and comments on the country presentations and also to ask questions, if there was any. Major characteristics, issues and concerns identified through country presentations and participants discussions are summarised in the following table.

Country	Major status , issues and concerns
Bangladesh	<ul style="list-style-type: none"> Bangladesh currently is working to deploy large NPP (2 x 1000 MWe) but may consider deploying innovative SMRs in case of SMRs being as economically viable proven technology. Concerns and issues: commercial availability of SMRs (600 MWe class); rationalization of SMR reactor types; importance of reference plants or prototype/demonstration plants.
Canada	<ul style="list-style-type: none"> Canada applies one licensing process regardless of reactor size: RR, SMR, NPP. Canada is currently now developing SMR related regulatory requirements and guidance with graded approach in mind (e.g. Staffing commensurate with risk, operating and maintenance needs, emergency planning zones based risk informed). Concerns and issues: safety issues for the factory sealed type SMRs; technical positions on emergency planning and accident response for remotely sited reactor facilities (e.g. define acceptance criteria for EPZ); need for common position on safety classification; involvement of MDEP in OECD/NEA and interface with codes and standards organizations.
Finland	<ul style="list-style-type: none"> Concerns and issues: standardization considering technical differences (siting, design, licensing, etc.) and modularization; safety system configuration (including passive safety features); validation of simulation program.
India	<ul style="list-style-type: none"> AERB has completed the Pre-licensing Design of AHWR (300MWe boiling light water cooled and heavy water moderated). Requirements for First of A Kind (FOAK) systems are: review of design details and reports of supporting experiments/ analysis; requirements of in-situ performance; design intent confirmation by commissioning checks. Concerns and issues: possibility for pre-licensing; need for inspection of vendor facilities; focus on SMR designs for near-term deployment; need for simplification of regulatory and licensing processes (graded approaches); consideration for PA issues.
Indonesia	<ul style="list-style-type: none"> Four main activities for deploying nuclear power are now in progress: pre-feasibility study; technology assessment; feasibility study; assessment of Indonesian nuclear energy system. Key licensing requirement for NPP are land-based and proven technology. Concerns and issues: licensing and public acceptance are the key issues; emergency preparedness; third party liability and recent development in safety issues.
Kenya	<ul style="list-style-type: none"> Concerns and issues: infrastructure requirements; water demand and management in SMR deployment; technical support and vender training.
Malaysia	<ul style="list-style-type: none"> Malaysia are now conducting a feasibility study for the SMR deployment and technology assessment and considering for inviting SMR demonstration plant as regional hub for SMR. Concerns and issues: need for building common regional regulatory framework (ASEAN countries); communication risk and PA for SMR.
Korea	<ul style="list-style-type: none"> On 4 July 2012 KAERI and KEPCO was given a Standard Design Approval of SMART from NSSC through the review process of 1,500 items of Q&A. The most post-Fukushima actions, which had been derived to enhance safety by NSSC, were implemented in the SSAR. Concerns and issues: logical emergency planning zone and source term issue; licensing structure for multi-module facility; licensing process and performance validation for passive system; safety analysis methodology.
Russian Federation	<ul style="list-style-type: none"> As Federal Target Programme “New Generation Nuclear Power Technologies for the Period of 2010 to 2015 and until 2020”, Russia is now developing diverse SMR designs including BREST-OD-300, SVBR-100, floating unit with KLT-40S reactor plant, etc. However only limited number of SMRs has been licensed including KLT-40S based reactor. Concerns and issues: new safety aspects for using non-water coolants (Pb, Pb-Bi, etc.); issues of demonstration of lifetime of systems, components and structures during long periods of maintenance-free operation; issues of licensing unconventional NPP sites (in particular, transportable units); safety requirements when siting NPPs in locations with undeveloped civil infrastructure; issues of nuclear safety liability of technology holders and users.
South Africa	<ul style="list-style-type: none"> Concerns and issues: safety culture; categorization of SMRs versus large NPPs; licensing of manufacturing facilities, TSOs in embarking countries, fuel facility, shared facility of multiple unit plant; multi-stage licensing for newcomer countries.

Spain	<ul style="list-style-type: none"> Concerns and issues: need for consideration of common user considerations (CUC) developed by INPRO Group.
United Kingdom	<ul style="list-style-type: none"> The UK currently has no Small Modular Reactor designs although the topic is of interest to potential licensees. UK requirements for SMR will not differ significantly from conventional reactors and the overall safety measures must reflect the need for defence in depth. Concerns and issues: cogeneration, common mode/cause failures, common position on I&C architecture, reliance of auxiliary systems, accident management and emergency response, raising concern of international nuclear society on SMR awareness.
United States of America	<ul style="list-style-type: none"> US has same licensing process as currently used (one-step or two-step) so criteria and basic requirements will not change. NRC has identified potential policy, licensing, and technical issues including use of risk insights to focus reviews, operator staffing, emergency planning and preparedness framework, security framework, and insurance and liability requirements. Concerns and issues: focus on near-term designs (deployment within 10 years); common issues in terms of technical, policy/legal and research aspects; decommissioning issues.
IAEA	<ul style="list-style-type: none"> Concerns and issues: need for specific and smart regulations for SMRs; siting & site evaluation and design; framework of safety; identification of gaps in the use of computer codes; possibility to use IAEA GSR Part 4 and SSR 2/1 in in design and operation.

3.4. Proposal of setting up an SMR Regulator's Forum

Mr Magruder from NRC, USA made a presentation on “Proposal of Setting up an SMR Regulator’s Forum (SNF) at the US NRC staff perspectives. In this proposal, he gave an idea that the purpose of the Forum is to provide a forum for regulators that are licensing, or preparing to license, SMRs to discuss common issues. He also suggested potential topics for discussion as follows: 1) technical issues including mechanistic source term, safety analysis computer codes, codes and standards, the Fukushima lessons learned, innovative safety features and flexible operation; 2) policy issues including emergency preparedness/planning, siting considerations, financial assurance and licensing process; and 3) opportunities for sharing resources such as rest facilities, vendor audits and safety analysis computer codes.

Following this proposal, participants raised basic questions such as the difference between and existing forum such as MDEP by OECD/NEA, its membership and operation fund. Also participants exchanged their views as follows: IAEA-NSNI basically supported the proposal in the aspects that the SNF could be supportive to IAEA activities and helpful in developing IAEA safety standards and government regulatory position of Member States; Canada expressed the view that the SRF should be an open and transparent forum and needs to be combined with the existing forums, topics may include industrial issues suggested by technical support organizations (TSOs); Russia in principle opposed the proposal since there are various relevant forums so MSs could use the existing forums rather than establishing a new forum with a special focus on SMRs.

In conclusion, the meeting has not reached a consensus but decided that the proposal continues to be open until the next INPRO Dialogue Forum in order to get more comments and opinions from participants and other Member States.

3.5. Drafting of a prospectus for the 6th INPRO Dialogue Forum

In order to prepare the 6th INPRO Dialogue Forum on licensing and safety issues for SMRs, the meeting reviewed the draft prospectus prepared by IAEA INPRO and thread bear discussions were made particularly on the following items: purpose and deliverables, dates and places, scope and nature, participants. The meeting produced a revised draft prospectus as attached (Annex B) and some of decisions made are as follows:

- Purpose and deliverables: revised to more clearly define its objectives and outputs.
- Types of SMRs: focus on SMRs with innovative design features for near-term deployment but do not need to confine certain reactor types.
- Dates and places: 29 July – 2 August 2013, Vienna, Austria
- Participants include regulators including WENRA, OECD CNRA, representatives from MDEP and CSNI, technology developers (vendors/reactor designers, GIF, fuel cycle facility designers), representative utilities and utilities group (e.g. WANO), representatives from TSOs, representatives from key “code and standard” developers (e.g. ASME), nuclear energy project implementing organization (NEPIO) from embarking countries.

The meeting had a brainstorming session to identify issues in connection with the licensing and safety of SMRs. In this session, all participants suggested several issues which a total of 44 issues were identified and prioritized by the evaluation of participants and categorized in five areas such as: 1) defence in depth for SMR designs; 2) site and siting considerations of SMRs; 3) application of graded approach in regulatory and licensing process; 4) legal and regulatory framework of SMRs; and 5) public participation in novel SMR concepts.

The meeting decided that the identified issues will be reviewed and narrowed down for more focused and efficient discussions at the Dialogue Forum by the volunteered leader and co-leader of each group. The list of identified issues is attached as Annex C.

4. Conclusions and Recommendations

The meeting was held in a very congenial atmosphere. All participants contributed towards achieving the goals of the CM. The meeting produced expected outcomes including a revised prospectus of the 6th Dialogue Forum and list of key discussion issues. The participants expected that the proposed 6th INPRO Dialogue Forum would be a productive one focusing on priority areas such as how SMRs can meet safety functions and be made licensable in user countries, particularly, in the newcomer countries.

Considering the importance of the Dialogue Forum on SMR licensing and safety issues, the CM requests that the necessary IAEA TC fund be supported to implement the relevant activity and successfully organize the 6th INPRO Dialogue Forum.

Annex A: Agenda



INPRO
International Project on
Innovative Nuclear Reactors
and Fuel Cycles

**Consultancy Meeting to prepare an INPRO Dialogue Forum
on Licensing and Safety Issues for Small and Medium-sized
Nuclear Power Reactors**

IAEA Headquarters, Vienna, Austria, 17-19 December 2012, Room F0814

AGENDA

Monday, 17 December 2012

Time	Topic and Issue	Presenter
09:30 – 10:00	<p>Opening</p> <ul style="list-style-type: none"> Opening remarks Self-introduction of participants Objectives and expected outcomes of the meeting Election of a Chairman and adoption of the Agenda 	<p>Mr V. Kuznetsov/ Mr R.A. Gibbs All participants Mr P.H. Park All participants</p>
10:00 – 10:30	Coffee break	
10:30 – 12:30	<p>Introduction</p> <ul style="list-style-type: none"> Introduction to INPRO Presentation on a draft prospectus (TOR) of the 6th INPRO Dialogue Forum on Licensing and Safety Issues of SMRs Presentation on licensing process for nuclear installations: Considerations for SMR Technology Presentation on global trend and prospects of innovative SMR development and deployment 	<p>Mr V. Kuznetsov Mr P.H. Park Mr R.A. Gibbs Mr H. Subki</p>
12:30 – 14:00	Lunch break	
14:00 – 14:30	<ul style="list-style-type: none"> Presentation on IAEA safety assessment requirements for nuclear installations 	Mr. H. Khartabil
14:30 – 16:00	<p>Status of Deployment and Licensing of SMRs: Examples from Technology Holder and Technology User Countries</p> <ul style="list-style-type: none"> Presentation by Canada and India: focusing on their experiences and proposal relating to the forum Discussion of licensing issues and challenges 	<p>Mr M. de Vos/ Mr A. Ramakrishna All participants</p>
16:00 – 16:30	Coffee break	
16:30 – 18:00	<ul style="list-style-type: none"> Presentation by Russia and United States of America: focusing on their experiences and proposal relating to the forum Discussion of licensing issues and challenges 	<p>Mr M. Miroshnichenko /Mr S. Magruder All participants</p>
18:00	Adjourn	

Tuesday, 18 December 2012

Time	Topic and Issue	Presenter
09:00 – 10:30	Regulatory Concerns and Safety Issues for SMRs by Technology User Perspectives <ul style="list-style-type: none"> • <i>Presentation by Indonesia and Kenya: focusing on their safety concerns and proposal relating to the forum</i> • <i>Discussion on regulatory concerns and safety issues</i> 	Mr D.S. Wisnubroto Mr C.G. Collins All participants
10:30 – 11:00	Coffee break	
11:00 – 12:30	<ul style="list-style-type: none"> • <i>Presentation by Malaysia, United Kingdom, Bangladesh and Republic of Korea: focusing on their safety concerns and proposal relating to the forum</i> • <i>Discussion on regulatory concerns and safety issues</i> 	Mr M.P.H. Abu/ Mr J. Jones All participants
12:30 – 14:00	Lunch break	
14:00 – 16:00	Proposal of Setting up an SMR Regulator's Forum <ul style="list-style-type: none"> • <i>Proposal to establish an SMR Regulator's Forum : Its necessity, objectives, roles and operation</i> • <i>Discussion on the proposal and follow up actions</i> 	Mr S. Magruder All participants
16:00 – 16:30	Coffee break	
16:30 – 18:00	Preparation for the 6th INPRO Dialogue Forum <ul style="list-style-type: none"> • <i>Discussion on types of SMRs that should be considered for the INPRO Dialogue Forum</i> 	All participants
18:00	Adjourn	
18:30	Reception – VIC Restaurant	All participants

Wednesday, 19 December 2012

Time	Topic and Issue	Presenter
09:00 – 11:00	Preparation for the 6th INPRO Dialogue Forum (cont) <ul style="list-style-type: none"> • <i>Discussion of the forum topics and issues</i> 	All participants
11:00 – 11:30	Coffee break	
11:30 – 12:30	<ul style="list-style-type: none"> • <i>Discussion on the organizational matters: objectives, deliverables, participants, organizers, budget, etc.</i> • <i>Recommendation to support TC fund for the Dialogue Forum by a representative of participating countries</i> • <i>Proposal to host the 6th Dialogue Forum by MSs</i> 	<i>All participants</i> Mr D.S. Wisnusubroto All participants
12:30 – 14:00	Lunch break	
14:00 – 16:00	<ul style="list-style-type: none"> • <i>Discussion of a revised prospectus on the Dialogue Forum</i> Conclusion <ul style="list-style-type: none"> • <i>Conclusion remarks</i> • <i>Closing of the meeting</i> 	All participants Chairman Mr V. Kuznetsov/ Mr J.E. Lyons
16:00	Adjourn	



INPRO
International Project on
Innovative Nuclear Reactors
and Fuel Cycles

Terms of Reference for

INPRO Dialogue Forum on Global Nuclear Energy Sustainability: Licensing and Safety Issues for Small and Medium-sized Nuclear Power Reactors (SMRs)

IAEA Headquarters, Vienna, Austria, 29 July - 2 August 2013
Boardroom A, Building M, Vienna International Centre (VIC)

Background

The Agency seeks to bring together technology holders and technology users to discuss and share information on desirable innovations, both technical and institutional, to ensure that nuclear energy is available to meet long-term global energy needs in a sustainable manner. The INPRO Dialogue Forum is one mechanism for technology holders and users to discuss such innovations.

The 56th IAEA general Conference resolution (GC(56)/RES/12) stressed the importance, when planning and deploying nuclear energy, including nuclear power and related fuel cycle activities, of ensuring the highest standards of safety and emergency preparedness and response, including incorporating the lessons learned from the Fukushima Daiichi accident.

In October 2011 an INPRO Dialogue Forum was held on Common User Considerations (CUC) for Small and Medium-sized Nuclear Power Reactors (SMRs) to discuss user considerations for SMRs in light of the conclusions reached in the CUC study and recent developments in SMR technologies.

The IAEA technical meeting, held in December 2011, on “Technology Assessment of SMRs for Near Term Deployment” concluded with respect to their safety and licensing aspects as follows: 1) Since many innovative SMRs contain a certain degree of ‘first-of-kind’ engineering systems and components, licensing and regulatory issues must be addressed; 2) Many newcomers are still in favour of ‘proven’ technology and want SMR technologies to be first deployed in the country of origin to minimize licensing and performance risks; 3) In the light of the Fukushima Daiichi Accident, the technology users paid particular attention to the implications of multi-module plants relating to extreme natural events that could potentially lead to severe accidents; and 4) The technology holders should incorporate lessons learned from the Fukushima Daiichi Accident into the design.

In December 2012, the INPRO Group in cooperation with NENP-NPTDS and NS-NSNI organized a Consultancy Meeting to prepare this Dialogue Forum and to discuss the possibility of setting up a “SMR Regulators Forum” in the IAEA Member States. At this Consultancy Meeting, participants discussed and identified specific topics and issues for this Dialogue Forum.

Participation

The meeting is open to 80 or more participants from Member States including Albania, Algeria, Argentina, Armenia, Bangladesh, Belarus, Belgium, Brazil, Bulgaria, Canada, Chile, China, Croatia, Czech Republic, Egypt, Finland, France, Germany, Hungary, India, Indonesia, Israel, Italy, Japan, Jordan, Kazakhstan, Kenya, Republic of Korea, Malaysia, Mexico, Morocco, Netherlands, Nigeria, Pakistan, Poland, Romania, Russian Federation, Saudi Arabia, Slovakia, South Africa, Spain, Sudan, Switzerland, Thailand, Tunisia, Turkey, Ukraine, United Arab Emirates, United Kingdom, United States of America, Uruguay, Vietnam, and the European Commission.

Participants may include representatives from: WENRA, OECD/NEA groups such as CNRA, CSNI and MDEP, technology developers (vendors/reactor designers, GIF, fuel cycle facility

designers), utilities and utilities groups such as WANO, TSOs, key “code and standard” developers (e.g., ASME), and NEPIO representatives from embarking countries.

The meeting targets senior officers or technical experts from potential licensees and national regulators, in both developing and developed countries, engaged or interested in the development, deployment and licensing of sustainable nuclear energy systems, especially on innovative SMRs. The participants will be expected to actively participate in the breakout session, including presenting any evidence to support a point of view. Participants are strongly encouraged to review the background material prior to the meeting.

Programmatic Context

The meeting is being held under Subprogramme 1.1.4, “International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO)”, of *The Agency’s Programme and Budget 2012–2013* (IAEA document GC(55)/5 issued in August 2011).

Objectives and Outputs of the Meeting

The traditional objective of the INPRO Dialogue Forum is to bring together nuclear technology users and technology holders from all IAEA interested Member States to discuss issues related to sustainable nuclear energy development and deployment. This dialogue facilitates mutual understanding of the needs and potential roles of technology users and the possibilities and limitations of technology holders. To date, five INPRO Dialogue Forums have been held since 2010. For details, see www.iaea.org/INPRO.

This Dialogue Forum aims to discuss the following major issues regarding licensing and safety issues of Small and Medium sized Nuclear Power Reactors (SMRs): 1) considerations for SMR designs; 2) siting considerations of SMRs; 3) application of graded approach in regulatory and licensing process; 4) legal and regulatory framework of SMRs; and 5) public participation in SMR licensing process (see Annex: Scope and nature of the Meeting).

The primary audience for this forum will be nuclear regulators and operating organisations in the IAEA Member States that are potentially licensing or preparing to license SMRs. Other stakeholders such as technical support organizations, vendors, and codes and standards organizations are also encouraged to participate. All participants will discuss the common issues for deployment of SMRs. For those countries considering SMRs in their nuclear power development programme, it will provide licensing and regulatory knowledge and experience through its participants with an opportunity to discuss common safety issues with technology holders.

Participating Member States considering the use of SMR technology are expected to develop and prioritise a list of licensing and safety issues, develop an understanding of related work in other forums and a recommended path forward to resolve, and address the issues identified through participation in a working group.

Location

This Dialogue Forum will be held at IAEA Headquarters, Boardroom A, Building M, Vienna International Centre (VIC), Austria.

Meeting Officers

Scientific Secretaries:

- Mr Pill-Hwan Park, Senior Nuclear Engineer, INPRO Group, Division of Nuclear Power, Department of Nuclear Energy; tel.: +43 1 2600 22818, e-mail: P.Park@iaea.org
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- Mr. M. Hadid Subki, Nuclear Engineer, Nuclear Power Technology Development Section, Division of Nuclear Power, Department of Nuclear Energy; tel.: +43 1 2600 22820, e-mail: M.Subki@iaea.org

INPRO Group Head:

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Secretarial and Administrative Support

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Annex: Scope and Nature of the Meeting

The workshop will consist of lectures and presentations by IAEA professional staffs, invited experts and representatives from Member States and International Organizations as follows:

The workshop will consist of lectures and presentations by IAEA professional staffs, invited experts and representatives from Member States and International Organizations as follows:

- IAEA presentations may include INPRO methodology to assess innovative nuclear energy systems; status and prospects for SMRs; IAEA Safety Standards on the licensing process and related safety assessment requirements for nuclear power plants; and common user considerations on safety for SMRs.
- Member States' presentations may include: experiences and preparations for SMR licensing and deployment (technology holders) and licensing safety issues for SMRs (technology users).
- Presentations by International Organizations and invited speakers may include; licensing and safety approaches, development of design criteria, codes and standards for new nuclear energy systems including SMRs and Generation IV reactors.

Prior to the workshop selected participants will be provided with an opportunity to supply information on:

- Their national vision and status of development, deployment and licensing of SMRs from the perspectives of technology holders.
- Licensing and safety issues for the deployment of SMR technologies from the perspectives of technology users.
- Policy and technical issues and user requirements with respect to the unique design features and deployment plans for SMRs.

These presentations will be followed by breakout sessions to facilitate in-depth discussion on the following topics and issues:

- (Group 1) Considerations for SMR designs: implementation of defence in depth; approaches to international standardization; I&C and plant staffing; safety analysis challenges; and Fukushima lessons learned.
- (Group 2) Siting considerations for SMRs: determining source terms for non-water cooled SMRs or novel fuels; siting considerations for fuelled transportable reactors; and sites in regions lacking in fundamental infrastructure (including extreme remote sites).
- (Group 3) Application of graded approach in regulatory and licensing process: flexibility in emergency planning requirements and accident response; licensing codes and methodologies; R&D programmes; and demonstration of innovative features.
- (Group 4) Legal and regulatory framework of SMRs: plant staffing; licensing process for multiple modules; standardization of portion of design and safety classification; identification of required changes to safety standards; and transportation of fuelled-NPPs (modules).
- (Group 5) Public participation in SMR licensing process: new nuclear fuel issues (e.g. uranium nitride); environmental impact; safety culture; transportation of fuelled-NPPs (modules); and spent fuel management.

This breakout session will be followed by a panel discussion toward innovative licensing approaches for SMRs and presentations of proposals toward future actions for licensing and safety issues for SMRs.

The final session will consist of presentations summarizing the conclusions and recommendations from representatives from technology developers and potential users with a summation and concluding remarks by the Chairperson.