A. Introduction

The assessment of human and organizational factors (HOF) is an integral part of achieving and maintaining a high level of safety in nuclear installations. The importance of human factors in nuclear safety was highlighted by the Three Mile Island accident in 1979 and later identified as a root cause of the Chernobyl accident in 1986. In addition, the topic of HOF attracted renewed attention in connection with the 2011 Fukushima Daiichi accident and has been specifically addressed in the International Atomic Energy Agency’s (IAEA’s) post-Fukushima activities.

The consideration of human interactions in safety assessment is one of the requirements outlined in the General Safety Requirements publication Safety Assessment for Facilities and Activities (IAEA Safety Standards Series No. GSR Part 4 (Rev. 1), Vienna, 2016), which indicates the necessity of evaluating the design and procedural aspects of human performance implementation. The framework for considering and assessing human factors in the process of safety assessment is mainly provided by the human reliability assessment (HRA).

The conduct of HRA is a complex task designed to predict human performance in the prevailing context. HRA methods have continuously evolved and significantly progressed during the last
decades. The progress of HRA methods is conditioned by several factors, such as the further development of the state of knowledge, developments in simulator data to support HRA methods, and continuous identification and resolution of open issues in existing HRA approaches. However, observations related to the implementation of HRA for nuclear installations worldwide show that advanced HRA methods and tools are not being widely applied.

Human reliability assessment methods have been applied to nuclear installations for several decades; nevertheless, there are still emerging issues which are considered to be a challenge for comprehensive HRA, including:

- Errors of commission
- Dependency analysis
- Multi-unit considerations
- Long-time window scenarios
- Digitalized main control room
- Use of simulator data to improve the human error probability
- Dynamics in HRA

The variety of existing HRA methods provides a significant basis for discussions and requires efforts to be spent on the harmonization of the HRA framework.

Detailed guidance on HRA was presented in the IAEA Safety Practices publication *Human Reliability Assessment in Probabilistic Safety Assessment for Nuclear Power Plants* (Safety Series No. 50-P-10, IAEA, Vienna, 1995) to support the IAEA’s recommendations on probabilistic safety assessment (PSA). However, that publication was issued more than twenty years ago and it is no longer regarded as reflecting state-of-the-art practices in this field. Therefore, an activity aimed at the development of a new IAEA Safety Report entitled *Human Reliability Assessment for Nuclear Installations* was initiated by the IAEA in 2016. It is planned that the publication will describe the overall methodology of HRA, the stepwise approach that HRA involves, and various considerations to be taken into account. In addition, the publication will contain a brief overview of existing HRA methods, including brief description, area of application, limitations and the resources required for each of these methods. The publication is intended to be used by a broad spectrum of analysts (e.g. PSA practitioners, human factor engineers) from regulatory bodies, utilities, research institutes, technical support organizations (TSOs) and designers of nuclear installations.

**B. Objectives and Scope**

The main objective of this meeting is to serve as an international forum for presentations and discussions on the current practices and recent developments in the field of HRA for nuclear installations. The meeting will focus, in particular, on HRA challenges and possible solutions. In addition, the meeting will provide a platform for discussions on the recently initiated IAEA activity aimed at the development of a new IAEA Safety Report entitled *Human Reliability Assessment for Nuclear Installations*. 
C. Topics

Participants are invited to share their views and give a presentation and provide written material on any of the following issues of interest:

- Lessons learned and recent developments in the application of HRA methods for nuclear installations
- Emerging issues in the field of HRA (errors of commission, dependency analysis, Multi-unit considerations, long time window scenarios, etc.)
- Use of simulator data in support of HRA methods
- The role of HRA in PSA
- Human factors engineering in HRA

D. Participation

Participation is solicited from nuclear safety professionals from nuclear power plant (NPP) design and operating organizations, regulatory bodies, and TSOs who are engaged in activities related to the safety of NPPs and specifically involved in HRA for nuclear installations.

The nominated experts should have sound knowledge and experience related to HRA for nuclear installations. To ensure maximum effectiveness in the exchange of information, participants should be persons actively involved in the subject of the meeting.

Participants should complete the Participation Form (Form A) and send it to the competent official authority (i.e. Ministry of Foreign Affairs or National Atomic Energy Authority) for transmission to the IAEA Secretariat to arrive no later than 10 September 2017. The nomination of a participant will be accepted only if forwarded by the Government of an IAEA Member State or by an organization invited to participate.

E. Visas

Designated participants who require a visa to enter Austria should submit the necessary application to the nearest diplomatic or consular representative of Austria as soon as possible.

Similarly, the necessary arrangements for accompanying hardware/software should also be made as soon as possible.
F. Expenditure

The costs of the meeting will be borne by the IAEA; no registration fee will be charged to participants.

Travel and subsistence expenses of participants will not be borne by the IAEA. Limited funds are, however, available to help cover the cost of attendance of certain participants. Such assistance may be offered upon specific request to normally one participant per country provided that, in the IAEA’s view, the participant on whose behalf assistance is requested will make an important contribution to the meeting. The application for financial support should be made at the time of nominating the participant and should reach the IAEA Secretariat no later than 10 September 2017.

G. Papers

Papers or presentations should be submitted through the established official channels on items covered by the programme of the meeting (see Section C above). The submission of a paper implies that the author intends to participate in the meeting if it is accepted. Papers should not exceed 3000 words and should contain an abstract of about 400 words. Papers should be prepared according to the guidelines provided in Attachment B.

A completed Participation Form (Form A), with an indication of whether or not the nominee intends to present a paper, must be sent to the IAEA through the competent official authority by 10 September 2017, together with an abstract of 400 words. The abstract will be used to select papers for the meeting and to establish the final programme (see Sample A).

In addition to the master (paper) copy, it is necessary to provide an electronic version of the paper.

H. Working Language

The working language of the meeting will be English. No simultaneous interpretation will be provided.

I. Proceedings

The contributed papers, presentations and summary conclusions of the meeting will be compiled and made available as soon as possible after the meeting.
J. Local Arrangements

The meeting will be held at the IAEA’s Headquarters in Vienna, Austria. It will start at 09:30 on Monday, 13 November 2017, and will end at noon on Friday, 17 November 2017.

Additional details, together with information on local arrangements, will be sent at a later date to all selected participants.

For further questions about local arrangements please contact the Administrative Secretary of the meeting, Ms Silvia Gogany-Pavlovic (Tel.: +43 1 2600 22658; Fax: +43 1 2600 7 22658; Email: S.Gogany@iaea.org).

The Scientific Secretary of the meeting is Mr Shahen Poghosyan of the Safety Assessment Section of the Division of Nuclear Installation Safety. His contact details are as follows:

Mr Shahen Poghosyan
Safety Assessment Section
Division of Nuclear Installation Safety
Department of Nuclear Safety and Security
International Atomic Energy Agency
Vienna International Centre
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1400 VIENNA
AUSTRIA

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Fax: +43 1 26007
Email: S.Poghosyan@iaea.org
# Participation Form

**Technical Meeting on the Development of the Safety Report on Human Reliability Assessment for Nuclear Installations**

**IAEA Headquarters, Vienna, Austria**

**13–17 November 2017**

To be completed by the participant and sent to the competent official authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA, or National Atomic Energy Authority) of his/her country for subsequent transmission to the International Atomic Energy Agency (IAEA), Vienna International Centre, PO Box 100, 1400 Vienna, Austria, either electronically by email to: [Official.Mail@iaea.org](mailto:Official.Mail@iaea.org) or by fax to: +43 1 26007 (no hard copies needed). Kindly send also a copy per email to: [S.Poghosyan@iaea.org](mailto:S.Poghosyan@iaea.org) and [S.Gogany@iaea.org](mailto:S.Gogany@iaea.org).

Participants who are members of an invited organization can submit this form to their organization for subsequent transmission to the IAEA.

**Deadline for receipt by IAEA through official channels: 10 September 2017**

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