



# **Technical Meeting on Justification of Commercial Industrial Instrumentation and Control Equipment for Nuclear Power Plant Applications**

**Hosted by the  
Government of Canada**

**through  
Curtiss-Wright Corporation**

**Toronto, Canada**

**19–22 June 2018**

**Ref. No.: I2-TM-1702864**

## **Information Sheet**

### **A. Background**

Historically, nuclear grade instrumentation and control (I&C) systems were specifically developed to implement functions important to safety in nuclear power plants (NPPs) using conventional analogue technology. The gradual decrease of market availability of nuclear qualified I&C products and the worldwide transition to digital technology, resulting in a more rapid obsolescence, have prompted I&C designers increasingly to seek to integrate commercial products within new development or modernization projects.

Commercial off-the-shelf digital I&C products can offer reliable and cost-effective alternatives to products designed and pre-qualified for systems important to safety in NPPs. These products offer such

benefits as an extensive history of operation, a large installed user base, proven technology and a larger group of technical personnel who are experienced in their use. However, they have to be shown to meet the relevant functional, safety and environmental requirements with equal or better reliability as the former, nuclear qualified products.

A special aspect is that many traditionally non-digital products (e.g. sensors, motor control centres, device actuators, panel displays, power supplies, etc.) offered in the commercial market now often include embedded programmable components even though this may not be evident. These products may be subject to unique vulnerabilities (including computer security vulnerabilities) and failure modes (e.g. software faults or common cause failures) that need to be analysed before they can be used in systems important to safety.

Also, how these products may be affected by external environmental conditions present in NPPs such as heat, humidity, vibration and electromagnetic interference needs to be thoroughly evaluated and tested to ensure that the components will behave in a known and predictable manner.

In summary, the justification of the suitability and correctness of commercial industrial I&C equipment for its intended use in NPP applications should confirm that it meets the functional requirements, that systematic faults are minimized and that no anticipated external effect can result in an unsafe operation of its principal functions.

Recognizing the relevance of the above-mentioned issues and the rapid development of techniques, the members of the Technical Working Group on Nuclear Power Plant Instrumentation and Control (TWG-NPPIC) at their 2017 meeting recommended that the International Atomic Energy Agency (IAEA) initiate relevant activities to address these problems. In response, the IAEA is developing a new IAEA Nuclear Energy Series report provisionally entitled *Justification of Commercial Industrial Instrumentation and Control Equipment for Nuclear Power Plant Applications* to provide guidance to Member States in this area.

The objective of this proposed new publication is to provide an overview of the current knowledge, up-to-date best practices, experiences, and benefits and challenges related to the justification of the above-mentioned digital I&C products, to document a systematic approach, and to define the various steps involved in the justification process. The report is intended to be used by Member States to support the design, development, justification, qualification, licensing, implementation, and operation of nuclear I&C equipment.

## **B. Objectives**

The purpose of the meeting is to serve as an international forum for sharing best practices and strategies used in the justification of commercial industrial I&C equipment for NPP applications, as well as for discussing the challenges and issues that need to be resolved in this area. An additional goal of the meeting is to disseminate information on the lessons learned through the work carried out so far on the above-mentioned proposed new IAEA Nuclear Energy Series report, and to review the latest draft of this document.

The meeting has the following primary objectives:

- To provide an international forum for presentations and discussions on the subject of the meeting;

- To strengthen Member States' capabilities for improved understanding of the justification of commercial industrial I&C equipment for application at NPPs;
- To disseminate the experience that has been gained while developing the new IAEA Nuclear Energy Series report provisionally entitled *Justification of Commercial Industrial Instrumentation and Control Equipment for Nuclear Power Plant Applications*;
- To review the draft version of that report; and
- To support the IAEA in defining future activities in the field of I&C applications at NPPs.

## C. Topics

Presentations are invited on all approaches that are related to the justification of commercial industrial I&C equipment for NPP applications. The following list provides examples of presentation topics that would be appropriate for the meeting:

- Strategies for the justification of commercial I&C products
- Types of justification, selection of appropriate methods
- Justification process
- Suitability requirements and evaluation
- Justification inputs, outputs, evidence
- Qualification activities
- Grading the justification according to safety classes
- Gaps, allowance for non-compliance
- Digital 'smart' devices with embedded software, undeclared digital content in commercial products
- Vulnerabilities of digital products addressed by the justification
- Considerations for design changes, obsolescence management
- Regulatory aspects
- Counterfeit, fraudulent and suspect items
- Role and use of third-party, independent assessors and certifications
- Lessons learned from experience (case studies, operating experience, proven practices, etc.).

## D. Working Material

The draft manuscript of the new IAEA Nuclear Energy Series report provisionally entitled *Justification of Commercial Industrial Instrumentation and Control Equipment for Nuclear Power Plant*

*Applications* will be provided to the participants prior to the meeting. This draft will serve as the basis for dialogues at the meeting. Participants will be requested to review selected parts of the document and to provide their remarks and comments.

## **E. Participation**

In view of the subject of the meeting, participation is limited to IAEA Member States that currently operate NPPs or are constructing their first NPP units. Participation is solicited from representatives of NPPs and regulatory bodies, utilities, technical support organizations, developers, vendors, research organizations and justification assessors engaged in the field of I&C equipment design and the application of such equipment at NPPs. To ensure maximum effectiveness in the exchange of information, participants should be persons actively involved in the subject matter of the meeting.

## **F. Application Procedure**

Designations should be submitted using the attached Participation Form (Form A). Completed forms should be endorsed by the competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA, or National Atomic Energy Authority) and returned through the established official channels. They must be received by the IAEA not later than **16 April 2018**. Designations received after that date or applications sent directly by individuals or by private institutions cannot be considered. Designating Governments will be informed in due course of the names of the selected candidates and at that time full details will be given on the procedures to be followed with regard to administrative and logistic matters.

The meeting is, in principle, open to all officially designated persons. The IAEA, however, reserves the right to limit participation due to limitations imposed by the available facilities. The maximum number of participants for this meeting (excluding those from Canada) is 50. It is, therefore, recommended that interested persons take the necessary steps for the official designation as early as possible.

## **G. Visas**

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

## **H. Expenditure**

The costs of the meeting are borne by the host organizations; no registration fee is charged to participants. Travel and subsistence expenses of participants will have to be borne in general by their designating Governments/organizations. The IAEA has, however, limited funds at its disposal to help

meet 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 designating the participant.

The organizers of the meeting do not accept liability for the payment of any cost or compensation that may arise from damage to or loss of personal property, or from illness, injury, disability or death of a participant while he/she is travelling to and from or attending the meeting, and it is clearly understood that each Government, in designating participants, undertakes responsibility for such coverage. Governments would be well advised to take out insurance against these risks.

## **I. Presentations**

Presentations should be prepared as Microsoft PowerPoint (.ppt) or Portable Document Format (.pdf) files. Computer-based projection facilities will be provided. Authors are requested to provide the Scientific Secretary (see Section M) with electronic copies of their presentation files in advance of their scheduled presentation slot so that the files can be duly uploaded. Electronic versions of the presentations are also necessary to ensure timely issuance of the proceedings to be prepared and distributed in electronic form.

It is not mandatory for all participants to submit a presentation. However, the IAEA welcomes and encourages contributions in this format. Time for the presentations will be limited to 25 minutes followed by a five-minute discussion period. The number of presentations may have to be limited so as to leave sufficient time for discussions and review of the draft IAEA Nuclear Energy Series report provisionally entitled *Justification of Commercial Industrial Instrumentation and Control Equipment for Nuclear Power Plant Applications*.

## **J. Working Language**

The working language of the meeting will be English; no interpretation will be provided.

## **K. Local Arrangements**

The meeting will be held at the Sheraton Centre Toronto Hotel, 123 Queen Street West, Toronto, M5H 2M9, Canada and will start on Tuesday, 19 June 2018, at 9.30 a.m. and end on Friday, 22 June 2018, at 2.00 p.m.

The meeting agenda, together with information on local arrangements, will be sent to the designated participants.

The local representative of the host organization (Curtiss-Wright Corporation) will be Mr Chris Mitchell.

Contact details:

**Mr Chris Mitchell**

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## **L. Accommodation**

The host organization (Curtiss-Wright Corporation) will be providing a link to help participants in making hotel room reservations at the Sheraton Centre Toronto Hotel. Participants are requested to book their rooms themselves. Information on the hotel can be found at: <http://www.sheratontoronto.com/>

Additionally, participants may elect to make their own bookings at other hotels in the area of the meeting location.

## **M. IAEA Secretariat**

The IAEA Scientific Secretary for the meeting is Mr Janos Eiler of the Department of Nuclear Energy. His contact details are:

**Mr Janos Eiler**

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Subsequent correspondence on scientific matters should be sent to the Scientific Secretary and correspondence on other matters related to the meeting to the Administrative Secretary.