IAEA
International Atomic Energy Agency
Atoms for Peace and Development

Workshop on Condition Based Qualification of Equipment in Nuclear Power Plants

3–5 June 2025

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Information Sheet

Introduction

Currently, the median age of operating nuclear power units worldwide is approximately 37 years, with about one-third of the 440 operational units undergoing long-term operation (LTO). Additionally, around 27 Member States have either implemented or are in the process of implementing LTO programs. Supporting our Member States in these efforts remains a critical mission for the IAEA.

Equipment Qualification (EQ) plays a vital role in ensuring the continued safe and reliable operation of nuclear power plants (NPPs), particularly as they enter LTO. Traditionally, EQ follows a time-based approach, demonstrated through the concept of "Qualified Life." Qualified Life refers to the period during which a structure, system, or component has been shown—through testing, analysis, or operational experience—to function within acceptable criteria under normal operating conditions while retaining its ability to perform during accident conditions, such as a design basis accident or earthquake.

While effective, this time-based approach can be - conservative, often leading to the premature replacement of equipment that remains fully functional. Moreover, it does not always account for actual field conditions or real-time degradation. This is why Condition-Based Qualification (CBQ) is gaining traction among Member States (MS), as it introduces a more advanced approach that integrates real-time monitoring, diagnostics, and actual performance data into the qualification process.

CBQ is based on the IEC/IEEE dual-logo standard 60780-323 (2016), widely recognized as the authoritative standard for equipment qualification in the nuclear industry. The CBQ methodology establishes the “qualified condition” of equipment using specific Condition Indicators (CIs), enabling

utilities to monitor degradation and predict the remaining useful life of components, such as Class 1E cables. Key steps in the CBQ process include selecting appropriate Condition Monitoring (CM) techniques and correlating CIs with the functional integrity of safety-related equipment.

Recent research and practical applications highlight several key benefits of CBQ, including:

- Enhanced safety compliance for extended operations
- Elimination of time-based replacement schedules
- A cost-effective alternative to requalification

As part of its ongoing support for Member States in their LTO efforts, the IAEA officially launched the **International Network on Life Management of Nuclear Power Plants (LMNPP)** (website: LMNPP Public) in November 2022. Hosted on the IAEA CONNECT platform, the LMNPP Network fosters international cooperation, enhances knowledge-sharing in nuclear power plant life management, and establishes project-based Working Groups (WGs) to further support MS in LTO initiatives and knowledge transfer.

Among these efforts, **WG5 focuses on equipment survivability under accident conditions.** During its Kick-off Workshop in May 2024, Member State representatives identified CBQ as a key area of interest. In response, the IAEA has initiated actions to address these needs, reinforcing its commitment to advancing CBQ and related methodologies to enhance the safety and sustainability of nuclear power plant operations.

The IAEA held the **first hybrid consultancy meeting on Condition-Based Qualification of Equipment in Nuclear Power Plants** in Vienna from **25–27 February 2025.** During the meeting, participants shared recent experiences, discussed gaps and barriers to CBQ implementation, and explored CBQ methodologies.

Objectives

The purpose of the event is to discuss the method of condition-based qualification in establishing a process for evaluating the remaining useful life of equipment, based on the use of specific condition monitoring methods.

During the event, the participants will exchange insights, recent experiences, and case studies on CBQ in nuclear power plants, ultimately contributing to the development of a forthcoming **IAEA TECDOC** on the topic. The following are examples of relevant presentations and discussion topics for the event:

1. Recent industry experience and R&D results on CBQ
2. Regulatory insights on CBQ
3. Gaps, barriers, and benefits of CBQ
4. CBQ methodologies

Language

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

Working Material

The template of the presentation and other meeting materials will be provided to the participants prior to the meeting.

Topics

Please refer to "Objectives" for examples of topics.

Participation and Registration

All persons wishing to participate in the event have to be designated by an IAEA Member State or should be members of organizations that have been invited to attend.

In order to be designated by an IAEA Member State or invited organization, participants are requested to submit their application via the InTouch+ platform (https://intouchplus.iaea.org) to the competent national authority (Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) or organization for onward transmission to the IAEA by **22 April 2025,** following the registration procedure in InTouch+:

1. Access the InTouch+ platform (https://intouchplus.iaea.org):
   - Persons with an existing NUCLEUS account can sign in to the platform with their username and password;
   - Persons without an existing NUCLEUS account can register here.

2. Once signed in, prospective participants can use the InTouch+ platform to:
   - Complete or update their personal details under 'Complete Profile' and upload the relevant supporting documents;
   - Search for the relevant event under the 'My Eligible Events' tab;
   - Select the Member State or invited organization they want to represent from the drop-down menu entitled 'Designating Authority' (if an invited organization is not listed, please contact InTouchPlus.Contact-Point@iaea.org);
   - If applicable, indicate whether financial support is requested and complete the relevant information (this is not applicable to participants from invited organizations);
   - Based on the data input, the InTouch+ platform will automatically generate the Participation Form (Form A) and/or the Grant Application Form (Form C);
   - Submit their application.

Once submitted through the InTouch+ platform, the application, together with the auto-generated form(s), will be transmitted automatically to the required authority for approval. If approved, the application, together with the applicable form(s), will automatically be sent to the IAEA through the online platform.

NOTE: The application for financial support should be made, together with the submission of the application, by **22 April 2025.**

For additional information on how to apply for an event, please refer to the InTouch+ Help page. Any other issues or queries related to InTouch+ can be sent to InTouchPlus.Contact-Point@iaea.org.

Selected participants will be informed in due course on the procedures to be followed with regard to administrative and financial matters.

Participants are hereby informed that the personal data they submit will be processed in line with the Agency's Personal Data and Privacy Policy and is collected solely for the purpose(s) of reviewing and assessing the application and to complete logistical arrangements where required. The IAEA may also use the contact details of Applicants to inform them of the IAEA's scientific and technical publications, or the latest employment opportunities and current open vacancies at the IAEA. These secondary purposes are consistent with the IAEA's mandate.

Further information can be found in the Data Processing Notice concerning IAEA InTouch+ platform.

Presentations

The IAEA encourages participants to give presentations on the work of their respective institutions that falls under the topics listed above. The detailed report (.docx) is also encouraged to submit, it might be integrated to the possible IAEA Technical Report.

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 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.

Expenditures and Grants

The costs of the meeting are borne by the host organization; 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 application for financial support should be made, together with the submission of the application, by **15 April 2025.**

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.

Venue

The event will be held in the Room C-CR2, Conference Room 2, Second Floor, Building C of the Vienna International Centre (VIC), where the IAEA's Headquarters are located. Participants must make their own travel and accommodation arrangements.

General information on the VIC and other practical details, such as a list of hotels offering a reduced rate for IAEA participants, are listed on the following IAEA web page: www.iaea.org/events.

Participants are advised to arrive at Checkpoint 1/Gate 1 of the VIC one hour before the start of the event on the first day in order to allow for timely registration. Participants will need to present an official photo identification document in order to be admitted to the VIC premises.

Visas

Participants who require a visa to enter Austria should submit the necessary application to the nearest diplomatic or consular representative of Austria at least four weeks before they travel to Austria. Since Austria is a Schengen State, persons requiring a visa will have to apply for a Schengen visa. In States where Austria has no diplomatic mission, visas can be obtained from the consular authority of a Schengen Partner State representing Austria in the country in question.

Additional Information

The event agenda, together with information on local arrangements, will be sent to the designated participants in due course.

General information on hotels offering a reduced rate for IAEA participants, are listed on the following IAEA web page: https://www.iaea.org/events/hotel-list.

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

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