

Fact Sheet on Plant Life Management for Safe Long Term Operation of Nuclear Power Plants

What are the issues?

- The world's fleet of Nuclear Power Plants (NPPs) is approximately 20 years old on average, and most plants are believed to be able to operate for 60 years or more. The design life of a NPP is typically 30 to 40 years. This may be extended by 10 to 20 years, or more, provided that the plant can demonstrate by analysis, trending, equipment and system upgrades, increased vigilance, testing, ageing management, and other means that license renewal presents no threat to public health and safety.

What are the benefits?

- The basic goal of Plant Life Management (PLiM) is to satisfy requirements for safe long-term supplies of electricity in an economically competitive way. The basic goal of the operating company and the owners to operate as long as economically reasonable and possible from safety point of view. PLiM is a management tool for doing that.
- PLiM is a system of programmes and procedures to satisfy safety requirements for safe operation and for power production in a competitive way and for time which is rational from technical and economical point of view. PLiM is not only a technical system; it is also an attitude of the operational company to keep the plant in operation as long as possible from safety and business point of view.
- The common objectives of PLiM assessment are to help and review the pre-conditions for PLiM and long-term operation approaches. PLiM should not be associated with extension of operational life-time of the NPP only. It is an owner's attitude and rational approach of the operating company to run the business economically and safely.

How to benefit of PLiM?

- The effectiveness of PLiM Programme can be assessed by three complementary kinds of assessment: self-assessment, peer review and comprehensive programme review by the plant owner/ operator.
- IAEA will provide the assessment service for peer review of PLiM.
- The specific objective of the PLiM assessment is as follows:
 - to give knowledge to better understand PLiM,
 - to investigate and assess the Member state approach on PLiM,
 - to take proper action to minimize material degradation
 - to formulate guidelines for ageing management of critical system, structure and components,
 - to review of detailed plants life evaluation and establishment of PLiM programme.

What are recent Nuclear Power Engineering Section activities in PLiM?

- We have been providing technical support through Technical cooperation projects as follows:
 - Regional TC project :
 - RER/04/27 : Strengthening capabilities for NPP performance and service life including engineering aspects
 - RLA/4/021 Cracking and Structural Integrity of Components in Light Water Reactors
 - RAS/4/028 "Integrated Management Systems for Expanding Nuclear Power Programmes
 - National TC projects :
 - China : Ageing management of Critical Components

- Mexico : Life Management programme for Laguna Verde NPPs
- Hungary : License Renewal of Paks Nuclear Power Plant Operation
- Ukraine : Action Plans for Nuclear Power Plant Lifetime Management
- Argentina : PLiM programme for Embalse NPP
- Through the regular programme, NPES published the technical documents as follows;
 - TRS- 448 : PLiM Guidelines for Light water reactor.
 - TECDOC-1503 : Heavy water reactor PLiM Refurbishment – processes & technology
 - TECDOC-1435, TRS- 429 : Reactor Irradiation effects in RPV steels
 - Reactor pressure vessel (RPV) core internals behavior and technology for repair and replacement
- We have been coordinating research project (CRP) on reactor pressure vessel integrity, with the participation of 15 Member States.
 - Master Curve Approach to monitor the Fracture Toughness of RPV in Nuclear power plants (2005 – 2007)
 - Review and benchmark of calculation methods for structural integrity assessment of RPVs during pressurized thermal shock (2005 - 2008)
- Provide the material degradation workshops on both technology and managerial aspects.
- Technical working group of NPP life management (TWG LM-NPP) composed of representatives from 25 Member States serves the role of technical committee advisory group for our activities.

Looking ahead

- Preparation
 - Preparation for a PLiM Assessment service will be initiated only after the IAEA has been formally approached by a MS and funding (e.g. an existing Technical cooperation project) has been established. The scope of the review should be agreed between relevant organizations (e.g. utility or an industry) and the IAEA at this stage.
 - Administrative arrangements
 - Regulatory environments
 - Plant specific information (Active SSCs, Passive SSCs)
 - Specific PLiM problems and issues (Ageing management, licensing renewal, PSR etc.)
- Assessment methodology
 - Interview
 - Observations
 - Documentation review and walk down
- Reporting
 - The report prepared by mission will be confidential to the MS visited unless specifically stated otherwise. The decision to implement any recommendations of the report lies entirely with utility concerned.
 - Recommendations, Suggestions, Good Practices

For more information please contact

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