

I&C AND ELECTRICAL EQUIPMENT QUALIFIED LIFE REASSESSMENT

Analytical reassessment supporting plant long-term operation

Efficient and pragmatic approach to extend the qualified life of I&C and electrical components

Challenge

Plant operators are considering extending their plant's life. However, the qualified life of I&C and electrical equipment may not formally support the extended life. Straight replacement of such equipment would be associated with high cost; exchanging cables may even be impossible. Moreover, codes and standards mandatorily require a reassessment of the equipment's qualified life, which will be challenging if documentation is only partially or even not available as needed.

Solution

Framatome provides an integrated concept for the analytical reassessment of I&C and electrical equipment that minimizes replacing qualified equipment with associated efforts. The reassessment fully complies with requirements stated in the pertinent international standards.

In a first step, the plant operator and our experts define the scope of equipment for the reassessment. Then the available plant documents are analyzed. Furthermore, the individual environmental data are gathered, mainly temperature and radiation. If needed such environmental data can be collected in course of a measurement campaign.

In the main phase Framatome will reassess and calculate the expected remaining equipment qualified life, based upon comprehensive expertise on equipment design, component application and materials used.

As the outcome of the reassessment, the operator will receive a clear view, which equipment is suitable for the planned extended plant life. Together with the plant operator's experts the team will also identify equipment that would require more extensive analytical investigations, testing or refurbishment. This approach de-risks the operator's long-term operation project.



Motor-operated valve being reassessed

Technical information

The Framatome approach is built upon:

- Codes / standards applied: IAEA SSG-69, SSG-48, IEC/IEEE 60780-323
- Utilization of available material data
- Consideration of aging and function parameters of the Equipment Qualification Database
- Decades of qualification and qualification assessment expertise

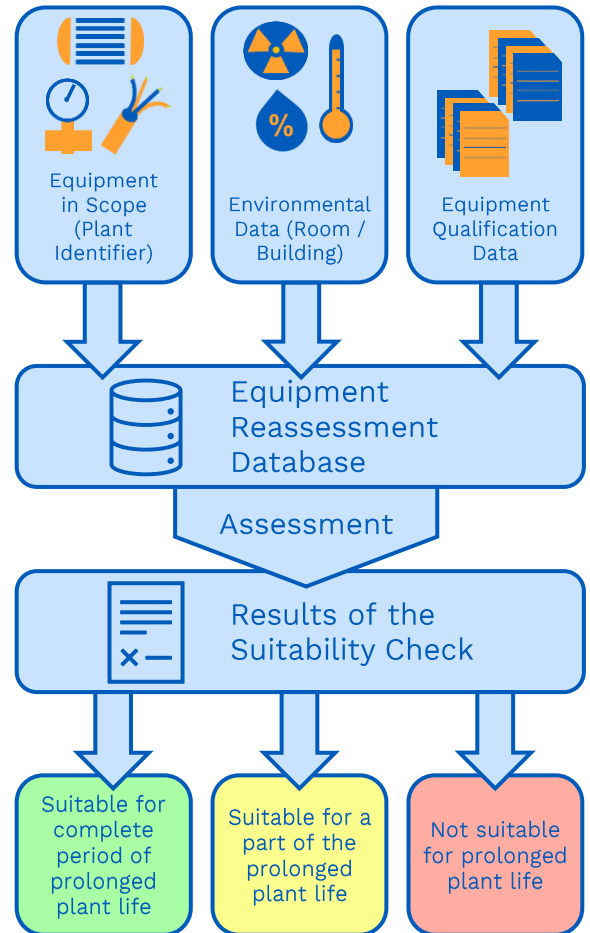
Customer benefits

- Cost-efficient approach by focusing on pure analysis as much as possible
- Clearly structured and easy-to-use evaluation results
- Identification of critical components and locations
- Planning basis for remaining subsequent activities (if necessary)
- Take benefit from decades of qualification expertise and experience
- Support the utility in front of the licensing authority.
- De-risking of Long-term Operation project

Your performance
is our everyday **commitment**

Technical information

- Scoping
 - Perform scoping of the equipment based on the safety design of the plant (Operator and Framatome).
 - Consider safety design changes performed over time and affecting this scope.
 - The result is a complete, up to date equipment list that corresponds with individual plant identifiers and reflects the current safety design of the plant.
- Environmental conditions (individual for each installation position)
 - Different qualified life values may be obtained for identical types of equipment at different positions.
 - Framatome initially uses global environment data for the reassessment. If the application of such global values already leads to sufficient qualified life values, no further activities are needed.
 - If the obtained values do not meet the objective, Framatome can support the operator to perform a measurement campaign supplemented by plant walkdowns.
- Results and next steps
 - Even if individual environmental data is used for the reassessment, the qualified life may not be sufficient for the desired plant life extension and replacement might be considered. In this case Framatome analyzes the initial qualification based on the detailed equipment design and the materials used.
 - Framatome's comprehensive knowledge on the degradation behavior of components and materials helps verifying a sufficient qualified life of the equipment, which otherwise must be replaced.
 - Framatome provides a comprehensive expertise in material degradation, based on which it may be possible to only replace individual sub-components of an equipment.
 - In case of missing qualification documents, Framatome may suggest using data of similar equipment available in Framatome's Equipment Qualification Database.
 - The results of the reassessment forms the basis for planning the plant life extension and mitigates risks for the long-term operation.



Key figures

Approximately **16,000** components
of more than **300** equipment types assessed
in **16** reactor units worldwide.

References

All German PWRs and BWRs, reactors of the 900 MW Framatome fleet outside Europe and KWU PWRs in Europe.

Contact : qualification@framatome.com
www.framatome.com

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