

Improving Nuclear Fuel Reliability:

MODULE NO. 2

MANUFACTURING AND QUALITY ASSURANCE

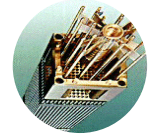
The best-designed fuel assemblies will not perform reliably unless they are manufactured to approved standards using approved processes and procedures by qualified operators. To best ensure that these criteria are met, utility fuel quality assurance and surveillance personnel must focus on those factors that directly affect fuel performance. A simple review of QA records is not enough to provide confidence that all these requirements are met.

An effective utility quality assurance program is critical in achieving top decile fuel performance.

This module addresses the importance of comprehensive fuel audits and surveillances, the activities that comprise an effective QA program and the relationship of these activities to the ultimate performance of the fuel.

The objectives of the standard Manufacturing and Quality Assurance Module are as follows, but the training sessions may be customized to meet your specific needs. This module can be conducted in two to three days.

- ◆ Describe and Discuss the Importance of a Utility QA/Surveillance Program
- ◆ Provide and Discuss Examples of Performance-related QA/QC Problems from NAC Stoller's Experience.
- ◆ Describe and Discuss the Various Types of Audits/Surveillances
 - Vendor QA system audits
 - Manufacturing process qualification audits
 - Fuel assembly manufacturing audits/surveillance
 - Sub-supplier audits
- ◆ Describe and Discuss the Areas to be Addressed During Surveillance Visits
 - Sampling and inspection plans
 - Procedures and instructions
 - Key manufacturing and inspection activities
 - Operator training
 - Measurement standards and calibration
 - Handling and storage methods and material compatibility
 - Packing and shipping methods
 - Manufacturing and inspection records
 - Non-conformance control and reporting



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- ◆ Describe and Discuss Specific Audits of Fuel Assemblies and Components
 - Pellets
 - Zirconium alloy components
 - Ingot
 - TREX – cladding
 - Strip – spacer parts
 - Bar – endplugs
 - Spacers
 - BWR fuel channels
 - Nozzles/Tie Plates
 - Castings
 - Finished parts
 - Fuel Rods
 - Assemblies
- ◆ For Each Component, Describe and Discuss:
 - Key surveillance areas for the components,
 - Potential impact of QA/QC problems on in-reactor fuel performance
- ◆ Describe and Discuss Issues Specific to Sub-suppliers
- ◆ Describe and Discuss the Elements of Effective Audits/Surveillances
 - Planning
 - Entrance meeting with the supplier
 - Conducting the audit
 - Identification of findings
 - Exit meeting with the supplier
 - Close-out of findings
- ◆ Describe and Discuss How Each Element of the QA Program Can Impact Fuel Reliability