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Workshop on Life Beyond 60

EPRI/DOE/CENG Demonstration Plant Project: EPRI Perspective

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Agenda



- Constellation Demonstration Project
 - Joint effort with EPRI, DOE, CENG – Nuclear Plant Life Extension Demonstration Project
 - General agreement regarding effort and coordination
 - Planned activities for Ginna and NMP1
 - Outages related activities for 2011
 - Longer term efforts
 - EPRI role and deliverables

Project Description

- DOE Light Water Reactor Sustainability (“LWRS”) Program, EPRI’s Long Term Operation (“LTO”) Project and Constellation will jointly investigate the technical issues and demonstrate, as appropriate, analysis methods necessary to support nuclear plant life extension to 80 years.
- Constellation’s Ginna and Nine Mile Point Unit 1 nuclear power stations will be used as the pilot plant sites due to their age and representation of the PWR and BWR technologies.
- **Work specifically for license renewal application submittals is not expected.**

Technical Focus

- Specific technical areas for 80 years of life include:
 - Identify potential life-limiting issues
 - Additional time-dependent aging mechanisms
 - Additional aging management requirements
 - Life Cycle Management methods
 - Refurbishment and modernization opportunities
- DOE focus on science and understanding of general (US nuclear fleet) application and impact
- EPRI focus on expansion and refinement of current guidance approach for extended life (40 to 60 years)
- **Guidance for beyond 60 years to be jointly developed and reviewed**

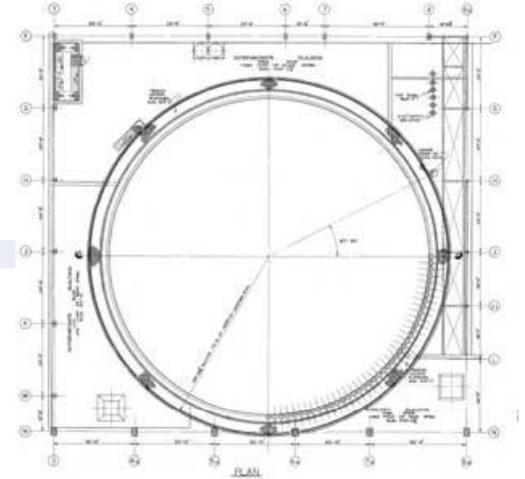
Baseline Considerations



- Ginna in extension to 60 years
 - Implementing inspection and assessment recommendations from EPRI Materials Reliability Program report (MRP-227) for operation to 60 years
 - Refueling Outages planned in 2011 and 2012

- NMP1 in extension to 60 years
 - Implementing inspection and assessment recommendations from EPRI BWR Vessel and Internals Program (BWRVIP)
 - Refueling Outages planned in 2011 and 2013

Ginna Spring 2011 Outage Activities



- Specific Work Scope Established
 - Containment Assessment
 - Pre-outage activities at site are in progress
 - Strain measurements and digital image correlation work to assess new approaches and technologies
 - Internals Assessment
 - First application of MRP-227 guidance
 - Review inspections and results
 - Post irradiation examination of a sample of baffle bolts

Inspection Plan – MRP-227

- **The development of screening criteria, with susceptibility thresholds for the eight postulated aging mechanisms relevant to reactor internals and their effects**
 - Irradiation-assisted stress corrosion cracking, stress corrosion cracking, stress relaxation and creep, thermal aging embrittlement, irradiation embrittlement, wear, fatigue, and void swelling
- **Categorization of PWR internals components (using the screening criteria) into categories based on significance of susceptibility to the aging effects.**
- **Functionality assessments based on representative plant designs of PWR internals components to determine the effects of degradation mechanisms on functionality so that these components can be managed appropriately.**
- **Note that MRP-227 will be applied to Ginna to confirm that operations will continue to be conducted in accordance with the current licensing bases for the reactor vessel internals**

Ginna Aging Management Program

- **PWR internals components placed into four functional groups**
 - **Primary:** internals components highly susceptible to the effects of at least one of the eight aging mechanisms and requiring specific management of those effects
 - **Expansion:** components highly or moderately susceptible to at least one of the eight aging mechanisms but having a degree of tolerance to those effects
 - **Existing Programs:** components susceptible to at least one of the eight aging mechanisms and where existing AMP elements are managing those effects
 - **No Additional Measures:** the effects of all eight aging mechanisms are below the screening criteria
- **Demo Project will examine processes and results relative to assuring safety and reliability beyond 60 years of operations**

EPRI Objectives - Ginna

- Industry Guidance regarding Technical Bases and Confirmatory Actions for Potential License Extension beyond 60 Years
 - Vessel Internals
 - Feed updates to MRP-227 process
 - Vessel
 - Considerations for LB60 especially focused on surveillance program needs and understanding potential high dose effects
 - Containment
 - Enhanced assessment guideline planned
 - Other Plant Equipment as Deemed Appropriate
- Create a series of documents and periodic updates

Nine Mile Point Unit 1 Spring 2011 Outage Activities

- Specific Work Scope Established
 - Vessel and Internals Inspections
 - Implementation of BWRVIP recommendations
 - Containment
 - Baseline
 - No specific issues currently identified
 - Longer term efforts
 - Disposition of current supplemental surveillance capsules (2)
 - Not part of BWRVIP Integrated Surveillance Program
 - Potential future outage action to assess cracking in top guide
 - Irradiation assisted stress corrosion cracking likely

NMP1 Aging Management Program

- **Comparable approach to PWR process but guided by EPRI BWR Vessel & Internals Program**
 - **Defined inspection actions and acceptance criteria**
- **Demo Project will examine processes and results relative to assuring safety and reliability beyond 60 years of operations**
- **Deliverables will parallel those for Ginna**
 - **Internals**
 - **Reactor Pressure Vessel**
 - **Use and testing of remaining supplemental and original surveillance program capsules**
 - **Lead factor for supplemental capsules will place dose at > 60 year equivalent at 2013 outage and achieve > 80 year equivalent in additional 10 years of operation**
 - **Containment**
 - **Review and evaluation of planned activities per current life extension**

Summary

- Ginna and NMP1 now operating during extended life period
- Joint demonstration project will allow confirmation of current technical bases and expansion/refinement for additional life extension
 - Containment assessment is a unique opportunity evolving from this project
- Project is a proactive industry approach to supporting the technical bases for a potential LB60 license submittal
 - Science supported by field results



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