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Pre-Submittal Meeting

Palisades Nuclear Plant
GL 2004-02 / GSI-191 Closure Plan

October 24, 2024

Meeting Agenda

- Introductions
- Purpose & Outcome
- Background
- Closure Plan
- Closure Plan Submittal Content
- Schedule
- Questions

Introductions

- U.S Nuclear Regulatory Committee (NRC) Staff
- Holtec Decommissioning International, LLC (HDI)
  - Jean Fleming – Holtec International, Vice President of Licensing and Regulatory Affairs
  - Jim Miksa – HDI, Regulatory Assurance Manager for Palisades
  - Joe Jerz – HDI, Engineering Director
- ENERCON
  - Tim Sande – PRA Manager, GSI-191 SME
  - Kyle Reno – Chief Mechanical Supervisor
  - Blake Stair (Remote Participant) – Chemical Effects SME
  - Haifeng Li (Remote Participant) – EG Mechanical Supervisor, GSI-191 SME

Purpose & Outcome

- Purpose:
  - Inform NRC of Palisades Nuclear Plant (PNP) plans to resume work on GL 2004-02 “Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors”
  - Provide a summary of PNP GL 2004-02 / GSI-191 activities completed prior to cessation of power operations
  - Present key elements of PNP GL 2004-02 closure plan
- Outcome:
  - Solicit NRC Staff questions and comments on proposed closure plan
  - Provide schedule information to support NRC resource allocation

Background

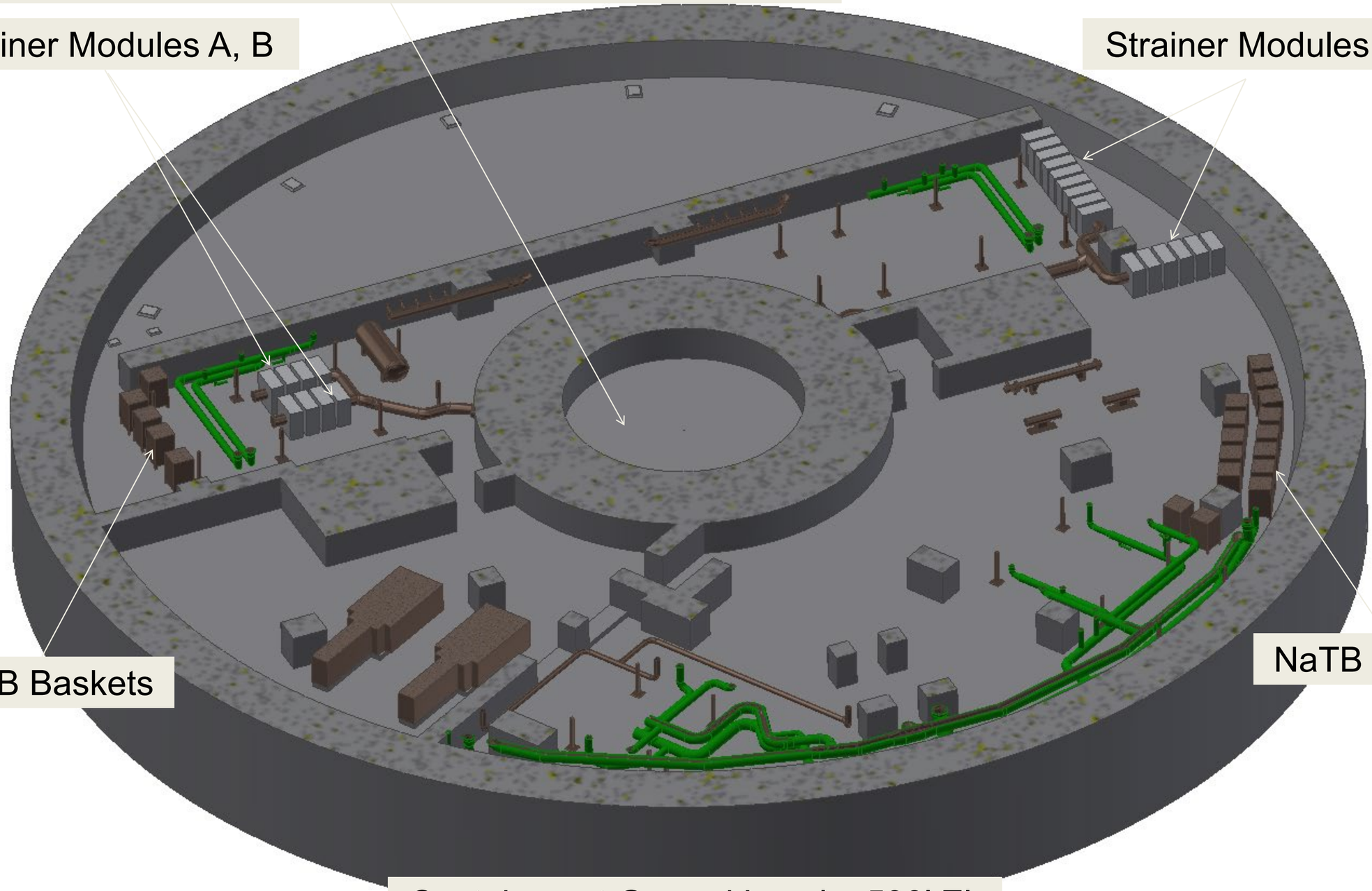
- Palisades Design
  - 2 Loop Combustion Engineering Nuclear Steam Supply System (NSSS)
  - Sodium Tetraborate (NaTB) Buffer
  - Debris screens installed at inlets to the containment sump
  - Passive debris strainers installed at Emergency Core Cooling System (ECCS) inlet to containment sump

Background

Containment Sump
Suction source for ECCS pumps for recirculation phase post-Loss Of Coolant Accident (LOCA)

Strainer Modules A, B

Strainer Modules C, D



NaTB Baskets

NaTB Baskets

Containment Ground Level – 590’ El.

Background

- 2004 – NRC issues GL 2004-02 “Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors” (ML042360586)

- 2007 - Changed the sump buffering agent from TSP to Sodium Tetraborate (NaTB) (ML13136A006)
  - Decrease the magnitude of chemical precipitates

- 2007 - Replaced the high-pressure safety injection (HPSI) pump mechanical seals and cyclone separators (ML13136A006)
  - Components not susceptible to premature failure due to fibrous debris

- 2007 - Installed passive debris screens on containment sump downcomers, containment floor drains, and containment sump vent lines (ML13136A006)
  - Mitigate post-LOCA generated debris entry into the containment sump envelope

- 2009 – Installed passive sump strainer assemblies with 0.095” hole size at ECCS pump suction inlet to containment sump (ML13136A006)

Background

- 2013 – PNP selected the risk-informed approach to GSI-191 closure (ML13136A006)
  - Similar approach to South Texas Project, the risk informed pilot plant for GL 2004-02 / GSI-191 closure activities

- March 2018 PNP Delivered GSI-191 (GL 2004-02) Milestone Schedule (ML18088A139)
  - Projected closure date February 2022

- 2018 - Modified the containment sump vents to enhance sump performance (ML19064A089)

- March 2019 PNP notified NRC stopping work on GSI-191 closure efforts due to early permanent shutdown for decommissioning (ML19064A089)

Background

- March 2024 – Conducted scoping study to identify viable options for responding to GL 2004-02 / GSI-191
  - Used most recent industry operating experience
  - Utilized ENERCON as subject matter experts due to their recent involvement in other utilities GL 2004-02 closure responses

- August 2024 – Completed third-party independent review of ENERCON scoping study
  - Utilized Westinghouse to independently validate recommended closure plan
  - Westinghouse team was actively involved in industry closure guidance including WCAP-17788-P “Comprehensive Analysis and Test Program for GSI-191 Closure”

Closure Plan

- The below closure options were considered when determining the recommended strategy for resolving GL 2004-02
- Deterministic resolution
  - Significant amount of high worker dose insulation replacement required
  - Bounding tests and calculations
  - GL 2004-02 response submittal
- Alternate break resolution
  - Bounding assessment for alternate break size
  - Relaxed assessment for larger breaks
  - GL 2004-02 response submittal
- Risk-informed resolution
  - Risk over Deterministic (RoverD) approach
  - Conditional failure probability (CFP) approach
  - Threshold break approach
  - Any of the approaches above require a LAR and a request for exemption from certain requirements in 10 CFR 50.46

Closure Plan

- The CFP risk informed approach was selected for PNP based on:
  - Most accurately evaluates PNP post-LOCA conditions
  - Similar approach as Vogtle and Point Beach for successful resolution to GL 2004-02
- After updating key GSI-191 calculations and tests, HDI will assess if the alternate break methodology can be used to evaluate PNP post LOCA conditions
- Deterministic approach was not selected due to the worker dose associated with a significant amount of insulation replacement

Closure Plan

- In-Vessel Effects to be resolved using industry guidance
  - PWROG-16793-P “Evaluation of Long-Term Colling Considering Particulate, Fibrous and Chemical Debris in the Recirculating Fluid”
  - WCAP-17788-P “Comprehensive Analysis and Test Program for GSI-191 Closure”
- PNP will consider industry operating experience used by other licensees to inform the results of the overall GL 2004-02 / GSI-191 assessment
  - Use another licensee’s results from previously conducted penetration tests on PCI strainers with an identical 0.095-inch hole size
  - Chemical precipitate timing for in-vessel effects (t_{chem}) will be assumed at 8 hr per PWROG-16073-P and WCAP-17788-P

Closure Plan

- Major milestones for closure
  - Develop/update initial GSI-191 calculations (debris generation, transport, chemical effects)
  - Conduct strainer head loss testing
  - Determine if Alternate Break resolution is viable for PNP
  - Develop/update follow-on GSI-191 calculations (strainer structural qualification, in-vessel effects, PRA inputs, risk/uncertainty quantification)
  - Submit GL 2004-02 response

Closure Plan Submittal Content

- GL-2004-02 Closure Actions Taken to Date
- Summary of Reinstated Closure Plan
- Key Reference Documents
- Commitments to be reinstated in accordance with NEI 99-04, “Guidelines for Managing NRC Commitments,” coincident with transition to power operations licensing basis
- Provide Closure Plan Schedule

Schedule

Milestone	Date
Submit Updated GL 2004-02 Closure Plan to NRC	4Q2024
Develop/update GSI-191 calculations (debris generation, transport, chemical effects)	2Q2025
Conduct strainer testing (head loss, penetration)	3Q2025-4Q2025
Decision Point – Use of CFP or Alternate Break approach	1Q2026
Finalize GSI-191 calculations (strainer structural qualification, in-vessel effects, PRA inputs, risk/uncertainty quantification)	2Q2026
Submit Final Response and Close-out to GL 2004-02	2Q2026

Thank You

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