

# Comanche Peak Nuclear Power Plant (CPNPP)

First License Renewal (60 years) Application:  
Pre-Application Submittal Meeting #2

May 2022



**Luminant**

# Opening Remarks and Introductions

## Speakers

- Steven Sewell (Luminant)
- Todd Evans (Luminant)
- Taylor Smith (Luminant)
- Amit Kalia (Luminant)

## Participants

- Ramiz Gilada (Luminant)
- Burns Cunningham (ENERCON)
- Mitch McFarland (ENERCON)
- Gary Adkins (ENERCON)
- Tyler Bro (Westinghouse)
- Jen Meneely (Westinghouse)

# CPNPP Site



# Agenda

- Update of Information Provided September 2021
  - Aging Management Programs (AMPs)
  - Time-Limited Aging Analysis (TLAA)
- Use of SLR Operating Experience for First LR
- General Topics and Future Activities

# Aging Management Programs – Overview

Total AMPs	Existing AMPs	New AMPs
43	32	11



Consistent with GALL (no exceptions or enhancements)	Includes Exception(s) Only	Includes Exception(s) and Enhancement(s)	Includes Enhancement(s) Only
5	1	10	16

Plant-Specific AMPs
None



# Aging Management Programs – Exceptions

- **Water Chemistry, Flow-Accelerated Corrosion, and Closed Treated Water** – Exceptions to use later revisions of standards which have been included in GALL-SLR
- **Steam Generators**
  - Exception for Unit 2 model D5 tube-to-tube sheet weld inspections, NRC approved TS Amendment which exempted welds from inspection and monitoring due to design (welds are not pressure boundary). Rolled tubes are the pressure boundary.
  - Exceptions to use later revisions of EPRI standards
- **Fire Water** – Exception to not perform trip testing on specific deluge valves in order to protect the charcoal filter units; instead, perform periodic visual inspection
- **Buried Piping and Tanks** – Exception to continue Emergency Diesel Generator Fuel Oil Storage Tank inspections at a 20-yr frequency as opposed to the GALL 10-yr frequency. Inspection frequency evaluations have been implemented based on internal operating experience.
- **Fuel Oil Chemistry**
  - Exception to perform bottom-level sampling instead of multi-level sampling in the horizontal EDG fuel oil storage tanks.
  - The exception above for the Buried Piping and Tanks AMP is also within the Fuel Oil Chemistry AMP.

# Aging Management Programs – Exceptions (cont)

- **Reactor Vessel Surveillance** – Exception to not submit the U1 and U2 capsule schedule changes with LRA. Appropriate outage has not been determined. Schedule will be submitted in accordance with 10 CFR Part 50 Appendix H at least 6 months prior to PEO, or no later than the last refueling outage prior to the PEO.
- **Reactor Head Closure Stud Bolting** – Exception to allow high strength closure studs to remain in service and spares already acquired to be placed in service.
- **ASME Section XI, Subsection IWF** - IWF AMP requirements for examination and testing of ASME Class CC and MC components and Class MC component supports are included in separate AMPs (IWE, Overhead Heavy Load, and Structures Monitoring).
- **Internal Coatings** – Exceptions are to:
  - Perform opportunistic inspections of buried cement-lined fire protection piping consistent with SLR-ISG-2021-02-MECHANICAL.
  - Manage coatings in an indoor air environment (the EDG intercoolers), consistent with SLR-ISG-2021-02-MECHANICAL.
  - Credit periodic oil sampling by the Lubricating Oil Analysis AMP instead of performing periodic inspections of internal coatings in the Safety Injection pump lubricating oil reservoirs.
  - Non-destructively tap test coatings surrounding a blister as an alternative to destructive adhesion testing.

# Aging Management Programs – NUREG-1801 AMPs Not Applicable to CPNPP

- **Containment Tendon** – CPNPP does not have pre-stressed tendon containment design
- **Boraflex Monitoring** – CPNPP does not use boraflex in spent fuel pool
- **Fuse Holders** – Fuse holders were screened out because they are included in the EQ Program or due to their location in a larger active device or assembly, consistent with the screening guidance in NUREG-1801, Section XI.E5.
- **Aboveground Metallic Tanks** – the CSTs, RWSTs, and RMWSTs are concrete tanks with stainless steel liners and managed by Structures Monitoring, Water Chemistry, One-Time Inspection and Internal Surfaces AMPs.
  - Additional tanks:
    - Fire Water Storage Tanks managed by Fire Water AMP.
    - Recycle Hold Up Tanks do not have a 54.4(a)(2) function due to their location in watertight compartments.



# AMP – Reactor Vessel Internals

- CPNPP will be implementing MRP-227 Rev 1A
- SLR-ISG-2021-01-PWRVI gap analysis
  - Not required for 1st LR
- Technical Bases for SLR-ISG-2021-01-PWRVI
  - CPNPP requests staff to provide a status update
- MRP-227-A A/LAI 1 for Inspection and Evaluation Guidelines for RVI
  - BFB degradation addressed in AMP OE section as applicable
- MRP-227-A A/LAI 8 plant-specific inspection plan
  - required previously for rev 0A
  - will not be included in a separate Appendix C section

# TLAA – Steam Generators

TLAA	Applicable Unit(s)	Category	Disposition	TLAA?
<b>SG Flow-Induced Vibration and Tube Wear Evaluations</b>	1 and 2	SG tube vibration wear projections	10 CFR 54.21(c)(1)(i)	Yes
<b>SG U-Bend Tube Vibration and Fatigue Assessment</b>	2		10 CFR 54.21(c)(1)(i)	
<b>SG Tube Wear Rates and Wear Projections for AVB and TSP Wear</b>	2		10 CFR 54.21(c)(1)(ii)	
<b>SG Tubes Metal Corrosion Allowance</b>	2	U2 SG tube corrosion allowance	10 CFR 54.21(c)(1)(i)	Yes

# TLAA – Irradiation of Service Level I Coatings

- Identified as a TLAA
  - Coatings qualified for  $3 \times 10^8$  Rads and required to resist environmental radiation for the life of the plant
  - Total Integrated Dose (TID) through end of PEO (60 years) remains below  $3 \times 10^8$  Rads
- Dispositioned as 10 CFR 54.21(c)(1)(i), remains valid for the PEO
- Service Level I Coatings will continue to be managed for aging effects, other than irradiation, by the NUREG-1801 Section XI.S8 Protective Coating Monitoring and Maintenance AMP

# TLAA – Environmentally Assisted Fatigue

- NUREG/CR-6260 sample set locations (newer vintage Westinghouse plant) have been evaluated:
  - Reactor vessel shell and lower head
  - Reactor vessel inlet and outlet nozzles
  - RCS charging system nozzle
  - RCS safety injection (SI) nozzle
  - Residual Heat Removal (RHR) system Class 1 piping - Sentinel location is RCS cold leg accumulator nozzle
  - Pressurizer surge line (including hot leg and pressurizer nozzles) – Sentinel location is RCS Hot Leg Surge Nozzle
- Environmental fatigue penalty factors taken from NUREG/CR-6909 Rev. 1
- Evaluation methods include refined analyses (i.e. finite element modeling), consideration of 60-year projected cycles, etc.
- All NUREG/CR-6260 locations environmental fatigue usage results meet ASME Code fatigue usage requirements ( $< 1.0$ )

## TLAA – Environmentally Assisted Fatigue (cont.)

- EAF screening has been completed consistent with GALL Revision 2, X.M1 to identify additional plant-specific component locations that are more limiting than NUREG/CR-6260 locations
  - EAF screening methodology utilized is as described in Section 4 of the Electric Power Research Institute (EPRI) report 3002018262
    - Utilizes the Section III fatigue analyses in the current licensing basis
    - Class 1, wetted surface, pressure boundary locations
    - Environmental fatigue penalty factors taken from NUREG/CR-6909 Rev. 1
    - Considers transient sections for fatigue usage results subject to similar loadings
    - Compares fatigue usage results based on level of technical rigor in-addition to the published fatigue usage result
    - Determines a sentinel location for each material type (i.e. low-alloy, carbon steel, stainless steel, nickel alloy) for all transient sections
- Additional sentinel locations will be addressed prior to entering the PEO

# TLAA – Leak Before Break Analysis & Alloy 82/182 Welds

- Reactor Coolant Loop Analysis
  - LBB considers the PWSCC effects due to alloy 82/182 welds at RPV inlet and outlet nozzles
  - Unit 1 - Mitigated via Mechanical Stress Improvement Process (MSIP), evaluation included within the LBB analysis
  - Unit 2 - Partial implementation of MSIP (Loop 2 Hot Leg, Loop 4 Cold Leg Nozzle), evaluation included within the LBB analysis
- Pressurizer Surge Line
  - Unit 1 and Unit 2 Alloy 82/182 location at the Pressurizer Nozzle to safe end weld has been mitigated by a structural weld overlay (SWOL)
  - SWOL has been included within the LBB analysis



# TLAA – Environmental Qualification

- Environmental Qualification is evaluated as a TLAA in LRA Chapter 4 and Appendix A, and evaluated as an AMP in Appendices A and B
- Mechanical Environmental Qualification Program is currently incorporated in the CLB
- Mechanical Environmental Qualification Program will be removed from the CLB prior to LRA submittal in accordance with 10 CFR 50.59.

# Use of SLR Operating Experience – Examples

- Opportunistic inspections of the internal cement lining applied to buried fire protection ductile iron piping
  - Guidance incorporated from SLR-ISG-2021-02-MECHANICAL in the Internal Coatings/Linings AMP
- Later revisions of EPRI standards endorsed by GALL-SLR
  - Guidance incorporated in Water Chemistry AMP
  - Guidance incorporated in Flow-Accelerated Corrosion AMP
- PWR Vessel Internals AMP written to SLR-ISG-2021-01-PWRVI requirements, which completely supersedes previous revisions of GALL

# General Topics and Future Activities

- Luminant would like NRC's perspective on currently developing topics that the NRC is aware of whose timing could impact Luminant's application or the NRCs review of the application, e.g.
  - Additional ISGs
  - Lessons Learned from current SLR application reviews
  - Process changes
- Portal (e-room) plan
  - Two portals – one for Westinghouse proprietary documents and one for all other documents
  - Luminant propose file structure; NRC PM and staff provide feedback
  - Luminant conduct an overview (virtual meeting) towards later part of sufficiency review
  - Portal to be made available upon completion of sufficiency review

# General Topics and Future Activities (cont)

- Luminant to offer "information sessions" on the following topics:
  - Operating Experience
  - Portal / e-room
  - Audit support logistics
- OE and Portal information sessions towards later part of sufficiency review
- Audit support logistics prior to "on-site" audit
- Would like NRC perspective on GEIS activities

Questions?

# Additional Information



# General Information

- Comanche Peak Nuclear Power Plant (CPNPP) Units 1 and 2
  - Four Loop Westinghouse PWRs that are nearly identical
  - Located in north Texas, southwest of Dallas–Fort Worth
  - Unit 1 40 year license expires February 8, 2030
  - Unit 2 40 year license expires February 2, 2033
- LRA written to NUREG-1801 Rev. 2 and LR-ISGs
- LRA submittal planned for Oct-Dec 2022
  - Industry Peer Review to be conducted prior to submittal
- Major Modifications
  - Unit 1 SG and RVCH replacements, alternate access cut into containment (returned to original specification)
  - Stretch Power Uprate in 2007
  - Material Stress Improvement Process (MSIP) for Reactor Vessel Nozzles complete in Unit 1 and partially complete in Unit 2
  - Structural Weld Overlay (SWOL) for Pressurizer Nozzles

# General Information (cont)

- Licensee information
  - Operator – Vistra Operation Company LLC (Vistra OpCo)
    - Luminant commonly used to denote CPNPP operator
  - Owner – Comanche Peak Power Company LLC (CP Power Co)
  - Vistra OpCo owned by Vistra Corp. (through an intermediary)
- Project structure (Luminant, ENERCON, and WEC)
  - Luminant Project Team
  - Luminant staff Subject Matter Experts
  - ENERCON
    - Chapters 1, 2, 3 and appendices
    - Environmental Report (Appendix E)
    - Overall application assembly
  - Westinghouse
    - Chapter 4 TLAA
  - Consultant review of selected documents