

# Comanche Peak Nuclear Power Plant (CPNPP)

License Renewal Environmental Application  
Pre-Submittal Meeting

Severe Accident Mitigation Alternatives  
(SAMA) Analysis Technical Approach

January 12, 2021



**Luminant**

# LR Pre-Submittal Meeting on SAMA

## Agenda

- Opening Remarks & Introduction
- Introduction to CPNPP
- SAMDA / SAMA History
- SAMA Technical Approach
- Closing Remarks

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## Opening Remarks and Introductions

### Speakers

- Steven Sewell (Luminant)
- Todd Evans (Luminant)
- Richard Anoba (Enercon)

### Participants

- Stacy Burgess (Enercon)
- Rachel Turney-Work (Enercon)
- James Boatwright (Westinghouse)

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## Introduction to CPNPP

CPNPP Units 1 & 2 are owned by Comanche Peak Power Company LLC and operated by Vistra Operations Company LLC

Westinghouse 4-Loop PWRs of almost identical design

CPNPP Site is about 7,700 acres

Located in southern Hood and northern Somervell Counties, TX

40 Year licenses expire in 2030 and 2033 for Units 1 & 2 respectively



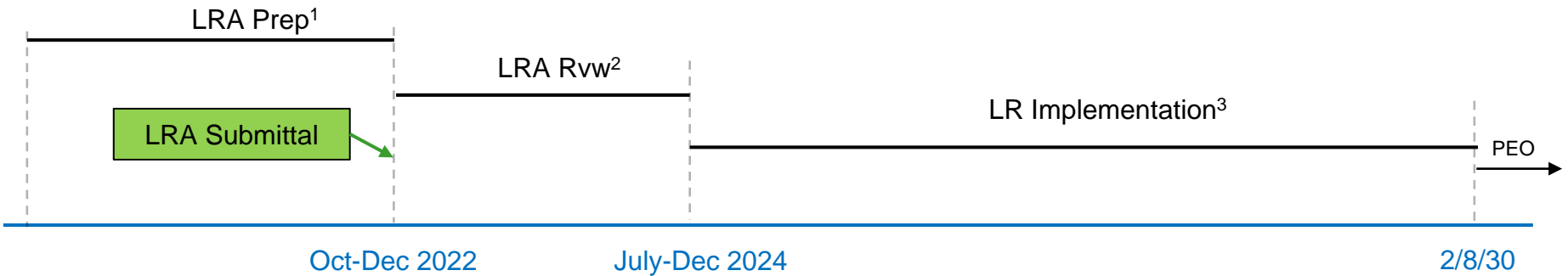
### Legend

- Railroad
- - - Protected Area Fence
- Building/Structure
- - - Exclusion Area Boundary
- CPNPP Site Boundary



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## CPNPP License Renewal Timeline



LRA – License Renewal Application  
LRI – License Renewal Implementation  
PEO – Period of Extended Operation

<sup>1</sup>Preparation of application  
<sup>2</sup>Application review  
<sup>3</sup>Engineering, Planning and Implementation of commitments

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## SAMDA / SAMA History at CPNPP

- SAMDA analysis:
  - Performed in 1989 as part of initial licensing
  - Identified potential severe accident mitigation design alternatives based on available industry PRA studies
  - Dispositioned potential severe accident mitigation design alternatives based on existing plant capabilities and cost evaluation of alternatives
- No subsequent SAMA analysis performed
- 1996 Part 51 rulemaking states that SAMA need not be reconsidered for Comanche Peak for license renewal
- Investigated options for SAMA

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## SAMA Technical Approach

- SAMA analysis for CPNPP will be performed using methodology in NUREG/BR-0184 and guidance provided in NEI 05-01
- SAMA analysis will conform with NRC staff guidance contained in Section 5.1 and 5.2 of NUREG-1555
- SAMA analysis will include a review of state of the industry practices and lessons learned from recent LRs/SLRs (NEI 17-04), including RAIs

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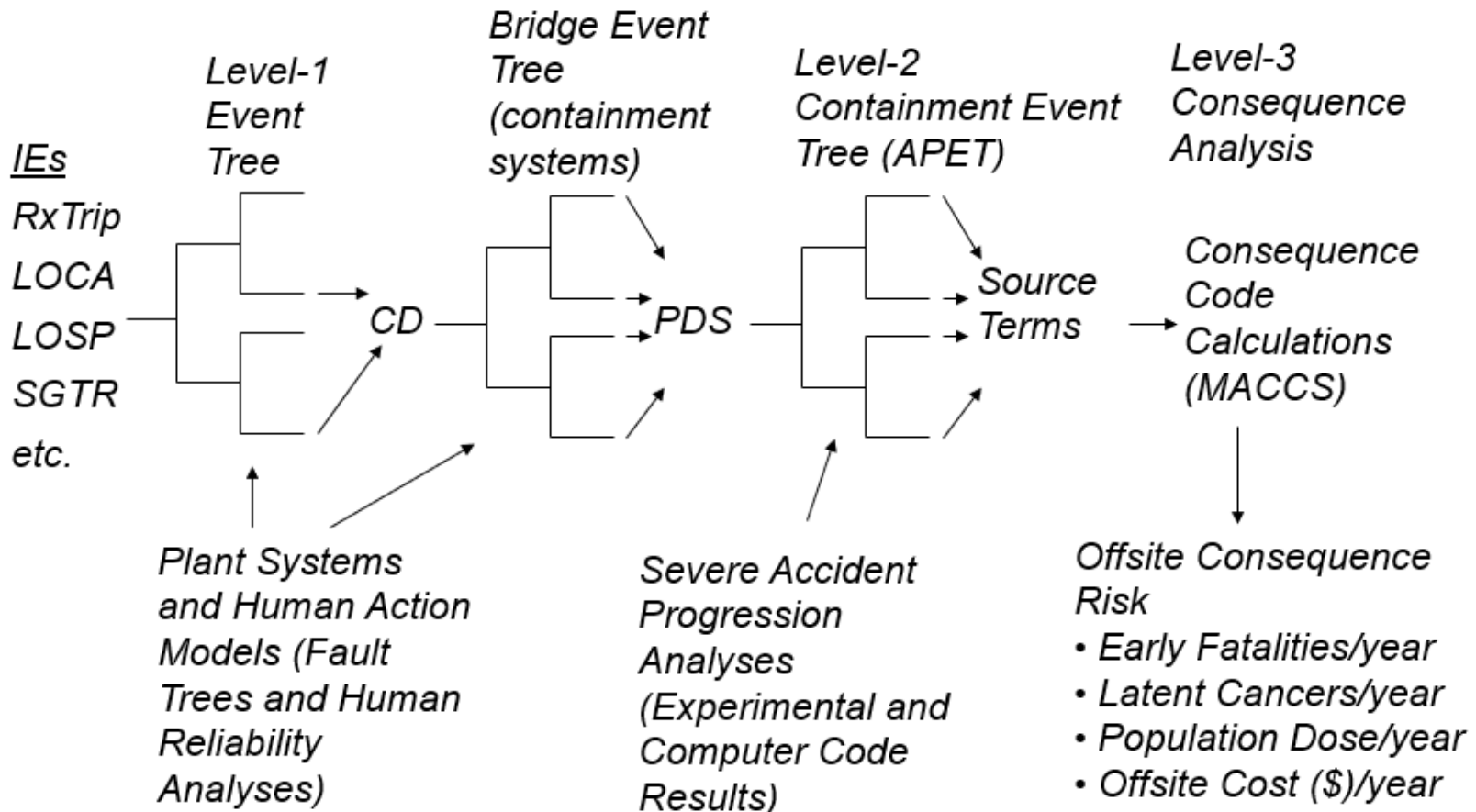
## SAMA Technical Approach

- Major steps:
  - 1) PRA Model Review
  - 2) SAMA Screening Analysis
  - 3) SAMA Decision Process and Documentation



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## 1) PRA Model Review – Generic PRA



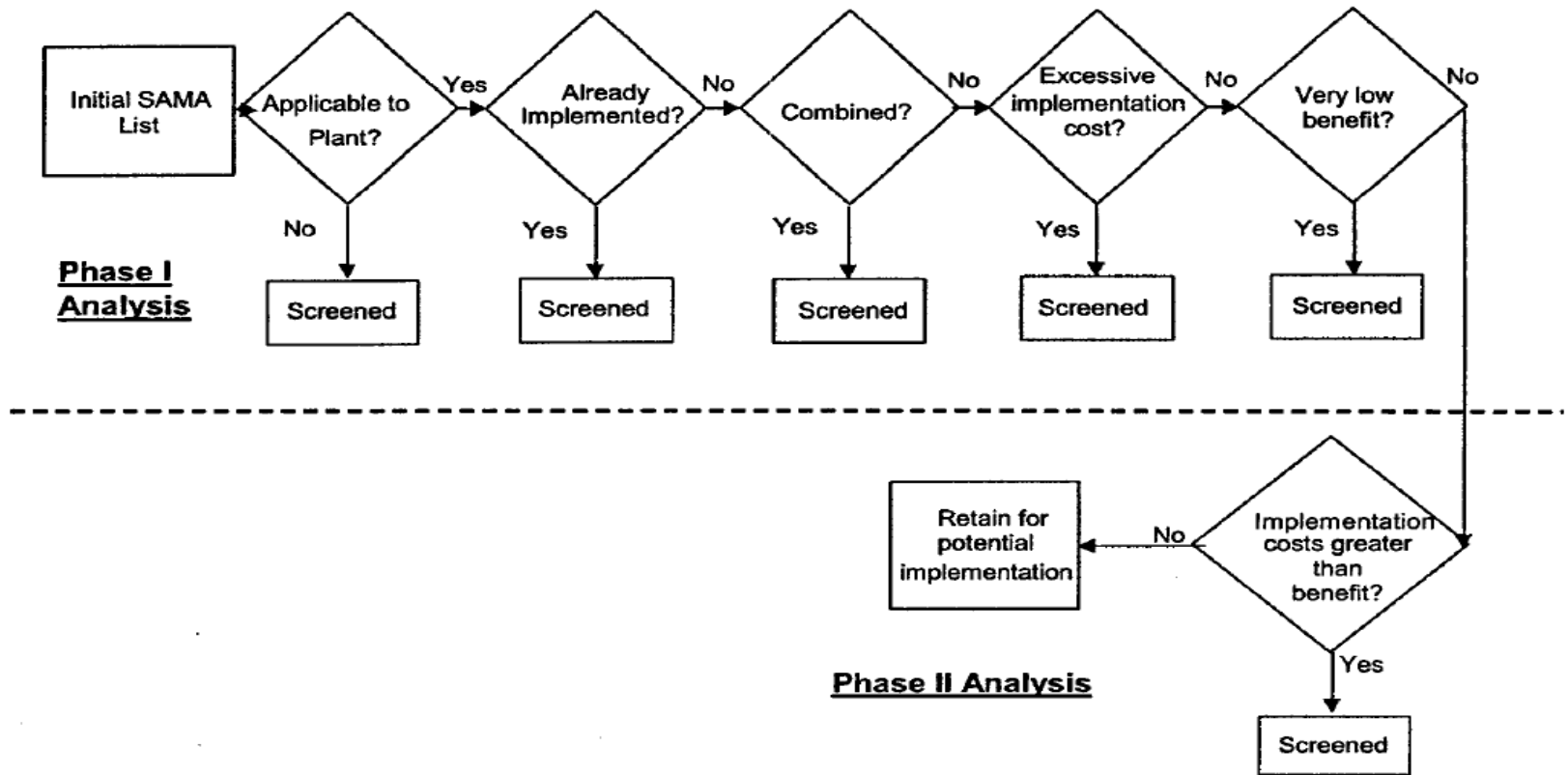
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## 1) PRA Model Review

- CPNPP PRA (Level 1 and Level 2) models and other external hazard assessment models will be used to perform SAMA evaluation in Phase II
- Full Level 2 PRA model will be used to address required entry conditions into the Level 3 PRA (e.g. Release Category Frequencies and Source Terms)
- A Level 3 PRA model will be developed to support quantitative SAMA assessments in Phase II (i.e. MELCOR Accident Consequence Code System (MACCS) output – Offsite doses and economic impact)
- Available Fire PRA models, External Events PRA models, and other assessments (i.e. IPEEE, SMA, etc.) will be reviewed to estimate an external event multiplier on the Maximum Benefit Calculation

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## 2) SAMA Screening Analysis



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## 2) SAMA Screening Analysis – Phase I: Initial SAMA List

- Plant-specific SAMA candidates will be identified based on importance to the PRA
- CPNPP individual plant examination (IPE) and individual plant examination of external events (IPEEE) will be reviewed for potential plant-specific SAMA candidates
- Potential SAMA candidates from the industry will also be examined, including consideration of:
  - Industry SAMAs from Table 14 of NEI 05-01
  - 2013 NUREG-1437, Supplement 1
  - SAMDAs from the initial licensing of CPNPP
  - Other PWR SAMA submittals

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## 2) SAMA Screening Analysis – Phase II: Cost-Benefit Analysis

- Offsite Exposure and Economic Cost – use output from Level 3 PRA (MACCS)
- Onsite Exposure and Economic Cost – use Core Damage Frequency with other inputs
- External event multiplier based on review of available external event models or analyses
- $\text{Maximum Benefit} = (\text{Offsite Exposure Cost} + \text{Offsite Economic Cost} + \text{Onsite Exposure Cost} + \text{Onsite Economic Cost}) * \text{External Event Multiplier}$
- Maximum benefit (\$) is compared to SAMA implementation costs (\$)
- Implementation costs estimated using industry and plant-specific sources

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## 3) SAMA Decisions and Documentation

- Screening of candidate SAMA strategies at various stages will be revisited with reasonable variations in costs and benefits assumed to demonstrate the robustness of screening actions
- SAMA analysis will include a review of state of the industry practices and lessons learned from recent LRs/SLRs, including RAIs
- Sensitivity analyses will be identified and performed to supplement the SAMA cost/benefit decision-making process
- Results of SAMA analysis will be documented in the SAMA basis document

# Closing Remarks

Technical approach is consistent with state of the industry practices and lessons learned from recent LRs/SLRs, and meets industry requirements for the recommended approach for each regulatory submittal.

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## References

1. NUREG/BR-0184, "Regulatory Analysis Technical Evaluation Handbook," U.S. Nuclear Regulatory Commission, 1997 (ML111290858).
2. NEI 05-01, "Severe Accident Mitigation Alternatives (SAMA) Analysis Guidance Document," Revision A, November 2005 (ML060530203).
3. NUREG-1555, *Standard Review Plan for Environmental Reviews for Nuclear Power Plants*, Supplement 1, *Operating License Renewal, Final Report*, Revision 1 – June 2013, Sections 5.1 and 5.2 (ML13106A246).
4. Comanche Peak Steam Electric Plant Letter No. TXX-89720, "Severe Accident Mitigation Design Alternatives (SAMDA)," September 22, 1989 (ML20248D047).
5. NEI 17-04, Revision 1, "Model SLR New and Significant Assessment Approach for SAMA," August 2019 (ML19316C718).
6. U.S. NRC, "Interim Endorsement of NEI 17-04, "Model SLR [Subsequent or Second License Renewal] New and Significant Assessment Approach For SAMA, Revision 1," Letter from Anna Bradford, Director Division of New and Renewed Licenses Office of NRR to Chris Earls, Senior Director Regulatory Affairs, NEI, December 11, 2019 (ML19323E740).
7. RG 4.2, Supplement 1, Revision 1, "Preparation of Environmental Reports For Nuclear Power Plant License Renewal Applications" June 2013 (ML13067A354).
8. Environmental Review for Renewal of Nuclear Power Plant Operating Licenses, 61 Fed. Reg. 28,467, 28,481 (June 5, 1996).