

***Tornado Licensing Basis
and Mitigation Strategy –
Kick-off Meeting***

Oconee Nuclear Station
March 17, 2005



Agenda

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- Introductions**
 - Objectives**
 - Oconee Licensing Basis Insights**
 - Safety Review**
 - Design Basis Upgrade Initiative**
 - Summary**
 - Potential Modifications**
 - Closing Remarks**



Goals & Objectives

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- Engage with NRC to find and implement an effective solution to the Oconee Tornado licensing basis and mitigation issues
 - Provide an overview of licensing basis insights from an Oconee perspective
 - Communicate results of the Safety Review performed relative to the list of NRC concerns
 - Move beyond differences in interpretation of the Oconee current licensing basis



Goals & Objectives

- Establish a framework of cooperative issue resolution with NRC
 - ✓ What changes will bring our two views of the Current Licensing Basis (CLB) closer together?
 - ✓ Craft a LB both Duke and NRC agree on, and most importantly, stands the test of time.

- Provide an overview of modifications under consideration to eliminate or decrease tornado vulnerabilities

- Provide periodic status to NRC of Duke activities to strengthen the licensing basis both in the short-term and long-term. Establish a schedule to support these discussions



Oconee Licensing Basis Insights

- ❑ Original LB (1973 - Unit 1; 1974 - Units 2 and 3)
 - ✓ Oconee's initial operating license pre-dates the GDCs, SRPs and the NRC (AEC).
 - ✓ several diverse and physically separated power sources
 - ✓ abundant supply of water (up to 37 days)
 - ✓ protected station ASW pump and power supply
 - ✓ no single failure requirements
 - ✓ tornado does not occur with nor can not cause a LOCA

- ❑ Issues not addressed with respect to tornadoes in original FSAR/SER:
 - ✓ Primary make-up capabilities
 - ✓ RCP seal LOCAs
 - ✓ PORV/PRV failures
 - ✓ SG tube stresses



Oconee Licensing Basis Insights

- LB: 1974-1994
 - ✓ NUREG 0737, II.E.1.1, “Short-term Auxiliary Feedwater System Evaluation”
 - ✓ SSF begins operation
- LB: 1995
 - ✓ Primary make-up capabilities added to UFSAR due to industry RCP seal LOCA concerns.
 - SSF RCMU
 - HPI pump fed from BWST or SFP
- LB: 1998 - present
 - ✓ Added clarification to UFSAR 3.2.2 based on IPEEE risk results.



Results of Safety Review

- ❑ A Safety Review was performed for each issue identified in the "Licensing Basis Discrepancy" document received from NRC.
- ❑ The Oconee position is that we are in compliance with CLB. Therefore, an operability determination in accordance with GL 91-18 did not apply.
- ❑ The CLB is based on diversity and defense in depth, not deterministic.
 - ✓ Concerns articulated by NRC are tornado vulnerabilities, not licensing basis conformance deviations
 - ✓ GL 88-20 drove non-SRP plants to perform IPEEE evaluations
 - ✓ The IPEEE Technical Evaluation Report (TER) for Oconee accepted the IPEEE's conclusion that Oconee had no severe accident vulnerabilities that needed to be addressed via the 10CFR 50.109 backfit process
 - ✓ GL 95-04, System Evaluation Process (SEP), contains a table that supports the Oconee position regarding IPEEE tornado strategy



Results of Safety Review

NRC concerns list evaluated

✓ Results:

- Safety evaluation performed. Based primarily on low-risk impact of the items from the list, Oconee is safe.
- UFSAR needs to be clarified.

✓ Action:

- Submit an LAR to clarify/strengthen UFSAR Section 3.2.2

LAR Details

- ✓ Traditional LAR submittal w/risk insights (but not a classic risk informed LAR per RG 1.174)
- ✓ Clarify actual mitigation strategy
 - Limitations are described/quantified using risk
 - Overall tornado risk discussed



Design Basis Upgrade Initiative Modifications

- Presentation addresses phase I of the mod process
 - ✓ Investigate design concepts
 - ✓ Evaluate feasibility and constructability
 - ✓ Develop order of magnitude cost estimates
- Mod proposals outlined in this presentation
 - ✓ Developed as an aid for the vendors
 - ✓ The optimum design concept resulting from phase I of the mod process may differ significantly from the modification proposals outlined in this presentation



Design Basis Upgrade Initiative Modifications

Scope

- ✓ Enhance natural phenomena barriers
- ✓ Improved alternate safe shutdown path
 - Using Station ASW and HPI
 - Upgraded power supplies
 - Control from the main control room
 - Significantly reduces tornado damage frequency



Design Basis Upgrade Initiative Modifications

Scope (cont'd)

- ✓ Enhance natural phenomena barriers
 - Upgrade north Unit 3 Control Room Wall
 - Missiles addressed via TORMIS submittal
 - Wind/DP to be addressed with additional shielding
 - Upgrade elevated SSF trench to withstand missiles
 - Upgrade west pen and cask decon room walls for missiles, wind, and DP



Design Basis Upgrade Initiative Modifications

Sensitive Information (withheld per SECY 04-0191)



Design Basis Upgrade Initiative Modifications

Sensitive Information (withheld per SECY 04-0191)



Design Basis Upgrade Initiative Modifications

Sensitive Information (withheld per SECY 04-0191)



Design Basis Upgrade Initiative Modifications

Scope (cont'd)

✓ Alternate safe shutdown path

- Station ASW

- Upgrade Station ASW to high pressure system

- Eliminates need to manually operate atmospheric dumps

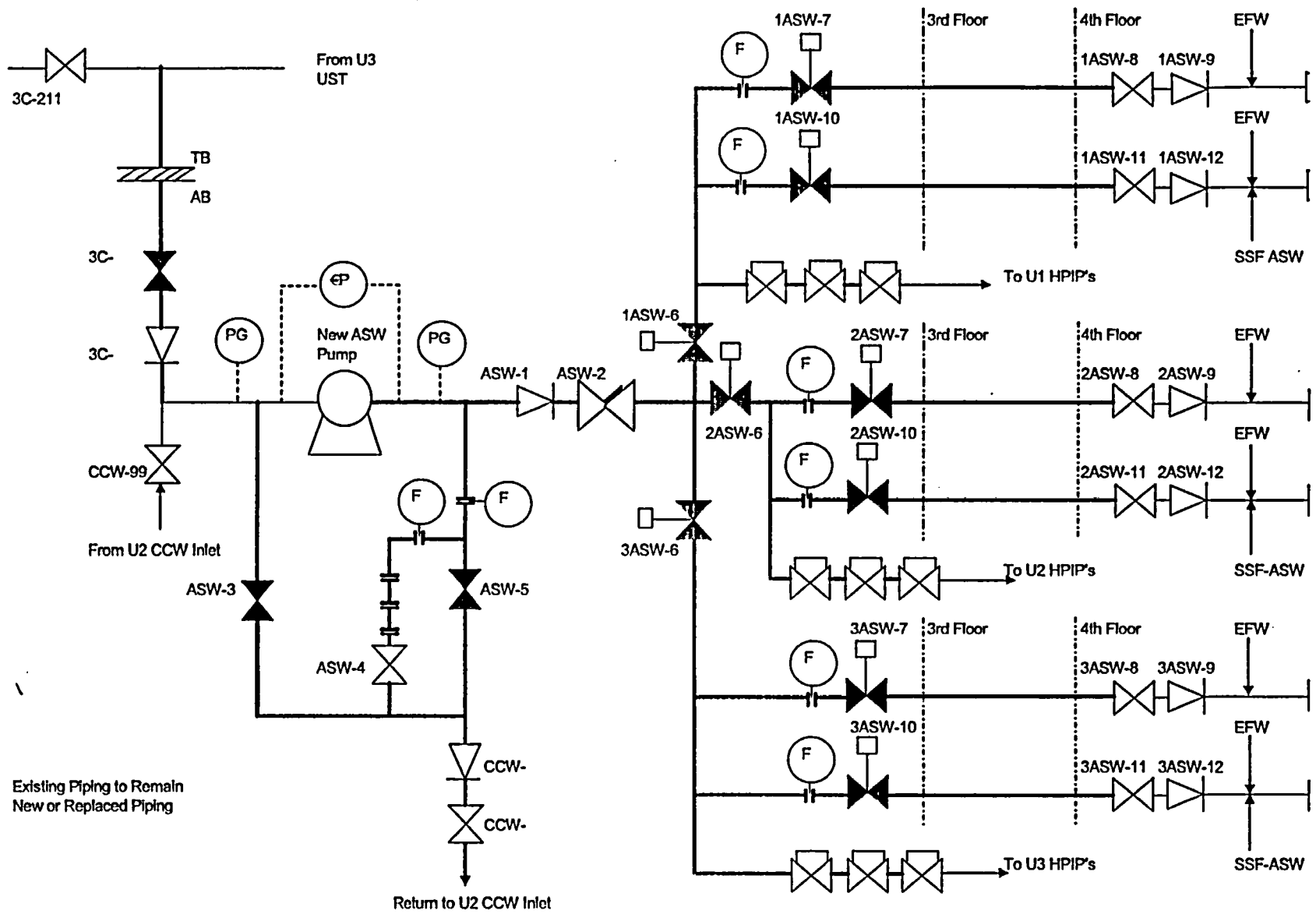
- Improves tube to shell differential temperatures

- Provide start and flow control and indication in control room

- Response time reduced from 40 minutes to less than 15 minutes

- Eliminates PORV, PSV challenge

- Improves three unit control capability



Legend
 — Existing Piping to Remain
 — New or Replaced Piping

Proposed Station ASW Upgrade



Design Basis Upgrade Initiative Modifications

Sensitive Information (withheld per SECY 04-0191)



Design Basis Upgrade Initiative Modifications

- Scope (cont'd)
 - ✓ New Station ASW switchgear loads
 - High pressure ASW pump & system
 - Isolation Valves
 - Flow control valves
 - Flow instrumentation
 - One HPI pump per unit & system
 - Provide remote transfer to new ASW switchgear for one HPI pump/unit
 - Provide sufficient power and cubicles for future equipment (next slide)



Design Basis Upgrade Initiative Modifications

Scope (cont'd)

✓ Alternate safe shutdown path (cont'd)

- *HPI (to follow Station ASW and electrical upgrades)*

- *Provide hardened power supply and remote control for*

- *BWST suction valves*

- *RCP seal flow control valves*

- *Reactor head and high point vent valves for letdown*

- *Pressurizer heaters*



Design Basis Upgrade Initiative Modifications

Proposed Schedule

- ✓ Duke completes phase I of the mod process
 - Natural phenomena barriers
 - Complete design concepts- May 2005
 - Test of concepts if necessary- End of 2005
 - Station ASW and electrical enhancement- End of 2005
 - *HPI upgrade- to follow Station ASW and Electrical Upgrades*
- ✓ Duke initiates final design package- early 2006



Design Basis Upgrade Initiative Modifications

Status

- ✓ Natural phenomena barriers
 - Contracted Fluor to develop design concept
 - Past experience at Hanford
 - Design concept, feasibility, order of magnitude cost on target for completion by May 2005
 - Testing targeted for completion by end of 2005 if necessary



Design Basis Upgrade Initiative Modifications

Status (cont'd)

✓ Station ASW

- ONS mod teams in place (PM, lead design eng, risk reduction eng, system eng)
- Technical Scope Requirement document completed
- Request for quotes sent to vendors this week

✓ Upgrade power supplies

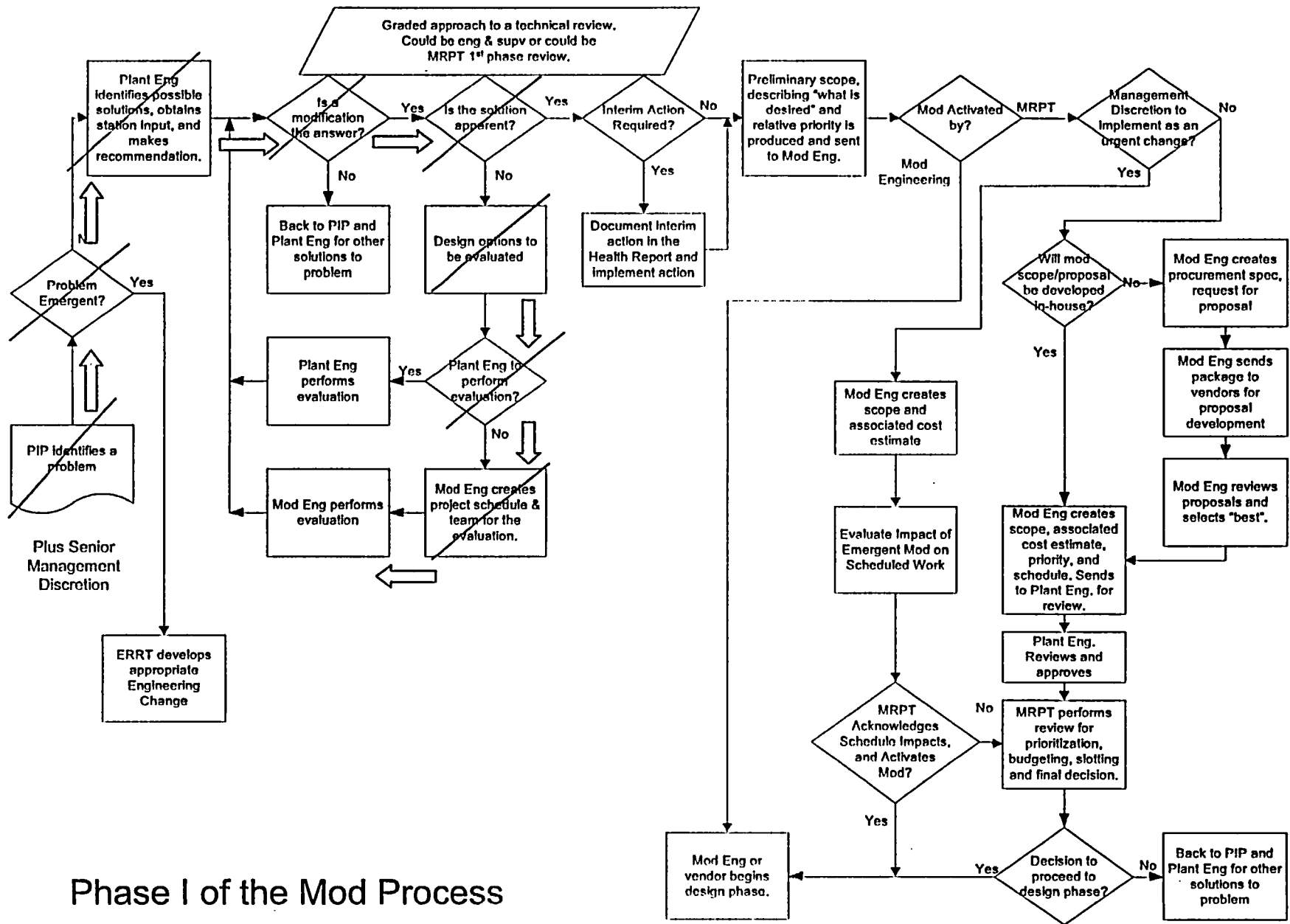
- ONS mod teams in place
- Draft Technical Scope Requirement document completed
- Request for quotes to vendors to be sent out by the end of March



Design Basis Upgrade Initiative Modifications

Challenges

- ✓ Accelerated schedule
 - Feasibility/design for SG Replacement took several years
 - Large, complex project
 - Scarce resources for oversight
 - Working with new vendors
- ✓ Technical Challenges
 - Providing alternate or upgraded power supply to new ASW SWGR
 - New cable runs to cable spread room
 - Avoiding adverse impact on existing SSCs
 - Implementation- CT5, Standby Bus and Station ASW are 3 unit systems



Phase I of the Mod Process



Design Basis Upgrade Initiative Modifications

NRC concerns being addressed

✓ Natural Phenomena Barriers

- New power supply from Station ASW Switchgear to battery chargers in Auxiliary Building
- Upgraded west penetration and cask decon rooms
- Upgraded unit 3 north control room wall
- Upgraded SSF trench
- Eliminating manual actions in turbine building to open atmospheric dumps



Design Basis Upgrade Initiative Modifications

- NRC concerns being addressed (cont'd)
 - ✓ Mitigation system functionality
 - Reduces PORV and PSV challenge
 - Significantly reduces steam generator tube to shell differential temperatures
 - Remote and reliable flow control of station ASW to all three units
 - *Provides for hot shutdown capability using HPI and alternate letdown paths (to follow Station ASW and electrical upgrades)*



Closing Remarks

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- Oconee is safe today relative to tornado risk
 - Oconee will add clarity and detail to the existing LB contained in UFSAR.
 - Modifications are being aggressively pursued to address vulnerabilities and improve overall tornado mitigation strategy for the future.
 - Oconee has a strong desire to proactively engage with NRC to resolve these issues and implement satisfactory solutions.
 - Questions
 - Next meeting