

October 31, 2000

LICENSEE: Duke Energy Corporation

FACILITY: Oconee Nuclear Station, Units 1, 2, and 3

SUBJECT: OCONEE NUCLEAR STATION, UNITS 1, 2, and 3 RE: MEETING SUMMARY ON THE EMERGENCY FEEDWATER SYSTEM (TAC NOS. MA9294, MA9295, AND MA9296)

On October 25, 2000, the NRC met at the NRC headquarters in Rockville, Maryland, with representatives of the Duke Energy Corporation (Duke) staff to discuss the proposed revision to the Final Safety Analysis Report regarding the Emergency Feedwater (EFW) System that was submitted for staff review on June 21, 2000. Enclosure 1 is a list of the individuals who attended the meeting, and Enclosure 2 is the handout material that was supplied by Duke.

The topics discussed included past EFW design changes (such topics as the original licensing bases, high energy line break considerations, post-Three Mile Island system changes, seismic design, Standby Shutdown Facility interaction), evolution and status of past EFW licensing documentation and safety evaluations, single failure aspects of the design, previous acceptance of the EFW System design, docketed correspondence, Duke and NRC understanding of the EFW licensing basis requirements, present design of the EFW system, development and structure of the submittal, the objectives of the submittal and staff review, and significance and importance of the review.

/RA/

David E. LaBarge, Senior Project Manager, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-269, 50-270, and 50-287

Enclosures:

- 1. Attendance List
- 2. Duke Handout

cc w/encls: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

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List of Attendees

NAME	AFFILIATION
David LaBarge	NRC/NRR/DLPM
Jim Tatum	NRC/NRR/SPLB
Herbert Berkow	NRC/NRR/DLPM
Dick Eckenrode	NRC/NRR/DLPM/IOLB
Rich Emch	NRC/NRR/DLPM
Larry Nicholson	Duke/Reg Compliance Manager
Ed Burchfield	Duke/Engineering
Noel Clarkson	Duke/Reg. Compliance
Bill Foster	Duke/Ocone/Safety Assurance
John Hannon	NRC/NRR/DSSA/SPLB

Oconee Nuclear Station



NRR/Duke Meeting to Discuss
Review of Emergency Feedwater
UFSAR Submittal
October 25, 2000

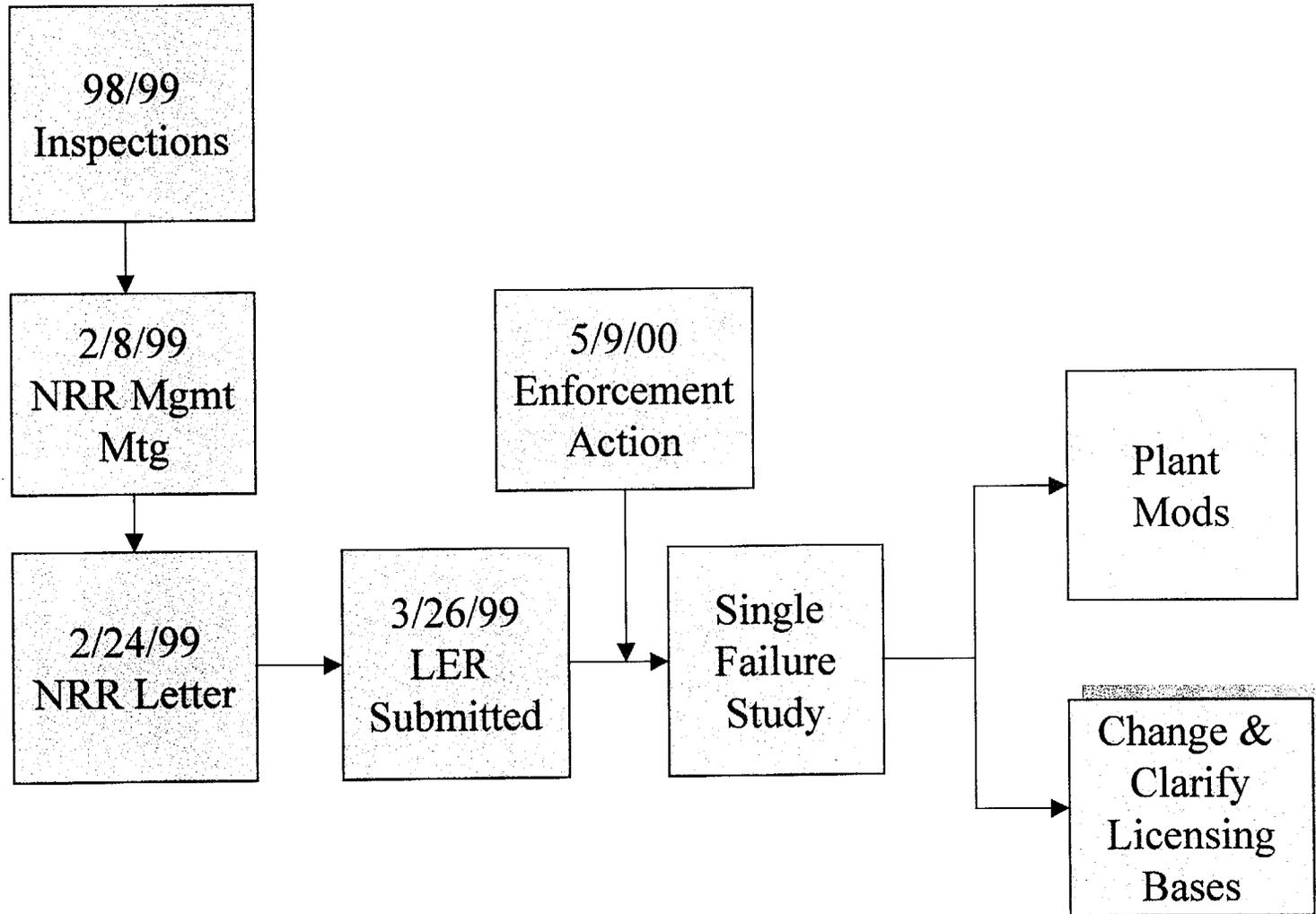


Agenda

- Submittal Objective
- EFW Licensing Evolution
- Submittal Development
- Key Focus Issues



EFW Project Timeline





Issues to be Resolved by Modifications

- Single failure vulnerabilities of flow control valves
- Single failure vulnerabilities associated with UST source



Submittal Objective

- Duke request via 6/21/2000 submittal:
 - *NRC review and agreement that this revised UFSAR Section 10.4.7 constitutes an adequate characterization of the EFW licensing bases.*



Submittal Overview

- EFW system evolved over last 30 years
- UFSAR description does not adequately reflect EFW licensing bases
- Recent NRC licensing positions have conflicted with Duke's fundamental understanding of EFW licensing requirements

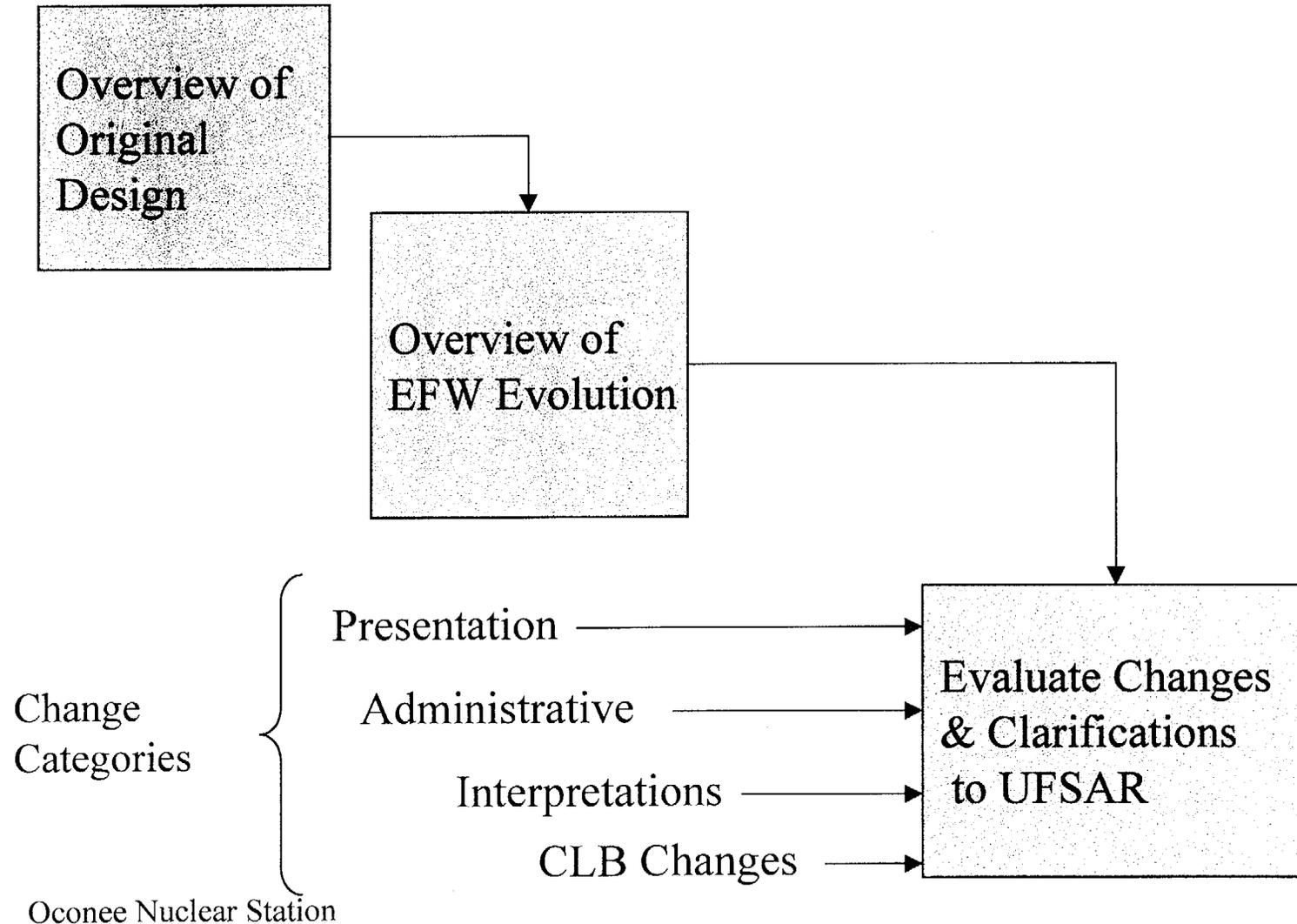


Desired Endpoint

- Firmly established, well articulated EFW licensing bases
- Duke believes this request will:
 - Provide common foundation for both Duke and the NRC going forward
 - Facilitate more predictable NRC positions
 - Allow for more confident and consistent safety and business decisions

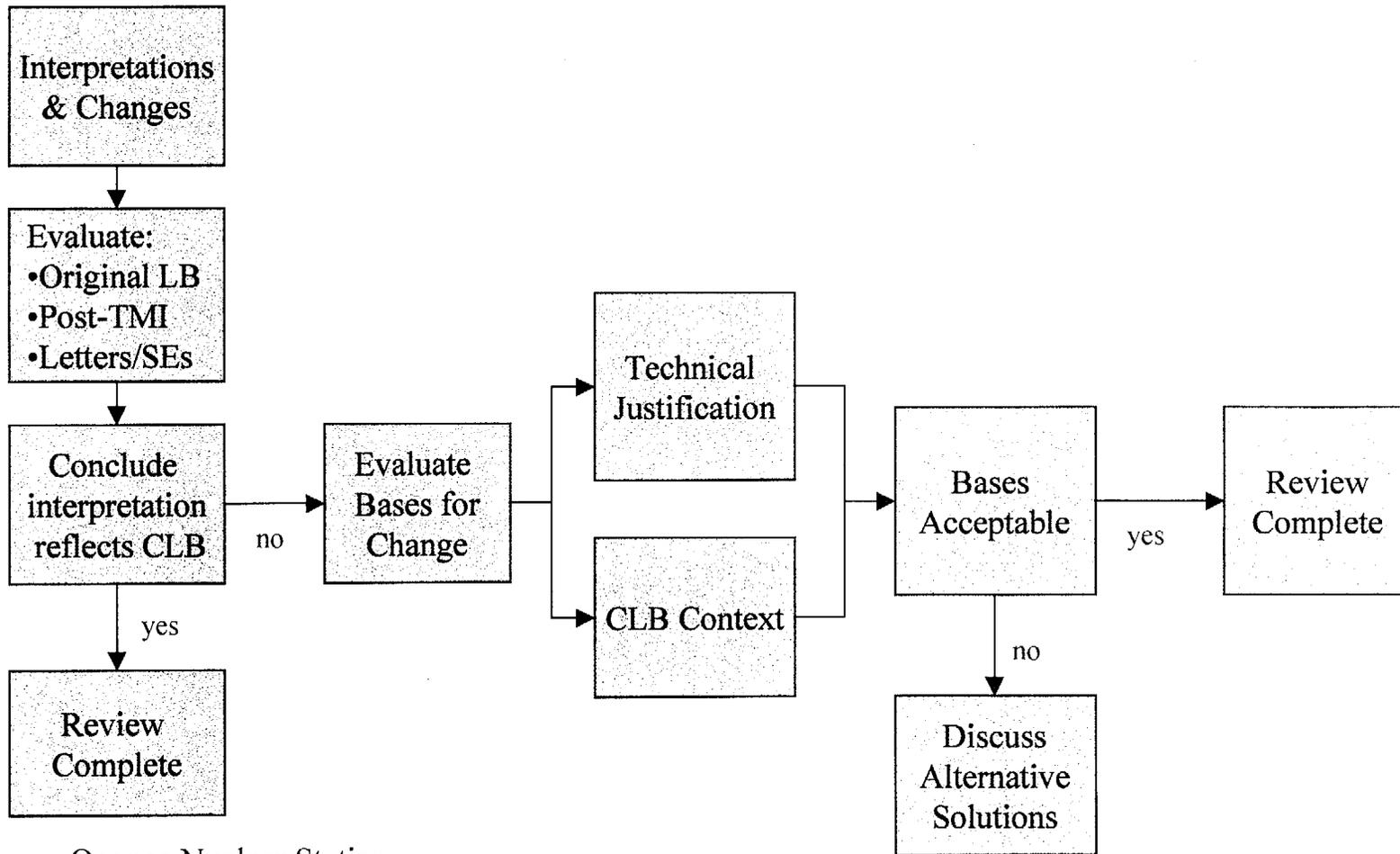


Submittal Review Template





Submittal Review Template





Licensing Dilemma

- Both the industry and the NRC have sometimes been vague, inconsistent and undisciplined in their approach to establishing and controlling licensing bases information

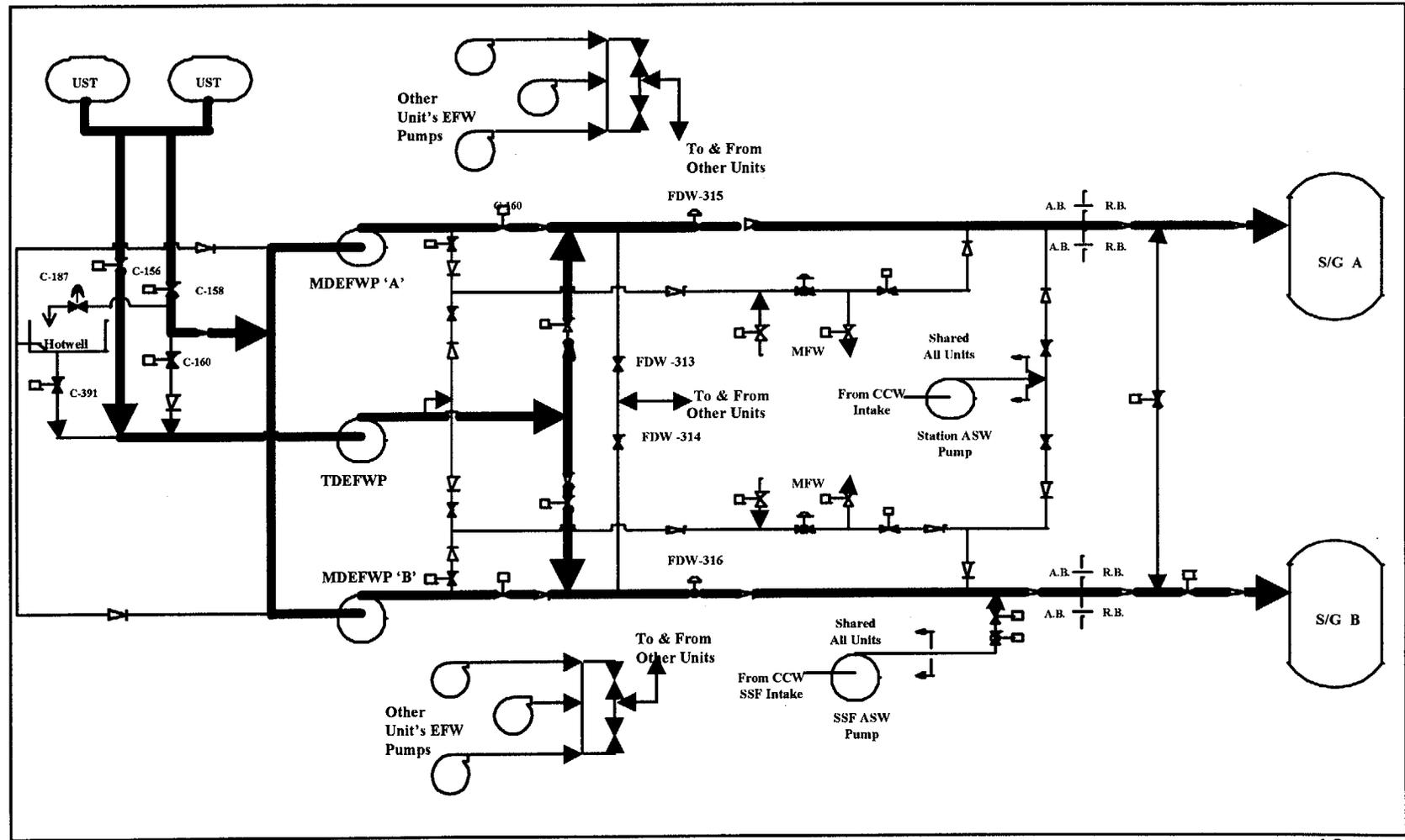


Key Licensing Principles

- Original design must be used to establish appropriate frame of reference for subsequent changes
- Understanding context of historical correspondence is difficult but essential
- Licensing bases derived from more than NRC Safety Evaluation (SE) language



Post-TMI EFW System





Licensing Evolution of EFW

- Original Licensing Bases
- HELB
- Post-TMI
- GL 81-14 Seismic Qualification



EFW Original Licensing Bases

- System as originally designed was not single failure proof
 - Only one turbine-driven pump
 - No cross-connects between units, no SSF
- “Redundancy” considered in context of entire steam conversion system
 - Main feedwater, hotwell, condensate booster, emergency feedwater pumps & Station ASW
- Main feedwater line breaks not considered in original design



HELB Influence on EFW

- AEC (Giambusso) letter (12/15/72) requested that Duke address HELBs
 - Focused on dynamic effects
- Duke HELB analysis identified secondary side cooling vulnerabilities
- EFW modifications addressed vulnerabilities:
 - Rerouted EFW piping through Turbine Building basement
 - Installed EFW cross-connects between units
- AEC Safety Evaluation for operating license, dated 7/6/73, accepted Duke's HELB strategy
 - Relied upon cross-connects between units to address single failure criterion



TMI Influence on EFW

- Order issued on 5/7/79 after TMI-2 accident
- Duke submitted conceptual design for EFW upgrade on 5/17/79
- Key system improvement was the installation of two motor driven EFW pumps and associated piping on each unit



TMI Influence on EFW

- NRC letter (5/18/79) finds satisfactory compliance with immediate actions of order
- Duke letter (7/23/80) responding to NUREG-0667 recommendation to upgrade EFW to meet safety grade requirements stated: ***“The Oconee emergency feedwater system coupled with the dedicated Standby Shutdown Facility, currently under construction, meet this recommendation and no additional modifications to the system are necessary.”***
- NRC SE (8/25/81) accepts Duke submittal (4/3/81) which credited EFW unit cross-connects and SSF capability
- NRC SE (12/29/81) revising the TS out-of-service times for the motor-driven EFW pumps recognizes and credits cross-connect, SSF and station ASW as means of providing EFW



Result of Post-TMI Effort

- Significant modification to system
- Significant correspondence, meetings and dialogue
- Mutual agreement in overall direction
- Licensing review focused on failure of pumps and specific valves, not entire system
- No change in inventory requirements or feedwater line break response strategy



Seismic Qualification of EFW (GL 81-14)

- Duke original and subsequent responses repeated intent to utilize the dedicated Standby Shutdown Facility (SSF) as an alternate means of feedwater supply (1982)
- NRC requests further information relating to SSF (1982, 1984)
- Duke identifies and corrects issues involving seismic qualifications of certain EFW valves and piping (1985 - 1986)
- NRC SE (1/14/87) approving Duke's response based in part on the availability of alternate means of decay heat removal

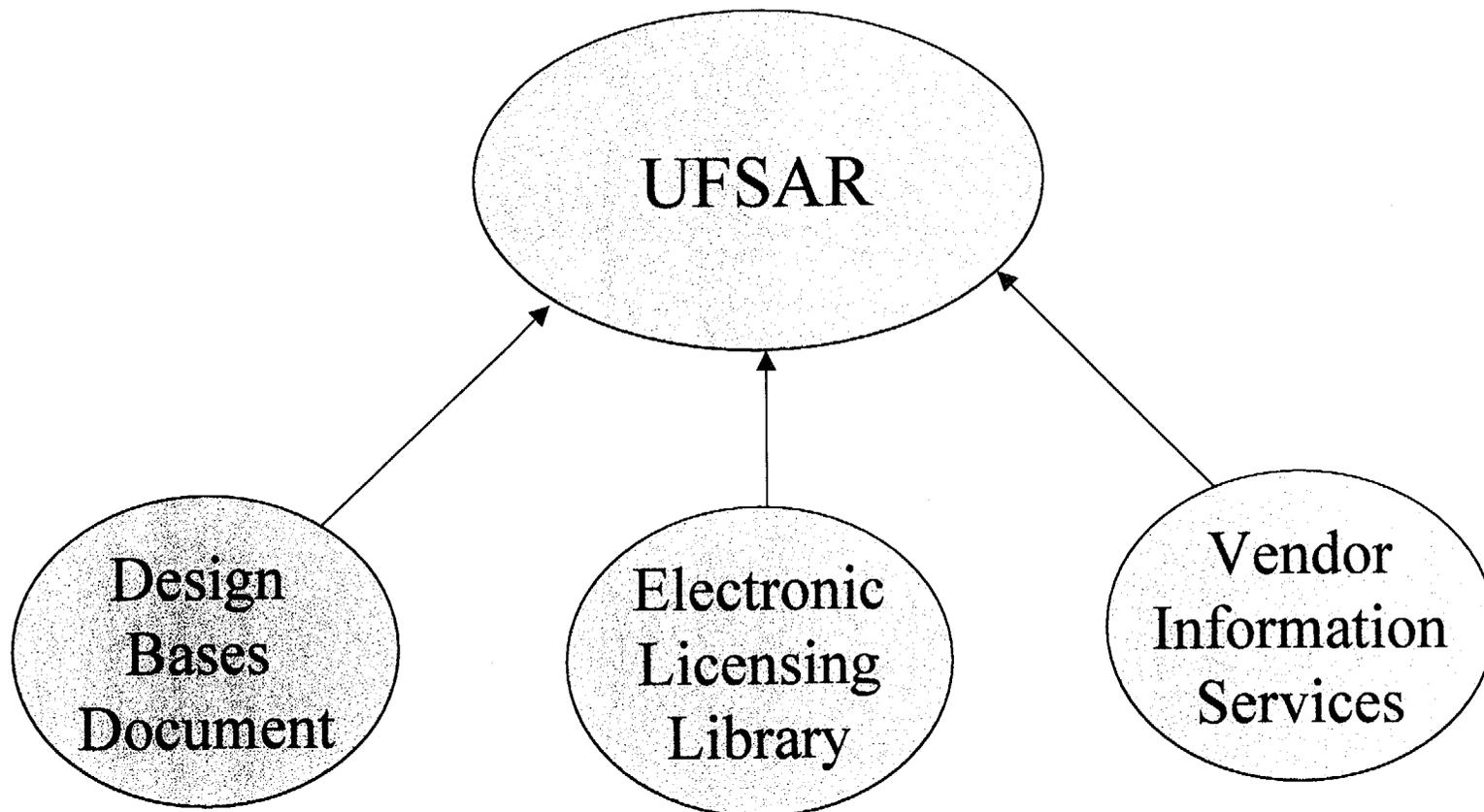


EFW Licensing Summary

- ONS EFW was never designed or licensed to equal a standard, stand-alone safety system
- NRC has accepted diverse and redundant methods of supplying feedwater to address EFW limitations



Licensing Information Infrastructure



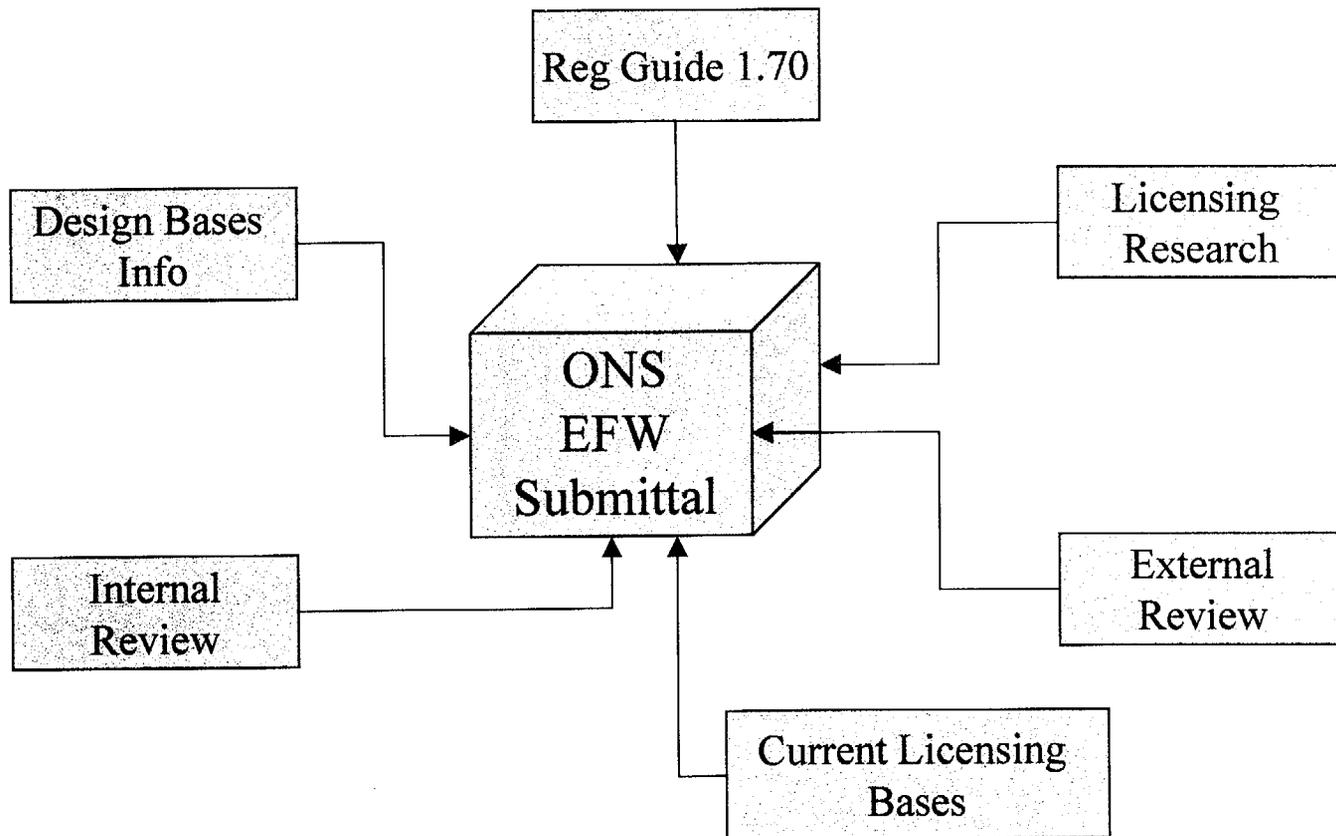


Structure of Submittal

- Request for agreement that UFSAR rewrite is adequate characterization of licensing bases
- Rewrite and mark-up of UFSAR section
- Discussion of proposed changes
- Justification for changes
- Supporting licensing documentation



Submittal Development





UFSAR Format & Level of Detail

- Reg Guide 1.70, rev. 3, “Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants” used for format guidance
- NEI 98-03, rev.1, used to establish appropriate level of detail



Change Categories “P” & “A”

- Category P
 - Presentation changes only, does not alter existing UFSAR information
- Category A
 - Editorial changes that clarify by either removing, adding, or rewording existing UFSAR information



Change Category “M”

- Category M
 - Could be considered a CLB modification
- Two category M items:
 - Both involve crediting Standby Shutdown Facility (SSF) for certain HELB & flow control valve failure scenarios
 - Adequate controls are in place to ensure SSF availability



EFW Control Valve Failure During LOOP (M1)

- Post TMI correspondence silent on mitigation of MFLB/MSLB with flow control valve failure coincident with LOOP
 - Correspondence does recognize use of alternate startup flowpath
 - Does not discuss LOOP effects on startup flowpath valves
- Scenario may require use of SSF ASW
 - Scenario $<0.01\%$ of ONS CDF



HELB Effect on Feedwater (M2)

- NRC (1973) accepted use of unit cross-connect & station ASW for mitigation of certain HELB feedwater scenarios
- Standby Shutdown Facility has since been constructed, provides improved mitigation alternative
 - UFSAR rewrite proposes to credit SSF
 - Scenarios <1% of ONS CDF



Change Category “L”

- Category L
 - Clarifications that could be subject to diverse interpretations
- Three category L items:
 - Clarification of worst-case time to deplete upper surge tank (UST) inventory
 - Impact of non-safety instrument failures
 - Explicit single failure exceptions



Worst-case UST Inventory Depletion (L1)

- Current UFSAR depletion time of 75 minutes does not consider worse case of all 3 EFW pumps running
 - Actual worse case time is approximately 44 minutes
- Time still within 20 minute design bases established in NRC letter dated 11/14/80



Non-Safety Instrumentation Failures (L2)

- Reliance on non-QA equipment in conformance with Duke response to GL 83-28, dated 4/12/95
 - Ex: Turbine-driven pump relies on non-safety aux oil system to start
 - Single failure of non-safety components included in single failure study
- NRC agreed with ONS safety classification via SE dated 8/3/95



Single Failure Exceptions (L3)

- Seismic
 - NRC SE (1/14/87) approved use of alternate (non-EFW) methods
 - NRC SE (1/14/87) approved use of single seismic boundary valves
- Control Valve 315/316 failures
 - Duke answer to question 14 in letter dated 4/3/81 specified use of startup flowpath



Single Failure Exceptions (L3)

- Manual control room start of TDEFW pump necessary with failure of MDEFW associated with unaffected SG
 - NRC SE (12/7/98) acknowledged that MSLB isolation circuitry not single failure proof
 - Control room start of TDEFW easily accomplished within 20 minute CLB timeframe



Single Failure Exceptions (L3)

- Long Term Inventory
 - Post-TMI correspondence did not impose additional requirements relative to EFW inventory
 - NRC SE (1/14/87) approved use of SSF and HPI feed & bleed as acceptable mitigation strategies



Summary

- Overall quality of UFSAR Section significantly improved
- Requesting approval for clarified role of SSF during two specific scenarios
- Seek agreement on three potential interpretation issues
- Committed to work closely with staff to achieve desired end point

Oconee Nuclear Station

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