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R. E. Ginna Nuclear Power Plant

NFPA 805

License Amendment Request

Pre-Application Meeting with NRC Staff

February 20, 2013

Introductions

■ CENG Representatives

- Elliott Flick CENG Gen'l Manager – Fleet Engineering
- Tom Mogren Ginna Engineering Manager
- Michael Lilley Ginna Project Manager, NFPA 805
- Jarred Jackson Ginna Supervisor, Licensing
- Jeff Stone CENG Supervisor, PRA
- Sean Gillen Ginna Supervisor, Electrical Design
- Rob Cavedo CENG PRA Principle Engineer

■ Project Consultants

- Paul Amico Sr. Risk Consultant, KGRS
- Suzanne Loyd Risk Analyst, KGRS



Agenda

- Overview of Ginna Design Features
- Current Fire Protection Licensing Basis
- NFPA 805 Transition Project Overview
- Compliance with NFPA 805
- Probabilistic Risk Assessment Development/Results
- Implementation Overview
- Summary



Overview of Ginna Design Features

- Single unit PWR, 1775 MWt
- Westinghouse 2-loop NSSS
- Ultimate heat sink is Lake Ontario
- Initial Operating License issued in 1969
- Renewed Operating License issued – expires in 2029



Ginna Current Fire Protection Licensing Basis

- Fire Protection Program Standard License Condition
- 10 CFR 50.48(a) and (b)
- 10 CFR 50, Appendix A, General Design Criterion 3
- 10 CFR 50, Appendix R
- Branch Technical Position APCSB 9.5-1 Appendix A
- Current Exemptions
- Operator Actions – Existing with NRC approval



NFPA 805 Transition Project Overview

- License Amendment Request (LAR) committed submittal date – March 29, 2013
- Using the Nuclear Energy Institute (NEI) LAR template
- Preparation and internal review activities are in progress
- Web portal has been established to support NRC review



NFPA 805 Transition Project Overview

- Fire Protection Program Transition
 - License Condition being revised
 - Technical Specifications being revised
 - Reviewed existing exemptions
 - Will not be transitioning any exemptions to NFPA 805



Compliance with NFPA 805

- NFPA 805 Chapter 3 Compliance
 - Review performed using NEI 04-02, Revision 2 guidance as supplemented by FAQ 07-0036
 - Review documented in B-1 Table (Attachment A of LAR)
 - Results
 - One Modification –code compliance adding 2 sprinkler heads
 - 108 of 120 Sections/Sub-sections comply or comply with evaluation
 - 4 Comply with clarifications
 - 3 Comply with Prior NRC Approval
 - 5 Submit for NRC Approval



Compliance with NFPA 805

■ Non-Power Operations

- Review performed using NEI 04-02, Revision 2 guidance as supplemented by FAQ 07-0040
- Results of Review
 - All success paths identified
 - Complete component list by Key Safety Function
 - High Risk Evolutions
 - Pinch Points identified
 - Recommendations to manage Fire Risk



Compliance with NFPA 805

- Radioactive Release
 - Review performed using NEI 04-02, Revision 2 guidance as supplemented by FAQ 09-0056
 - Plant evaluated on a Fire Zone basis
 - Credit engineering controls for gaseous and liquid effluents
 - Revised Pre-Fire Plans and Training material to clarify monitoring and control requirements
 - Procedure changes and training program revisions are complete



Compliance with NFPA 805

- Nuclear Safety Capability Assessment
 - Review performed using NEI 04-02, Revision 2 guidance as supplemented by FAQ 08-0054
 - Fire Area Review
 - Common Enclosures
 - Suppression Initiation Effects
 - Extensive Breaker Coordination Analysis performed
 - Multiple Spurious Operations review
 - Results:
 - No Fire Areas to be transitioned deterministically
 - All 16 Fire Areas to be transitioned using Risk-Informed (RI)-Performance Based (PB) method



Compliance with NFPA 805

- Safe and Stable (STS):
 - Originally defined as Cold Shutdown
 - While completing NSCA, changed to Hot Shutdown
- NFPA 805 guidance points to “Hot Standby” for PWRs
 - STS defines Hot Standby as:
 - Mode - 3
 - $K_{eff} < 0.99$
 - Rx Mwt - N/A
 - RCS Temp $\geq 350^{\circ}\text{F}$
- Ginna “Hot Shutdown” meets all of the STS definition
- Titles of Modes 3 and 4 are reversed at Ginna.



Compliance with NFPA 805

■ Recovery Actions

- Review performed using NEI 04-02, Revision 2 guidance as supplemented by FAQ 07-0030
- Primary Control Station
 - 3 Appendix R Alternate Shutdown Locations
- 7 Unique Recovery actions



Compliance with NFPA 805

■ Monitoring Program

- Following FAQ 10-0059, Revision 5 guidance
- NSEL and FPRA Components
 - Include any new functions in existing Maintenance Rule Program
- NPO Components, Rad Release Systems, FP Program Components
 - Include in normal System and Program Health Monitoring
- FP Systems and Features
 - Low Safety Significant – Normal System/Program Health Monitoring
 - High Safety Significant – NFPA 805 Specific Monitoring Program that uses the Maintenance Rule Program software



PRA Development/Results

- Fire PRA built on a high quality Internal Events model
 - Full peer review to RG 1.200, Revision 1 in 2009
 - Focused-scope peer review to RG 1.200, Revision 2 in 2011
- Fire PRA peer reviewed by PWROG in June 2012
 - Total of 44 Facts & Observations (F&Os)
 - 19 Findings
 - 22 Suggestions
 - 3 Best Practices
 - All F&Os subsequently addressed
 - No unreviewed methods used



PRA Development/Results

- Overall Plant Risk Post-Transition
 - Total Fire CDF = $3.35\text{E-}5/\text{yr}$ and LERF = $1.27\text{E-}6/\text{yr}$
 - Total CDF = $5.05\text{E-}5/\text{yr}$ and LERF = $3.25\text{E-}6/\text{yr}$
 - Sufficient margin to account for non-quantified hazards
- The results of the RI-PB evaluation meet the requirements of NFPA 805 and RG 1.174



PRA Development/Results

- Delta-risk includes internal events risk reduction from NFPA 805 modifications

| Metric | Fire Delta | IE Delta | Net Delta |
|--------|------------|----------|------------|
| CDF | 1.53E-5/yr | -6.05E-6 | 9.22E-6/yr |
| LERF | 9.25E-7/yr | -3.30E-7 | 5.95E-7/yr |

- Fire delta = Post-transition - Compliant (with 805 Mods)
- IE delta = Current - Post-transition



Implementation Overview

- Modifications Planned
 - 17 Total Modifications Credited in FPRA
 - 1 Previously mentioned for NFPA Code compliance
 - 2 modifications credited were already in progress
- Process/Procedure Changes
 - Training
 - Operator Response for Recovery Actions
 - Fire Brigade Response
 - Design Change Process



Major Modifications Credited

- Power for the Standby Auxiliary Feed Water (AFW) pumps will be able to be supplied by a dedicated Diesel Generator (DG) in the Standby AFW pump room with available connections for a second portable DG
- Install shutdown seals on both Reactor Coolant Pumps to minimize seal leakage during a fire induced loss of seal injection



Major Modifications Credited

- Install a stand-by high-head pump in the SBAFW building to be free from the effects of a fire outside the charging pump room
- Install disconnects in the Control Room for PORVs, Letdown orifice valves, Letdown Isolation, and Excess letdown isolation.
- Install additional protected indication in the control room for Pressurizer pressure and steam generator level



Major Modifications Credited

- Install overcurrent protection for both DGs that is not impacted by a fire outside the DG Rooms
- Provide a diverse Reactor trip from protected Pressurizer high pressure signal to open Rod Drive MG supply AC.
- Upgrade design of HEMYC for specified circuits in Battery Room B.



Major Modifications Credited

- Provide auto isolation of specified Containment Isolation/Containment Ventilation Isolation valves on low Pressurizer pressure signal.
- Provide an auto-closure of PORVs on Pressurizer low pressure signal.
- Provide automatic closure of the MSIVs on 2-of-2 low SG water level protected channels.



Summary

- Complete LAR to be submitted on or before March 29, 2013
- No alternative Fire PRA methods
- Significant Modifications planned
- Transition Schedule
 - Implement procedure/process changes 6 months after SER
 - Completion of modifications by 1st Refueling Outage more than 12 months after SER

