

FitzPatrick Nuclear Power Plant Application For License Amendment

Primary Containment ΔP deletion and Torus level band margin

- Project Background
- Need for Change
- Technical Specification Proposal
- Operational Safety Benefits
- Supporting Documentation
- Lessons Learned
- Summary

FitzPatrick Nuclear Power Plant

Application For License Amendment

Project Background

- Primary Containment Technical Specification (TS) dP implementation (1978) was intended as temporary short-term mitigation until MARK I hydrodynamic loads were analyzed and necessary modifications completed demonstrating adequate design (NUREG 0661).
- NUREG 0661 Provided direction to restore an identified reduction in Safety Margin for, among other things, structural loading of the Mark I Torus.
- JAF maintained a Tech Spec Required Minimum Drywell to Torus Differential Pressure (Min DP) and reduced the allowable water level range in response to the Mark I Containment Long Term Program (NUREG-0661).

FitzPatrick Nuclear Power Plant

Application For License Amendment

Need for Change

- To sustain primary Containment dP at Fitzpatrick, it takes frequent venting of the Torus or nitrogen make-up to the Drywell. This adds operation of the Standby Gas System (SBGT) and cycling large primary containment vent and purge valves (PCIVs). This adds hours on the SBGT charcoal filters, and frequent cycles on valves along with operator actions.
- The increase in Torus water level band will provide operational margin. This will reduce the number of RHR operations required to maintain Torus level during required RCIC/HPCI testing.

FitzPatrick Nuclear Power Plant

Application For License Amendment

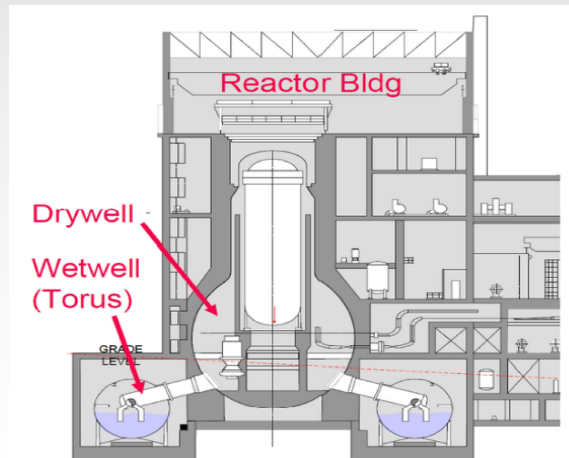
Technical Specification (TS) Proposal

- TS-3.6.2.2 Suppression Pool water Level
 - Increase water band from ≥ 13.88 ft and ≤ 14 ft to ≤ 14.25 ft
- TS- 3.6.2.4 Drywell-to-Suppression Chamber Differential Pressure and associated Bases
 - Delete
- TS-3.3.5.1 Emergency Core Cooling System (ECCS) Instrumentation
 - Table 3.3.5.1-1, Function 3.e, increase allowable value from ≤ 14.5 ft to ≤ 14.75 ft

FitzPatrick Nuclear Power Plant Application For License Amendment

Operational Safety Benefits

- Minimizes the time Primary Containment vent and purge isolation valves (PCIVs) are open for maintaining containment parameters at power.
- Reduces the frequent distraction requiring Licensed operators to go to the Relay Room for containment control operations.



FitzPatrick Nuclear Power Plant

Application For License Amendment

Supporting Documentation

- Technical Report (TR) 13-0541-TR-002 Rev1.0 JAF “Mark I Torus Suppression Chamber Program 0ΔP Pool Swell Loading Determination for Normal Operation,” Rev. 1, May 2018.
- GE Report 005N1724 “Short-Term Containment Analysis for Zero Drywell-to-Wetwell Pressure Differential” dated May 2019
- NRC Letter dated December 12, 1984, James A. FitzPatrick Nuclear Power Plant, ‘MARK I CONTAINMENT LONG TERM PROGRAM’
- NRC Letter dated January 22, 1985, Nine Mile Point Nuclear Station, Unit No.1 ‘MARK I CONTAINMENT LONG TERM PROGRAM’
- NRC Letter dated January 7, 1986, Nine Mile Point Nuclear Station, Unit No.1 ‘SUPPRESSION POOL TEMPERATURE/PRESSURE Amendment No.76 to delete the requirement to maintain a drywell to suppression chamber differential pressure.

FitzPatrick Nuclear Power Plant

Application For License Amendment

Technical Report (TR) 13-0541-TR-002 Rev1.0 JAF “Mark I Torus Suppression Chamber Program ΔP Pool Swell Loading Determination for Normal Operation”

Analyzed the Torus structural impact for ΔP and increased Torus water level

- Additional water in downcomers due to ΔP normal operation
- Increased Torus maximum water volume due to level

Evaluated OE, GE report and modifications

- IN 2003-07- water in vent pipe bowls
- Power uprate and ARTS/MEOD Amendments
- Torus ECCS and RCIC Strainer
- SRV discharges (increased bore size / throat diameter of the main valve)
- Large and Small Bore piping systems
- Incorporated GE 005N1724 Rev 0 April 2019 results in TR

Conclusion – All affected structural elements met code requirements with adequate margin and no additional modifications are required.



FitzPatrick Nuclear Power Plant

Application For License Amendment

GE 005N1724 Rev 0 April 2019, Short-Term Containment Analysis for Zero Drywell-to-Wetwell Pressure Differential (PD)

Performed an updated containment short-term analysis

- GEH used the same methods that have been used previously in the current analysis of record (NEDC-33087P, Rev 001) and approved by the NRC.
- Evaluated effects on short-term containment pressure and temperature response to the limiting Design Basis Loss of Coolant Accident.

Results

- The existing pool swell, condensation oscillation and chugging loads bound the results of the GEH analysis.
- GEH results demonstrate that all existing vent thrust loads remain valid except for the downcomer mitre bend vent thrust loads (increased $\approx 8\%$). Imperia's analysis conservatively bounds GEH calculated vent thrust loads.
- New peak drywell pressure and temperature remain bounded by the design drywell pressure and temperature (56 psig and 309 °F).

FitzPatrick Nuclear Power Plant Application For License Amendment

Lessons Learned from Other Utilities

- NMP1 deletion of Containment dp TS Amendment 76 dated January 7, 1986
- Performed Finite Element Analysis using improved computer and finite element technology
- Code reconciliation and use of the 1999 lower safety factor implemented in the ASME Code and approved by NRC in subsequent editions
- QSTF facility tested and provided results for the JAF 0.0 dP PS load case. (NEDE 23545P, 21944P)
- Use of Workbook to assist reviews (NEI 96-06)

FitzPatrick Nuclear Power Plant

Application For License Amendment

Summary

- This will benefit plant operations by minimizing cycling of containment valves, diversion of Control Room operators, operation of the Standby Gas System (SBGT) extending charcoal filter life and reduce nitrogen make-up. This will also reduce RHR system operations by increasing the Torus level band.