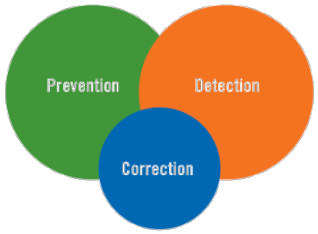
NEXTera® ENERGY RESOURCES



Containment Dome Truss Seismic Analysis Methodology

License Amendment Request

Point Beach Nuclear Plant Units 1 & 2

July 2015

Agenda

- Introductions
- Purpose
- Overview
- History
- Current Status
- License Amendment Request
- Planned Modifications
- Summary
- Questions

NEXTera® ENERGY RESOURCES

Purpose

- **To provide a summary of the License Amendment Request being developed by NextEra Energy Point Beach**
  - The License Amendment Request addresses:
    - The seismic analysis methodology used to evaluate the containment dome truss and supported components
    - The structural analysis methodology used to evaluate dome truss components

NEXTera® ENERGY RESOURCES

Overview

Unit 1 & 2 Containment Dome Truss Configuration

Unit 1 & 2 Containment Dome Truss Structures and Containment Spray piping ring headers have been reviewed and are currently:

- Operable-but-Nonconforming to the design code of record (seismic loads)
  - AISC Steel Construction Manual, 6th Edition
  - USAS B31.1 – ’67 Ed. / ASME B&PV Sec. III ‘77 thru Winter of ’78
- Meets the NRC criteria for treatment as a legacy (i.e. old design) issue

Unit 1 & 2 Containment structures are:

- Operable-but-Nonconforming for post-accident thermal clearance

License Amendment Request is for revised seismic and structural analysis methodology for the dome truss structures and attached components

Modifications are being developed to resolve the seismic and thermal nonconformance

NEXTera® ENERGY RESOURCES

History

- Dome trusses were originally a construction aid for the containment dome
  - Subsequently, the Dome Trusses were used to support the Containment Spray ring headers and Containment Air Recirculation Cooling System ductwork
- 5/17/68 (pre-operation) document from Westinghouse indicated the trusses would be evaluated to meet the site seismic criteria
- 7/15/70 Bechtel letter reiterated a seismic analysis of the trusses with attached piping had been completed
- 10/18/89 Bechtel letter contained a dome truss evaluation for resisting dead loads during construction (concrete, liner plate, construction loads)
- 12/6/90 calculation by Sargent & Lundy (S&L) evaluated the trusses for seismic and deadweight loads without attached pipe loads
- 2/14/94 calculation by S&L analyzed containment spray piping and contained an open item to evaluate the dome truss with applied pipe loads

NEXTera® ENERGY RESOURCES

History

- August 2011 CDBI Inspection questioned resolution of open item in the 2/14/94 calculation (CR01677914 issued)
- August 2011 Stevenson & Associates (S&A) hired to perform preliminary review of 12/6/90 S&L calculation and containment spray piping calculations; concluded the trusses with attached piping loads were acceptable
- During CR01677914 resolution, 1990 S&L computer model could not be retrieved; new model created by S&A
- March 2012 During development of S&A model identified as-built configuration not in accordance with the Bechtel design drawing which was the basis for the S&L model; identified structural (seismic load) nonconformance
  - OBN classification (CR01750123 tracks resolution)
- 2012 and 2013 refueling outage walkdowns conducted to support modification development to correct structural (seismic load) nonconformance
  - Engineering Changes (EC) 276584, 276585 developed

NEXTera® ENERGY RESOURCES

History

- March 2014 RFO walkdown for modification planning, Unit 2 dome truss bearing box housing bolts found not centered as analyzed
  - EC 281403 implemented prior to Unit 2 startup to correct centering
- April 2014 Unit 1 electively taken offline; similar bearing box nonconformance identified
  - EC 281440 implemented prior to Unit 1 startup to correct centering
- April 2014, during Unit 1 repair, identified inadequate thermal growth clearance
  - POD 1962836-01 concludes Unit 1 is Operable-but-Nonconforming
  - POD 1962836-04 performed for extent-of-condition (Unit 2)
- August 2014, elective U2 outage, walkdowns were performed to assess thermal clearances
  - Unit 2 clearances identified as bounded by Unit 1 condition/evaluation

Modifications Needed to Address Thermal Clearance and Seismic

NEXTera® ENERGY RESOURCES

Current Status

Seismic Modifications Developed (EC 276584, 276585)

- Involves the dome truss structures, spray piping supports, reroute ductwork and lighting
  - *Seismic modifications as currently developed do not address thermal clearance*

Thermal Modifications Developed (EC 282198, 283096)

- Alter the truss structures to increase available clearance
  - *Implementation of the thermal clearance modifications using the existing current license basis results in adverse impact on seismic margins*

Seismic and Thermal Modifications Developed to Address Nonconformance

NEXTera® ENERGY RESOURCES

License Amendment Request

- **Overall Scope**
  - Revise seismic analysis methodology
    - Revise the in-structure response spectra and structural damping
    - Application limited to dome truss structures and supported equipment
  - Revise structural analysis methodology
    - Application limited to dome truss
    - Supplement the current code of record
  - Impacts the scope of seismic and thermal modifications

License Amendment Request

- **Ground Motion Response Spectra (GMRS) developed by EPRI for Fukushima Near Term Task Force Recommendation 2.1**
  - Utilized to develop ground motion time-history
  - GMRS developed following the guidelines of Reg. Guide 1.208
- **Revise in-structure response spectra at dome truss elevation**
  - Soil structure interaction analysis performed
  - NUREG-0800 SRP 3.7.1 and 3.7.2 used as guidance
- **Revise damping values following the guidance of RG 1.61, Rev. 1:**

	OBE	SSE
Dome Truss Bolted Steel w/bearing connections	5%	7%
Pre-stressed Concrete Containment	3%	5%
Containment Spray Lines	3%	4%

Use of EPRI GMRS Developed for NTTF Recommendation 2.1

License Amendment Request

- **Use ASME Section III Appendix F acceptance criteria to supplement the structural code of record**
  - Supplements structural code of record (AISC Steel Construction Manual, 6th Ed.)

- **Development of New Seismic/Temperature Limits for the dome truss**

New Seismic/Temperature Limits for Dome Trusses

NEXTera® ENERGY RESOURCES

Planned Modifications (in Conjunction with License Amendment Request)

- Provide additional restraint to the dome truss structures at six (6) support locations (seismic)
- Reinforce two (2) containment spray pipe supports (seismic)
- Modify the dome truss structures to increase clearance (thermal)
- Implementation anticipated to occur over two Refueling Outages for each Unit

Seismic and Thermal Modifications

NEXTera® ENERGY RESOURCES

Summary

License Amendment Request for seismic and structural analysis methodology

- Ground Motion Response Spectra, damping, and soil structure interaction analysis
- Use of ASME Section III Appendix F and New Seismic/Temperature Limits
- Methodology limited in use to the dome truss structures and attached components

Modifications to the truss structures and containment spray pipe supports to resolve seismic and thermal nonconformance

- License Amendment defines the scope of seismic and thermal modifications
- License Amendment required prior to implementing thermal modifications

License Amendment for Seismic and Structural Analysis Methodology Modifications Correct Nonconformance

NEXTera® ENERGY RESOURCES

Questions

NEXTera® ENERGY RESOURCES