PG&E Meeting with NRC on Proposed Part 50 LAR and use of a Single-Failure-Proof Lifting Device in the Refueling Building

April 20, 2004

Humboldt Bay ISFSI Project

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Agenda

- Introduction
- Overview
- HBPP Part 72 Application Status
- HBPP SAFSTOR Licensing Basis
- Cask Handling Concepts
- LAR Contents
- Major Analyses
- Proprietary Discussion of Davit Crane and Strand Jack

Overview of Humboldt Bay Unit 3

- Unit 3 is a 65 MWe BWR co-located with 2 operating fossil units and 2 combustion turbines
- Unit 3 was shutdown in 1976 for refueling and seismic modifications
- Refueling Building upgraded to 0.5g. Did not obtain NRC concurrence on seismic hazard
- DPR-7 was amended in 1988 to a possession-only license (SAFSTOR)
- Part 72 license application for an ISFSI filed with the NRC in December 2003
- Plan to file Part 50 LAR in July 2004

Overview of Spent Fuel

- Fuel stored in steel lined below grade spent fuel pool located in Refueling Building (RFB) next to Reactor Vessel
- 390 spent fuel assemblies - all but one stored in individual Boral cans
- No cooling required - approximately 35 watts per assembly with water of 78ºF

HBPP Part 72 Application Review Schedule

- Application filed on December 19, 2003
- Acceptance review completed on February 2, 2004
- RAIs to be issued September 2004
- PG&E RAI response November 2004
- License issuance scheduled for August 2005

HBPP SAFSTOR Licensing Basis

- SAFSTOR Accident Summary
  - Fuel handling accident and non-mechanistic heavy load drop
  - No criticality due to a seismically-induced or otherwise load-induced rearrangement of spent fuel assemblies
  - Spent fuel pool rupture
  - Impact of tsunami flooding
- SER Conclusions
  - Fuel handling accident or non-mechanistic heavy load drop doses are a small fraction of Part 100
  - Small likelihood of criticality due to seismic loads or other mechanical loads
  - Consequences of rupture of the SFP found acceptable
  - Offsite radiological consequences of a tsunami are bounded by the above

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Cask Handling Concepts

Handling under 0.5g design criteria

- Lower empty cask into pool using special single failure proof lifting device (device design is proprietary)
- Load casks and set MPC lid
- Install temporary lid restraint
- Lift loaded casks from pool using special single failure proof lifting device and perform initial cask decontamination
- Set loaded cask on rail dolly
- Perform initial tack welds on MPC lid

Cask Handling Concepts, cont.

- Remove temporary lid restraint
- Prepare and perform MPC welding, drying, and helium backfill procedures.
- Install permanent HI-STAR overpack bolted closure plate
- Prepare and perform overpack drying and helium backfill procedures
- Perform final decontamination of the overpack
- Roll cask out of RFB on the rail dolly to be received by the transporter

Davit Crane Design

- Dead load, lifted load, and seismic load
- ASME NF equipment support for davit crane structure
- ACI-349-01 Appendix for anchorage to concrete
- ACI-349-01 for capacity check of existing concrete under dead, hydrostatic, seismic, and anchorage loads
- Design seismic input is SSEERFB (ZPA = 0.5)
- ANSYS FEA with response spectra for 3-D seismic load cases
- NUREG-0612 and NUREG-0554 as applicable

LAR Contents

- Heavy loads program
- Structural/seismic design
- Thermal design
- Radiological assessment
- Water chemistry considerations
- Criticality
- Accidents and events evaluated
  - Drops and tipovers
  - Natural phenomena

Design and Major Analyses

- Seismic
- Davit crane
- Pool wall
- Cask on rail dolly
- Thermal analysis
- Criticality analysis
- Drops and tipover

Seismic

- Analyses performed will be under existing licensing basis and using seismic design criteria of 0.5g
- Analyses
  - Davit crane and strand jack
  - Cask pit
  - Cask wash down area
  - Pool wall
  - Cask on rail dolly

Davit Crane

- Methodology - finite element analysis using ANSYS 5.7
- Acceptance criteria - ASME Section III, NF for level D
- Analysis documented in HI-2033021 and show safety factors greater than 1.0

Pool Wall

- Methodology - finite element analysis using ANSYS 5.7
- Acceptance criteria - ACI 349
- Analysis documented in HI-2033021 and shows pool wall under davit crane will withstand combined loads induced by the weight of the crane, the lifted load, and hydrodynamic loads under normal and earthquake conditions

Cask on Rail Dolly

- Methodology - VisualNastran and Solidworks
- Acceptance criteria - HI-STAR HB on dolly does not tip over under 0.5g and acceleration is <60g under deterministic earthquake
- Analysis documented in HI-2033046 and show that the cask does not tip over during 0.5g and acceleration is <60g under deterministic earthquake

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Thermal Analysis

- No cooling required for existing fuel in boral cans in the pool - approximately 35 watts per assembly with water of 78ºF
- No adverse effect on SFP water temperature or RFB HVAC based on the very low heat load of the fuel

Criticality Analysis

- Analysis performed using the HI-STAR FSAR methodology which has been approved by the NRC through issuance of CoC No. 1008
- Analysis and associated codes are described in detail in the HI-STAR FSAR
- Part 72 SAR analysis results confirm the maximum reactivity for HI-STAR HB with failed fuel is well below 0.95 k_{eff}

Drops And Tip-over

- Drops are not postulated since load handling equipment meets NUREG-0612 single failure proof requirements for 0.5g earthquake
- Tipover of cask on dolly is postulated for >0.5g earthquake and has acceleration <60g
- In the event of an earthquake greater than 0.5g resulting in a cask drop into the pool, existing SAFSTOR licensing basis is bounding

Proprietary Information