# *NRC - PG&E Meeting*
# *Cask Handling Enhancements*
# *December 4, 2007*

Diablo Canyon Power Plant
Used Fuel Storage Project

Pacific Gas and Electric Company™

# *Agenda*

- Introduction - Purpose — T. Grebel
- Project Status — J. Strickland
- System Enhancements — J. Strickland
  - Cask Load Handling Review
  - FHB Crane Upgrade
  - Spent Fuel Pool Frame
  - Cask Wash-down Area Structure
  - Vertical MPC Handling
  - Storage Cask Handling at CTF
- Dry-run and Loading Schedule — J. Strickland
- Summary – Conclusions — T. Grebel

# *Purpose of Meeting*

- Update Staff on Project status
- Follow-up on cask handling enhancements discussed in June 2004
- Discuss reasons for the enhancements
  - Improved personnel safety and ALARA
  - Cask thermal capacity and nuclear fuel materials research
  - Proven crane technologies and operating experience
  - Strengthen operational focus on MPC processing
- Address NRC Staff questions on the enhancements
- Identify areas covered under a future License Amendment Request

# *Project Status*

- 10 CFR 72 DC ISFSI License
  - SNM-2511 Issued 03/22/04
- 10 CFR 50 DCPP License Amendment
  - LA 162/163 Issued 09/26/03
- California Coastal Development Permit
  - Issued on 04/20/04 by San Luis Obispo County
- ISFSI Construction will be completed in December 2007
- Plant Modifications to be completed June 2008

# *System/Facility Enhancements*

- FHB Crane main hoist single-failure-proof (S-F-P) upgrade
- Shorten Spent Fuel Pool (SFP) Frame
- Relocate Cask Washdown Area (CWA) Restraint Frame – Single unit processing
- Vertical handling of loaded MPCs
- Low Profile Transport system at the FHB
- Storage Cask load handling at the Cask Transfer Facility (CTF) to be performed by Cask Transporter in lieu of CTF platform screw jack system

# *Enhancement*
# *FHB Crane Main Hoist Upgrade*

- Original Configuration
  - 125T Non-Single-Failure-Proof (S-F-P) Main Hoist + Auxiliary Lift used in parallel during selected load handling operations for load drop prevention
  - FHB Crane and FHB/AB crane runway structure are seismically-qualified at full crane rated capacity in the fuel handling areas
  - Postulated cask drop accidents with impact limiting hardware for remaining handling operations

# *Enhancement*
# *FHB Crane Main Hoist Upgrade*

- Implemented Enhancement
  - Upgrade (at same rated capacity of 125T) to industry-standard S-F-P hardware features and functions per NUREG-0554 criteria in conformance with NUREG-0612 Appendix C
  - Credit single-failure-proof crane in lieu of cask drop accidents and eliminate impact limiter hardware

# *FHB Crane Main Hoist Upgrade*

| S-F-P Main Hoist | Main Hoist + Aux. Lift |
|---|---|
| 125T Rated Capacity | 125T Rated Capacity |
| 55 ft. Reach (approx.) | 8 ft. Reach (approx.) |
| Seismically-designed | Seismically-designed |
| Variable Speed Motor Controls | Variable Speed Motor Controls |
| Load Measurement | Load Measurement |
| Programmable Logic Controls | Programmable Logic Controls |
| Diverse Master Crane Stop Switch | Diverse Master Crane Stop Switch |
| Industry standard hardware per NUREG-0554 criteria in conformance with NUREG-0612 Appendix C | Site-specific aux. lift design in conformance with NUREG-0612 Appendix C |

# *Enhancement*
# *FHB Crane Main Hoist Upgrade*

- Reason for Change
  - Improved personnel safety and ALARA
  - Equivalent weight and capacity S-F-P trolley is available and in nuclear industry use
  - Simplifies MPC processing by eliminating multiple transfer cask rigging and handling activities
  - Industry standard crane design and hardware
- Affected Analyses
  - Minor changes to load paths – Unit 1 fuel to Unit 2
  - Remove cask handling drop analyses from design and licensing bases
  - Minor changes to update PG&E crane calculations

# *Enhancement*
# *Spent Fuel Pool Frame*

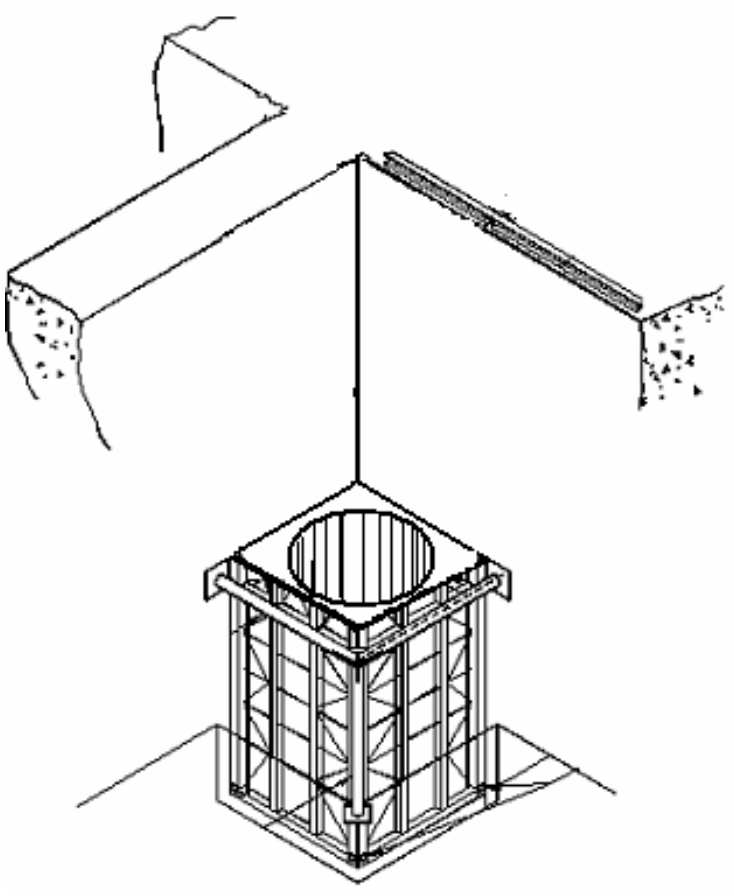
- Original Configuration
  - Frame extends from spent fuel pool cask recess area floor elevation 94’-6” to top of pool walls at elevation 141’
  - Frame relied upon to guide transfer cask and prevent interaction with pool walls during cask vertical movement coincident with a seismic event
  - Gate in frame opens for fuel movement to or from MPC

# *Enhancement*
# *Spent Fuel Pool Frame*

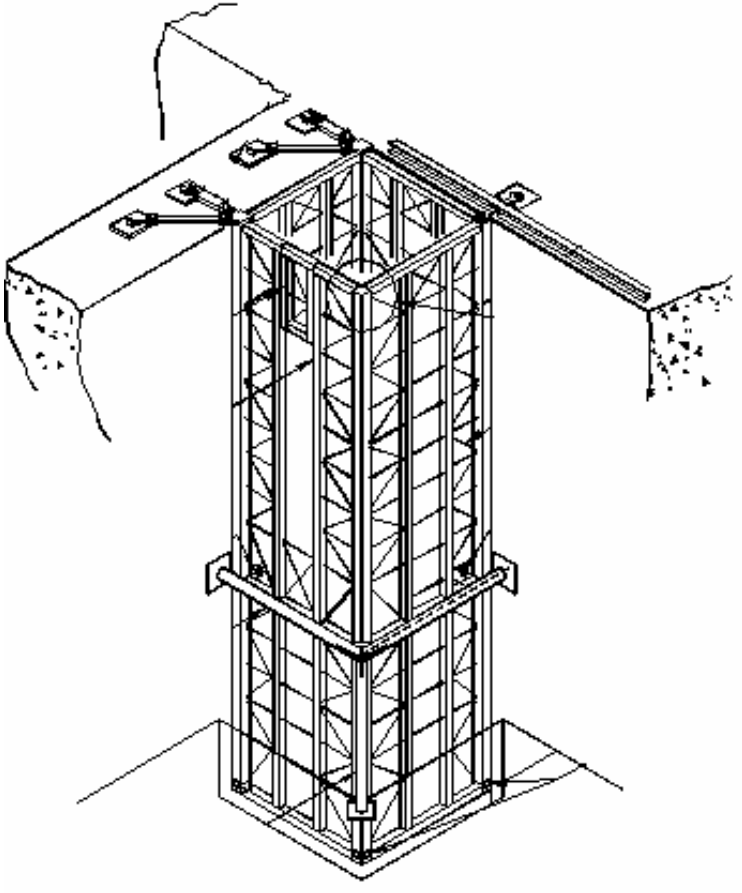
- Current Configuration
  - Credit S-F-P crane to eliminate postulated cask load drop accident in pool
  - Evaluate impact of cask swing into wall during a seismic event, from elevation 141’ to 115’
  - Shortened SFP frame precludes adverse interaction of transfer cask with fuel storage racks below elevation 115’
  - Gate in frame structure for fuel movement no longer necessary

# *Enhancement*
# *Spent Fuel Pool Frame*

Current



Original

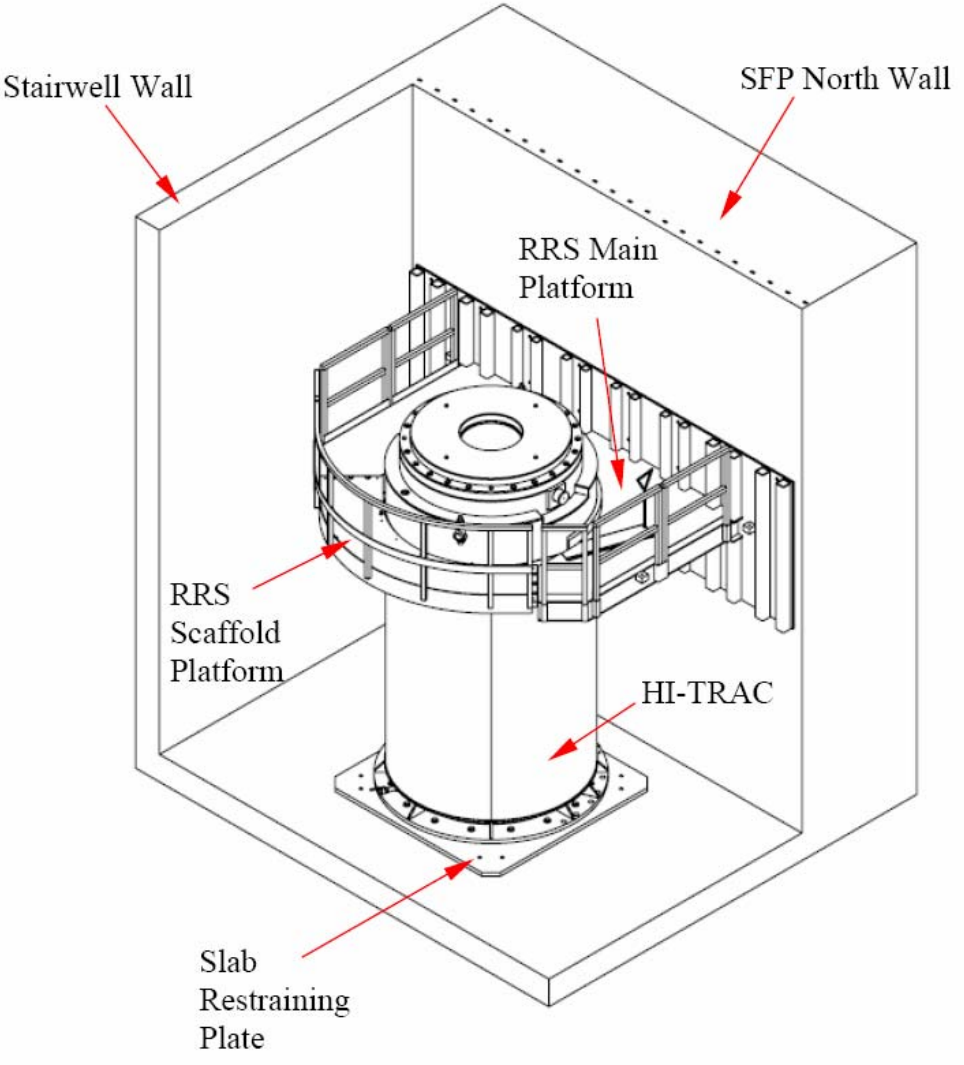


# *Enhancement*
# *Cask Washdown Area Structure*

- Current Configuration
  - Credit S-F-P crane to eliminate postulated cask load drop accident into CWA structure
  - CWA structure functions to prevent cask-to-FHB/AB structure seismic interaction during cask and MPC processing operations
  - Relocate structure in CWA to simplify cask decon and MPC processing - ALARA
  - Remove gate feature for cask lateral access

# *Enhancement*
# *Cask Washdown Area Structure*

- CWA Structure Relocation



# *Enhancement*
# *Spent Fuel Pool & Washdown Structures*

- Reasons for Change
  - Improved personnel safety and ALARA
  - Simplifies MPC processing by eliminating multiple transfer cask rigging and handling activities
- Analyses Affected
  - SFP Frame structural analyses
  - CWA structure structural analyses
  - Minor changes to CWA safe load paths
  - SFP and CWA cask drop analyses eliminated
  - SFP and CWA wall and floor loading analyses

# *Enhancement*
# *Vertical MPC Handling*

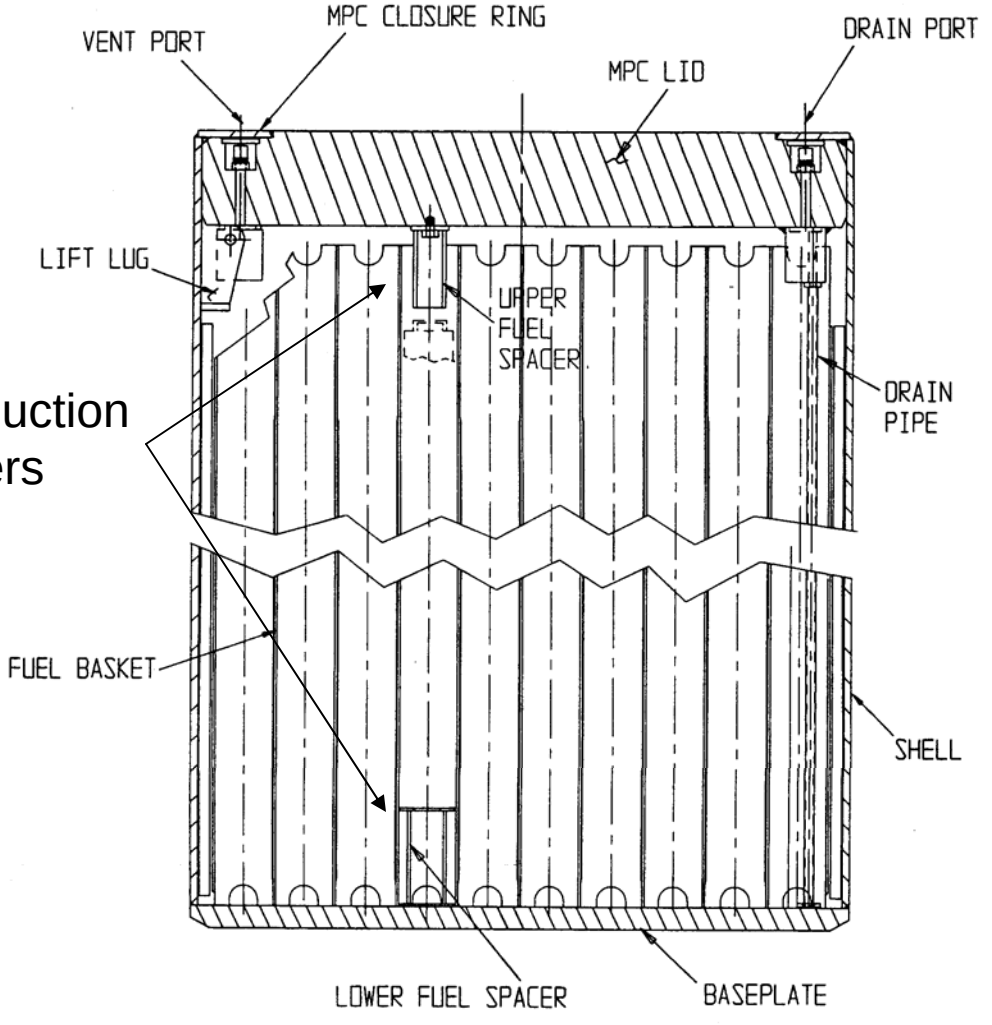
- Original Configuration
  - Holtec HI-TRAC 125D and HI-STORM 100SA MPCs
  - Loaded MPC exits/enters FHB/AB in horizontal orientation
  - Loaded MPC horizontally-transported from FHB/AB to DC ISFSI Cask Transfer Facility (CTF)

# *Enhancement*
# *Vertical MPC Handling*

- Current Configuration
  - Deploy shortened (approx. 9 in.) MPC and Transfer Cask (used at Trojan ISFSI) for vertically-oriented passage into and out of the FHB/AB exterior door on a low profile dolly
  - Minor modification to FHB/AB exterior door frame to increase height and width
  - Eliminate cask transport frame (no downending/upending operations)
  - Eliminate transfer cask horizontal lift rig

# Enhancement
# Vertical MPC Handling

MPC Length Reduction
- Fuel Spacers



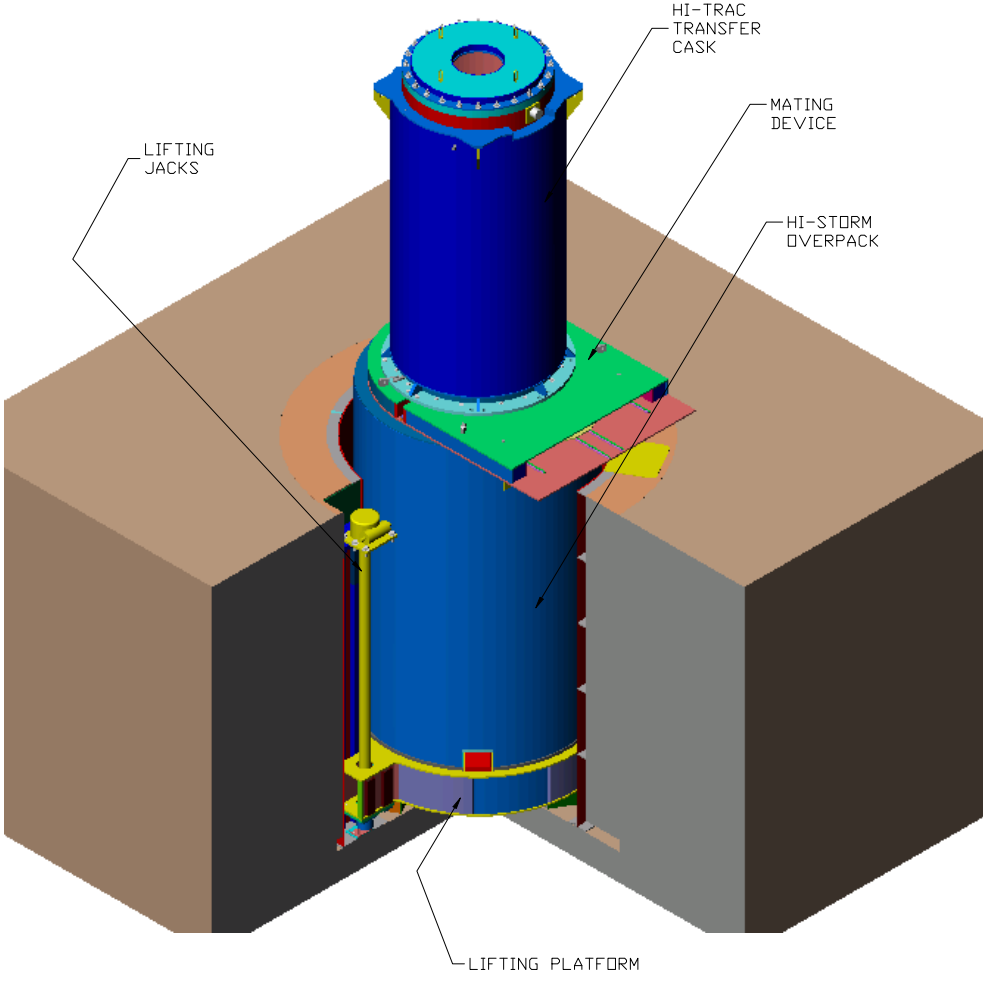
# *Enhancement*
# *Vertical MPC Handling*

- Reason for Change
  - Improved MPC Thermal Performance
  - Proven configuration (Trojan ISFSI Holtec MPC-24)
  - Improved personnel safety and ALARA
  - Simplifies MPC processing by eliminating multiple transfer cask rigging and handling activities
  - Reduces overall weight of loaded transfer cask
- Analyses Affected
  - HI-STORM MPC-32 System Analyses (Thermal, Structural)
  - Seismic Analyses of loaded cask in FHB/AB (low profile transporter)
  - Cask Transporter Seismic Sliding Analyses

# *Enhancement*
# *Storage Cask Handling at CTF*

- Original Configuration
  - Storage Cask handling using dedicated platform screw jack system once cask is landed on the platform with Cask Transporter

# Enhancement
# Storage Cask Handling at CTF




Note: Transporter and lateral restraints not shown.

# *Enhancement*
# *Storage Cask Handling at CTF*

- Current Configuration
  - Use S-F-P cask transporter for all Storage Cask handling and eliminate CTF handling system
- Reason for Change
  - Cask transporter is designed for all required cask handling
  - CTF screw jack system maintenance eliminated
  - Improved personnel safety and ALARA
  - Simplifies MPC processing by eliminating multiple cask rigging and handling activities

# *Enhancement*
# *Storage Cask Handling at CTF*

- Analyses Affected
  - Thermal accident analyses
  - CTF structural analyses
  - Eliminates non-mechanistic failure of CTF screw jack accident

# *Summary - Conclusions*

- The System Optimization:
  - Optimized system and facility design
  - Reduced cask handling burden to assure timely processing of the MPC
  - Improved personnel safety and ALARA
  - Utilized standard equipment

# *Dry-run and Loading Schedule*

- PG&E Dry-runs - June 2008
- NRC Dry-run - July 2008
- Start Loading - August 1, 2008
  - Load 8 cask
  - Scheduled for 10 days per cask
  - Loading to complete by November 2008 to support SGRP activities

# *License Amendment Request*

# *LAR Changes*

- TS 3.1.1, “Multi-Purpose Canister (MPC)” is modified to clarify the required helium leak rate condition and the leak rate testing requirements.
- TS 3.1.4, “Spent Fuel Storage Cask (SFSC) Time Limitation in Cask Transfer Facility (CTF)” is eliminated.
- TS 3.2.1, “Dissolved Boron Concentration”, is modified regarding the dissolved boron concentrations required for MPC-32 canisters and to allow linear interpolation for some enrichments.
- A note is added to surveillance requirements of TS 3.2.1, to limit the monitoring requirements.
- TS 4.1 is revised to allow use of Metamic.
- TS 5.1.3 is modified to clarify required maintenance of conditions in the annular gap between the MPC and the HI-TRAC transfer cask during the moisture removal processes.

# *SUMMARY AND CONCLUSIONS*