

Diablo Canyon Power Plant Fukushima Response, including Economic Considerations **California Energy Commission**

June 19, 2013



DCPP Elevations

310' Dry Cask Storage and Fresh Water Reservoirs

85' Power Block; Diesel Generators

~45' Auxiliary Saltwater Snorkels

140' Surface of Spent Fuel Pools





Fukushima Daiichi Learnings

- Vulnerability to/preparedness for significant natural phenomenon, particularly flooding
- Potential for multi-unit events
- Importance of ability to maintain fuel cooling during station blackout and other beyond design basis conditions
- Importance of monitoring spent fuel pool conditions under upset conditions
- Need for robust emergency response capabilities
 - Pre-positioned strategies/equipment
 - Staffing
 - Communications capability



DCPP Initial Response

- Dedicated Team Established with Director level oversight
- Partnered with STARS plants
- Westinghouse established as STARS preferred vendor
- Teamed with Enercon, Enova and Advance Concepts for project staffing



NRC Orders and Recommendations

Issued on March 12, 2012

- Seismic Re-evaluation
- Flooding Re-evaluation
- Seismic Walkdowns
- Flooding Walkdowns
- FLEX Program for Electrical and Fluid Supply
- Spent Fuel Pool Instrumentation
- Emergency Planning Staffing
- Emergency Planning Communications



Flooding Evaluations

Regulatory Guidance

- NRC established prioritization scheme by plant for submittal of Rec 2.1 hazard reevaluation report
- DCPD has 3 years to complete the re-evaluation

Project Activities

- On-site Probable Maximum Precipitation (PMP) evaluations
- Tsunami evaluation and data collection
- Completion required by March 2015



Flooding Walkdowns

Regulatory Guidance

- NRC endorsed guidance developed by Nuclear Energy Institute (NEI) and issued Interim Staff Guidance (ISG)
- PG&E has committed to compliance with the ISG

Project Activities

- Flooding Walkdowns and Evaluation Procedures developed
- Team established and trained
- Flooding Walkdown Packages developed
- Walkdowns completed and findings evaluated
- Report issued to the NRC



Seismic Evaluations

Regulatory Guidance

- Complete the development of Seismic Source and Ground Motion Characterization using the SSHAC process
- Complete SSHAC process by March 2015
- Use new Ground Motion Response Spectra (GRMS) to evaluate the plant facilities

DCPP Actions

- Long Term Seismic Program in effect since the late 1980's
- Geosciences department with Geologists and Seismologists
- SSHAC Level 3 initiated in 2011
 - Partnered with SONGS and Palo Verde
 - 2D and 3D seismic studies being performed both on-shore and off-shore of DCPP (evaluation of local faults)



Seismic Walkdowns

Regulatory Guidance

- NRC endorsed the Guidance establishing inspection requirements and issued ISG
- PG&E confirmation of compliance with guidance submittal

Project Activities

- Component list developed
- Seismic Walkdown procedure developed
- Completed Walkdowns and Issue Report on Nov 21, 2012
 - No issues identified that would have an adverse impact on the power plant



Flex Program Requirements

- Provide a diverse and flexible means of preventing fuel damage while maintaining containment function following a beyond design basis external event
- Scenario is an extended loss of all AC power and loss of normal access to the ultimate heat sink
- Must have N+1 (where N is number of units) or redundant sets of equipment
- Primary and alternate connection points for all strategies must be evaluated
- Must incorporate training, maintenance, staffing, and a augmented/graded quality program



FLEX Coping Strategies

- Maintain Core Cooling & Heat Removal
- Maintain Containment Integrity
- Maintain Reactor Coolant System Inventory Control and Maintain Reactivity Control
- Maintain Spent Fuel Pool Cooling



Electrical Support Strategies

- Maintaining 120V vital DC batteries for instrumentation and control
 - Load Stripping
 - Repowering battery chargers with 480V diesel generators
- Locally repowering instrumentation
- Lighting in control room and other vital areas
- Reestablish ventilation in control room and battery charger rooms
- Repower communications room
- 4kV Regional Response Center Backup Generator



Spent Fuel Pool Instrumentation

Regulatory Guidance

- Requires the addition of redundant level indication in each pool
 - Seismically qualified with independent back-up power supply

Project Activities

- Contract awarded to Westinghouse to provide a Guided Wave level indication system
- Design details to be developed in 2013/2014
- Installation in 2014/2015



Emergency Planning Communications & Staffing

Regulatory Guidance

- NEI 12-01 Guidance has been accepted by NRC
- NRC issuance of Interim Staff Guidance

Project Activities

- Conducted a communication assessment and submitted to the NRC
 - Communication trailers
 - Satellite phone system
- Onsite/Augmented Staffing Assessment
 - Phase 1 with existing equipment and procedures completed and submitted to the NRC
 - Phase 2 with FLEX equipment due in May 2015



Financial Projections

	Project	Prior years	2013	2014	2015	2016	Total
Capital Projects	Tier 1 Projects	\$5.4	\$12.6M	\$21.2M	\$5.1	\$2.8	\$47.1M
	Potential Tier II and Tier III Projects	\$0	\$0	\$7.0 M	\$14.7 M	\$18.5 M	\$40.2 M
	Capital Projects Total	\$5.4 M	\$12.6 M	\$28.2 M	\$19.8 M	\$21.3 M	\$87.3 M
Expense Projects	Fukushima Studies/Analysis	\$2.2 M	\$2.5 M	\$6.2 M	\$4.8 M	\$1.4 M	\$17.1 M
	Expense Projects Total	\$2.2 M	\$2.5 M	\$6.2 M	\$4.8 M	\$1.4 M	\$17.1 M



Summary

- Nuclear safety is a top priority for Diablo Canyon
- PG&E is committed to learn from the events at the Fukushima Daiichi Plant
- Diablo Canyon has established a dedicated team to implement Fukushima Regulatory Requirements
- Strategically Partnered with STARS and Westinghouse
- Committed to completion of plant assessment, equipment procurement, and plant improvements within the timelines established by the Nuclear Regulatory Commission