

Diablo Canyon Power Plant

Facility Overview

Santa Barbara County Board of Supervisors



Jearl Strickland

May 10, 2011



Fukushima Daiichi Sequence of Events

- Large Earthquake caused automatic reactor shutdown and loss of offsite power
- Emergency diesel generators and other safety systems actuated
- Large tsunami wave (~1 hour later) disabled nearly all plant electrical and safety systems
- Remaining systems provided adequate core cooling for several hours, eventually became exhausted leading to core becoming uncovered and containment over pressurization
- Additionally, spent fuel pools heated up



Seismic/Tsunami Information

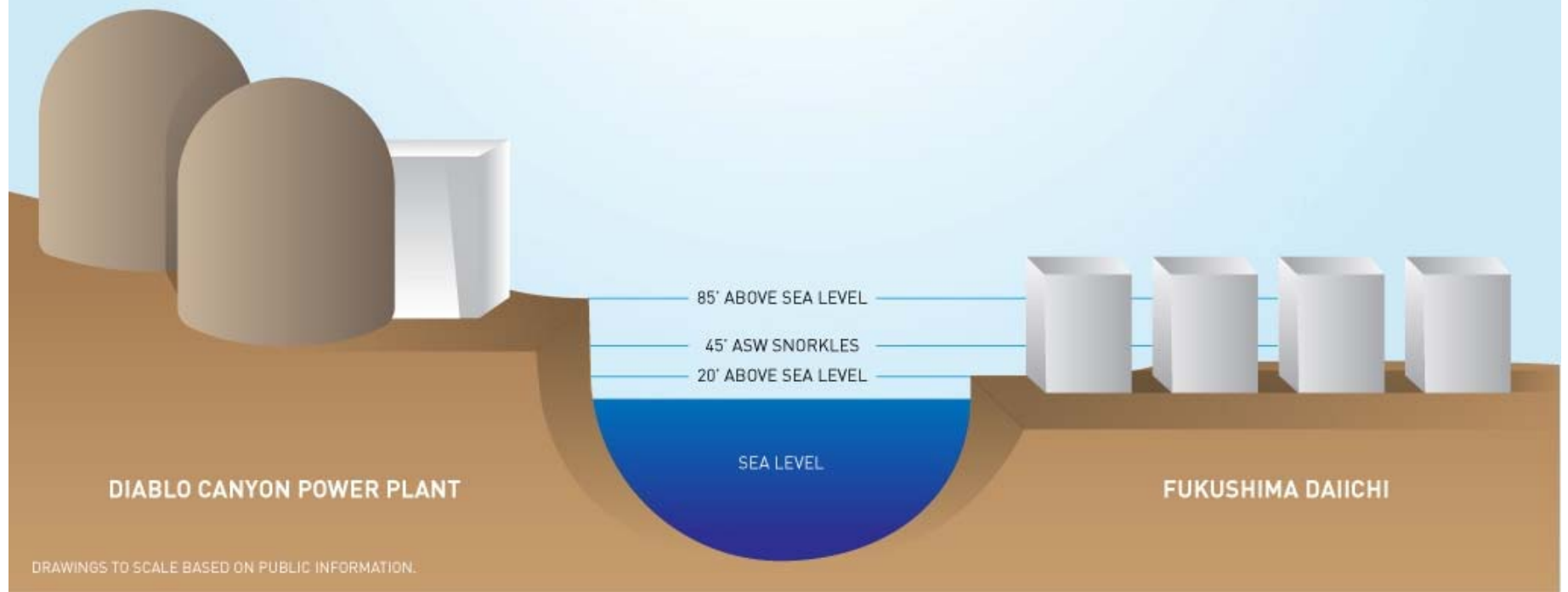
Fukushima Daiichi License/Design Basis	Fukushima Daiichi Reported	DCPP License/Design Basis
Ground Acceleration: 0.18 – 0.36 g	Ground Acceleration: 0.2 – 0.51 g	Ground Acceleration: 0.75 g
Tsunami Wave Height: 6.5 m (~21 ft)	Tsunami Wave Height: 7 – 10 m (~23 – 33 ft)	Tsunami Wave Height: ~35 ft



DCPP Critical Design and Safety Features

- **Auxiliary saltwater pump snorkels: ~45 ft**
- **Remaining equipment protected by 85 ft bluff**
 - Diesel Generators, Emergency Core Cooling, Electrical Switchgear
- **Fresh water reservoirs: 310 ft**
 - Two 2.5 million gallon reservoirs
 - Provide gravity-fed cooling water
- **Steam Driven Auxiliary Feed Water Pumps**
- **Containment structures and spent fuel pools anchored to bedrock**
- **Six Diesel Generators; three per unit**
 - Generators designed with cross-ties to allow one generator to serve both units
- **Two Underground diesel fuel storage tanks**
 - Minimum seven days of fuel for diesel generators
- **On-site fire department, fire engines and equipment**

PLANT ELEVATIONS



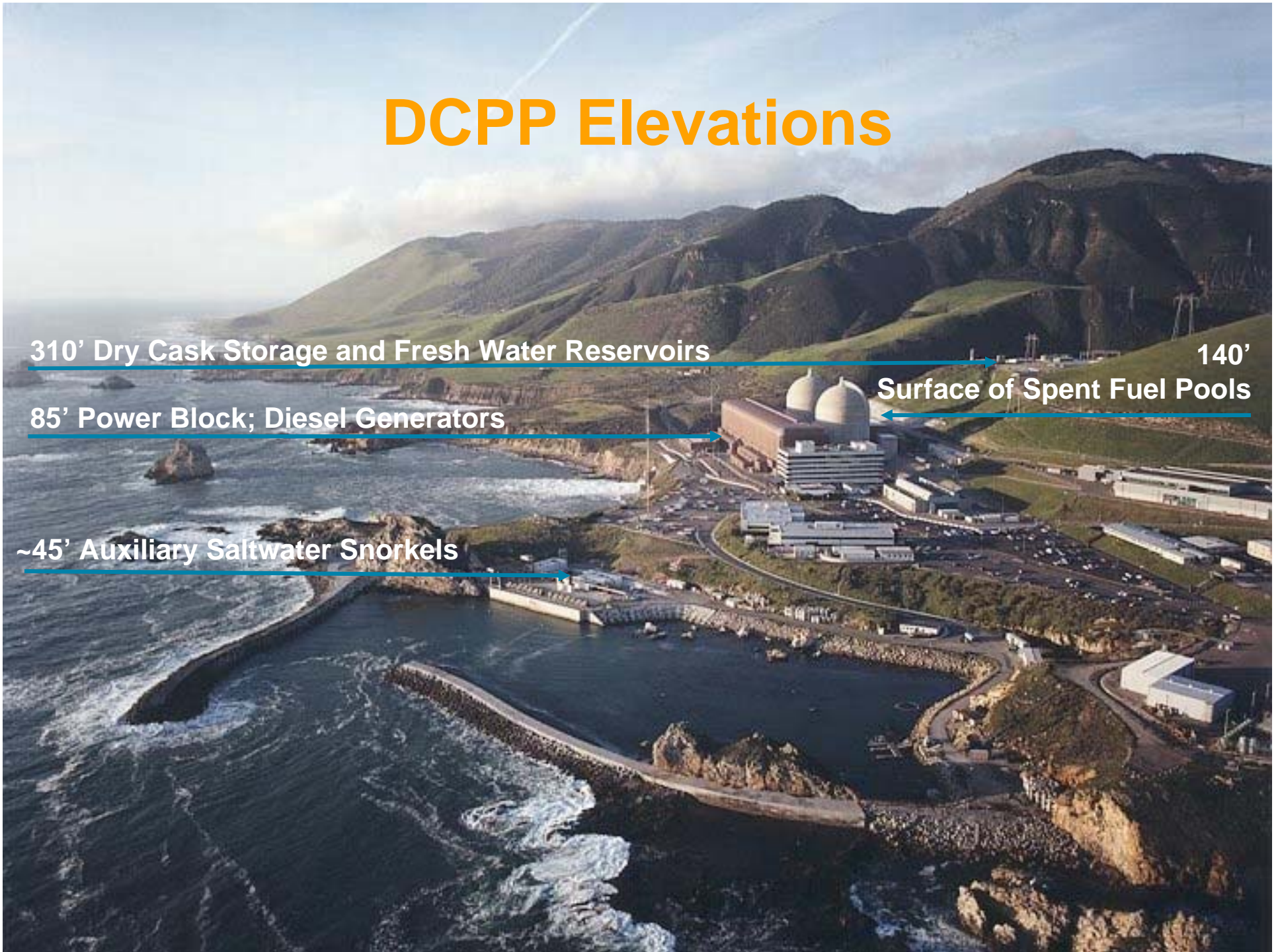
DCPP Elevations

310' Dry Cask Storage and Fresh Water Reservoirs

85' Power Block; Diesel Generators

~45' Auxiliary Saltwater Snorkels

140'
Surface of Spent Fuel Pools





115' Water Storage Tanks



Dry storage containers artist's rendering



Used Fuel Storage

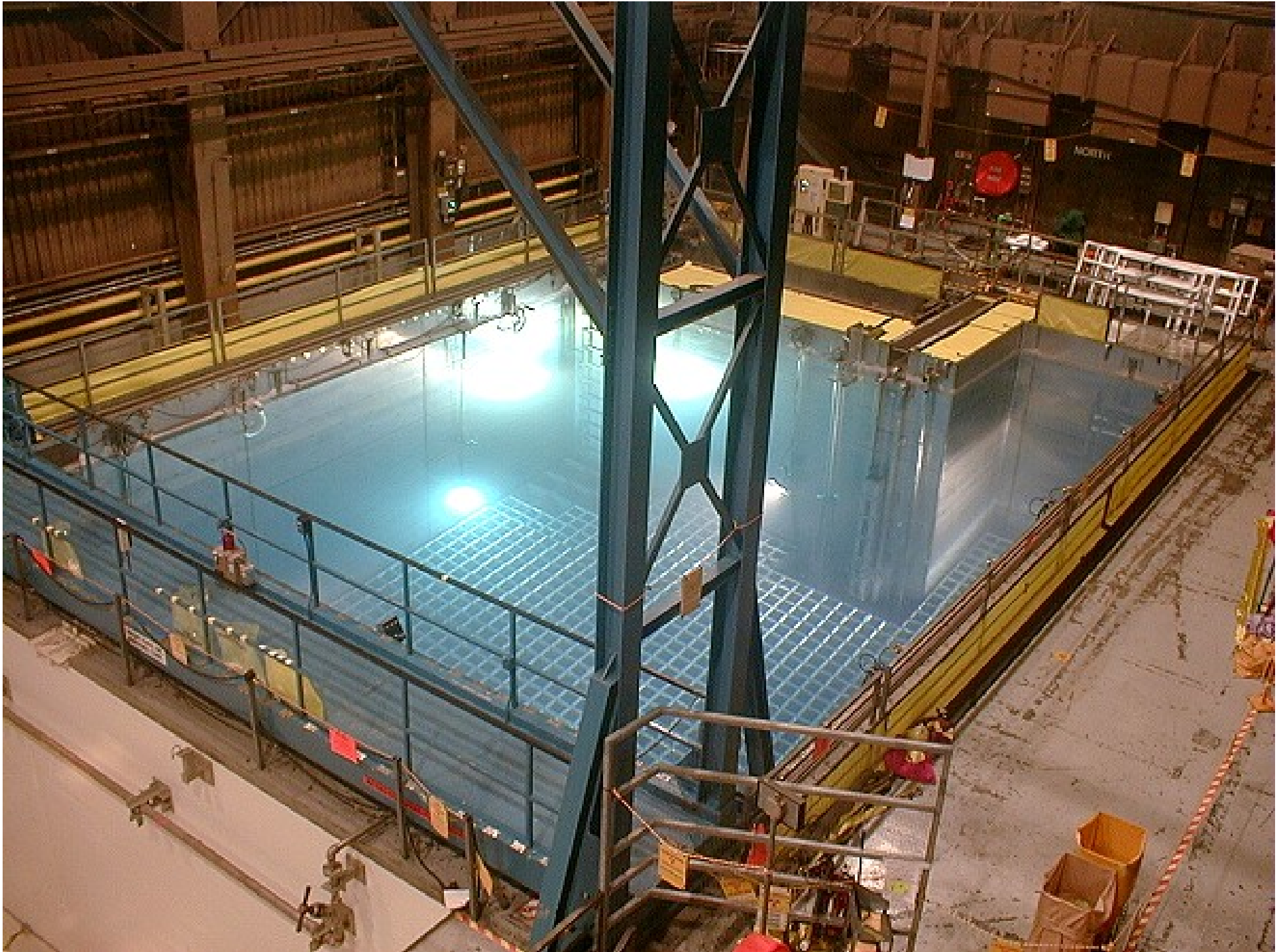
Approximately 2,600 used fuel assemblies are stored on site

Spent Fuel Pool

- Reinforced concrete structure
- Stainless steel plate liner
- Minimum of 23 ft of borated water over used fuel assemblies
- Emergency replacement water capability; including reservoir and water tanks
- Bottom of pool 16 ft below grade

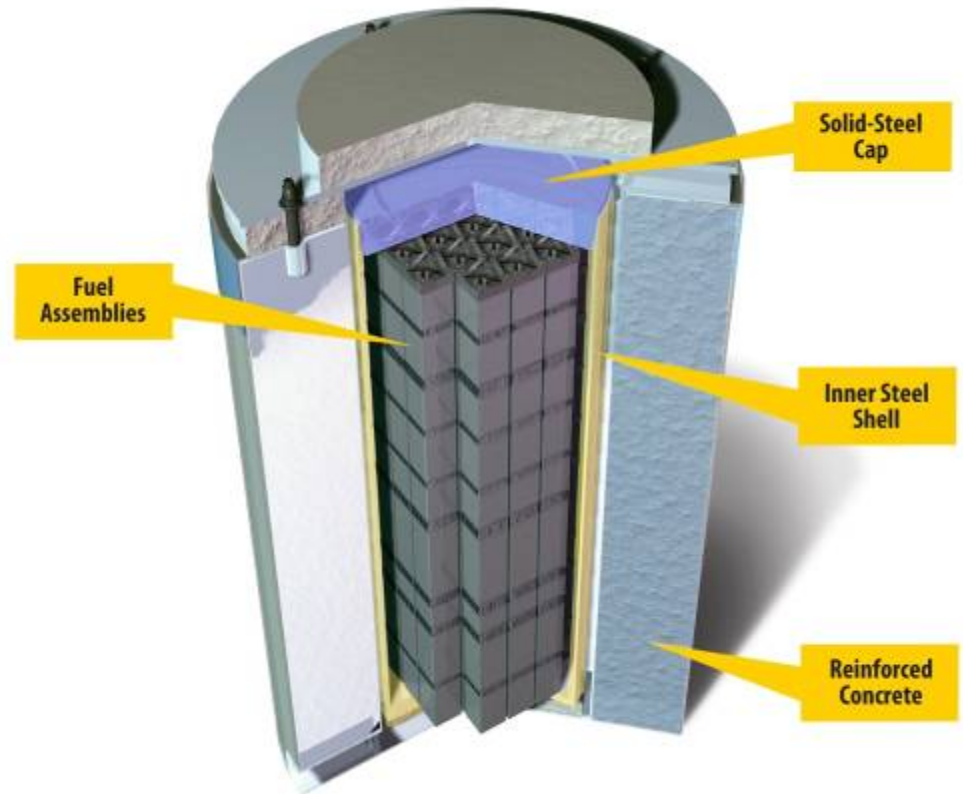
Dry Cask Storage

- Used fuel assemblies are stored in stainless steel Multi-Purpose Canister (MPC)
- Within a 20 ft tall “Storage Overpack”





Steel-reinforced containment







Severe and Extreme Accident Response – Beyond Design Basis

Severe Accident Management Guidelines (SAMG)

- Controlling Reactor Coolant System (RCS) pressure and temperature
- Injecting into Steam Generators
- Controlling containment pressure and hydrogen concentration
- Flooding containment

Extreme Damage Mitigation Guidelines (EDMG) – Actions taken to address extensive plant damage

- Spent Fuel Pool (SFP) water replacement and spray via fire water and portable pump (fire truck)
- Depressurization of steam generators using atmospheric dump valves
- Ability to reduce containment pressure even with no power or air available
- Start emergency diesel generators with no power available



Additional Organizational Capabilities

Long Term Seismic Program

- Dedicated geosciences department
- Ongoing seismic studies and analysis

Onsite Fire Department

- Minimum of five personnel on site 24/7
- Two fire engines

Recurring Emergency Preparedness Training

- Four Emergency Response Organization (ERO) teams
- Dedicated on-site and off-site emergency response facilities
- Periodic table-top and full-scope drills (minimum of four annually)



Prompt Industry Response INPO Event Report

“Actions provide near-term assurance that each station is in a high state of readiness to respond to both design basis and beyond design basis events.” INPO 2011

- DCCP is verifying the capability to respond to:
 - Beyond design basis events
 - **Security threats**
 - **Severe action management scenarios**
 - Station blackout (loss of AC power)
 - Internal and external flooding
 - Respond to a fire or flood with a seismic event
- The Chief Nuclear Officers (CNO), working with INPO, formed a working group to look at additional short-term items, including station blackout equipment and Spent Fuel Pool equipment and contingencies



Conclusion

- **DCPP's critical equipment is protected from flooding by elevations far above the maximum postulated tsunami wave height**
- **DCPP has robust and redundant emergency back up power capabilities**
- **DCPP stores five million gallons of water that constitutes a unique source of replacement cooling water supplied by gravity and does not rely on AC power**
- **Fault structures offshore in the vicinity of DCPP are not a significant tsunami source**
- **DCPP is reconfirming capability of equipment, procedures, training and contracts to respond to "beyond design basis"**
- **DCPP is committed to learning from the Fukushima Daiichi accident**

Diablo Canyon Power Plant

Additional Background Information





Diablo Canyon Power Plant

Key Facts



Diablo Canyon provides clean, affordable and reliable electricity for more than three million northern and central California homes and businesses - with almost zero greenhouse gas emissions

- 2,300 MW of generating capacity – approximately 18,000 GWh of electricity annually
- Two Pressurized Water Reactors (PWR)
- Located on approximately 12,000 acres of land, much of it preserved in its natural state
- Provides approximately 24% of the electricity to serve PG&E's customers
- Largest private employer in the county with over 1,300 jobs
- Largest taxpayer in San Luis Obispo County in 2009 – Approx. \$24 million with \$15 million going to educational institutions
- In 2009, DCPD contributed \$966.8 million of economic impact to the local economy



Significant Upgrades at Diablo Canyon

PG&E has invested over \$1 billion in improvements since it began operating in the mid 1980s. Some of these changes include:

- Added 6th on-site diesel generator and increased volume of diesel gas fuel tanks to seven day supply
- Replaced offsite power source transformers
- Replaced reactor heads
- Replaced steam generators with new designs that are more resistant to corrosion
- Upgraded residual heat removal system piping to reduce potential flow induced erosion following an accident
- Implemented significant site changes to improve plant security

Thank you Questions?



Jearl Strickland
Sr. Regional Manager
LJS2@pge.com