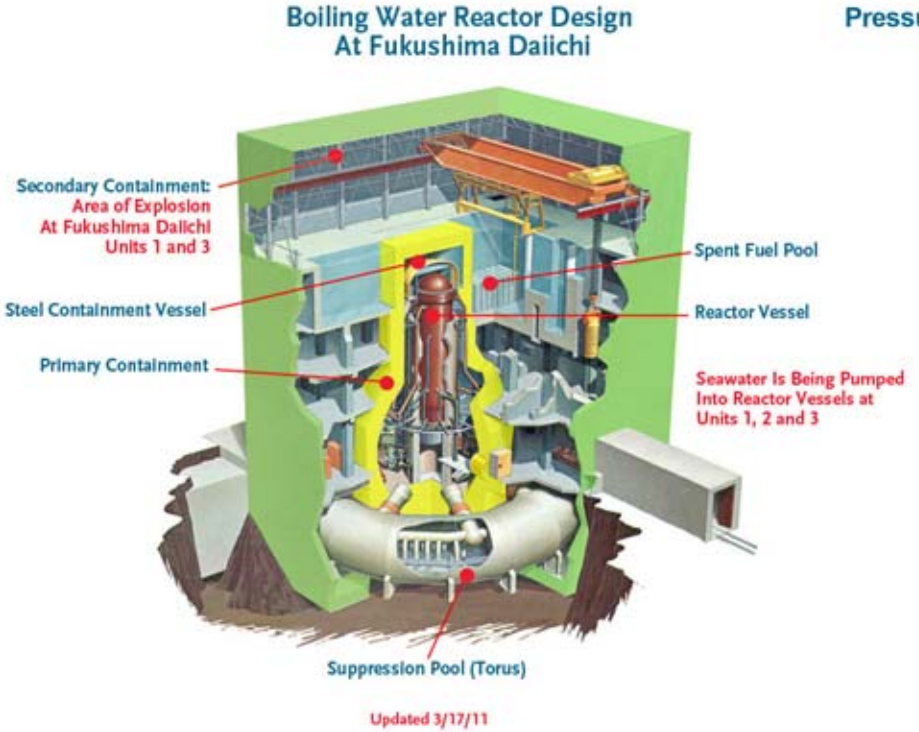
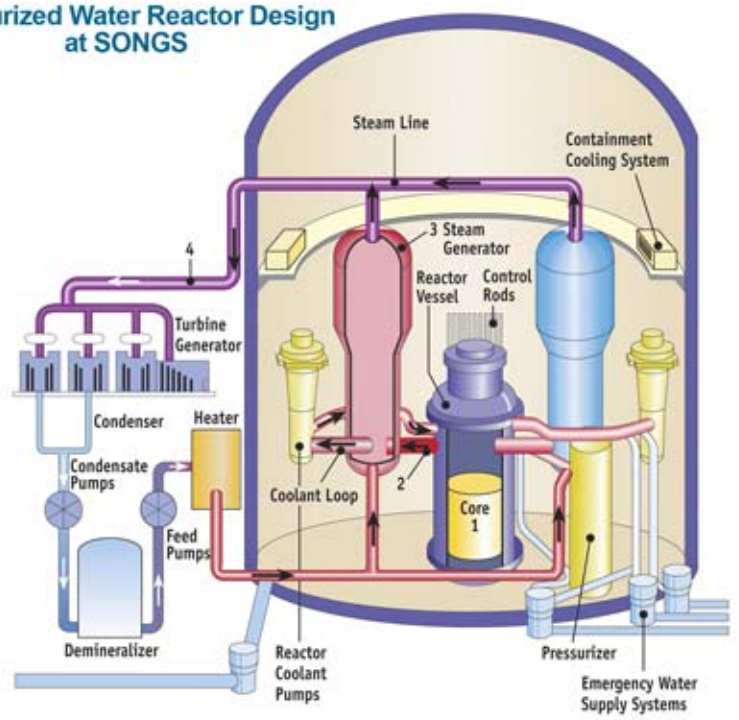
San Onofre Nuclear Generating Station (SONGS)

San Onofre Nuclear Generating Station

Leading the Way in Electricity

Boiling Water Reactor
vs
Pressurized Water Reactor





Seismic/Tsunami Information

Fukushima Daiichi License/Design Basis[+]	Fukushima Daiichi Experienced[*]	SCE License/Design Basis
Ground Acceleration: 0.46 g	Ground Acceleration (in-structure): 0.61-0.72 g	Ground Acceleration (free field) 0.67 g
Tsunami wave height: ≥5.7 m (~ 19 ft)	Tsunami wave height: ~14 m (~ 46 ft)	Tsunami wave height: 8.3 m (~27 ft)

[+] Design basis not confirmed
* Preliminary only – actual values unknown at this time

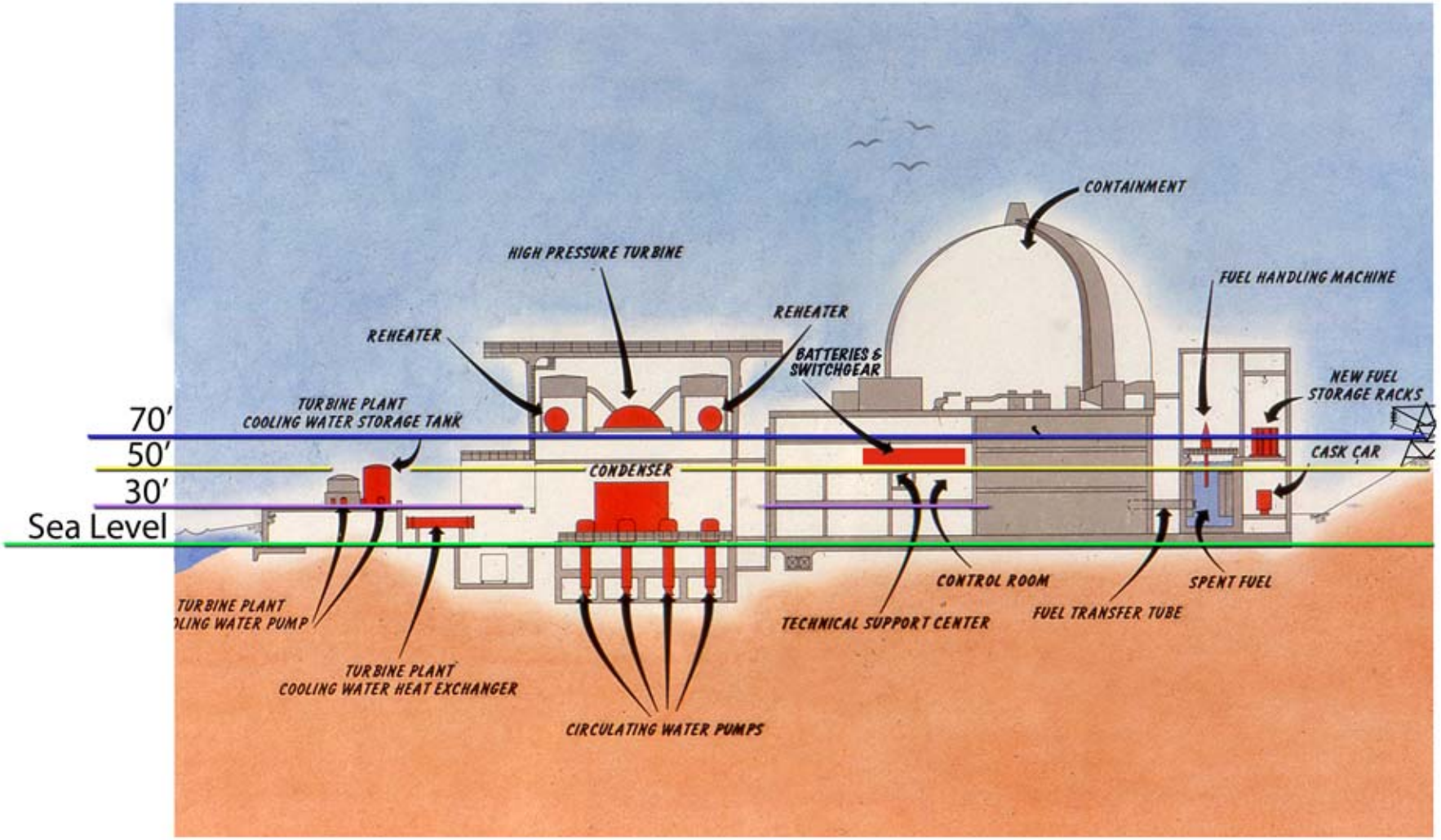
Plant Orientation

Tsunami Wall

SCE Critical Design and Safety Features

- **Equipment need to provide emergency cooling is housed in structures designed to withstand earthquakes and flooding**
  - Switchgear and emergency batteries at 50 ft elevation
- **Saltwater pump at 9 ft enclosed and protected from flooding**
- **On-site water supply:**
  - 3 million gallons in seismically qualified tanks
  - 5.3 million gallons (total, includes non-seismically qualified tanks)
- **Steam-driven auxiliary feed water pumps (1/unit)**
- **Safety-related structures including spent fuel pools are built to withstand ground motion of at least 0.67g**
- **4 diesel generators; 2 per Unit at 30 ft elevation**
  - Generators designed with cross-ties to allow one generator to serve both units
  - 1 diesel generator is needed to maintain the safe shutdown loads on one unit
- **4 underground diesel fuel storage tanks designed to withstand flooding**
  - Provides 7 days of diesel fuel supply
- **On-Site professional fire department, dedicated water supply, fire engines and equipment**

Elevation View



Used Fuel Storage

3421 used fuel assemblies are safely stored on site

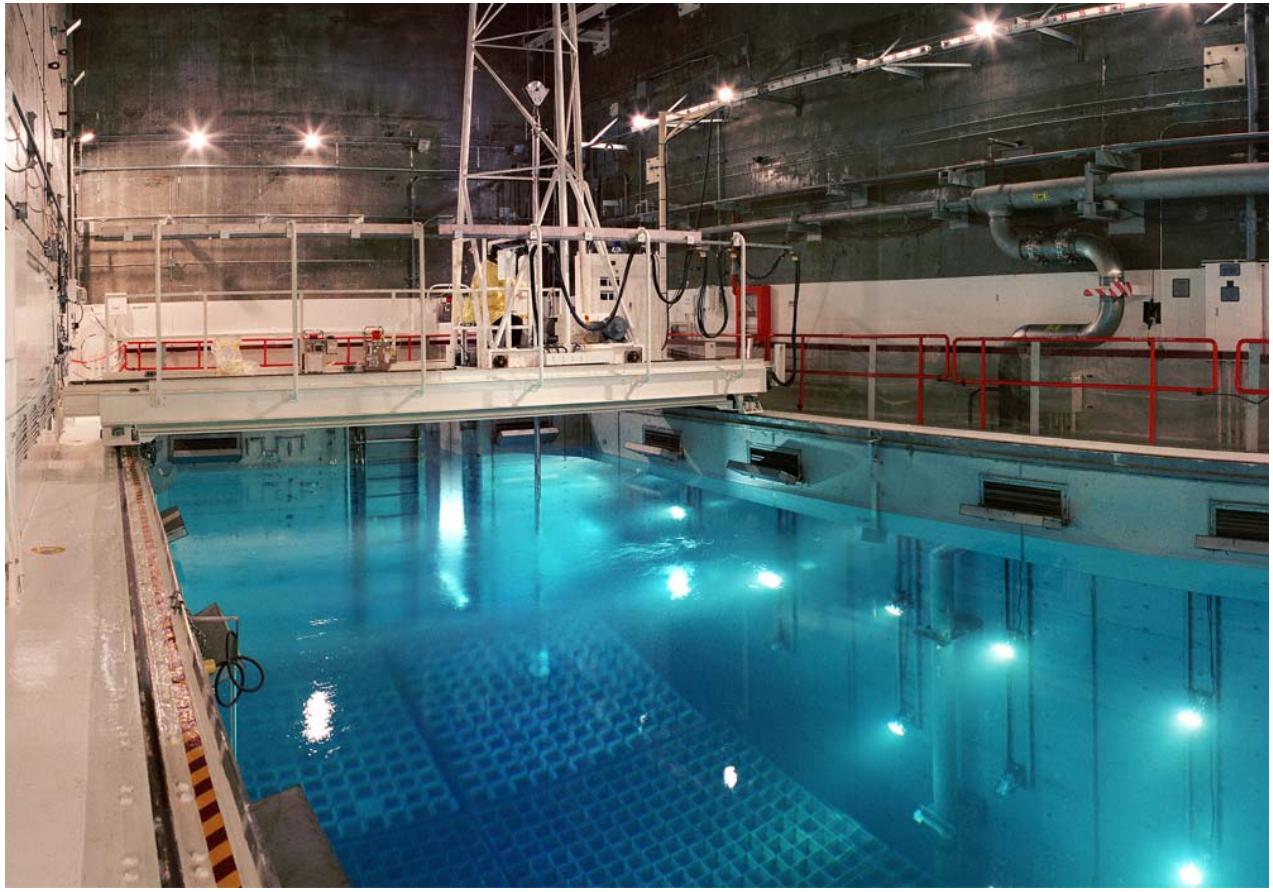
Spent Fuel Pool (~1200 assemblies per pool)

- Reinforced concrete structure
- Stainless steel plate liner
- >23 ft of borated water over used fuel assemblies
- Emergency replacement water on-site capability
- Top of used fuel assemblies ~2-3 ft above grade

Dry Cask Storage (~970 assemblies)

- Used fuel assemblies are stored in stainless steel multi-purpose canister (MPC) and housed in robust reinforced concrete structures
- Capability to withstand flood conditions

SONGS Used fuel pool



- Top of used fuel assemblies in the spent fuel pool are at ~ 2-3 ft above grade
- Water depth is ~ 55 ft

Severe and Extreme Accident Response

- **B.5B Guidelines** – Actions taken to address extensive plant damage enable
  - Use of firewater and portable pump (fire truck or skid pumps) to feed steam generators, replace spent fuel pool water, or flood containment
  - Depressurizing steam generators using atmospheric dump valves
  - Command and control in the event of loss of control room
  - Manual operation of steam-driven pump without electrical power
- **Severe Accident Management Guidelines** – Actions taken to address malfunctions beyond design conditions, even core melt
  - Depressurize the reactor coolant system (RCS)
  - Reduce containment hydrogen and control flammability
  - Mitigate fission product releases, regardless of core conditions
  - Provide cooling water into RCS and steam generators

Additional Organizational Capabilities

On-going Seismic Program

- Periodic evaluations of new information on seismic and tsunami hazards
- Utilizes input from academia, research, and geotechnical professionals
- Independently reviewed by external experts

Onsite Fire Department

- Minimum of 5 personnel on site 24/7, typically 6-7
- 2 Fire Engines, one pumper and one 75-ft aerial ladder truck
- Hazardous materials response capability with staff of 7
  - Mutual aid from San Diego and Marine Corps

Recurring Emergency Preparedness Training

- 4 Emergency Response Organization teams
- Dedicated on-site and off-site Emergency Response Facilities
- Periodic table top and full-scope drills (minimum of 4 annually)

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**
- **SCE is verifying the capability to mitigate conditions from:**
- **Beyond Design Basis Events**
  - Security Threats
  - Severe Action Management Guidelines
- **Station Blackout**
- **Internal and External Flooding**
- **Responding to a Fire or Flood Event in Addition to a Seismic Event**

SONGS' Status

- Fault systems offshore in the vicinity of SONGS are strike-slip, not a significant tsunami source
- Critical equipment is located at elevations above the maximum credible tsunami wave height for San Onofre
- SONGS has robust and redundant emergency back-up power capabilities
- SCE stores 5.3 million gallons of water on-site, 3 million of which is in seismically qualified tanks that can provide replacement cooling
- SCE is reconfirming capability and resources to respond "beyond design basis"
- SCE is committed to learning from the Fukushima Daiichi accident and to identify additional actions that can be taken to further enhance our readiness for severe accidents