
Thoughts from Diablo Canyon Power Plant

Pat Nugent

Director – Quality Verification





Safe
Clean
Reliable

PG&E – Company Overview

Company Facts

- Over 21,000 employees
- 70,000 square-mile service territory
- \$15.6 billion in revenues
- Peak electricity demand: ~20,000 MW
- Over 15 million people served
... about 1 in 20 Americans
 - 5.2 million electric distribution customers
 - 4.4 million natural gas distribution customers
- Over 50% of PG&E's electric supply comes from non-greenhouse gas emitting facilities



PG&E Challenges

- Recovering from natural gas pipeline explosion in San Bruno, CA
 - 30”, steel, high pressure gas-line failed
- Integration of solar generation into infrastructure
 - 800MW solar plant in San Luis Obispo County
 - More rooftop solar in service territory than anywhere else in country
- Economics
 - Low natural gas prices can affect economic viability of nuclear generation

PG&E Opportunities

- California drought
 - Diablo Canyon has capacity to desalinate nearly 1,000,000 gallons of water per day
 - Reached agreement with California state fire department to provide water to fire trucks
 - Evaluating possible tie-ins to municipal water systems

Importance of Quality Assurance

- Required by federal regulation
- Cornerstone of safe operation of a nuclear plant
 - Provides assurance that equipment and services are of the highest level appropriate for the task
 - Provides a level of assurance that equipment will perform as required

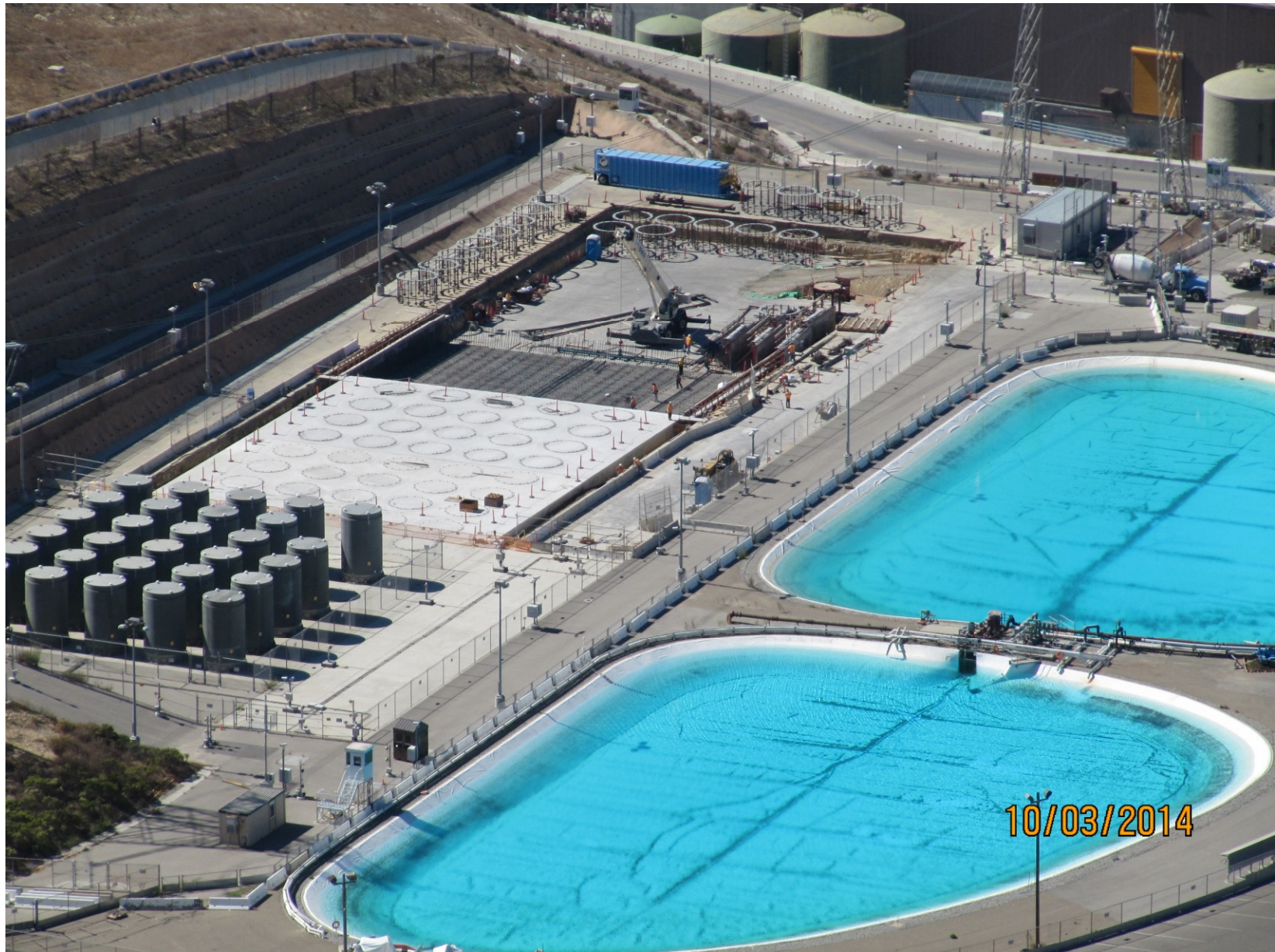
2014/2015 Major Projects at Diablo Canyon

- Independent Spent Fuel Storage Installation (ISFSI) Expansion
- FLEX/Fukushima Response
- Refueling Outage Support

ISFSI Expansion

- Diablo Canyon ISFSI
 - 7 foot thick pad
 - Casks bolted to pad for seismic qualification
 - Holtec supplies safety-related casks and transporter
- Added 5 additional ISFSI pads
 - 11,000 cubic yards of class 1 concrete
 - Provides adequate used fuel storage for both units through end of operating licenses

Aerial View of ISFSI Construction



ISFSI Pad Preparation



ISFSI Pad Concrete Pour



Quality Aspects of ISFSI

- Largest class 1 concrete pour outside of new construction
 - Concrete verified and poured under Diablo Canyon quality program
- Casks and transporter supplied under quality program of Holtec
 - Holtec supplies quality-related material to many plants – quality-program makes the support and business possible

FLEX/Fukushima Response

- Flooding re-evaluation
 - Performed by Enercon with support from outside flooding experts
 - Included both precipitation and tsunami flooding
- Seismic re-evaluation
 - Performed by PG&E Geosciences under internal quality program

FLEX

- Developed FLEX strategies in accordance with guidance in NEI 12-06
 - FLEX equipment is not required to be safety-related
 - NEI 12-06 requires establishment of a quality program for FLEX
 - FLEX strategy development based on Westinghouse input and review, including analytical basis for many strategy aspects
- Installing new reactor coolant pump low-leakage seals

Selected FLEX Equipment



FLEX Storage Building



Quality Aspects of FLEX/Fukushima Response

- Graded quality applies to FLEX
 - Although not applicable to equipment vendors, quality-requirements may be applicable to analysis vendors such as Westinghouse, AREVA
- Some plants chose to purchase equipment as safety-related
 - Increase pedigree of equipment
 - Eliminate potential ambiguity
 - Allows for equipment use in other applications

Refueling Outage Services

- Diablo Canyon has established a contract with a single Integrated Services Supplier (ISS)
 - ISS covers everything:
 - From janitorial work to engineering
 - From maintenance to refueling outage services
 - ISS led by Fluor, and includes partners such as Sargent and Lundy and AREVA
 - ISS also include recurring refueling outage services such as core offload/reload and steam generator inspections

Quality Aspects of ISS

- ISS work may be quality-related
 - Performed under the ISS QA program
 - Includes design, maintenance, analyses, services
 - Metrics established to monitor quality
 - Vendors in ISS may also be within the scope of NUPIC

Conclusions

- We've seen what can happen when quality standards are not satisfied
 - Nuclear industry is fortunate to have many top-notch vendors
 - Vendors develop high quality products to assure that nuclear power remains capable of satisfying its mission
 - US nuclear industry assures that vendors remain true to their processes