San Onofre Nuclear Generating Station Information Package
The Current Situation at San Onofre

- Extensive inspections and testing showed wear in the steam generator tubing in both units. Some wear was expected, such as “tube-to-support” wear, but some was unexpected “tube-to-tube” wear, which was predominantly found in Unit 3.

- Engineers determined that the unexpected wear was associated with excessive vibration of the tubes in certain areas of the steam generators.

- Unit 3 had more than 300 tubes with the unexpected tube-to-tube wear; Unit 2 only had two tubes exhibiting minor tube-to-tube wear.

- The Nuclear Regulatory Commission (NRC) determined that computer modeling used during the design phase by the manufacturer, Mitsubishi Heavy Industries, underpredicted the thermal hydraulic conditions in the steam generators which contributed to the unstable tube vibration. The unstable tube vibration caused the unexpected wear in the steam generators.

- Both units are currently safely offline.

- Unit 2 was taken out of service Jan. 9, 2012, for a planned outage.

- Unit 3 was safely taken offline Jan. 31, 2012, after station operators detected a small leak in a steam generator tube.

- In March 2012, the NRC issued a Confirmatory Action Letter (CAL) outlining the actions SCE must take before restarting each unit.

San Onofre

Sound Bites

The Role of Nuclear Energy in California

While safety guides the process at San Onofre, real facts about nuclear energy can inform the overall debate about California’s energy future.

- **Nuclear energy produces about 20 percent of the United States’ electricity.** Across the U.S., nuclear power produces enough energy to power one of every five homes and businesses.

- **Nuclear energy plays an important role in stabilizing this state’s electric grid, a critical aspect for importing power from remotely located renewable sources.**

- Currently, California gets about half of its electricity from natural gas. Although prices are presently low, historically natural gas prices have been volatile based on a variety of factors. **It makes sense to have fuel and technology diversity for electric generation while striving for the optimal mix of environmental protection and consumer cost.**

- **Nuclear power is the lowest-cost producer of baseload electricity, meaning its power serves customers’ needs day and night, regardless of the weather, unlike wind and solar.**

Nuclear Energy for a Clean Future in California

- **Nuclear power is the largest source of electricity that does not emit greenhouse gases and its facilities are the most reliable on the electric grid.** It supplies 37 percent of California’s emission-free power.

- **In the coming decade, California will be challenged to simultaneously grow its economy, meet rising electricity demand, and reduce greenhouse gas emissions.**
  - To meet this challenge, the state must establish a comprehensive and sustainable energy policy that supports the development of diverse, technology-based, low-carbon solutions.

- **Nuclear energy plays an important role in keeping the air clean, the lights on, and maintaining the reliability of our electricity grid.**
  - Nuclear power should continue to be a part of the discussion and planning for California’s energy future.
Next Steps at San Onofre

- A team of internal and external steam generator experts has prepared corrective action, repair and operation plans to ensure SCE meets the high-safety standards required.

- SCE has provided the NRC with the materials needed to request restart of Unit 2. The NRC will take the necessary time to review all technical materials and the plan before making a decision about the restart of Unit 2.

- Because Unit 3 had much more tube-to-tube wear than Unit 2, it is not clear at this time whether Unit 3 will be able to restart without additional repairs. The reality is that the Unit 3 reactor will not be operating for some time.

- SCE defueled Unit 3, which is the standard practice during any extended outage and is the best way to continue testing and evaluation.

- Safety is the No. 1 priority and there is no timeline on safety. SCE will not restart the units until the NRC is satisfied it is safe to do so.
5 Key Points About San Onofre

SAN ONOFRE STATUS

• After extensive inspections and testing, unexpected tube-to-tube wear in the steam generator tubing in Unit 3 was identified as the cause of the Jan. 31, 2012 tube leak. Some early signs of potentially similar wear were identified in Unit 2. The wear in Unit 2 is far less extensive than the wear in Unit 3. Currently, both units are safely offline.

RESPONSE

• A team of internal and external steam generator experts has prepared corrective action, repair and operation plans to ensure SCE meets the high-safety standards required by the NRC.

SAFETY

• San Onofre has never been closed down for a safety violation. The NRC has determined that SCE has operated in a manner that preserves the public’s health and safety during every year of the plant’s operation.

NUCLEAR ENERGY IN CALIFORNIA

• Nuclear energy produces about 20 percent of the United States’ electricity and is the largest clean source of electricity that does not emit greenhouse gases. It also plays an important role in stabilizing this state’s electric grid — a critical aspect for importing power from remotely located renewable sources.

FINANCIAL IMPACT TO CUSTOMERS

• Before charging customers, SCE will first look to warranties and insurance to recover the costs associated with the current outages. The California Public Utilities Commission will also review any costs and determine if the costs were reasonably incurred.
San Onofre
Myths vs. Facts

Myth
Southern California doesn’t need San Onofre. We have more than enough solar and wind power to make it up.

FACT
Nuclear energy facilities supply 37 percent of California’s emission-free power and about 20 percent of the United States’ electricity. Nuclear energy is by far the largest clean air energy source and the only one that can produce large amounts of electricity day and night, and without weather constraints.

So far, upgraded transmission lines and the temporary restart of gas-powered plants in Huntington Beach (limited to summer 2012 only), combined with consumers’ tremendous conservation efforts, have avoided any power shortages this summer, which was mild based on historical data. California’s long-term goal for cleaner air, and reliable emission-free power can greatly benefit from San Onofre’s continued operation.

The San Onofre Nuclear Generating Station provides “baseload” generation, meaning its power serves customers’ needs day and night, regardless of the weather, unlike wind and solar. It also provides critical voltage support — which allows the local grid to import more power when demand is high from far away sources.

Should San Onofre remain offline beyond 2014, SCE would need to consider a combination of generation resources and/or transmission, including new lines in Los Angeles and Orange Counties.

Myth
San Onofre doesn’t have a good safety record.

FACT
Safety is the top priority at San Onofre and our safety-conscious work environment was noted in a letter from the NRC in 2012. The plant has never been closed down for a safety violation. The NRC has determined that SCE has operated in a manner that preserves the public’s health and safety each and every year of the plant’s operation.

Myth
SCE dramatically changed the steam generator design and didn’t tell the NRC.

FACT
The NRC has publicly stated that SCE followed regulations regarding the modifications in the steam generators’ replacement and that SCE fully informed the NRC of all changes, including the number of additional tubes and changes to the tube support structures. SCE applied for and received license amendments as required by the process.
**Myth**

Customers are going to get stuck with all of the costs.

**FACT**

SCE will first look to warranties and insurance to recover costs associated with the current outages. The California Public Utilities Commission will review all costs and determine if they were reasonably incurred before impacting customers.

---

**Myth**

San Onofre isn’t built for a Southern California big earthquake, and what happened at Fukushima Daiichi can happen here.

**FACT**

Every U.S. nuclear power plant is designed to withstand the maximum potential earthquake for its location without releasing radioactive materials. The commonly known Richter scale is not used to determine earthquake building safety for any building. Instead, building safety relies on a more accurate value known as “peak ground acceleration,” which is based on the anticipated ground movement at the site during the largest potential earthquake, estimated by geologists. Additionally, the proximity of the fault and soil conditions must also be considered. So it is not accurate to simply say that San Onofre was only built to withstand a 7.0 earthquake.

As approved by the U.S. NRC, San Onofre was built to withstand a peak ground acceleration of at least 0.67g (g refers to the force of gravity). For comparison, the current California Building Code design requires any buildings built in the vicinity of San Onofre to be designed to withstand an earthquake motion that has peak ground acceleration of 0.38g.