

Comments submitted by Alexander Marion, Nuclear Energy Institute
California Energy Commission Committee Workshop on California Nuclear Power Plant Issues
July 26, 2011

Good morning and I thank you for the opportunity to discuss the Fukushima-Daiichi accident. I propose to deviate from the subject for this panel session discussion entitled, "Events at Fukushima and Their Implications for California's Nuclear Plants," since the representatives from Pacific Gas and Electric Company and Southern California Edison previously discussed the implications of this accident at the Diablo Canyon and San Onofre sites. I propose to offer a few clarifying comments based upon the discussion held thus far and discuss the action the U.S. nuclear industry has taken to address lessons learned from this unfortunate accident.

Clarifications of earlier discussion points:

- It is inappropriate to compare earthquakes from different regions of the country primarily because of differences in geology and past history of such events in these regions. This becomes more important when one attempts to make similar comparisons on an international level. The island of Japan is surrounded by geological formations called subduction zones where one tectonic plate is pushed under another plate. This type of geological formation produces the kind of massive tsunami seen in Japan. In the continental US, the only subduction zone is the Cascadia subduction zone which lies approximately 300 miles off the Pacific Northwest coast. The only nuclear plant near this subduction zone is the Columbia Generating Station located approximately 225 miles inland.
- Since the accident of Three Mile Island the U.S. nuclear industry, through the efforts of the Institute of Nuclear Power Operations (INPO), has established a practice of evaluating operating experience and sharing that experience with all of the plants. Each plant reviews that information for applicability to plant practices, programs and designs. This continuous learning process is an important contributor to the excellent performance of U.S. nuclear plants. Following the Chernobyl accident in 1986 and the formation of the World Association of Nuclear Operators (WANO), the evaluation and dissemination of operating experience has been occurring on an international level to all nuclear sites.
- The NRC regulations mandate a 10 mile emergency planning zone and 50 mile monitoring zone for environment and food. However, state and local authorities have the flexibility to extend the zone should the site accident conditions call for it to be expanded.
- The U.S. Nuclear Regulatory Commission 90-day Task Force Report contains recommendations for the Commission to consider and either approve, disapprove or modify. Response from the Commission will take the form of a staff requirements memorandum (SRM) providing response and direction to the Task Force Report. What is disappointing in the Task Force Report is the lack of detail in providing a rational basis for these recommendations, a discussion of why the recommendation is warranted and its relationship to lessons learned from the Fukushima-Daiichi accident? For example one recommendation calls for enhanced venting capability of the primary containment of BWR Mark I and Mark II designs. We do not yet know whether or not the designs are similar to those in U. S. plants, we do not know precisely when the operators at Fukushima attempted to vent,, whether venting was successful for any period of time,

why it was not successful, what equipment performance issues affected the capability to vent, etc. To make modifications at any nuclear plant at this point without fully understanding what happened creates the strong possibility for redoing a modification at a future time when further information is made available.

- Regarding station blackout and losses of offsite power (grid), the fundamental issue is a common cause event that affects multiple, redundant backup systems at multiple unit sites. Specifically the earthquake affected offsite power AC sources to the plant site. The plants responded by transferring electrical power to the onsite emergency diesel generators and information we received indicated the operating units were proceeding to a safe shutdown condition. The tsunami struck the site approximately 40 minutes later resulting in flooding of electrical equipment rooms as well as rendering the emergency diesel generators inoperable. At this point the plants relied solely on dc power from the station batteries. Ultimately the batteries were drained and no electrical power was available.

We are currently developing a sequence of events to identify the timing of what occurred, what did not in terms of system/component response, and actions taken by plant operations personnel. This information is scheduled to be available in August. This will help in improving our understanding this event.

We have had recent experiences with unusual losses of offsite power at U.S. nuclear plants. In 1992, Hurricane Andrew impacted the east coast of Florida and the power transmission system. This resulted in a loss of the power transmission system providing ac power to the St. Lucie nuclear plant. The plant transferred key electrical loads to emergency diesel generators and maintained a safe shutdown condition for nearly two weeks until the power grid was restored. In 2005, Hurricane Katrina impacted Louisiana and damaged the power transmission system. The Waterford station responded to the loss of offsite power, as designed, and transferred electrical loads to the site emergency diesel generators and maintained this condition for approximately four days. More recently a series of tornadoes this spring impacted the transmission system in Tennessee thereby causing the Browns Ferry plant to shut down. The plant responded as designed, transferring to emergency diesel generators and maintaining a safe shutdown condition until offsite power was restored a couple of days later.

In addition, NRC issued a regulatory requirement in 1988 calling for all U.S. nuclear plants to demonstrate a capability of withstanding a station blackout condition, that is, a loss of offsite power and a loss of select onsite ac power sources for a specified duration. Obviously this regulation will be revisited based upon what occurred in Japan.

Actions undertaken by the U.S. nuclear industry:

- The Electric Power Research Institute (EPRI), INPO, and the Nuclear Energy Institute (NEI) in conjunction with senior utility executive leadership have created a framework to integrate and coordinate the U.S. industry response to the Fukushima Daiichi accident. A paper describing this action was made available to the committee titled, "The Way Forward – U.S. Industry Leadership in Response to Events at the Fukushima Daiichi Nuclear Power Plants."
- This effort will include engagement of industry stakeholders, including vendors, architect – engineering firms, nuclear steam system supply owner's groups and national consensus standard organizations.
- It will also include engagement of key federal agencies: Nuclear Regulatory Commission, Environment Protection Agency, Federal Emergency Management Agency, Department of Homeland Security, as well as state and local authorities.

- The overall objective of this effort is to enhance nuclear safety by learning and applying the lessons learned from the Fukushima Daiichi accident.
- At this point it is difficult to assign a time frame when all of the actions will be completed as it is very much dependent upon information from Japan. This will involve a continuum of activity for several years.

I encourage the Commission members to review information posted on various websites including the NRC, NEI, Department of Energy, the International Atomic Energy Agency (IAEA).

Respectfully submitted.