

Impacts on Reactor Operators from Fukushima Lesson Learned Activities

Introduction

PROS – The Professional Reactor Operator Society currently has approximately 600 members.

Our mission is to serve individuals involved with safe nuclear operations. The society will work to communicate and promote the knowledge and professional values of our members, and to offer constructive input to the regulatory process on issues related to Operators.

To carry out this mission, the Professional Reactor Operator Society will engage in the following activities:

- Give voice to our members' professional ideas.
- Exchange technical information concerning operation practices, Operator training, and individual license regulation.
- Communicate professional values held by our members.
- Meet with the U.S. Nuclear Regulatory Commission to provide Operator viewpoints and input on related topics.

Current Operator Impacts

Training- The Fukushima Recommendations along with INPO Crew Performance Evaluation changes have already led to more focus on Multiple Events in Training. Recommendation 8.1 and Recommendation 8.4 will affect Operators in a major way. The incorporation of the EDMGs, SAMGs, and other mitigating procedures into the EOPs (Emergency Operation Procedures) will require significant training time to achieve Operator proficiency. Also, the NRC has ordered licensees to modify EOP technical guidelines per Recommendation 8.1, the changes in technical content of EOPs will also lead to more Operator Training to become proficient.

Operators already attend training 5 or 6 weeks a year (approximate 12% of our work time). With all of the other training requirements and commitments these training weeks are already quite full. One option could be additional training time, but due to the Nuclear Fatigue Rule, any lengthened training could result in some plants not able to adequately fill their normal shift rotations. Also, too much focus on the Fukushima recommendations would result in less training in other areas (Systems, AOP, EOP, etc). PROS is concerned that excessive training on extremely low probability events could degrade Operator proficiency on higher probability events, which could create bigger problems should one of these higher probability events occur. PROS would recommend that a balance of training time be maintained between the Fukushima type events and other required training.

The additional training that Operators have seen since Fukushima has helped Operators understand and discuss the reality of Beyond Design-Bases events occurring. Since Fukushima, nuclear power plants in the US have seen four events that have challenged Operators. In each of these four events, the operators have responded appropriately and have successfully handled the event. The four events were:

- Browns Ferry Tornadoes
- Fort Calhoun Flooding
- North Anna Earthquake
- Byron LOOP

Operator Staffing Plans – Recommendation 9 says the facility emergency plans address prolonged SBO (Station Black Out) and multiunit events. This will have an effect on Operators since utilities need to have plans for post-event staffing that go beyond the immediate EP responders. These plans need to include Operators and others who will be implementing the mitigating strategies, and to provide for relief and resting periods.

Future Operator Impacts/Concerns

Equipment Costs

PROS has a concern that the NRC mandated Fukushima improvements may redirect limited resources away from existing programs, modifications, and upgrades requested by Operators. Operators know that plant resources are not infinite, and resources applied to Fukushima recommendations will likely come from programs Operators would consider a higher priority. This in turn could lead to equipment reliability issues that could cause more plant transients and plant shutdowns.

Surveillance Requirements for New Equipment

Some U.S. nuclear facilities are currently facing Operator staffing challenges. The new equipment acquired to meet the Fukushima recommendations (Extra Generators, Pumps, etc.) will have to be tested and maintained, even if it is never used, which will just add to the workload of the existing plant staff. This could limit the amount of time field operators or control room operators have to perform normal daily operational tasks.

New Equipment and Modifications Effects on Current Plant Design

PROS is concerned that plant modifications and new equipment installation to meet Fukushima requirements could create unanticipated problems for Operators. Although designed to function in specific conditions, new equipment can, and has, interfered with Operators performing unrelated tasks during routine operations and post-accident situations. Examples include:

- At one station, flooding barriers were built that inhibit access to thermal barrier booster pumps. These pumps would supply cooling water to reactor coolant pumps in the event normal seal cooling is lost, and are used in EOPs.
- At another station, delay barriers installed on plant stairwells to meet NRC-required anti-terrorist security measures also delay Operators moving about the plant. An Operator on the wrong side of one or more of these barriers will take longer to perform post-event mitigating functions such as locally opening Reactor Trip Breakers during an ATWS, or other time-critical Operator Actions required to meet accident analysis assumptions.

Conclusion

As Operators we have only seen the beginning of the changes from the Fukushima recommendations. PROS agrees that the recommendations will be an overall improvement for the safety margin at facilities in the United States. PROS is expressing these concerns to ensure that the industry and the NRC are aware that implementation of these recommendations could create some negative consequences for Operators. The issues that Operators have already started to see from implementation of these recommendations are training and plant staffing issues. With future issues of equipment costs, additional Surveillance Requirements,

and changes to current plant equipment that could affect how Operators control the plant. PROS feels that the industry and the NRC need to work with Operators to ensure that the recommendations are not just well written ideas and theories, but that implementation of these recommendations will achieve the desired enhancements in safety.