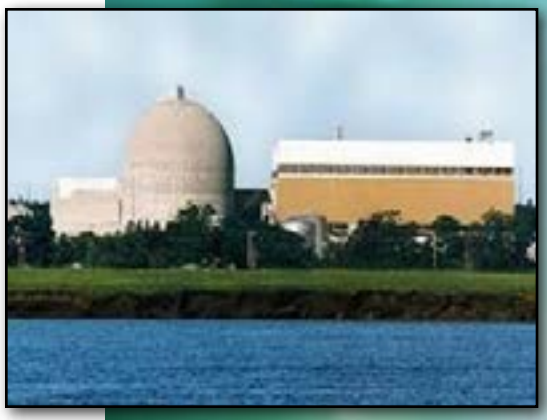
EPRI Research Informs Nuclear Industry Assessment of External Hazards

EPRI's evolving external hazards research has enabled early users to more effectively discriminate between hazards representing relevant, realistic risks and those not appropriate for further consideration.



NextEra Energy's Seabrook Station.

EPRI's Risk and Safety Management Program develops technical methods and analysis tools to inform risk assessment efforts at nuclear power plants. Increased interest in external hazards – including seismic events, flooding, storms, high winds, and extreme temperatures – prompted EPRI to expand its research efforts in this area.

Initial EPRI guidance is captured in the report, *Identification of External Hazards for Analysis in Probabilistic Risk Assessment* (1022997). Early users – including Bruce Power Company, EDF, CEZ a.s., UJV Rez a.s., and NextEra Energy – have worked with EPRI to apply the guidance to their plants and capture insights and potential improvements. Based on their input, EPRI can refine its tools and develop improved risk assessment methodologies for external hazards analysis that:

- Provide fundamental guidance for conducting plant studies
- Enable users to benchmark and evaluate recently completed work
- Enhance utility- and country-specific processes and decision criteria

Member Participation and Feedback

NextEra Energy used the external hazards screening process to identify additional hazards that needed to be considered for evaluating the risks at its nuclear plants. The company applied the screening process to one northern site and one southern site to gain perspective on the impact of both cold and hot climates

According to Anil Julka, manager of risk and reliability in NextEra's nuclear organization, EPRI's approach to external hazards gave the company a new way to look at risk assessment and mitigation. "Prior to using EPRI methodology, we were only looking at external floods and seismic hazards," said Julka. "Using the EPRI methodology, we were able to consider other hazards, such as extreme temperatures and high winds. It provided a systematic approach to looking at external hazards and a means to encompass all possible hazards."

The other early users of the EPRI guidance applied it in a manner similar to NextEra, although the initial set of external hazards under consideration may have been different. Additional feedback about EPRI's external hazard research from the early users included positive comments about its timelines and comprehensiveness, including the inclusion of information from around the world, making it useful for a global audience.

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According to EPRI Technical Executive Ken Huffman, EPRI's research also proved useful to members because of the technical details it included. "An attribute that made EPRI's research valuable to the early users was that it consists of a comprehensive collection of worldwide technical criteria and considerations, and it is a relatively recent treatment of the subject matter," Huffman explained. "This provides users with confidence that they haven't missed external hazards of importance to their plant, and they have the benefit of the most recent technical perspectives."

The results from this research will be incorporated into EPRI's external hazard roadmap and will be used to guide future research needs. EPRI also is using the experiences from early users to update the initial guidance, which will include additional information on:

- Deploying the initial results, including processes shown to be successful in applying the criteria
- Technical information useful in documenting and applying qualitative criteria, along with additional treatment of quantitative criteria
- Further information on treatment of combined external hazards

Industry Impact

EPRI's external hazards identification research provides value along multiple dimensions:

- A technical basis for discriminating between hazards representing relevant, realistic risks appropriate for further consideration and those not appropriate for further consideration
- Increased confidence that external hazard safety priorities are appropriate and technically defendable
- Greater technical credibility and acceptance of results by external audiences

Early support from nuclear plant owners demonstrated a willingness to proactively address external hazards considerations. Moreover, the U.S. Nuclear Regulatory Commission recognized EPRI's work in this area during a commissioner's briefing that addressed external hazards in 2014.

As Huffman explained, the review process benefits external hazards progress in two directions. "It helps bring to the members' attention the external hazards that may benefit from additional consideration. And, by addressing such discoveries, plant owners and operators are assured that they are properly prepared to address externally generated hazards," he explained. "In another direction, it enables users to make technically informed decisions regarding whether an external hazard represents a threat to plants. On a collective basis it helps to identify what hazards are significant to multiple plants and deserving of additional research."

These benefits are certainly true in NextEra's case, which had been focusing on external flooding, seismic activity, and maximum precipitation. By applying EPRI research and methodologies, NextEra gained insights into other external hazards that may require attention. "Our pilot effort was for two plants," said Julka. "Now the same criteria will be applied to other NextEra sites, and this will evolve into informed decision-making for risk mitigation in the future."

For more information, contact the EPRI Customer Assistance Center at 800.313.3774 (askepri@epri.com)

CONTACT

Ken Huffman, *Technical Executive.*
704.595.2555, khuffman@epri.com

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Electric Power Research Institute
3420 Hillview Avenue, Palo Alto, California 94304-1338 • PO Box 10412, Palo Alto, California 94303-0813 USA
800.313.3774 • 650.855.2121 • askepri@epri.com • www.epri.com

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