Long-Term Operation of Nuclear Power Plants: Summary of Executive Interviews

EPRI interviewed 47 U.S. utility executives in November/December 2007 to gauge industry perspectives on long-term operation of nuclear power plants. The survey supplements advisory input and EPRI technology innovation initiatives examining advanced capabilities that may be required to address critical industry issues and that may benefit from collaborative research efforts.

The survey found that long-term operation of existing nuclear power plants beyond 60 years is definitely on senior executive radar screens. While the executives cited many challenges to long-term operation, none were characterized as unmanageable, and the leading barriers identified were technical, particularly plant reliability. The survey participants recognized a strong role for EPRI in defining and addressing the technical challenges to long-term operation, and most indicated a personal willingness to participate in industry efforts related to long-term operation.

Survey Background/Overview

Studies by EPRI and others consistently show the importance of nuclear power in reducing greenhouse gas emissions and ensuring the availability of safe, reliable and economic electric power. While the construction and operation of new nuclear power plants is important, maintaining operation from existing facilities is critical as well. These facilities have demonstrated safe and reliable operation for several decades, but will require diligent care and attention to sustain long-term operation. In the United States, the Department of Energy and the U.S. Nuclear Regulatory Commission have initiated efforts to look at extending plant licenses past 60 years and are actively seeking industry involvement.

Recognizing these drivers, EPRI conducted a systematic survey of industry perspectives related to long-term operation of nuclear power plants. Interviews were conducted by telephone with 47 executives from 23 U.S. nuclear operators/owners. The interviews were intended to gauge the level of industry interest in long-term operation, to identify barriers to long-term operation, and to identify collaboration opportunities to facilitate long-term operation.

Specifically, the survey solicited executive input on the following issues:

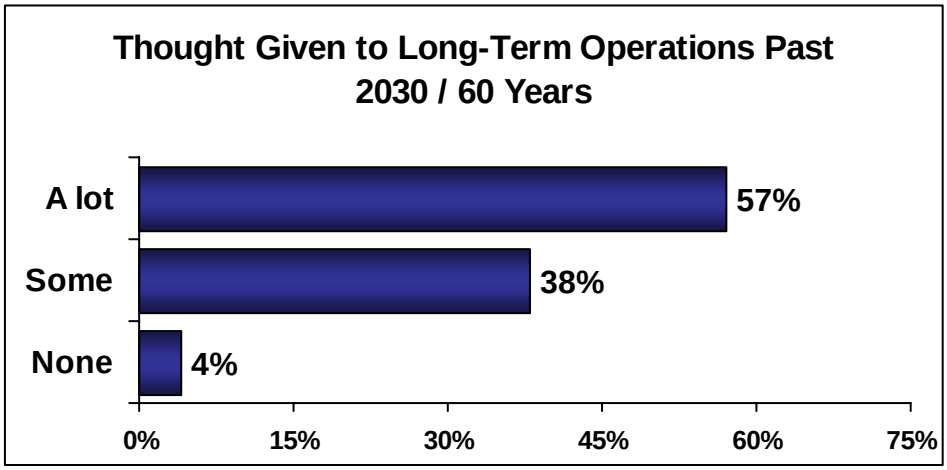
- Thought being given to long-term operation of existing nuclear plants,
- Likelihood of their company seeking license renewal past 60 years,
- Reasons for and potentially against pursuing license renewal past 60 years,
- Current planning and preparation activities for long-term operation of existing plants,
- Significance and manageability of issues/challenges and how to address,
- Which departments within their company would be most involved,
- EPRI's role, and
- Their personal interest in devoting time to industry activities on this topic.

The executives interviewed comprised a balanced, high-level cross-section of utilities with demonstrated nuclear industry involvement.

- Three-fourths of the 47 interviews were conducted at the vice presidential level or higher. Job titles/responsibilities represented included 13 CNOs, 7 CEOs/COOs, 10 engineering executives, 6 in the area of license renewal, 4 CFOs/financial executives, 4 strategy/planning executives and 3 others.
- 68% of the executives came from companies with at least one unit reaching 60 years by 2037, 36% with at least one merchant plant, 47% with a single nuclear site, 53% with a fleet, 62% with BWRs, and 85% with PWRs. More than one executive was interviewed at 15 of the companies to gauge consistency.
- 51% of the interviewees are current EPRI advisors, while 49% are not; 28% are Nuclear Power Council Representatives; 4% are EPRI Board Members; and 4% are Research Advisory Council Members.

Industry is Forward-Thinking

The survey results indicate that the nuclear power industry is increasingly confident of the long-term viability of nuclear power as a generation option. Most executives interviewed stated that their company had given significant thought to the long-term operation of nuclear plants: 95% of interviewees had given a lot or some thought to the issue. Higher-level executives had given more thought to the topic.



The vast majority (more than 85%) of those interviewed think it is at least somewhat likely that their company will pursue plant operation beyond 60 years, and more than half think operation beyond 60 years is very likely. Executives indicated that the most important drivers for their companies seeking license renewal past 60 years are potential CO_2 restrictions and economic competitiveness of existing nuclear plants. While these results are based on small numbers, and are limited to the United States, the insight indicates a strong preference for long-term extended operation of nuclear assets.

Large majorities of all groups of executives interviewed said that plant operation beyond 60 years is at least somewhat likely for their plants. The main reasons cited for extending operation beyond 60 years relate to the value of the plants as an economic and carbon-free power source for meeting future electricity needs and to the cost-effectiveness of maintaining operation from a paid-for and proven asset. The main factors cited that might lead a utility not to pursue extended plant operation relate to technical and economic concerns, followed by regulatory uncertainty and the political climate.

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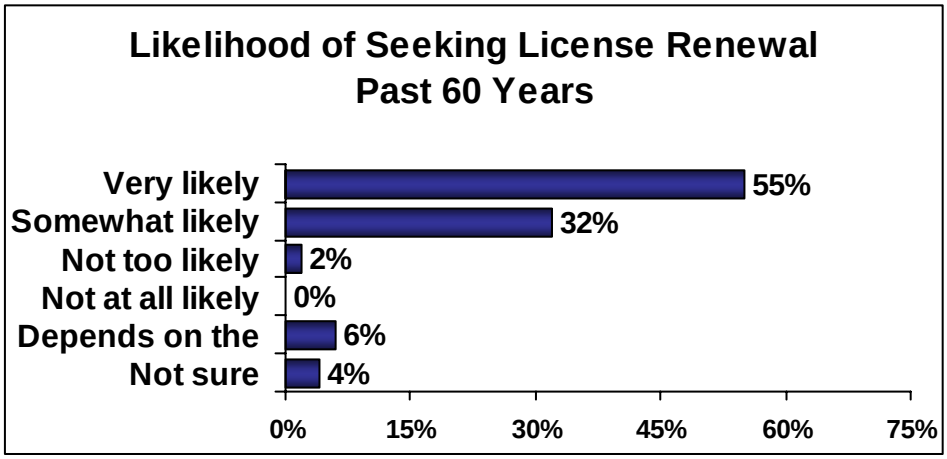
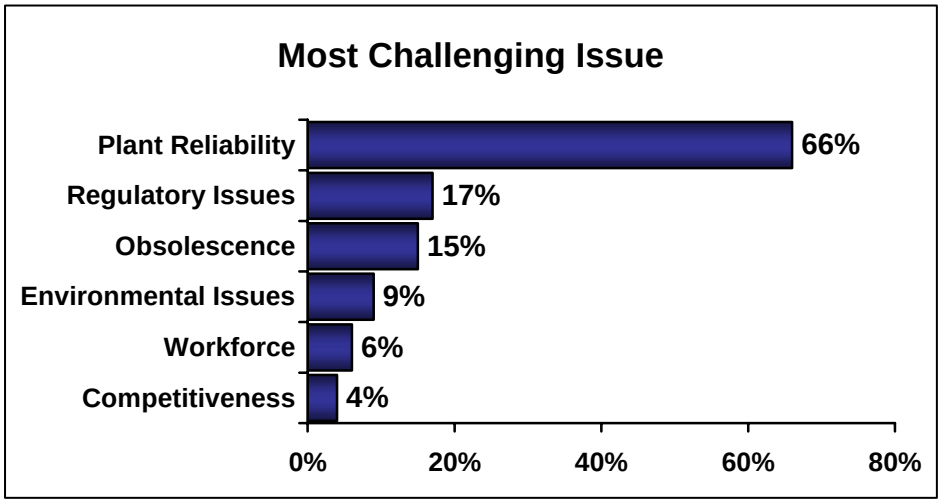


Challenge is Technical

The survey revealed that technical challenges to long-term operation pose more concern than non-technical, business-related challenges. Two-thirds of those interviewed identified plant reliability as the most challenging issue area for long-term plant operation. Regulatory issues, obsolescence, and workforce issues were rated as significant but manageable problems for long-term operation.



Note: Percentages don't sum to 100. Some interviewees cited more than one issue as most challenging.

Interviewees identified materials aging and cable/piping issues as the top plant reliability concerns. Specific materials issues cited included metallurgy, flaw detection, concrete aging, and effect of radiation on structural steel.

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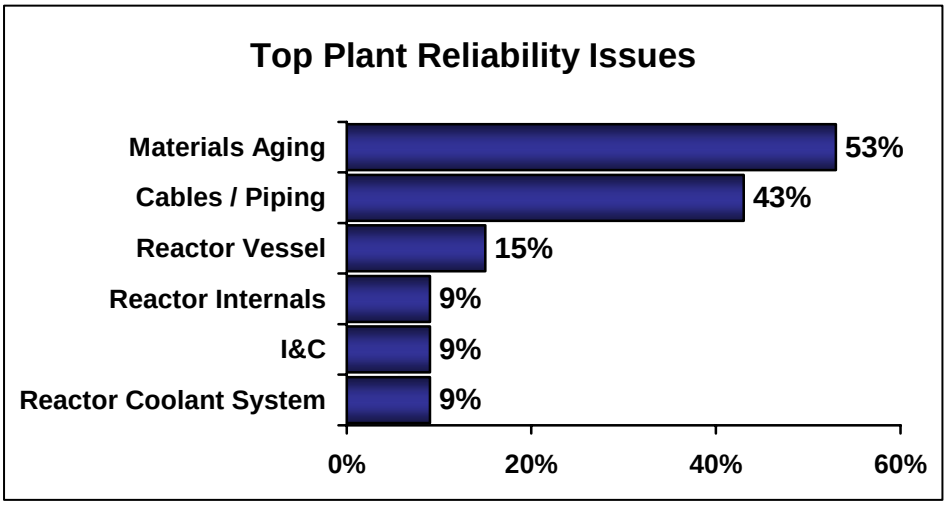

Note: Percentages don't sum to 100. Interviewees could provide multiple responses.

EPRI Expectations

The interviews sought input on EPRI's role in identifying and resolving the technical issues associated with plant operation beyond 60 years. Those interviewed would like EPRI to identify and stay in front of key technical issues, and to facilitate government and industry interaction in addressing these issues in a consistent manner. The long-term nature of the issues identified, particularly related to plant reliability, dovetails with the collaborative, cross-cutting and technical nature of EPRI's research programs.

Notably, more than 70% of those interviewed said they would be interested in actively advising or working with EPRI and the Nuclear Energy Institute as the industry begins working closely with the Department of Energy and the Nuclear Regulatory Commission on long-term extended plant operation.

Converting Expectations into Action

Tackling the technical challenges that need to be overcome to ensure the operation of existing nuclear plants past 2030 will require a comprehensives approach.

EPRI will begin an internal Long-Term Operation Initiative that will consist of a "think-tank" type activity to systematically identify issues, determine solution strategies and assess technical vulnerabilities in solution strategies. R&D pathways to address technical vulnerabilities will be mapped to EPRI Action Plans and Technology Innovation projects. To ensure this R&D effectively responds to industry needs, EPRI will need member consideration and support of initiative-identified strategic R&D needs by the Action Plan Working Groups.

The assessment of technical vulnerabilities will also facilitate identification of topics amenable to joint R&D through public-private partnerships, international collaboratives, and cross-U.S. industry coordination activities. Some of the potential collaborations include DOE, NRC RES, EDF and the

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Materials Aging Institute, the CANDU Owners Group, U.S. national laboratories (such as the Idaho National Laboratory), and international efforts such as the Japanese Plant Life Management and Aging Road Map effort. EPRI will need utility management and technical input to support partnerships, collaborative and coordination activities, particularly in the formative stages of these activities. Because the challenges facing long-term nuclear plant operation are not specific to any one country, technology, or ownership model, EPRI is interested in receiving input from a diverse array of global stakeholders.

Conclusions

- The subject of long-term operation of existing nuclear power plants beyond 2030 and 60 years is definitely on executive radar screens.
- The interview findings are remarkably consistent across all demographics: role within company, plant age, regulated vs. merchant, single site vs. fleet, BWR vs. PWR, interest vs. no interest in new plants, and within companies where more than one person was interviewed.
- Most interviewees believe the long-term nuclear plant operation challenge is technical, centered around plant reliability concerns.
- Industry executives favor a proactive and collaborative research approach that can eliminate barriers to long-term plant operation.
- Commitment to the long-term operation is evident in the high interest in contributing time to collaborative industry efforts.
- EPRI's future plans include involvement of its advisory structure as well as external facilitation with DOE, NRC and NEI.

January 2008

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