



NUCLEAR POWER PLANT UPRATES

AUGUST 13, 2024

2:00 – 3:00 PM ET

ADVANCE NUCLEAR STATE COLLABORATIVE

Housekeeping



- Use the chat box on the zoom toolbar to ask questions at any time
- Audience questions will be asked after the presentations
- The webinar recording and slides will be emailed to attendees after today's webinar



Nuclear Power Plant Uprates

Moderator: Alyse Peterson, Senior Advisor for Nuclear Coordination and Radioactive Waste Policy, NYSERDA

Panelists:

Chris Weigand, Senior Technical Executive, Electric Power Research Institute

David Brown, Senior Vice President of Federal Government Affairs and Public Policy, Constellation Energy

William Orders, Senior Licensing Project Manager, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission

ANSC Nuclear Power Plant Upgrades

webinar



Chris Wiegand, cwiegand@epri.com
Senior Technical Executive, EPRI
August 2024

What is a Power Uprate & The Different Kinds

A power uprate is a process that increases the maximum licensed power level at which a commercial nuclear power plant can operate.

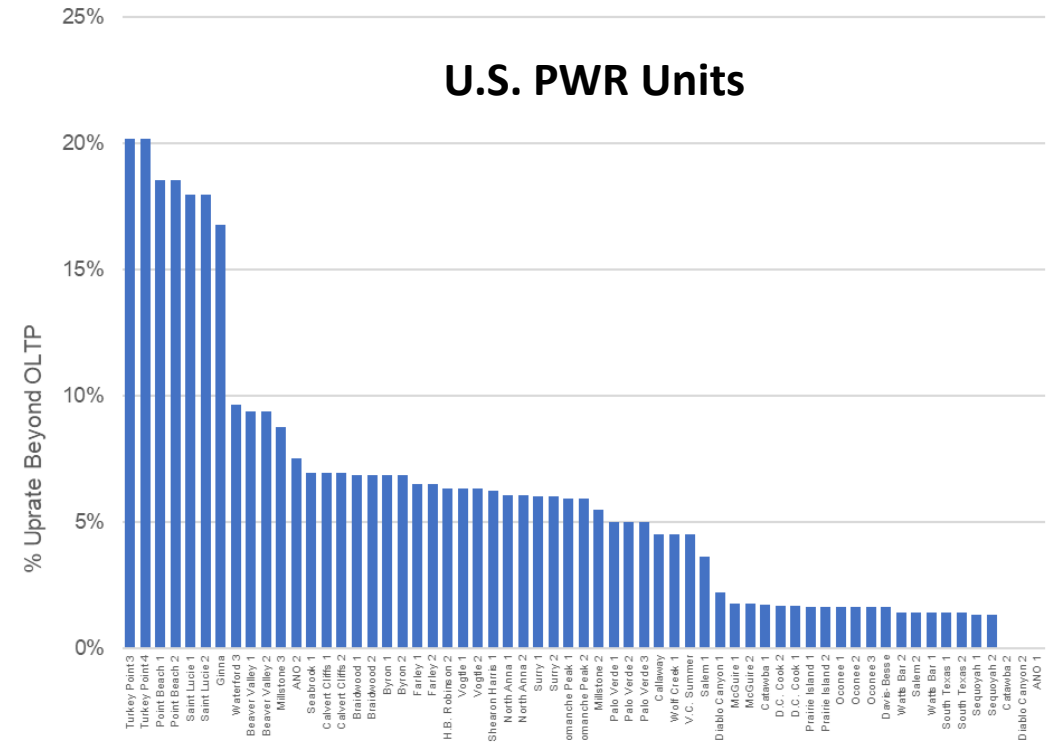
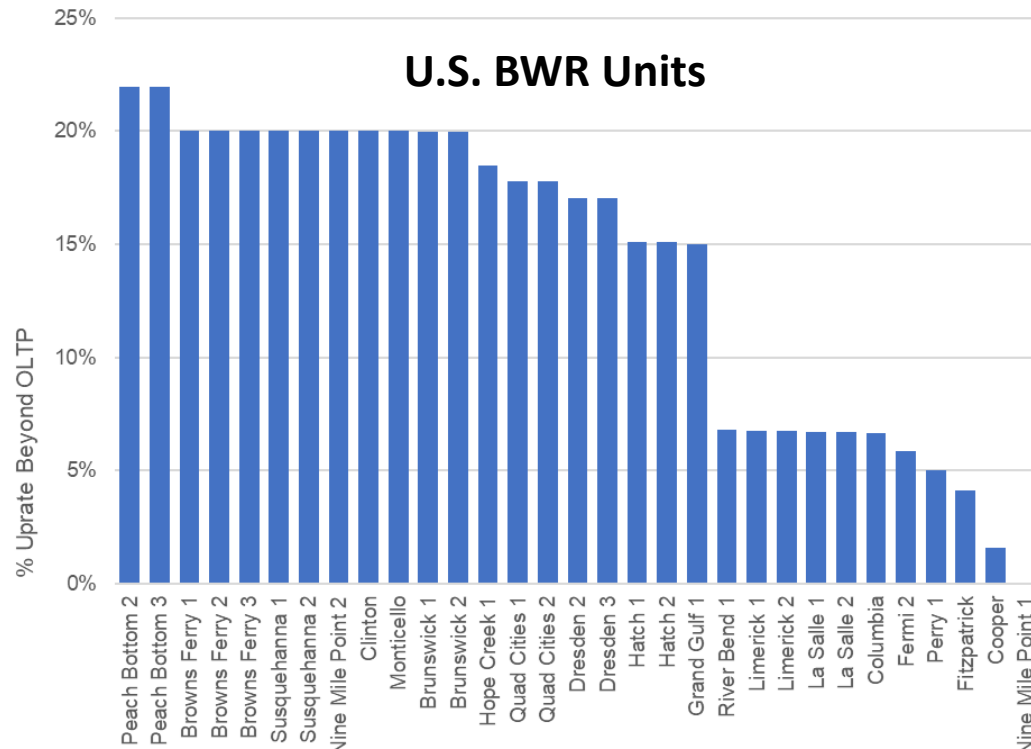
- *For example, a 1000 MWe is uprated to 1300 MWe*
- *Requires NRC approval*
- *Measurement Uncertainty Recapture (1 to 1.7%)*
- *Stretch Power Uprate (2 to 7%)*
- *Extended Power Uprate (up to 20% and greater)*
- *Leverages the existing infrastructure*

Safe and Reliable Implementation

Power Upgrades: Reflecting on the Past

- Widely implemented since the 1970's
- Nearly all U.S. plants and more than 45 international units have upgraded
- Units in Sweden beyond 125% of Original Licensed Thermal Power (OLTP)

- Overall positive results
- Some plants did experience budget, schedule, and/or technical issues
- Driven by business case



What's the Opportunity for Future Upgrades?

Power Upgrades: Looking to the Future

Office of Nuclear Energy

Inflation Reduction Act Keeps Momentum Building for Nuclear Power



• **Current Drive**

- Urgent need for additional carbon free MWe
- Increased value of nuclear
- Life extension to 80 years and beyond
- Incentives – ROI critical

• **Additional Benefits**

- Life-cycle management strategy
- Increased resiliency
- Margin recapture
- Vulnerability elimination
- Proven experience in upgrades

Bridging the Gap to New Nuclear

Two Recent Products that Discuss Leveraging Existing Nuclear Infrastructure for Climate Goals


EPRI




EPRI Product 3002023082
LEVERAGING EXISTING INFRASTRUCTURE
Three Areas to Consider to Meet 2030 Decarbonization Goals



EPRI



EPRI Product 3002022700
TECHNOLOGY INNOVATION: A ROADMAP
TO LEVERAGE EXISTING NUCLEAR POWER
PLANTS TO INCREASE ZERO-CARBON
ENERGY PRODUCTION



November 2021

Ways to leverage NPPs

- Improve Capacity Factor
- Reduce Outage Length
- Extend Refueling Interval
- Power Uprate



TOGETHER...SHAPING THE FUTURE OF ENERGY®



NRC Power Uprate Review Process

ADVANCED NUCLEAR STATE COLLABORATIVE NUCLEAR POWER PLANT UPRATE WEBINAR

AUGUST 13, 2024

Power Uprate Forecast

- ▶ Industry Survey results on power uprates found the following:
 - ▶ Greater than 50% of sites surveyed have a level of interest/planning for one or more power uprates with a combined capacity increase of 2 Gwe.
 - ▶ Inflation Reduction Act production tax credits, along with the Civil Nuclear Credit program and Bipartisan Infrastructure Bill of 2021, have generated industry interest in power uprates.

Power Uprate Reviews

- ▶ The NRC has approved 171 power uprate amendments since the late 1970s
- ▶ The NRC has established processes to support those reviews
- ▶ Data indicates an increase in the resources and time required to conduct those reviews.
- ▶ Given the forecast of multiple power uprate applications, the NRC is in the process of identifying opportunities to improve and optimize our reviews.

Power Uprate Review Process

- ▶ The process for amending commercial nuclear power plant licenses related to power uprates is the same as the process used for other license amendment requests. The NRC PM notifies the public in the Federal Register that the NRC is considering the application. The public has 30 days to comment on the NRC's proposed determination regarding the no significant hazards consideration (NSHC) and 60 days to request a hearing. After completing its review, the NRC staff documents the findings in a safety evaluation. The PM will consult with the State official regarding the NRC's proposed determination regarding the NSHC and will consider any comments of that State official.

NRC Guidance for the Power Uprate Review Process

- ▶ NRC Guidance for Power Uprates
- ▶ NRC License Instruction (LIC) 112, Revision 2, "Power Uprate Process" provides generic guidance for power uprate reviews, referencing the following for specific review types:
 - ▶ Measurement Uncertainty Recapture Uprates
 - ▶ RIS 2002-03, "NRC Regulatory Issue Summary 2002-03 Guidance on the Content of Measurement Uncertainty Recapture Power Uprate Applications"
 - ▶ RIS 2007-24 , "NRC Staff Position on Use of the Westinghouse Crossflow Ultrasonic Flow Meter for Power Uprate or Power Recovery"
 - ▶ Stretch Uprates
 - ▶ The NRC uses previously approved stretch power uprates, along with RS-001,"Review Standard for Extended Power Uprates for guidance.
 - ▶ Extended Power Uprates
 - ▶ The NRC uses review standard RS-001 for extended power uprates

Opportunities for State Involvement

- ▶ State officials may participate in the following public forums:
 - ▶ Pre-Application Meetings
 - ▶ Comment on the NRC's proposed determination about No Significant Hazards Consideration for amendment to an operating license (10 CFR 50.91(b)(3))
 - ▶ Comment on draft environmental finding of no significant impact, if prepared and issued (10 CFR 51.33(a), 51.74(a)(4))
 - ▶ Request a hearing (10 CFR 2.309(h))
 - ▶ Advisory Committee on Reactor Safeguards meeting, if held

Questions



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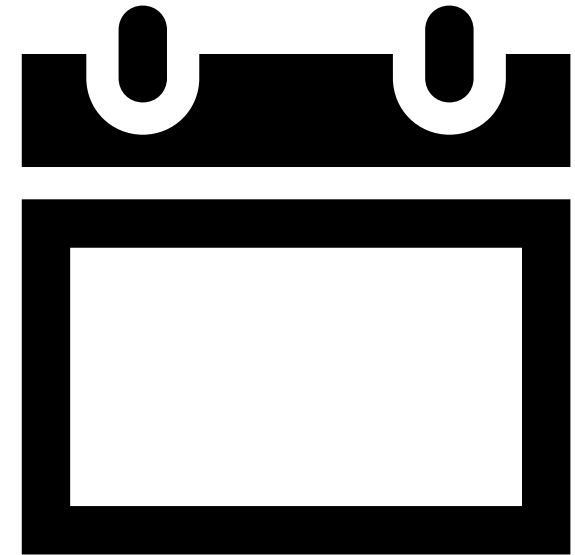
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Upcoming

- **NARUC Annual Meeting abstracts due Tuesday, August 20 (link in chat)**
- **NASEO Annual Meeting
September 29- October 2 in New York**
 - **Registration available at**
<https://annualmeeting2024.naseo.org/registration>
 - **Nuclear session tentatively scheduled for 10:30 am on September 30**



For more information about the Advanced Nuclear State Collaborative



Advanced Nuclear State Collaborative

The National Association of Regulatory Utility Commissioners and the National Association of State Energy Officials formed the Advanced Nuclear State Collaborative (ANSC) with support from the U.S. Department of Energy in 2023. The ANSC convenes state utility regulators and State Energy Officials to enhance collective understanding of the unique regulatory and policy questions surrounding the consideration and deployment of new nuclear generation and support peer learning.

The ANSC is an initiative of the Nuclear Energy Partnership, a multi-year cooperative established in January 2021 between DOE's Office of Nuclear Energy and NARUC.

NARUC and NASEO members can join the ANSC at any time by submitting an expression of interest to NARUC staff describing their state's interest in advanced nuclear generation and act to consider or deploy new nuclear.

For non-NARUC or NASEO members interested in learning more about the ANSC events open to the public, please contact NARUC staff to be placed on an email distribution list.

Visit www.naruc.org

Resources

Activities

Partners

More Information

Resources

- [Coal to Nuclear Repowering: Considerations for State Energy Offices and Public Utility Commissions, April 2024](#)
This report highlights some of the benefits and challenges associated with the coal to nuclear repowering process, with a particular focus on the policy, programmatic, and regulatory considerations of relevance to State Energy Offices and Public Utility Commissions.
 - [Download the report](#)
 - [Read the press release](#)
- [NARUC and NASEO Release Advanced Nuclear State Action Tracker to Highlight State Activities Surrounding Advanced Nuclear, March 2024](#)
[Explore the tracker here.](#)
- [New NARUC-NASEO Advanced Nuclear State Collaborative Helps Better Inform State Approaches to New Nuclear Generation, April 2023](#)
This press release announces the ANSC initiative and lists all participating utility commissions and State Energy Officials as of April 10. [Read to learn more about the ANSC.](#)

ANSC Available Resources



Coal to Nuclear Repowering: Considerations for State Energy Offices and Public Utility Commissions, April 2024. Available [here](#).

Developing State Advanced Nuclear Frameworks *peer sharing call (December 12, 2023)*. Materials available to ANSC members upon request. [WY Energy Authority Nuclear Energy Strategic Framework and Roadmap](#).

Repowering Coal Sites with Nuclear Energy *peer sharing call (October 26, 2023)*. Slides available [here](#). Call notes available to ANSC members upon request.

[Evaluating Nuclear Waste and Safety Considerations for Advanced Nuclear Deployment](#) (September 27, 2023). Slides available [here](#). Recording available [here](#).

[Facilitating Equitable Community Engagement to Support the Deployment of Advanced Nuclear](#) (August 17, 2023). Slides available [here](#). Recording available [here](#).

[Nuclear Energy Partnership Briefing on Pathways to Commercial Liftoff: Advanced Nuclear](#) with Julie Kozeracki, Senior Advisor, DOE LPO (June 22, 2023) slides available [here](#). Recording available [here](#).

Nuclear 101 and Intro to the ANSC (April 22, 2023) Slides and recording available upon Request, email NARUC or NASEO staff.

[Advanced Nuclear Resource Repository](#) This repository provides links and overviews for a variety of reports on different aspects of advanced nuclear.