

RIC 2024 Hybrid

U.S. Nuclear Regulatory Commission
36th Annual Regulatory Information Conference

ADAPTING TO A CHANGING LANDSCAPE

MARCH 12-14, 2024

Bethesda North Marriott Hotel
and Conference Center
Rockville, Maryland

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Use of Accident Tolerant Fuel to Safely Increase Reactor Output

Regulatory Information Conference Session W9

March 13, 2024

PANELISTS:

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NRC Perspective:

Licensing for Accident Tolerant Fuel and Power Upgrades

Scott Krepel

Branch Chief, Nuclear Methods & Fuel Analysis Branch, NRC

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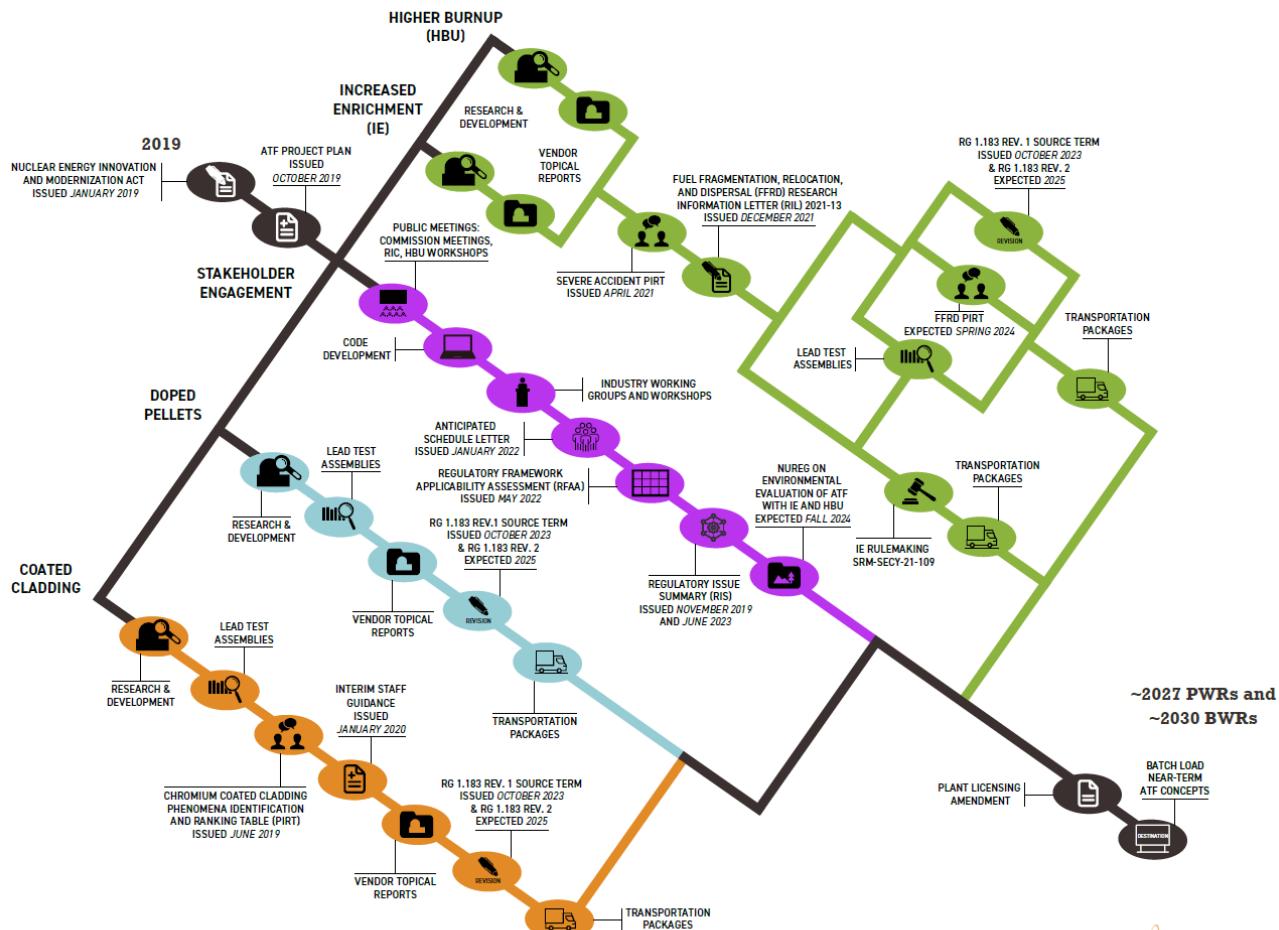
Accident Tolerant Fuel (ATF)

- Novel fuel materials
 - Doped pellets
 - Coated cladding
- Increased enrichment
(> 5 weight percent uranium-235)
- Higher burnups
(> 62 gigawatt days per metric ton uranium rod average)

Power Uprates (PURs)

- Measurement uncertainty recapture (MUR) (<2%)
- Stretch PURs (<7%)
- Extended PURs (<20%)
- Beyond current licensing experience?

Accident Tolerant Fuel (ATF), Increased Enrichment, and Higher Burnup Roadmap to Readiness



Refer to the New Fuels Infographic for information regarding fuel facilities, transportation, and spent fuel storage.

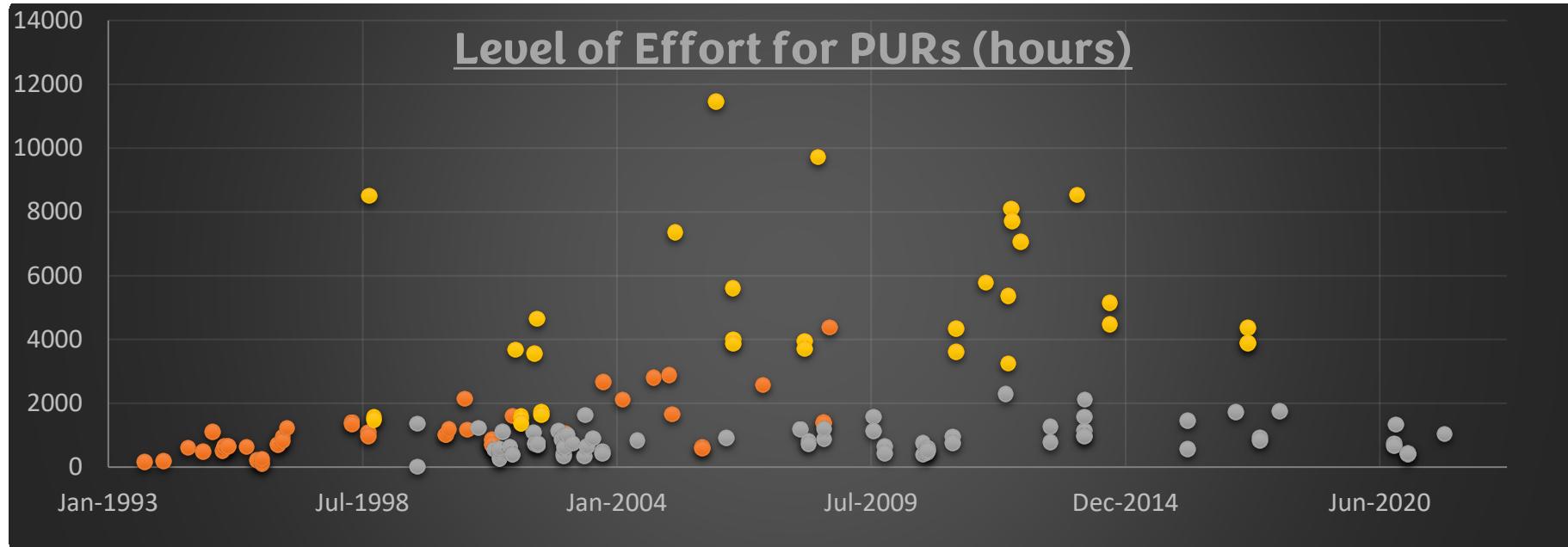
Current Status: PURs

- The NRC has approved 172 PURs to date, equivalent to over 8 gigawatts of electricity generation capability
 - MURs – 73
 - Stretch PURs – 65
 - Extended PURs – 34
- The NRC has guidance available for PUR applications
 - Regulatory Information Summary 2002-03
 - Review Standard RS-001
 - Application of resolution of complex issues in one application to subsequent applications

Combining ATF and PURs

- Benefits in timely and efficient review
- Holistic consideration of cross-cutting issues
 - Reduction in review schedule
 - Less administrative duplication
 - Supports power capacity and decarbonization needs
- Comes with some risk
 - Resource management challenges due to scope
 - Complications that may arise from linked actions

The NRC Is Using Historical Data to Optimize Future Reviews



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What Can the NRC Do?

- Identify resources with prior PUR review expertise
 - Knowledge management/transfer
- Establish “core teams”
 - Same reviewers assigned to similar PUR applications
- Use recent tools to improve regulatory efficiency, such as—
 - Request for confirmation of information

What Can the Licensee Do?

- Early engagement with the NRC on complex issues
 - Application of data validation and reconstitution methods
 - PURs beyond current licensing experience
- High-quality, complete submittals
 - Consider prior NRC requests for additional information on similar PURs
- Proactively consider impact of PUR on plant
 - Steam dryer cracking issues

Wrap-Up

- The NRC doesn't consult or collaborate with the industry on development and licensing of ATF or PUR implementation...
- ...but the NRC and licensees are both responsible for efficient and timely licensing.
- Additional information on ATF & PURs:
 - <https://www.nrc.gov/reactors/power/atf.html>
 - <https://www.nrc.gov/reactors/operating/licensing/power-uprates.html>