



**RIC 2024 Hybrid**

U.S. Nuclear Regulatory Commission  
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# ADAPTING TO A **CHANGING LANDSCAPE**

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[www.nrc.gov](http://www.nrc.gov)

# Use of Accident Tolerant Fuel to Safely Increase Reactor Output

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**NRC Perspective:**  
**Licensing for Accident Tolerant Fuel and Power  
Upgrades**

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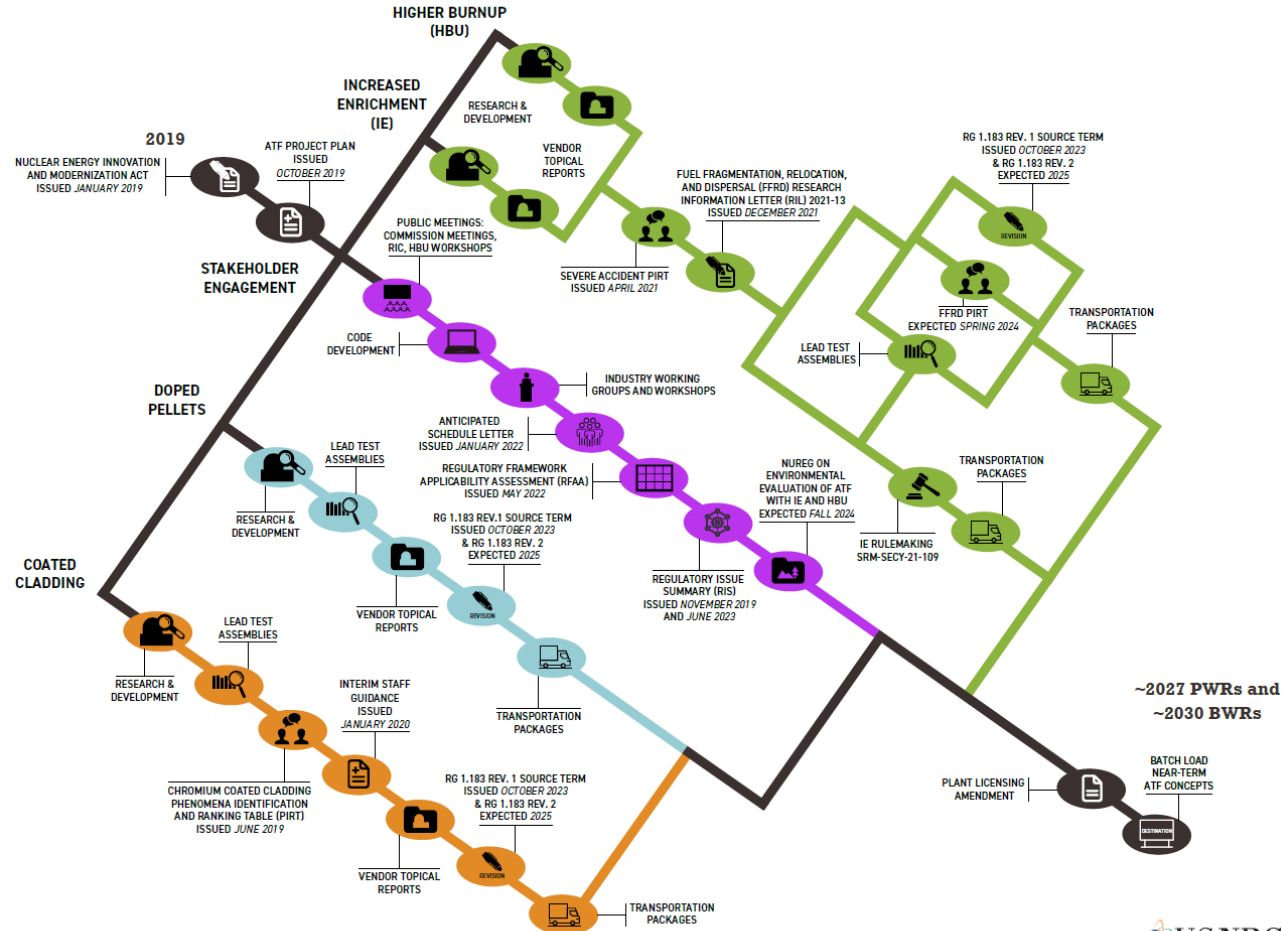
### Accident Tolerant Fuel (ATF)

- 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 Upgrades (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.

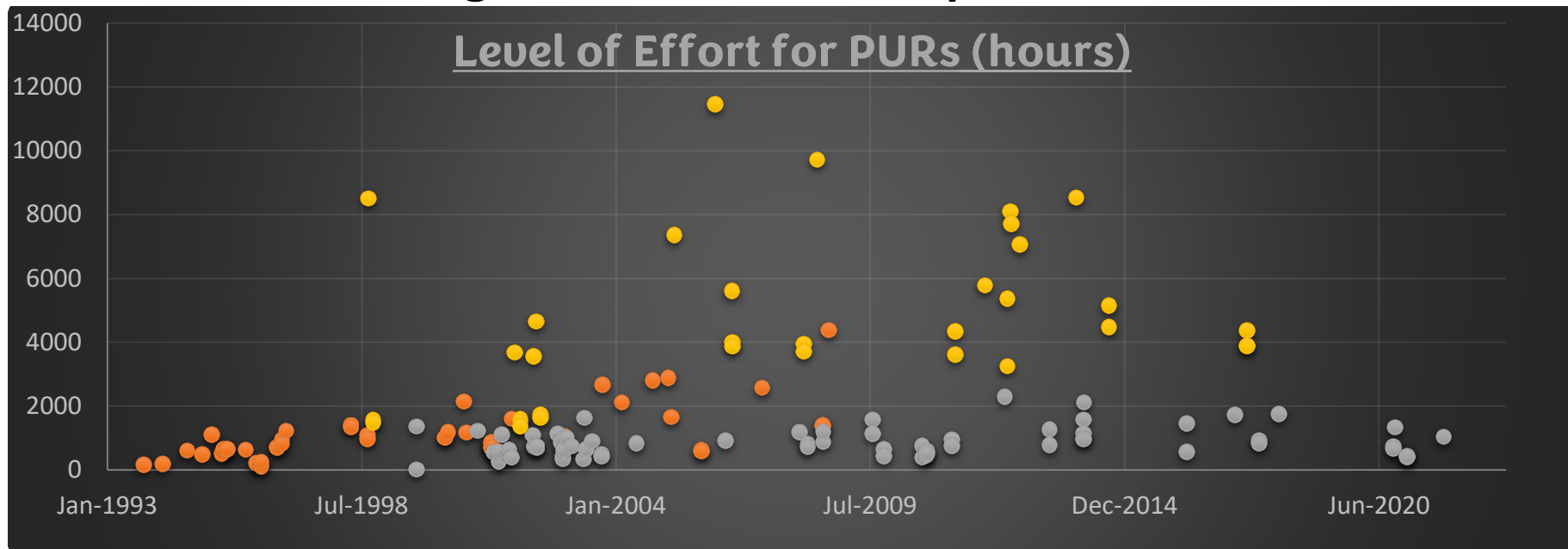
## Current Status: PURs

- 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>