U. S. Nuclear Regulatory Commission

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Overview of NRR…

- Who we are
- What we do
- How we accomplish our mission
- Power Uprate program
- Conclusion

Who we are…

- Located at Headquarters in Rockville, Maryland
- Legislatively mandated - Atomic Energy Act (1974*)
- Engineers, Scientists, Project Managers, Risk Analysts, Financial Analysts, Administrative staff
- One of the major program offices at NRC (about 600 of the 2800 staff)

What we do….

- Ensure safe operation of:
  - *103 power reactors*
  - *Research / Test reactors*
  - *Decommissioned reactors*
- Review new Reactor Designs
- Develop & oversee Reactor inspection program
- Review operating plants' applications for life extension (e.g. License Renewal)
- Review applications for changes to plant licenses (e.g. Power Uprates)

How we accomplish our mission

- Develop, implement and keep current regulations, safety standards, and regulatory guidance
- Perform operating reactor licensing and technical reviews
- Assess operational events and take needed actions (generic or plant specific; immediate or long term)
- Perform independent technical analyses
- Work with Regions to assess licensee performance and take appropriate actions

Power Uprate Program

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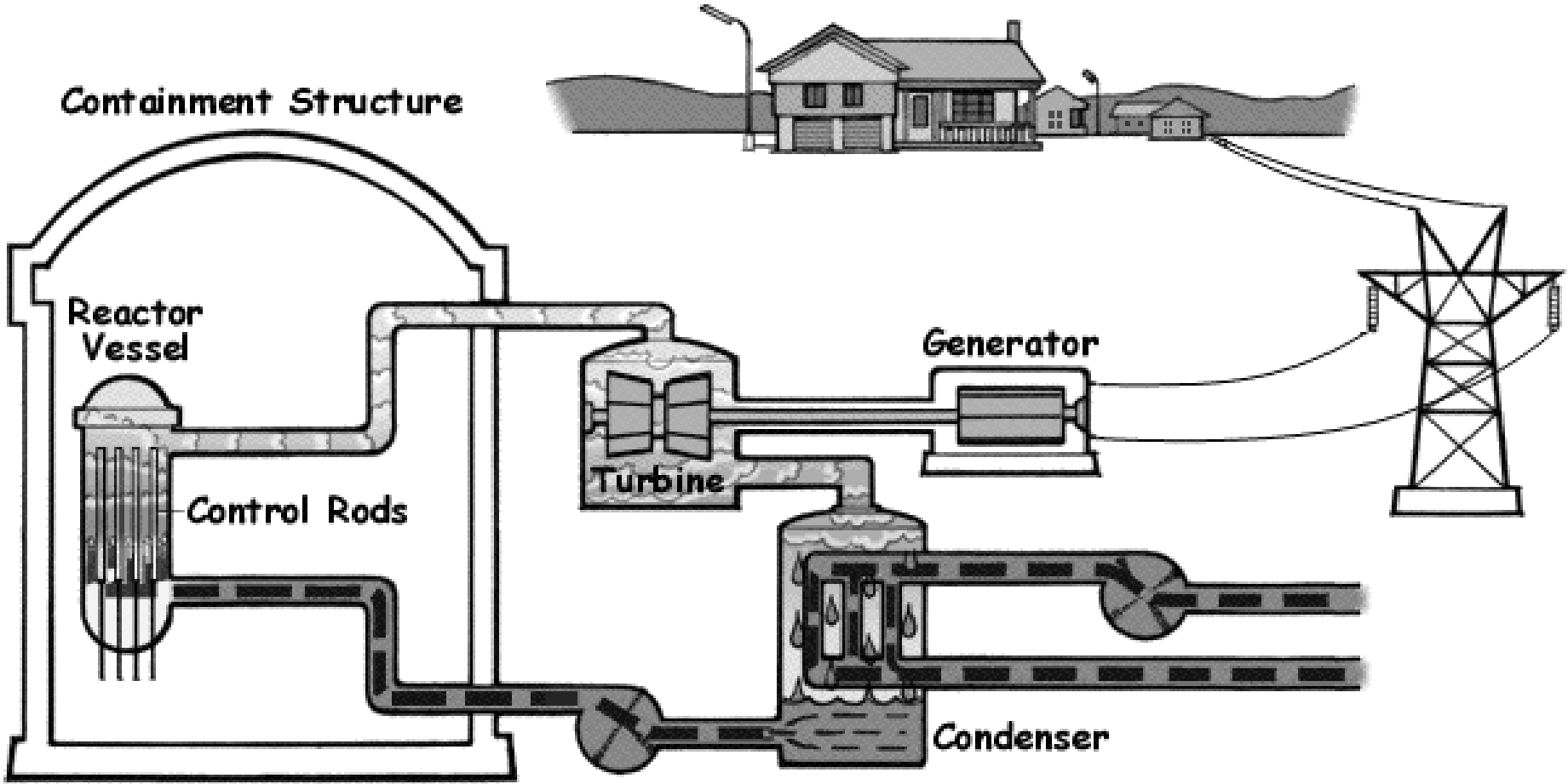
Overview

- What is a Power Uprate?
- How is a Power Uprate Achieved?
- Types of Power Uprates
- Approved Power Uprates
- Review Process for Power Uprates
- Public Involvement
- Scope of Technical Review
- Review Guidance
- Review Effort
- Additional Assurance

What is a Power Uprate?

The process of increasing the licensed power level at a commercial nuclear power plant allowing the plant to generate more electricity.

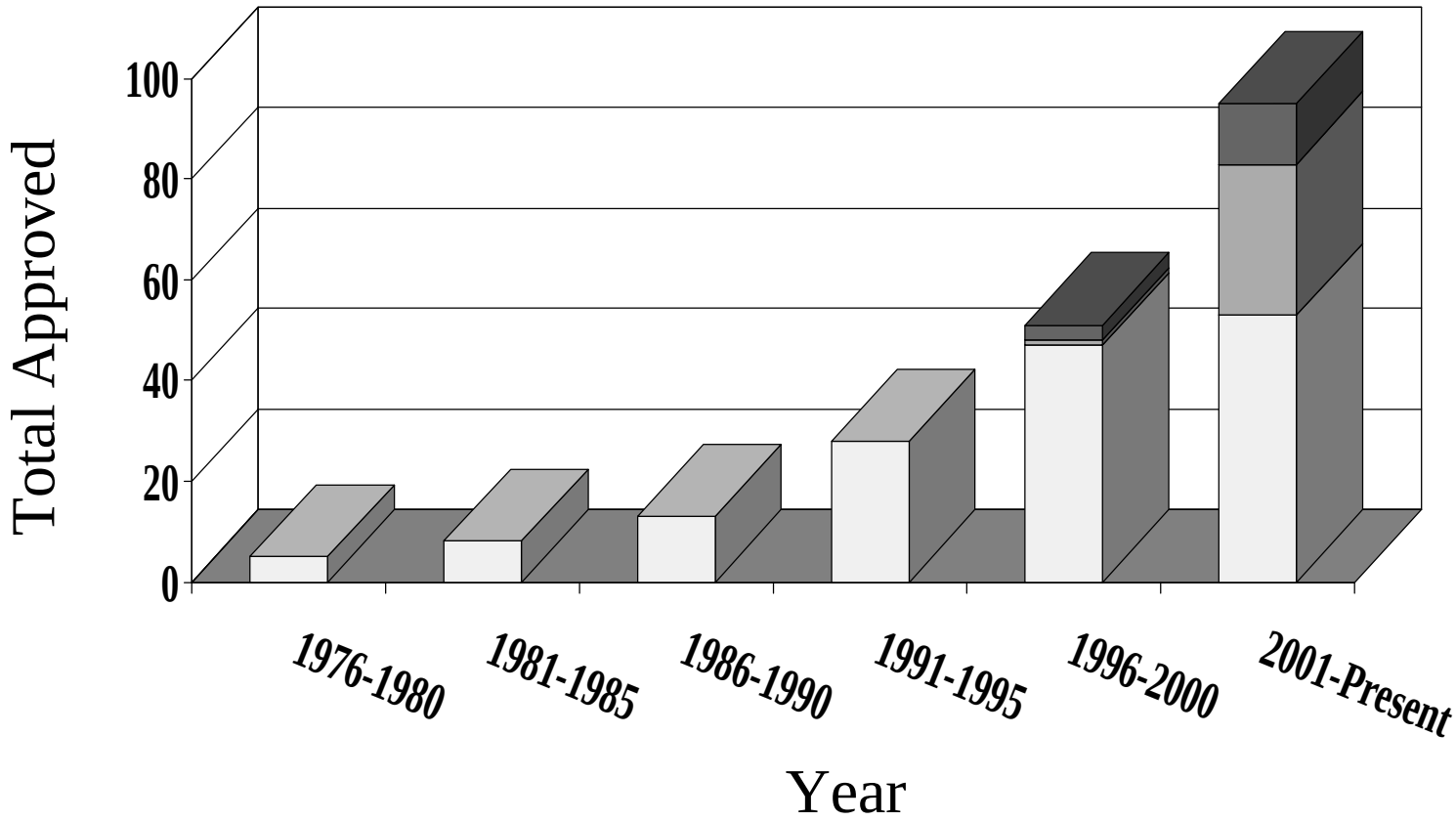
How is a Power Uprate Achieved?



Types of Power Uprates

- Measurement Uncertainty Recapture Power Uprates
- Stretch Power Uprates
- Extended Power Uprates

Approved Power Uprates

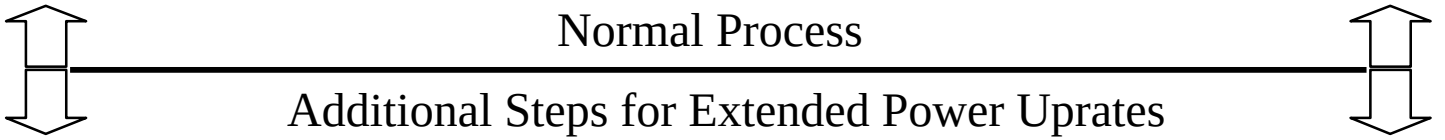


Extended Power Uprates at Boiling-Water Reactors

- Monticello – 6.3%
- Hatch 1 and 2 – 8%
- Duane Arnold – 15.3%
- Dresden 2 and 3 – 17%
- Quad Cities 1 and 2 – 17.8%
- Clinton – 20%
- Brunswick 1 and 2 – 15%

Review Process

- License Amendment Process



- Special Public Notice - More Emphasis on External Involvement
- Environmental Assessment
- Advisory Committee on Reactor Safeguards
- Higher Level Management Review and Approval
- Inspection by Region-Based Qualified Inspectors

Public Awareness & Involvement

- Public Notices
- Documentation
- Meetings and Workshops
- Draft Environmental Assessment
- Advisory Committee on Reactor Safeguards Meetings

Scope of Technical Review

- Environmental Considerations
- Human Performance & Training
- Maintenance and Testing
- Occupational Health Physics
- Radiological Consequences
- Containment Performance
- Balance-of-Plant Systems
- Fire Protection
- Reactor Core/Fuel Performance
- Transient & Accident Analyses
- Erosion/Corrosion
- Civil Engineering
- Mechanical Engineering
- Chemical Engineering
- Piping Integrity
- Vessel and Internals Integrity
- System/Component Capabilities
- Spent Fuel Pool
- Instrumentation & Controls
- Electrical Engineering
- Environmental Qualification
- Probabilistic Risk Assessment

Flow-Accelerated Corrosion

- Increased Flow Rates ➡ Higher Wear Rate
- Review by Flow-Accelerated Corrosion Experts
  - Prediction of Erosion Rates
  - Programs for Maintaining Piping in Safe Condition
- Detailed Guidance in Review Standard

Testing and Power Ascension

- Modifications ➡ Need for Testing
- New Operating Conditions ➡ Need for Monitoring Approach to New Conditions

- Reviewed by Maintenance and Testing Experts
  - Testing of Modifications
  - Power Ascension Program
    - Slow, Careful, Deliberate
  - Monitoring of Important Parameters

- Detailed Guidance in Review Standard

Comprehensive Review Guidance

- Standard Review Plan
- Review Standard for Extended Power Uprates
- General Electric Topical Reports
- Experience with Past Power Uprate Reviews

Review Effort

- Large Effort
  - 17 Technical Groups – Multiple Reviewers Per Group
  - About 4000 Staff-Hours (Typical Licensing Action ~ 80 hours)
  - 100 – 200 Questions (Requests for Additional Information)

- Methods of Review
  - Review of Information Submitted and Other Material
  - Audits of Licensee and Contractor Calculations and Programs
  - Independent Calculations
  - Requests for Additional Information
  - Previous Experience with Plant-Specific Power Uprates and Generic Topical Reports

Power Uprate Information

- Available at NRC’s Public Website

http://www.nrc.gov/reactors/operating/licensing/power-uprates.html

Closing Remarks…

- Power Uprate amendments are among the Most Significant Licensing Actions
- Intrusive and Comprehensive Review Effort
- Senior Management Oversight - from the top!
- Advisory Committee on Reactor Safeguards
- Public Involvement