



# **Research and Test Reactor Licensing Actions and Lessons Learned**

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September 23, 2010

# Outline

- License Renewal
  - General Overview
  - Streamlined Process
- Tips for high quality applications and RAI responses
  - Guidance
  - Lessons Learned
- Other licensing actions
- The Future!

## Background

- Currently renewal of a Non-power reactor Facility Operating License deemed equivalent to reissuing the license
- Not merely a routine administrative process, but involves:
  - In-depth review of all facility documentation
  - One or more onsite reviews
  - Federal Register Notice
    - Acknowledgement and Acceptance of renewal application
    - Provides opportunity for public participation



# License Renewal Application

Application shall include all of the following documentation:

- Cover letter requesting renewal (10 CFR 50.33)
- Updated Safety Analysis Report (10 CFR 50.34(b))
- Technical Specifications (10 CFR 50.34 (b)(6)(vi))
- Financial Qualifications (10 CFR 50.33(f))
- Environmental Report (10 CFR Part 51)



# License Renewal Application

If requesting a Power Increase or requesting NRC plan approval; application should also include\*:

- Emergency Plan (10 CFR 50.54(q) and (r) and 10 CFR 50, Appendix E)
- Physical Security Plan (10 CFR 73.67)
- Operator Requalification Plan (10 CFR 50.54 (i-1) and 10 CFR Part 55)

\* Also required for all facilities licensed for  $\geq 2$  MW(t) per the ISG

# Documentation

- **Existing Documentation is Starting Point for Analysis**
  - Safety Analysis Report (SAR)
  - Technical Specifications (TS)
  - Emergency Plan
  - Security Plan
  - Operator Requalification Plan
  - Annual Reports
  - Inspection Reports

## Documentation (Continued)

- **SAR must accurately describe the facility**
  - Changes to the Facility detailed
  - Changes to Site and Area described
  - Accident Analyses and calculations current
  - Known issues considered
    - Potential Heat Exchanger Leak / Failure
    - Potential Pool Leak / Failure
  - All calculations current
  - Proposed Technical Specifications (TS)
- \* **NOTE**: The ISG review *may* consider less information than stipulated in NUREG-1537 guidance. However, the SAR submittal must include information for all 16 chapters

## Guidance Documents

- **NUREG-1537** "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors"
- **Division 2 Regulatory Guides** for Research Reactors
- American Nuclear Society **ANS-15 Series** Standards for Research Reactors
- "Example" Documents



# Guidance Documents

## NUREG-1537

- **Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors**
  - Part 1 – Format and Content.
  - Part 2 – Standard Review Plan and Acceptance Criteria
- **Provides guidance on all aspects of licensing, including amendments, renewals, and staff reviews**
- **Publically Available:**
  - <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1537/>
  - Refer to Both Volumes for licensing application guidance

## PURPOSE

- Enhance quality and uniformity of Non-Power Reactor (NPR) licensing applications
  - Suggested uniform format
  - *Ensure completeness of information*
  - Capture existing practice
- Improve understanding of staff review process
- Represents a format that is acceptable to NRC staff
- Widest possible dissemination of information on NPR regulatory matters

## USE & APPLICABILITY

- **NUREG-1537 is a Guidance Document**
  - Not Required, but Highly Recommended
- **NUREG-1537 Does Not Contain Requirements**
  - Applicant must carefully consider applicability
- **NUREG-1537 is a living document**
  - Document updates planned for:
    - Streamlining Licensing Process
    - Licensing Mo-99 Facilities
    - Evaluation of Digital Instrumentation Upgrades

# Guidance Documents

## ANSI/ANS-15.1

- **The Development of Technical Specifications for Research Reactors**
- **Identifies and establishes content of TS acceptable to the NRC\***
- **Guidance ensures that all relevant items and information for the TS is included**
- **Available:**
  - [http://www.new.ans.org/store/i\\_240267/](http://www.new.ans.org/store/i_240267/)

**\* As tailored by NUREG-1537, section 14.1**

## USE & APPLICABILITY

- **ANSI/ANS-15.1 is a Guidance Document**
  - Not Required, but Highly Recommended
- **ANSI/ANS-15.1 contains guidance for a wide-range of research and test reactors**
  - Applicability requires careful consideration
- **ANSI/ANS-15.1 to be endorsed by new Regulatory Guide**
  - See <http://www.nrc.gov/reading-rm/doc-collections/reg-guides/res-test-reactors/rg/>

## Lessons Learned

- Safety Analysis Report (SAR)
  - Completeness & depth of SARs varies
    - Some SARs no longer reflect facility
    - SAR submittals vary significantly in quality
  - Some regulations have evolved since facilities last licensed
- SAR Updates:
  - No regulatory requirement for periodic updates
  - Updates may occur for:
    - License Amendments
    - 10 CFR 50.59 determinations
    - Licensee decision

## Lessons Learned

- Technical Specifications (TS)
  - Completeness & depth of proposed TSs
    - Proposed TS do not meet 10 CFR 50.36 requirements
      - Bases for TS, as required by 10 CFR 50.36
      - Derived from the safety analyses report evaluation
      - Comprehensive list of all:
        - » LSSS
        - » LCOs
        - » Applicable Surveillances
      - Design features incomplete (section 5)
        - » Missing “bases” [10 CFR 50.36(a)(1)]
        - » Site & facility description (area under license)
        - » Reactor coolant system description
        - » Reactor core & fuel description
        - » Other features having a significant safety effect (construction mat’l & geometric arrangements)

## Lessons Learned

- Technical Specifications (Continued)
  - TS definitions inconsistent / missing
  - “NRC” referenced when appropriate
  - Explicit reference to SAR justification for TS
  - Reference to “other” sources supporting TS
  - Consistent “units” (e.g., reactivity)
  - Correct record retention requirements
  - Difference between “licensed” and “maximum” allowable power
- \* Revising TS to conform to ANSI/ANS-15.1 is Strongly Encouraged



# Lessons Learned

- Financial Qualification:
  - Increased communication during Financial RAI process
    - Higher quality initial licensee responses
    - Reduced issuance of additional RAIs
  - Examples of previously approved financial information
    - Increased the quality of the licensee's responses to RAIs
  - TIPS:
    - Acceptable for the licensee to provide a link to relevant financial statements for NRC review
    - Ensure Decommissioning Cost estimate reasonable & supported
    - Using a Self-guarantee for decommissioning funding assurance
      - Allowed by Appendix E to Part 30
      - Must repeat financial test within 90 days of close of each succeeding year.

## FINANCIAL EXAMPLES

- **References to Statement of Intent Examples:**
  - ML101530139
  - ML101670413
  - ML093410385
- **References to Self-Guarantee Examples:**
  - ML092030312
  - ML092990409
  - ML101930104 (Original Self-Guarantee Information)
  - ML100820472 (NRC Staff RAI regarding the Self-Guarantee)
  - ML101340587 (Revised Self-Guarantee Information)
- **References to Decommissioning Cost Estimate Examples:**

– ML080720676	– ML083030209
– ML081560246	– ML091540202
– ML101030215	– ML101310231

## Lessons Learned

- Environmental Analysis:
  - Submittal should follow NUREG guidance
  - Conflicting follow up information
    - Any differences require explanation
  - Environmental data generally complete
    - Not just radiological impact
  - State SHPO requests a 106 review

## Lessons Learned

- Environmental Analysis:
  - Older applications required updated information:
    - Releases to the environment
    - Dosimetry information
    - updated facility descriptions
  - Better description of the total RTR facility
    - Need to address “attached” facilities
      - effluent release structures
      - holding tanks
      - waste storage facilities
      - closest permanent residence
      - closest historically significant buildings
      - endangered species, etc.
  - Conversely, more data → easier to review trends

## Lessons Learned

- Emergency Plans:
  - Out of date plans led to issuance of additional RAIs
  - RAI questions related to:
    - MOU's not current (date back to the 1980's )
    - Facility name changes not updated
    - Offsite response organization name changes not updated
    - Emergency action levels not in accordance with IN 97-34 or ANS/ANSI 15.16
    - Facility maps not updated

## Lessons Learned

- Request for Additional Information (RAI):
  - Enables the staff to obtain relevant information
    - Not included in initial submission
    - Not contained in other docketed correspondence
    - Cannot be reasonably inferred from other information available to the staff
  - Section 2.102 of 10 CFR allows the NRC staff to request additional information (RAI)
  - Application can be denied if responses not provided within specified time [10 CFR 2.108]  
-or-
  - Application can be withdrawn by licensee

## Lessons Learned

- Request for Additional Information (RAI):
  - ↓ Application quality → ↑ RAIs
  - Goal of “1” Set of RAI’s not met
  - RAI questions separated by difficulty level
  - Response Timeliness
    - Communicate early & often
    - Discuss and agree to RAIs & due dates
    - Draft and partial submission process
    - Extension requests:
      - Initial Phone call (NLT Draft due date)
      - Follow-up Letter
        - » What can be completed by due date
        - » Schedule for remaining items
        - » Rationale for extension request

## Lessons Learned

- MISCELLANEOUS:
  - Late engagement of Contractor support
    - Accident Analyses
    - Neutronic & thermal hydraulic analyses
    - Other RAI responses
  - Insufficient Staff
    - Key personnel absent at critical juncture
    - Staff turnover
  - Document Submission
    - Oath or Affirmation
    - Document Control Desk
    - Unapproved submittals



# Amendment Applications

- The 10 CFR 50.90 process is used for:
  - A change in a technical specification
  - A change to the facility or procedures, or to conduct tests or experiments not made under 10 CFR 50.59
- Application, to the extent applicable, follows the format prescribed for an initial application



# Amendment Applications

- Documentation
  - Cover letter
    - Signed Oath or affirmation
    - Description of desired change
  - SAR to support Technical acceptability
  - Replacement TS pages (as applicable)
  - License pages (as applicable)
    - License Conditions
    - Replacement License pages
  - Environmental Report (as applicable)



## Other Important Information

- NRC RTR Public Website
  - <http://www.nrc.gov/<Need address>>
- Interim Staff Guidance
  - ML091420066
- DOE Point-of-Contact – Jim Wade
  - [wadejr@id.doe.gov](mailto:wadejr@id.doe.gov)
  - (208) 526-6876
- RTR *Explorer* Newsletter
  - <http://www.nrc.gov/<Need address>>
- RTR Licensing Actions & Lessons Learned
  - ML102450241 (this presentation)



# ON THE HORIZON ...

## Research & Test Reactor Rulemaking

- Define those attributes, consistent with minimum regulation, to streamline the RTR license renewal process while ensuring the common defense and security and protecting public health and safety

Identify constraints and limitations of existing regulations and key guidance documents

Feasibility study for segregating Non-power reactor regulations

Benchmark DoD / DoE License renewal methodologies



Develop proposed rule and backfit analysis

Comments and Public Workshop(s)

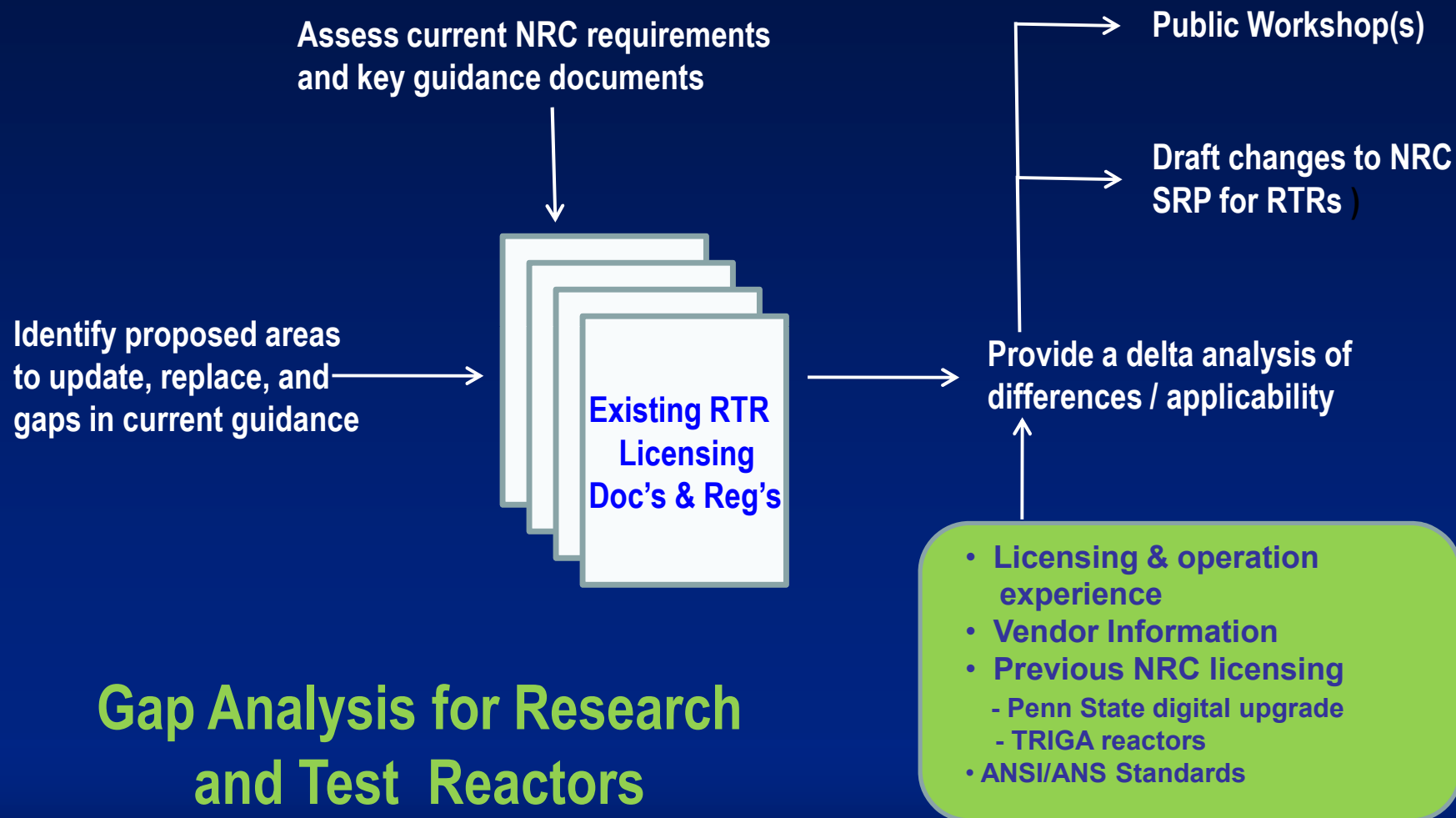
Update RTR Licensing Doc's & Reg's

Develop final rule

## **RTR Digital I&C Guidance**

- Updating and Enhancing Available Guidance for Conformance with NRC Regulations for Digital I&C Systems in RTRs
  - Developing new guidance document(s) to review applications (i.e., updating NUREG-1537)
  - Identifying and/or updating NRC regulations (e.g., Division 2 RGs)
  - Public workshop(s) on policy and key technical issues

# RTR I&C Gap Analysis



**Gap Analysis for Research and Test Reactors**

## **Digital I&C and 50.59 Process**

- Licensees are responsible for evaluating proposed changes to their facilities for their effects on the licensing basis of the plant, as described in the FSAR;
  - **Software potentially introduces common mode failure**
  - **Manual Reactor Scram (operator) impacted by digital indication → TS Change**
    - Watchdog scram
    - Associated LCO and Surveillance
  - **Cyber Security**





# QUESTIONS?

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## BACKUP SLIDES



## License Renewal Process

Staff conducts technical review of application package:

- If needed, a Request for Additional Information (RAI) is sent to the licensee
  - Process repeats until all technical issues are resolved
- After initial review, a site visit occurs to verify select facility design conditions, observe operations, and discuss license renewal issues directly with licensee
- Evaluations are prepared and assembled into the NRC Safety Evaluation Report (SER)