License Renewal for Research and Test Reactors

March 27, 2012

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National Organization of Test, Research and Training Reactors (TRTR)

TRTR Overview

- National Organization of Test, Research, and Training Reactors (TRTR)
- Professional organization with members from 40+ research reactors in U.S. and Canada, and adjunct members from other nations
- Promotes science and engineering education, fundamental and applied research, the application of technology in areas of national concerns, and improving U.S. technological competitiveness

Research and Test Reactors (RTRs)

- Research and Test Reactors are termed “Non-power Reactors” under 10CFR 50.2 definitions.
- Test Reactors (“Testing Facility” under 10CFR 50.2)
  - *Power level greater than 10 MW, or*
  - *In-core circulating loop with fueled experiments, or*
  - *Liquid fuel loading, or*
  - *In-core experiments greater than 16 square inches in cross-sectional area.*

RTRs Overview (cont.)

- 42 RTRs currently licensed under NRC
- 31 operating
- 25 operating RTRs at universities
- Most are class 104 research and development licenses (10CFR 50.21)
- Most were built in 1960 -1980
- Licensed thermal power levels range from a few watts to 20 MW.

RTRs Overview (cont.)

- RTR usage requires a different design from power reactors.
- RTRs are designed to produce high thermal neutron fluxes at much lower thermal outputs than power reactors.
- RTR core volumes are physically much smaller than power reactors (a cubic meter versus tens of cubic meters)

RTRs Overview (cont.)

- RTRs require much less fuel (a few kilograms versus thousands of kilograms).
- RTRs have far lower fission product inventories.
- RTRs lack the thermal hydraulic energy to disperse fission products in the event of an accident.

RTR Usage

- *Neutron* physics studies.
- *Neutron* scattering for materials studies.
- *Neutron* radiography studies – imaging for aerospace, automotive and other engineering uses.
- *Neutron* induced radioisotope production for medical and other research and industrial applications.

RTR Usage (cont.)

- *Neutron* activation analysis - non-destructive measurement of trace elements in environmental, nutritional, archaeological, geological and forensics.
- *Neutron* irradiated materials - doping silicon for semiconductors and development of membranes used in dialysis and water purification.

RTR Usage (cont.)

- RTRs offer a unique tool for instructing the next generation of nuclear engineers and technicians in reactor physics, radiation safety, and nuclear technology – providing unparalleled hands-on experience in a safe and controlled environment.
- Most RTRs are designed for educational use, but all are designed to perform some type of research.

RTR Usage (cont.)

- RTRs are a unique tool for educating the public about the science of nuclear technology and demonstrating the safe and effective use of nuclear reactors.

Position on License Renewal

- TRTR recognizes the unique challenges imposed on NRC during RTR relicensing in the past decade (staffing issues, 9/11, etc.)
- TRTR appreciates the efforts made by the Commission to alleviate the relicensing backlog.
- TRTR appreciates the efforts of the NRC RTR group to update guidance for future relicensing efforts and the opportunity to participate in the update process via public meetings.

Generic Suggestions for Streamlining Relicensing

- The process has become excessively complex compared to 20 years ago, with no quantifiable improvement to safety.
- Consider the development of generic thermal hydraulic analysis models for TRIGA and plate-type fueled RTRs (1MW or less)
- Similarly for the Maximum Hypothetical Accident analysis

Generic Suggestions for Streamlining Relicensing

- Develop a systematic way outside of the RAI process to correct typographical and editing errors
- Develop a generic decommissioning cost analysis based on previous experiences, indexed to power level and inflation
- Endorse the use of ANSI/ANS Standards in Regulatory Guidance

On behalf of TRTR, thank you for the opportunity to provide this briefing.