Integrated Leak Rate Testing Experience

Q&A

Background

- Integrated Leak Rate Testing (ILRT) is a long established regulatory requirement in the United States for verifying containment integrity under 10 CFR Part 50, Appendix J.

- While leakage acceptance limits are fixed by regulation, the rate at which containment pressure is reduced during ILRT depressurization is not specified by U.S. regulations or standards.

- Instead, allowable rates are determined by engineering evaluation, instrumentation accuracy, and compliance with ANSI/ANS 56.8 test methodology.

Publicly Available Information

- Publicly accessible U.S. NRC evaluations, regulatory guides, and industry standards provide clear evidence that U.S. PWR nuclear stations have safely depressurized containment during ILRTs at rates significantly exceeding 40 kPa/h (≈5.8 psi/h)—including NRC documented depressurization at 15 psi/hr (≈103 kPa/hr).

- This demonstrates a regulatory and technical precedent supporting higher depressurization rates when justified

Example Resources

NRC-Documented U.S. ILRT Depressurization Practices

Davis-Besse Example: 15 psi/hr (≈103 kPa/hr)

- An NRC engineering evaluation of ILRT procedure revisions at the Davis-Besse Nuclear Power Station confirmed that depressurization (or pressurization) at 15 psi/hr does not challenge containment structural capability.
- https://www.nrc.gov/docs/ML1029/ML102920086.pdf

U.S. Standards and Regulatory Guidance

ANSI/ANS-56.8 – Containment System Leakage Testing Requirements

- This publicly available standard outlines ILRT methodology, instrumentation requirements, and stabilization criteria but does not prescribe a maximum depressurization rate.
- https://www.nrc.gov/docs/ML1132/ML11327A024.pdf

Examples Resources

NRC Regulatory Guide 1.163 – Performance-Based ILRT Program

- Regulatory Guide 1.163 endorses NEI 94-01 and defines NRC-approved performance-based ILRT methods, without specifying depressurization rate limits
- https://www.nrc.gov/docs/ML2307/ML23073A154.pdf

Historical U.S. ILRT Operating Context

- Oconee Nuclear Station ILRT reports hosted publicly by the NRC show successful ILRT execution at containment pressures up to 59 psig, demonstrating long-standing U.S. experience under accident-level pressure conditions
- https://ww2.nrc.gov/docs/ML1623/ML16230A282.pdf

ILRT Improvements and Broader U.S. Experience

- A DOE OSTI-published study documents ILRT improvements and lessons learned across U.S. plants including Surry-2 and Turkey Point-4.
- https://www.osti.gov/biblio/6664244

Conclusions

- U.S. plants have depressurized containment during ILRTs at rates ≥ 15 psi/hr (≈103 kPa/hr).
- No U.S. regulation or standard sets a maximum depressurization rate.
- Historical ILRT practice at accident-level pressures demonstrates structural safety margin.
- Depressurization at 40 kPa/h is consistent with U.S. precedent and well within allowable capability.

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