



U.S.NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

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U.S. PLANT-REFERENCED SIMULATOR REGULATION

Lawrence Vick

Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission

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Topics

- Plant-referenced Simulator Regulation
- Industry Consensus Standard
- Regulatory Oversight
- Use of Referenced Simulators

Title 10 of the *Code of Federal Regulations (CFR)*

- 10 CFR Part 55 “Operators’ Licenses”

- 10 CFR Part 55.46 “Simulation facilities”
 - (c) Plant-referenced simulators

10 CFR 55.46(c)

Plant-referenced Simulators

- Regulatory Uses
- Performance Requirements
- Continued Assurance of Simulator Fidelity



Regulatory Uses

- NRC Operating Tests
- Requalification Training
- Applicant Reactor Experience

Performance Requirements

- Simulator must demonstrate expected plant response to:
 - operator input
 - normal, transient, and accident conditions to which the simulator has been designed to respond

Performance Requirements -continued

- Simulator is sufficient in scope and fidelity to allow conduct of evolutions associated with:
 - operating tests and
 - licensed operator requalification training
- Simulator allows for the completion of control manipulations for operator license applicants

Performance Requirements -continued

- If used for applicant reactor experience, simulator utilizes models relating to nuclear and thermal-hydraulic characteristics that replicate the most recent core load in the nuclear power reference plant for which a license is being sought; and

Performance Requirements -continued

- Simulator fidelity has been demonstrated so that significant control manipulations are completed without:
 - procedural exceptions,
 - simulator performance exceptions, or
 - deviation from the approved training scenario sequence.

Continued Assurance of Fidelity

- Conduct performance testing throughout the life of the simulation facility in a manner sufficient to ensure that fidelity is demonstrated and met.
- Correct modeling and hardware discrepancies.

Industry Consensus Standard

- ANSI/ANS-3.5-1998 (-1993, -1985), “Nuclear Power Plant Simulators For Use in Operator Training and Examination”
- US NRC Regulatory Guide (RG) 1.149, Revision 3, “Nuclear Power Plant Simulation Facilities For Use in Operator Training and License Examinations”

Regulatory Oversight

- Reactor Oversight Process
- Inspection Procedure IP-71111.11, “Licensed Operator Requalification Program”
- Overall, simulator fidelity is being maintained

Use of Referenced Simulators

- 72 plant-referenced simulators used to meet NRC operator licensing requirements
- 4,500 licensed operators maintain qualifications using a compliant plant-referenced simulator
- 354 applicants received an NRC “operating test” initial examination in CY2008