



NEI/NRC SIMULATOR WORKSHOP

Implementation of 10 CFR 55.46

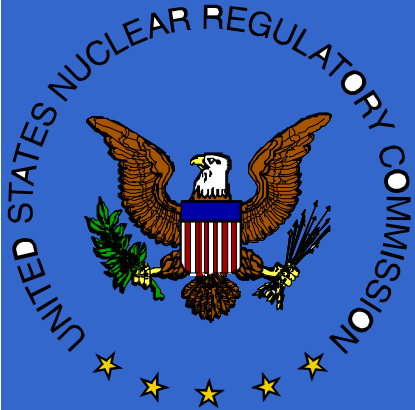
“Simulation Facilities”

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Amended Simulator Requirements

- Allow applicants to fulfill a portion of the required experience prerequisites by manipulating a plant-referenced simulator as an alternative to manipulation of the controls of the plant
- Remove current requirements for certification
- Eliminate the necessity for submittal of 474 reports to the NRC for review that identified any uncorrected performance test failure and a schedule for correction



Reason for Simulator Rule Change

- Improvements in simulator technology and fidelity.
- More than 14 years of successful experience in using plant-specific simulation facilities.
- When properly maintained and tested, simulators in use provide accurate and validated operator training and examination scenarios that convey realism in reactivity manipulations, normal and abnormal procedure operations, complex plant operations, and emergency operating procedure evolutions, including simultaneous task management and faulted conditions.



Amended Simulator Requirements

- The plant-referenced simulator must be designed and implemented so that it:
 - Is sufficient in scope and fidelity to allow conduct of the evolutions listed in Secs. 55.45(a)(1) through (13), and 55.59(c)(3)(i)(A) through (AA) . . .



Amended Simulator Requirements (Cont.)

- Continued assurance of simulator fidelity
 - Conduct performance testing and retain results for four years
 - Correct modeling and hardware discrepancies and discrepancies identified from scenario validation and from performance testing
 - Make results of any uncorrected performance test failures available for NRC review
 - Maintain the provisions for license application, examination, and test integrity



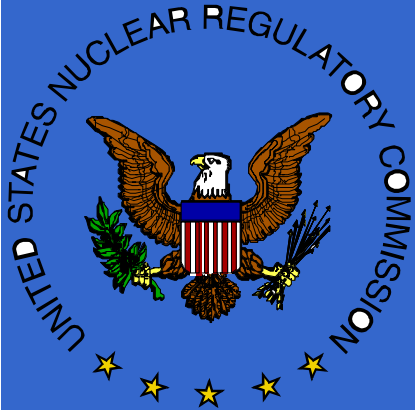
Amended Simulator Requirements (Cont.)

- 55.46(d) – Continued assurance of simulator fidelity. Facility licensees that maintain a simulation facility shall:
- (1) Conduct performance testing throughout the life of the simulation facility in a manner sufficient to ensure that paragraphs (c)(2)(ii), as applicable, and (d)(3) of this section are met. The results of performance tests must be retained for four years after the completion of each performance test or until superseded by updated test results;



Amended Eligibility Requirements

- 55.31(a)(5) - Provide evidence that the applicant, as a trainee, has successfully manipulated the controls of either the facility for which a license is sought or a plant-referenced simulator that meets the requirements of 55.46(c). . .



Amended Eligibility Requirements (Cont.)

- 55.46 (c) (2) – Facility licensees that propose to use a plant-reference simulator to meet the control manipulation requirements in 55.31(a)(5) must ensure that:
 - (i) The plant referenced simulator utilizes models relating to nuclear and thermal-hydraulic characteristics that replicate the most recent core load . . .



Amended Eligibility Requirements (Cont.)

- 55.46 (c) (2) – Facility licensees that propose to use a plant-reference simulator to meet the control manipulation requirements in 55.31(a)(5) must ensure that:
 - (ii) 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.



How NRC Ensures Compliance

- NRC examination process (NUREG-1021)
- Reactor Oversight Process (ROP)
Baseline Inspection IP 71111.11 (Revised September 2002)
- Manual Chapter 0609
 - Significance Determination Process (SDP)
 - Appendix I Flowchart – Requalification Program



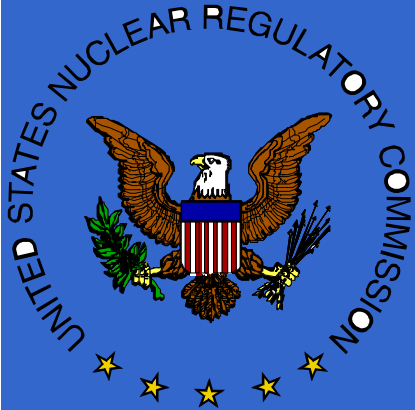
Scope of IP 71111.11 With Regard to Simulation Facilities

- Assess simulation facility for adequacy for use in operator licensing examinations and for satisfying experience requirements
- Review samples of simulator performance test records, and the process for ensuring simulator fidelity
- Assess discrepancy process to ensure that discrepancies are entered into a corrective action system, and completed in a timely fashion commensurate with the safety significance of the item (prioritization scheme)
- Assess open simulator discrepancies for importance relative to impact on 10 CFR 55.45 & 59 operator actions as well as nuclear & thermal hydraulic operating characteristics

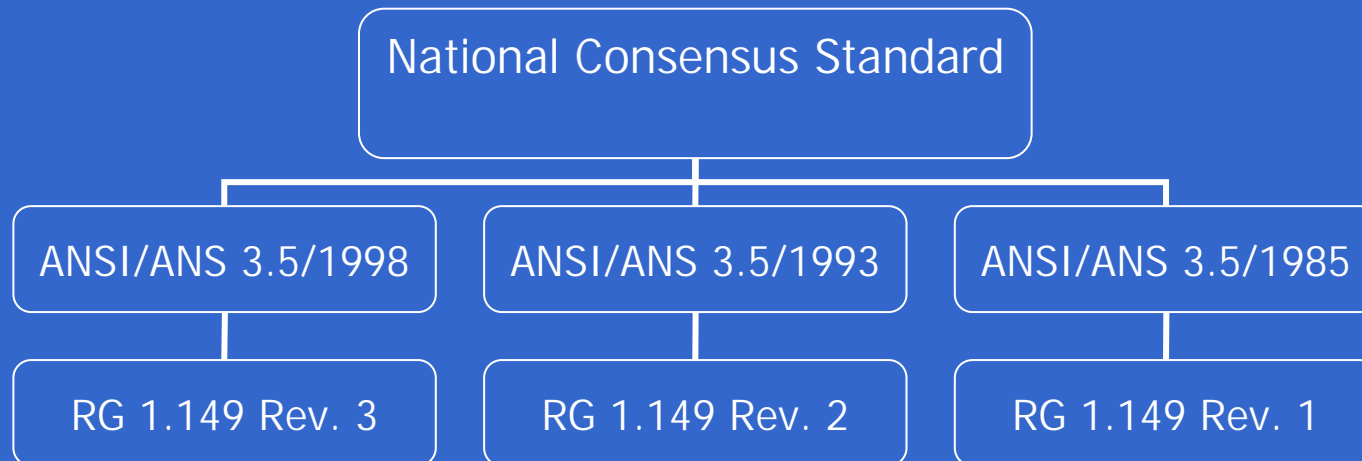


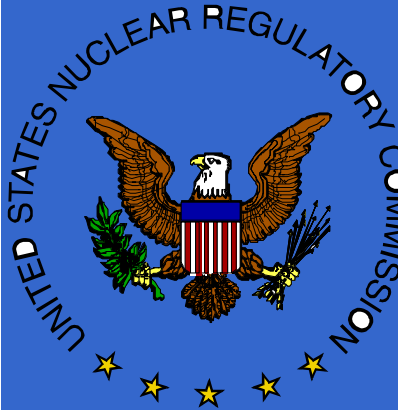
Regulatory Guide 1.149,

- Regulatory Guide 1.149, “Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations,” describes methods acceptable to the NRC for complying with those portions of the NRC’s regulations associated with simulation facilities
- Revision 3 does not require facility licensees to adopt the 1998 version of ANSI/ANS – 3.5 or to modify existing simulator support programs or practices

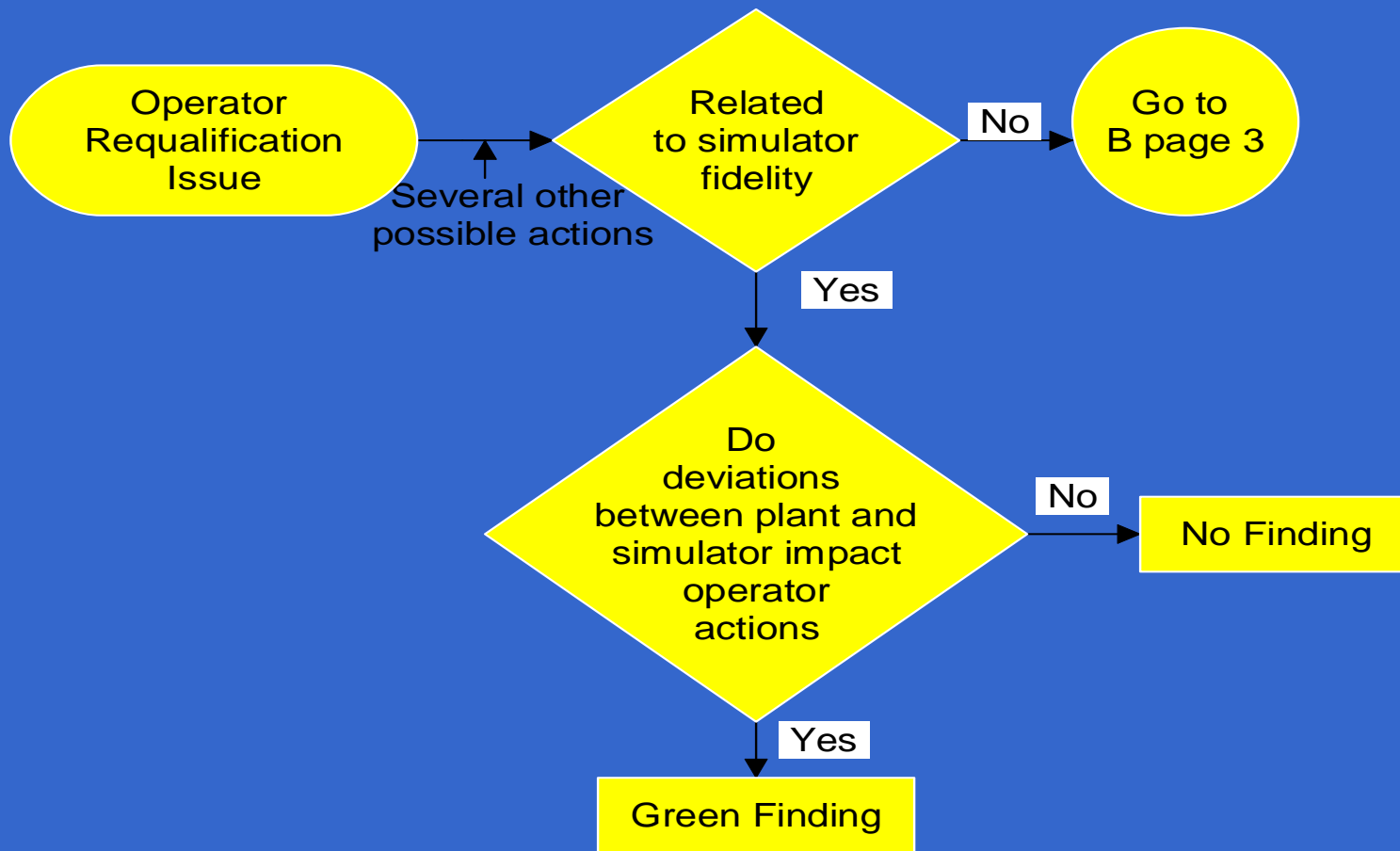


Which Regulatory Guide applies to a Licensee?





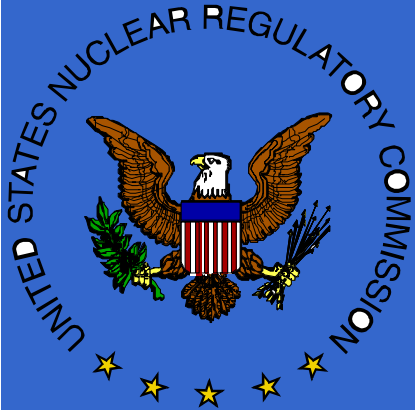
Operator Requalification Human Performance SDP





Appendix I Flowchart Guidance (Top Diamond)

- Related to Simulator Fidelity – Yes? or No?
(i.e., Is the issue related to the physical or functional fidelity of the simulator as compared to the real plant?)



Appendix I Flowchart Guidance (Bottom Diamond)

- Do Deviations between Plant and Simulator Impact Operator Actions - Yes? Or No?
 - Could deviations or differences between the plant control room and the plant reference simulator negatively impact operator actions?
 - Could the differences result in negative training?
 - Does the simulator meet the performance requirements of 10 CFR 55.46?



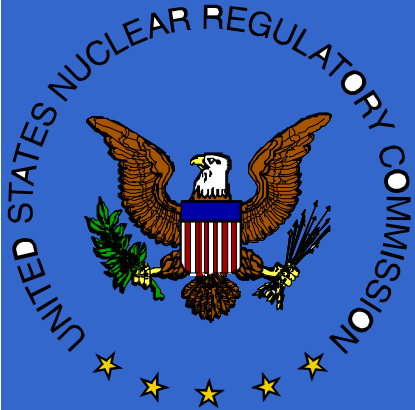
Sources of Simulator Fidelity Issues

- Licensee Simulation Facility Discrepancy (Problem) Reports
- Licensee Event Reports (LERs)
- Inspection Reports (IRs) or Plant Issue Matrix (PIMS)
- Simulator Performance Test Results
- NUREG-1021 ES-501, Simulation Facility Report



Simulator Fidelity Discrepancies

- Operator Actions identified in the regulations
- Performance test results
- Procedure compliance issues
- Nuclear characteristics
- Thermal-Hydraulic characteristics
- Scenario validations
- Control board physical fidelity
- System flow path and logic paths issues



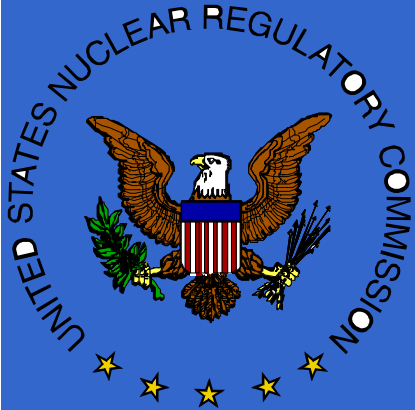
Simulator Performance Testing

- 10 CFR 55.4 definition - Performance testing means testing conducted to verify a simulation facility's performance as compared to actual or predicted reference plant performance
- ANSI/ANS – 3.5-1998 definition - Testing characterized by a comparison of the results of integrated operation of the simulation facility to actual or predicted reference unit data
 - A record of the conduct of these tests, and data comparison that the results meet reference unit data, shall be maintained (cover sheet is not sufficient documentation)



Revised Requalification Inspections Conducted

- Beaver Valley
- Byron
- Catawba
- Columbia
- Davis Besse
- Dresden
- Duane Arnold
- Fort Calhoun
- Hope Creek
- Kewaunee
- Palo Verde
- Perry
- Pilgrim
- Millstone
- Nine Mile Point
- Seabrook



Inspection Results Issues

- Applicant eligibility requirements
- Scope of performance test
- Performance test results
 - Technical content
 - Acceptance criteria
 - Lapses
 - Comparisons
 - Periodicity
 - Documentation
- Discrepancy identification and resolution
- Prioritization schemes for discrepancies