



Overview of Operator Licensing Examination Standards for Power Reactors

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NUREG-1021

- NUREG – 1021 establishes the standard that is in accordance with 10CFR part 55 “Operators’ Licenses” to examine applicants and licensees
- 3 Levels of licenses
 - Reactor Operators (RO) – manipulates the controls of the facility
 - Senior Reactor Operators (SRO) – responsible for directing the licensed activities of a licensed operator
 - Senior Operator Limited to Fuel Handling (LSRO)
 - Trainee exemption – under the direction and in the presence of an RO/SRO an individual in an approved training program may manipulate the controls [55.13]

Operator Requirements

- Education
- Experience
- Training
- Medical certification
- Application
- Examination
- Licenses
 - Issuing
 - Conditions [10 CFR 55.53]
 - Expiration
 - Renewal
 - Requalification
- Enforcement

Operator Requirements

- RO
 - High School diploma / GED
 - Power Plant experience
 - 18 months nuclear / military
 - 27 months non-nuclear
 - Minimum Time on site
- SRO (Flow Paths)
 - RO upgrade
 - Direct SRO (a.k.a. Instant)
 - Prior RO license
 - military
 - College degree or professional engineer
 - SRO certified instructor
 - Minimum Time on site

Operator Requirements

- 12- 24 months of training
 - Classroom training
 - Generic Fundamental Concepts
 - Systems training
 - Procedures
 - Simulator training
 - Startup-shutdown
 - Normal, Alarm, Abnormal, Emergency Procedures
 - On-shift under instruction and qualification book
 - 5 Reactivity Manipulations

Operator Requirements

- Medical Certification (NRC Form 396 – PII)
 - Sight, Hearing, Smell, Tactile, Physical and Mental ability / capacity
 - Required to be conducted every 2 years
 - Changes in medical status reported within 30 days
- Restrictions on license:
 - None, Corrective lenses, hearing aids, medications, therapeutic devices, no solo operation, medical status report, other

Operator Requirements

- Application:
 - Personal Qualification Statement (NRC Form 398)
 - License being applied for and qualification basis
 - Medical Certification (NRC Form 396)
 - NRC contract physicians review medical information other than corrective lenses, hearing aids, and CPAP needs (NRC Form 396A)

Examination

- NUREG -1021, Rev. 12 “Operator Licensing Examination Standards for Power Reactors”
- Agency estimate:
 - 48 examinations a year
 - 12 per region, nominal exam
 - 714 hours per exam
 - Each region writing 1 exam per year
- RO exam – 75 written exam questions, simulator test plus Job Performance Measures (JPMs)
- SRO exam – 100 written exam questions, simulator test plus JPMs

Examination Scheduling

- Annually Regulatory Issue Summary (RIS) requests site exam needs (with class size) for the next 3 years
- Regional offices coordinate with facilities to schedule exams
- Facilities can request to develop their own exam or NRC developed
- NRC informs facilities which exams they will write (1 per year for NRC training, each region)

Examination - Written

- Developed from a technology specific outline and a sampling of technology specific Knowledge and Abilities [K/A] catalog
 - Four tiers of questions
 - Tier 1, “Emergency and Tier 1, “Emergency and Abnormal Plant Evolutions”
 - Tier 2, “Plant Systems”
 - Tier 3, “Generic Knowledge and Abilities”
 - Tier 4, “Theory”
 - SRO portion tests items such as use of technical specifications, procedure choice, and emergency plan implementation
 - All written examination questions are multiple-choice
 - Four answer options with each plausible and only 1 correct answer

Examination - Operating

- Simulator test consists of dynamic simulator scenarios (a.k.a. scenario set)
- One or more scenarios per applicant
 - ROs 2 to 3 scenarios (with one at the controls)
 - Direct SRO 2 to 3 scenarios (with one SRO position and one control board position)
 - Upgrade SRO 1 to 2 scenarios (with one at SRO position)
- Each scenario has the following events
 - Reactivity
 - Normal
 - Instrument/Control Malfunctions
 - Major casualty
 - Manual control of automatic system
 - Technical Specifications

Examination – Job Performance Measures

- 3 types: Administrative, Control room system and In-Plant system
- 15 JPMs for RO/SRO direct, 10 for Upgrade SRO
- Administrative JPMs covers shift staffing, clearance, surveillance, release permits, and emergency plan
- Control room system and In-Plant system JPMs require demonstration of procedures
- Common to all JPMs: initial conditions and a cue
- Some JPMs have equipment failures that impact the outcome (called alternative path)

Examination Milestones (Facility Prepared)

- 18 months before the exam facility gets written exam sample plan
- 210 days prior to exam is the project milestone discussion
- 150 days prior to exam start operating test outlines with draft operating test schedule
- 75 days prior to exam start all proposed exam material is due

Examination Milestones (Facility Prepared)

- 60 days prior to exam start preliminary waiver / excusal requests
- 35 days prior to exam start NRC validation (on site) occurs
- 14 days prior to exam start final license applications
- 7 days prior to exam start
 - NRC supervisor approves exam
 - Final applications reviewed / audited for eligibility
 - List of applicants generated
 - Exam approval letter generated

Examination Milestones (Facility Prepared)

- Exam administration – NRC examiners conduct operating test at the facility 1 to 2 weeks
- Written exam conducted within 30 days of Operating test
- Post exam package from the facility within 20 days of completion of all parts of the initial examination
- NRC makes licensing decisions within 30 days of receiving the post examination package
- Exam records are uploaded in ADAMS and available for public review (2 year delay)

Licenses

- Applicants are issued licenses for 6 years
- Applicants license must comply with license conditions and restrictions
- License renewal required prior to expiration on same forms as initial application
- Requalification training is required for all licensed operators and inspected every 2 years

Enforcement

- Licensed operators must comply with the conditions of their license (10CFR55.53)
 - Maintaining an active license, or reactivation
 - Attend requal
 - Biennial medical exam
 - The licensee shall not perform activities authorized by their license while “under the influence” of ... a substance that could adversely affect their ability to safely and competently perform their licensed duties
 - Fitness for duty rules in accordance with 10 CFR 26

Enforcement

- Issued significant enforcement actions – public information
 - <https://www.nrc.gov/about-nrc/regulatory/enforcement/current.html>
- 2022 Turkey Point licensed operator under the influence of alcohol while performing licensed activities – Severity Level III violation
- 2022 Limerick licensed operator under the influence of alcohol while performing licensed activities – Severity Level III violation
- 2021 Palo Verde licensed operator under the influence of an illegal substance (marijuana) while performing licensed activities – Severity Level III violation
- 2021 Vogtle 1&2 licensed operator failure to report prescription medications, deliberately provided incomplete and inaccurate information to the licensee - Severity Level III violation



Conclusion

Thank you for your participation!