

NUREG-1021
Rev. 9, Supp. 1

Operator Licensing Examination Standards For Power Reactors

Final Report

**U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, DC 20555-0001**



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Rev. 9, Supp. 1

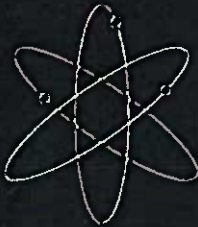
Operator Licensing Examination Standards For Power Reactors

Final Report

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**Division of Inspection and Regional Support
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001**



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**SUPPLEMENT 1 TO REVISION 9 OF NUREG-1021,
"OPERATOR LICENSING EXAMINATION STANDARDS FOR POWER REACTORS,"
PAGE REPLACEMENT INSTRUCTIONS**

Remove existing Revision 9 (with errata) pages and insert Supplement 1 pages as noted below. Individual changes within the body of the NUREG are indicated by a vertical bars in the margins. Note that since NUREG-1021 is printed double-sided, a single change results in a minimum of two replacement pages. Also note that changes can effect page breaks and the total number of pages in a section, resulting in a large number of pages to replace.

Section / Standard	Remove Page(s)	Replacement Page(s)	Correction Summary
Cover Pages	Cover pages	Cover pages	Added Supplement 1.
Abstract	iii - iv	iii - iv	Describes Supplement 1 changes.
ES-201	1 - blank (all)	1 - 28	Total number of pages changed, replace entire section.
Detailed Changes in ES-201:		<u>Pages</u> 3, 6 8 9, 24 9 12 15, 18 22, 23 26 6, 7, 9, 15, 19 - 25	References new Attachment 2 for procedure freezes. New guidance for delaying parts of an NRC examination. Revised examination approval letter; NRC and licensee agree that it meets the guidelines of NUREG-1021. Added Supplement 1 to the letter. Removed requirement to send list of applicants Form ES-201-4 to the NRR program office. New policy on using surrogate operators. New Attachment 2 for procedure freezes. Added Supplement 1, updated OMB date on Attachment 4. Restored * footnote to Form ES-201-2. Revised ES-201 Attachment numbers throughout ES-201, due to new Attachment 2.
ES-202	3 - 13 & blank	3 - 13 & blank	New text changes page breaks.
Detailed Changes in ES-202:		<u>Pages</u> 3 4 6 7 12 13	Updated availability of Forms 396, 398 and their instructions. Clarified medical exam timeliness for ROs applying for a SRO license. Added waiver for exam delays. Clarified electronic submittal of license applications. Updated Division of Inspection Program Management (DIPM) to Division of Inspection and Regional Support (DIRS). Updated block numbers for Form 396. Changed name of "Restricted Individuals List." Deleted research reactor start-ups for cold license eligibility. Updated DIPM to DIRS. Added address for express mail.
ES-204	3 - 4	3 - 4	Corrected name of Form ES-201-4. Clarified that the NRC regional office may grant certain waivers. Deleted cold license requirement for startups on a research reactor.

SUPPLEMENT 1 TO REVISION 9 OF NUREG-1021,
"OPERATOR LICENSING EXAMINATION STANDARDS FOR POWER REACTORS,"
PAGE REPLACEMENT INSTRUCTIONS

Section / Standard	Remove Page(s)	Replacement Page(s)	Correction Summary
ES-205	5 - 10	5 - 10	Update title and address for Chief, Operator Licensing and Human Performance Branch. Updated DIPM to DIRS.
ES-301	1 - 4	1 - 4	Changed Administrative Topics to conform to the new K/A catalogs. Added text "/plan" to agree with topic title in K/A catalogs ("Emergency Procedures / Plan"). Revised ES-201 attachment number reference.
	9 - 12	9 - 12	Added text to randomly select JPMs from past NRC exams, to conform with existing Forms ES-301-1 and 301-2. Changed Administrative Topics description to conform to the new K/A catalogs. Added text "/plan" to agree with topic title in K/A catalogs.
	21 - 22	21 - 22	Added text "/plan" to agree with topic title in K/A catalogs.
	23 - 24	23 - 24	Added a type code for engineered safety feature, to allow check of existing requirement.
	25 - 26	25 - 26	Added allowance for SROIs to credit a malfunctions if performing in an additional scenario as a BOP operator.
ES-302	3 - 12	3 - 12	New text changes page breaks.
Detailed Changes in ES-302:		<u>Page(s)</u> 4 11	New policy on using surrogate operators. Revised ES-201 attachment number.
ES-401	1 - 18 21 - 22 27 - 28 31 - 33 & blank	1 - 18 21 - 22 27 - 28 31 - 33 & blank	New text changes page breaks.
Detailed Changes in ES-401:		<u>Page(s)</u> 2 4 - 5 5 8 14 16 17 21 22 28 32 - 33	Revised ES-201 attachment number. Revised generic K/A sampling. Moved K/A elimination guidance out of Attachment 2. Deleted Attachment 2. Clarified what constitutes SRO-level questions. Added text to include revision/version number for references. Deleted Attachment 2 from list of Attachments. Changed reference from Attachment 2 to Section D.1.b. Added word "reactor" to K/A 295037; added new K/A 700000, "Generator Voltage and Electric Grid Disturbances." Changed reference from Attachment 2 to Section D.1.b. Added new K/A 700000, "Generator Voltage and Electric Grid Disturbances." Added text to include revision/version number for references. Added column for bank/modified/new questions.

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SUPPLEMENT 1 TO REVISION 9 OF NUREG-1021,
"OPERATOR LICENSING EXAMINATION STANDARDS FOR POWER REACTORS,"
PAGE REPLACEMENT INSTRUCTIONS

Section / Standard	Remove Page(s)	Replacement Page(s)	Correction Summary
ES-402	5 - 6	5 - 6	Added collecting applicant comments and identifying docket numbers. Added reference to ES-403 prior to submitting comments.
ES-403	1 - blank (all)	1 - 6	Total number of pages changed, replace entire section.
Detailed Changes in ES-403:		<u>Page(s)</u> 3 3, 4	Qualified NRC's review of post-examination comments; provided examples of most likely and less likely changes. Clarified when two correct answers will not be accepted. Changed remaining lettering of Section D.1.
ES-501	3 - 6 7 - 8 11 - 12 13 - 14 17 - 18 19 - 20 21 - 22	3 - 6 7 - 8 11 - 12 13 - 14 17 - 18 19 - 20 21 - 22	Added reference to ES-403 to qualify NRC's review of post-examination comments. Corrected lettering typo - changed E.1.f to E.1.d. Added redacting applicant docket number in NRC exam report for post-examination comments. Revised ES-201 Attachment numbers. Corrected typo in Attachment 3 for Public Law 93-438. Corrected typo for Public Law 93-438. Added address for express mail to Attachment 4. Updated DIPM to DIRS. Added address for express mail to Attachment 4.
ES-502	1 - 4 (all)	1 - 5 & blank	Total number of pages changed, replace entire section. Changes in this section: Updated DIPM to DIRS; added address for express mail.
ES-601	5 - 6 19 - 20	5 - 6 19 - 20	Revised ES-201 Attachment number. Added Supplement 1; updated OMB date.
ES-603	3 - 6	3 - 6	Added text that JPMS shall not test solely for simple recall or memorization. New text changes page breaks.
ES-605	1 - 10 (all)	1 - 14	Total number of pages changed, replace entire section.
Detailed Changes in ES-605:		<u>Page(s)</u> 1 3 - 6 8 - 10 11 12 13	Clarified 24-month allotted time for completing a requalification program and the written examination. Added guidance for watch-standing proficiency and license reactivation. Clarified medical standards, including use of prescription medications. Added wording for the LSRO no-solo condition. Clarified license renewal for ROs in SRO upgrade training. Clarified electronic submittal of license renewals. Updated DIPM to DIRS and added address for express mail. Added address for express mail. Clarified license renewal for ROs in SRO upgrade training.

SUPPLEMENT 1 TO REVISION 9 OF NUREG-1021,
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 PAGE REPLACEMENT INSTRUCTIONS

Section / Standard	Remove Page(s)	Replacement Page(s)	Correction Summary
ES-701	1 - 2	1 - 2	Reference ES-401 Section D.1 instead of deleted ES-401 Attachment 2.
	3 - 4	3 - 4	Clarified use of bank/modified/new questions. Added definition for significantly modified.
	7 - 10	7 - 10	Reference ES-401 Section D.1 instead of deleted ES-401 Attachment 2.
	13 - 16	13 - 16	Changed allowed repeat JPMs from past two NRC exams to last NRC exam. Restored * footnote.
App. C	1 - 6 9 - 10	1 - 6 9 - 10	Added text that JPMs shall not test solely for simple recall or memorization.
Inserted by: _____ Date: _____			



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Washington, D.C. 20555-0001

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May 13, 2005

Report Number: NUREG-1021, Revision 9

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Abstract	iii - iv	iii - iv / Correct OMB control number and regulatory citation.
ES-201	17 - 18 21 - 22 23 - 24	17 - 18, 21 - 22 / Attachments 2 & 3: Sensitive examination information should be marked and segregated. 23 - 24 / Form ES-201-1*: Items that do not apply to NRC-prepared exams are denoted with { }; Form ES-201-3 added to Item 8; audit requirements in Item 14 are clarified.
ES-202	13 - blank	13 - blank / Correct over-strikes.
ES-301	1 - 4 11 - 12 21 - 22 23 - 24 25 - 26 27 - blank	1 - 4 / B.1: Swap fuel handling and drawings; emphasize that listed administrative topics are examples. 11 - 12 / D.3.a: Remove reference to B.1 examples; select administrative subjects from Section 2 of the K/A catalog. D.3.d: move fuel handling from operations to equipment control. 21 - 22 / Form ES-301-1*: Added "Class(R)oom" as possible venue. 23 - 24 / Form ES-301-2*: Control room systems for SRO-U must include ESF; Type Code (L) includes shutdown. 25 - 26 / Form ES-301-5*: Minimum event requirements vary based on license level; signatures removed. 27 - blank / Form ES-301-6*: Signatures removed.
ES-303	9 - 10 11 - 12 13 - 14	9 - 10 / Form ES-303-1, Page 1: SRO Exam Types corrected; "Deny License" recommendation added. 11 - 12 / Form ES-303-1, Page 3.a: RO Competency 1 rating factors corrected (there is no "d"). 13 - 14 / Correct over-strikes.
ES-401	15 - 16 21 - 22 29 - 32	15 - 16, 21 - 22 / Forms ES-401-1&2: SRO Column "A2" split for fuel handling in Tier 2, Group 2; Note 8 clarified. 29 - 32 / Form ES-401-6*: Intent of Items 4 & 5 clarified; Form ES-401-7*.
ES-403	5 - blank	5 - blank / Form ES-403-1*.
ES-501	13 - 14 21 - 24	13 - 14 / E.4.c & F.1.f: Reference SECY-04-0191 to ensure that sensitive information is withheld from public disclosure and require inclusion of handouts in the examination file. 21 - 24 / Correct over-strikes; add facility and date to Form ES-501-1; Form ES-501-2*.
ES-604	11 - 12	11 - 12 / Correct over-strikes.
ES-701	1 - 18 (all)	1 - 18 / Correct over-strikes; clarify intent of Form ES-701-6, Items 4 & 5; Form ES-701-8*.
Appendix C	1 - 10 (all)	1 - 10 / Correct over-strikes.
Appendix F	1 - 6 (all)	1 - 6 / Correct over-strikes.
Inserted by: _____ Date: _____		

ABSTRACT

The U.S. Nuclear Regulatory Commission (NRC) publishes NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," to establish the policies, procedures, and practices for examining licensees and applicants for reactor operator and senior reactor operator licenses at power reactor facilities pursuant to Title 10, Part 55, of the *Code of Federal Regulations* (10 CFR Part 55). The related guidance that was previously published in the "Examiners' Handbook for Developing Operator Licensing Written Examinations" (NUREG/BR-0122, Rev. 5, dated March 1990) has been incorporated herein. NUREG/BR-0122 is no longer in effect.

These examination standards are intended to help NRC examiners and facility licensees better understand the processes associated with initial and requalification examinations. The standards also ensure the equitable and consistent administration of examinations for all applicants. These standards are *for guidance purposes* and are not a substitute for the operator licensing regulations (i.e., 10 CFR Part 55), and they are subject to revision or other changes in internal operator licensing policy. Minor policy clarifications that become necessary before the next formal revision of these standards will be promulgated on the NRC's operator licensing Web page at <http://www.nrc.gov/reactors/operator-licensing.html>.

The NRC issued Revision 9 in July 2004 primarily to (1) improve efficiency by reducing the length of the reactor operator written examination, without sacrificing validity or reliability; (2) clarify and simplify the design of the senior reactor operator written examination; (3) better risk-inform both written examinations; (4) better balance the administrative and systems portions of the walk-through operating test; (5) clarify the grading criteria for the simulator operating test to improve objectivity and ensure proper emphasis on competence; and (6) incorporate guidance that was previously promulgated on the NRC's operator licensing Web page regarding the suppression of inappropriate knowledge and ability (K/A) statements and the conduct of peer checks. The changes are identified with bars in the margins and described in the Executive Summary.

Supplement 1 to Revision 9 is being issued to (1) clarify licensed operator medical requirements, including the use of prescription medications; (2) clarify the use of surrogate operators during dynamic simulator scenarios; (3) clarify the selection process for generic knowledge and ability (K/A) statements; (4) qualify the NRC review of post-examination comments; (5) provide additional guidance for maintaining an active license (watchstander proficiency) and license reactivation; and (6) conform with updates to NUREGs-1122 [and -1123], "Knowledge and Abilities Catalog[s] for Nuclear Power Plant Operators: Pressurized [and Boiling] Water Reactors." The changes are identified with bars in the margins and summarized in "Revision 9 Supplement 1 Page Replacement Instructions."

Revision 9, Supplement 1, will become effective for corporate notification letters issued 60 days after its publication is noticed in the *Federal Register*. This will provide facility licensees with at least 180 days notice that the examinations will be administered in accordance with the revised policies, procedures, and practices. Facility licensees may make arrangements for earlier implementation by contacting their NRC regional office.

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EXECUTIVE SUMMARY

Title 10, Part 55, of the *Code of Federal Regulations* (10 CFR Part 55) requires that applicants for reactor operator (RO) and senior reactor operator (SRO) licenses must pass both a written examination and an operating test that are developed and administered in accordance with 10 CFR 55.41 and 55.45, or 10 CFR 55.43 and 55.45, respectively. The regulations (specifically 10 CFR 55.40) allow facility licensees to develop and submit, upon approval by an authorized representative of the facility licensee, proposed examinations for review and approval by the staff of the U.S. Nuclear Regulatory Commission (NRC). The NRC will prepare the examinations if requested in writing by a facility licensee, and may elect to prepare the examinations, in lieu of allowing a specific facility licensee to do so, as necessary to maintain the proficiency of its examiners or the quality of the examinations.

Facility licensees who elect to prepare their own examinations shall develop and submit their proposed examinations based on the guidelines and instructions contained herein. Section 107 of the *Atomic Energy Act of 1954*, as amended, requires the Commission to prescribe uniform licensing conditions for operators. Therefore, the NRC discourages facility licensees from using testing methodologies that do not conform to the policies, procedures, and practices defined in this NUREG-series report. Nonetheless, facility licensees may propose alternatives to specific guidance in NUREG-1021, and the NRC will review and rule on the acceptability of the alternatives.

The NRC will make a reasonable attempt to administer all license examinations on the dates requested by facility licensees. At times, however, resource limitations may compel the staff to prioritize its examination review and development activities based on need and safety considerations. Facility licensees are strongly encouraged to schedule their initial license examinations and to resolve any applicant eligibility questions with their NRC regional office *before* commencing a license training class.

The NRC staff developed the changes in Revision 9 during a series of public meetings with the nuclear power industry's Initial Licensed Operator Focus Group. Summaries of those meetings, which have taken place since the NRC published Revision 8, Supplement 1, in April 2001, are available through the NRC's operator licensing Web page at <http://www.nrc.gov/reactors/operator-licensing/meetings.html>.

Draft Revision 9, which is available in the NRC's public electronic reading room (<http://www.nrc.gov/reading-rm/adams.html>) under Accession Number ML030230303, was published for comment and voluntary trial use in February 2003 (68 FR 5312), and the comment period closed in December 2003. The public and internal comments and resolutions are summarized in ML041240004, which is also available in the NRC's public electronic reading room.

The following table summarizes the significant (but not all) changes from Revision 8, Supplement 1. New or modified text is also identified with vertical bars in the margins throughout this revision of NUREG-1021. Refer to pages xvii through xx for a definition of abbreviations used within this executive summary and throughout NUREG-1021.

Changes from NUREG-1021, Revision 8, Supplement 1	
Location	Change
ES-102	D.5 and F.4 have been revised to reflect the issuance of Revision 3 of Regulatory Guide (RG) 1.149, "Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations," dated October 2001.
	E.6 has been added to reference NUREG-1262, "Answers to Questions at Public Meetings Regarding Implementation of Title 10, <i>Code of Federal Regulations</i> , Part 55 on Operators' Licenses," as a historical document.
	E.7 has been edited to indicate that NUREG-1021 takes precedence over NUREG-1291, "BWR and PWR Off-Normal Event Descriptions," dated November 1987.
ES-201	C.1.i and C.2.c have been revised to address the simulator fidelity requirements in 10 CFR 55.46.
	C.2.i and Attachment 4 have been revised to require a formal examination approval letter instead of an assignment sheet.
	C.3.g has been revised to allow the agency to forward NRC-prepared exams to the facility before the formal review.
	C.3.j has been revised to recognize that the chief examiner can make or change simulator crew assignments (up to 2 weeks before the examination date).
	Attachment 3 has been edited to reference 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."
	Form ES-201-1 has been edited to improve the task descriptions and cross-references.
	Form ES-201-2 has been edited to capture more of the walk-through criteria and to delete the note exempting NRC-prepared operating tests from duplicating scenarios and tasks from the applicants' audit test(s).
	Form ES-201-3 has been edited to more accurately reflect Section D.2.b.
	Form ES-201-4 replaces the assignment sheet (formerly Attachment 4).
ES-202	C.1.a has been revised to note that SRO-upgrade applicants in good standing can request a waiver of the RO written examination.
	C.1.a has been revised to clarify the guidelines on medical examinations, including the use of nurse practitioners and physician's assistants and the policy on waivers; it also adds a reference to the Form 396 instructions on the Web site.
	C.1.b has been revised to reflect that the generic fundamentals examination (GFE) must be taken within 24 months before the date of application or waived in accordance with ES-204.
	C.1.c and D.1.b(3) have been revised to reflect that the control manipulations required by 10 CFR 55.31(a)(5) can be done on the simulator; it also clarifies the NRC's expectations regarding magnitude.
	C.1.d has been added to note that U.S. citizenship is not required for licensure.
	C.1.f has been revised to clarify the definition of senior management representative on site.

Changes from NUREG-1021, Revision 8, Supplement 1	
Location	Change
	C.1.f has been revised to address the electronic submittal of forms.
	C.2.e has been revised to require the NRC's regional offices to audit 10 percent of applications.
	D.2.a(2) has been revised to delete the reference to the chief reactor watch as being equivalent to a licensed RO.
	D.2.a(4) has been clarified to reflect that the NRC's Office of Nuclear Reactor Regulation (NRR) will evaluate the eligibility of applicants who might otherwise be disqualified because they do not meet the strict definition of "responsible nuclear power plant experience."
	D.3.a has been clarified to reflect that limited senior reactor operators (LSROs) are required to perform five significant control manipulations in accordance with 10 CFR 55.31(a)(5).
ES-204	D.1.a has been revised to allow the NRC's regional offices to grant the SRO-only written and administrative walk-through waivers, to clarify the policy regarding SRO waivers, and to note that waivers are limited to 1 year after the date of the exam (rather than the final denial date).
	D.1.c has been clarified to indicate that medical waivers/exceptions will be coordinated with the NRC's contract physician.
	D.1.g has been edited to note that the written exam waiver would include the GFE.
	D.1.h has been revised to allow the NRC's regional offices to issue conditional licenses, regardless of the reason for not completing the control manipulations required by 10 CFR 55.31(a)(5).
	D.1.j has been added to allow the NRC's regional offices to waive the RO written exam for SRO-upgrade applicants in good standing.
	D.1.k has been added to establish criteria that will allow the NRC's regional offices to waive the need to retake the GFE for applicants who passed their original GFE more than 24 months before the date of license application.
ES-205	The Background discussion has been revised to limit the longevity of the GFE to 24 months without proficiency training and reflect four exam administrations per year.
	C.2.b and Attachment 1 have been revised to reflect the shift to an annual notification letter.
	C.3.b has been added to require the NRC's regional offices to informally remind facilities to submit their registration letters for the June, September, and December exams.
	C.3.e has been revised to indicate that the results letters will only be sent to participating licensees.
	C.4 has been added to address the criteria for the industry to use in reviewing and commenting on the GFEs before they are administered.

Changes from NUREG-1021, Revision 8, Supplement 1	
Location	Change
	Section D and Attachment 4 have been revised to reflect the shorter, 50-question examination and the question distribution guidelines.
	Attachment 1 has been revised to indicate that the GFEs will be available in the NRC's public electronic reading room and on the NRC's GFE Web page, and its enclosure has been clarified to indicate that the exams cannot be sent to home addresses.
ES-301	Throughout: Old Categories A and B have been combined into a section called "Walk-Through," and Category C is simply called "Simulator Test."
	Throughout: The "Walk-Through" now consists entirely of job performance measures (JPMs); questions will be used only for followup, as necessary.
	D.1.a has been revised such that the prohibition on duplicating test items from the applicants' audit test(s) applies to NRC-prepared operating tests (as well as those prepared by facility licensees).
	D.2 has been created from old Section D.1.k and parts of old Section D.3.b.
	D.3.a and Form ES-301-1 have been revised to reduce the number of RO administrative topics on the "Walk-Through" from five to four.
	D.4.a and Form ES-301-2 have been revised to increase the RO control room systems coverage from seven to eight.
	D.4.b and Form ES-301-2 have been revised to allow a 40- to 60-percent range of alternative path tasks, and to define "low-power" as 5 percent.
	D.5.a and Form ES-301-5 have been revised to allow the reactivity and normal evolutions to be replaced with additional instrument or component malfunctions, and to clarify crew rotation policies.
	D.5.d and Form ES-301-5 have been revised to require SRO applicants to perform two or more technical specification (TS) evaluations during the "Simulator Test"; applicants should be given multiple opportunities to demonstrate competence in each area.
	D.5.f has been edited to indicate that all "required" actions shall be documented on Form ES-D-2.
	Forms ES-301-1 and ES-301-2 have been revised to incorporate the acceptance criteria at the bottom of the form.
	Form ES-301-5 has been completely revised to make it more user friendly and to incorporate other changes (e.g., crew rotation, TS for SROs, and optional reactivity manipulations).
ES-302	Some of the competencies on Form ES-301-6 have been consolidated to conform with ES-303 and Section E of Appendix D.
	Throughout: Old Categories A and B have been combined into the "Walk-Through," and Category C is simply called "Simulator Test."
	Throughout: All references to questions have been edited to reflect that they will only be asked "for cause."

Changes from NUREG-1021, Revision 8, Supplement 1	
Location	Change
	D.1.j, D.2.g, and D.3.l have been revised to incorporate the "peer check" guidance previously issued on the NRC's operator licensing Web page.
	D.1.l has been added to ensure that uncorrected simulator performance deficiencies do not interfere with the planned tests.
	D.1.k has been revised to add guidance on protecting predecisional performance information.
	D.3.k has been added for consistency with Appendix E.
	D.3.o has been clarified to require an additional scenario, if necessary, to evaluate the required evolutions and competencies.
	D.3.q has been revised to prohibit "backtracking" when restarting an inoperable simulator.
ES-303	The Background definitions of "satisfactory" and "unsatisfactory" have been deleted.
	Throughout: Old Categories A and B have been combined into the "Walk-Through," and Category C is simply called "Simulator Test."
	Throughout: The "Walk-Through" now consists entirely of JPMs; questions will be used only for followup, as necessary.
	C.2 has been revised to allow examiners to recommend a passing grade even if the applicant made errors that would normally result in a failure.
	D.2.a has been revised to collectively grade the administrative and systems JPMs, with an overall 80-percent cut score and separate administrative cut scores of 60- and 50-percent for SRO and RO applicants.
	D.2.b and Forms ES-303-1, 3, and 4 have been revised to consolidate some of the rating factors and competencies, to allow examiners to assign "not observed" grades for some rating factors, to specify the number of errors allowed for each integral rating factor grade, and to eliminate the behavioral anchors.
	D.3.b has been edited to ensure that examiners document the potential and actual consequences of an applicant's action if the error contributes to a failure of the operating test.
	D.3.d has been added to provide guidance on documenting deviations from the nominal grading criteria.
ES-401	Throughout: The RO written exam has been shortened to 75 questions; SRO applicants will take that exam plus a 25-question exam focused on SRO-only knowledge and abilities (K/As); SRO-upgrade applicants may apply for a waiver of the RO examination pursuant to 10 CFR 55.47.
	D.1.b now references a new Attachment 2, which incorporates previous Web-based guidance regarding the elimination of inapplicable or inappropriate K/A statements; when selecting K/As, every item in the group should be sampled once before selecting a second K/A for any item in the group.

Changes from NUREG-1021, Revision 8, Supplement 1	
Location	Change
	D.1.c has been revised to focus the SRO-only sample on those K/A categories that are linked to 10 CFR 55.43 and the fuel handling system.
	Old D.1.d, which allowed exam authors to propose 10 site-specific priority K/As, has been deleted.
	D.2.a has been revised to provide guidance on testing multi-part K/A statements.
	D.2.c and Form ES-401-6 have been edited to indicate that more than 60 percent of the questions in the overall SRO exam could assess higher cognitive level.
	D.2.g and Form ES-401-6 have been clarified to ensure that reference materials do not assist the applicants in eliminating incorrect distractors.
	Section E, E.2.d, and Form ES-401-9 have been clarified to indicate that distractors should always be plausible.
	E.2.d has been clarified to require the replacement of otherwise good questions that do not match the approved K/A statement.
	Attachment 1, Step 1, has been revised to require the addition of important systems and evolutions that are not included on the generic lists. Instructions have also been added for sampling SRO-only K/As.
	Attachment 2 incorporates K/A elimination guidance that was previously issued on the NRC's operator licensing Web page, with minor clarifications.
	Forms ES-401-1 and 2 have been revised to conform with the new RO/SRO-only formats. The notes have been revised to conform with the body of ES-401. The evolutions and systems have been divided into high- and low-risk-significance groups, and the sampling rates have been adjusted accordingly.
	Form ES-401-6, Item 4, has been revised to require NRC examiners to review the sampling process if too many questions are repeated.
	Form ES-401-8 has become the new cover sheet for SRO applicants.
ES-402	C.1.e has been revised to state that a dictionary should be available in the examination room.
	D.1.f has added a caution regarding the use of machine-gradable answer sheets.
	D.2.d has been edited to ensure that the applicants properly page-check their examinations.
	D.4.d has been revised to include a 3-hour time limit for the SRO-only exam taken alone and to allow licensees to extend the time upon notifying the NRC.
ES-403	D.2.d and Form ES-403-1 have been edited to accommodate the new SRO cover sheet and grading criteria.
ES-501	C.2.c has been revised to adjust the thresholds for conducting a validity review.
	D.2.c has been revised to trigger borderline reviews based on SRO-only grades.

Changes from NUREG-1021, Revision 8, Supplement 1	
Location	Change
	D.2.e has been revised to clarify guidance regarding licensing recommendations based on applicant grades. SRO-instant applicants who pass the written exam overall and the operating test do not automatically qualify for an RO license.
	D.3.b has been revised to ensure that NRR program office concurrence is obtained when operating test grading deviates from nominal guidance.
	D.3.c and Attachment 5 have been edited to hold licenses and trigger a performance analysis at 82 percent overall and 74 percent on the SRO-only items.
	E.3.a has been revised to include question deletions and answer key changes when counting unacceptable questions for documentation in the exam report; RO and SRO-only questions will be counted separately; negative comments will not be made only if it was the facility's first submittal; the regions may adjust the nominal 20-percent comment threshold with NRR program office concurrence; and the criteria for documenting security issues have been clarified.
	E.3.c has been revised to ensure that simulator fidelity issues are addressed during the next requalification program inspection.
	E.4.a has been revised to clarify the policy regarding SRO-upgrade applicants who received a waiver of the RO portion of the license exam and did not participate in RO requalification training and testing while in the upgrade training program; SROs who passed overall but scored below 80 percent on either the RO or SRO-only may require additional review and training.
	Attachment 4 and Form ES-501-2 have been edited to conform with examination format changes.
	Attachment 5 has been edited to accommodate medical waivers and exam format changes.
ES-502	C.1.b(1) and (2) have been edited to better conform with 10 CFR 55.35.
	C.2.a has been revised to indicate that the NRC may request a facility licensee who prepared its licensing examination to confirm the validity of any test items that are challenged by an applicant during an appeal.
	D.2.a has been clarified to address multiple appeals and generic corrections.
ES-601	Throughout: References to systematic assessment of licensee performance (SALP) have been removed, and the requalification program inspection procedure number has been updated to IP 71111.11.
	Section C has been clarified to indicate that the NRC will consider preferentially using the facility's exam process if it complies with 10 CFR 55.59 and is free of significant flaws.
	J.1 has been updated to reflect new record retention guidelines.
	Form ES-601-1 has been revised to parallel Form ES-201-3.

Changes from NUREG-1021, Revision 8, Supplement 1	
Location	Change
ES-604	E.2 has been revised to indicate that the individual evaluations will be done using the appropriate sections of Form ES-604-2 instead of the competency evaluation forms in ES-303.
ES-605	C.1.a has been added to elaborate on requalification testing requirements that were previously clarified on the NRC's operator licensing Web page.
	C.1.b has been added to clarify requalification testing requirements for newly licensed operators.
	C.2.a has been clarified to address the proficiency requirements for SROs who normally stand watch only as ROs.
	C.2.b has been clarified by incorporating guidance related to LSRO watch-standing proficiency, which was previously issued on the NRC's operator licensing Web page.
	C.3 has been extensively updated to clarify the regulatory requirements and guidelines, to note that temporary medical conditions may preclude operators from completing the requalification program, and to address conditional licenses.
	C.4 has been added to incorporate staff practice as it pertains to voluntarily down-grading an SRO license to the RO level.
	D.1.a has been edited to include the results of the most recent requalification written exam and operating test on license renewal applications.
	D.1.c has been clarified to address renewal applications that are received more than 60 days before the license expiration date.
ES-701	C.1.c and C.2.d have been revised, pursuant to 10 CFR 55.46(b), to require Commission approval to use the plant or something other than a plant-referenced simulator for the operating tests.
	The written examination has been revised to more closely follow the 3-Tier format in ES-401, with a total of 40 questions; separate outlines and quality checklists are included.
	The operating test has been revised to consist of 10 JPMs, with 3 in the administrative area, 4 in systems, and 3 related to emergency and abnormal plant evolutions; the discussion scenarios have been deleted; and separate outlines and quality checklists are included.
Appendix A	C.3.c has been added to elaborate on "level of knowledge" versus "level of difficulty."
Appendix D	B.3 has been edited to state that Form ES-D-2 should include every required, rather than expected, operator action.
	Section E has been revised to consolidate some of the competency descriptions.

Changes from NUREG-1021, Revision 8, Supplement 1	
Location	Change
Appendix E	Part B has been revised to incorporate separate SRO cut scores and time limits, to note that programable calculator memories must be erased, to add a caution regarding machine-gradable answer sheets, to note that applicant questions are taken into consideration when reviewing appeals, and to caution applicants not to make assumptions regarding operator actions.
	Part C, Item 4, has been clarified to prohibit discussions with other applicants who have not completed the applicable portion of the operating test.
	Part D has been edited to eliminate guidelines related to prescribed questions, adjust the length of the walk-through, and incorporate "peer check" guidance.
	Part E, Item 4, has been expanded to include "peer check" guidance.
Appendix F	The definition of "Category" has been eliminated.
	A definition of "Low-power" has been added.
	The definitions of "Plant-referenced simulator" and "Simulation facility" have been edited.

ABBREVIATIONS

AC	alternating current	
ADAMS	Agencywide Documents Access and Management System (NRC)	
ADS	automatic depressurization system	
AFW	auxiliary feedwater	
ANS	American Nuclear Society	
ANSI	American National Standards	
AO	auxiliary operator	
AOP	abnormal operating procedure	
APRM	average power range monitor	
ARP	alarm (or annunciator) response procedure	
ATC	at the controls (operator)	
ATWS(T)	anticipated transient without scram (trip)	
B&W	Babcock and Wilcox	
BOP	balance of plant (operator)	
BWR	boiling-water reactor	
C	(degrees) Celsius	
CAL	confirmatory action letter	
CCP	centrifugal charging pump	
CCW	component cooling water	
CD-ROM	compact disk, read-only memory	
CE	Combustion Engineering	
CFPT	condensate feedwater pump turbine	
CFR	<i>Code of Federal Regulations</i>	
CRD	control rod drive	
CRT	criterion-referenced test	
CS	core spray	
CT	critical task	
CTMT	containment	
CVCS	chemical and volume control system	
DAS	dominant accident sequence	
DC	direct current	
DG	diesel generator	
DHR	decay heat removal	
DIPM	Division of Inspection Program Management (NRR)	
EAL	emergency action level	
E/APE	emergency/abnormal plant evolution	
ECA	emergency contingency action (procedure)	
ECCS	emergency core cooling system	
ECP	estimated critical position	
EDG	emergency diesel generator	
EHC	electrohydraulic control	
EIE	electronic information exchange	

EOL	end-of-life
EOP	emergency operating procedure
EPIP	emergency plan implementing procedure
EQB	examination question bank
ES	examination standard
ESF	engineered safety feature
F	(degrees) Fahrenheit
FHE	fuel handling equipment
FR	<i>Federal Register</i>
FRP	functional recovery procedure
FSAR	final safety analysis report
GE	General Electric
GFE	generic fundamentals examination
GL	generic letter
GUI	graphic user interface
HCL	higher cognitive level
HCU	hydraulic control unit
HHSI	high head safety injection
HP	health physics
HPCI	high-pressure coolant injection
HPCS	high-pressure core spray
HPSI	high-pressure safety injection
HVAC	heating, ventilation, and air conditioning
IC	initial condition <i>or</i> instrumentation and control
INPO	Institute of Nuclear Power Operations
IP	inspection procedure
IPE	individual plant examination
IR	importance rating
IRM	intermediate range monitor
JPM	job performance measure
JTA	job task analysis
K/A	knowledge and ability
KSA	knowledge, skill, and ability
LAN	local area network
LCO	limiting condition for operation
LER	licensee event report
LOCA	loss-of-coolant accident
LOD	level of difficulty
LOK	level of knowledge
LOOP	loss of offsite power
LPCI	low-pressure coolant injection

LPCS	low-pressure core spray
LPRM	local power range monitor
LSRO	limited senior reactor operator
LWR	light-water reactor
MC	Manual Chapter (NRC Inspection)
MCC	motor control center
MDAFW(P)	motor-driven AFW (pump)
MFP	main feedwater pump
MIP	master inspection plan
MSIV	main steam isolation valve
NANT	National Academy for Nuclear Training
NEI	Nuclear Energy Institute
NNAB	National Nuclear Accrediting Board
NRC	U.S. Nuclear Regulator Commission
NOP	normal operating procedure
NRR	Office of Nuclear Reactor Regulation (NRC)
NRT	norm-referenced test
NWPA	<i>Nuclear Waste Policy Act (of 1982)</i>
OJT	on-the-job training
OLA	operator licensing assistant
OLTS	operator licensing tracking system
OTSG	once-through steam generator
OMB	Office of Management and Budget (U.S.)
PARS	Publicly Available Records System
PCIS	primary containment isolation system
PDR	Public Document Room
PORV	power-operated relief valve
PPR	plant performance review
PRA	probabilistic risk assessment
PSI(A)(G)	pounds per square inch (absolute) (gauge)
PZR	pressurizer
PWR	pressurized-water reactor
QA	quality assurance
QPTR	quadrant power tilt ratio
RBCCW	reactor building closed cooling water
RBM	rod block monitor
RCA	radiologically controlled area
RCS	reactor coolant system
RCP	reactor coolant pump
RCIC	reactor core isolation cooling
RF	rating factor
RFP	reactor feed pump
RG	Regulatory Guide

RHR	residual heat removal
RMCS	reactor manual control system
RO	reactor operator
ROI	report on interaction
RM	radiation monitor
RNPPE	responsible nuclear power plant experience
RPIS	rod position indication system
RPM	revolutions per minute
RPS	reactor protection system
RPV	reactor pressure vessel
RWST	refueling water storage tank
S(AT)	satisfactory
SALP	systematic assessment of licensee performance
SAT	systems approach to training
S(B)GTS	standby gas treatment system
SD	standard deviation
SG(TR)	steam generator (tube rupture)
SI	safety injection
SLC	standby liquid control
SO	senior operator
SME	subject matter expert
SPND	self-powered neutron detector
SRO(I)(U)	senior reactor operator (instant) (upgrade)
SRP	Standard Review Plan (NUREG-0800)
SRV	safety relief valve
SSW	standby service water
STA	shift technical advisor
TDAFW(P)	turbine-driven AFW (pump)
T/F	true-false (statement/question)
TPA	temporary plant alteration
TS	technical specification (or other technical requirements document)
U(NSAT)	unsatisfactory
UPS	uninterruptible power supply
U.S.C.	<i>United States Code</i>
V(AC)(DC)	volts AC or DC
VCT	volume control tank
W	Westinghouse
W/T	walk-through

ES-101

PURPOSE AND FORMAT

OF OPERATOR LICENSING EXAMINATION STANDARDS

A. Purpose

Title 10, Part 55, of the *Code of Federal Regulations* (10 CFR Part 55) requires that applicants for reactor operator (RO) and senior reactor operator (SRO) licenses must pass both a written examination and an operating test (both initially and for requalification). Moreover, the regulations mandate that the license examinations must be developed and administered in accordance with 10 CFR 55.41 and 55.45 for ROs, or 10 CFR 55.43 and 55.45 for SROs.

The "Operator Licensing Examination Standards for Power Reactors" (NUREG-1021) establish the policies, procedures, and practices for administering the required initial and requalification written examinations and operating tests. These standards describe the provisions of the *Atomic Energy Act of 1954* and the regulations on which the operator licensing program is based. They also ensure the equitable and consistent administration of examinations to all applicants and licensed operators at all facilities that are subject to the regulations.

B. Format

Each examination standard (ES) explains the policies, procedures, and practices for a particular aspect of the program. For ease of reference, each standard is assigned a three-digit number, and related standards are grouped together in the sense that standards beginning with the same digit apply to related aspects of the program, as follows:

ES-1xx:	General
ES-2xx:	Initial pre-examination activities
ES-3xx:	Initial operating tests
ES-4xx:	Initial written examinations
ES-5xx:	Initial post-examination activities
ES-6xx:	Requalification examinations
ES-7xx:	Fuel handling examinations

ES-102
REGULATIONS AND PUBLICATIONS
APPLICABLE TO OPERATOR LICENSING

A. Purpose

This standard lists the United States statutes and the regulations of the U.S. Nuclear Regulatory Commission (NRC) that establish the requirements for conducting operator licensing examinations. It also identifies the regulatory guides and NUREG-series reports that establish the procedures for implementing the regulations and administering the examinations, as well as industry standards promulgated by the American National Standards Institute/American Nuclear Society (ANSI/ANS), which may provide additional guidance.

Regulatory guides, NUREG-series reports, and industry standards do not constitute requirements, except as specified in Commission orders or as committed to by the facility licensee. NRC examiners and licensees should consult the appropriate revisions, as referenced in each facility's final safety analysis report (FSAR) or approved training program. The following paragraphs summarize the latest revisions of these documents.

B. Statutes

1. Atomic Energy Act of 1954

Section 107 of the *Atomic Energy Act of 1954* (42 U.S.C. 2137), as amended, requires that the NRC must prescribe uniform conditions for licensing individuals as operators of production and utilization facilities, determining the qualifications of these individuals, and issuing licenses to such individuals.

2. Nuclear Waste Policy Act of 1982

Section 306 of the *Nuclear Waste Policy Act of 1982* (42 U.S.C. 10226, 96 Stat. 2201, at 2262–2263) directs the NRC to establish requirements governing (1) simulator training for applicants for operator licenses and for operator requalification training programs, (2) NRC administration of requalification examinations, and (3) operating tests at civilian nuclear power plant simulators.

C. Regulations

1. 10 CFR Part 2, "Rules of Practice"

The regulations in 10 CFR Part 2 govern the conduct of all proceedings under the *Atomic Energy Act of 1954*, as amended, and the *Energy Reorganization Act of 1974* with regard to (a) granting, suspending, revoking, amending, or taking other action with respect to any license; (b) imposing civil penalties; and (c) public rulemaking.

10 CFR 2.103 establishes the applicant's right to demand a review of a proposed license denial, and defines the applicant's appeal and hearing rights.

Subpart L, "Informal Hearing Procedures for NRC Adjudications," governs proceedings for the issuance, renewal, or licensee-initiated amendment of an operator or senior operator license.

2. 10 CFR Part 9, "Public Records"

The regulations in 10 CFR Part 9 prescribe the rules governing the NRC's public records that relate to any proceeding subject to 10 CFR Part 2.

Subparts A and B describe and implement the requirements for balancing the public's rights to information under the *Freedom of Information Act* and the NRC's responsibility to protect personal information under the *Privacy Act*.

Subparts C and D implement the provisions of the *Sunshine Act*, concerning the opening of Commission meetings to public observation. They also describe the procedures governing the production of agency records, information, or testimony in response to subpoenas or demands of courts or other judicial authorities in State and Federal proceedings.

3. 10 CFR Part 20, "Standards for Protection Against Radiation"

The regulations in 10 CFR Part 20 establish standards for protection against radiation hazards arising from licensed activities. Some of the material is appropriate for inclusion in the examinations administered to candidates for RO or SRO licenses.

4. 10 CFR Part 50, "Licensing of Production and Utilization Facilities"

10 CFR 50.34(b)(8) requires that the FSAR must include a description of the operator requalification program. That description forms the basis for the inspection, audit, and approval of requalification programs.

10 CFR 50.54(l-1) requires facility licensees to implement an operator requalification program that meets the requirements of 10 CFR 55.59(c) within 3 months after receiving a facility operating license. Notwithstanding the provisions of 10 CFR 50.59, the licensee may not decrease the scope of its approved requalification program without authorization from the Commission.

10 CFR 50.54(k) – (m) contain regulations that restrict control manipulations to licensed operators. These regulations are conditions of all facility licenses issued under 10 CFR Part 50.

10 CFR 50.74 requires facility licensees to notify the Commission within 30 days if there is a change in the status of a licensed RO or SRO.

5. **10 CFR Part 55, “Operators’ Licenses”**

10 CFR Part 55 is the implementing regulation that establishes the requirements and the regulatory basis for licensing and requalifying ROs and SROs.

D. **Regulatory Guides**

1. **Regulatory Guide 1.8, “Qualification and Training of Personnel for Nuclear Power Plants,” Revision 3, May 2000**

Section C of this regulatory guide (RG) currently endorses ANSI/ANS 3.1-1993, “American National Standard for Selection, Qualification, and Training of Personnel for Nuclear Power Plants,” with additions, exceptions, and clarifications thereto. No backfitting is intended or required in connection with the issuance of the revised RG.

2. **Regulatory Guide 1.33, “Quality Assurance Program Requirements: Operations,” Revision 2, February 1978**

Appendix A to this RG contains a list of typical procedures for pressurized-water reactors and boiling-water reactors.

3. **Regulatory Guide 1.114, “Guidance on Being an Operator at the Controls of a Nuclear Power Plant,” Revision 2, May 1989**

This RG describes a method that the NRC staff finds acceptable for complying with the Commission’s regulations in 10 CFR 50.54(k) – (m), which require the presence of an RO at the controls of a nuclear power unit and an SRO in the control room from which the nuclear power unit is being operated.

4. **Regulatory Guide 1.134, “Medical Evaluation of Licensed Personnel for Nuclear Power Plants,” Revision 3, March 1998**

This RG currently endorses ANSI/ANS 3.4-1996, “Medical Certification and Monitoring of Personnel Requiring Operator Licenses for Nuclear Power Plants,” with exceptions. However, facility licensees may continue to use the 1983 version of ANSI/ANS 3.4, which was previously endorsed in its entirety by Revision 2 of RG 1.134, dated April 1987.

5. **Regulatory Guide 1.149, "Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations," Revision 3, October 2001**

This RG currently endorses ANSI/ANS 3.5-1998, "Nuclear Power Plant Simulators for Use in Operator Training and Examination," with clarifications. However, facility licensees may continue to use the 1985 and/or 1993 versions of ANSI/ANS 3.5, which were previously endorsed, with exceptions, by Revisions 1 and 2 of RG 1.149, dated April 1987 and April 1996, respectively.

E. NUREG-Series Reports

1. **NUREG-0660, Vol. 1, "NRC Action Plan Developed as a Result of the TMI-2 Accident," May 1980**

Item I.A.4.2 of this document describes the guidelines for long-term simulator upgrades.

2. **NUREG-0737, "Clarification of TMI Action Plan Requirements," November 1980**

This document clarifies the following action plan items, which are intended to upgrade the training, licensing, education, and experience of operators on the basis of experience gained from the accident at Three Mile Island, Unit 2:

- Item I.A.2.1, "Immediate Upgrading of RO and SRO Training and Qualifications"
- Item 1.A.2.3, "Administration of Training Programs"
- Item 1.A.3.1, "Revised Scope and Criteria for Licensing Exams"
- Item 11.B.4, "Training for Mitigating Core Damage"

3. **NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, LWR Edition," July 1981**

Section 13.2, "Reactor Operator Training," describes the training and licensing of operators and identifies information to be submitted by applicants for construction permits and operating licenses.

4. **NUREG-1122, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Pressurized-Water Reactors," Revision 2, June 1998**

This document provides the basis for developing content-valid licensing examinations for operators at pressurized-water reactors. It contains knowledge and ability (K/A) statements that have been rated for their importance to ensuring that the plant is operated in a manner that is consistent with the health and safety of plant personnel and the public.

5. **NUREG-1123, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Boiling-Water Reactors," Revision 2, June 1998**

This document provides the basis for developing content-valid licensing examinations for operators at boiling-water reactors. It contains K/A statements that have been rated

for their importance to ensuring that the plant is operated in a manner that is consistent with the health and safety of plant personnel and the public.

6. **NUREG-1262, "Answers to Questions at Public Meetings Regarding Implementation of Title 10, Code of Federal Regulations, Part 55 on Operators' Licenses," November 1987**

This report presents questions and answers based on the transcripts of four public meetings (and written questions submitted after the meetings) conducted by the NRC staff shortly after publication of the Part 55 rule change in 1987. Although many of the answers have been overtaken by events since 1987, this report remains useful in that it provides a historical perspective on many issues. If the report conflicts with any other guidance issued since 1987 (e.g., NUREG-1021 or the frequently asked questions on the NRC's operator licensing Web page) the more recent guidance would take precedence.

7. **NUREG-1291, "BWR and PWR Off-Normal Event Descriptions," November 1987**

The reactor event descriptions in this document previously served as a generic reference tool to help examiners develop simulator scenarios. Refer to ES-301 or ES-604 (as applicable for initial or requalification examinations) and Appendix D to NUREG-1021 for current guidance regarding the preparation of site-specific simulator scenarios.

8. **NUREG-1560, "Individual Plant Examination Program: Perspectives on Reactor Safety and Plant Performance," December 1997**

This report provides perspectives gained by reviewing 75 individual plant examination (IPE) submittals pertaining to 108 nuclear power plant units. Chapter 13, "Operational Perspectives," is of particular interest because it identifies a number of important human actions that should be considered for evaluation on licensing and requalification examinations for pressurized- and boiling-water reactors.

9. **NUREG-1600, "General Statement of Policy and Procedure for NRC Enforcement Actions," May 2000**

This report addresses the NRC's expectations regarding compliance with 10 CFR 55.49, "Integrity of Examinations and Tests," and possible enforcement actions against parties who are subject to that regulation (i.e., Part 55 license holders and applicants and Part 50 licensees).

10. **NUREG/BR-0122, "Examiners' Handbook for Developing Operator Licensing Written Examinations," Revision 5, March 1990**

This document, which presented a procedure for systematically constructing content-valid licensing examinations for nuclear power plant operators, has been incorporated into the examination standards in NUREG-1021, Revisions 8 and 9. It may be used for historical perspective, but is no longer used for developing examinations.

F. Industry Standards

1. ANSI/ANS 3.1, "American National Standard for Selection, Qualification, and Training of Personnel for Nuclear Power Plants"

This standard provides criteria for selecting and training nuclear power plant employees who perform a variety of functions at various levels of responsibility (e.g., managers, supervisors, operators, and technicians). RG 1.8, Revision 3 (May 2000) endorses the 1993 version of this standard, with additions, exceptions, and clarifications thereto.

2. ANS 3.2 (ANSI N18.7-1976), "Administrative Controls and QA for the Operational Phase of Nuclear Power Plants"

This standard provides guidance and recommendations for administrative rules of practice and related subjects and for preparing procedures and audit programs. See RG 1.33.

3. ANSI/ANS 3.4-1996, "Medical Certification and Monitoring of Personnel Requiring Operator Licenses for Nuclear Power Plants"

This standard is the basic document covering the general health and disqualifying conditions applicable to license applicants and licensed personnel. Revision 3 of RG 1.134 currently endorses this standard, with exceptions, but facility licensees may continue to use the 1983 version, which was previously endorsed in its entirety by Revision 2 of RG 1.134.

4. ANSI/ANS 3.5-1998, "Nuclear Power Plant Simulators for Use in Operator Training"

This standard establishes the minimum functional requirements and capabilities for nuclear power plant simulators for use in operator training. Revision 3 of RG 1.149 endorses this standard, with clarifications. However, facility licensees may continue to use the 1985 and 1993 versions, which were previously endorsed, with exceptions, by Revisions 1 and 2 of RG 1.149.

ES-201

INITIAL OPERATOR LICENSING EXAMINATION PROCESS

A. Purpose

This standard describes the activities that must be completed to prepare for initial operator licensing examinations (including written examinations and operating tests) at power reactor facilities. As such, this standard includes instructions for scheduling and coordinating examination development, assigning NRC examiners and facility personnel, maintaining examination security, and obtaining reference and examination materials from the facility licensee.

B. Background

Title 10, Part 55, of the *Code of Federal Regulations* (10 CFR Part 55) requires that applicants for reactor operator (RO) and senior reactor operator (SRO) licenses must pass both a written examination and an operating test. The regulation allows power reactor facility licensees to prepare the site-specific written examinations and operating tests, provided that (1) the facility licensee shall prepare the examinations and tests in accordance with the criteria contained herein; (2) the facility licensee shall establish, implement, and maintain procedures to control examination security and integrity; (3) an authorized representative of the facility licensee shall approve the examinations and tests before they are submitted to the NRC for review and approval; and (4) the facility licensee shall obtain NRC approval of its proposed written examinations and operating tests. Moreover, the regulation requires that the license examinations must be developed and administered in accordance with 10 CFR 55.41 and 55.45 for ROs, or 10 CFR 55.43 and 55.45 for SROs.

Facility licensees may propose alternatives to the examination criteria contained herein and evaluate how the proposed alternatives provide an acceptable method of complying with the Commission's regulations. The NRC staff will review any proposed alternatives and make a decision regarding their acceptability. The NRC will not approve any alternative that would compromise the agency's statutory responsibility to prescribe uniform conditions for the operator licensing examinations.

The NRC staff will continue to prepare the examinations (or discrete portions thereof, including the outline, written, or operating tests) upon written request by facility licensees (consistent with NRC staff availability) and retains the authority to develop the examinations on a case-by-case basis to certify new examiners or if the staff loses confidence that a facility licensee will develop examinations upon which the NRC can base its licensing decisions. If the staff determines that a facility is unable to develop acceptable examinations, the examinations could be delayed until the NRC can schedule sufficient resources to develop and conduct the examinations, or until the facility licensee can develop an acceptable examination. Each NRC regional office will also prepare at least one examination per calendar year to certify new examiners, as required, and to maintain examiner proficiency.

The NRC will make a reasonable attempt to administer all license examinations on the dates requested by facility licensees. At times, however, resource limitations may compel the staff to prioritize its examination review and development activities based on need and safety.

considerations. Examinations for fewer than three applicants should be scheduled only under extenuating circumstances, such as a shortage of licensed ROs or SROs at the facility. If a facility licensee has fewer than three license applicants, the examinations may be delayed until more applicants are trained. Moreover, facility licensees who elect to have the NRC prepare their licensing examinations should keep in mind that the NRC staff requires more time to prepare than to review an examination and that the NRC will require greater flexibility to schedule those services.

In accordance with 10 CFR 55.40(a), the NRC shall use the criteria in NUREG-1021 to prepare the written examinations required by 10 CFR 55.41 and 55.43 and the operating tests required by 10 CFR 55.45. The NRC shall also use the criteria in NUREG-1021 to evaluate the written examinations and operating tests prepared by power reactor facility licensees pursuant to 10 CFR 55.40(b). The NRC's regional offices shall obtain approval from the NRR operator licensing program office before knowingly deviating from the intent of NUREG-1021. Moreover, the regional offices shall obtain program office approval before undertaking any initiative that could undermine examination consistency among the regions.

Other pre-examination activities, such as submitting and reviewing license applications and eligibility waivers and administering the generic fundamentals examination program, are addressed in ES-202, ES-204, and ES-205. Specific instructions for developing, administering, and grading the written examinations and operating tests are found in ES-401 through ES-403 and ES-301 through ES-303, respectively. Post-examination administrative activities, including management review of the examination results and preparation of examination reports, are discussed in ES-501. Cross-references to each of these standards have been provided where appropriate.

C. Responsibilities

Facility licensees and NRC staff should use Form ES-201-1, "Examination Preparation Checklist," to track the examination preparations. As noted on the form, the target due dates can be adjusted as necessary to accommodate a given situation. The NRC chief examiner will initial the items as they are completed and ensure that the original form is retained for the master examination file (refer to ES-501).

1. Facility Licensee

If a facility licensee asks the NRC to prepare the licensing examinations, only those items identified with an asterisk (*) apply.

- a*. The facility licensee is expected to apprise its NRC regional office of changes in its examination requirements.

The facility licensee should respond in writing to the NRC's annual letter soliciting estimated operator licensing needs (including estimated numbers of applicants, examination dates, and the licensee's intended level of participation in developing all parts of the examination). The facility licensee should also notify its NRC regional office if its examination requirements change significantly from those stated in its response. The NRC strongly encourages

facility licensees to schedule their examinations and to resolve any applicant eligibility questions with their NRC regional office *before* commencing an initial license training class.

In accordance with 10 CFR 55.40(c), facility licensees who elect to have the NRC prepare, proctor, and grade any portion of their operator licensing examinations shall submit written requests (to the responsible NRC regional office) for those examinations pursuant to 10 CFR 55.31(a)(3). A response to the NRC's annual letter will satisfy this requirement.

- b*. In accordance with 10 CFR 55.49, facility licensees and applicants shall not engage in any activity that compromises the integrity of any application, test, or examination that is required by 10 CFR Part 55. Attachment 1 to this examination standard summarizes several examination security and integrity considerations. NUREG-1600, "General Statement of Policy and Procedures for NRC Enforcement Actions," dated May 1, 2000, addresses possible enforcement actions against parties who are subject to the requirements in the regulation (i.e., Part 55 license applicants and licensees and Part 50 licensees).
- c. Pursuant to 10 CFR 55.40(b)(2), facility licensees who elect to prepare their own examinations shall establish, implement, and maintain procedures to control examination security and integrity. Attachment 1 discusses a number of examination security and integrity guidelines that may be appropriate for incorporation in those procedures.
- d*. All facility and contractor personnel involved with an examination are subject to the restrictions stated in Section D of this examination standard. Any questions regarding those restrictions should be resolved with the NRC chief examiner before granting an individual access to the licensing examination.

The facility licensee shall designate a point of contact to work with the NRC chief examiner and assign additional personnel as required to ensure that the examinations are developed, reviewed, administered, and graded in accordance with the applicable examination standards. The facility licensee may use contractors or other outside assistance to develop the examinations, but the licensee bears full responsibility for the product, including conformance with the examination criteria and maintenance of examination security and integrity.

- e*. The facility contact shall submit the required reference materials, examination outlines, and examinations, as applicable, based on the level of facility participation. Form ES-201-1 specifies target due dates for the various materials; the actual dates may be adjusted with prior agreement from the NRC regional office. For the purposes of operator training and examination, the facility licensee may "freeze" the plant procedures at a particular revision in order to facilitate examination development. The facility licensee shall discuss this option with the the NRC chief examiner in advance and refer to Attachment 2 for additional guidance on procedure freezes.

- f. The examination outlines and examinations shall be prepared in accordance with the guidelines in ES-301, ES-401, and ES-701, as applicable. The proposed outlines and examinations shall cover all portions of the license examination (written, dynamic simulator, and walk-through) at all license levels relevant to the applicants (RO, SRO, and limited SRO) to be tested.

A facility supervisor or manager shall independently review the examination outline(s) and the proposed examination(s) before they are submitted to the NRC regional office in accordance with Item (g), below.

In conducting this review, the facility supervisor or manager shall use Forms ES-201-2, "Examination Outline Quality Checklist"; ES-301-3, "Operating Test Quality Checklist"; ES-301-4, "Simulator Scenario Quality Checklist"; and ES-401-6, "Written Examination Quality Checklist."

- g. Pursuant to 10 CFR 55.40(b)(3), an authorized representative of the facility licensee shall approve the examination outline(s) and the proposed examination(s) before they are submitted to the NRC regional office for review and approval. The outline(s) and examination(s) should be forwarded to the NRC regional office with a cover letter signed by the facility representative. The materials must be complete and ready-to-use.
- h. In its examination submittal to the NRC, the facility licensee (or its contractor) shall provide the following information for each test item proposed for use as part of the written examination and/or the operating tests:
- State the source of each item (e.g., is the item taken directly, without changes, from the facility licensee's or **any** other bank; is the item a modified version of a bank item; or is the item new?). Facility licensees are encouraged to identify those bank items that were used on an NRC license examination at the facility since October 1995 because they will generally undergo less-rigorous review by the NRC.
 - For those items that were derived by modifying existing bank items, note the changes that were made or submit a copy of the item from which it originated.
- i. The facility licensee shall make its simulation facility available, as necessary, for NRC examiners to prepare for and administer the operating tests. The NRC will make reasonable efforts to minimize the impact on other training activities.

Before developing or administering an initial licensing examination, facility licensees are encouraged to review the simulator examination security considerations in Appendix D to NUREG-1021 for applicability to their facility. Because facility licensees are more familiar than NRC examiners with the unique capabilities, limitations, and vulnerabilities of their simulators, the NRC staff expects licensees to take responsibility for determining and implementing whatever measures might be necessary to ensure the integrity of the operating tests.

Pursuant to 10 CFR 55.46(c)(1)(i) and 55.46(d), facility licensees must ensure sufficient simulator fidelity to allow conduct of the evolutions listed in 10 CFR 55.45(a)(1) – (13), as applicable to the design of the reference plant. In addition, facility licensees must make available for NRC review the results of any uncorrected performance deficiencies that may exist at the time of the operating test.

- j. The facility licensee shall meet with the NRC in the regional office or at the facility, as necessary and appropriate, to review the examinations and discuss potential changes.

If the NRC prepared the examination, the facility reviewers should make their comments and recommendations on a copy of the written examination(s) and operating test(s) provided to them by the NRC examiner. Simple editorial changes that do not change the intent of the question require no justification; however, every substantive change (e.g., deleting a question, replacing a distractor, or revising an answer) must be supported by approved facility reference material.

If the facility licensee has significant concerns with the content or difficulty of the NRC-prepared examination, the changes that the NRC has directed the facility licensee to make in its proposed examination, or the general implementation of the requirements and guidelines in this NUREG, the facility licensee is encouraged to communicate those concerns to the NRC and, if appropriate, to request a meeting with the NRC to address the concerns. The NRC chief examiner is normally the first point of contact for resolving any concerns regarding the examination. If the concerns are not resolved at that level, the facility licensee should contact NRC regional management and, if necessary, the chief of the NRR operator licensing program office for resolution.

- k. If the facility licensee developed the examination, the licensee will generally make any necessary changes as agreed upon with the NRC; however, the NRC retains final authority to approve the examinations.
- l*. In accordance with ES-202, the facility licensee shall submit the license applications along with a letter requesting that licensing examinations be administered.

2. NRC Regional Management, Supervision, and Designees

- a. The regional office shall schedule the NRC's initial operator licensing examinations and shall arrange for the development, administration, and grading of those examinations as discussed below. The regional office shall periodically review each facility licensee's examination requirements and shall negotiate with the facility licensee's training representatives, as necessary, to schedule specific examination dates consistent with operational requirements and NRC resource availability. Each regional office shall plan to prepare at least one complete examination per calendar year.

- b. Approximately 6 months before each anticipated examination date, the regional office should contact the facility licensee and confirm the examination date(s) and the expected number of applicants to be examined. The regional office should use that information to estimate the required number of NRC examiners and to make preliminary work assignments.
- c. The regional office should contact the facility licensee by telephone at least 4 months before the scheduled examinations to reconfirm the expected number of applicants and the examination dates, and to make other preliminary arrangements for developing the examinations. The person who contacts the facility licensee shall discuss the following examination arrangements, as applicable, depending on the facility licensee's level of participation in the examination development process:
- the examination integrity and security requirements and considerations (refer to Attachment 1)
 - the guidance related to freezing plant procedure changes (refer to Attachment 2)
 - the requirement that an authorized representative of the facility licensee must approve the examination outlines and examinations before they are submitted to the NRC for review
 - the need to have the examination outlines delivered to the NRC approximately 75 days before the scheduled examination date
 - the need to have the reference materials necessary for the NRC to develop the examination (if applicable; refer to Attachment 3) delivered to the regional office at least 75, but preferably 90, days before the scheduled examination date
 - the guidelines for developing, administering, and grading the written examinations, as applicable (i.e., the effective version of ES-401, ES-402, and ES-403, respectively)
 - the need to ensure simulator fidelity in accordance with 10 CFR 55.46(c)(1)(i), and to have the simulator and a list of uncorrected performance deficiencies and deviations from the reference plant available at the time of the operating tests
 - the guidelines for developing and administering the operating tests (i.e., the effective version of ES-301 and ES-302, respectively)
 - the need to have the examinations and the supporting reference materials (refer to Attachment 3) delivered to the NRC regional office approximately 45 days before the scheduled examination date

- the option to submit some sample test items (e.g., 5 to 10 written questions, 1 scenario, and 1 to 2 job performance measures) for preliminary NRC review and comment (this could increase the efficiency of the examination review process by promoting early identification and correction of generic examination development concerns)
- the requirements (refer to 10 CFR 55.31) and guidelines (refer to ES-202) for submitting the license applications

The NRC regional office may negotiate earlier due dates with the facility contact, but should refrain from advancing the dates if it is unlikely that the review will begin promptly after the material arrives in the regional office. The regional office should also keep the facility contact informed of the dates by which the region expects to provide its comments regarding the licensee's submittals.

- d. The NRC regional office shall normally issue a letter confirming the arrangements no later than 120 days before the examination begins. The letter should be addressed to the person at the highest level of corporate management who is responsible for plant operations (e.g., Vice President of Nuclear Operations). Attachment 4 is an example of such a letter; the exact wording may be modified, as necessary to reflect the situation.
- e. Approximately 4 months before the scheduled examination, the NRC regional office will assign the required number of examiners to develop, prepare for, and administer the examination as arranged with the facility licensee. The regional office will also designate a chief examiner to coordinate the examination project with the facility licensee and other examiners assigned to the examination. When making assignments, the regional office should consider each examiner's certification status, other examination commitments, possible conflicts of interest (as discussed in Section D of this examination standard), and general availability.

Once the facility licensee has begun preparing the examination, the regional office shall avoid changing the chief examiner assignment unless absolutely necessary. If a change is unavoidable, the responsible supervisor shall attempt to minimize the impact on the facility licensee.

Regional management should try to assign a sufficient number of examiners so that no examiner will have to administer more than four operating tests per week.

- f. The regional office will evaluate each examination assignment to determine if some or all of the assigned examiners should make a separate preparatory site visit. The purposes of such a visit may include providing examiner orientation, retrieving additional reference material, auditing the accuracy of the license applications per ES-202, or reviewing and validating the examinations. When making a decision, the regional office should carefully weigh the costs and benefits associated with each additional trip to the facility. The regional office should also consider such factors as the experience of the assigned examiners, the quality of the facility licensee's examinations (if applicable), the number of written examinations and operating tests to be validated, and the status

of the simulation facility (e.g., is it new or recently upgraded?). In addition, the regional office should consider the alternative of reviewing the written examination(s) and operating test(s) with the facility licensee via telephone (if the examination quality is high) or in the regional office, as well as the alternative of validating the operating test(s) on-site at the beginning of the examination week.

- g. Upon receiving the preliminary license applications, approximately 30 days before the examination date, the regional office shall review the applications in accordance with ES-202. In addition, the regional office shall evaluate any waiver requests in accordance with ES-204 to determine if the applicants meet the eligibility criteria specified in 10 CFR 55.31.
- h. The responsible regional supervisor will review the examination outlines and the draft examinations and evaluate any recommended changes and corrections noted during the chief (and other) examiner's review. (Refer to ES-301 and ES-401 for additional guidance regarding examination reviews). The supervisory review is not intended to be another detailed review, but rather a check to ensure that all applicable administrative requirements have been implemented. If the outlines, examinations, and recommended changes are acceptable, the supervisor will authorize the chief examiner to resolve any noted deficiencies with the author or facility contact.

If any of the facility-developed examination materials (written, walk-through, or simulator) require substantive changes and cannot be made to conform with the examination standards by the end of the designated examination review week, regional management shall consult the NRR operator licensing program office and make a decision whether to proceed with the facility-developed examinations or develop the examinations in-house. If the regional office does not have the resources to ensure that acceptable examinations are prepared by the scheduled administration date, regional management shall negotiate with the facility licensee to reschedule the examinations as necessary. Although it is generally easier to postpone the written examination and focus on the operating tests so that they can be administered on schedule and without affecting examinations at other facilities, regional management may delay either part (written examination or operating test) of an examination for up to 30 days to allow additional time for examination development or to address other scheduling concerns. It is *not* appropriate to delay one part of an NRC examination based on license applicant performance on another part of an NRC examination that has already been administered, or based on applicant performance on facility-administered audit examinations. However, the entire NRC examination may be delayed for other reasons (e.g., applicant readiness) as agreed upon by the regional office. The regional office shall consult the NRR operator licensing program office regarding any delay and notify the facility licensee in writing of the reasons for delaying the examination(s).

The responsible supervisor will also ensure that any significant deficiencies and problems are addressed in the examination report in accordance with ES-501.

- i. After the chief examiner has verified that the necessary changes and corrections have been made, the responsible supervisor will review and approve the examinations for administration. Before signing the applicable quality checklist (i.e., Form ES-301-3 and/or Form ES-401-6), the supervisor must be satisfied that the examination is acceptable for administration.

After approving the examination and license applications, including resolving all waiver requests, the region will prepare an "Examination Approval Letter" (in the format of Attachment 5) and a "List of Applicants" (Form ES-201-4). The letter will notify the facility licensee that the NRC has completed its review of the license applications, confirm that both the NRC and the facility licensee agree that the examination meets the guidelines of NUREG-1021, and provide authorization to the facility licensee to administer the written examinations, if applicable. Form ES-201-4 will identify the approved applicants by name, docket number, and type of examination to be administered (e.g., SRO upgrade, SRO-only written, RO written only). All applicants listed on the form will be administered complete examinations (written and operating) as indicated unless waivers have been granted in accordance with ES-204. A copy of Form ES-201-4 will be distributed to all assigned examiners; however, because it contains information that is protected by the *Privacy Act*, the form will not be attached to the approval letter, but will be provided separately to the facility licensee.

- j. The responsible supervisor shall query the facility licensee management counterpart regarding the licensee's views on the examination sometime before the examination is administered. The following subjects should be considered for discussion, and corrective measures shall be implemented when necessary:

- whether the NRC test item comments were justified and clearly explained
- the licensee's assessment of the significant test item changes
- whether any of the examination changes are believed to render the test items or the examination/test as a whole unfair, and whether this concern was shared with the chief examiner
- whether the NRC asked the licensee to rework any "NRC-validated" questions
- whether the facility licensee requested and was permitted to defer the correction of test item flaws that were identified as minor in nature

- k. If there is an indication that an examination may have been compromised, the responsible supervisor will take action as necessary to ensure and restore the integrity and security of the examination process. Actions may include not giving the examination, making additional changes to the examination, voiding the results if the examination has already been given, reevaluating the licensing decisions pursuant to 10 CFR 55.61(b), and possibly imposing enforcement action in accordance with NUREG-1600. The supervisor shall

keep regional management and the NRR operator licensing program office informed of any concerns regarding examination integrity or security.

3. Assigned NRC Examiners

- a. When assigned to administer operating tests for the first time at a particular facility, the examiner should inform the chief examiner and the responsible supervisor so that arrangements can be made to conduct an orientation trip to the facility as described in Item C.2.f, if deemed appropriate.
- b. NRC examiners monitor and ensure the integrity of the examination process. If they perceive that a compromise has occurred, they must immediately report it to the responsible regional supervisor so that the necessary actions can be taken to restore the integrity of the examination. Attachment 1 summarizes several examination security and integrity considerations that examiners should note when reviewing the procedures that the facility licensee has established pursuant to 10 CFR 55.40(b)(2), as applicable.
- c. The assigned examiners shall review and inventory the reference materials received from the facility licensee in response to the 120-day corporate notification letter. The purpose of this review is to determine if the materials are complete and adequate to enable the regional office to review or develop the examinations, as applicable. If not, the reviewer(s) shall inform the chief examiner and the responsible supervisor and request that the facility licensee send any additional materials that might be required. If necessary, an examiner may review and select additional reference materials during a site orientation trip (refer to Item C.2.f).
- d. The chief examiner will work with the assigned examiners and the designated facility contact, as applicable, to ensure that the examination outlines and examinations are developed in accordance with the applicable examination standards. The chief examiner should adapt the level of oversight and coordination based upon the experience of the individuals who are preparing the examinations. Facility employees are generally less familiar with the examination standards and will require more oversight to ensure that a quality examination is ready on time.
- e. The chief examiner will ensure that the examination outlines are independently reviewed using Form ES-201-2, "Examination Outline Quality Checklist," as a guide; if the chief examiner prepared any portion of the outline, another NRC examiner shall perform that part of the independent review. The NRC reviewer(s) will initial Column "c" of Form ES-201-2 for the specific items they reviewed. A thorough and timely review (i.e., within 5 working days) will minimize the potential for significant problems with the examinations.

The chief examiner will note/review any necessary changes and forward the outlines to the responsible supervisor for review and comment before resolving any deficiencies with the author or facility contact. The chief examiner will document his/her review/concurrence, as applicable, by signing the bottom

of the form. If the outlines are significantly deficient, refer to Item C.2.h for additional guidance.

- f. The chief examiner will ensure that the written examinations and operating tests are independently reviewed for quality in accordance with the applicable checklists (refer to ES-301 and ES-401) forwarded with the examination. If the chief examiner wrote any portion of the examination, another NRC examiner shall perform the independent review of that portion. The NRC reviewer(s) will initial Column "c" of the applicable checklist for the specific item(s) they reviewed. The regional office may conduct additional reviews at its discretion if resources permit.

It is especially important that facility-developed written examinations and operating tests be reviewed promptly because of the extra time that may be required if extensive changes are necessary. The written examination sampling review (as described in Section E of ES-401) should be completed within 1 week after receiving the examination, and the balance of quality reviews should be completed within 2 weeks after the written examinations and operating tests are received from the author or facility contact.

The chief examiner will note any necessary changes and forward the written examinations and operating tests to the responsible supervisor for review and comment before reviewing the examinations with the author or facility contact. The chief examiner will document his/her review/concurrence, as applicable, by signing the bottom of each quality checklist. There are no minimum or maximum limits on the number or scope of changes the NRC may direct the facility licensee to make to its proposed examinations, provided that they are necessary to make the examinations conform with established acceptance criteria or to attain an appropriate level of examination difficulty. Chief examiners shall exercise their experience and judgement to ensure that the level of difficulty remains consistent with that expected on NRC-prepared examinations. If the examinations are significantly deficient, refer to Item C.2.h for additional guidance. The chief examiner shall document the responsible supervisor's authorization to proceed with for the facility review by initialing Item 11 on Form ES-201-1.

- g. Upon supervisory approval, generally about 2 weeks before the examinations are scheduled to be given, the chief examiner will review the written examinations and operating tests with the facility licensee.

The chief examiner may conduct the examination review via telephone, in the regional office, or at the facility, as appropriate to the circumstances, depending on the extent of the changes, and as approved by the responsible regional supervisor (refer to Item C.2.f).

If the NRC staff prepared the examination, the regional office will provide a copy of the written examination(s) and operating test(s) to the facility reviewers after they sign the security agreement (Form ES-201-3); if necessary to promote efficiency, this may be done before the actual review. The facility reviewers

should make their comments directly on the examination(s), return the marked-up copies to the NRC chief examiner, and ensure that he or she understands their comments and recommendations. The facility reviewers may retain a copy of the marked-up examination(s), subject to the physical security considerations in Attachment 1.

If the facility reviewers have significant disagreements with the chief examiner, the chief examiner will inform the responsible regional supervisor so that the disagreements can be resolved before the examinations are administered.

- h. After the examination corrections have been made, the chief examiner shall verify that the changes are appropriate and route the examinations and the marked-up drafts to the responsible supervisor for final approval.
- i. As soon as possible after the responsible supervisor has approved the operating tests for administration, the chief examiner shall distribute copies of the scenarios, job performance measures (JPMs), and questions to the other assigned examiners so that they can familiarize themselves with those materials and be better prepared to probe the applicants' deficiencies if required.
- j. The chief examiner should work with the designated facility contact to schedule the operating tests to optimize efficiency and the mix of RO and SRO applicants in the crews assembled for the simulator examinations. The chief examiner may elect to make or change the facility licensee's crew assignments; however, crew changes will generally not be made less than 2 weeks before the date on which the examinations are scheduled to begin, so that the affected applicants have some time to adapt to working as a crew. When assembling crews for the simulator examinations, surrogate operators should be used only when they are required to complete an operating crew. A facility licensee may not replace license applicants with surrogates solely because the applicants have performed the minimum required number of events or scenarios. If an applicant would be exposed to only *one* additional scenario above the minimum required, a surrogate operator should not be used in place of a license applicant. However, no applicant will be required to participate in *more* than one scenario above the minimum required, in which case, a surrogate operator should be used. If, at the discretion of the chief examiner, it is desired to use surrogate operators contrary to the above guidance, the operator licensing program office should be consulted prior to implementation.

The number of applicants on a crew shall not exceed the number of assigned examiners (i.e., one-on-one evaluations are mandatory), except as noted below. However, if the facility licensee's technical specifications routinely require more than two ROs to be stationed in the control room, the chief examiner may authorize the use of additional surrogates. Only one individual (applicant or surrogate) is allowed to fill a shift supervisor or manager position during the simulator operating test.

If a three-person operating crew consists entirely of SRO-upgrade applicants (who do not have to be evaluated on the control boards), the region may assign

only two examiners to observe the crew. Although the applicants in the RO and balance-of-plant positions may not be individually evaluated, they will be graded and held accountable for any errors that occur as a result of their action(s) or inaction(s). SRO-instant applicants will always be individually evaluated, regardless what operating position they are filling during a given scenario.

Normally, for purposes of test integration and continuity, the same examiner should administer all three operating test categories to an applicant. However, under certain circumstances, the walk-through portion of the operating test may be divided among different examiners. Such division is appropriate if a facility licensee's simulator is not located near the plant, because of limitations in examiner resources or scheduling, or if a facility licensee requests examinations for an unusually large group of applicants. Refer to ES-302 for specific instructions regarding administration of the operating tests.

Operating tests will normally be administered on regular work days. If weekend or shift work is required to administer the operating tests, the chief examiner will coordinate the arrangements with the assigned examiners and the facility licensee.

The written examinations may be administered as soon as they and the license applications (including any applicable waivers) have been approved. The region shall not allow the written examination and operating test dates to diverge by more than 30 days without obtaining concurrence from the NRR operator licensing program office.

If, as an efficiency measure, the facility licensee prepared the written examinations or operating tests in conjunction with another facility, the two examinations/tests must be administered at the same time.

If the examination schedule has to be changed on short notice, the chief examiner will work with his or her supervisor and the designated facility contact to reschedule the examinations to a time when examiners are available and other examinations are not affected.

- k. If the facility licensee will administer the written examinations, the chief examiner shall review the ES-402 requirements (e.g., proctoring and responding to applicant questions) and confirm the applicant's status on Form ES-201-4 (i.e., examination type and waivers) with the facility contact before the examinations are given.

D. Personnel Restrictions

It is impossible to define criteria that anticipate every possible conflict-of-interest issue. Supervisors must apply sound judgment to the facts of each case. If any doubt exists regarding a particular case, the supervisor should consult with regional management and/or the NRR operator licensing program office to resolve the issue.

1. NRC Examiners

- a. The regional office shall not assign an examiner who failed an applicant on an operating test to administer any part of that applicant's retake operating test.
- b. If an examiner was previously employed by a facility licensee (or one of its contractors) and was significantly involved in training the current license applicants, the regional office will not assign that examiner any direct responsibilities for developing or administering written examinations or operating tests at that facility. Regional management will control other in-office examination activities concerning the facility, such as technical consultation and quality reviews of examinations.
- c. If an examiner is assigned to an examination that might appear to present a conflict of interest, the examiner shall inform his or her immediate supervisor of the potential conflict. Such notifications should include the following information:
 - the nature and extent of previous personal and professional relationships with the applicants
 - anything that could affect the administration, performance, evaluation, or results of the examination
 - anything that could create the *appearance* of a conflict of interest

2. Facility Personnel

- a. Although there is no specific upper limit to the number of facility personnel who have access to the NRC licensing examination, the facility licensee shall ensure that access is limited on a need-to-know basis. Moreover, the facility licensee should limit each person's access to only those portions of the examination for which the individual bears responsibility (e.g., the individuals who prepare the simulator scenarios may not require access to the written examinations).
- b. All personnel who will receive detailed knowledge of any portion of the NRC licensing examination, including the examination outline, must acknowledge their responsibilities by reading and signing Form ES-201-3, "Examination Security Agreement," before they obtain detailed knowledge and again after the examinations are complete. Prohibited activities for personnel who have signed Form ES-201-3 include the following examples:
 - the design and administration of any classroom and simulator instruction (including scheduled sessions, individual coaching, and remedial training) specifically for the license applicants (Simulator booth operation is acceptable if the individual does not select the training content or provide direct or indirect feedback. Continued participation in requalification training for groups including SRO upgrade applicants

is also acceptable, as long as it is documented on Form ES-201-3 and is limited to areas in which the instructor has no examination knowledge.)

- all on-the-job training, practice, coaching, and sign-offs
- the preparation, review, grading, and evaluation of periodic quizzes, examinations, and simulator exercises (Individuals on the security agreement may prepare and grade the audit examination, subject to an NRC review for test item duplication.)

Supervisors and managers having knowledge of the examination content may continue their general oversight of the training program for the license applicants, including the review of examinations, quizzes, and remedial training programs, as well as the counseling of applicants concerning non-technical issues. However, those supervisors and managers may not provide any technical guidance, training, or other direct feedback regarding the content of those examinations, quizzes, or programs in a manner that might compromise the integrity of the licensing examination as defined in 10 CFR 55.49.

The original security agreement forms must be submitted to the NRC's regional office for retention after the examinations are complete.

E. Attachments/Forms

Attachment 1,	"Examination Security and Integrity Considerations"
Attachment 2,	"Guidelines for Freezing Plant Procedures"
Attachment 3,	"Reference Material Guidelines for Initial Licensing Examinations"
Attachment 4,	"Sample Corporate Notification Letter"
Attachment 5,	"Sample Examination Approval Letter"
Form ES-201-1,	"Examination Preparation Checklist"
Form ES-201-2,	"Examination Outline Quality Checklist"
Form ES-201-3,	"Examination Security Agreement"
Form ES-201-4,	"List of Applicants"

NRC and facility licensee personnel must be attentive to examination security measures to ensure compliance with 10 CFR 55.49. Moreover, pursuant to 10 CFR 55.40(b)(2), facility licensees who elect to prepare their own examinations must establish, implement, and maintain procedures to control examination security and integrity. At the time the examination arrangements are confirmed, an NRC examiner shall review the facility licensee's security procedures and brief the facility contact on the following examination security guidelines. Although these guidelines are not regulatory requirements, the NRC staff encourages facility licensees to consider them when establishing their own procedures.

Physical Security Guidelines

1. The NRC expects that personnel will be aware of the facility licensee's physical security measures and requirements (as documented in the facility licensee's approved procedures), sign the NRC's examination security agreement, and understand their security responsibilities, including the limits on their interaction with the license applicants (as discussed in Section D.2 of ES-201), before they are given knowledge or custody of any examination materials.
2. The examination outlines and final examinations shall be positively and continuously controlled and protected as sensitive information (i.e., under lock-and-key or in the custody of someone who has signed the security agreement). The number of copies of outlines and examinations should be limited, and each should be uniquely identified and controlled (e.g., with sign-out custody) at all times. Drafts, copies, and waste materials must also be controlled and disposed of properly.

The NRC staff recommends that facility licensees should consider implementing additional security measures when they are developing, storing, or printing examinations using a computer network to which license applicants or other persons who have not signed the security agreement could gain access. Although the use of passwords should provide adequate security if normal computer security practices (e.g., selecting and changing passwords) are observed, special cases may need additional consideration. For example, if a trainee has extended access to the local area network (LAN) in his normal position, additional security measures might be appropriate.

3. The examination outlines, written examinations, and operating tests that are sent to the NRC's regional office shall be placed in a double envelope. The inner envelope shall be conspicuously marked "FOR OFFICIAL USE ONLY" and "TO BE OPENED BY ADDRESSEE ONLY." Furthermore, the cover letter forwarding the examination materials shall state that the materials must be withheld from public disclosure until after the examinations are complete.

The facility licensee should follow up on its examination mailing by communicating with the NRC chief examiner to ensure that the package was received.

The examination outlines and examinations shall not be transmitted via non-secure electronic means. However, they may be transmitted via the NRC's "AUTOS" LAN in the resident inspector's office or as password-protected electronic files over the Internet if the licensee's word processing software provides adequate security and is compatible with the NRC's, and the password is separately provided to the NRC chief examiner by mail (**not** email), fax, or phone. The files do not need to be encrypted.

4. The facility licensee is expected to immediately report to the NRC chief examiner any indications or suggestions that examination security may have been compromised, even if the situation is identified and corrected before the examination is submitted to the NRC for review and approval. The NRC will evaluate such situations on a case-by-case basis and determine the appropriate course of action.
5. The facility licensee and the NRC should determine if examination security problems were noted in the past and ensure that corrective actions have been taken to preclude recurrence.
6. The facility licensee and the chief examiner will review the simulator security considerations in Appendix D to ensure that the instructor station features, programmers' tools, and external interconnections do not compromise examination integrity. The primary objective is to ensure that the exam material cannot be read or recorded at other unsecured consoles, and that examination materials are either physically secured or electronically protected when not in use by individuals listed on the security agreement.

Examination Bank Limitations

1. The facility licensee and chief examiner shall ensure that written examinations and operating tests conform with the guidelines in ES-301 and ES-401 regarding the use of items taken directly from the bank, modified items, and new items.
2. If the facility licensee has an open bank, it will not place any new or modified test items (written questions, JPMs, or simulator scenarios) that will be used on the examination in its examination bank until after the last examination has been administered.

Other Considerations

1. The NRC will consider an examination to be potentially compromised if any activity occurs that could affect the equitable and consistent administration of the examination, regardless of whether the activity takes place before, during, or after the examination is administered.
2. The license applicants should not be able to predict or narrow the possible scope or content of the licensing examination based on the facility licensee's examination practices (other than those authorized by NUREG-1021 or in writing by the NRC).
3. Facility licensees are responsible for the integrity, security, and quality of examinations prepared for them by contractor personnel.

The NRC understands that facility licensees may wish to train and examine their license applicants to the same version of plant procedures. At their discretion, facility licensees may "freeze" plant procedures to a particular revision for purposes of applicant training and examination development (either for facility-prepared examinations or as reflected in the reference materials submitted for NRC-prepared examinations). The NRC does not have any specific requirements related to the timing of procedure freezes, but offers the following general guidance and cautions:

- Clearly, the later the procedures are frozen the better, thereby limiting the disparity between training/testing and current plant operations. Alternatively, facility licensees could choose to not freeze procedures at all, but rather track any procedure changes and make adjustments to the training and examinations as required. However, depending on the nature and volume of changes, this alternative could impose a significant additional burden on the facility and NRC examiners to ensure that procedure revisions affecting test items are reconciled prior to exam administration.
- Note that applicants will be exposed to the current version of the procedures when they spend time in the control room. Therefore, freezing procedures for the exam has the potential to confuse applicants, by testing them on a different version of procedures than they have seen. There have been cases in which such confusion contributed to applicants' failure on the written examination, because they based their answer on the wrong version of procedures. If the procedures are frozen, the applicants must be informed of the date of the procedure freeze, such that they have a complete understanding of which versions of the procedures the NRC examination is based upon. Note that freezing different procedures at different times would probably just add to their confusion.
- Examination authors and NRC reviewers need to consider the implications of the freeze when they develop the examination; for example, the plausibility and correctness of a distractor should not hinge on a procedure change that has not yet been incorporated into the frozen version of the procedure. Another consideration is whether the simulator will support the implementation of both procedure versions - the new one for license holders and the old one for the applicants.
- If changes in the procedures occur after the freeze and before the licensing date, the NRC would expect the facility licensee to provide training to fill the gap; if the changes are significant, the NRC would likely request more information about the nature of such training and testing. In at least one instance, applicants were trained and tested on a new version of the emergency operating procedures (EOPs) that had not yet been implemented in the plant; this eliminated the need to retrain the applicants but prompted the NRC to delay their licensing until the new EOPs went into effect.

The facility contact should discuss the details of and basis for their freeze proposal with their NRC contact when confirming the examination arrangements as discussed in Section C.2.c of ES-201 of NUREG-1021. The chief examiner, in consultation with the regional operator licensing supervisor (and the operator licensing program office, if deemed necessary), will review the facility's proposal and negotiate a mutually acceptable plan and cut-off date.

This attachment discusses the reference materials that facility licensees are expected to provide for each NRC initial licensing examination. The regional office will customize the list of reference materials, as required, to support the specific examination assignment; the regional office may request additional materials at a later time, if necessary, to ensure the accuracy and validity of the examinations.

In determining the need for reference materials, the regional office will consider the facility licensee's level of participation in the examination development process. If the facility licensee will prepare the examinations, it may be sufficient to obtain only those references necessary to review and validate the items that appear on the examination, plus a set of key procedures and other documents required to prepare for the operating tests. The regional office will duly consider the administrative burden it places on the facility licensee and will request only those materials that are actually necessary for the NRC examiners to prepare for the examinations.

All reference materials provided for the license examinations should be approved, final issues and should be so marked; any personal, proprietary, sensitive, or safeguards information should be marked and submitted in a separate enclosure. If any of the material is expected to change before the scheduled examination date, the facility licensee should reach agreement with the NRC chief examiner regarding changes before the examinations are administered.

The facility licensee may submit reference materials on computer diskettes (in a format that is compatible with the NRC's word processing software), as hard copy, or a combination, as arranged with the NRC chief examiner. If the facility licensee prepares the examinations, the hard-copy references should normally be limited to those materials required to validate the selected test items. All procedures and reference materials should be bound with appropriate indices or tables of contents so that they can be used efficiently; a master table of contents should be provided for all materials sent. Failure to provide complete, properly bound, and indexed reference materials may prompt the NRC to return the materials to the person at the highest level of corporate management responsible for plant operations. The returned reference materials will be accompanied by a cover letter explaining the deficiencies in the materials and the basis for postponing or canceling the examinations.

Unless otherwise instructed by the NRC's regional office, the facility licensee is expected to provide the following reference materials for each NRC initial licensing examination:

1. Materials used by the facility licensee to ensure operator competency
 - a. The following types of materials used to train applicants for initial RO and SRO licensing, as necessary to support examination development:
 - learning objectives, student handouts, and lesson plans
 - system descriptions, drawings, and diagrams of all operationally relevant flow paths, components, controls, and instrumentation

- material used to clarify and strengthen understanding of normal, abnormal, and emergency operating procedures
- complete, operationally useful descriptions of all safety system interactions and, where available, balance-of-plant system interactions under emergency and abnormal conditions, including consequences of anticipated operator errors, maintenance errors, and equipment failures, as well as plant-specific risk insights based on a probabilistic risk analysis (PRA) and individual plant examination (IPE)

These materials should be complete, comprehensive, and of sufficient detail to support the development of accurate and valid examinations without being redundant.

- b. Questions and answers specific to the facility training program that may be used in the written examinations or operating tests
 - c. Copies of facility-generated simulator scenarios that expose the applicants to abnormal and emergency conditions, including degraded pressure control, degraded heat removal capability, and containment challenges, during all modes of operation, including low-power conditions (A description of the scenarios used for the training class may also be provided.)
 - d. All JPMs used to ascertain the competence of the operators in performing tasks within the control room complex and outside the control room (i.e., local operations) as identified in the facility's job task analysis (JTA) (JPMs should evaluate operator responsibilities during normal, abnormal, and emergency conditions and events, and during all modes of operation including cold shutdown, low power, and full power.)
2. Complete index of procedures (including all categories sent)
 3. All administrative procedures applicable to reactor operation or safety
 4. All integrated plant procedures (normal or general operating procedures)
 5. All emergency procedures (emergency instructions, abnormal or special procedures)
 6. Standing orders (important orders that are safety-related and may modify the regular procedures)
 7. Surveillance procedures that are run frequently (i.e., weekly) or that can be run on the simulator
 8. Fuel handling and core loading procedures (if SRO applicants will be examined)

9. All annunciator and alarm procedures
10. Radiation protection manual (radiation control manual or procedures)
11. Emergency plan implementing procedures
12. Technical Specifications or similar technical requirements documents (and interpretations, if available) for all units for which licenses are sought
13. System operating procedures
14. Technical data book and plant curve information used by operators, as well as the facility precautions, limitations, and set points document
15. The following information pertaining to the simulation facility:
 - a. list of all initial conditions
 - b. list of all malfunctions with identification numbers and cause-and-effect information, including a concise description of the expected result or range of results that will occur upon initiation and an indication of which annunciators will be actuated as a result of the malfunction
 - c. a description of the simulator's failure capabilities for valves, breakers, indicators, and alarms
 - d. the range of severity of each variable malfunction (e.g., the size of a reactor coolant or steam leak, or the rate of a component failure such as a feed pump, turbine generator, or major valve)
 - e. a list of modeling conditions (e.g., simplifications, assumptions, and limits) and problems that may affect the examination
 - f. a list of any known performance test discrepancies not yet corrected
 - g. a list of differences between the simulator and the reference plant's control room
 - h. simulator instructor's manual
16. Any additional plant-specific material that the NRC examiners have requested to develop examinations that meet the guidelines of these standards and the regulations

(Date)

(Name, Title)

(Name of facility)

(Address)

(City, State, Zip code)

Dear (Name):

In a telephone conversation on (date) between Mr./Ms. (Name, Title) and Mr./Ms. (Name, Title), arrangements were made for the administration of licensing examinations at (facility name) during the week(s) of (date).

As agreed during the telephone conversation, [your staff][[the staff of the U.S. Nuclear Regulatory Commission (NRC)]] will prepare the examinations based on the guidelines in Revision 9, Supplement 1, of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors." [The NRC's regional office will discuss with your staff any changes that might be necessary before the examinations are administered.][[Your staff will be given the opportunity to review the examinations during the week of (date).]]

To meet the above schedule, it will be necessary for your staff to furnish the [examination outlines by (date). The written examinations, operating tests, and supporting] reference materials identified in Attachment 3 to ES-201 [will be due] by (date). [Pursuant to Title 10, Section 55.40(b)(3), of the Code of Federal Regulations (10 CFR 55.40(b)(3)), an authorized representative of the facility licensee shall approve the outlines, examinations, and tests before they are submitted to the NRC for review and approval. All materials shall be complete and ready-to-use.] We request that any personal, proprietary, sensitive unclassified, or safeguards information in your response be contained in a separate enclosure and appropriately marked. Any delay in receiving the required [examination and] reference materials, or the submittal of inadequate or incomplete materials, may cause the examinations to be rescheduled.

In order to conduct the requested written examinations and operating tests, it will be necessary for your staff to provide adequate space and accommodations in accordance with ES-402, and to make the simulation facility available on the dates noted above. In accordance with ES-302, your staff should retain the original simulator performance data (e.g., system pressures, temperatures, and levels) generated during the dynamic operating tests until the examination results are final.

Appendix E to NUREG-1021 contains a number of NRC policies and guidelines that will be in effect while the written examinations and operating tests are being administered.

To permit timely NRC review and evaluation, your staff should submit preliminary reactor operator and senior reactor operator license applications (Office of Management and Budget (OMB) approval number 3150-0090), medical certifications (OMB approval number 3150-0024), and waiver requests (if any)(OMB approval number 3150-0090) at least 30 days before the first examination date. If the applications are not received at least 30 days before the examination

date, a postponement may be necessary. Signed applications certifying that all training has been completed should be submitted at least 14 days before the first examination date.

This letter contains information collections that are subject to the *Paperwork Reduction Act of 1995* (44 U.S.C. 3501 et seq.). These information collections were approved by OMB, under approval number 3150-0018, which expires on June 30, 2009. The public reporting burden for this collection of information is estimated to average [500] [[50]] hours per response, including the time for reviewing instructions, gathering and maintaining the data needed, [writing the examinations,]and completing and reviewing the collection of information. Send comments on any aspect of this collection of information, including suggestions for reducing the burden, to the Information and Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet electronic mail to BJS1@nrc.gov; and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0018), Office of Management and Budget, Washington, DC 20503.

The NRC may neither conduct nor sponsor, and a person is not required to respond to, an information collection, unless it displays a currently valid OMB control number.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the Electronic Reading Room page of the NRC's public Web site at <http://www.nrc.gov/reading-rm/adams.html>.

Thank you for your cooperation in this matter. (Name) has been advised of the policies and guidelines referenced in this letter. If you have any questions regarding the NRC's examination procedures and guidelines, please contact (name of regional contact) at (telephone number), or (name of responsible regional supervisor) at (telephone number).

Sincerely,

(Appropriate regional representative,
Title)

Docket No.: 50-(Number)

Distribution: Public
NRC Document Control System
Regional Distribution

- [] Include only for examinations to be prepared by the facility licensee.
[[]] Include only for examinations to be prepared by the NRC.

(Date)

(Name, Title)

(Name of facility)

(Address)

(City, State, Zip code)

SUBJECT: OPERATOR LICENSING EXAMINATION APPROVAL

Dear (Name):

The purpose of this letter is to confirm the final arrangements for the upcoming operator licensing examinations at (Facility).

The NRC has completed its review of the operator license applications submitted in connection with this examination and separately provided a list of approved applicants to (Name, Title). Note that any examination waivers and application denials have been addressed in separate correspondence.

The NRC has approved the subject examinations and hereby authorizes you to administer the written examinations in accordance with Revision 9, Supplement 1, of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," on (date). The NRC staff will administer the operating tests during the week of (date). This examination has undergone extensive review by my staff and representatives responsible for licensed operator training at your facility. Based on this review I have concluded that the examination meets the guidelines of NUREG-1021 for content, operational, and discrimination validity. By administering this examination, you also agree that it meets NUREG-1021 guidelines, and is appropriate for measuring the qualifications of licensed operator applicants at your facility. If you determine that this examination is not appropriate for licensing operators at your facility, do not administer the examination and contact me at (phone number).

Please contact your Chief Examiner, (Name), at (phone number), if you have any questions or identify any errors or changes in the license level (RO or SRO) or type of examination (partial or complete written examination and/or operating test) specified for each applicant.

Sincerely,

(Appropriate regional representative,
Title)

Docket No.: 50-

cc: Public
NRC Document Control System
Regional Distribution

Facility: _____		Date of Examination: _____
Developed by: Written - Facility <input type="checkbox"/> NRC <input type="checkbox"/> // Operating - Facility <input type="checkbox"/> NRC <input type="checkbox"/>		
Target Date*	Task Description (Reference)	Chief Examiner's Initials
-180	1. Examination administration date confirmed (C.1.a; C.2.a and b)	
-120	2. NRC examiners and facility contact assigned (C.1.d; C.2.e)	
-120	3. Facility contact briefed on security and other requirements (C.2.c)	
-120	4. Corporate notification letter sent (C.2.d)	
[-90]	[5. Reference material due (C.1.e; C.3.c; Attachment 3)]	
{-75}	6. Integrated examination outline(s) due, including Forms ES-201-2, ES-201-3, ES-301-1, ES-301-2, ES-301-5, ES-D-1's, ES-401-1/2, ES-401-3, and ES-401-4, as applicable (C.1.e and f; C.3.d)	
{-70}	[7. Examination outline(s) reviewed by NRC and feedback provided to facility licensee (C.2.h; C.3.e)]	
{-45}	8. Proposed examinations (including written, walk-through JPMs, and scenarios, as applicable), supporting documentation (including Forms ES-301-3, ES-301-4, ES-301-5, ES-301-6, and ES-401-6, and any Form ES-201-3 updates), and reference materials due (C.1.e, f, g and h; C.3.d)	
-30	9. Preliminary license applications (NRC Form 398's) due (C.1.i; C.2.g; ES-202)	
-14	10. Final license applications due and Form ES-201-4 prepared (C.1.i; C.2.i; ES-202)	
-14	11. Examination approved by NRC supervisor for facility licensee review (C.2.h; C.3.f)	
-14	12. Examinations reviewed with facility licensee (C.1.j; C.2.f and h; C.3.g)	
-7	13. Written examinations and operating tests approved by NRC supervisor (C.2.i; C.3.h)	
-7	14. Final applications reviewed; 1 or 2 (if >10) applications audited to confirm qualifications / eligibility; and examination approval and waiver letters sent (C.2.i; Attachment 5; ES-202, C.2.e; ES-204)	
-7	15. Proctoring/written exam administration guidelines reviewed with facility licensee (C.3.k)	
-7	16. Approved scenarios, job performance measures, and questions distributed to NRC examiners (C.3.i)	
<p>* Target dates are generally based on facility-prepared examinations and are keyed to the examination date identified in the corporate notification letter. They are for planning purposes and may be adjusted on a case-by-case basis in coordination with the facility licensee.</p> <p>[Applies only] (Does not apply) to examinations prepared by the NRC.</p>		

Facility: _____		Date of Examination: _____		
Item	Task Description	Initials		
		a	b*	c#
1. W R I T T E N	a. Verify that the outline(s) fit(s) the appropriate model, in accordance with ES-401.			
	b. Assess whether the outline was systematically and randomly prepared in accordance with Section D.1 of ES-401 and whether all K/A categories are appropriately sampled.			
	c. Assess whether the outline over-emphasizes any systems, evolutions, or generic topics.			
	d. Assess whether the justifications for deselected or rejected K/A statements are appropriate.			
2. S I M U L A T O R	a. Using Form ES-301-5, verify that the proposed scenario sets cover the required number of normal evolutions, instrument and component failures, technical specifications, and major transients.			
	b. Assess whether there are enough scenario sets (and spares) to test the projected number and mix of applicants in accordance with the expected crew composition and rotation schedule without compromising exam integrity, and ensure that each applicant can be tested using at least one new or significantly modified scenario, that no scenarios are duplicated from the applicants' audit test(s), and that scenarios will not be repeated on subsequent days.			
	c. To the extent possible, assess whether the outline(s) conform(s) with the qualitative and quantitative criteria specified on Form ES-301-4 and described in Appendix D.			
3. W / T	a. Verify that the systems walk-through outline meets the criteria specified on Form ES-301-2: (1) the outline(s) contain(s) the required number of control room and in-plant tasks distributed among the safety functions as specified on the form (2) task repetition from the last two NRC examinations is within the limits specified on the form (3) no tasks are duplicated from the applicants' audit test(s) (4) the number of new or modified tasks meets or exceeds the minimums specified on the form (5) the number of alternate path, low-power, emergency, and RCA tasks meet the criteria on the form.			
	b. Verify that the administrative outline meets the criteria specified on Form ES-301-1: (1) the tasks are distributed among the topics as specified on the form (2) at least one task is new or significantly modified (3) no more than one task is repeated from the last two NRC licensing examinations			
	c. Determine if there are enough different outlines to test the projected number and mix of applicants and ensure that no items are duplicated on subsequent days.			
4. G E N E R A L	a. Assess whether plant-specific priorities (including PRA and IPE insights) are covered in the appropriate exam sections.			
	b. Assess whether the 10 CFR 55.41/43 and 55.45 sampling is appropriate.			
	c. Ensure that K/A importance ratings (except for plant-specific priorities) are at least 2.5.			
	d. Check for duplication and overlap among exam sections.			
	e. Check the entire exam for balance of coverage.			
	f. Assess whether the exam fits the appropriate job level (RO or SRO).			
<div style="display: flex; justify-content: space-between;"> <div> <p>a. Author _____</p> <p>b. Facility Reviewer (*) _____</p> <p>c. NRC Chief Examiner (#) _____</p> <p>d. NRC Supervisor _____</p> </div> <div> <p>Printed Name/Signature</p> </div> <div> <p>Date</p> </div> </div>				
<p>Note: # Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required.</p> <p>* Not applicable for NRC-prepared examination outlines</p>				

1. Pre-Examination

I acknowledge that I have acquired specialized knowledge about the NRC licensing examinations scheduled for the week(s) of _____ as of the date of my signature. I agree that I will not knowingly divulge any information about these examinations to any persons who have not been authorized by the NRC chief examiner. I understand that I am not to instruct, evaluate, or provide performance feedback to those applicants scheduled to be administered these licensing examinations from this date until completion of examination administration, except as specifically noted below and authorized by the NRC (e.g., acting as a simulator booth operator or communicator is acceptable if the individual does not select the training content or provide direct or indirect feedback). Furthermore, I am aware of the physical security measures and requirements (as documented in the facility licensee's procedures) and understand that violation of the conditions of this agreement may result in cancellation of the examinations and/or an enforcement action against me or the facility licensee. I will immediately report to facility management or the NRC chief examiner any indications or suggestions that examination security may have been compromised.

2. Post-Examination

To the best of my knowledge, I did not divulge to any unauthorized persons any information concerning the NRC licensing examinations administered during the week(s) of _____. From the date that I entered into this security agreement until the completion of examination administration, I did not instruct, evaluate, or provide performance feedback to those applicants who were administered these licensing examinations, except as specifically noted below and authorized by the NRC.

	PRINTED NAME	JOB TITLE / RESPONSIBILITY	SIGNATURE (1)	DATE	SIGNATURE (2)	DATE	NOTE
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NOTES:							

ES-202

PREPARING AND REVIEWING OPERATOR LICENSING APPLICATIONS

A. Purpose

This standard provides instructions for facility licensees and applicants to prepare and the NRC to review initial licensing applications. It also discusses the experience, training, education, and certification requirements and guidelines that an applicant should satisfy before being allowed to take an NRC reactor operator (RO), senior reactor operator (SRO), or limited senior reactor operator (LSRO) licensing examination.

B. Background

In accordance with Title 10, Section 55.31(a)(4), of the *Code of Federal Regulations* (10 CFR 55.31(a)(4)), as amended by a rule change dated March 25, 1987, a license applicant must provide evidence that he or she has successfully completed the facility licensee's requirements to be licensed as an RO or SRO. An authorized representative of the facility licensee shall certify this evidence on the license application; the required certification must include the details of the applicant's qualifications, training, and experience. In lieu of these details, the Commission may accept certification that the applicant has successfully completed a Commission-approved training program that is based on a systems approach to training (SAT) and uses a simulation facility that is acceptable to the Commission.

Revision 2 of Regulatory Guide (RG) 1.8, "Qualification and Training of Personnel for Nuclear Power Plants," which was published in conjunction with the 1987 rule change, provided guidance on an acceptable method of implementing this regulation. However, the NRC staff had reviewed¹ the industry's licensed operator training program experience guidelines in effect at the time of the 1987 rule change and determined that they were equivalent to the baseline experience criteria of RG 1.8, Revision 2. Consequently, as indicated in the statement of consideration for the 1987 rule change, a facility licensee's training program would be considered approved by the NRC when it is accredited by the National Nuclear Accrediting Board (NNAB).

On March 19, 1987, the NRC staff published Generic Letter (GL) 87-07, "Information Transmittal of Final Rulemaking for Revisions to Operator Licensing: 10 CFR Part 55 and Conforming Amendments." Specifically, GL 87-07 informed facility licensees that they have the option to substitute an accredited, SAT-based program in lieu of the operator training program that the NRC staff previously approved for the given facility. The GL also indicated that facility licensees may implement this option upon providing written notification to the NRC and without the need for any staff review. In addition, the GL noted the NRC's expectation that facility licensees would update their licensing-basis documents (e.g., their final safety analysis reports (FSARs) and technical specifications (TSs)), as necessary, to conform with their accredited program status.

¹ The NRC staff conducted this review pursuant to the Commission's continued endorsement of the industry's accreditation process, which the Commission first conferred in its "Final Policy Statement on Training and Qualification of Nuclear Power Plant Personnel" (50 FR 11147), dated March 20, 1985.

In November 1987, the NRC published NUREG-1262, "Answers to Questions at Public Meetings Regarding Implementation of Title 10, *Code of Federal Regulations*, Part 55 on Operators' Licenses," which reiterated and clarified the NRC staff's expectations regarding licensees' compliance with 10 CFR 55.31(a), Revision 2 of RG 1.8, and accredited training programs, as well as the need for facility licensees to update their licensing-basis documents in accordance with 10 CFR 50.71(e). NUREG-1262 also reminded facility licensees that Revision 2 of RG 1.8 would go into effect on March 31, 1988. In addition, this NUREG noted that facilities with NNAB-accredited license training programs do not need to meet the guidance in Revision 2 of RG 1.8.

In summary, the NRC has not changed its requirements or position with regard to license eligibility for ROs and SROs since 1987. RG 1.8 (Revision 2 or 3) and the guidelines for education and experience promulgated by the National Academy for Nuclear Training (NANT)² — including those that were in effect in 1987 and those that were issued in January 2000 — outline acceptable methods for implementing the Commission's regulations in this area. In addition, methods different from those set forth in RG 1.8 (Revision 2 or 3) or the NANT guidelines may be acceptable if a facility licensee provides an adequate basis for using such methods.

The staff encourages all facility licensees to review their requirements and commitments related to RO and SRO education and experience and to update their documentation (e.g., FSAR, TSs, and training program descriptions) to enhance consistency and minimize confusion.

When a facility licensee's licensed operator training program description and/or licensing-basis documents contain education and experience requirements that are more restrictive than either Revision 3 of RG 1.8 or the current NANT guidelines, the most restrictive requirements will continue to apply pending the initiation of action by the licensee to amend these requirements; any required TS changes would be considered administrative in nature.

Operator license applicants and facility licensees must provide the NRC with sufficient information to enable the staff to determine whether to grant or deny the applications. However, some facility licensees did not respond to GL 87-07 and/or failed to update their licensing-basis documents to eliminate inconsistencies and contradictions. This has made it difficult for the NRC staff to determine whether some license applicants have successfully completed their facility licensee's requirements to be licensed as an RO or SRO. Nonetheless, the fact that every facility licensee has voluntarily obtained and periodically renewed the accreditation of its licensed operator training program suggests that every facility licensee is implementing the education and experience guidelines endorsed by the NNAB. Specifically, the NRC staff understands that the current version of those guidelines are outlined in the NANT "Guidelines for Initial Training and Qualification of Licensed Operators,"³ which were issued in January 2000

² The NANT operates under the auspices of the Institute of Nuclear Power Operations (INPO). It integrates the training efforts of all U.S. nuclear utilities, the activities of the NNAB, and the training-related activities of INPO.

³ The NRC staff has reviewed the NANT guidelines and considers them to be equivalent to the agency's guidelines in Revision 3 of RG 1.8, which was published in May 2000. RG 1.8 now endorses American National Standards Institute/American Nuclear Society (ANSI/ANS) Standard 3.1-1993, "Selection, Qualification, and Training of Personnel for Nuclear Power Plants," with certain clarifications, additions, and exceptions. It replaces Revision 2 of RG 1.8, which was issued in conjunction with the 1987 rule change and endorsed the 1981 revision of ANSI/ANS 3.1.

(NANT 2000 guidelines). Consequently, unless otherwise informed by a facility licensee, the NRC staff believes that the education and experience guidelines described in the NANT 2000 guidelines constitute the facility licensee's education and experience requirements to be licensed as an RO or SRO.

In an effort to clarify the situation, the NRC staff revised NRC Form 398, "Personal Qualifications Statement: Licensee," to clarify that when a facility licensee certifies, pursuant to 10 CFR 55.31(a)(4), that an applicant has successfully completed a Commission-approved, SAT-based training program, it means that the applicant meets or exceeds the minimum education and experience guidelines currently outlined by the NANT (and, by extension, Revision 3 of RG 1.8). Facility licensees can use the revised NRC Form 398 to document any exceptions or waivers that the applicant has taken from the baseline education and experience guidelines outlined by the NANT. In addition, recognizing that the only significant difference between Revision 3 of RG 1.8 and the current accreditation guidelines pertains to certified instructors seeking an SRO license, those applicants can use the revised NRC Form 398 to document the details of their experience. This will minimize the potential for misunderstanding and the need to seek additional information.

C. Responsibilities

The regulatory requirements associated with the license application process are detailed in Subpart D, "Applications," of 10 CFR Part 55, while the medical requirements for license applicants and licensed operators appear in Subpart C, "Medical Requirements." NRC staff and license applicant should refer to these requirements as necessary when preparing and reviewing license applications.

1. Applicant/Facility Licensee

- a. To apply for an RO or SRO license, an applicant must submit NRC Form 398, and NRC Form 396, "Certification of Medical Examination by Facility Licensee." (Computer-generated facsimiles are acceptable.) The application is not complete until both forms are filled out, signed by the appropriate personnel, and received by the NRC. Detailed instructions for completing NRC Form 398 are provided with the form. Applicants and facility licensees should pay particular attention to the instructions and note related to Item 12. Additional instructions regarding waivers of training, experience, and examination requirements are provided in ES-204. Instructions for completing NRC Form 396 are also provided with the form. Both Form 396 and 398 are available on the NRC's operator licensing Web page at <http://www.nrc.gov/reactors/operator-licensing/licensing-process.html>.

If the applicant is reapplying following a license denial, 10 CFR 55.35 applies, and the applicant must complete and submit a new Form 398; however, as discussed below, a new Form 396 may not be required. The applicant may file the second application 2 months after the date of the first final denial, a third application 6 months after the date of the second final denial, and successive applications 2 years after the date of each subsequent denial. Each new Form 398 shall describe the extent of the applicant's additional training

since the denial and shall include a certification by the facility licensee that the applicant is ready for reexamination.

If the applicant previously passed either the written examination or the operating test, he or she may request a waiver of that portion of the licensing examination. Such waivers are limited to the first re-application and must be requested within 1 year of the date on which the applicant completed the original examination. The NRC staff will also consider written examination waivers for ROs in good standing who prefer to take only the 25-question, SRO portion of the written examination when they apply to upgrade their licenses. Refer to ES-204 for a more detailed discussion of these and other waiver criteria.

Prior to licensing, every applicant must have a complete medical examination that meets the guidelines in the applicable version of ANSI/ANS 3.4, "Medical Certification and Monitoring of Personnel Requiring Operator Licenses for Nuclear Power Plants," as endorsed by RG 1.134, "Medical Evaluation of Licensed Personnel at Nuclear Power Plants." Although licensed operators can go up to 24 months between medical examinations, new license applicants are generally expected to be examined and certified as fit (on NRC Form 396) no more than 6 months before the anticipated date of licensing. However, if more than 6 months have passed since the date of an applicant's last medical examination or fitness certification on NRC Form 396, the applicant/facility licensee may request a waiver of medical reexamination by checking Item 4.f.4 on NRC Form 398 and certifying in writing, in Item 17, "Comments," that the applicant has not developed any physical or mental condition that would be reportable under 10 CFR 55.25. The NRC staff will consider such a waiver if an applicant is reapplying for a license (because of withdrawing a previous application, final license denial on a previous application, or terminating a previous license at the same facility), or if an examination is delayed from its originally scheduled date. (Refer to ES-204 for more information on waivers.) However, if an applicant's physical or mental condition has changed, or the time since the applicant's last complete medical examination is expected to exceed 24 months before the licensing action is completed, the applicant shall be reexamined by a physician and the facility licensee shall recertify the applicant's medical fitness on NRC Form 396. Licensed ROs upgrading to an SRO license need not have an additional medical examination or waiver request, as long as their medical status as a licensed RO is up to date at the time of application, including a complete medical examination within the past 24 months.

In accordance with Section 3.1 of ANSI/ANS 3.4-1996, which the NRC endorsed in Revision 3 of RG 1.134, the examining physician may delegate portions of the medical examination to a licensed nurse practitioner or licensed physician's assistant who is familiar with the ANSI/ANS 3.4-1996 and the activities required of a nuclear power plant operator or senior operator. However, the physician has the ultimate responsibility for certifying that the medical examination was conducted in accordance with the standard and that the applicant meets the medical requirements. The names and license numbers of all medical practitioners (but not laboratory technicians) who were substantially involved in the examination should be entered on NRC Form 396.

- b. Each new applicant (except those applying for an LSRO license or an SRO upgrade license at the same facility) must satisfactorily complete the NRC's generic fundamentals examination (GFE) section of the written operator licensing examination for the applicable reactor type (boiling- or pressurized-water) within 24 months before the date of application. Applicants who passed a GFE on the same reactor type more than 24 months before the date of application may request a waiver of the GFE in accordance with ES-204. Refer to ES-205 for more information on the GFE program.
- c. Pursuant to 10 CFR 55.31(a)(5), new applications must include the number of significant control manipulations affecting reactivity or power level in Item 14, "Significant Control Manipulations." At least five manipulations are required on the facility for which the license is sought or a plant-referenced simulator. Control manipulations performed on the plant-referenced simulator may be chosen from a representative sampling of the control manipulations and plant evolutions described in 10 CFR 55.59(c)(3)(i)(A-F), (R), (T), (W), and (X), as applicable to the design of the plant for which the license application is submitted. Power changes (Items (E) and (F)) performed on the simulator must be 10 percent or greater in magnitude, while those on the plant may be smaller but of sufficient magnitude for the operator to experience appropriate feedback (i.e., clearly observable effects on the plant) as a result of the control manipulation. Every effort should be made to perform at least some of the manipulations on the actual plant and to diversify the reactivity and power changes for each applicant. For ROs applying for an SRO license, certification that the operator has successfully operated the controls of the facility as a licensed operator shall be accepted as evidence of having completed the required manipulations.

Facility licensees who propose to use a plant-referenced simulator to perform the control manipulations required by 10 CFR 55.31(a)(5) must ensure that simulator fidelity has been demonstrated pursuant to 10 CFR 55.46(c).

- d. Neither 10 CFR Part 55 nor Section 107 of the *Atomic Energy Act* requires license applicants to be citizens of the United States; therefore, non-citizens may apply for a license without having to obtain a waiver or exemption. However, all applicants must meet the requirements for unescorted access to a nuclear power facility pursuant to 10 CFR 73.56 – 57, including a criminal history check and background investigation.
- e. As noted in ES-201, the facility licensee should submit preliminary, uncertified license applications and medical certifications for review by the NRC's regional office at least 30 days before the examination date. This will permit the NRC staff to make preliminary eligibility determinations, process the medical certifications, evaluate any waivers that might be appropriate, and obtain additional information, if necessary, while allowing the facility licensee to finish training the applicants before the certified applications are due.
- f. The facility licensee's senior management representative on site (i.e., an authorized representative of the facility licensee, such as the plant manager or site vice-president) must certify when an applicant has completed all of

the facility licensee's requirements and commitments for the desired license level (i.e., experience, control manipulations, training, and medical). Such certification involves placing a check in Item 19.b of NRC Form 398, signing the form, and submitting it to the NRC's regional office at least 14 days before the examination date. The senior management representative must also sign Item B, "Certification," on NRC Form 396.

Pursuant to 10 CFR 55.5, "Communications," facility licensees may submit these forms to the NRC by mail, in person, or, where practicable, via electronic information exchange (EIE) or on CD-ROM. Electronic submissions must be made in a manner that enables the NRC to receive, read, authenticate, distribute, and archive the submission, and process and retrieve it one page at a time. Detailed guidance on making electronic submissions can be obtained by visiting the NRC's public Web site at <http://www.nrc.gov/site-help/eie.html>, calling (301) 415-6030, sending an email message to EIE@nrc.gov, or writing to the Office of the Chief Information Officer, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001. Forms that have only a single signature, such as NRC Form 396, may be submitted electronically using an electronic digital signature. However, forms with multiple signatures, such as NRC Form 398, must rely on handwritten optically scanned signatures, because of the limited digital signature capability of the EIE system. For any textual documents submitted in an optically scanned format, please note that Searchable Image (Exact) PDF is required, to preclude optical character recognition errors. When sending these forms via EIE, facility licensees are encouraged to follow up with a phone call or e-mail message to the operator licensing assistant in the regional office to ensure the forms are received.

The facility must also submit a written request to administer the written examination and operating test to the applicant.

- g. When the NRC's regional office denies a license application, the applicant need not accept the proposed denial. In such instances, the applicant may request that the Director, Division of Inspection and Regional Support, Office of Nuclear Reactor Regulation (NRR), review the application denial or request a hearing in accordance with 10 CFR 2.103(b)(2). Further action will be taken in accordance with ES-502.
- h. The facility licensee is expected to inform the NRC's regional office in writing if it wishes to withdraw an application before the licensing process is complete.

2. NRC Regional Office

- a. The NRC's regional office shall review preliminary applications as soon as possible after they are received. In that way, the regional office can process the medical certifications, evaluate and resolve any waiver requests in accordance with ES-204, and obtain from the facility licensee any additional information that might be necessary in order to support the final eligibility determinations.

With regard to medical certifications, the regional office shall forward the applicant's NRC Form 396 and supporting medical evidence to the NRC's contract physician for evaluation any time the examining physician recommends that the NRC should issue a restricted license to the applicant, that the NRC should grant the applicant a waiver (exception) of any requirement set forth in the applicable ANSI/ANS standard, or that the NRC should change an existing restriction (by checking any of blocks A.2 to A.10 on Form 396). If, on the date of the licensing examination, the NRC's physician is still reviewing an applicant's medical certification but there is no reason to expect that the physician will disqualify the applicant, the NRC's regional office should allow the applicant to take the examination, with the understanding that the NRC will withhold the license until the medical certification is approved.

The NRC will not process a retake application if the applicant's request for reconsideration or a hearing on the previous license denial is still outstanding. (Refer to ES-502.)

Before entering the applicants' data in the operator licensing tracking system (OLTS), the NRC's regional office shall verify that none of the applicants' names appear on the list of "Escalated Enforcement Actions Issued to Individuals." The regional office shall check with the appropriate contact in the Office of Enforcement by telephone or email to verify that the information on the subject individuals is current before using the information on the list to deny a licensing action.

- b. The regional office will verify that the applicant has successfully passed the GFE, if required, and review the data on NRC Form 398 to ensure that it is complete.

Affirmative responses to Items 12.a and 12.b on NRC Form 398, indicate that the applicant has successfully completed a Commission-approved, SAT-based training program that (1) meets the education and experience requirements outlined by the NNAB and (2) uses a simulation facility acceptable to the Commission under 10 CFR 55.45(b). If the facility licensee checks "yes" in response to these items, the licensee need not complete Item 13, "Training," or Item 15, "Experience Details," on NRC Form 398, except as noted below, and the regional office may accept the application without further review.

The regional office will verify that new applications include at least five significant control manipulations affecting reactivity or power level in Item 14 of NRC Form 398 (refer to Section C.1.c).

As noted in the instructions for Item 12 on NRC Form 398, certified instructors (who may not have the requisite responsible nuclear power plant experience, or RNPPE, defined in RG 1.8, Revision 3) seeking an SRO license must complete Item 15. Moreover, any exceptions or waivers from the education and experience requirements outlined in the NANT "Guidelines for Initial Training and Qualification of Licensed Operators" must be explained in Item 17.

If an applicant checks "no" in response to Items 12.a and 12.b, provides information that is not required, or indicates that exceptions or waivers have been taken (in Item 17 on NRC Form 398), the regional office shall review the application against the specific eligibility requirements and commitments applicable to the facility licensee and shall refer any eligibility issues (e.g., any failure to meet the minimum guidelines established by the NNAB or RG 1.8, Revision 3) and questions to the NRR operator licensing program office for resolution.

If the applicant is reapplying after a previous examination failure and license denial, the regional office shall evaluate the applicant's additional training to determine if the facility licensee made a reasonable effort to remediate the deficiencies that caused the applicant to fail the previous examination.

- c. The regional office may determine (1) that the preliminary application is incomplete, (2) more information is necessary to make a waiver determination, or (3) the applicant does not meet the requirements in 10 CFR 55.31. In such instances, the regional office will note the deficiencies and request that the facility licensee supply additional information when it submits the final, certified license application (or sooner if possible).

Conversely, the regional office may determine that the preliminary application is complete, and the applicant meets the eligibility requirements or is expected to meet the requirements pending the receipt of additional information. In such instances, the regional office shall enter the applicant's name, docket number, and examination requirements on the "List of Applicants" in accordance with ES-201.

- d. Upon receiving the final, certified license application, the reviewer shall evaluate any new information to ensure that the eligibility criteria are satisfied. If so, the reviewer shall check the "meets requirements" block at the bottom of NRC Form 398 and shall sign and date the form. If necessary, the reviewer shall add the applicant's name and other data to the "List of Applicants" in accordance with ES-201. The reviewer shall also ensure that the list accurately reflects any examination waivers that may have been granted in accordance with ES-204.

If the regional office determines that the applicant still does not meet the eligibility requirements, the regional licensing authority will (1) discuss its decision with the NRR operator licensing program office, (2) notify the applicant in writing that the application is being denied, and (3) identify the deficiencies on which the denial is based (Attachment 1). The responsible regional supervisor, or designee, shall check the "does not meet requirements" block at the bottom of Form 398, and shall sign and date the form. The applicant's name shall be stricken from the "List of Applicants," and the applicant shall not be permitted to take the licensing examination until the regional office determines that he or she meets the eligibility criteria.

In accordance with ES-204, the region may administer a license examination to an applicant who has not satisfied the applicable training or experience requirements at the time of the examination, but is expected to complete them

shortly thereafter. Assuming that the applicant passes the examination, the regional office shall not issue the applicant's license until the facility licensee certifies that all of the requirements have been completed. (Refer to ES-501 for additional guidance.)

- e. During either the preparatory site visit or the examination week, the regional office shall audit a sample (approximately 10 percent) of the license applications (i.e., NRC Form 398s) to confirm that they accurately reflect the subject applicants' qualifications. The review should focus primarily on the applicants' experience and on-the-job training, including reactivity manipulations, to ensure that they comply with Part 55 and the facility's licensing-basis documents and licensed operator training program description. The regional office will refer specific eligibility questions and deficiencies to the NRR operator licensing program office for review before making the licensing decisions.

D. NRC License Eligibility Guidelines

Regulatory Guide (RG) 1.8, "Qualification and Training of Personnel for Nuclear Power Plants," describes a method that the NRC staff finds acceptable for complying with the Commission's regulations with regard to the training and qualifications of nuclear power plant personnel. For the positions of shift supervisor, senior operator, and licensed operator, Revision 3 of RG 1.8, which was issued in May 2000, endorses the guidelines contained in ANSI/ANS 3.1-1993; specific clarifications, additions, and exceptions are noted in Section C, "Regulatory Position," of RG 1.8. The license eligibility guidelines in RG 1.8, Revision 3, and ANSI/ANS 3.1-1993 are summarized below; refer to those documents for more detailed information. No backfitting is intended or required in connection with the issuance of the revised RG.

As noted in Section B, above, the NRC has reviewed the current education and experience guidelines outlined in the NANT "Guidelines for Initial Training and Qualification of Licensed Operators," and concluded that they are equivalent to the NRC staff guidelines in RG 1.8, Revision 3.

Except as specifically noted below, experience and training are separate aspects of license eligibility. As stated in NUREG-1262 (in response to Question No. 113), a person should meet the experience guidelines before entering the license training program. Time spent in training before entering the license training program may qualify as experience, but time spent in an NRC-approved training program leading up to license eligibility should normally not be double-counted as experience.

1. Reactor Operator

a. Experience

- (1) The applicant should have a minimum of 3 years of power plant experience, at least 1 of which should be spent at the nuclear power plant for which the license is sought (preferably in the performance of non-licensed operator duties) and should not include any of the time spent in the control room as an extra person on shift.

- (2) The applicant should spend at least 6 months performing plant operational duties as a non-licensed operator at the nuclear power plant for which the license is sought.

b. Training

- (1) Before being assigned RO duties, the applicant should complete at least 3 months as an extra person on shift in training for the RO position. This training should include all phases of day-to-day operations and should be conducted under the supervision of licensed personnel. This time should not count toward the 1-year onsite experience specified in Item D.1(a)(1) above.
- (2) The applicant should complete an RO training program that is established and maintained using a systems approach to training (SAT).
- (3) The applicant must manipulate the controls of the reactor or a plant-referenced simulator that meets the requirements of 10 CFR 55.46(c) during five significant changes in reactivity or power level (refer to 10 CFR 55.31(a)(5) and Section C.1.c above). Every effort should be made to perform at least some of the manipulations on the actual plant and to diversify the reactivity and power changes for each applicant.

3. Education

The applicant should have a high school diploma or equivalent.

2. **Senior Reactor Operator**

a. Experience

- (1) A non-licensed (i.e., instant SRO) applicant should have a minimum of 3 years of responsible nuclear power plant experience (RNPPE), as defined in RG 1.8. At least 6 months of the RNPPE should be at the plant for which the applicant seeks a license and should not include any of the time spent in the control room as an extra person on shift. A maximum of 1 year of RNPPE may be fulfilled by academic or related technical training on a one-for-one basis.
- (2) Applicants for an SRO license who do not hold a bachelor's degree in engineering or the equivalent should have held an operator's license and should have been actively involved in the performance of licensed duties for at least 1 year or have at least 2 years in a position that is equivalent (or superior) to a licensed RO at a military reactor (e.g., propulsion plant watch officer, reactor operator, engineering officer of the watch, propulsion plant watch supervisor, or engineering watch supervisor). Maintaining a minimally active operator's license pursuant to 10 CFR 55.53(e) is not sufficient to satisfy this experience guideline.

- (3) During the years of responsible nuclear power plant experience, the applicant should participate in reactor operator activities at power levels greater than 20 percent for at least 6 weeks.
- (4) The eligibility of equipment operators, plant technicians, and non-degreed licensed operator instructors, who do not satisfy the strict definition of RNPPE and might otherwise be disqualified, will be evaluated on a case-by-case basis. The NRR operator licensing program office will assess their experience to determine the degree of equivalence and amount of credit to be granted.

b. Training

- (1) Before being assigned SRO duties, the applicant should complete at least 3 months as an extra person on shift in training for the SRO position. This training should include all phases of day-to-day operations and should be conducted under the supervision of licensed personnel. This time does not count toward the 6-month onsite responsible experience guideline in Item D.2(a)(1) above. However, any portion of the 3 months that is spent at or above 20 percent power may also be used to satisfy the experience guideline in Section D.2.a(3).
- (2) If the applicant has not held an RO license at the facility for which a license is sought, the applicant must complete the required control manipulations as discussed in Section C.1.c above.
- (3) The applicant should complete a SAT-based SRO training program.

c. Education

The applicant should have a high school diploma or equivalent.

3. **Limited Senior Reactor Operator**

a. Experience

The applicant should have 3 years of RNPPE that includes active participation in at least one refueling outage at the site for which the license is sought or at a similar facility. Pursuant to 10 CFR 55.31(a)(5), the applicant must perform five significant control manipulations that affect reactivity (e.g., by loading or unloading fuel into, out of, or within the reactor vessel). Six months of the RNPPE should be at the site for which the LSRO license is sought or at a similar facility owned by the same facility licensee.

b. Training

The applicant is expected to have satisfactorily completed a SAT-based training program.

c. Education

The applicant should have a high school diploma or equivalent.

4. Cold License Eligibility

Cold examinations are those administered before the unit completes pre-operational testing and the initial startup test program as described in the FSAR.

Each applicant must satisfactorily complete the training programs described in Section 13.2 of the FSAR and approved by the NRC. The NRC's review and approval are based on information contained in Section 13.2.1 of the Standard Review Plan (SRP) (NUREG-0800).

E. Attachments/Forms

Attachment 1, "Sample Initial Application Denial from Region"

NRC Letterhead

(date)

(Applicant's name)

(Street address)

(City, State, Zip code)

Dear (Name):

This is to inform you that your application, dated (date), for a (reactor operator, senior reactor operator) license, submitted in connection with (facility name), is hereby denied.

(Region to discuss deficiencies and which part of 10 CFR 55.31, ES-202, NRC-approved facility training program, or Regulatory Guide 1.8 was involved.) When you have met the requirements of Title 10, Section 55.31, of the Code of Federal Regulations (10 CFR 55.31), you may submit another application.

If you do not accept this denial, you may, within 20 days of the date of this letter, take one of the following actions:

- You may request that the NRC reconsider the denial of your application by writing to the Director, Division of Inspection and Regional Support, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555. If submitting via private courier (e.g., FedEx, UPS), send your request to 11555 Rockville Pike, Rockville, Maryland 20852, instead of using the Washington, DC, address. Your request must include specific reasons for your belief that your application was improperly denied. If the NRC determines that the denial of your application remains appropriate, you still have the right to request a hearing pursuant to 10 CFR 2.103(b)(2), as described below.
- You may request a hearing in accordance with 10 CFR 2.103(b)(2). Submit your request, in writing, to the Office of the Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, Attention: Rulemakings and Adjudications Staff, with a copy to the Associate General Counsel for Hearings, Enforcement, and Administration, Office of the General Counsel, at the same address. (Refer to 10 CFR 2.302 for additional filing options and instructions.) If submitting via private courier (e.g., FedEx, UPS), send your request to 11555 Rockville Pike, Rockville, Maryland 20852, instead of using the Washington, DC, address.

If you have any questions, please contact (name) at (telephone number).

Sincerely,

(Regional branch chief or above)

Docket No. 55-(number)

cc: (Facility representative who signed the applicant's NRC Form 398)

CERTIFIED MAIL — RETURN RECEIPT REQUESTED

ES-204
PROCESSING WAIVERS REQUESTED BY
REACTOR OPERATOR AND SENIOR REACTOR OPERATOR APPLICANTS

A. Purpose

This standard provides guidance concerning the processing of waivers requested by reactor operator (RO) and senior reactor operator (SRO) license applicants at power reactor facilities.

B. Background

In accordance with Title 10, Section 55.35, "Re-applications," of the *Code of Federal Regulations* (10 CFR 55.35), and 10 CFR 55.47, "Waiver of Examination and Test Requirements," an applicant may request to be excused from a written examination or an operating test. The NRC may waive any or all of the examination requirements if it determines that the applicant has presented sufficient justification. In an effort to expedite the resolution of applicant requests, the Office of Nuclear Reactor Regulation (NRR) has delegated the authority to grant routine waivers of certain operator licensing requirements to the NRC regional offices.

C. Responsibilities

1. Applicant/Facility Licensee

- a. An applicant may request a waiver of a license requirement by checking the appropriate block in Item 4.f on NRC Form 398, "Personal Qualifications Statement: Licensee." The applicant should also explain the basis for requesting the waiver in Item 17, "Comments."
- b. The facility licensee's senior management representative on site must certify the final license application, thereby substantiating the basis for the applicant's waiver request.
- c. Facility licensees having units designed by the same nuclear steam supply system vendor and operated at approximately the same power level may request dual licensing for their operators. Similarly, if the units of a multi-unit facility are nearly identical, the facility licensee may request a waiver of the examination requirements for the second and subsequent units.

In either case, the facility licensee must justify to the NRC that the differences between the units are not so significant that they could affect the operator's ability to operate each unit safely and competently. Further, the facility licensee must submit for NRC review the details of the training and certification program. The analysis and summary of the differences on which the applicants must be trained will include the following, as applicable:

- facility design and systems relevant to control room personnel
- technical specifications
- procedures (primarily abnormal and emergency operating)
- control room design and instrument location
- operational characteristics
- administrative procedures related to conduct of operations at a multi-unit site (e.g., shift manning and response to accidents and fires)
- the expected method of rotating personnel between units and the refamiliarization training to be conducted before an operator assumes responsibility on a new unit

2. **NRC Regional Office**

- a. The regional office will evaluate waiver requests on a case-by-case basis against the waiver criteria discussed in Section D of this examination standard.
- b. The regional office may grant routine waivers identified in Section D.1 without first obtaining concurrence from the NRR operator licensing program office.

However, waivers of experience requirements, completion of training, or completion of examinations not specifically identified in Section D.1 must be approved by NRR. The regional office should evaluate the waiver request and forward its approval recommendation to the NRR operator licensing program office for concurrence.

The region does not require written concurrence from NRR to deny an applicant's waiver request, but it should discuss its decision with the operator licensing program office before informing the applicant; formal concurrence may be desirable in some cases.

- c. If additional information is required to reach a decision on a waiver request, the regional office shall generally request the necessary information from the facility licensee in accordance with ES-202.
- d. Upon deciding to grant or deny a waiver, the regional office shall promptly notify the applicant in writing concerning the disposition of the request, and provide an explanation for the denial. If time is too short to notify the applicant in writing before the examination date, the regional office shall notify the facility training representative by telephone concerning the disposition of the waiver request and provide a followup written response to the applicant. The regional office shall include the NRR operator licensing program office on distribution for all waiver disposition letters.
- e. The region shall document the disposition of every waiver request, whether granted or denied, by completing the block designated "For NRC Use"

on the applicant's NRC Form 398 and by entering the data in the operator licensing tracking system (OLTS).

- f. NRC examiners assigned to a particular examination will be notified of approved waivers by the appropriate regional supervisor and by an entry on the list of applicants (Form ES-201-4).
- g. If the applicant is determined to be ineligible to take the licensing examination, the regional office shall issue a denial letter in accordance with ES-202.

D. Waiver Criteria

1. Routine Waivers

- a. If an applicant failed *only* one portion of the site-specific initial licensing examination (i.e., either the written examination overall, the SRO-only section of the written examination, the simulator operating test, the walk-through overall, or the administrative portion of the walk-through), the region may waive those examination areas that were passed. This is only applicable for the first retake examination and only if it takes place within 1 year of the date on which the original examination was completed.

Note that an SRO applicant who passed the operating test, achieved a score of 80 percent on the RO portion of the written examination, 76 percent on the SRO-only questions, and 79 percent overall would *not* be eligible for a waiver of the RO portion because the overall 80-percent cut score was not achieved. An SRO-instant applicant who passed everything except the SRO-only portion of the written examination may reapply for an RO license, and a full RO examination waiver, after accepting a final denial of the original SRO application; however, this is *not* considered a routine waiver and must be forwarded to NRR for approval as discussed in Section C.2.b. Such a waiver would be contingent upon the applicant's eligibility for an RO license (refer to the training and experience guidelines in ES-202) and the applicant's demonstration of control board competence during the simulator operating test (refer to ES-303).

- b. The region may waive training requirements specified in the final safety analysis report (FSAR) when the FSAR authorizes waiver of those specific requirements and the applicant otherwise meets NRC requirements (e.g., waiver of some training requirements for applicants previously licensed at a comparable facility).
- c. The medical data in support of NRC Form 396 are normally good for 6 months from the date of the medical examination for a person applying for an RO or SRO instant license. For re-applications (e.g., following a license denial or withdrawal of an application, or to request reinstatement of a terminated license) or for an examination which is delayed from its originally scheduled date, the NRC regional office may grant waivers extending the 6-month period, provided that the date of the original medical examination is within 24 months of the anticipated

licensing date and Item 17, "Comments," of NRC Form 398 certifies that the applicant has not developed any physical or mental condition that would be reportable under 10 CFR 55.25. For renewal and SRO upgrade applicants, the medical examination documented on NRC Form 396 is good for 2 years from the date of the medical examination.

Waivers/exceptions and license conditions/restrictions that might be requested if an applicant does not meet the medical standards in the applicable version of ANSI/ANS 3.4, "Medical Certification and Monitoring of Personnel Requiring Operator Licenses for Nuclear Power Plants," will be coordinated with the NRC contract physician as discussed in ES-202.

- d. Substitutions allowed by Regulatory Guide (RG) 1.8, Revision 3, are not considered to be waivers and, therefore, do not require approval. For example, substitution of related technical training for up to 1 year of experience for an SRO is not a waiver. However, training for the examination applied for may not be counted as related technical training.
- e. If the facility licensee certifies that the applicant has successfully completed a training program accredited by the Institute of Nuclear Power Operations using an acceptable simulation facility, the region may waive the requirement for 10 startups on an operating reactor, which is typically required by NRC-approved cold license training programs.
- f. For those applicants who are unable to meet the requirement for 6 weeks on shift at greater than 20 percent power (because of extended plant shutdowns or other extraordinary circumstances), the NRC regional office may waive this requirement upon application if the following criteria are satisfied:
 - (1) Facility training objectives for the desired licensed position have been developed using a properly validated job task analysis (JTA).
 - (2) The facility licensee's training program is based on a systems approach to training (SAT) using the five elements defined in 10 CFR 55.4.
 - (3) The facility licensee can accomplish the required training objectives for plant operation at greater than 20 percent power using a plant-referenced or NRC-approved simulation facility.
- g. If an operator was previously licensed at a facility and reapplies for a license at the same facility and the same or lower license level, the regional office may, pursuant to 10 CFR 55.47, waive the requirement for the applicant to pass a written examination (including the generic fundamentals examination (GFE)) and an operating test if it finds that the applicant meets the following criteria:
 - (1) previously discharged his or her responsibilities competently and safely and is capable of continuing to do so

- (2) terminated participation in the facility licensee's requalification program less than 2 years (24 months) before the date of the license application
 - (3) successfully completed "Additional Training," pursuant to 10 CFR 55.59(b), and a facility-prepared written examination and operating test, which ensure that the applicant is up-to-date in the licensed operator requalification training program (including GFE topics)
 - (4) will successfully complete at least 40 hours of shift functions under the direction of an operator or senior operator, as appropriate, and in the position to which the applicant will be assigned (see 10 CFR 55.53(f)) before being assigned to licensed duties
 - (5) complies with the requirements of 10 CFR 55.31
- h. If an applicant is unable to perform the five significant control manipulations required by 10 CFR 55.31(a)(5), the regional office may process the application, administer the examination, and issue a conditional license that is only valid with the reactor in cold shutdown and refueling (or simply delay licensing the applicant until the facility licensee certifies that the required manipulations have been completed; refer to Section D.3.c of ES-501). The regional office will not remove the license condition until the facility licensee supplies the required evidence that the applicant has successfully completed the control manipulations (refer to ES-501).
- i. The region may authorize a facility licensee to defer completion of the following specific experience and training guidelines until after the licensing examination is passed:
- (1) up to 6 months of the 3 years of (responsible nuclear) power plant experience for an RO (or an SRO), but not to exceed 2 months of the year of onsite experience for an RO and 1 month of the 6 for an SRO
 - (2) up to 2 months of the year actively performing duties as a licensed RO at the facility for which an SRO upgrade license is sought
 - (3) up to 1 month of the 3 spent as an extra RO or SRO on-shift in training
- The facility licensee must provide evidence that the deferred items have been completed before the region will issue the license (refer to ES-501).
- j. If an individual is currently licensed as an RO at a facility and applies for an SRO license at the same facility, the regional office may waive the requirement for the applicant to take the RO portion of the SRO written examination if the applicant satisfies the following requirements:
- (1) Pursuant to 10 CFR 55.47(a)(1), which requires extensive actual operating experience within the previous 2 years, the applicant must

have maintained an active license for at least 12 of the 24 months preceding the date of application. This would also satisfy the SRO-upgrade eligibility criteria in Section D.2.a(2) of ES-202 and the similar guidelines established by the National Academy for Nuclear Training.

- (2) Pursuant to 10 CFR 55.47(a)(2), the applicant must have discharged his or her responsibilities competently and safely and be capable of continuing to do so. As in 10 CFR 55.57, the NRC will consider the applicant's past performance and certification by the facility licensee when making this determination.
- (3) Pursuant to 10 CFR 55.47(a)(3), the applicant must have learned the operating procedures for and be qualified to safely and competently operate the facility. This requirement would be satisfied if the applicant passed his or her most recent requalification examination and was up-to-date in the facility licensee's requalification training program at the time that he or she entered the upgrade training program.

Applications who do not satisfy these requirements shall be referred to the NRR operator licensing program office in accordance with Section C.2.b, above.

- k. If an applicant passed the GFE more than 24 months before the date of license application, the regional office may waive the requirement to pass another GFE if the applicant meets any one of the following criteria (as explained in Item 17 on NRC Form 398):
 - (1) The applicant terminated an RO or SRO license at a comparable (boiling- or pressurized-water) facility less than 24 months before the date of application and was up-to-date in the requalification program at the time of license termination.
 - (2) Within the 24 months preceding the date of application, the applicant completed self-study or classroom instruction, as deemed necessary by the facility licensee, and passed a prior GFE that was randomly selected from among those contained on the NRC's GFE Web page and administered, under controlled conditions, by the facility licensee.
 - (3) Within the 24 months preceding the date of application, the applicant completed self-study or classroom instruction, as deemed necessary by the facility licensee, and passed a GFE prepared by the facility licensee in accordance with Section D of ES-205 and administered under controlled conditions.

2. Examination Waivers for Operators Previously Licensed at Comparable Facilities

Depending on the justification provided by the applicant and the facility licensee, NRR will consider examination waivers for operators who were previously licensed

at a comparable facility. Pursuant to 10 CFR 55.47, the Commission may waive any or all requirements for a written examination and operating test.

3. **Multi-Unit Examination Waivers**

- a. Generally, personnel will *not* be examined on or allowed to hold licenses for "different units" simultaneously. For purposes of this standard, "different units" owned or managed by a single facility licensee are defined as follows:
- units having the same vendor, but significantly different age and/or power level (e.g., Nine Mile Point Units 1 and 2)
 - units having the same vendor and similar design, but different locations (e.g., Sequoyah and Watts Bar, Byron and Braidwood)
 - units having different vendors (pressurized-water reactors only), but located on the same site (e.g., Arkansas Units 1 and 2, Millstone Units 2 and 3)

NRR may authorize a limited senior reactor operator (LSRO) to be licensed at multiple sites, provided that the units are manufactured by the same vendor and are of similar design. The applicant must pass an examination that addresses the differences in the designs, procedures, technical data, and administrative controls of the separate facilities for which the license is being sought.

- b. With regard to the examination requirements for "identical" second or subsequent units at the same site, NRR may waive any or all requirements for a written examination and operating test if the staff finds that the applicant meets the criteria specified in 10 CFR 55.47, as noted in Item D.2 above. If the situation warrants, the Commission may impose other examination requirements, such as NRC-administered operating tests and written examinations concerning the plant differences.

ES-205
PROCEDURE FOR ADMINISTERING
THE GENERIC FUNDAMENTALS EXAMINATION PROGRAM

A. Purpose

This standard describes the procedures and policies pertaining to administration of the generic fundamentals examination (GFE) section of the written operator licensing examination at power reactor facilities. It describes how the examinations are scheduled and constructed, how to solicit facility licensees for applicants to take the examinations, and how to promulgate the examination results.

B. Background

Title 10, Sections 55.41 and 55.43, of the *Code of Federal Regulations* (10 CFR 55.41 and 55.43) require that the written operator licensing examinations for reactor operators (ROs) and senior reactor operators (SROs) must include questions concerning various mechanical components, principles of heat transfer, thermodynamics, and fluid mechanics. These regulations also require that the written examinations must address fundamentals of reactor theory, including the fission process, neutron multiplication, source effects, control rod effects, criticality indications, reactivity coefficients, and poison effects.

The fundamental knowledge and abilities (K/As) required of an operator do not vary significantly between license levels or among facilities of the same vendor type. As a result, the NRC implemented the GFE program to standardize the fundamental examination coverage for all applicants at pressurized- and boiling-water reactors (PWRs and BWRs). Having passed a GFE as an RO or an SRO applicant, an operator will not have to take another GFE unless he or she transfers to a facility of the other vendor type or discontinues, for a period exceeding 2 years (24 months), participation in an accredited licensed operator requalification training program that maintains proficiency in the GFE topics. Refer to Section D.1.k of ES-204 for guidance regarding waivers of the GFE. The GFE program does not pertain to limited senior reactor operator (LSRO) license applicants.

The GFE examinations for BWRs and PWRs are typically administered four times a year, on the Wednesday following the first Sunday in March, June, September, and December.

C. Responsibilities

1. Facility Licensee

- a. The facility licensee must certify that all individuals who plan to take the GFE are enrolled in a facility-sponsored training program that will satisfy the eligibility requirements for an RO or SRO license. The operator trainees need not complete all of the training required for the license before they take the GFE.

The facility licensee may use the sample registration letter enclosed with the NRC notification letter (Attachment 1) or any similar format that contains the required information and certification. If the facility licensee must add or delete an individual after submitting its registration letter, the facility licensee should inform the Office of Nuclear Reactor Regulation (NRR) operator licensing program office of the change, as specified in the examination cover letter, *before* the examinations are administered.

- b. Upon receiving the examinations from the GFE contractor, the facility licensee shall reproduce and safeguard the examinations as described in the examination cover letter.
- c. On the designated examination day, the facility licensee shall administer and proctor the GFE in accordance with the instructions contained in the examination package.

The facility licensee will start and stop the GFE in accordance with the time zone map contained within the examination package. Late arrivals will be allowed to take the examination; however, all examinees must hand in their examinations at the completion time designated in the proctor instructions enclosed with the examination cover letter (refer to Section C.2.d).

- d. No later than the day after the GFE is administered, the facility licensee shall send the following items via overnight mail to the name and address designated in the examination package:
 - the original answer sheets
 - the signed exam cover sheets
 - the signed security statements

2. NRR Operator Licensing Program Office and GFE Contractor

- a. The NRR operator licensing program office will designate a coordinator to oversee the GFE activities of the regional offices, the GFE contractor, and the facility licensees.
- b. Beginning in 2005, the NRC will send a notification letter (Attachment 1) to each facility licensee at the beginning of each calendar year. The letter will announce the GFE administration dates for the entire year and inform facility licensees when the registration letters are due to the NRC.
- c. The GFE contractor will prepare the examinations as described in Section D of this examination standard. The examiner assigned responsibility for developing the GFE shall submit the examinations to the NRR GFE coordinator and any other designated reviewers at least 20 calendar days before the scheduled administration date. The NRR operator licensing program office will provide comments and recommended changes to the examination author as soon as possible. The final examinations should be ready at least 14 days before the GFE administration date.

- d. The GFE contractor will assemble the approved examination packages as described below, and mail the packages to the names and addresses designated by the participating facility licensees. The examinations should normally be mailed 1 week before the examinations are scheduled to be administered.

The examination packet will contain the following information, enclosures, and attachments:

- cover letter (Attachment 2 is a sample letter)
 - proctor instructions
 - security agreement
 - single copies of appropriate exam, forms A and B
 - exam time zone map
 - sample answer sheet
 - facility docket number sheet
 - applicant docket number sheet
 - appropriate number of answer sheets
 - applicant answer sheet instructions
- e. On the day that the GFE is administered, the NRR GFE coordinator and GFE contractor shall be available to answer questions from facility proctors if the need arises.
- f. Upon receiving the examination answer sheets from the facility licensees, the GFE contractor shall score, grade, and tabulate the overall item statistics, and generate facility and regional grade reports for each GFE examination. The contractor shall forward the regional and facility grade reports, including individual scores and copies of individual answer sheets, and corrected answer keys to the applicable regional office for distribution.

The GFE contractor shall develop individual item statistics on all questions used on the GFE examinations. Questions with acceptable statistical characteristics shall be moved into the "validated" GFE question bank.

The contractor will provide copies of all grade reports to the NRR GFE coordinator, along with the following additional items:

- exam-wide item statistics (PWR and BWR)
 - analysis reports of specific items deleted or answers changed
 - corrected answer keys
 - original answer sheets
 - original signed exam cover sheets
 - signed security statements
- g. The NRR operator licensing program licensing assistant will ensure that copies of the final master BWR and PWR examinations are placed in the NRC's Public Document Room.

3. NRC Regional Office

- a. Regional management should assign an individual to coordinate GFE administration in the region.
- b. Beginning in 2005, the NRC will issue a single notification letter each year, and the regional office will informally remind facility licensees (by electronic mail or telephone) to submit their registration letters for the June, September, and December examinations.
- c. The regional operator licensing assistant (OLA) shall assign a docket number to each individual identified in the facility licensee's registration letter. The OLA shall then forward the list of names and docket numbers for each facility to the GFE contractor, with a copy to the NRR GFE coordinator, no later than 20 days before the examination administration date.
- d. The regional GFE coordinator should keep the NRR GFE coordinator informed of any changes in the number of applicants scheduled to take the GFE at any facility.
- e. The regional office shall distribute the GFE examination results to their participating facility licensees. A sample cover letter is provided in Attachment 3 to this examination standard.
- f. The regional OLA shall update the applicants' status (pass or fail) in the operator licensing tracking system (OLTS) and ensure that a hard copy of the GFE results is placed in each applicant's docket file.

4. Industry

The industry may make arrangements to review and comment on the GFEs before they are administered by contacting the NRR operator licensing program office at least 2 months before the scheduled examination date. The review will be limited to one BWR and one PWR instructor (provided by the facility) who will not be fielding applicants during the subject examination. These reviewers will be required to sign security agreements, in accordance with Section D.2.b of ES-201, before and after seeing the examinations. The reviewers must complete the review (including the new, modified, and previously validated questions, as desired) and provide feedback to the NRC staff within 3 working days from the date of receipt. If the NRR operator licensing program office does not receive the reviewers' comments within the allotted time, the examinations will proceed on schedule. Otherwise, the NRR operator licensing program office and GFE contractor will evaluate the reviewers' comments and make changes as deemed appropriate.

D. Examination Scope and Structure

Each GFE shall contain 50 questions covering the "Components" and "Theory" (including reactor theory and thermodynamics) sections of NUREG-1122, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Pressurized-Water Reactors," or NUREG-1123, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Boiling-Water Reactors." The passing grade for the GFE is 80 percent.

The K/A topics applicable to the GFE for PWRs and BWRs have been categorized into various component, reactor theory, and thermodynamics groups as shown in Attachment 4 to this examination standard. That attachment also identifies the number of test questions required to evaluate each topic.

The questions used on the GFE examination shall conform with the applicable construction and style guidelines in Appendix B. The examination shall include 40 questions taken directly from the NRC's GFE question bank for the applicable vendor type, 5 questions that are derived from existing bank questions by making one or more significant modifications, and 5 questions that are newly developed.

E. Attachments/Forms

Attachment 1,	"Sample Notification Letter"
Attachment 2,	"Sample Examination Cover Letter"
Attachment 3,	"Sample Results Letter"
Attachment 4,	"GFE Test Item Distribution"

NRC Letterhead

(Date)

(Name, Title)

(Facility name)

(Street address)

(City, State Zip code)

Dear (Name):

The U.S. Nuclear Regulatory Commission (NRC) plans to administer the generic fundamentals examination (GFE) section of the written operator licensing examination on the following dates during this calendar year:

March ##, 200#

June ##, 200#

September ##, 200#

December ##, 200#

To register personnel to take the GFE, an authorized representative of your facility must submit a letter to the appropriate regional administrator with a copy addressed as follows:

Chief, Operator Licensing and Human Performance Branch

Mail Stop OWFN 12D19

U.S. Nuclear Regulatory Commission

Washington, DC. 20555-0001

Your letter should identify the individuals who will take the examination, and it should certify that they are enrolled in a facility licensee-sponsored program leading to NRC operator or senior operator licensing and that they will have completed their fundamentals training by the date of the examination. The letter should also identify the personnel who will have access to the examinations before they are administered (e.g., proctors) and the address to which the examinations are to be sent. To allow the NRC to assign docket numbers, your letter should be received by both the NRC regional administrator and the Chief, Operator Licensing and Human Performance Branch, **30 days before each desired examination date** shown above. A sample registration letter is enclosed.

Copies of the administered GFEs and their answer keys will be available for review in the NRC's Public Document Room approximately 45 days following each examination. The NRC's GFE Web page (which is available at <http://www.nrc.gov/reactors/operator-licensing/generic-fundamentals-examinations.html>) will be updated semi-annually, approximately 60 days following the June and December examinations.

Sincerely,

(Appropriate regional representative)

Docket No. 50-(Number)

Enclosure: As stated

Enclosure

(Name)
Regional Administrator
U.S. Nuclear Regulatory Commission
Region (Number)
(Street address)
(City, State Zip code)

Dear (Name),

(Facility name) requests approval from the U.S. Nuclear Regulatory Commission (NRC) to have the following (number) individuals take the (BWR or PWR) generic fundamentals examination (GFE) section of the written operator licensing examination to be administered on (date):

<u>Name</u>	<u>Date of Birth</u>	<u>Previous Docket No.</u>
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(Insert the name, date of birth, and previous 10 CFR Part 55 Docket Number (if applicable) for each person.)

All of the listed personnel are enrolled in the (facility name) operator licensing training program and will have completed the generic fundamentals portion of the program by the examination date.

The following personnel will have access to the examinations before they are administered:

<u>Name</u>	<u>Title</u>
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(Insert the name and title of each person who will have access to the examinations before they are administered (e.g., proctors).)

Please address the examinations to the **overnight mail** address, as follows (note that home addresses are not acceptable):

Name, Title
Street address
City, State Zip code

If you have any questions, please contact (facility contact name) at (telephone number).

Sincerely,

(Name, title)

cc:
Chief, Operator Licensing and Human Performance Branch, NRR

(Date)

(Name, Title of designated addressee)

(Facility name)

(Street address)

(City, State Zip code)

Dear (Name):

The U.S. Nuclear Regulatory Commission (NRC) has scheduled your facility to administer the generic fundamentals examination (GFE) section of the NRC's written operator licensing examination on (date). (Name of contractor) is authorized to support the NRC under contract in the administration of GFE-related activities.

Note: For security reasons, please open the sealed envelope now and page-check the examination using the enclosed checklist. Then, immediately and no later than (date), contact one of the persons listed below informing (him or her) that you have received this package and noting any discrepancies:

(Name), (Telephone Number)

(Name), (Telephone Number)

This letter and its enclosures provide the instructions and guidelines for administering the GFE and returning the completed exams and related materials to (Name of contractor). Please read this letter **now**, and follow the directions in the accompanying enclosures.

Enclosure 1. Security Agreement. Please refer to the enclosed NRC Security Agreement. A copy of this agreement must be completed by each and every exam administrator and/or proctor who sees or has knowledge of the GFE contents. For security reasons, the number of persons who see or have knowledge of this exam's contents before the exam must be limited to **three** persons who **have a need to know**.

The top portion of the security agreement is expected to be completed **now**, and the bottom portion immediately **after** the exam has been completed. Fill in the spaces for each individual's **name** and the **name of the facility** for both portions, and have the individual(s) sign the form(s).

Please note: The signed security agreements **must** be returned to (Name of contractor) along with the completed exam answer sheets before any scoring will be performed.

Enclosure 2. Exam Copies. Two single copies of Forms A and B of the exam are provided. These alternative forms are identical in content; however, for security purposes, the test item sequence on each form is different to reduce the possibility of an applicant copying any answers from a nearby test answer sheet. (See the separate Proctor Instructions in Enclosure 3 for further exam administration instructions.)

You are responsible for reproducing the number of exam copies required for the number of individuals taking the exam. Prior to the exam, store the original copies in a locked cabinet or safe and reproduce the necessary number of copies **only** on the day immediately preceding the exam; in this case, copies should be made on (date). Please note that your total number of copies should consist of one half Form A and one half Form B. After making the necessary number of copies, secure the original and all copies from view of unauthorized persons, storing them in a locked cabinet or safe until the exam date.

Each individual who takes the exam must sign the security statement on the exam cover page. This page must be removed from the exam copy and mailed to (Name of contractor) along with the answer sheets and administrator/proctor security agreements.

After the exam has been given, the exam copies become public knowledge and no longer need security. Therefore, exam copies may subsequently be kept or disposed of as desired.

Enclosure 3. Proctor Instructions. The proctor instructions detail the guidelines for administering the exam. Please note that the specific instructions presented are designed to be adhered to and followed identically by each proctor at **all** facilities. This process will ensure uniform administration and equity of results nationwide. As noted in the Proctor Instructions, all GFE exams will be administered at the same time in accordance with the local time zone in which the facility is located.

Enclosure 4. Exam Answer Sheets. The appropriate number of answer sheets (extra copies included) is enclosed for the number of applicants you identified to take the exam. All applicants must use the original enclosed answer sheets for recording answers during the exam.

Summary of Items to be Returned to (Name of contractor)

The following items must be mailed via **Overnight Delivery Service** to (Name of contractor) and postmarked no later than (date).

- completed answer sheets
- applicant-signed exam cover sheets
- administrator/proctor-signed security statement(s)

Mail all of the above exam-related materials addressed as follows:

(Name)

(Name of contractor)

(Street address)

(City, State Zip code)

For further questions regarding the specifics of this exam, please contact (Name) at (telephone number). For questions regarding the GFE in general, please contact (Name), NRC, at (telephone number).

For matters regarding candidate withdrawals or cancellations, contact either (Name) or (Name) at (telephone numbers) for specific guidance.

(Name), Chief
Operator Licensing and Human Performance Branch
Division of Inspection and Regional Support
Office of Nuclear Reactor Regulation

Enclosures:

As stated

Distribution: w/o enclosures

Director, DIRS

Chief, Operator Licensing and Human Performance Branch

NRR GFE Coordinator

Project Manager

Public

NRC Letterhead

(Date)(Name, Title)(Facility name)(Street address)(City, State Zip code)Dear (Name):

On (date), the U.S. Nuclear Regulatory Commission (NRC) administered the generic fundamentals examination (GFE) section of the written operator licensing examination to employees of your facility. Enclosed with this letter are copies of both forms of the examination, including answer keys, the grading results for your facility, and copies of the individual answer sheets for each of your employees. Please forward the results to the individuals along with the copies of their respective answer sheets. A "P" in the RESULTS column indicates that the individual achieved a passing grade of 80 percent or better on the GFE, while an "F" indicates that the individual failed the examination.

If you have any questions concerning this examination, please contact (Name of the NRR GFE coordinator) at (phone number).

Sincerely,

(Appropriate regional representative)Docket No. 50-(Number)

Enclosures:

1. Examination Form "A" and "B" with answers
2. Examination Results Summary for (Facility Name)
3. Individual Answer Sheets

K/A	Pressurized-Water Reactors Topic	No. of Items
	<u>Components</u>	
191001	Valves	2
191002	Sensors and Detectors	4
191003	Controllers and Positioners	3
191004	Pumps	4
191005	Motors and Generators	2
191006	Heat Exchangers and Condensers	2
191007	Demineralizers and Ion Exchangers	2
191008	Breakers, Relays, and Disconnects	3
	<u>Reactor Theory</u>	
192001	Neutrons	1
192002	Neutron Life Cycle	1
192003	Reactor Kinetics and Neutron Sources	1
192004	Reactivity Coefficients	2
192005	Control Rods	2
192006	Fission Product Poisons	2
192007	Fuel Depletion and Burnable Poisons	1
192008	Reactor Operational Physics	4
	<u>Thermodynamics</u>	
193001	Thermodynamic Units and Properties	1
193002	Not Applicable	0
193003	Steam	2
193004	Thermodynamic Processes	1
193005	Thermodynamic Cycles	1
193006	Fluid Statics and Dynamics	2
193007	Heat Transfer	1
193008	Thermal Hydraulics	4
193009	Core Thermal Limits	1
193010	Brittle Fracture and Vessel Thermal Stress	1
<u>Total Items</u>		50

K/A	Boiling-Water Reactors Topic	No. of Items
	<u>Components</u>	
291001	Valves	3
291002	Sensors and Detectors	4
291003	Controllers and Positioners	2
291004	Pumps	4
291005	Motors and Generators	2
291006	Heat Exchangers and Condensers	3
291007	Demineralizers and Ion Exchangers	2
291008	Breakers, Relays, and Disconnects	2
	<u>Reactor Theory</u>	
292001	Neutrons	1
292002	Neutron Life Cycle	1
292003	Reactor Kinetics and Neutron Sources	1
292004	Reactivity Coefficients	2
292005	Control Rods	2
292006	Fission Product Poisons	2
292007	Fuel Depletion and Burnable Poisons	1
292008	Reactor Operational Physics	4
	<u>Group I Thermodynamics</u>	
293001	Thermodynamic Units and Properties	1
293002	Basic Energy Concepts	0
293003	Steam	1
293004	Thermodynamic Processes	1
293005	Thermodynamic Cycles	1
293006	Fluid Statics	2
293007	Heat Transfer and Heat Exchangers	1
293008	Thermal Hydraulics	3
293009	Core Thermal Limits	3
293010	Brittle Fracture and Vessel Thermal Stress	1
<u>Total Items</u>		50

ES-301

PREPARING INITIAL OPERATING TESTS

A. Purpose

All applicants for reactor operator (RO) and senior reactor operator (SRO) licenses at power reactor facilities are required to take an operating test, unless it has been waived in accordance with Title 10, Section 55.47, of the Code of Federal Regulations (10 CFR 55.47). (Refer to ES-204, "Processing Waivers Requested by Reactor Operator and Senior Reactor Operator Applicants.") The specific content of the operating test depends on the type of license for which the applicant has applied.

This standard describes the procedure for developing operating tests that meet the requirements of 10 CFR 55.45, including the use of reactor plant simulation facilities and the conduct of multi-unit evaluations.

B. Background

To the extent applicable, the operating test will require the applicant to demonstrate an understanding of, and the ability to perform, the actions necessary to accomplish a representative sampling of the 13 items identified in 10 CFR 55.45(a). (All 13 items do not need to be sampled on every operating test). In addition, the content of the operating test will be identified, in part, from learning objectives contained in the facility licensee's training program and information in the final safety analysis report, system description manuals and operating procedures, the facility license and amendments thereto, licensee event reports, and other materials that the Commission requests from the facility licensee.

The structure of the operating test is dictated, in part, by 10 CFR 55.45(b). Specifically, that requirement states that the test will be administered in a plant walk-through and in either a simulation facility that the Commission has approved pursuant to 10 CFR 55.46(b), a plant-referenced simulator that conforms with 10 CFR 55.46(c), or the plant, if approved by the Commission under 10 CFR 55.46(b).

The walk-through portion of the operating test consists of two parts ("Administrative Topics" and "Control Room/In-Plant Systems"), each focusing on specific knowledge and abilities (K/As) required for licensed operators to safely discharge their assigned duties and responsibilities. The second major portion of the operating test (the "Simulator Test") is administered on an NRC-approved or plant-referenced simulator. Unless specifically waived in accordance with ES-204 and documented on the "List of Applicants" (Form ES-201-4), each license applicant must complete the entire operating test.

Each part of the operating test is briefly described below. Section D of this standard provides detailed instructions for developing each part. Procedures for administering and grading the operating test are contained in ES-302, "Administering Operating Tests to Initial License Applicants," and ES-303, "Documenting and Grading Initial Operating Tests," respectively.

1. "Administrative Topics"

This part of the walk-through operating test covers K/As that are generally associated with administrative control of the plant. It implements items 9–12 of 10 CFR 55.45(a) and is divided into four administrative topics, as described below. The scope and depth of coverage required in each topic is based on the applicant's license level.

The applicant's competence in each topic is evaluated by administering job performance measures (JPMs) and asking specific "for cause" followup questions, as necessary, based on the applicant's performance (refer to ES-302).

The first topic, "Conduct of Operations," evaluates the applicant's knowledge of the daily operation of the facility. The following subjects are examples of the types of information that could be evaluated under this topic:

- shift turnover
- shift staffing requirements
- access controls for vital/controlled plant areas
- operator responsibilities and procedure usage
- purpose, function, and controls for plant systems
- fuel handling and refueling

The second topic, "Equipment Control," addresses the administrative requirements associated with managing and controlling plant systems and equipment. The following subjects are examples of the types of information that could be evaluated under this topic:

- surveillance testing
- pre-startup activities
- maintenance
- tagging and clearances
- temporary modification of systems
- changes to procedures and plant design
- technical specifications, including plant mode
- familiarity with and use of piping and instrument drawings

The third topic, "Radiation Control," evaluates the applicant's knowledge and abilities with respect to radiation hazards and protection (of plant personnel and the public).

The following subjects are examples of the types of information that could be evaluated under this topic:

- use and function of portable radiation and contamination survey instruments and personnel monitoring equipment
- knowledge of significant radiation hazards
- radiological safety principles and procedures
- radiation exposure limits under normal or emergency conditions
- radiation work permits
- control of radiation releases

The fourth topic, "Emergency Procedures/Plan," evaluates the applicant's knowledge of the facility's emergency plan, including, as appropriate, the responsibility of the RO or SRO to decide whether the plan should be executed and duties assigned under the plan. The following subjects are examples of the types of information that could be evaluated under this topic:

- lines of authority during an emergency
- operator responsibilities during an emergency
- emergency operating procedures
- emergency action levels and classifications
- emergency facilities
- emergency communications
- emergency protective action recommendations
- security event procedures (non-safeguards information)

The "Administrative Topics" are administered in a one-on-one, walk-through format in accordance with ES-302 and graded in accordance with ES-303.

2. "Control Room/In-Plant Systems"

This part of the walk-through operating test is used to determine whether the applicant has an adequate knowledge of plant system design and is able to safely operate those systems. This part implements the requirements of items 3, 4, 7, 8, and 9 identified in 10 CFR 55.45(a) and encompasses several types of systems, including primary coolant, emergency coolant, decay heat removal, auxiliary, radiation monitoring, and instrumentation and control.

This part of the walk-through focuses primarily on those systems with which licensed operators are most involved (i.e., those having controls and indications in the main control room). To a lesser extent, it also ensures that the applicant is familiar with the design and operation of systems located outside the main control room. The applicant's knowledge and abilities relative to each system are evaluated by administering JPMs and, when necessary, specific followup questions based on the applicant's performance of each JPM.

This part of the operating test is administered in a one-on-one, walk-through format in accordance with ES-302 and graded in accordance with ES-303.

3. “Simulator Operating Test”

This part of the operating test implements items 1–8 and 11–13 of 10 CFR 55.45(a). This is the most performance-based aspect of the operating test and is used to evaluate the applicant’s ability to safely operate the plant’s systems under dynamic, integrated conditions.

The simulator test is administered in a team format with up to three applicants (or surrogates) filling the RO and SRO license positions (as appropriate) on an operating crew. (Refer to ES-201, “Initial Operator Licensing Examination Process,” for additional guidance on crew composition and ES-302 for test administration instructions.) This format enables the examiner to evaluate each applicant’s ability to function within the control room team as appropriate to the assigned position, in such a way that the facility licensee’s procedures are adhered to and that the limitations in its license and amendments are not violated. [Refer to 10 CFR 55.45(a)(13).]

Each team or crew of applicants is administered a set of scenarios designed so that the examiners can individually evaluate each applicant on a range of competencies applicable to the applicant’s license level. Appendix D describes those competencies, and Forms ES-303-3 and ES-303-4, the “Simulator Competency Grading Worksheets” for ROs and SROs, break down each competency into a number of specific rating factors to be considered during the grading process (refer to ES-303).

Each applicant must demonstrate proficiency on every competency applicable to his or her license level. The only exception is that SRO Competency Number 3, “Control Board Operations,” is optional for SRO-upgrade applicants (i.e., SRO-upgrade applicants do not have to fill a position that requires control board operations; however, if they do rotate into such a position, they will be graded on this competency even though they may not be individually observed by an NRC examiner, as discussed in ES-302).

C. Responsibilities

1. Facility Licensee

The facility licensee is responsible for the following activities, as applicable, depending upon the examination arrangements confirmed with the NRC’s regional office in accordance with ES-201 approximately 4 months before the scheduled examination date:

- a. Prepare proposed examination outlines in accordance with Section D and submit them to the NRC’s regional office for review and approval in accordance with ES-201.
- b. Submit the reference materials necessary for the NRC regional office to prepare and/or review the requested examination(s). (Refer to ES-201, Attachment 3.)

- c. Prepare and review the final operating tests in accordance with the previously approved examination outline(s) and the instructions in Sections D and E, and submit the tests to the NRC's regional office in accordance with ES-201.
- d. Make the simulation facility available, as necessary, for NRC examiners to prepare for the operating tests.
- e. Meet with the NRC examination team in the regional office or at the facility, when and as necessary, to review the proposed operating tests and discuss potential changes. (Refer to ES-201.)
- f. Revise the operating test outlines and the final tests as applicable and as agreed upon by the NRC regional office. (Refer to ES-201.)
The NRC retains final authority to approve the operating tests.

2. NRC Regional Office

The NRC's regional office is responsible for the following activities:

- a. Ensure that the operating tests are developed in accordance with Section D.
- b. Ensure that the operating tests are reviewed for quality in accordance with Section E.
- c. Meet with the facility licensee, when and as appropriate, to pre-review the operating tests in accordance with ES-201.

D. Instructions

Prepare each category of the operating test in accordance with the following general guidelines and specific instructions:

1. General Guidelines

- a. In an effort to reduce examination preparation effort, the same operating test may be used to examine multiple applicants and simulator crews. Depending on the number and license level of the applicants being examined, it might be possible to use the same set of JPMs and scenarios to examine all of the applicants if the operating test is administered in multiple segments (e.g., single scenarios or two to four JPMs), each of which can be given to all of the applicants in a single day. The facility licensee and the NRC's chief examiner shall discuss the options and reach agreement on the process before developing the operating tests.

To minimize predictability and maintain test integrity, varied subjects, systems, and operations shall be evaluated with applicants who are not being examined at the same time, unless measures are taken to preclude interaction among the applicants. The same JPMs and simulator scenarios shall not be repeated on subsequent days.

Operating tests may not duplicate test items (simulator scenarios or JPMs) from the applicants' audit test (or tests if the applicant is retaking the examination) given at or near the end of the license training class. Simulator events and JPMs that are similar to those that were tested on the audit examination are permitted provided that the actions required to mitigate the transient or complete the task (e.g., using an alternative path as discussed in Appendix C) are significantly different from those required during the audit examination. The facility licensee shall identify for the NRC chief examiner those simulator events and JPMs that are similar to those that were tested on the audit examination.

Sufficient operating test materials shall be developed to ensure that all applicants can be tested with the available personnel according to the schedule agreed upon by the NRC's regional office and the facility licensee (refer to ES-201).

- b. To the extent permitted for each part of the operating test, select and modify testing materials (i.e., JPMs and simulator scenarios) from the facility's examination banks. Every selected test item must satisfy the qualitative and quantitative criteria specified for the applicable section of the operating test or be modified accordingly.
- c. Consider the K/As associated with normal, abnormal, and emergency tasks and evolutions as a source of topics for use in evaluating applicant competency in each part of the operating test.

The K/As associated with the tasks and questions planned for the operating test should have importance factors of at least 2.5. Tasks with importance factors of less than 2.5 may be used if there is a substantive reason for including them (e.g., a recent licensee event or a significant system modification). Failure to train the applicants on a particular K/A is not an acceptable basis for rejecting that K/A.

The K/As should be appropriate to the plant-specific requirements for the applicant's license level. Refer to the facility's job and task analysis (if available), learning objectives, and other reference material to confirm that the operating test is correctly oriented to the facility and the applicant's license level.

The facility licensee's site-specific task list may be used to supplement or override, on a case-by-case basis, selected individual items in the NRC's K/A catalogs. In order to maintain examination consistency, the site-specific task list shall not be used in place of the entire K/A catalog.

- d. When selecting and developing JPMs and scenarios for the operating test, ensure that the materials contribute to the test's overall capacity to differentiate between those applicants who are competent to safely operate the plant and those who are not. Additionally, all of the test items should include the three facets of test validity (i.e., content, operational, and discrimination) discussed in Appendix A. Any test items that, when missed, would raise questions regarding adequate justification for denying the applicant's license should not be included on the operating test.
- e. SRO applicants, whether upgrade or instant, will be examined for the highest on-shift position for which the SRO's license is applicable (e.g., shift supervisor), regardless of the position to be assigned when licensed. SRO applicants should demonstrate their supervisory abilities and an attitude of responsibility for safe operation, and are expected to assume a management role during plant transients and upset conditions while taking the simulator operating test. The operating test briefing, discussed in Appendix E, ensures that the applicants are advised of this policy.

Differences in administrative controls and facility design will affect the SRO's responsibilities; however, in general, the following guidelines should be used to differentiate the SRO operating test from that of an RO:

- In directing licensed activities, the SRO must evaluate plant performance and make operational judgments accordingly. SRO applicants should, therefore, be more knowledgeable in areas such as operating characteristics, reactor behavior, and instrument interpretation.
- In directing licensed activities, the SRO must have a broader and more thorough knowledge of facility administrative controls and methods, including limitations imposed by the regulations and the facility's technical specifications and their bases.
- The SRO may be assigned responsibilities for auxiliary systems that are outside the control room (e.g., waste disposal and fuel handling systems) and are not normally operated by licensed operators. Because the SRO may have these additional responsibilities, the SRO license applicant should demonstrate knowledge of the designs of such systems as they relate to maximum permissible concentrations, effluent release rates, and other radiological considerations.

- f. Incorporate facility-specific and industry-generic operating experience into the operating test whenever possible. Documentation such as licensee event reports, significant event reports, and service information letters are readily available sources of operationally oriented plant anomalies.

Evaluate the dominant accident sequences (DASs) for the facility to determine whether they are suitable for testing, on a sampling basis, during the dynamic simulator or walk-through tests. DASs are those sequences that contribute significantly to the frequency of core damage as determined by the facility licensee's probabilistic risk assessment (PRA) or individual plant examination (IPE).

The PRA/IPE should also be used to identify risk-important operator actions. Chapter 13, "Operational Perspectives," of NUREG-1560, "Individual Plant Examination Program: Perspectives on Reactor Safety and Plant Performance," identifies a number of important human actions that may be appropriate for evaluation on the operating test. In determining what actions to evaluate, do not overlook actions that are relied upon or result in specific events being driven to low risk contribution. This will help identify those human actions that are assumed to be very reliable, but might otherwise not show up in a list of risk-dominant actions.

- g. If the applicants at a facility qualify for dual or multi-unit licenses, the operating tests should evaluate their knowledge of the design, procedural, and operational differences between the units.

Divide the operating test coverage among the units and do not become predictable by conducting the walk-through tests on only one unit. Different applicants may be examined on different units, or each applicant may be asked to explain or demonstrate his or her understanding of variations in control board layouts, systems, instrumentation, and procedural actions between the units at the facility.

Most dual- or multi-unit stations have a simulator that is modeled after only one of the units. Therefore, ensure that the applicants are properly tested on the different systems, control board layouts, and any other differences between the units during the walk-through portion of the operating test.

For example, after administering the simulator operating test on Browns Ferry Unit 1, the control room systems portion of the walk-through operating test could be administered on Unit 2 or Unit 3 or both.

- h. The operating test should examine a broad range of knowledge and abilities, systems and components, and operations and events. The walk-through and simulator tests should not be redundant, nor should they duplicate material that is covered on the written examination. It is particularly important that the simulator and control room systems walk-through be developed and reviewed as a package to preclude the same tasks and events from appearing on both parts of the test.

- i. Every facet of the operating test, including the walk-through JPMs and simulator scenarios, should be planned, researched, validated, and documented to the maximum extent possible before the test is administered.
- j. Examiners who will be administering the operating tests but were not involved in their development are expected to research and study the topics and systems to be examined on the operating test so that they are prepared to ask whatever performance-based followup questions might be necessary to determine whether the applicant is competent in those areas. As stated in 10 CFR 55.45(a), the operating test requires the applicant to demonstrate an understanding of and the ability to perform the actions necessary to accomplish a representative sample from among 13 items listed in the rule. If the applicant correctly performs a JPM (including both critical and noncritical steps) and demonstrates familiarity with the administrative topic, equipment, and procedures, it is not necessary to ask any followup questions. However, if the applicant fails to accomplish the task standard for the JPM or demonstrates a lack of understanding regarding the administrative topic, equipment, and procedures such as having difficulty locating information, control board indications, or controls, the examiner must be prepared to ask performance-based followup questions, as necessary, to clarify or confirm the applicant's understanding of the administrative topic or system as it relates to the task that was performed.

Examination team members are strongly encouraged to meet as a group with the chief examiner to review the examination materials after they have been approved for administration by the responsible supervisor. The discussions should focus on those test items that might require extensive cuing by the examiner and those that are unique to the facility and require a response different from what the examiner might expect based on past experience.

- k. Performance-based followup questions during any part of the operating test may include a combination of open- and closed-reference items. Open-reference items that require applicants to apply their knowledge of the plant to postulated normal, abnormal, and emergency situations are preferred. Closed-reference items may be used to evaluate the immediate actions of emergency and other procedures, certain automatic actions, operating characteristics, interlocks, set points, and routine administrative activities, as appropriate to the facility.

Refer to Attachment 1 for more guidance regarding the development and use of open reference questions. To the extent possible, the concepts in the attachment should be applied to performance-based followup questions.

- l. If it becomes necessary to deviate from a test outline that has been approved by the NRC's chief examiner in accordance with ES-201, discuss the proposed deviation with the chief examiner and obtain concurrence before proceeding with the changes. Be prepared to explain why the original proposal could not be implemented and why the proposed replacement is considered an acceptable substitute.

2. Walk-Through Guidelines

- a. In order to protect the integrity and security of the examination process, the examination author must limit how much of the examination is taken directly from the facility's testing materials without significant modification and how much of the walk-through test is repeated from the last two NRC licensing examinations at the facility. A significant modification means that at least one condition has been substantively changed in a manner that alters the course of action of the JPM. If JPMs are repeated from the past two NRC examinations, they must be randomly selected from all the JPMs used on the past 2 examinations. Refer to Forms ES-301-1 and ES-301-2 for specific limits on JPM bank use and repetition from the previous 2 NRC examinations.
- b. JPMs should include the elements identified in Appendix C (e.g., initiating and terminating cues, critical steps, and performance criteria). The guidelines and forms (or equivalents) in that appendix should be used when developing new JPMs. Facility procedures may be adapted for use as JPMs by identifying critical steps and entering comments on how to execute particular steps.
- c. The JPMs should, individually and as a group, have meaningful performance requirements that will provide a legitimate basis for evaluating the applicant's understanding of and ability to safely operate the plant (as required by 10 CFR 55.45).

3. Specific Instructions for the "Administrative Topics" Walk-Through

Although the administrative topics may be examined separately, it is preferable, whenever possible, to link, associate, or integrate them with tasks and events conducted during the systems and simulator portions of the operating test. However, it is important to keep in mind that the applicant's proficiency in the administrative topics should be deliberately evaluated and not inferred solely from observations made during the other portions of the operating test.

- a. For each of the administrative topics listed below, select the required number of subjects to be evaluated during the operating test based on the applicant's license level.

Topic	Number of Subjects	
	RO	SRO and RO Retakes
"Conduct of Operations"	1 (or 2)	2
"Equipment Control"	1 (or 0)	1
"Radiation Control"	1 (or 0)	1
"Emergency Procedures/Plan"	1 (or 0)	1
Total	4	5



RO applicants need not be evaluated on every topic (as indicated above, "Equipment Control," "Radiation Control," or "Emergency Procedures/Plan" can be omitted by doubling-up on "Conduct of Operations"), unless the applicant is retaking only the "Administrative Topics" (with a waiver of the systems walk-through and simulator test pursuant to ES-204).

K/As associated with each administrative topic shall be selected from Section 2 of the applicable NRC K/A catalog for pressurized- or boiling-water reactors (i.e., NUREG-1122 and 1123, respectively). For the "Emergency Procedures/Plan" topic, only those K/As related to the emergency plan and implementing procedures [not those associated with the emergency operating procedures (EOPs)] are applicable to this category of the operating test.

- b. For each administrative subject, select a performance-based activity for which an administrative JPM can be developed. The administrative JPMs may require the applicant to identify and respond to one or more postulated administrative errors in a manner similar to the alternate path methodology discussed in Appendix C.
- c. In general, SROs have more administrative responsibilities than ROs, so SRO applicants should be evaluated in greater depth on the administrative topics. RO applicants need only understand the mechanics and intent of the related subjects, as they pertain to tasks at the facility.
- d. The following specific guidelines should be applied when selecting or developing JPMs to confirm the applicant's competence with regard to each topic:

"Conduct of Operations"

Many of these subjects can be covered within the framework of a shift turnover or by integrating them into other discussions, as they apply, throughout the examination.

The applicant's awareness of access controls for vital/controlled plant areas should be evaluated by observing his or her behavior during the operating test. However, passive observations, in and of themselves, are insufficient to justify an evaluation in that subject area.

The subject of fuel handling can be covered in the control room, but attempt to cover this subject in the fuel handling areas of the plant whenever possible. The RO applicant should be aware of his or her duties in the control room during fuel handling. These duties include monitoring instrumentation and responding to alarms from the fuel handling area, communicating with the fuel handling and storage facility, and operating systems from the control room in support of (re)fueling operations. For the SRO applicant, evaluate topics such as core alterations, new and spent fuel storage and movement, the design of the fuel handling area, use of the fuel handling tools, and fuel handling casualties.

"Equipment Control"

These subjects can be evaluated within the framework of a normal maintenance evolution. For example, have the applicant demonstrate how he or she would take a failed system or component out of service, initiate maintenance on the system, and test the system before placing it back in service. During the maintenance evolution, have the applicant demonstrate the use of piping and instrument drawings and technical specifications.

"Radiation Control"

This topic is best covered in conjunction with the JPMs prepared for the in-plant systems walk-through. It is most appropriate to evaluate these subjects during the required entry into the radiologically controlled area (RCA).

The levels of knowledge expected of RO and SRO applicants in some radiation control subjects are significantly different. The RO's duties generally require knowledge of radiation worker responsibilities and operation of plant systems associated with liquid and gaseous waste releases. Therefore, the depth to which RO applicants are evaluated should be limited to their responsibilities and the monitoring requirements before, during, and after the release. The SRO, however, may be involved in reviewing and approving release permits and should be cognizant of the requirements associated with those releases, as well as their potential effect on the health and safety of the public. The SRO applicants may be asked to simulate a planned release (e.g., liquid, gaseous, or containment purge) when examining these topics.

"Emergency Procedures/Plan"

There are significant differences between the knowledge required of RO and SRO applicants in this area. RO applicants should be familiar with the emergency plan and with their plant-specific responsibilities under the emergency plan implementing procedures (EPIPs). By contrast, SRO applicants must demonstrate additional knowledge based upon their responsibility to direct and manage the implementation of the EPIPs during the initial phases of an emergency. As a result, SRO applicants should have a more detailed understanding of the EPIPs, in general, and should be familiar with event classification procedures, protective action recommendations, and communication requirements and methods. As discussed in Section D.1, ensure that the test does not become predictable by always performing a different variation of the same activity (e.g., repetitive emergency classifications with different events).

This topic is best evaluated by linking a JPM to a simulator transient that requires implementation of the emergency plan. Such a JPM can be conducted immediately following a simulator scenario or during the walk-through examination.

- e. The planned administrative subjects should normally take no more than 1 hour and 1.5 hours to administer to RO and SRO applicants, respectively.
- f. On Form ES-301-1, "Administrative Topics Outline," briefly describe the specific administrative activities selected for evaluation.
- g. Forward the completed outline to the NRC's chief examiner so that it is *received* by the date agreed upon with the NRC regional office at the time the examination arrangements were confirmed; the outline is normally due approximately 75 days before the scheduled examination date. Refer to ES-201 for additional instructions regarding the review and submittal of the examination outline.

The NRC's chief examiner and responsible supervisor shall review the test outline coverage as soon as possible in accordance with ES-201 and forward any comments to the originator for resolution.

- h. After the NRC's chief examiner approves the operating test outline, prepare the final administrative JPMs in accordance with the general operating test guidelines in Sections D.1 and 2 and the JPM guidelines in Appendix C.
- i. When the materials are complete, review the quality of the final administrative walk-through test using Form ES-301-3, "Operating Test Quality Checklist." This review shall be performed in conjunction with the associated systems walk-through and the dynamic simulator operating test as noted in Sections D.4 and D.5.

Submit the entire operating test package to the designated facility reviewer or the NRC's chief examiner, as appropriate, for review and approval in accordance with Section E. The NRC's chief examiner must receive the test approximately 45 days before the scheduled administration date, unless other arrangements have been made.

4. **Specific Instructions for the "Control Room/In-Plant Systems" Walk-Through**

This part of the operating test evaluates the applicant on systems-related K/As by having the applicant perform selected tasks and, when necessary, based on the applicant's performance, probing his or her knowledge of the task and its associated system with specific followup questions. The selected tasks are *in addition to* and shall be *different from* the events and evolutions conducted during the simulator operating test. A task that is similar to a scenario event may be acceptable if the actions required to complete the task are significantly different from those required in response to the scenario event.

- a. Refer to Section 1.9 of the K/A catalog applicable to the type of reactor for which the applicant is seeking a license (i.e., NUREG-1122 for PWRs and NUREG-1123 for BWRs). From the nine safety function groupings identified in the catalog, select the appropriate number of systems (see the table below) to be evaluated based on the applicant's license level. The emergency and abnormal plant evolutions (E/APEs) listed in Section 1.10 of the appropriate NUREG may also be used to evaluate the applicable safety function (as specified for each E/APE in the first tier of the written examination outlines attached to ES-401, "Preparing Initial Site-Specific Written Examinations").

License Level	Control Room	In-Plant	Total
RO	8	3	11
SRO-instant (I)	7	3	10
SRO-upgrade (U)	2 or 3	3 or 2	5

Each of the control room systems and evolutions (and separately each of the in-plant systems and evolutions) selected for RO and SRO-I applicants should evaluate a different safety function, and the same system or evolution should not be used to evaluate more than one safety function in each location. For PWR operating tests, the primary and secondary systems listed under Safety Function 4, "Heat Removal From Reactor Core," in Section 1.9 of NUREG-1122 may be treated as separate safety functions (i.e., two systems, one primary and one secondary, may be selected from Safety Function 4).

The five systems and evolutions selected for an SRO-U applicant should evaluate at least five different safety functions. One of the control room systems or evolutions must be an engineered safety feature, and the same system or evolution should not be used to evaluate more than one safety function.

- b. For each system selected for evaluation, select from the applicable K/A catalog or the facility licensee's site-specific task list *one* task for which a JPM exists or can be developed. Review the associated simulator outline if it has already been prepared (refer to Section D.5), and avoid those tasks that have already been selected for evaluation on the dynamic simulator test.

At least one of the tasks shall be related to a shutdown or low-power¹ condition, and four to six of the tasks for ROs and instant SROs and two to three of the tasks for upgrade SROs shall require the applicant to execute alternative paths within the facility's operating procedures. In addition, at least one of the tasks conducted in the plant shall evaluate the applicant's ability to implement actions required during an emergency or abnormal condition, and another shall require the applicant to enter the RCA. This provides an excellent opportunity for the applicant to discuss or demonstrate the radiation control administrative subjects.

¹ NUREG-1449, "NRC Staff Evaluation of Shutdown and Low-Power Operation," defines "low power" to include the range from criticality to 5 percent power.

If it is not possible to develop or locate a suitable task and/or JPM for each of the selected systems, return to Step (a), above, and select a different system or evolution. After identifying a JPM for each system, list the JPM and its associated safety function number on Form ES-301-2, "Control Room/In-Plant Systems Outline." Also indicate the type of JPM by entering the applicable code(s) identified at the bottom of the form.

- c. Forward the completed walk-through test outline to the NRC's chief examiner so that it is *received* by the date agreed upon with the NRC's regional office at the time the examination arrangements were confirmed; the outlines are normally due approximately 75 days before the scheduled examination date. Refer to ES-201 for additional instructions regarding the review and submittal of examination outlines.

The NRC's chief examiner and responsible supervisor shall review the test outline in accordance with ES-201 and forward any comments to the originator for resolution.

- d. After the NRC's chief examiner approves the operating test outline, prepare the final JPMs in accordance with the general guidance in Sections D.1 and D.2 and the JPM guidelines in Appendix C.
- e. When the materials are complete, review the completed walk-through test for quality using Form ES-301-3, "Operating Test Quality Checklist," and make any changes that might be necessary. To minimize duplication, this review shall be performed in conjunction with the associated administrative topics and the simulator operating test (refer to Sections D.3 and D.5).

Submit the entire operating test package to the designated facility reviewer or the NRC's chief examiner, as appropriate, for review and approval in accordance with Section E. The NRC's chief examiner must receive the test approximately 45 days before the scheduled review date, unless other arrangements have been made.

5. **Specific Instructions for the "Simulator Operating Test"**

- a. Based on the anticipated crew compositions, determine the number of scenarios and scenario sets necessary to rotate each RO and SRO-I applicant into the lead reactor operator (i.e., the "at-the-controls") position. For example, a crew consisting of two ROs and one SRO-I will normally require three scenarios to evaluate each applicant's performance on the reactor controls; however, a surrogate SRO will have to fill the supervisory role while the SRO-I applicant is in the lead operator position. Additionally, the crews and scenarios will have to be planned so that every SRO applicant (U and I) fills the supervisory role and every RO applicant rotates through the balance-of-plant (BOP) position for at least one scenario.

SRO-U applicants are given credit for their previous RO license evaluation and experience and are normally not required to manipulate the controls.

It may be possible to significantly reduce the number of simulator scenario sets required to examine a large group of applicants by administering the same set of scenarios on the same day to two (or more) different crews of applicants. However, provisions must be made to ensure that the crews remain out of contact until all crews have completed the set of scenarios (refer to ES-302).

Additional or replacement scenarios should also be prepared and available while administering the operating tests in accordance with ES-302, in case one of the planned scenarios does not work as intended.

- b. The simulator operating tests (i.e., scenario sets) will be constructed by selecting and modifying scenarios from existing facility licensee or NRC scenario banks and by developing new scenarios.

In order to maintain test integrity, every applicant shall be tested on at least one new or significantly modified scenario that he or she has not had the opportunity to rehearse or practice. A significant modification means that at least one condition or event has been substantively changed to alter the course of action in the scenario. Furthermore, any other scenarios that are extracted from the facility licensee's bank must be altered to the degree necessary to prevent the applicants from immediately recognizing the scenarios based on the initial conditions or other cues.

- c. The initial conditions, normal operations, malfunctions, and major transients should be varied among the scenarios and should include startup, low-power², and full-power situations. Review the associated walk-through outline if it has already been prepared (refer to Section D.4), and take care not to duplicate operations that will be tested during the systems walk-through portion of the operating test.
- d. In order to maximize the quality and consistency of the operating tests, develop new scenarios in accordance with the instructions in Appendix D. Modify existing scenarios, as necessary, to make them conform with the qualitative and quantitative attributes described in that appendix and enumerated on Form ES-301-4, "Simulator Scenario Quality Checklist." The quantitative attribute target ranges that are specified on the form are not absolute limitations; some scenarios may be an excellent evaluation tool, but may not fit within the ranges. A scenario that does not fit into these ranges shall be evaluated to ensure that the level of difficulty is appropriate. Whenever possible, the critical tasks should be distributed so that each applicant is required to respond.

² NUREG-1449, "NRC Staff Evaluation of Shutdown and Low-Power Operation," defines "low power" to include the range from criticality to 5 percent power.

At a minimum, each scenario set must require each applicant to respond to the types of evolutions, failures, technical specification (TS) evaluations, and transients in the quantities identified for the applicant's license level on Form ES-301-5, "Transient and Event Checklist." An applicant should only be given credit for those events that require the applicant to perform verifiable actions that provide insight to the applicant's competence. The required instrument and component failures should normally be completed before starting the major transient; those that are initiated after the major transient should be carefully reviewed because they may require little applicant action and provide little insight regarding their performance. With the exception of the SRO TS evaluations, each event should only be counted once per applicant; for example, a power change can be counted as a normal evolution *or* as a reactivity manipulation and, similarly, a component failure that immediately results in a major transient counts as one or the other, but not both.

Any normal evolution, component failure, or abnormal event (other than a reactor trip or other automatic power reduction) that requires the operator to perform a *controlled* power or reactivity change will qualify as a reactivity manipulation. This includes events such as an emergency borating, a dropped rod recovery, a significant rod bank realignment, or a manual reactor power reduction in response to a secondary system upset. Such events may produce a more timely operator and plant response than a normal power change.

Furthermore, each scenario set must also allow the examiner to evaluate the applicant's performance on each competency and rating factor that is germane to the applicant's license level. Use Form ES-301-6, "Competencies Checklist," to verify that the competencies are adequately evaluated by entering the scenario and event numbers that are intended to assess each competency. To minimize the need to run an additional scenario if an applicant makes a single, uncompensated error related to a rating factor (refer to Section D.3.n of ES-302), it is recommended that each applicant be given multiple opportunities to demonstrate competence in any particular area.

If the facility licensee normally operates with and is required by its technical specifications to have more than two ROs in the control room, the chief examiner may authorize the use of additional surrogates to fill out the crews. In such cases, take care in planning the scenarios to ensure that the additional operators do not reduce the examiners' ability to evaluate each applicant on the required number of events and on every competency and rating factor.

Appendix D provides detailed instructions for completing Form ES-D-1, the "Scenario Outline," and Form ES-D-2, the "Required Operator Actions," that examiners will use to administer the simulator operating tests. In order to minimize the amount of rework that might be required as a result of changes in the planned scenario events, Form ES-D-2 should be completed after the NRC's chief examiner has had the opportunity to review and comment on the proposed simulator operating test outlines (i.e., Form ES-D-1) in accordance with ES-201.

- e. When the proposed simulator operating test outlines are complete, forward them to the NRC's chief examiner so they are *received* by the date agreed upon with the NRC's regional office at the time the examination arrangements were confirmed; the outlines are normally due approximately 75 days before the scheduled examination date. Refer to ES-201 for additional instructions regarding the review and submittal of the examination outlines.

The NRC's chief examiner shall review the operating test outlines in accordance with ES-201, and forward any comments to the originator for resolution.

- f. After the NRC's chief examiner approves the operating test outlines, prepare the final simulator test materials by revising Form(s) ES-D-1 as requested by the NRC's chief examiner and completing a detailed operator action form (ES-D-2) for each event. All required operator actions (e.g., opening, closing, and throttling valves; starting and stopping equipment; raising and lowering level, flow, and pressure; making decisions and giving directions; acknowledging or verifying key alarms and automatic actions) shall be documented, and critical tasks shall be identified. Events that do not require an operator to take one or more substantive actions will not count toward the minimum number of events required for each operator per Form ES-301-5.
- g. Review the completed simulator operating test for quality using Form ES-301-4, "Simulator Scenario Quality Checklist," and make any changes that might be necessary. This review shall be performed in conjunction with the associated walk-through test (refer to Sections D.3 and D.4) to minimize duplication.

Submit the entire operating test package to the designated facility reviewer or the NRC's chief examiner, as appropriate, for review and approval in accordance with Section E. The NRC's chief examiner must receive the test approximately 45 days before the scheduled administration date, unless other arrangements have been made.

E. Quality Reviews

1. Facility Management Review

If the operating test was prepared by the facility licensee, the preliminary outline and the proposed test shall be independently reviewed by a supervisor or manager before they are submitted to the NRC's regional office for review and approval in accordance with ES-201. The reviewer should evaluate the outline and test using the criteria on Forms ES-201-2, ES-301-3, and ES-301-4 and include the signed forms (for each different operating test) in the examination package submitted to the NRC in accordance with ES-201.

2. NRC Examiner Review

- a. The NRC's chief examiner shall ensure that each operating test is independently reviewed for content, wording, operational validity, and level of difficulty. As a minimum, the examiner shall check the items listed on Forms ES-301-3 and ES-301-4, as applicable. The examiner should keep in mind that counting the number of scenario quantitative attributes is not always indicative of the scenario's level of difficulty. Although there are no definitive minimum or maximum attribute values that can be used to identify scenarios that will not discriminate because they are too easy or difficult, scenarios that fall outside the target ranges specified on Form ES-301-4 should be carefully evaluated to ensure they are appropriate. Refer to Section C.3 of ES-201 for additional guidance regarding examination reviews.
- b. The NRC examiner should review the operating tests as soon as possible after receipt so that supervisory approval can be obtained before the final review with the facility licensee, which is normally scheduled about 2 weeks before the administration date. It is especially important that the examiner promptly review tests prepared by a facility licensee because of the extra time that may be required if extensive changes are necessary. The chief examiner shall consolidate the comments from other regional reviewers and submit one set of comments to the author.
- c. If the facility licensee developed the operating test, the facility licensee is primarily responsible for technical accuracy and compliance with the restrictions concerning the use of examination banks. However, the chief examiner is expected to use his or her best judgment and take reasonable measures, including selective review of reference materials and past tests, to verify these attributes.
- d. The chief examiner will note/review any changes that need to be made and forward the tests to the responsible supervisor for review and comment in accordance with Section E.3 before reviewing the examinations with the author or facility contact. There are no minimum or maximum limits on the number or scope of changes the chief examiner may direct the author or facility contact to make to the proposed tests, provided that they are necessary to make the tests conform with established acceptance criteria. Refer to ES-201 for additional guidance regarding NRC response to facility-developed examinations that are significantly deficient.
- e. Upon supervisory approval, and generally at least 14 days before the operating tests are scheduled to be given, the chief examiner will review the tests with the facility licensee in accordance with ES-201.

Tests that were developed by the NRC should be clean, properly formatted, and "ready-to-give" before they are reviewed with the facility licensee. The regional office should not rely on the facility licensee to ensure that the tests are of acceptable quality to administer.

- f. After reviewing the tests with the facility licensee, the chief examiner will ensure that any comments and recommendations are resolved and the tests are revised as necessary. If the facility licensee developed the tests, it will generally be expected to make whatever changes the NRC recommends.
- g. After the necessary changes have been made and the chief examiner is satisfied with the test, he or she will sign Form(s) ES-301-3 and forward the test package to the responsible supervisor for final approval.

3. NRC Supervisory Review

- a. In accordance with ES-201, the responsible supervisor shall review the operating tests before authorizing the chief examiner to proceed with the facility pre-review. The supervisory review is not intended to be another detailed review, but rather a general assessment of test quality, including a review of the changes recommended by the chief examiner, and a check to ensure that all of the applicable administrative requirements have been implemented.
- b. The responsible supervisor should ensure that any significant deficiencies in the original operating tests submitted by a facility licensee are evaluated in accordance with ES-201 to determine the appropriate course of action. At a minimum, the supervisor should ensure that they are addressed in the final examination report in accordance with ES-501, "Initial Post-Examination Process."
- c. Following the facility review, the responsible supervisor should again review the tests to ensure that the concerns expressed by the facility licensee and the chief examiner have been appropriately addressed. The supervisor shall not sign Form(s) ES-301-3 until he or she is satisfied that the examination is acceptable to be administered.

F. Attachments/Forms

Attachment 1,	"Open-Reference Question Guidelines"
Form ES-301-1,	"Administrative Topics Outline"
Form ES-301-2,	"Control Room/In-Plant Systems Outline"
Form ES-301-3,	"Operating Test Quality Checklist"
Form ES-301-4,	"Simulator Scenario Quality Checklist"
Form ES-301-5,	"Transient and Event Checklist"
Form ES-301-6,	"Competencies Checklist"

1. The most appropriate format is the short-answer question, which requires the applicant to compose a response rather than select from among a set of alternative responses, as is the case with multiple-choice, matching, and true/false questions.
2. Provide clear, explicit directions and/or guidelines for answering the question so that the applicant understands what constitutes a fully correct response. Choose words carefully to ensure that the stipulations and requirements of the question are appropriately conveyed. Words such as "evaluate," "outline," and "explain," can invite a lot of detail that is not necessarily relevant.
3. Make sure that the expected response matches (and is limited to) the requirements posed in the question. Consider the amount of partial credit to be granted for an incomplete answer. For questions requiring computation, specify the degree of precision expected. Try to make the answer turn out to be whole numbers.
4. Avoid giving away part or all of the answer by the way the question is worded. For example, "If the letdown line became obstructed, could borating of the plant be accomplished shortly after a reactor trip to put the plant in cold shutdown? If so, how?"

A test-wise applicant can realize that the answer has to be yes, or else the second part of the question would have read something like "If not, why not?"
5. Avoid what could be considered "trick" questions, in which the expected answer does not precisely match the question. For example, asking "How do the SI termination criteria change following an SI re-initiation?" implies that the termination criteria will change, when in actuality they do not.
6. Do not use direct look-up questions that only require the applicant to recall where to find the answer to the question. The operational orientation required of questions on the walk-through test and the applicant's access to reference documents, argue against the use of questions that test recall and memorization. Any questions that do not require any analysis, synthesis, or application of information by the applicant should be answerable without the aid of reference materials. Refer to ES-602, Attachment 1, for a more detailed discussion of direct look-up questions.
7. Questions should also adhere to the generic item construction principles and guidelines in Appendix B. Moreover, Form ES-602-1, "NRC Checklist for Open-Reference Test Items," contains a list of questions that can be used to evaluate the suitability of the questions for the walk-through portion of the operating test. Although the checklist was developed for use in evaluating requalification written examinations, all of the criteria except 9–11, and the K/A rating on item 7 are generically applicable.

Facility: _____
 Examination Level: RO ☐ SRO ☐

Date of Examination: _____
 Operating Test Number: _____

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations		
Conduct of Operations		
Equipment Control		
Radiation Control		
Emergency Procedures/Plan		

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

* Type Codes & Criteria: (C)ontrol room, (S)imulator, or Class(R)oom
 (D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
 (N)ew or (M)odified from bank (≥ 1)
 (P)revious 2 exams (≤ 1 ; randomly selected)

Facility: _____ Exam Level: RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>		Date of Examination: _____ Operating Test No.: _____	
Control Room Systems® (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)			
System / JPM Title	Type Code*	Safety Function	
a.			
b.			
c.			
d.			
e.			
f.			
g.			
h.			
In-Plant Systems® (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)			
i.			
j.			
k.			
@ All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.			
* Type Codes	Criteria for RO / SRO-I / SRO-U		
(A)lternate path (C)ontrol room (D)irect from bank (E)mergency or abnormal in-plant (EN)gineered safety feature (L)ow-Power / Shutdown (N)ew or (M)odified from bank including 1(A) (P)revious 2 exams (R)CA (S)imulator	4-6 / 4-6 / 2-3 $\leq 9 / \leq 8 / \leq 4$ $\geq 1 / \geq 1 / \geq 1$ - / - / ≥ 1 (control room system) $\geq 1 / \geq 1 / \geq 1$ $\geq 2 / \geq 2 / \geq 1$ $\leq 3 / \leq 3 / \leq 2$ (randomly selected) $\geq 1 / \geq 1 / \geq 1$		

Facility:		Date of Examination:		Operating Test Number:	
1. General Criteria			Initials		
			a	b*	c#
a.	The operating test conforms with the previously approved outline; changes are consistent with sampling requirements (e.g., 10 CFR 55.45, operational importance, safety function distribution).				
b.	There is no day-to-day repetition between this and other operating tests to be administered during this examination.				
c.	The operating test shall not duplicate items from the applicants' audit test(s). (see Section D.1.a.)				
d.	Overlap with the written examination and between different parts of the operating test is within acceptable limits.				
e.	It appears that the operating test will differentiate between competent and less-than-competent applicants at the designated license level.				
2. Walk-Through Criteria			--	--	--
a.	Each JPM includes the following, as applicable: <ul style="list-style-type: none"> • initial conditions • initiating cues • references and tools, including associated procedures • reasonable and validated time limits (average time allowed for completion) and specific designation if deemed to be time-critical by the facility licensee • operationally important specific performance criteria that include: <ul style="list-style-type: none"> – detailed expected actions with exact criteria and nomenclature – system response and other examiner cues – statements describing important observations to be made by the applicant – criteria for successful completion of the task – identification of critical steps and their associated performance standards – restrictions on the sequence of steps, if applicable 				
b.	Ensure that any changes from the previously approved systems and administrative walk-through outlines (Forms ES-301-1 and 2) have not caused the test to deviate from any of the acceptance criteria (e.g., item distribution, bank use, repetition from the last 2 NRC examinations) specified on those forms and Form ES-201-2.				
3. Simulator Criteria			--	--	--
The associated simulator operating tests (scenario sets) have been reviewed in accordance with Form ES-301-4 and a copy is attached.					
Printed Name / Signature			Date		
a.	Author _____		_____		
b.	Facility Reviewer(*) _____		_____		
c.	NRC Chief Examiner (#) _____		_____		
d.	NRC Supervisor _____		_____		
NOTE: * The facility signature is not applicable for NRC-developed tests. # Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required.					

Facility:		Date of Exam:		Scenario Numbers: / /		Operating Test No.:	
QUALITATIVE ATTRIBUTES				Initials			
				a	b*	c#	
1.	The initial conditions are realistic, in that some equipment and/or instrumentation may be out of service, but it does not cue the operators into expected events.						
2.	The scenarios consist mostly of related events.						
3.	Each event description consists of <ul style="list-style-type: none"> the point in the scenario when it is to be initiated the malfunction(s) that are entered to initiate the event the symptoms/cues that will be visible to the crew the expected operator actions (by shift position) the event termination point (if applicable) 						
4.	No more than one non-mechanistic failure (e.g., pipe break) is incorporated into the scenario without a credible preceding incident such as a seismic event.						
5.	The events are valid with regard to physics and thermodynamics.						
6.	Sequencing and timing of events is reasonable, and allows the examination team to obtain complete evaluation results commensurate with the scenario objectives.						
7.	If time compression techniques are used, the scenario summary clearly so indicates. Operators have sufficient time to carry out expected activities without undue time constraints. Cues are given.						
8.	The simulator modeling is not altered.						
9.	The scenarios have been validated. Pursuant to 10 CFR 55.46(d), any open simulator performance deficiencies or deviations from the referenced plant have been evaluated to ensure that functional fidelity is maintained while running the planned scenarios.						
10.	Every operator will be evaluated using at least one new or significantly modified scenario. All other scenarios have been altered in accordance with Section D.5 of ES-301.						
11.	All individual operator competencies can be evaluated, as verified using Form ES-301-6 (submit the form along with the simulator scenarios).						
12.	Each applicant will be significantly involved in the minimum number of transients and events specified on Form ES-301-5 (submit the form with the simulator scenarios).						
13.	The level of difficulty is appropriate to support licensing decisions for each crew position.						
Target Quantitative Attributes (Per Scenario; See Section D.5.d)				Actual Attributes	--	--	
1.	Total malfunctions (5-8)			/ /			
2.	Malfunctions after EOP entry (1-2)			/ /			
3.	Abnormal events (2-4)			/ /			
4.	Major transients (1-2)			/ /			
5.	EOPs entered/requiring substantive actions (1-2)			/ /			
6.	EOP contingencies requiring substantive actions (0-2)			/ /			
7.	Critical tasks (2-3)			/ /			

Facility:		Date of Exam:									Operating Test No.:						
A P P L I C A N T	E V E N T T Y P E	Scenarios												T O T A L	M I N I M U M (*)		
		1			2			3			4						
		C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N			C R E W P O S I T I O N						
		S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P	S R O	A T C	B O P				
														R	I	U	
RO	RX														1	1	0
<input type="checkbox"/> SRO-I	NOR														1	1	1
<input type="checkbox"/> SRO-U	I/C														4	4	2
<input type="checkbox"/>	MAJ														2	2	1
<input type="checkbox"/>	TS														0	2	2
RO	RX														1	1	0
<input type="checkbox"/> SRO-I	NOR														1	1	1
<input type="checkbox"/> SRO-U	I/C														4	4	2
<input type="checkbox"/>	MAJ														2	2	1
<input type="checkbox"/>	TS														0	2	2
RO	RX														1	1	0
<input type="checkbox"/> SRO-I	NOR														1	1	1
<input type="checkbox"/> SRO-U	I/C														4	4	2
<input type="checkbox"/>	MAJ														2	2	1
<input type="checkbox"/>	TS														0	2	2
RO	RX														1	1	0
<input type="checkbox"/> SRO-I	NOR														1	1	1
<input type="checkbox"/> SRO-U	I/C														4	4	2
<input type="checkbox"/>	MAJ														2	2	1
<input type="checkbox"/>	TS														0	2	2

Instructions:

- Check the applicant level and enter the operating test number and Form ES-D-1 event numbers for each event type; TS are not applicable for RO applicants. ROs must serve in both the "at-the-controls (ATC)" and "balance-of-plant (BOP)" positions; Instant SROs must serve in both the SRO and the ATC positions, including at least two instrument or component (I/C) malfunctions and one major transient, in the ATC position. If an Instant SRO *additionally* serves in the BOP position, one I/C malfunction can be credited toward the two I/C malfunctions required for the ATC position.
- Reactivity manipulations may be conducted under normal or *controlled* abnormal conditions (refer to Section D.5.d) but must be significant per Section C.2.a of Appendix D. (*) Reactivity and normal evolutions may be replaced with additional instrument or component malfunctions on a 1-for-1 basis.
- Whenever practical, both instrument and component malfunctions should be included; only those that require verifiable actions that provide insight to the applicant's competence count toward the minimum requirements specified for the applicant's license level in the right-hand columns.

Facility:		Date of Examination:		Operating Test No.:													
Competencies	APPLICANTS																
	RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>				RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>				RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>				RO <input type="checkbox"/> SRO-I <input type="checkbox"/> SRO-U <input type="checkbox"/>				
	SCENARIO				SCENARIO				SCENARIO				SCENARIO				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Interpret/Diagnose Events and Conditions																	
Comply With and Use Procedures (1)																	
Operate Control Boards (2)																	
Communicate and Interact																	
Demonstrate Supervisory Ability (3)																	
Comply With and Use Tech. Specs. (3)																	
Notes: (1) Includes Technical Specification compliance for an RO. (2) Optional for an SRO-U. (3) Only applicable to SROs.																	

Instructions:

Check the applicants' license type and enter one or more event numbers that will allow the examiners to evaluate every applicable competency for every applicant.

ES-302

ADMINISTERING OPERATING TESTS TO INITIAL LICENSE APPLICANTS

A. Purpose

This standard describes how to administer operating tests to initial license applicants in accordance with the requirements of Title 10, Section 55.45, of the *Code of Federal Regulations* (10 CFR 55.45). It includes policies and guidelines for administering both the walk-through and integrated plant operations portions of the operating test. This standard presumes that the operating test was prepared in accordance with ES-301, "Preparing Initial Operating Tests."

B. Background

As noted in ES-201, "Initial Operator Licensing Examination Process," facility licensees will generally prepare proposed operating tests in accordance with ES-301 and submit them to the responsible NRC regional office for review and approval. Regardless of whether the facility licensee or the NRC prepared a given operating test, an NRC licensing examiner will independently administer and grade every test in accordance with the instructions contained herein and in ES-303, "Documenting and Grading Initial Operating Tests."

C. Responsibilities

1. Facility Licensee

The facility licensee is responsible for the following activities:

- a. Make the plant and simulation facility available, as necessary, for validating and administering the operating tests.
- b. Safeguard the integrity and security of the operating tests in accordance with facility procedures established pursuant to 10 CFR 55.40(b)(2) and the guidelines discussed in Attachment 1 to ES-201.
- c. Provide administrative and logistics support (e.g., personnel to operate the simulation facility, surrogate operators, copies of the approved operating test materials as arranged with the chief examiner, etc.) to facilitate the administration of the operating tests in accordance with Section D.
- d. Inform the NRC's regional office in writing if an applicant withdraws from the examination process before it is complete.

2. NRC Regional Office

The NRC regional office is responsible for the following activities:

- a. Work with the facility contact to coordinate the operating test administration schedule in a manner that maximizes efficiency and maintains security. Normally, the operating tests should be administered within 30 days before or after the written examinations. The regional office shall obtain concurrence from the NRR operator licensing program office if the examination dates diverge by more than 30 days. (Refer to ES-201 for additional guidance regarding examinations that have to be rescheduled to achieve an acceptable product.)
- b. Administer the operating tests in accordance with Section D.

D. **Test Administration Instructions and Policies**

1. General

- a. Before beginning the operating test, an examiner shall brief the applicant(s) using Parts A, C, D, and E of Appendix E. To save time, the examiner(s) may brief the applicants as a group.
- b. If an applicant requests to withdraw during any part of the examination process, the examiner shall inform the applicant that this will result in automatic license denial and that he or she may reapply in accordance with 10 CFR 55.35. The chief examiner will then ask the facility licensee to document the applicant's withdrawal in a letter to the NRC's regional administrator.
- c. Each applicant identified on the "List of Applicants" (Form ES-201-4) shall be administered an operating test as indicated on the form.
- d. For purposes of test integration and continuity, the chief examiner should generally schedule the same examiner to administer both the walk-through and simulator portions of the operating test to an applicant. However, under certain circumstances, such as when a licensee's simulation facility is not located near the plant or if a licensee requests examinations for an unusually large group of applicants, the responsible regional supervisor may authorize the chief examiner to divide the operating test among different examiners. (However, simulator operating tests consisting of multiple scenarios shall not be divided among examiners.) The chief examiner will be responsible for ensuring that each applicant receives a complete operating test and that the tests are thoroughly and accurately documented.

Normally, an NRC examiner will be assigned to individually evaluate each applicant during the simulator operating test. However, if a three-person operating crew consists entirely of senior reactor operator (SRO) upgrade applicants (who do not have to be evaluated on the control boards), the chief

examiner may assign only two examiners to observe the crew. In addition, although applicants in the reactor operator (RO) and balance-of-plant positions may not be individually evaluated, they will be held accountable for any errors that occur as a result of their action(s) or inaction(s), and they will be graded on their ability to "operate the control boards" (i.e., SRO Competency 3). By contrast, SRO-instant applicants will always be individually evaluated by an NRC examiner, regardless of what operating position they fill during a given scenario.

- e. The examiner is expected to administer the planned operating test in accordance with the prepared and approved walk-through test outlines (Forms ES-301-1, "Administrative Topics Outline," and ES-301-2, "Control Room/In-Plant Systems Outline") and simulator scenarios (Forms ES-D-1, "Scenario Outline," and ES-D-2, "Required Operator Actions"). Examiners shall document every significant aspect of each applicant's performance for later evaluation, but they shall *not* use the applicant's unplanned actions and statements to displace any part of the planned operating test.

Normally, examiners should substitute or replace planned operating test materials only if an item is determined to be invalid or impossible to perform or simulate because of unanticipated access restrictions or equipment failures.

- f. Examiners may administer the same operating test (walk-through and simulator) to consecutive applicants and crews on the same day, but they must ensure that the security of the operating test is maintained. The same simulator scenarios and job performance measures (JPMs) shall not be repeated during subsequent days.

If previously agreed upon by the facility licensee, examiners may also administer the same operating test (walk-through and simulator) by dividing the test into segments that can be administered to all of the applicants on the same day. This will minimize the amount of effort required to develop different operating tests, but will complicate the scheduling process.

- g. The examiner should normally administer the systems walk-through and the simulator operating test first and attempt to concurrently evaluate as many of the planned administrative subjects as possible. The examiner should then evaluate the remaining administrative subjects in accordance with the approved outline.
- h. The examiner must take sufficient notes to facilitate thorough documentation of any and all applicant deficiencies in accordance with ES-303. The examiner must be able to cross-reference each comment to a specific JPM, simulator event, or for-cause followup question.
- i. The making of videotapes during the administration of operating tests is not authorized.

- j. The number of persons present during an operating test should be limited to ensure the integrity of the test and to minimize distractions to the applicants:
- Except for the simulation facility operators, no other member of the facility's staff shall be allowed to observe an operating test without the chief examiner's permission. Facility management and other personnel deemed necessary by the facility licensee should generally be allowed access to the examination (under security agreements, as appropriate), provided that the simulation facility can accommodate them and there is no impact on the applicants.

Although the simulation facility operator will normally assume the role of the other personnel that the applicants direct or notify regarding plant operations, the chief examiner may permit other members of the facility training or operations staff (e.g., a shift technical advisor (STA)) to augment the operating shift team if necessary. In such instances, the chief examiner shall fully brief those individuals regarding their responsibilities, reporting requirements, duties, and level of participation before the operating test begins. All participants in the testing process must also be mindful of their responsibilities with regard to examination integrity pursuant to 10 CFR 55.49.

Although the applicants will generally be expected to perform "peer checks" in accordance with the facility licensee's operations and training procedures and practices, additional personnel may not be stationed or called upon for this purpose.

Surrogate operators should be used only when they are necessary to complete an operating crew. A facility licensee may not replace license applicants with surrogates solely because the applicants have performed the minimum number of events or scenarios. If an applicant would be exposed to only *one* additional scenario above the minimum required, a surrogate operator should not be used in place of a license applicant. However, no applicant will be required to participate in *more* than one scenario above the minimum required, in which case, a surrogate operator should be used. If, at the discretion of the chief examiner, it is desired to use surrogate operators contrary to the above guidance, the operator licensing program office should be consulted prior to implementation.

When surrogate operators are required to complete the operating crew (e.g., during retake tests or for a class consisting entirely of ROs), the chief examiner shall ensure that the surrogate operator(s) are briefed regarding the content of the scenario(s) and their expected actions in response to every event. The examiners must not restrict the surrogate operators' activities to such an extent that the applicants being evaluated are required to assume responsibilities beyond the scope of their respective positions. The surrogate operators do not need to be licensed at the facility, but they must have the knowledge and abilities required to

assume the full responsibilities of the roles they take in the operating test. Consultations with an STA shall be conducted in accordance with the facility licensee's normal control room practice (e.g., an STA shall not be stationed in the simulator if they are on-call at the site). If used, the STA shall also be briefed regarding the content of the scenario(s) and their expected actions in response to every event. Surrogates and STAs should not take a proactive role in assisting or coaching the applicants because such interventions would hinder the examiners' ability to evaluate the applicants' competence. Examiners shall run additional scenarios if necessary to make a licensing decision.

If the facility licensee normally operates with and is required by its technical specifications to have more than two ROs in the control room, the chief examiner may authorize the use of additional surrogates to fill out the crews. In such cases, examiners must take care that the presence of additional operators does not dilute the examiners' ability to evaluate each applicant during the required number of events and on every applicable competency rating factor. Examiners shall not hesitate to run additional scenarios, as necessary, to ensure that every applicant has the opportunity to demonstrate his or her competence. Only one individual (applicant or surrogate) is allowed to fill a shift supervisor or manager position during the simulator operating test.

- Under **no** circumstances will another applicant be allowed to observe an operating test. Operating tests are **not** to be used as training vehicles for future applicants.
- Other examiners may observe an operating test as part of their training or to audit the performance of the examiner administering the operating test.
- The chief examiner may permit other NRC employees, such as resident inspectors, regional personnel, researchers, or NRC supervisors, to observe an operating test. Personnel who are not NRC employees (e.g., representatives from the Institute of Nuclear Power Operations (INPO)) may observe the operating tests with prior approval from the NRR operator licensing program office. The chief examiner will control the observers' activities in accordance with guidance provided by NRR. The examiner should also give the applicants the opportunity to object to the presence of observers.

- k. The chief examiner should confirm with the facility licensee that the simulator instructor's station, programmers' tools, and external interconnections do not compromise operating test security while conducting examinations (refer to Section F of Appendix D). The primary objective is to ensure that the exam material cannot be read or recorded at other unsecured consoles and is either physically secured or electronically protected when not in use by individuals listed on the security agreement.

Examiners should also take reasonable measures to ensure that any notes documenting the applicants' performance on the operating test are not accessible to the facility staff. Notwithstanding the fact that the facility staff has signed the security agreement, such notes are predecisional and should not be left unattended or unsecured in the simulator or examination room to which the facility staff has access.

- l. Pursuant to 10 CFR 55.46(d), the chief examiner should confirm that any uncorrected simulator performance deficiencies do not interfere with the conduct of the planned operating tests.
- m. The chief examiner should arrange for any NRC examiners who are not familiar with the facility to obtain a tour before they administer any operating tests. Such tours shall not be conducted or observed by any of the applicants. In addition, the tours should concentrate on areas of the plant that will be used during the examination process, such as the control room, the simulation facility, and planned walk-through locations.
- n. The chief examiner will conduct an exit briefing with the facility licensee after the operating tests are complete. The briefing should address any generic weaknesses noted during the operating tests, as well as any other significant issues (e.g., problems with the reference materials, the simulation facility, or the plant) that might be addressed in the examination report. The individual operating test results are predecisional until approved by NRC management in accordance with ES-501, "Initial Post-Examination Activities," and shall **not** be shared with the facility licensee during the exit briefing.

2. Walk-Through

- a. The examiner should validate any JPMs that were not previously validated by the facility licensee or the NRC during a preparatory site visit. This is particularly important for complex JPMs and those that require the applicant to implement an alternative method directed by plant procedures.
- b. To the extent possible, the examiner should have the applicant perform the control room JPMs on the simulator, rather than asking the applicant to describe how he or she would accomplish the task.

If the examiner observes a discrepancy between the simulator setup and the conditions specified in a JPM, the examiner shall stop the JPM and correct the situation, as necessary. If the task can be completed with different values (e.g., wind direction when determining a protective action recommendation during an emergency), the examiner shall document the differences and coordinate with the facility contact and the NRC chief examiner to validate the applicant's response under the actual conditions.

The chief examiner is expected to coordinate the administration of the JPMs to maximize the use of the simulator. To increase efficiency, different JPMs may be administered simultaneously to multiple applicants, but the examiners

must ensure that mutual interference is minimized and test integrity is not compromised.

Under certain circumstances, it may be more efficient to administer some or all of the JPMs in "station-keeping" mode, in which the examiners remain in position at designated operating stations and the applicants, under escort, rotate through the various stations. Such arrangements would have to be agreed to by and coordinated with the facility licensee; moreover, the guidelines in Sections D.1.d and D.1.f would apply.

When JPMs or followup discussions are conducted in the control room, the examiners shall make every effort to accommodate and not interfere with normal shift operations. The chief examiner should ask the facility training manager to notify the shift supervisor when the NRC will be conducting examination activities in the control room. If the number of persons or the noise level in the control room is excessive, the examiner should, if possible, move to a quieter location, modify the sequence of the JPMs and return when the level of activity in the control room has abated, or ask the facility training manager to address the issue.

- c. The examiner should encourage the applicants to sketch diagrams, flow paths, or other illustrations to aid in answering any followup questions that might be necessary. In all cases, the examiner shall collect the supporting material because it provides additional documentation to support a pass or fail decision (refer to ES-303). To facilitate photocopying, the applicant's drawings should be restricted to one side of separate sheets of 8.5-inch by 11-inch paper.
- d. The examiner should encourage the applicants to use such materials as facility forms, schedules, and procedures if they are relevant to the tasks to be performed or the followup questions to be asked.
- e. The examiner should keep in mind that the applicant's proficiency in every administrative topic and each control room and in-plant system should be deliberately evaluated in a manner that is consistent with the operating test that was prepared in accordance with ES-301.
- f. As stated in 10 CFR 55.45(a), the operating test requires applicants to demonstrate an understanding of and the ability to perform the actions necessary to accomplish a representative sample from among 13 items listed in the rule. If an applicant correctly performs a JPM (including both critical and noncritical steps) and demonstrates familiarity with the equipment and procedures, the examiner should infer that the applicant has an adequate understanding of the system/task and should refrain from asking followup questions. However, if the applicant fails to accomplish the task standard for the JPM; exhibits behavior that demonstrates a lack of familiarity with the equipment and procedure; or is unable to locate information, control board indications, or controls, the examiner should ask performance-based followup questions (as necessary) to clarify or confirm the applicant's understanding of the system as it relates to the task performed.

The examiner shall document all performance-based questions and answers for later evaluation.

If the applicant exceeds twice the validated time estimate for any JPM (including time-critical) because he or she has selected an incorrect procedure or operated the wrong equipment (despite being presented with sufficient plant feedback to correct the error), the examiner should stop the JPM, document the circumstances, and proceed with the next JPM. However, if the applicant is on the correct path but has simply stopped making progress toward completing a non-time-critical JPM, the examiner should ask the applicant to describe the work to be done and how long it should take to complete the JPM. If the applicant does not then make timely progress toward completing the described actions, the examiner should inform the applicant that the allowed time for the JPM has elapsed and the applicant will be evaluated on the work completed. The examiner should then proceed with the next JPM.

If an applicant volunteers additional or corrected information after completing a task, the examiner shall offer the applicant the opportunity to take whatever actions would be required in a similar situation in the plant. The examiner will record any revisions to previously performed tasks or answers for consideration when grading the operating test in accordance with ES-303.

- g. If an applicant requests a "peer check," the examiner will simply acknowledge the applicant's request and grade any errors in accordance with ES-303. Similarly, the examiner will not permit an applicant to obtain assistance from a "procedure reader" when performing JPMs.
- h. The examiner should practice other good walk-through evaluation techniques, as discussed in Section D of Appendix C.

3. Simulator Operating Test

- a. Before administering the test(s), the examiners will validate each scenario on the simulator to ensure that it will run as intended. Scenarios that were adapted from previous NRC examinations at the facility or from the facility licensee's bank may not require real-time validation. At a minimum, the examiners will "dry run" those events that have variable inputs and questionable outcomes and discuss the remainder of the scenario with the facility's simulator instructor to ensure that it will run as planned.

In some cases, the scenarios can be validated while the applicants are taking the written examination. However, it may be beneficial to validate the scenarios during a preparatory site visit as determined by NRC regional management (refer to ES-201).

- b. The examiners will take precautions to prevent the scenarios from being revealed to the applicants before the tests begin. If significant portions of the scenarios are dry run or otherwise reviewed with the simulator instructor(s), the chief examiner

shall ask the instructor(s) to sign a security agreement (Form ES-201-3) to protect the integrity of the simulator test.

- c. The examiners should revise all copies of Forms ES-D-1 and ES-D-2 to reflect any changes made to the scenario events or the expected operator actions as a result of the scenario validation runs and reviews. These revisions should be neatly written in ink so that the forms can be used in the final write-up of the simulator test, as discussed in ES-303.
- d. The examiners should review the scenarios together and discuss the required procedures, technical specifications, special circumstances, and so forth, related to the scenarios.
- e. Immediately before beginning the simulator tests, the examiners should review the scenario events with the simulator operator and provide him or her with a copy of Form ES-D-1. This review should familiarize the operator with the sequence of events to ensure that they will proceed as planned. This is particularly important if the simulator operator during the test is not the same individual who assisted in validating the scenarios.
- f. The examiners should identify important plant parameters to be monitored during each simulator scenario. The chief examiner should ask the simulator operator to record selected parameters, if possible, on the facility's safety parameter display system(s). Parameter readings should be collected at meaningful intervals, depending on the parameter, the nature of the event, and the capability of the simulation facility. The chief examiner should retain the recordings as backup documentation to augment the notes taken by the examiners during the simulator test.
- g. The examiner in charge of each scenario should arrange a suitable communication system with the simulator operator so that he or she can be prompted to insert the malfunctions without cuing the applicants. Malfunctions may be planned for a predetermined time or power level so that the examiners and the facility operator are aware of the event that is occurring or pending.

If necessary, the examiners may use time compression to speed up the response of key parameters so that the scenario can proceed to the next event within a reasonable time. Time compression is acceptable as long as it is used judiciously and the operators are given sufficient time to perform the tasks that they would typically perform in real time. If the examiners intend to use time compression, they should inform the applicants of that fact during the operating test briefing (refer to Section D.1.a). The examiners should also mitigate the potential for negative training by debriefing the applicants after any scenario in which time compression was used.

- h. Before beginning each scenario set, the examiners should have the simulator operator advance any control room strip chart recorders that may prove useful in recreating the sequence of events. The charts should be clearly marked

with the date, time, and examiner's initials so that they can be accurately matched with the correct operating crew.

- i. The chief examiner should ensure that the simulator operator (or examiner) playing the role of other plant personnel is aware of the time scale for responding to the applicants' requests for information. For example, fast-time could be specified for auxiliary operator checks or lineups to prevent long delays in simulated operations, while maintenance and chemistry sample information can be provided with normal time delays to present the applicants with the same analysis problems that they will face as operators.
- j. Before the simulator test begins, the examiners shall caution the simulator operator to provide only information that is specifically requested by the applicants and does not compromise the integrity of the examination. When the simulator operator is briefing the applicants or communicating with them on the telephone, the examiners should monitor the conversations to ensure that the information provided is appropriate and does not cue the applicants.
- k. Before the simulator test begins, the facility instructor (or examiner) will provide a shift turnover briefing. The briefing will cover present plant conditions, power history, equipment out of service, abnormal conditions, surveillances due, and instructions for the shift, and the applicants will be given time to familiarize themselves with the plant status.
- l. The operating team or crew (including license applicants and surrogates, if applicable) should perform peer checks in accordance with the facility licensee's operations and training procedures and practices. NRC examiners will not perform this function. If an applicant begins to make an error that is corrected by a peer checker, the applicant will be held accountable for the consequences of the potential error without regard to mitigation by the crew.
- m. Each examiner should use the expected actions and behaviors listed on Form ES-D-2 as a guide while administering the simulator tests. If an applicant performs as expected, the examiner may simply note in the left-hand column of the form the time when the expected actions occurred. However, if an applicant does not perform as expected, the examiner should note the applicant's actions (or lack thereof) next to or below the expected action and follow up with appropriate questions after the simulator scenario is completed (refer to Section D.3.n).

Each examiner must determine the best way to document the applicant's actions. Some examiners record a minute-by-minute account of all key plant events and applicant actions as they occur; other examiners record only the applicant's significant actions. Each individual examiner should develop his or her own examination documentation technique; however, the documentation must provide an adequate basis for a licensing decision. In addition, the examiner's notes must provide sufficient information to allow the examiner to confidently assess the applicant's performance on the competencies described in Appendix D.

n. Examiners shall limit discussions with the applicants during the scenarios both to maintain realism and to avoid distracting the applicants from operating the plant. The examiners' questions during the scenarios should be limited to those that are necessary to assess the applicants' understanding of plant conditions and the required operator actions. Whenever possible, the examiner shall defer questioning the applicant until a time when the applicant is not operating or closely monitoring the plant (preferably after the simulator has been placed in "freeze"). The examiner's followup questions or concerns can generally be addressed during a brief question-and-answer period after each scenario or during the control room systems and facility walk-through portion of the operating test if it is performed after the simulator test.

o. The examiners who administer the simulator test shall confer immediately after completing the scenario set to compare notes and verify that each examiner observed his or her applicant performing the required number of transients and events in a manner sufficient to justify a proper evaluation of all required competencies. If necessary, the examiners shall run an additional scenario to ensure that all required evolutions and competencies are covered. For example, if an applicant has only one opportunity to demonstrate competence on a particular rating factor, but makes an error that does not affect his or her performance of a critical task, the examiners shall give the applicant another opportunity to demonstrate competence or to make a second error that would justify an unsatisfactory score for the subject rating factor (refer Section D.2.b of ES-303 for detailed simulator grading instructions). All scenarios will be planned and documented in accordance with Section D of ES-301.

The chief examiner shall ensure that the examiners' observations are consistent and their findings are mutually supportive. If a performance deficiency is "shared" by more than one applicant, both evaluating examiners should note the deficiency. Ideally, this cross-check should be accomplished as soon as possible after running the scenarios while still at the facility. The cross-check must be accomplished before finalizing the examination results in accordance with ES-303.

p. If the applicants did not perform as expected, the examiner shall ask the simulator operator to provide copies of the logs, charts, and other materials that may be required after leaving the facility to evaluate and document the applicants' performance. The examiner of record shall retain all documentation related to any operating test failure until the proposed denial becomes final or a license is issued.

The chief examiner should also ask the simulator operator to retain copies of the same materials until all applicants are licensed or all appeals are settled, as suggested in the sample corporate notification letter shown in Attachment 4 to ES-201.

q. If the simulation facility should become inoperable and cause excessive delay of the operating tests, the chief examiner should discuss the situation with the facility licensee and the responsible regional supervisor so that management

can make a decision regarding the conduct of the operating tests; it may be necessary to reschedule the simulator examinations for a later date.

The simulator should be considered inoperable under any of the following conditions:

- The simulator exhibits a mass/energy imbalance, erratic logic, or inexplicable panel indications during model execution.
- The simulator exhibits unplanned and unexplained events or malfunctions that cause the applicants to divert from the expected responses and success path of the planned scenario.
- The simulator automatically goes to the "freeze" state during a scenario, or a "beyond simulated limits" alarm is received on the instructor's station.
- The simulator instructor informs the examination team that a software module has halted or "kicked out."

Occurrence of any of these abnormal simulator operating conditions during an examination constitutes sufficient cause to stop the scenario. Evaluations of the applicants' performance during any of these simulator malfunctions may be unreliable.

When the simulator has been restored to full operability, the chief examiner will determine whether the scenario requires replacement, may be resumed in progress, or may be restarted from the beginning. Examiners will not use the "backtrack" function when restarting a scenario; the simulator must be in a stable plant condition, at a definitive procedural step, before conducting a turnover as discussed in Item D.3(k), above.

ES-303

DOCUMENTING AND GRADING INITIAL OPERATING TESTS

A. Purpose

This standard describes the procedures for documenting all categories of the operating test, collating the data to arrive at a pass or fail recommendation, and reviewing the documentation to ensure quality.

B. Background

This standard assumes that the operating test was prepared and administered in accordance with ES-301, "Preparing Initial Operating Tests," and ES-302, "Administering Operating Tests to Initial License Applicants," respectively. The procedures contained herein require the examiner to evaluate each applicant's performance on the operating test and make a judgement as to whether the applicant's level of knowledge and understanding meet the minimum requirements to safely operate the facility for which the license is sought. The examiner evaluates each noted deficiency in light of the total breadth of knowledge and ability (K/A) demonstrated by the applicant in that subject area.

C. Responsibilities

1. Facility Licensee

The facility licensee's responsibilities are limited to providing the NRC examiners with whatever additional reference materials and information the examiner might require to evaluate the applicants' performance on the operating tests. Such materials might include simulator strip chart recordings that document plant status during the simulator scenarios, and procedures that document the expected operator actions.

2. NRC Examiner of Record

As soon as possible after administering the test, the examiner of record shall review, evaluate, and finalize each applicant's operating test documentation in accordance with the instructions in Section D.

If an applicant made an error with *serious safety consequences*, the examiner may recommend an operating test failure even if the grading instructions in Section D would normally result in a passing grade. Conversely, if an applicant made a number of errors with minimal or no safety consequences, the examiner may recommend that the applicant be granted a license even if the grading instructions in Section D would normally result in a failing grade. However, in either case, the examiner shall thoroughly justify and document the basis for the recommendation in accordance with Section D.3. Moreover, the NRC's regional office shall obtain written concurrence from the NRR operator licensing program office before completing the licensing action.

3. NRC Chief Examiner

- a. The chief examiner shall arrange a meeting of the NRC's examination team members after the simulator scenarios are complete. Such meetings enable the examiners to compare notes to ensure that the documentation for applicants on the same operating crew is consistent and mutually supportive.
- b. The chief examiner shall work with the other examiners on the team to resolve any technical questions that might arise during the grading process, and communicate any additional reference material requirements to the facility contact.
- c. The chief examiner or a management-approved designee will review the grading of each operating test to verify that the examiner's comments appropriately support his or her recommendation and to ensure that the operating test meets the requirements of ES-301. If the chief examiner or designee does not agree with any of the examiner's recommendations, he or she shall confer with the examiner before overturning the recommendation. Such disagreements are not common and usually arise because an unsatisfactory grade is not adequately justified. It is, therefore, very important for examiners to be complete and accurate in their grading and documentation.
- d. The chief examiner or designee shall make an independent pass or fail recommendation, sign the "Final Recommendation" block on Form ES-303-1, "Individual Examination Report," and forward the package to the responsible supervisor for review in accordance with ES-501, "Initial Post-Examination Activities." The supervisor must concur in any recommendation to overturn the examiner's results, and the specific reasons for this action must be explained on Form ES-303-2, "Operating Test Comments" (or equivalent).

D. Grading and Documentation Instructions

1. Review and Categorize Rough Notes and Documentation

- a. Review the walk-through job performance measures (JPMs) and simulator scenarios that were performed and the performance-based followup questions that were asked. Evaluate all rough notes and documentation generated while administering the operating test to determine the areas in which the applicant was deficient. If the applicant generated or used any material (such as figures, drawings, flowcharts, or forms) during the operating test, the material may be used to aid in documenting the applicant's performance. If it contributes to an unsatisfactory performance evaluation, the material shall be appropriately marked and cross-referenced to the applicable deficiency and attached to the examination package for retention.

- b. Verify the validity and technical accuracy of any performance-based questions that were asked during the operating test, as well as any unexpected events or actions that occurred during the simulator operating test. If necessary, work through the chief examiner to obtain any additional reference material that might be required to resolve any technical questions.
- c. On the rough notes and documentation, label or highlight every action, response, note, or comment that may constitute a performance deficiency.
- d. Review each simulator operating test performance deficiency. Using as a guide the competency and rating factor descriptions in Appendix D and on Form ES-303-3 (RO) or Form ES-303-4 (SRO), code each deficiency with the number and letter of the rating factor(s) it most accurately reflects (e.g., 4.a). Whenever possible, attempt to identify the root cause of the applicant's deficiencies and code each deficiency with no more than two different rating factors. However, one significant deficiency may be coded with additional rating factors if the error can be shown, consistent with the criteria in Section D.3.b, to be relevant to each of the cited rating factors.

As stated in ES-302, it is essential that the simulator operating test documentation is consistent and mutually supportive for all applicants in an operating crew. Operating errors that involved more than one applicant should be noted by each applicant's evaluating examiner. If the examination team members do not have the opportunity to discuss and compare their observations before leaving the site, the chief examiner shall schedule a conference call after the examiners return to their respective offices.

2. **Evaluate the Applicant's Performance**

After categorizing and coding the rough notes, review, evaluate, and grade the applicant's performance, as follows:

a. *The "Walk-Through"*

On page 2 of the applicant's Form ES-303-1, enter the titles of the JPMs examined during the "Administrative Topics" and "Control Room and In-Plant Systems" portions of the walk-through test.

To determine a grade for each administrative and systems JPM listed on Form ES-303-1, evaluate each deficiency highlighted in the rough notes. If the following criteria are met, assign a satisfactory grade by placing an "S" in the "Evaluation" column for that JPM; otherwise enter a "U":

- Time-critical JPMs must be completed within the allotted time. All other JPMs should normally be completed within twice the validated time estimate (refer to Section D.2.f of ES-302). The reason for terminating any JPM shall be documented in accordance with Section D.3, below.

- The task standard for the JPM must be accomplished by correctly completing all of the critical steps.

If the applicant initially missed a critical step, but later performed it correctly and accomplished the task standard without degrading the condition of the system or the plant, the applicant's performance on that JPM should be graded as satisfactory. However, the applicant's error shall be documented in accordance with Section D.3, below.

- The responses to any performance-based followup questions asked pursuant to Section D.2.f of ES-302 must confirm that the applicant's understanding of the administrative topic/system/JPM is satisfactory.

If the responses to any of the followup questions reveal that the applicant's understanding of the administrative topic/system/JPM is seriously deficient, the examiner may recommend an unsatisfactory grade for the administrative topic/system even though the applicant successfully completed the task standard for the JPM. The basis for the recommendation shall be thoroughly justified and documented in accordance with Section D.3, below.

Conversely, if the applicant did not accomplish the task standard and followup questioning revealed that the failure was caused by a deficiency in the procedure or some other factor beyond the applicant's control, the examiner may still recommend a satisfactory grade for the administrative topic/system/JPM. Once again, the basis for the recommendation shall be thoroughly justified and documented in accordance with Section D.3, below.

After grading the applicant's performance on each of the administrative topics/systems, determine an overall grade for the "walk-through" by calculating the percentage of satisfactory topic/system grades. If the applicant has an "S" on fewer than 80 percent of the topics/systems (i.e., 12/15 for RO and SRO-I applicants and 8/10 for SRO-U applicants), the applicant fails the "walk-through" and receives a "U" overall.

Additionally, in order to ensure minimal competence in the administrative area, determine a separate "Administrative Topics" grade by calculating the percentage of satisfactory grades for the administrative JPMs. If an SRO applicant has an "S" on fewer than 60 percent (i.e., 3/5) or an RO applicant has an "S" on fewer than 50 percent (2/4) of the administrative topics/JPMs, the applicant fails this portion of the walk-through. Retake applicants who were granted a waiver of the systems walk-through pursuant to ES-204, "Processing Waivers Requested by Reactor Operator and Senior Reactor Operator Applicants," must achieve a satisfactory grade on at least 80 percent of the topics/JPMs (i.e., 4/5 for RO and SRO applicants) to pass.

Document the applicant's grades by placing an "S" or a "U" in the appropriate blocks in the "Operating Test Summary" on page 1 of Form ES-303-1. Enter "W" if any part of the walk-through was waived in accordance with ES-204. Document and justify every deficiency in accordance with Section D.3, below.

b. *The "Simulator Operating Test"*

Using Form ES-303-3 or ES-303-4, depending on the applicant's license level, and the following generic guidance, evaluate any deficiencies coded for the simulator test to determine a grade for every applicable rating factor (RF) and competency. Keep in mind that the simulator test is generally graded based on competencies rather than consequences; every error that reflects on an operator's competence is considered equal unless it is related to the performance of a critical task (as determined in accordance with ES-301 and Appendix D).

- If there is no basis upon which to grade a rating factor (i.e., it is "not observed"), circle the "0" "Weighting Factor," enter an "RF Grade" of "N/O," and explain in accordance with Section D.3, below. Depending upon which RF is "N/O," circle the appropriate "Weighting Factor" for each remaining RF applicable to that competency; the "Weighting Factors" for each competency must always add up to "1." If more than one rating factor per competency or more than two rating factors overall are not observed, inform the NRC's regional office management and consult the NRR operator licensing program office to determine whether the test supports a licensing decision. As discussed in ES-301, Competency 3 is optional for SRO upgrade applicants and may be scored as "N/O." However, the examiner shall evaluate Competency 3 if the applicant rotated into an operating crew position that required the applicant to manipulate the controls.
- If an applicant performs activities related to a rating factor and makes no errors, circle an "RF Score" of "3" for that rating factor.
- If an applicant makes a single error related to a rating factor, circle an "RF Score" of "2" for that rating factor, unless the error related to a critical task, in which case a score of "1" would be required. Missing a critical task does not necessarily mean that the applicant will fail the simulator test, nor does success on every critical task prevent the examiner from recommending a failure if the applicant had other deficiencies that, in the aggregate, justify the failure based on the competency evaluations.
- If an applicant makes two errors related to a rating factor, circle an "RF Score" of "1" for that rating factor unless a score of "2" can be justified (and documented as discussed in Section D.3, below) based on correctly performing another activity (or activities) related to the same rating factor; three or more errors generally require a score of "1," regardless of the applicant's compensatory actions.

Multiply each "RF Score" by its associated "Weighting Factor" to obtain a numerical measure ("RF Grade") for the applicant's performance on each rating factor. Then sum the RF Grades to obtain a "Competency Grade" for each competency and enter the corresponding numbers (or "N/O," as appropriate) on page 3 of the RO or SRO applicant's Form ES-303-1.

For each competency on page 3 of Form ES-303-1, sum the rating factor grades and enter the resulting competency grade in the designated column. (The grades should range between 1 and 3.)

Using the following evaluation criteria, determine whether the applicant's overall performance on the simulator test is satisfactory or unsatisfactory, and document the grade by placing an "S" or a "U" in the "Simulator Operating Test" block of the "Operating Test Summary" on page 1 of Form ES-303-1. Enter "W" if this part of the operating test was waived in accordance with ES-204.

- If the grade for *all* competencies is greater than 1.8, the applicant's performance is generally satisfactory.
- If the grade for Competency 4, "Communications and Crew Interactions," is less than or equal to 1.8 but greater than 1.0, *and* the individual grades for *all* other competencies are 2.0 or greater, the applicant's performance is satisfactory.
- If the grade for Competency 4 is 1.0, *or* the grade for any other competency is 1.8 or less, the applicant's performance is unsatisfactory.

Note that Competency 3, "Control Board Operations," is optional for SRO upgrade applicants. However, if it is evaluated, it shall be factored into the applicant's final grade.

Document and justify every deficiency in accordance with Section D.3, below.

3. **Finalize the Documentation**

- a. Review and finalize the simulator scenarios that were run during the operating test.

Complete Form ES-D-1, "Scenario Outline," by entering the applicants' names, the positions they occupied during the scenario, and the facility's name on the top of the form. Also enter on Form ES-D-1 any scenario revisions that were made during the test, so that each form accurately shows all of the events that actually occurred during each scenario. Change the event numbers, malfunction numbers, malfunction types, and descriptions, as necessary, to reflect the "as run" conditions. These changes may be made using pen-and-ink or by retyping the scenario, provided that the final form is clear and legible.

Update each Form ES-D-2, "Required Operator Actions," to reflect the "as run" conditions. Discard or mark as "not used" any events that were not run, and fill out new forms for any events that were run but not originally planned. Neatly enter notes, comments, and additional actions in the spaces between the expected operator actions.

The final Forms ES-D-1 and ES-D-2 must be a clear, legible, and sequential record of the actual events and actions that occurred during the simulator operating test. The forms sent to the applicant shall not contain any rough notes or irrelevant comments.

Any events or malfunctions that did not function as expected or were not useful in evaluating the applicants (e.g., a surveillance test that required a long time to perform) should be noted on the master copy of the scenarios to aid in future scenario preparation.

- b. Review the applicant's Form ES-303-1 and the rough documentation. Justify *in detail* on Form ES-303-2, "Operating Test Comments" (or equivalent), every knowledge or ability deficiency that contributed to a failure in any part of the operating test. Provide the following specific information, as applicable:

- the task administered (i.e., describe the JPM or simulator scenario and event, as well as the applicant's position on the operating crew)
- the applicant's incorrect action and an indication of whether the action was a JPM critical step or a simulator critical task
- the lack of knowledge or ability that the applicant demonstrated
- the potential or actual consequences of the applicant's incorrect action (particularly if the examiner recommends a failure based on a serious error that would not normally result in a failing grade)
- any for-cause followup questions asked and the applicant's responses
- the correct answer or action, with an appropriate facility reference (e.g., lesson plan, system description, procedure name and number)
- the K/A number and its importance rating (as given in NUREG-1122 or NUREG-1123) and the facility's learning objective
- the item from Title 10, Section 55.45(a), of the *Code of Federal Regulations* [10 CFR 55.45(a)] that the applicant did not understand or was unable to perform

General statements (such as "did not know decay heat removal system") are not adequate.

Whenever possible, substantiate comments with printouts or strip chart recordings generated during the simulator operating test and drawings and illustrations generated by the applicant.

- c. Deficiencies that do not contribute to an operating test failure shall also be documented; however, a brief statement describing the error and the expected action or response is generally sufficient. Examiners should keep in mind that their licensing recommendation and associated documentation are subject to review by the NRC's chief examiner and regional office management. Therefore, the documentation should contain sufficient detail so that the independent reviewer, responsible supervisor, and licensing official can make a logical decision in support of the examiner's recommendation to deny or issue the license.
- d. As noted in Section D.2, above, deviations from the nominal grading criteria must be explained in detail. For example, an examiner may conclude that an applicant's performance is acceptable despite exhibiting deficiencies that would normally result in an unsatisfactory grade (e.g., committing two or more errors related to the same simulator rating factor or failing to accomplish the task standard for a JPM). Conversely, an examiner may conclude that an applicant's performance is unacceptable even though the documented deficiencies would normally result in a passing grade. In either case, the examiner shall document the basis for concluding that the applicant is, in fact, (un)acceptably proficient in that area, why the nominal grading criteria might be too (lenient) severe, and/or how a flaw in the test item might have contributed to the applicant's deficient performance. Moreover, as noted in Section C.2, the NRC's regional office shall obtain written concurrence from the NRR operator licensing program office before completing the licensing action.

Any simulator rating factor that is graded as "not observed" must also be explained in the documentation (e.g., did the simulator malfunction, did an event not take place as planned, or did another applicant intercede?).
- e. Retain rough documentation until the NRC's chief examiner and regional office management have reviewed the examiner's recommendations and concurred in the results (refer to ES-501). Examiners shall retain all applicable notes and documentation associated with proposed denials until the denials become final. Examiners are advised that such notes would be subject to disclosure if requested under the Freedom of Information Act.
- f. Cross-reference each comment on Form ES-303-2 with the specific task, subject, or competency rating factor to which it applies on the applicant's Form ES-303-1. Do this by entering the applicable reference from Form ES-303-1 (e.g., Admin-a, Systems-d, or Simulator-1.c) in the left-hand column of Form ES-303-2, and entering the page number on which the comment is found in the appropriate block on Form ES-303-1.

4. Make a Final Recommendation

- a. After grading and documenting the operating test, make an overall recommendation by checking the "Pass" or "Fail" (or "Waive" if the entire operating test was waived in accordance with ES-204) block, and signing and dating the "Examiner Recommendations" section on the applicant's Form ES-303-1. Make a "Pass" recommendation only if *all* summary blocks of the operating test contain satisfactory ("S") grades or the letter "W," indicating that the applicant was not examined in that area.
- b. Assemble the operating test package (including Forms ES-303-1, ES-303-2, ES-D-1, and ES-D-2 and all supporting documentation such as strip chart recordings and applicant notes and drawings) for each applicant and forward the package to the chief examiner for review in accordance with ES-501.

E. Attachments/Forms

Form ES-303-1,	"Individual Examination Report"
Form ES-303-2,	"Operating Test Comments"
Form ES-303-3,	"RO Competency Grading Worksheet for the Simulator Test"
Form ES-303-4,	"SRO Competency Grading Worksheet for the Simulator Test"

PRIVACY ACT INFORMATION — FOR OFFICIAL USE ONLY

U.S. Nuclear Regulatory Commission Individual Examination Report					
Applicant's Name				Docket Number 55-	
I	R	Examination Type (Initial or Retake)		Facility Name	
		Reactor Operator		Facility Description	Hot
		Senior Reactor Operator (SRO) Instant			Cold
		SRO Upgrade			BWR
		SRO Limited to Fuel Handling			PWR

Written Examination Summary					
NRC Author/Reviewer			RO/SRO/Total Exam Points ___ / ___ / ___		
NRC Grader/Reviewer			Applicant Points ___ / ___ / ___		
Date Administered			Applicant Grade (%) ___ / ___ / ___		
Operating Test Summary					
Administered by			Date Administered		
Walk-Through (Overall)					
Administrative Topics					
Simulator Operating Test					
Examiner Recommendations					
Check Blocks	Pass	Fail	Waive	Signature	Date
Written Examination					
Operating Test					
Final Recommendation					
License Recommendation					
	Issue License	Supervisor's Signature			Date
	Deny License				

PRIVACY ACT INFORMATION — FOR OFFICIAL USE ONLY

PRIVACY ACT INFORMATION — FOR OFFICIAL USE ONLY

Applicant Docket Number: 55-		Page of
Walk-Through Grading Details	Evaluation (S or U)	Comment Page Number
Administrative Topics		
a.		
b.		
c.		
d.		
e.		
Systems — Control Room		
a.		
b.		
c.		
d.		
e.		
f.		
g.		
h.		
Systems — In-Plant		
i.		
j.		
k.		

PRIVACY ACT INFORMATION — FOR OFFICIAL USE ONLY

PRIVACY ACT INFORMATION — FOR OFFICIAL USE ONLY

Applicant Docket Number: 55-					Page of
Reactor Operator Simulator Operating Test Grading Details					
Competencies/ Rating Factors (RFs)	RF Weights	RF Scores	RF Grades	Comp. Grades	Comment Page No.
1. Interpretation/Diagnosis a. Recognize & Verify Status b. Interpret & Diagnose Conditions c. Prioritize Response	_____ _____ _____	_____ _____ _____	_____ _____ _____	_____ _____ _____	_____ _____ _____
2. Procedures/Tech Specs a. Reference b. Procedure Compliance c. Tech Spec Entry	_____ _____ _____	_____ _____ _____	_____ _____ _____	_____ _____ _____	_____ _____ _____
3. Control Board Operations a. Locate & Manipulate b. Understanding c. Manual Control	_____ _____ _____	_____ _____ _____	_____ _____ _____	_____ _____ _____	_____ _____ _____
4. Communications a. Provide Information b. Receive Information c. Carry Out Instructions	_____ _____ _____	_____ _____ _____	_____ _____ _____	_____ _____ _____	_____ _____ _____

[Note: Enter RF Weights (nominal, adjusted, or "0" if not observed (N/O)), RF Scores (1, 2, 3, or N/O), and RF Grades from Form ES-303-3 and sum to obtain Competency Grades.]

PRIVACY ACT INFORMATION — FOR OFFICIAL USE ONLY

PRIVACY ACT INFORMATION — FOR OFFICIAL USE ONLY

Applicant Docket Number: 55-					Page of
Senior Reactor Operator Simulator Operating Test Grading Details					
Competencies/ Rating Factors (RFs)	RF Weights	RF Scores	RF Grades	Comp. Grades	Comment Page No.
1. Interpretation/Diagnosis a. Recognize & Attend b. Ensure Accuracy c. Understanding d. Diagnose	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____
2. Procedures a. Reference b. EOP Entry c. Correct Use	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____
3. Control Board Operations a. Locate & Manipulate b. Understanding c. Manual Control	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____
4. Communications a. Clarity b. Crew & Others Informed c. Receive Information	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____
5. Directing Operations a. Timely & Decisive Action b. Oversight c. Solicit Crew Feedback d. Monitor Crew Activities	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____
6. Technical Specifications a. Recognize and Locate b. Compliance	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____	_____ _____ _____ _____

[Note: Enter RF Weights (nominal, adjusted, or "0" if not observed (N/O)), RF Scores (1, 2, 3, or N/O), and RF Grades from Form ES-303-4 and sum to obtain Competency Grades.]

PRIVACY ACT INFORMATION — FOR OFFICIAL USE ONLY

1. Interpret/Diagnose Events and Conditions Based on Alarms, Signals, and Readings						
Rating Factors	Weighting Factors	RF Scores	RF Grades	Comp. Grade		
(a) Did the applicant RECOGNIZE and VERIFY off-normal trends and status?	N/O = 0	3				
	Nominal = 0.40	2				
	(b) or (c) N/O = 0.57	1				
(b) Did the applicant correctly INTERPRET/DIAGNOSE plant conditions based on control room indications?	N/O = 0	3				
	Nominal = 0.30	2				
	(c) N/O = 0.43	1				
	(a) N/O = 0.50					
(c) Did the applicant ATTEND TO annunciators, alarm signals, and instrument readings in order of importance and severity?	N/O = 0	3				
	Nominal = 0.30	2				
	(b) N/O = 0.43	1				
	(a) N/O = 0.50					
2. Comply with and Use Procedures, References, and Technical Specifications						
Rating Factors	Weighting Factors	RF Scores	RF Grades	Comp. Grade		
(a) Did the applicant REFER TO the appropriate procedure or reference in a timely manner?	N/O = 0	3				
	Nominal = 0.30	2				
	(c) N/O = 0.43	1				
	(b) N/O = 0.50					
(b) Did the applicant COMPLY WITH procedures (including precautions and limitations) and references in an accurate and timely manner?	N/O = 0	3				
	Nominal = 0.40	2				
	(a) or (c) N/O = 0.57	1				
(c) Did the applicant RECOGNIZE plant conditions that are addressed in technical specifications?	N/O = 0	3				
	Nominal = 0.30	2				
	(a) N/O = 0.43	1				
	(b) N/O = 0.50					

3. Operate the Control Boards						
Rating Factors	Weighting Factors	RF Scores	RF Grades	Comp. Grade		
(a) Did the applicant LOCATE AND MANIPULATE controls in an accurate and timely manner?	N/O = 0	3				
	Nominal = 0.40	2				
	(b) or (c) N/O = 0.57	1				
(b) Did the applicant's actions demonstrate UNDERSTANDING OF SYSTEM OPERATION, including set points, interlocks, and automatic actions?	N/O = 0	3				
	Nominal = 0.30	2				
	(c) N/O = 0.43	1				
	(a) N/O = 0.50					
(c) Did the applicant demonstrate the ability to take MANUAL CONTROL of automatic functions?	N/O = 0	3				
	Nominal = 0.30	2				
	(b) N/O = 0.43	1				
	(a) N/O = 0.50					
4. Communicate and Interact with Other Crew Members						
Rating Factors	Weighting Factors	RF Scores	RF Grades	Comp. Grade		
(a) Did the applicant PROVIDE clear and accurate INFORMATION on system status to others for the performance of their jobs?	N/O = 0	3				
	Nominal = 0.34	2				
	(b) or (c) N/O = 0.50	1				
(b) Did the applicant effectively RECEIVE INFORMATION from others (including requesting, acknowledging, and attending to information)?	N/O = 0	3				
	Nominal = 0.33	2				
	(a) or (c) N/O = 0.50	1				
(c) Did the applicant successfully CARRY OUT THE INSTRUCTIONS of the supervisor?	N/O = 0	3				
	Nominal = 0.33	2				
	(a) or (b) N/O = 0.50	1				

1. Interpret/Diagnose Events and Conditions Based on Alarms, Signals, and Readings				
Rating Factors	Weighting Factors	RF Scores	RF Grades	Comp. Grade
(a) Did the applicant RECOGNIZE AND ATTEND TO off-normal trends and status in order of their importance and severity?	N/O = 0	3		
	Nominal = 0.20	2		
	(b) N/O = 0.25	1		
	(c) or (d) N/O = 0.29			
(b) Did the applicant ensure the collection of CORRECT, ACCURATE, and COMPLETE information and reference material on which to base diagnoses?	N/O = 0	3		
	Nominal = 0.20	2		
	(a) N/O = 0.25	1		
	(c) or (d) N/O = 0.28			
(c) Did the applicant's directives and actions demonstrate an UNDERSTANDING of how the PLANT, SYSTEMS, and COMPONENTS OPERATE AND INTERACT (including set points, interlocks, and automatic actions)?	N/O = 0	3		
	Nominal = 0.30	2		
	(a) or (b) N/O = 0.38	1		
	(d) N/O = 0.43			
(d) Did the applicant correctly INTERPRET/DIAGNOSE plant conditions based on control room indications?	N/O = 0	3		
	Nominal = 0.30	2		
	(a) or (b) N/O = 0.37	1		
	(c) N/O = 0.43			
2. Comply with and Use Procedures and References				
Rating Factors	Weighting Factors	RF Scores	RF Grades	Comp. Grade
(a) Did the applicant REFER to correct procedures, procedural steps, and references when appropriate?	N/O = 0	3		
	Nominal = 0.30	2		
	(b) N/O = 0.43	1		
	(c) N/O = 0.50			
(b) Did the applicant RECOGNIZE EOP ENTRY CONDITIONS?	N/O = 0	3		
	Nominal = 0.30	2		
	(a) N/O = 0.43	1		
	(c) N/O = 0.50			
(c) Did the applicant USE PROCEDURES CORRECTLY, including following procedural steps in correct sequence, abiding by procedural cautions and limitations, selecting correct paths on decisions blocks, and correctly transitioning between procedures?	N/O = 0	3		
	Nominal = 0.40	2		
	(a) or (b) N/O = 0.57	1		

3. Operate the Control Boards

[NOTE: This competency is optional for SRO-upgrade applicants; refer to Section D.2.b.]

Rating Factors	Weighting Factors	RF Scores	RF Grades	Comp. Grade
(a) Did the applicant LOCATE AND MANIPULATE CONTROLS in an accurate and timely manner?	N/O = 0	3		
	Nominal = 0.34	2		
	(b) or (c) N/O = 0.5	1		
(b) Did the applicant's control manipulations demonstrate an UNDERSTANDING OF SYSTEM OPERATION, including set points, interlocks, and automatic actions?	N/O = 0	3		
	Nominal = 0.33	2		
	(a) or (c) N/O = 0.5	1		
(c) Did the applicant demonstrate the ability to take MANUAL CONTROL of automatic functions?	N/O = 0	3		
	Nominal = 0.33	2		
	(a) or (b) N/O = 0.5	1		

4. Communicate and Interact with the Crew and Other Personnel

Rating Factors	Weighting Factors	RF Scores	RF Grades	Comp. Grade
(a) Did the applicant communicate in a clear, easily understood manner?	N/O = 0	3		
	Nominal = 0.4	2		
	(c) N/O = 0.5	1		
	(b) N/O = 0.67			
(b) Did the applicant keep crew members and those outside the control room informed of plant status?	N/O = 0	3		
	Nominal = 0.4	2		
	(c) N/O = 0.5	1		
	(a) N/O = 0.67			
(c) Did the applicant ENSURE RECEIPT of clear, easily-understood communications from crew and others?	N/O = 0	3		
	Nominal = 0.2	2		
	(a) or (b) N/O = 0.33	1		

5. Direct Shift Operations				
Rating Factors	Weighting Factors	RF Scores	RF Grades	Comp. Grade
(a) Did the applicant take TIMELY AND DECISIVE ACTION that demonstrated appropriate CONCERN for the SAFETY of the plant, staff, and public?	N/O = 0	3		
	Nominal = 0.30	2		
	(c) or (d) N/O = 0.38	1		
	(b) N/O = 0.43			
(b) Did the applicant remain ATTENTIVE to control room indications, stay in a position of OVERSIGHT , and provide an APPROPRIATE AMOUNT of DIRECTION and GUIDANCE that facilitated CREW PERFORMANCE ?	N/O = 0	3		
	Nominal = 0.30	2		
	(c) or (d) N/O = 0.37	1		
	(a) N/O = 0.43			
(c) Did the applicant SOLICIT and INCORPORATE FEEDBACK from the crew to foster an effective, team-oriented approach to problem solving and decision making?	N/O = 0	3		
	Nominal = 0.20	2		
	(d) N/O = 0.25	1		
	(a) or (b) N/O = 0.29			
(d) Did the applicant ensure that CORRECT AND TIMELY ACTIVITIES (including diagnosis, procedural implementation, and control board operations) were carried out BY THE CREW ?	N/O = 0	3		
	Nominal = 0.20	2		
	(c) N/O = 0.25	1		
	(a) or (b) N/O = 0.28			
6. Comply with and Use Technical Specifications (TS)				
Rating Factors	Weighting Factors	RF Scores	RF Grades	Comp. Grade
(a) Did the applicant RECOGNIZE when conditions were covered by the TS and LOCATE the appropriate TS?	N/O = 0	3		
	Nominal = 0.4	2		
	(b) N/O = 1.0	1		
(b) Did the applicant ensure correct COMPLIANCE with TS and LCO action statements?	N/O = 0	3		
	Nominal = 0.6	2		
	(a) N/O = 1.0	1		

ES-401

PREPARING INITIAL SITE-SPECIFIC WRITTEN EXAMINATIONS

A. Purpose

This standard specifies the requirements, procedures, and guidelines for preparing site-specific written examinations for the initial licensing of reactor operator (RO) and senior reactor operator (SRO) applicants at power reactor facilities.

B. Background

The content of the written licensing examinations for ROs and SROs is dictated by Title 10, Sections 55.41 and 55.43, of the *Code of Federal Regulations* (10 CFR 55.41 and 55.43), respectively. Each examination shall contain a representative selection of questions concerning the knowledge, skills, and abilities (K/As) needed to perform duties at the desired license level. Both the RO and SRO examinations will sample the 14 items specified in 10 CFR 55.41(b), and the SRO examination will sample the 7 additional items specified in 10 CFR 55.43(b). Given that SRO-U (upgrade) applicants previously passed an RO licensing examination covering the topics specified in 10 CFR 55.41(b), they may apply for a waiver of the RO portion of the SRO written examination pursuant to 10 CFR 55.47. (Refer to ES-204, "Processing Waivers Requested by Reactor Operator and Senior Reactor Operator Applicants.")

The written operator licensing examination is administered in two sections, including a generic fundamentals examination (GFE) and a site-specific examination. The GFE covers those K/As that do not vary significantly among reactors of the same type (i.e., pressurized- or boiling-water) and is generally administered early in the license training process. (For a description of the program, refer to ES-205, "Procedure for Administering the Generic Fundamentals Examination Program.") The instructions in this standard apply only to the site-specific examination.

Except as noted in Section D.1.b of this examination standard (ES), the "Knowledge and Abilities Catalog[s] for Nuclear Power Plant Operators: Pressurized- [and Boiling-] Water Reactors" (NUREG-1122 and 1123, respectively) provide the basis for developing content-valid licensing examinations. Each K/A stem statement has been linked to the applicable item number in 10 CFR 55.41 and/or 55.43. Preparing the license examination using the appropriate K/A catalog, in conjunction with the instructions in this NUREG-series report, will ensure that the examination includes a representative sample of the items specified in the regulations.

C. Responsibilities

1. Facility Licensee

The facility licensee will perform the following activities, as applicable, depending upon the examination arrangements confirmed with the NRC's regional office (in accordance with ES-201, "Initial Operator Licensing Examination Process") approximately 4 months before the scheduled examination date:

- a. Prepare the proposed examination outline(s) in accordance with Section D.1, and submit the outline(s) to the NRC's regional office for review and approval in accordance with ES-201.
- b. Submit the reference materials necessary for the NRC's regional office to prepare and/or validate the requested examination(s). (Refer to ES-201, Attachment 3.)
- c. Prepare the proposed examination(s) in accordance with Sections D.2 through D.4, review the examination(s) in accordance with Section E, and submit the examination(s) to the NRC's regional office in accordance with ES-201.
- d. Meet with the NRC staff in the regional office or at the facility, when and as necessary, to review the proposed examination(s) and discuss potential changes. (Refer to ES-201.)
- e. Revise the proposed examination outline(s) and examination(s) as agreed upon with the NRC's regional office; however, the NRC retains final authority to approve the examination.
- f. Facility licensees that prepare the examination shall ensure that appropriate controls are implemented to keep the comprehensive audit or screening examination that is given at or near the end of the license training class (as well as any practice exams and quizzes that are developed after beginning work on the licensing examination) from compromising the integrity of the licensing examination. Examples of acceptable control measures are as follows (other methods may also be acceptable, but will have to be reviewed and approved on a case-by-case basis):
 - The facility licensee could prepare the audit examination using a systematic and random sampling process that is similar to that used to prepare the NRC's licensing examination as discussed in Section D.
 - The facility licensee could prepare and finalize the audit examination (and any practice exams and quizzes) before it begins developing the NRC's licensing examination outline as discussed in Section D.
 - The facility licensee could develop the audit (as well as any practice exams and quizzes) and the licensing examinations using independent examination teams.
 - The facility licensee could certify as part of the examination submittal that there is no question duplication between the facility licensee's audit and the NRC's licensing examinations.

2. **NRC Regional Office**

The NRC's regional office will perform the following activities:

- a. Ensure that the examinations are prepared in accordance with Section D.
- b. Ensure that the examinations are reviewed for quality as described in Section E.
- c. Meet with the facility licensee, when and as appropriate, to pre-review the examination(s) in accordance with ES-201.

D. Examination Preparation

1. Develop the Outline

Develop each written examination outline in accordance with the following general instructions:

- a. Select the appropriate examination outline model for the licensing examination being developed:
 - For RO applicants, use only the left side of Form ES-401-1 (BWR) or ES-401-2 (PWR), depending upon the facility design.
 - For SRO-I (instant) applicants, use both the RO and SRO portions of Form ES-401-1 (BWR) or ES-401-2 (PWR), depending upon the facility design.
 - For SRO-U applicants, use both sides of Form ES-401-1 (BWR) or ES-401-2 (PWR) unless the RO portion is waived in accordance with ES-204.
- b. Systematically and randomly select specific K/A statements (e.g., K1.03 or A2.11) from NUREG-1122 (for PWRs) or NUREG-1123 (for BWRs) to complete each of the three tiers (i.e., Tier 1, Emergency and Abnormal Plant Evolutions; Tier 2, Plant Systems; and Tier 3, Generic Knowledge and Abilities) of the applicable examination outline. In order to maintain examination consistency, the facility licensee's site-specific K/A list shall not be used in place of the NRC's K/A catalog. Attachment 1 provides an example of an acceptable methodology for randomly selecting K/As within the defined structure of the examination outline to achieve as broad a sample as possible. Other methodologies may be used, provided that they are reproducible and scrutable and yield an examination outline that is free of bias, adheres to the applicable examination model, minimizes the number of K/As related to any particular system or evolution (i.e., every system or evolution in the group should be sampled once before selecting a second K/A for any system or evolution), and samples at the specific K/A statement level.

When submitting its examination outline to the NRC, the facility licensee shall describe the process that was used to develop the examination outline (in sufficient detail for the NRC to confirm that it meets the systematic and random selection criteria). Examples of adequate documentation include (1) a statement that the facility licensee used the sampling process described in Attachment 1; (2) identification of the industry standard or widely-available commercial product that was used; or (3) a description or copy of the facility licensee's process document.

Because the NRC's K/A catalogs are based on generic job and task analyses and not all facilities are the same, examination authors can eliminate inapplicable or inappropriate K/A statements by (1) discarding randomly selected K/As during the outline development process and/or (2) pre-screening the entire K/A catalog to eliminate inappropriate K/As before beginning the random selection process.

Refer to the remainder of this section for specific requirements and guidance regarding K/A elimination.

The topics for the generic K/A category in Tiers 1 and 2 (i.e., Column "G" on Forms ES-401-1 and ES-401-2) shall be selected from Section 2, "Generic Knowledge and Abilities," of the applicable K/A catalog.) However, only those topics that are relevant to the selected evolution or system shall be included; therefore, generic K/As for Tiers 1 and 2 for both RO and SRO examinations should be randomly selected from the following: 2.1.7, 2.1.19, 2.1.20, 2.1.23, 2.1.25, 2.1.27, 2.1.28, 2.1.30, 2.1.31, 2.1.32, 2.2.3, 2.2.4, 2.2.12, 2.2.22, 2.2.25, 2.2.36, 2.2.37, 2.2.38, 2.2.39, 2.2.40, 2.2.42, 2.2.44, 2.4.1, 2.4.2, 2.4.3, 2.4.4, 2.4.6, 2.4.8, 2.4.9, 2.4.11, 2.4.18, 2.4.20, 2.4.21, 2.4.30, 2.4.31, 2.4.34, 2.4.35, 2.4.41, 2.4.45, 2.4.46, 2.4.47, 2.4.49, and 2.4.50. All other generic K/As for Tiers 1 and 2 may be eliminated before or after the random selection process, and single-unit facilities may also eliminate K/As 2.2.3 and 2.2.4.

Examination authors and reviewers should ask themselves the following questions to help determine whether or not any K/A statement is appropriate for testing:

- Is the subject K/A relevant (e.g., is the system, component, process, procedure, or event installed, in use, or possible) at the subject facility?
- Is the importance rating of the K/A equal to or greater than 2.5 for the license level of the proposed examination, or is there a site-specific priority that justifies keeping the K/A if its importance rating is below 2.5?
- Is it possible to prepare a psychometrically sound question related to the subject K/A?
- Is it possible to prepare a question at the correct license level related to the subject K/A? A question at the RO level should test one (or more) of the 14 items listed under 10 CFR 55.41(b) that the K/A is linked to, or test at a RO level as determined from the facility's learning objectives. A question at the SRO-only level should test one (or more) of the 7 items listed under 10 CFR 55.43(b) that the K/A is linked to, or test at a level that is unique to the SRO job position as determined from the facility's learning objectives.

If these questions can all be answered in the affirmative, then the subject K/A is probably appropriate for testing. The fact that a K/A does not have a corresponding facility learning objective, was not covered in training, or is subject to selection in multiple tiers, are not sufficient bases for eliminating the K/A from any tier of the outline.

Facility licensees that elect to pre-screen and eliminate any K/A statements from the random selection process should make arrangements for their NRC regional office to review their screening process and results before they submit their

examination outline. Any subsequent changes to the list of K/As from which the examination outline is generated would also have to be documented, justified, and reviewed by the NRC. All K/A statements that are eliminated after they have been randomly selected to fill an examination outline shall be documented on Form ES-401-4, "Record of Rejected K/As," or equivalent, and submitted to the NRC regional office for review in conjunction with the proposed outline.

Enter the K/A statement numbers, a brief description of each topic, the topics' importance ratings for the license level of the exam (use the RO and SRO ratings for the RO and SRO-only portions, respectively), and the point totals (system, category, group, and tier) on the examination outline. The proposed point totals for each group and tier must match the number specified on Forms ES-401-1 and ES-401-2, as applicable.

If a facility licensee proposes to use an outline that was previously used at the subject or another facility, the licensee shall identify the source of the outline and explain what effect its reuse is expected to have on examination integrity.

- c. Special attention is required to ensure that the SRO examination tests at the appropriate license level. The SRO outline (refer to the right-hand portion of Forms ES-401-1 or -2, as applicable) shall include 25 K/A statements that relate to the topics in 10 CFR 55.43(b).

A number of the generic K/As in Section 2 of the catalogs are specifically linked to one or more topics specified in 10 CFR 55.43(b), and all of the Category A2, AA2, and EA2 K/A statements are (or, in the case of NUREG-1123, should be) similarly linked. Consequently, the K/As for the SRO examination will be drawn from those K/A categories (denoted by Columns "A2" and "G" in the SRO-only section of the applicable examination outline) and from all K/A categories related to the fuel handling facilities, which are specifically identified for sampling in 10 CFR 55.43(b)(7). The fact that a K/A is linked to both 10 CFR 55.41 and 10 CFR 55.43 does not mean that the K/A cannot be used to develop an SRO-only question, nor does it exclude the K/A from sampling on the RO examination. However, to be used on the SRO-only section of an examination, a question developed from a K/A linked to both 10 CFR 55.41 and 10 CFR 55.43 should test at the level of the 10 CFR 55.43(b) item number(s) that the K/A is linked to, or test a level that is unique to the SRO job position as determined from the facility's learning objectives. K/A topics linked to 10 CFR 55.41(b) may also be appropriate for developing SRO-level questions, if the questions developed evaluate knowledge and abilities at a 10 CFR 55.43(b) level, or at a level that is unique to the SRO job position as determined from the facility's learning objectives.

- d. After completing the outline, check the selected K/As for balance of coverage within and across the three tiers. Ensure that every applicable K/A category is sampled at least twice within each of the three tiers so that a valid sample will likely be maintained in the event that some questions are deleted as a result of post-examination comments. Similarly, ensure that no emergency/abnormal plant evolution (E/APE), system, or K/A category is over-sampled (e.g., avoid

selecting more than two K/A topics from a given system unless they relate to plant-specific priorities. Make any adjustments that might be necessary by systematically and randomly selecting replacement K/A statements. Also check the overall balance of the entire licensing examination, including the walk-through and the dynamic simulator test, and make any necessary adjustments. Document and justify all changes on Form ES-401-4 and submit the documentation with the completed outline.

- e. Review and submit the completed outline to the NRC's chief examiner for review and approval in accordance with ES-201. Facility-developed outlines shall be independently reviewed by a facility supervisor or manager before being submitted to the NRC's regional office in accordance with ES-201. Facility licensees are responsible for ensuring that contractor-prepared outlines meet the guidelines herein. The NRC must receive the outlines by the date agreed upon when the examination arrangements were confirmed (normally approximately 75 days before the scheduled examination date).
- f. The NRC's chief examiner will ensure that the outline is independently reviewed within 5 working days (or as otherwise agreed with the facility licensee) and provide comments and recommended changes, as appropriate. The NRC's examiner shall review the sampling methodology, including all K/A rejections and changes, to ensure it is unbiased. The examiner shall also review and approve the site-specific item or topic substitutions. Refer to Section C.3 of ES-201 for additional guidance regarding outline reviews.

2. Select and Develop Questions

- a. Prepare the site-specific written operator licensing examination using a combination of existing, modified, and new questions that match the specific K/A statements in the previously approved examination outline (refer to Section D.1 and ES-201) and the criteria summarized below. Ensure that the questions selected for Tier 3 maintain their focus on plant-wide generic knowledge and abilities and do not become an extension of Tier 2, "Plant Systems."

When selecting or writing questions for K/As that test coupled knowledge or abilities (e.g., the A.2 K/A statements in Tiers 1 and 2 and a number of generic K/A statements, such as 2.4.1, in Tier 3), try to test both aspects of the K/A statement. If that is not possible without expending an inordinate amount of resources, limit the scope of the question to that aspect of the K/A statement requiring the highest cognitive level (e.g., the (b) portion of the A.2 K/A statements) or substitute another randomly selected K/A.

Any time it becomes necessary to deviate from the previously approved examination outline, discuss the proposed deviations with the NRC's chief examiner and obtain concurrence. Also explain on Form ES-401-4 why the original proposal could not be implemented and why the proposed replacement is considered an acceptable substitute.

- b. Ensure that each question is technically accurate *and free of the following psychometric flaws* that could diminish the validity of the examination:

- implausible distractors (C.2.g, h, k; D)
- confusing or ambiguous language (C.1.c; E)
- confusing or inappropriate negatives (C.2.e; E.3)
- collection of true/false statements (C.2.c; F)
- backward logic (C.1.h; G)
- specific determiners (C.2.m)

Appendix B provides a detailed discussion and examples of questions containing each of these and other errors; the parenthetical references (above) identify the applicable sections of Appendix B and its Attachment 2. Appendices A and B contain more detailed instructions and guidelines for preparing and formatting content-valid examinations and should be referred to as necessary while preparing the examination.

- c. Ensure that the questions will differentiate between competent and less-than-competent applicants, that they are appropriate for the job level being examined, and that they are operationally oriented when possible. Refer to Appendix A (Section C.2) and Appendix B (Section C.1.a and Section B of Attachment 2) for additional discussion of and examples to illustrate the concept of operational validity.

Establish a level of difficulty that discriminates between applicants who have and have not mastered the required knowledge, skills, and abilities. See Appendices A (Section C.3) and B (Section C.1.e and Section C of Attachment 2) for further guidance on setting the level of difficulty for individual test questions. The applicants should be able to complete and review the RO examination within 4 hours, and the SRO-only examination within 2 hours. (Refer to ES-402, "Administering Initial Written Examinations," for actual administration time limits.)

In order to maintain examination quality and consistency, between 50 and 60 percent of the questions on the RO examination shall be written at the comprehension/analysis level. The SRO examination, overall, could exceed 60 percent because the K/A categories emphasized on the SRO-only examination are generally consistent with the higher cognitive levels. The cognitive level of any question drawn directly from a bank will be counted at its face value. Refer to Appendix B (Section C.1.d and Section A of Attachment 2) for further guidance regarding the levels of knowledge and sample questions written at each level.

- d. The 25 SRO-level questions shall evaluate the additional knowledge and abilities required for the higher license level in accordance with 10 CFR 55.43(b) or the facility licensee's learning objectives. Questions related to 10 CFR 55.41(b) topics may also be appropriate SRO-level questions if they evaluate knowledge and abilities at a level that is unique to the SRO job position. The SRO-only questions are not required to be written at the higher cognitive levels (comprehension/analysis) discussed in the previous item, but shall be consistent with the cognitive level of the approved K/A statement.

- e. All test questions shall be in the multiple choice format described in Appendix B. Each question shall have four possible answer choices and be worth one point.
- f. To avoid compromising the integrity and security of the examination and to enhance consistency, observe the following limits on bank use when preparing the examination:
- Take no more than 75 percent of the questions for the examination (i.e., 56 for the RO and 19 for the SRO-only) directly from the facility licensee's or **any** other written examination question bank without significant modification.
 - If the bank contains more than one question that fits a specific K/A statement, randomly select from among the available questions unless there is an appropriate basis for selecting a specific question (e.g., higher cognitive level, better discrimination validity, more operationally oriented, or site-specific priority).
 - Write at least 10 new questions (i.e., 8 for the RO examination and 2 for the SRO-only) at the comprehension/analysis level, as described in Appendix B.
 - Select the remaining questions for the examination (nominally 11 for the RO and 4 for the SRO-only) from the facility licensee's or **any** other bank, but significantly modify each question by changing at least one pertinent condition in the stem and at least one distractor. Changing the conditions in the stem such that one of the three distractors in the original question becomes the correct answer would also be considered a significant modification. The intent or objective of the question does not necessarily have to be changed. Adding or deleting irrelevant information and making minor changes (e.g., the unit number, component train, or power level when it makes no difference) would not be considered a significant modification to the question.
- g. A technical reference, including the reference's revision or version number (if applicable) and a cross-reference to the facility licensee's examination question bank, if applicable, shall be noted for every question. If the facility licensee has a learning objective applicable to the question, it should also be referenced. However, the absence of a learning objective does not invalidate the question, provided that it has an appropriate K/A and technical reference. Refer to ES-201 for additional instructions regarding documenting the source of questions on facility-written examinations.

To facilitate the review process, examination authors should consider providing a brief explanation of why the answer is correct, and each of the distractors is plausible but incorrect. This **optional** practice increases the efficiency of the examination review process and promotes the detection and correction of problem questions before the examinations are administered.

Reference materials (such as diagrams, sketches, and portions of facility procedures) may be used on a selective basis as attachments to the written examination. Ensure that any reference material used in the examination is easy to read

and clearly marked, provides an effective and objective way for the applicant to demonstrate knowledge of the topic or concept, and does not give away the answers to other questions on the examination or improve the applicant's chances of guessing the correct answer by eliminating incorrect distractors.

Form ES-401-5 is a sample worksheet for use in preparing the written examination questions. Facility licensees may use that or a similar form to document the information related to each proposed question that is submitted to the NRC for review and approval.

3. Review and Submit the Examination

- a. Review the entire examination to ensure that it satisfies the criteria on Form ES-401-6, "Written Examination Quality Checklist."
- b. Forward the examination package, including all proposed attachments and the completed quality checklist, to the first reviewer. Section E provides instructions for conducting the quality reviews.

Facility-developed examinations must be reviewed by a supervisor or manager before they are sent to the NRC's regional office in accordance with ES-201. Facility authors shall submit their examinations for management review in time to support their delivery to the NRC's regional office approximately 45 days before the scheduled examination date.

NRC examiners shall submit their examinations to the chief examiner for review at least 1 week before the scheduled pre-review by the facility licensee. (Refer to ES-201.)

4. Assemble the Examinations

- a. Format the examinations using the one-question-per-page layout specified in Appendix B or by placing as many complete questions as possible on each page.
- b. Use a cover sheet in the format shown in Form ES-401-7 (or 8), "Site-Specific RO (or SRO) Written Examination Cover Sheet," as applicable, for all RO and SRO written examinations. Fill out all items in the upper section of the cover sheet, except the name of the applicant, when preparing the examinations.

E. Quality Reviews

When reviewing questions, reviewers should try to put themselves in the position of the applicants by attempting to answer the questions without using reference material or referring to the answer key. Reviewers should ensure that the conditions and requirements posed in the question are complete and unambiguous, all necessary information is provided, all unnecessary information is deleted, the intended answer clearly follows from what is asked in the question, and all of the distractors are plausible.

1. **Facility Management Review**

If the examination was prepared by the facility licensee, it shall be independently reviewed by a supervisor or manager before it is submitted to the NRC's regional office for review and approval in accordance with ES-201. The reviewer should evaluate the examination using the criteria on Form ES-401-6 and include the signed form in the examination package submitted to the NRC. Facility licensees are responsible for ensuring that contractor-prepared examinations meet the guidelines specified herein and are encouraged to verify the origins of the questions used to construct the examination.

2. **NRC Examiner Review**

- a. The NRC's regional office staff shall review the examination as soon as possible after receipt so that supervisory approval can be obtained before the final review with the facility licensee, which is normally scheduled about 2 weeks before the examination date. It is especially important for the regional office to promptly review examinations prepared by a facility licensee because of the extra time that may be required if extensive changes are necessary. The chief examiner shall consolidate the comments from all NRC reviewers and submit one set of comments to the author or facility contact. Refer to Section C.3 of ES-201 for additional guidance regarding examination reviews.
- b. If the NRC prepared the examination, the NRC's chief examiner shall ensure that a second examiner independently reviews all examination questions for content, wording, operational validity, and level of difficulty. As a minimum, the independent reviewer shall check the items listed on Form ES-401-6. The facility reviewer blocks in Column "b" are not applicable for NRC-prepared examinations.
- c. If the facility licensee developed the examination, the licensee is primarily responsible for ensuring compliance with the items listed on Form ES-401-6. However, the regional office staff is expected to take reasonable measures, including the selective review of reference materials, individual questions, and past examinations, to verify these items when reviewing the examination; exclusive reliance on the facility author's and reviewer's initials is *not* adequate. Depending upon the expected technical quality of the examination and the time available before the scheduled review with the facility licensee, the regional office staff shall independently review and verify the technical accuracy of a sample of the written examination questions. The regional office staff shall also confirm that the question content for a selected sample of the questions accurately implements the intent of the associated K/A statements from the previously approved examination outline. The sample shall include at least 30 questions¹ with an emphasis on those questions that were drawn directly from the facility licensee's examination bank. If more than 20 percent¹ of the sampled questions clearly do not match the intent of the associated

¹ The sample rates apply only to RO and RO/SRO combination exams. If the license class consists entirely of SRO-upgrade applicants who have been granted waivers of the RO examination pursuant to ES-204 or SROs limited to fuel handling, review the entire exam.

K/A statement, the region shall verify the K/A conformance on the remainder of the examination and, as appropriate, discuss its findings with the NRR operator licensing program office and the facility licensee, and assess the number of questions that were repeated from the applicants' audit examination and the last two NRC licensing examinations at the facility.

With regard to assessing the psychometric quality of the proposed examination questions, the regional office shall begin by systematically selecting a sample of questions for detailed review. The sample is based on the nominal bank/modified/new question distribution discussed in Section D.2.f above and the question background information provided by the facility licensee (using Form ES-401-5 or similar method). The sample shall include 10 of the new questions¹ on the examination and 20 additional questions¹ that are randomly selected from among the remaining questions that have not been pre-validated through successful use on an NRC licensing examination administered at the given facility since October 1, 1995. The regional office shall conduct and document the review of the 30 selected questions¹ using Form ES-401-9, "Written Examination Review Worksheet."

When the sample review is complete, the chief examiner shall consult with the responsible supervisor and proceed as directed to evaluate the remainder of the examination.

- d. There are no minimum or maximum limits on the number or scope of changes the regional office may direct the author or facility contact to make to the proposed examinations, provided that they are necessary to make the examinations conform with established acceptance criteria. All unacceptable flaws identified by using Form ES-401-9 (including questions that do not match the intent of the approved K/A, have more than one implausible distractor, or are intended as SRO-only questions but are not at the SRO license level as discussed in Section D.2.d) shall be corrected by rewriting or replacing the questions before the examination is administered. Questions that do not match the intent of the approved K/A statement, but are otherwise good questions, shall, nonetheless, be replaced with questions that match the K/A. Other flaws of a less serious nature (e.g., editorial clarifications or enhancements, single implausible distractors) should still be corrected before the examination is administered, but they will not be categorized as unacceptable for purposes of documentation in the examination report in accordance with Section E.3 of ES-501, "Initial Post-Examination Activities."
- e. Upon supervisory approval, generally at least 14 days before the examinations are scheduled to be given, the chief examiner will review the written examinations with the facility licensee in accordance with ES-201.

When providing feedback to the facility licensee regarding unacceptable questions, the chief examiner shall, at a minimum, *explain* how the Appendix B psychometric quantitative and qualitative attributes are not being met. For example, if the question is determined to have more than one implausible distractor, the attendant explanation shall articulate the reasons the examiner believes each of the faulty distractors is not credible.

Examinations that are written by the NRC shall be clean, properly formatted, and "ready-to-administer" before they are reviewed with the facility licensee. The region shall not rely on the facility licensee to ensure that the quality of the examination is acceptable for administration.

- f. After reviewing the examination with the facility licensee, the chief examiner will ensure that any comments and recommendations are resolved and the examination is revised as necessary. If the facility licensee developed the examination, it will generally be expected to make whatever changes the NRC recommends.
- g. After the necessary changes have been made and the chief examiner is satisfied with the examination, he or she will sign the quality checklist and forward the examination package to the responsible supervisor for final approval. If the examination was written by the facility licensee, the chief examiner should include a copy of the original submittal with the examination package.

3. **NRC Supervisory Review**

- a. The responsible supervisor shall review all questions that are determined to have unacceptable flaws in accordance with Form ES-401-9 before any comments are provided to the facility licensee. The responsible supervisor shall review the entire examination before authorizing the chief examiner to proceed with the facility pre-review in accordance with ES-201. The supervisory review is not intended to be another technical review, but rather a general assessment of examination quality, including a review of the changes being recommended by the chief examiner, and a check to ensure that all applicable administrative requirements have been implemented.
- b. Based on the results of the sampling review conducted in accordance with Section E.2.c (above), the responsible supervisor (in coordination with regional management and the NRR operator licensing program office, as appropriate) will continue the examination review as follows:
 - If fewer than 6 of the 30 sampled questions¹ contain unacceptable flaws as determined by using Form ES-401-9, the regional office shall review in detail the remainder of the examination (excluding those questions that were pre-validated by the NRC) using Form ES-401-9, and shall provide comments to the facility licensee for rework and correction. The NRC-validated questions need not be reviewed in detail, but will be evaluated as necessary to complete Form ES-401-6 (including the identification and correction of technical and psychometric flaws that cause the question to have no or multiple correct answers) before reviewing the examination with the facility licensee.

¹ The sample rates apply only to RO and RO/SRO combination exams. If the license class consists entirely of SRO-upgrade applicants who have been granted waivers of the RO examination pursuant to ES-204 or SROs limited to fuel handling, then review the entire exam.

The responsible supervisor will review and approve each comment that would require the facility licensee to rework an NRC-validated question.

- If 6 or more of the 30 sampled questions¹ contain unacceptable flaws as determined by using Form ES-401-9, the regional office may return the written examination (with explanatory comments) to the facility licensee for rework and correction without reviewing the remainder of the examination. (Refer to Section C.2.h of ES-201 for additional guidance regarding examination delays.) The facility licensee will be expected to correct the unacceptable flaws in the sampled questions and like-kind flaws that exist in the remainder of the examination. When the facility licensee resubmits the examination, every question (excluding the NRC-validated questions) will be subject to NRC review using Form ES-401-9. The NRC-validated questions will be reviewed as discussed above.

Alternatively, if the responsible supervisor concludes that the remainder of the examination (excluding the NRC-validated questions) can be reviewed and corrected in time for the scheduled examination date, the regional office should continue the review using Form ES-401-9 and provide comments to the facility licensee for correction.

- c. The responsible supervisor should ensure that any significant deficiencies in the original examinations submitted by a facility licensee are evaluated in accordance with ES-201 to determine the appropriate course of action. At a minimum, the supervisor should ensure that they are addressed in the final examination report in accordance with ES-501.
- d. Following the facility review, the responsible supervisor should again review the examination to ensure that the concerns expressed by the facility licensee and the NRC have been appropriately addressed. The supervisor shall not sign Form ES-401-6 until he or she is satisfied that the examination is acceptable to be administered.

4. Facility Peer Review

As a final check of the examination's technical accuracy, facility management should consider administering the examination (under security agreements) to one or more licensed personnel who were previously uninvolved in developing the examination. In light of examination security concerns, the NRC discourages the use of certain individuals (e.g., the applicants' supervisors or coworkers) to validate the examination. Any comments made and problems identified during the trial administration shall be discussed with the NRC's chief examiner and resolved before the examination is administered to the license applicants. The intent of the review is to identify and correct deficiencies that may affect the validity of the examination.

F. Attachments/Forms

Attachment 1,	"Example Systematic Sampling Methodology"
Form ES-401-1,	"BWR Examination Outline"
Form ES-401-2,	"PWR Examination Outline"
Form ES-401-3,	"Generic Knowledge and Abilities Outline (Tier 3)"
Form ES-401-4,	"Record of Rejected K/As"
Form ES-401-5,	"Sample Written Examination Question Worksheet"
Form ES-401-6,	"Written Examination Quality Checklist"
Form ES-401-7,	"Site-Specific RO Written Examination Cover Sheet"
Form ES-401-8,	"Site-Specific SRO Written Examination Cover Sheet"
Form ES-401-9,	"Written Examination Review Worksheet"

The following process, which uses the BWR outline (Form ES-401-1) for illustration, *may be used* for each group in Tiers 1 and 2 of the RO examination outline.

1. Review each group and delete those items [emergency/abnormal plant evolutions (E/APEs) for Tier 1 and systems for Tier 2] that clearly do not apply to the facility for which the examination is being written; be prepared to explain the basis for the deletions to the NRC's chief examiner. Add any operationally-important systems or E/APEs that pertain to the facility but are not included in the generic lists on Form ES-401-1.
2. Sequentially number the remaining items in the group and sequentially annotate the same number of tokens. If we assume that none of the 20 E/APEs in Tier 1, Group 1 was deleted in Step 1, there should be 20 tokens, numbered from 1 to 20.
 - a. Since the number of items remaining in the group (in this case 20) is the same as the required number of points for the group specified in the right-hand column of the examination outline, each item in the group would be sampled one time.
 - b. If the number of items remaining in the group is smaller than the required number of points for the group (e.g., Tier 2, Group 1 has 23 items but requires 26 points), sample each item once, and determine the rest of the sample by randomly selecting and removing tokens (in this case 3 of the 23) until the required total number of points is reached. Update Form ES-401-1 to note the selected items.
 - c. If the number of items remaining in the group is larger than the required number of points for the group (e.g., Tier 1, Group 2 has 20 items but only requires 7 points), randomly select and remove the required number of tokens and note them on Form ES-401-1.
3. After selecting the topics to be sampled in each group as described in Step 2, count the number of K/A categories in the group [e.g., 6 for each group in Tier 1 (i.e., K1, K2, K3, A1, A2, and G)] and sequentially annotate the same number of tokens (in this case 6). For each E/APE (and system) selected in Step 2, randomly select and remove a token and note the K/A category on Form ES-401-1. If the E/APE (or system) was sampled more than once in accordance with Step 2.a, randomly select a second K/A category. If the selected K/A category contains no K/A statements having an importance rating above 2.5, systematically select another K/A category, unless the lower importance is justified based on plant-specific priorities. Then replace all tokens in the container and repeat the process for every selected item in each group.
4. Use a similar method to randomly select from among the K/A statements under each selected K/A category. Describe each K/A topic in the space provided on Form ES-401-1 and enter the importance rating. K/As having importance ratings less than 2.5 can be used if justified based on plant priorities; the facility contact should be prepared to explain the basis to the NRC's chief examiner.

For Tier 3 (plant-wide generics) of the examination outline, randomly select K/As from Section 2 of the NRC's K/A catalog so that each of the four K/A categories (i.e., "Conduct of Operations," "Equipment Control," Radiation Control," and "Emergency Procedures/Plan") has at least two items.

Repeat Steps (1) through (4), above, to select the required number of topics for the SRO-only portion of the exam. With respect to Step (3), select topics from the shaded portions of the Tier 1 and 2 outlines [i.e., the "A2" and "G" K/A categories, which are linked to 10 CFR 55.43, and the fuel handling equipment, which is specifically identified for sampling in 10 CFR 55.43(b)(7)]. For Tier 3, select seven K/As linked to 10 CFR 55.43; sample one of the categories only once.

Facility:		Date of Exam:																			
Tier	Group	RO K/A Category Points											SRO-Only Points								
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2	G*	Total					
1. Emergency & Abnormal Plant Evolutions	1												20			7					
	2												7			3					
	Tier Totals												27			10					
2. Plant Systems	1												26			5					
	2												12			3					
	Tier Totals												38			8					
3. Generic Knowledge and Abilities Categories		1		2		3		4		10		1		2		3		4		7	

Note:

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).
2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ± 1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.
4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.
5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.
- 7.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.
8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

ES-401		BWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO / SRO)						Form ES-401-1	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295001 Partial or Complete Loss of Forced Core Flow Circulation / 1 & 4									
295003 Partial or Complete Loss of AC / 6									
295004 Partial or Total Loss of DC Pwr / 6									
295005 Main Turbine Generator Trip / 3									
295006 SCRAM / 1									
295016 Control Room Abandonment / 7									
295018 Partial or Total Loss of CCW / 8									
295019 Partial or Total Loss of Inst. Air / 8									
295021 Loss of Shutdown Cooling / 4									
295023 Refueling Acc / 8									
295024 High Drywell Pressure / 5									
295025 High Reactor Pressure / 3									
295026 Suppression Pool High Water Temp. / 5									
295027 High Containment Temperature / 5									
295028 High Drywell Temperature / 5									
295030 Low Suppression Pool Wtr Lvl / 5									
295031 Reactor Low Water Level / 2									
295037 SCRAM Condition Present and Reactor Power Above APRM Downscale or Unknown / 1									
295038 High Off-site Release Rate / 9									
600000 Plant Fire On Site / 8									
700000 Generator Voltage and Electric Grid Disturbances / 6									
K/A Category Totals:							Group Point Total:		20/7

ES-401		BWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / SRO)						Form ES-401-1	
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
295002 Loss of Main Condenser Vac / 3									
295007 High Reactor Pressure / 3									
295008 High Reactor Water Level / 2									
295009 Low Reactor Water Level / 2									
295010 High Drywell Pressure / 5									
295011 High Containment Temp / 5									
295012 High Drywell Temperature / 5									
295013 High Suppression Pool Temp. / 5									
295014 Inadvertent Reactivity Addition / 1									
295015 Incomplete SCRAM / 1									
295017 High Off-site Release Rate / 9									
295020 Inadvertent Cont. Isolation / 5 & 7									
295022 Loss of CRD Pumps / 1									
295029 High Suppression Pool Wtr Lvl / 5									
295032 High Secondary Containment Area Temperature / 5									
295033 High Secondary Containment Area Radiation Levels / 9									
295034 Secondary Containment Ventilation High Radiation / 9									
295035 Secondary Containment High Differential Pressure / 5									
295036 Secondary Containment High Sump/Area Water Level / 5									
500000 High CTMT Hydrogen Conc. / 5									
K/A Category Point Totals:							Group Point Total:		7/3

ES-401		BWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / SRO)											Form ES-401-1	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
203000 RHR/LPCI: Injection Mode														
205000 Shutdown Cooling														
206000 HPCI														
207000 Isolation (Emergency) Condenser														
209001 LPCS														
209002 HPCS														
211000 SLC														
212000 RPS														
215003 IRM														
215004 Source Range Monitor														
215005 APRM / LPRM														
217000 RCIC														
218000 ADS														
223002 PCIS/Nuclear Steam Supply Shutoff														
239002 SRVs														
259002 Reactor Water Level Control														
261000 SGTS														
262001 AC Electrical Distribution														
262002 UPS (AC/DC)														
263000 DC Electrical Distribution														
264000 EDGs														
300000 Instrument Air														
400000 Component Cooling Water														
K/A Category Point Totals:												Group Point Total:		26/5

BWR Examination Outline												Form ES-401-1		
Plant Systems - Tier 2/Group 2 (RO / SRO)														
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
201001 CRD Hydraulic														
201002 RMCS														
201003 Control Rod and Drive Mechanism														
201004 RSCS														
201005 RCIS														
201006 RWM														
202001 Recirculation														
202002 Recirculation Flow Control														
204000 RWCU														
214000 RPIS														
215001 Traversing In-core Probe														
215002 RBM														
216000 Nuclear Boiler Inst.														
219000 RHR/LPCI: Torus/Pool Cooling Mode														
223001 Primary CTMT and Aux.														
226001 RHR/LPCI: CTMT Spray Mode														
230000 RHR/LPCI: Torus/Pool Spray Mode														
233000 Fuel Pool Cooling/Cleanup														
234000 Fuel Handling Equipment														
239001 Main and Reheat Steam														
239003 MSIV Leakage Control														
241000 Reactor/Turbine Pressure Regulator														
245000 Main Turbine Gen. / Aux.														
256000 Reactor Condensate														
259001 Reactor Feedwater														
268000 Radwaste														
271000 Offgas														
272000 Radiation Monitoring														
286000 Fire Protection														
288000 Plant Ventilation														
290001 Secondary CTMT														
290003 Control Room HVAC														
290002 Reactor Vessel Internals														
K/A Category Point Totals:												Group Point Total:		12/3

Facility:		Date of Exam:																			
Tier	Group	RO K/A Category Points											SRO-Only Points								
		K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G *	Total	A2	G*	Total					
1. Emergency & Abnormal Plant Evolutions	1												18			6					
	2												9			4					
	Tier Totals												27			10					
2. Plant Systems	1												28			5					
	2												10			3					
	Tier Totals												38			8					
3. Generic Knowledge and Abilities Categories		1		2		3		4		10		1		2		3		4		7	
Note:		<p>1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).</p> <p>2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ± 1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.</p> <p>3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that do not apply at the facility should be deleted and justified; operationally important, site-specific systems/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.</p> <p>4. Select topics from as many systems and evolutions as possible; sample every system or evolution in the group before selecting a second topic for any system or evolution.</p> <p>5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.</p> <p>6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.</p> <p>7.* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.</p> <p>8. On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.</p> <p>9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.</p>																			

ES-401		PWR Examination Outline							Form ES-401-2	
Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (RO / SRO)										
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#	
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1										
000008 Pressurizer Vapor Space Accident / 3										
000009 Small Break LOCA / 3										
000011 Large Break LOCA / 3										
000015/17 RCP Malfunctions / 4										
000022 Loss of Rx Coolant Makeup / 2										
000025 Loss of RHR System / 4										
000026 Loss of Component Cooling Water / 8										
000027 Pressurizer Pressure Control System Malfunction / 3										
000029 ATWS / 1										
000038 Steam Gen. Tube Rupture / 3										
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4										
000054 (CE/E06) Loss of Main Feedwater / 4										
000055 Station Blackout / 6										
000056 Loss of Off-site Power / 6										
000057 Loss of Vital AC Inst. Bus / 6										
000058 Loss of DC Power / 6										
000062 Loss of Nuclear Svc Water / 4										
000065 Loss of Instrument Air / 8										
W/E04 LOCA Outside Containment / 3										
W/E11 Loss of Emergency Coolant Recirc. / 4										
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4										
000077 Generator Voltage and Electric Grid Disturbances / 6										
K/A Category Totals:							Group Point Total:		18/6	

ES-401		PWR Examination Outline						Form ES-401-2	
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (RO / SRO)									
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1									
000003 Dropped Control Rod / 1									
000005 Inoperable/Stuck Control Rod / 1									
000024 Emergency Boration / 1									
000028 Pressurizer Level Malfunction / 2									
000032 Loss of Source Range NI / 7									
000033 Loss of Intermediate Range NI / 7									
000036 (BW/A08) Fuel Handling Accident / 8									
000037 Steam Generator Tube Leak / 3									
000051 Loss of Condenser Vacuum / 4									
000059 Accidental Liquid RadWaste Rel. / 9									
000060 Accidental Gaseous Radwaste Rel. / 9									
000061 ARM System Alarms / 7									
000067 Plant Fire On-site / 8									
000068 (BW/A06) Control Room Evac. / 8									
000069 (W/E14) Loss of CTMT Integrity / 5									
000074 (W/E06&E07) Inad. Core Cooling / 4									
000076 High Reactor Coolant Activity / 9									
W/E01 & E02 Rediagnosis & SI Termination / 3									
W/E13 Steam Generator Over-pressure / 4									
W/E15 Containment Flooding / 5									
W/E16 High Containment Radiation / 9									
BW/A01 Plant Runback / 1									
BW/A02&A03 Loss of NNI-X/Y / 7									
BW/A04 Turbine Trip / 4									
BW/A05 Emergency Diesel Actuation / 6									
BW/A07 Flooding / 8									
BW/E03 Inadequate Subcooling Margin / 4									
BW/E08; W/E03 LOCA Cooldown - Depress. / 4									
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4									
BW/E13&E14 EOP Rules and Enclosures									
CE/A11; W/E08 RCS Overcooling - PTS / 4									
CE/A16 Excess RCS Leakage / 2									
CE/E09 Functional Recovery									
K/A Category Point Totals:							Group Point Total:		9/4

PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO / SRO)												Form ES-401-2		
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump														
004 Chemical and Volume Control														
005 Residual Heat Removal														
006 Emergency Core Cooling														
007 Pressurizer Relief/Quench Tank														
008 Component Cooling Water														
010 Pressurizer Pressure Control														
012 Reactor Protection														
013 Engineered Safety Features Actuation														
022 Containment Cooling														
025 Ice Condenser														
026 Containment Spray														
039 Main and Reheat Steam														
059 Main Feedwater														
061 Auxiliary/Emergency Feedwater														
062 AC Electrical Distribution														
063 DC Electrical Distribution														
064 Emergency Diesel Generator														
073 Process Radiation Monitoring														
076 Service Water														
078 Instrument Air														
103 Containment														
K/A Category Point Totals:												Group Point Total:		28/5

ES-401		PWR Examination Outline Plant Systems - Tier 2/Group 2 (RO / SRO)											Form ES-401-2	
System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
001 Control Rod Drive														
002 Reactor Coolant														
011 Pressurizer Level Control														
014 Rod Position Indication														
015 Nuclear Instrumentation														
016 Non-nuclear Instrumentation														
017 In-core Temperature Monitor														
027 Containment Iodine Removal														
028 Hydrogen Recombiner and Purge Control														
029 Containment Purge														
033 Spent Fuel Pool Cooling														
034 Fuel Handling Equipment														
035 Steam Generator														
041 Steam Dump/Turbine Bypass Control														
045 Main Turbine Generator														
055 Condenser Air Removal														
056 Condensate														
068 Liquid Radwaste														
071 Waste Gas Disposal														
072 Area Radiation Monitoring														
075 Circulating Water														
079 Station Air														
086 Fire Protection														
K/A Category Point Totals:												Group Point Total:		10/3

Facility:		Date of Exam:					
Category	K/A #	Topic	RO		SRO-Only		
			IR	#	IR	#	
1. Conduct of Operations	2.1.						
	2.1.						
	2.1.						
	2.1.						
	2.1.						
	2.1.						
	Subtotal						
2. Equipment Control	2.2.						
	2.2.						
	2.2.						
	2.2.						
	2.2.						
	2.2.						
	Subtotal						
3. Radiation Control	2.3.						
	2.3.						
	2.3.						
	2.3.						
	2.3.						
	2.3.						
	Subtotal						
4. Emergency Procedures / Plan	2.4.						
	2.4.						
	2.4.						
	2.4.						
	2.4.						
	2.4.						
	Subtotal						
Tier 3 Point Total				10		7	

Examination Outline Cross-Reference:

Level

RO

SRO

Tier #

Group #

K/A #

Importance Rating

Proposed Question:

Proposed Answer:

Explanation (Optional):

Technical Reference(s):

(Attach if not previously provided)

(including version/revision number)

Proposed references to be provided to applicants during examination:

Learning Objective:

(As available)

Question Source:

Bank #

Modified Bank #

New

(Note changes or attach parent)

Question History:

Last NRC Exam

(Optional: Questions validated at the facility since 10/95 will generally undergo less rigorous review by the NRC; failure to provide the information will necessitate a detailed review of every question.)

Question Cognitive Level:

Memory or Fundamental Knowledge

Comprehension or Analysis

10 CFR Part 55 Content:

55.41

55.43

Comments:

Facility:		Date of Exam:		Exam Level: RO <input type="checkbox"/> SRO <input type="checkbox"/>		
Item Description				Initial		
				a	b*	c#
1. Questions and answers are technically accurate and applicable to the facility.						
2. a. NRC K/As are referenced for all questions. b. Facility learning objectives are referenced as available.						
3. SRO questions are appropriate in accordance with Section D.2.d of ES-401						
4. The sampling process was random and systematic (If more than 4 RO or 2 SRO questions were repeated from the last 2 NRC licensing exams, consult the NRR OL program office).						
5. Question duplication from the license screening/audit exam was controlled as indicated below (check the item that applies) and appears appropriate: ___ the audit exam was systematically and randomly developed; or ___ the audit exam was completed before the license exam was started; or ___ the examinations were developed independently; or ___ the licensee certifies that there is no duplication; or ___ other (explain)						
6. Bank use meets limits (no more than 75 percent from the bank, at least 10 percent new, and the rest new or modified); enter the actual RO / SRO-only question distribution(s) at right.		Bank /	Modified /	New /		
7. Between 50 and 60 percent of the questions on the RO exam are written at the comprehension/ analysis level; the SRO exam may exceed 60 percent if the randomly selected K/As support the higher cognitive levels; enter the actual RO / SRO question distribution(s) at right.		Memory /		C/A /		
8. References/handouts provided do not give away answers or aid in the elimination of distractors.						
9. Question content conforms with specific K/A statements in the previously approved examination outline and is appropriate for the tier to which they are assigned; deviations are justified.						
10. Question psychometric quality and format meet the guidelines in ES Appendix B.						
11. The exam contains the required number of one-point, multiple choice items; the total is correct and agrees with the value on the cover sheet.						
<div style="display: flex; justify-content: space-between;"> Printed Name / Signature Date </div> <div style="display: flex; justify-content: space-between;"> <div style="width: 80%;"> a. Author _____ b. Facility Reviewer (*) _____ c. NRC Chief Examiner (#) _____ d. NRC Regional Supervisor _____ </div> <div style="width: 15%; text-align: center;"> _____ _____ _____ _____ </div> </div>						
Note: * The facility reviewer's initials/signature are not applicable for NRC-developed examinations. # Independent NRC reviewer initial items in Column "c"; chief examiner concurrence required.						

U.S. Nuclear Regulatory Commission

Site-Specific RO Written Examination

Applicant Information

Name: _____

Date: _____

Facility/Unit: _____

Region: I ☐ II ☐ III ☐ IV ☐Reactor Type: W ☐ CE ☐ BW ☐ GE ☐

Start Time: _____

Finish Time: _____

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. To pass the examination, you must achieve a final grade of at least 80.00 percent. Examination papers will be collected 6 hours after the examination begins.

Applicant Certification

All work done on this examination is my own. I have neither given nor received aid.

Applicant's Signature

Results

Examination Value _____ Points

Applicant's Score _____ Points

Applicant's Grade _____ Percent

U.S. Nuclear Regulatory Commission
Site-Specific SRO Written Examination

Applicant Information

Name: _____

Date: _____

Facility/Unit: _____

Region: I ☐ II ☐ III ☐ IV ☐Reactor Type: W ☐ CE ☐ BW ☐ GE ☐

Start Time: _____

Finish Time: _____

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. To pass the examination you must achieve a final grade of at least 80.00 percent overall, with 70.00 percent or better on the SRO-only items if given in conjunction with the RO exam; SRO-only exams given alone require a final grade of 80.00 percent to pass. You have 8 hours to complete the combined examination, and 3 hours if you are only taking the SRO portion.

Applicant Certification

All work done on this examination is my own. I have neither given nor received aid.

Applicant's Signature

Results

RO/SRO-Only/Total Examination Values _____ / _____ / _____ Points

Applicant's Scores _____ / _____ / _____ Points

Applicant's Grade _____ / _____ / _____ Percent

[illegible]

ES-402
ADMINISTERING INITIAL WRITTEN EXAMINATIONS

A. Purpose

This standard specifies the requirements and procedures for administering written examinations for the initial licensing of reactor operator (RO) and senior reactor operator (SRO) applicants at power reactor facilities. As such, this standard includes instructions for proctoring the examinations and conducting post-examination reviews of NRC-developed examinations.

B. Background

As noted in ES-201, "Initial Operator Licensing Examination Process," facility licensees will generally prepare the written operator licensing examinations, subject to review and approval by the NRC. Generally, examinations that are prepared by the facility licensee will also be administered by the facility licensee in accordance with the instructions contained herein.

C. Responsibilities

1. Facility Licensee

- a. The facility licensee shall safeguard the integrity and security of the examinations in accordance with ES-201.
- b. The facility licensee shall provide a single room suitable for administering the written examination. To ensure examination integrity, the room shall be large enough so that there is only one applicant per table, with a 1-meter (3-foot) space between tables.

The examination room and supporting restroom facilities (i.e., the examination area) shall be located to prevent the applicants from having contact with all other facility and contractor personnel during the written examination.
- c. If desired and compatible with examination security requirements, the facility licensee may arrange for the applicants to have lunch, coffee, or other refreshments during the examination.
- d. Before the scheduled examination date, the facility licensee should familiarize the applicants with the examination policies and guidelines contained in Appendix E.
- e. The facility licensee shall provide the necessary number of copies of the approved examinations, answer sheets, and handouts (e.g., equation sheets, selected technical specifications, and steam tables) for each applicant,

as directed and approved by the NRC chief examiner. An English dictionary should also be available in the examination room.

The facility licensee may use machine-gradable answer sheets if desired, but this is *not* required.

- f. If the facility licensee developed the examination, it shall also administer the examination to the applicants identified on the "List of Applicants" (Form ES-201-4) as arranged with the NRC chief examiner and in accordance with the specific instructions in Section D.
- g. The facility licensee will send a letter to the NRC regional administrator to formally withdraw the applications of any individuals whose names appear on Form ES-201-4 but who will not be taking the examination.
- h. As discussed in Section E, the facility licensee should provide the NRC's regional office with formal comments for consideration during the grading process (refer to ES-403, "Grading Initial Site-Specific Written Examinations"). The facility licensee may also request an informal meeting with the NRC's chief examiner to discuss the examination questions and resolve facility concerns.

2. NRC Regional Office

- a. The NRC's regional office may administer the examination, at its discretion, in accordance with the specific instructions in Section D, even if the examination was developed by the facility licensee. However, the regional office will generally arrange for the facility licensee to administer the examination. (Refer to ES-201 for further instructions on examination scheduling.)

If the NRC developed the examination, the regional office may arrange for an NRC examiner or the facility licensee to administer the examination.

- b. If the facility licensee will conduct the examinations while the NRC examiners are on site, the chief examiner should inspect the examination facilities to ensure their adequacy. In addition, the NRC examiners should periodically monitor the exam to ensure that the proctor is appropriately addressing the applicants' questions. If this is not feasible, the regional office should consider having an examiner check the facilities during the preparatory site visit (if one is deemed necessary) or upon arriving at the site for the operating tests.

If the facility licensee will conduct the examinations when no NRC examiners are on site, the chief examiner will ensure that an NRC point of contact is available in the regional office to respond to facility questions while the examinations are being given. If the NRC prepared the examination, an examiner familiar with the examination content must be available to respond to the applicants' questions by telephone.

The written examinations may be administered as soon as they and the license applications (including any applicable waivers) have been approved. The region shall not allow the written examination and operating test dates to diverge by more than 30 days without obtaining concurrence from the NRR operator licensing program office. (Refer to ES-201 for additional guidance regarding examinations that have to be rescheduled to achieve an acceptable product.)

- c. When the applicants have completed the written examination, the chief examiner may conduct an examination review with the facility staff as described in Section E, below.

D. Examination Administration Instructions

1. Make Preparations

- a. Arrange for the applicants to be proctored at all times while taking the written examination. Ensure that the proctor clearly understands his or her responsibilities (refer to Section D.2) before the examinations are distributed.

If the NRC will administer the examinations, the chief examiner should consider using the following resources to ensure adequate proctoring:

- NRC secretarial help
- another examiner
- other NRC employees

The examiner may arrange for facility employees to proctor the examination for brief periods if it is necessary for the examiner to go to the restroom.

- b. At least one individual who is familiar with the intent of the questions (i.e., an NRC examiner or facility employee who took part in developing the examination) shall be available to clarify examination questions for the applicants during the examination.
- c. Remove from the examination area, or otherwise remove from the applicants' view, any wall charts, models, or other training materials that might compromise examination integrity.
- d. Only NRC-approved applicants are allowed to take the examination. If applicable, the NRC examiner shall verify each applicant's identity and examination level against Form ES-201-4 before beginning the examination. Any errors or absences shall be resolved with the facility staff, and the form shall be updated as required.
- e. If possible, the RO and SRO applicants shall be seated at alternate tables. The proctor shall construct a chart illustrating the seating arrangement of the applicants during the examination.

- f. If the applicants will record their answers on machine gradable forms that offer more than four answer choices (e.g., "a" through "e"), use a straight edge to line out the inapplicable column(s) before distributing the forms.

2. Start the Examination

- a. Remind the applicants that they may use calculators to complete the examination, and that only reference materials provided with the examination are allowed in the examination area (i.e., the examination room and supporting restroom facilities).
- b. Pass out the examinations, blank answer sheets, and all required handouts approved by the NRC chief examiner (e.g., steam tables, equation sheets, and selected technical specifications). Instruct the applicants not to review the examination until told to do so.
- c. Provide each applicant with a copy of Appendix E, "Policies and Guidelines for Taking NRC Examinations," and brief the applicants on the rules and guidelines that will be in effect during the written examination (i.e., review Parts A and B of Appendix E). If time permits and the operating tests have not yet been administered, review those policies and guidelines (i.e., Parts C, D, and E of Appendix E) as well; this will save time later and give the applicants greater opportunity to resolve any questions they may have.
- d. Instruct the applicants to verify the completeness of their copies by checking the appropriate cover sheet (Form ES-401-7, ES-401-8, or ES-701-8) and each page of the examination. RO applicants should have a 75-question exam and SROs should have a 100-question exam, unless they have obtained a waiver (per ES-204, "Processing Waivers Requested by Reactor Operator and Senior Reactor Operator Applicants") to upgrade their RO licenses with a 25-question SRO-only exam or they are taking the 40-question SRO examination limited to fuel handling.
- e. Answer any questions that the applicants may have regarding the examination policies. Start the examination, and record the time.

3. Monitor the Examination

- a. The proctor shall give full attention to the applicants taking the examination. The proctor shall not read procedures or other material, grade examinations, or engage in any other activities in a manner that may divert his or her attention from the applicants and possibly cause the examination to be compromised.
- b. Personnel responding to questions raised by applicants during the examination must be extremely careful not to lead the applicants or give away answers when clarifying questions. If the proctor has any doubt about how to respond to an applicant's question, it is best to withhold additional guidance and instruct the applicant to do his or her best with the information that is provided.

Any question changes or clarifications shall be made on a chalk board or white board, if available, and called to the attention of all the applicants. Changes made to questions during the examination should be made in ink on the NRC's master copy and a copy that is retained by the facility staff after the examination is administered. Changes shall be reviewed and approved by the NRC's chief examiner as part of the grading process (refer to ES-403).

All applicant questions regarding specific written examination test items and all statements of clarification shall also be documented (verbatim if possible) for future review by the NRC's chief examiner and for reference in resolving grading conflicts.

- c. The proctor shall periodically advise the applicants of the time that remains to complete the examination. Normally, a chalk board or white board is available and can be used for this purpose.

4. Complete the Examination

- a. As the applicants complete the examination, ensure that they sign the examination cover sheet and staple it on top of their answer sheets. Collect the examination packages, including the questions and answer sheets, and any reference material provided with the examination. Verify that all applicants have entered their names on both the answer and cover sheets, and record the official start time and the time at which each applicant completed the examination in the space provided on the examination cover sheet.
- b. Retain the cover and answer sheets for grading in accordance with ES-403. The question books may be distributed to the applicants after the last examination has been collected.
- c. Remind the applicants to leave the examination area, as previously defined.
- d. When the allotted time for the examination (3 hours for the 25-question SRO-upgrade exam, 4 hours for the SRO exam limited to fuel handling, 6 hours for the RO exam, and 8 hours for the combined RO/SRO exam) has elapsed, instruct the remaining applicants to stop work, sign their examination cover sheets, and turn in their examinations. The facility licensee may extend the time allowed to complete the examination, but shall first notify the NRC's regional office to ensure that a point of contact remains available to respond to questions. The facility licensee shall inform the NRC when all of the applicants have completed the examination.
- e. Deliver the completed examination packages, the marked-up master examinations, the list of applicant questions and answers, and the seating chart to the NRC's chief examiner or the appropriate facility representative, as applicable, for review and grading in accordance with ES-403.

E. Post-Examination Reviews

1. If the NRC administered the examination, the chief examiner shall ensure that the master copy of the examination reflects all changes made to questions during the administration of the examination. The chief examiner will then provide a copy of the master examination and answer key to the facility staff and answer any questions they may have regarding the NRC's examination review and comment process.
2. If the NRC developed the examination, the chief examiner will also provide the facility licensee with a copy of the examination as edited during the facility prereview. If the facility reviewers believe that the NRC did not adequately resolve the prereview comments, they should address those concerns in a formal comment letter.
3. The NRC's chief examiner will ask the facility prereviewers to confirm that they did not divulge any information about the examination(s) by having them sign the post-examination security statement (Form ES-201-3) after the examinations are completed.
4. The facility licensee should submit formal comments within 5 working days after the examination is administered. However, the facility licensee may expedite the grading process by giving draft comments to the NRC chief examiner before he or she leaves the site. The NRC will consider comments not submitted within the requested time on a case-by-case basis; however, late comments may delay the examination grading process.

The facility licensee should collect all comments from the license applicants and submit them to the NRC. When submitting applicant comments to the NRC, the facility licensee should identify by docket number which applicant made the comment (which may be useful to the NRC should the applicant request an informal review or a hearing), and include a facility position for each applicant comment. Note that the NRC examination report (refer to ES-501, Section E.3) will not identify examination comments by applicant docket number.

5. The facility licensee should submit all comments in the following format:
 - List the question, answer, and reference.
 - State the comment and make a recommendation as to whether the answer should be changed or the question should be deleted. If the facility licensee does not support an applicant's comment, it should briefly explain the reason for its rejection.
 - Support the comment with a reference, and provide a copy if it was not included in the original reference material submittal. (Note: The NRC will not change the examination without a reference to support the facility's comment.)
6. Formal comments should be signed by an authorized facility representative and addressed to the responsible NRC regional office, with a copy to the NRC's chief examiner.
7. Although the NRC will review all post-examination comments submitted by a facility licensee, the agency is likely to approve only certain kinds of comments. In the interest of efficiency, facility licensees should consider the guidance contained in ES-403 Section D.1, before submitting post-examination comments to the NRC.

ES-403

GRADING INITIAL SITE-SPECIFIC WRITTEN EXAMINATIONS

A. Purpose

This standard explains the requirements and procedures for grading site-specific written examinations for the initial licensing of reactor operator (RO) and senior reactor operator (SRO) applicants at power reactor facilities. As such, this standard includes instructions for evaluating and revising the examinations after they are administered, grading the examinations, and conducting the first review of the graded examinations.

B. Background

As discussed in ES-201, "Initial Operator Licensing Examination Process," facility licensees will generally develop and administer the initial operator licensing written examinations, subject to review and approval by the NRC. Facility licensees will also be expected to grade the written examinations; evaluate the outcome; and submit the examination results to the responsible NRC regional office for review, approval, and licensing action in accordance with ES-501, "Initial Post-Examination Activities."

C. Responsibilities

1. Facility Licensee

- a. If the facility licensee developed and administered the written examinations, the licensee is also expected to perform the following grading activities, as described in Section D:
 - Review and resolve any questions and comments that arose during and/or after the examination (refer to ES-402, "Administering Initial Written Examinations").
 - Grade the examinations and review the grading using Form ES-403-1, "Written Examination Grading Quality Checklist."
 - Evaluate the applicants' performance on the examination.

Facility management will review the examination grading based on the guidance in ES-501 and will forward the graded examinations and all associated documentation to the NRC's chief examiner so that it is received, when practical, within 5 working days after the examination was administered.

- b. If the NRC developed the examinations, the facility licensee's responsibility is limited to providing the NRC's chief examiner with comments and recommendations regarding question deletions and answer key changes. Such comments and recommendations should normally be received within

5 working days after the exit meeting; any delay in submitting the comments will likely result in a comparable delay in the final licensing actions. (Refer to ES-402 for additional instructions regarding the post-examination review and comment process.)

2. NRC Regional Office

- a. If the facility licensee grades the examinations, the regional office shall provide guidance and assistance, as necessary, to ensure that the facility licensee complies with the instructions in Section D.
- b. If the NRC developed the examinations, the regional office should grade the examinations in accordance with Section D after receiving any comments and recommendations from the facility licensee (refer to ES-402). The regional office may take advantage of the facility licensee's machine grading capability if it is available.
- c. After the examinations have been graded, the regional office shall review the grading, process the documentation, and complete the licensing actions in accordance with ES-501.

D. Grading Instructions

The author of the examination should normally grade the examination; however, the examination may be graded by another equally qualified individual if the author is not available, the number of applicants is unusually large, or the NRC regional office or facility licensee wishes to expedite the grading process. The examinations shall be graded as expeditiously as possible, in accordance with the following instructions:

1. Evaluate Questions and Comments

- a. Evaluate all questions posed by applicants during the examination, any pen-and-ink changes made on the master examination during its administration, and any post-examination comments or recommendations received from the facility licensee and applicants after the examination was administered. Determine whether any questions should be deleted from the examination, or any answers need to be changed. Do not delete any question or change any answer unless there is a valid reference to support the change. An unreasonable assumption on the part of an applicant does not justify the acceptance of an alternative answer.

If there is some doubt as to whether the NRC's chief examiner will accept a proposed change, the grader is encouraged to discuss the matter with the chief examiner before proceeding with the grading process. This may help to minimize the need for grading corrections during the quality reviews.

For each comment and recommendation, the NRC's chief examiner shall document the reason that the question was changed or the comment

was not accepted; this information will be included in the examination report, as discussed in ES-501.

- b. Despite the extensive reviews performed by both the NRC and the facility licensee prior to examination administration (refer to ES-201, Attachment 5), it is possible that a few isolated errors may be discovered only after an examination has been administered. The following types of errors, if identified and adequately justified by the facility licensee, are most likely to result in post-examination changes agreeable to the NRC:

- a question with an unclear stem that confused the applicants or did not provide all the necessary information
- unintended typographical errors in a question or on the answer key
- newly discovered technical information that supports a change in the answer key
- a question that is at the wrong license level (RO versus SRO) or not linked to job requirements

Given that both the NRC and the facility licensee agreed that the examination met NUREG-1021 prior to examination administration, the following types of question errors, identified *after* examination administration, are less likely to result in examination changes:

- a question which does not exactly match its referenced K/A statement
- a question for which references would be needed to provide the correct answer, even though the facility licensee and the NRC previously agreed that the question should be closed-reference.
- a question that contains psychometric errors that do not increase its difficulty or make the question confusing. For example, a question with two implausible distractors or a collection of true false answers would be unsatisfactory during examination pre-review, but neither problem would justify deleting a question after examination administration.

Although the NRC will review all post-examination comments submitted by a facility licensee, in the interest of efficiency, facility licensees should consider the above examples prior to submitting post-examination comments to the NRC. Facility licensees with post-examination comments are encouraged to discuss them with the chief examiner prior to formally submitting any comments in writing.

- c. If it is determined that there are two correct answers, both answers will be accepted as correct. If, however, both answers contain conflicting information, the question will likely be deleted. For example, if part of one answer states that operators are required to insert a manual reactor scram, and part of another

answer states that a manual scram is not required, then it is unlikely that both answers will be accepted as correct, and the question will probably be deleted.

If three or more answers could be considered correct or there is no correct answer, the question shall be deleted.

Annotate the recommended changes on the master examination and answer key, and document the reason for every change or deletion.

- d. Those applicant questions, facility comments, and recommendations that do not result in answer key changes or question deletions, should be evaluated to determine whether the associated test questions might benefit from editorial changes before they are used on another examination.
- e. Before depositing the questions in any examination bank, revise the questions to incorporate all changes, comments, and enhancements, as appropriate.

2. Grade the Examinations

- a. Copy each applicant's answer sheet, and set the copies aside for later use during the grading review process.
- b. On each applicant's original answer sheet, indicate in *red pen or pencil* which questions were answered incorrectly, note their correct answers, and indicate which questions (if any) were deleted. If the answer sheet is more than one page long, it is helpful to note the total number of incorrect answers on each page to aid in tabulating the final grade.

If the examinations are graded by machine, attach a copy of each applicant's profile report to his or her answer sheet, or manually annotate the answer sheet as noted above.
- c. If it is necessary to change a grade during the grading process, do so by lining out the original grade in such a way that it remains legible. Briefly explain the reason for the change on the applicant's answer sheet, and initial the change. Under no circumstances will a grader use "white-out" or other methods that obscure the change.
- d. After grading all the questions, enter the applicable "Examination Value(s)" (i.e., the original test point total minus the point value of any deleted questions) for the RO, SRO-only, and overall exams in the "Results" section of the applicant's written examination cover sheet (Form ES-401-7 for ROs, ES-401-8 for SROs, or ES-701-8 for SROs limited to fuel handling). Also enter the "Applicant's Score" and "Applicant's Grade" (i.e., the Applicant's Score divided by the Examination Value) on each part of the examination (RO, SRO, and overall) in the spaces provided on the form.

If a facility chooses to share its preliminary grades with the applicants, it should caution them that the outcome may change if the NRC does not accept all of the facility licensee's recommended changes to the examination answer key.

3. Evaluate and Review the Grading

- a. Evaluate the applicants' performance on each examination question to identify any indications of a problem with the question or a deficiency in the applicants' training program. A table that summarizes the applicants' answers on each question, or a computerized item analysis (if the examinations were graded by machine) may be used to identify items with which the applicants had problems.

If it appears that a test question was faulty, determine whether the question should be deleted, the answer key should be changed, and/or the question should be revised before reuse. Then regrade the examinations as necessary.

If it appears that the training program was deficient, determine the need for remedial training and/or a program upgrade.

- b. After evaluating the examinations, review the grading *in detail* and complete Form ES-403-1, "Examination Grading Quality Checklist."
- c. Forward the examination package (i.e., the master examination and answer key, justification for any examination changes, any item analysis that was performed, the applicant's examination cover and answer sheets (the graded original and one clean copy), and Form ES-403-1) to the designated facility representative (if applicable) or to the NRC's chief examiner for review in accordance with ES-501.

E. Attachments/Forms

Form ES-403-1, "Written Examination Grading Quality Checklist"

Facility:		Date of Exam:		Exam Level: RO SRO	
Item Description	Initials				
	a	b	c		
1. Clean answer sheets copied before grading					
2. Answer key changes and question deletions justified and documented					
3. Applicants' scores checked for addition errors (reviewers spot check > 25% of examinations)					
4. Grading for all borderline cases (80 \pm 2% overall and 70 or 80, as applicable, \pm 4% on the SRO-only) reviewed in detail					
5. All other failing examinations checked to ensure that grades are justified					
6. Performance on missed questions checked for training deficiencies and wording problems; evaluate validity of questions missed by half or more of the applicants					
Printed Name/Signature		Date			
a. Grader	_____	_____			
b. Facility Reviewer(*)	_____	_____			
c. NRC Chief Examiner (*)	_____	_____			
d. NRC Supervisor (*)	_____	_____			
(*) The facility reviewer's signature is not applicable for examinations graded by the NRC; two independent NRC reviews are required.					

ES-501

INITIAL POST-EXAMINATION ACTIVITIES

A. Purpose

This standard describes and coordinates the activities that must be completed after the initial operating tests and written examinations have been administered and graded in accordance with the ES-300 and ES-400 series of the examination standards, respectively. Specifically, this standard includes instructions for assembling and reviewing the examination package, notifying the facility licensee and applicants of the examination results, preparing the examination report, and retaining examination records.

B. Background

The goal of the NRR operator licensing program office is to complete licensing or denial actions within 30 days after the facility licensee submits the graded examinations or its formal written examination comments to the NRC. The NRC and facility licensee staffs should establish their priorities and schedules to achieve this goal.

C. Responsibilities

1. Facility Licensee

- a. If the facility licensee participated in developing, administering, and grading the examination, the licensee shall forward the following examination documentation to the NRC's chief examiner (marked "addressee only") as soon as possible (within 5 working days, when practical) after administering the examinations:
 - the graded written examinations (i.e., each applicant's original answer and examination cover sheets) plus a clean copy of each applicant's answer sheet (ES-403, "Grading Initial Site-Specific Written Examinations")
 - the master examination(s) and answer key(s), annotated to indicate any changes made while administering and grading the examination(s) (ES-402, "Administering Initial Written Examinations," and ES-403)
 - any questions asked by and answers given to the applicants during the written examination (ES-402)
 - any substantive comments made by the applicants following the written examination, with an explanation concerning why the comment was accepted or rejected (this item is encouraged but not required) (ES-402)
 - the written examination seating chart (ES-402)

- a completed Form ES-403-1, "Written Examination Grading Quality Checklist" (ES-403 and Section D.1)
- the results of any written examination performance analysis that was performed, with recommended substantive changes (ES-403)
- original Form(s) ES-201-3, "Examination Security Agreement," with a pre- and post-examination signature by every individual who had detailed knowledge of any part of the operating tests or written examination before they were administered.

Refer to the referenced examination standards for a more detailed discussion of each documentation requirement.

- b. If the facility licensee did not participate in developing, administering, and grading the examination, the licensee should submit comments and recommendations regarding the NRC-developed written examination to the NRC's regional office as soon as possible (within 5 working days, when practical) after the exit meeting. The facility licensee should also include and consider comments made by the license applicants who took the examination. (Refer to ES-402 for more detailed instructions.)

2. **NRC Regional Office**

- a. The NRC's regional office shall ensure that the operating tests and written examinations are graded in accordance with ES-303, "Documenting and Grading Initial Operating Tests," and ES-403, respectively.
- b. The NRC's regional office shall ensure that the examination results and licensing recommendations receive the required reviews and approvals in accordance with Section D, that the associated administrative requirements are completed in accordance with Section E, and that the required records are retained in accordance with Section F.

The regional office may use Form ES-501-1, "Post-Examination Check Sheet," to track completion of the administrative items after the examinations are administered.

- c. NRC regional management should also review the overall examination results and any generic findings, deficiencies, or issues to determine whether any followup action is required.

If the facility licensee recommends deleting or changing the answers to four or more of the questions on an RO written examination (or two or more on an SRO-only exam) that it developed, the regional office should ask the facility licensee to explain why so many post-examination changes were necessary and what actions will be taken to improve future license examinations. As discussed in Section E.3.a, below, the regional office

will also consider post-examination deletions and changes when evaluating the quality of the facility licensee's proposed examination for documentation in the examination report.

If seven or more of the questions on an RO examination (or two or more on an SRO-only exam) are deleted during the grading process, the regional office shall evaluate the remainder of the examination to ensure that it still satisfies the test outline sampling requirements in ES-401, "Preparing Initial Site-Specific Written Examinations." The regional office should consult with the training and assessment specialist in the NRR operator licensing program office if the validity of the examination is in question.

If the content validity of the examination is affected [e.g., several knowledge and ability (K/A) topics are not covered, or the majority of the remaining K/As are associated with a small number of systems) as a result of deleting questions, the NRR operator licensing program office will make a decision concerning whether the examination should be voided.

D. Examination Reviews and Licensing Action

Except as noted below, the quality reviews generally constitute spot checks, or sampling, to follow up on the work performed by the operating test and written examination graders in accordance with ES-303 and ES-403, respectively. If the quality reviews indicate significant problems, additional detailed review will be necessary.

Reviewers should discuss all grading discrepancies with the grader or previous reviewer before making any changes. In addition, the reviewers shall document any changes by carefully lining out the original entry so that it remains legible, entering the revision with a brief explanation, and initialing the change. Reviewers shall not use "white-out" or other methods that obscure the original entry.

1. Facility Management

If the facility licensee graded the written examinations, a supervisor or manager shall confirm the quality of the grading and sign the bottom of Form ES-403-1 before sending the examinations to the NRC's regional office.

The NRC will consider the signed form to represent facility management concurrence with the individual and collective examination results, including the justification(s) for any examination change(s).

2. NRC Chief Examiner (or Designee)

The written examination grading shall be independently reviewed by at least two NRC personnel using Form ES-403-1 as a guide. If the examination was graded by the chief examiner, another examiner shall conduct the independent review. If the chief examiner conducts the independent review, he or she may not perform the supervisory review required by Section D.3.

- a. If the facility licensee graded the written examinations, the chief examiner shall immediately inventory the examination package to ensure that all required materials have been submitted. The chief examiner shall inform the responsible supervisor of any obvious deficiencies, and shall contact the facility licensee to determine the status of any missing documentation.
- b. The chief examiner shall independently analyze *each* examination and answer key change that was made or recommended by the facility licensee or a license applicant to determine whether it is justified. During the analysis, the chief examiner will keep in mind that both the facility licensee and the NRC had previously agreed that the examination met the requirements of NUREG-1021 (refer to ES-201, Attachment 5). Therefore, as discussed in Section D.1 of ES-403, certain kinds of post-examination comments and recommendations are less likely to justify grading or answer key changes.

The chief examiner shall ensure that the reason for accepting or rejecting each change or recommendation is documented in the examination report. The report shall briefly state the region's basis for accepting or rejecting each facility comment; simply stating concurrence with no explanation is not sufficient. The chief examiner will not accept a change to the examination unless the facility licensee submits a valid reference to support its recommendation.

- c. The chief examiner shall review the remaining items on Form ES-403-1. In so doing, the chief examiner should apply his or her judgment when reviewing the examination results and should adjust the level of the review based on the performance of the applicants and the facility licensee (e.g., the number of questions changed or deleted, the average grade, the number of borderline or failing grades, etc.). If the examination was graded by machine or using a template, the chief examiner shall ensure that the template accurately parallels the approved answer key.

The chief examiner shall independently grade every borderline examination [i.e., those between 78 and 82 percent overall and between 66 and 74 percent on the SRO-only portion (or 76 and 84 percent if the RO portion was waived), as applicable] using the final, approved answer key and the clean applicant answer sheets provided by the facility licensee.

- d. The chief examiner should review the written examination results and the facility licensee's performance analysis (if applicable) for indications of the following:
 - deficiencies in the applicants' training program, so that they may be addressed in the examination report

- poor question construction, so that the applicants are not graded unfairly, any significant problems can be addressed in the examination report, and the questions are corrected before reuse
 - any indications that the examination was compromised
- e. When satisfied with the examination grading, the chief examiner and written examination grader/reviewer (as applicable) shall complete the following actions:
- Sign and date Form ES-403-1 and pass it on to the responsible supervisor for management review (see Section D.2.h).
 - Record the written examination results (including RO, SRO, and total points and grades from each applicant's Form ES-401-7, ES-401-8, or ES-701-8) and the names of the NRC examiners who wrote, graded, or reviewed the examinations in the "Written Examination Summary" section of each applicant's Form ES-303-1, "Individual Examination Report."
 - Check the written examination "Pass," "Fail," or "Waive" block in the "Examiner Recommendations" section of each applicant's Form ES-303-1 and sign in the space provided. In order to pass the examination, applicants must achieve an overall grade of at least 80.00 percent, with a 70.00 percent or better on the SRO-only items, if applicable. Applicants who only take the SRO portion of the exam (as a retake or with an upgrade waiver of the RO exam) must achieve an 80.00 percent or better to pass. SRO-upgrade applicants who do take the RO portion of the exam and score below 80.00 percent on that part of the exam can still pass overall, but may require remediation (refer to Section E.4.a). SRO-instant applicants who pass the operating test and the written examination overall but fail the SRO portion of the written exam are not automatically eligible for an RO license; however, they may reapply for an RO license, and request an examination waiver, after accepting a final denial of their SRO application (refer to Section D.1.a of ES-204, "Processing Waivers Requested by Reactor Operator and Senior Reactor Operator Applicants").
- f. The chief examiner shall also review, *in detail*, the other examiners' operating test documentation to ensure that the test (as given) and its grading meet the requirements in ES-301 and ES-303. In so doing, the chief examiner shall ensure that the other examiners' operating test comments support the pass or fail recommendations and check for consistent documentation and grading among the operators tested on the same simulator crew.

If the documentation is accurate and complete, and the licensing recommendation is appropriate, the chief examiner shall check "Pass" or "Fail" and sign and date the "Final Recommendation" block on Form ES-303-1. By contrast, if the licensing recommendation is not appropriate based on the documentation presented, the chief examiner shall discuss the examination findings with the NRC examiner of record and resolve any disagreement.

If the chief examiner administered the operating test, the responsible regional supervisor shall designate another examiner to independently review the documentation and sign the "Final Recommendation" block on Page 1 of Form ES-303-1.

- g. The chief examiner shall record the results of the operating tests and written examinations (including the RO, SRO, and overall grades for each applicant) on Form ES-501-2, "Power Plant Examination Results Summary."
- h. The chief examiner shall ensure that the examination documentation is complete and contains all of the items identified in Section F before forwarding the entire package to the responsible supervisor for review and approval in accordance with Section D.3.

If the written examinations were administered much before the operating tests, the chief examiner should enter that data on the form and forward it with the completed written examination package to the responsible supervisor for review and approval in advance of the operating test results.

3. NRC Management Review and Licensing Action

- a. The responsible supervisor shall ensure that all examination results and documentation are complete. The supervisor shall evaluate the written examination results, ensure that the required quality reviews were completed, work with the chief examiner and the facility licensee (as necessary) to resolve any grading problems, and then sign and date Form ES-403-1 to document approval of the process.

Every written examination shall have at least two levels of NRC review. Therefore, the NRC examiner who performed the regional quality review is disqualified from also performing the supervisory review.

- b. The responsible supervisor will also independently review the operating test results, check the "Issue License" or "Deny License" block in the "License Recommendation" section of each applicant's Form ES-303-1, and sign and date each form. Under no circumstances will the same individual sign all three levels of recommendation on Form ES-303-1 (i.e., operating test administrator, chief examiner, and NRC supervisor).

If the responsible supervisor (or licensing official) does not believe that the operating test documentation supports the final recommendation, he or she shall consult the NRC examiner of record and the chief examiner to discuss and resolve any disagreements.

As discussed in Section C.2 of ES-303, any operating test licensing recommendation that deviates from the nominal grading instructions in Section D.2 of ES-303 (e.g., recommending a simulator test failure based on a single error with serious safety consequences or a passing grade despite multiple errors related to the same rating factor) requires written concurrence from the NRR operator licensing program office before completing the licensing action.

If a recommendation is overturned during the review by regional management (or the NRR operator licensing program office), the responsible supervisor will line out and initial the affected summary evaluations. The supervisor will then enter the new summary evaluation in the appropriate block, explain the change on Form ES-303-2, "Operating Test Comments," and attach that comment form to the applicant's Form ES-303-1.

- c. After making the licensing recommendations, the responsible supervisor will have the operator licensing assistant prepare a license, denial, or notification letter for each examined applicant and forward the examination package to the regional licensing official. However, the operator licensing assistant shall not send a denial letter to applicants who withdrew before taking any part of the license examination. Attachments 3 and 4 to this examination standard provide sample RO and SRO (conditional) license letters, as well as a sample denial letter.

Attachment 5 to this examination standard is a sample letter for use in notifying applicants that they passed the examination, but that their licensing action will be delayed. For example, if the NRC granted an applicant a waiver and allowed him or her to take the examination before completing all of the training and experience requirements, the regional office shall normally not issue a license to the applicant until the facility licensee has certified in writing that the applicant has completed all of the waived items. (Refer to ES-202, "Preparing and Reviewing Operator License Applications," and ES-204.) Likewise, if any of the applicants failed the written examination, the regional office shall analyze the question-by-question performance of those applicants who scored 82 percent or lower on the examination overall (or 74/84 percent, as applicable, or lower on the SRO-only items) to ensure that any question deletions or changes will not affect the licensing decision. In addition, if necessary, the regional office shall delay issuing licenses to those applicants until any written examination appeals have been reviewed for impact on the licensing decisions.

Before issuing a license in either instance, the regional office shall ensure that the applicant (1) has been determined to be medically fit within the past 24 months; (2) has not developed any permanent physical or mental condition that would be reportable under Title 10, Section 55.25, of the *Code of Federal Regulations* (10 CFR 55.25); and (3) is up-to-date in the requalification training program. Moreover, the regional office shall advise the facility licensee to properly activate the individual's license in accordance with 10 CFR 55.53(f) if more than 3 months have passed since the examination results were issued. If a licensing action is delayed for any reason, the effective date of the license will be the date on which it is issued; licenses will not be backdated.

- d. The final licensing decision is made by the NRC's regional administrator or his or her designee, who must be at or above the branch chief level; short-term designees shall not make licensing decisions. The licensing official will consider all recommendations; make changes as described above; and sign each applicant's license, denial, or notification letter, as applicable.

E. Examination Followup

1. Notify Facility Licensee of Results

The NRC's regional office will notify the facility licensee and applicants of the examination results (as described below) only after they are reviewed and approved by the licensing official.

- a. The regional office should normally notify the facility licensee's designated representative of the examination results by telephone, and may confirm the results by mailing a copy of Form ES-501-2 under a separate cover letter. For each applicant who failed or had significant deficiencies that warrant further evaluation and retraining by the facility licensee, the regional office will also send the facility licensee a copy of the applicant's Form ES-303-1 and written examination answer sheet. These form(s) shall *not* be placed in the NRC's Public Document Room or distributed with the final examination report.

If the written examinations were administered much before the operating tests and management has approved the results of those examinations, the regional office may notify the facility licensee of those results rather than waiting until the operating tests are completed.

- b. After the licensing official has signed the license, denial, and notification letters, the regional office shall send each applicant's letter along with the following materials:
 - a copy of Forms ES-303-1, ES-303-2, and ES-D-1 (and Form ES-D-2 if the applicant failed the simulator operating test) reflecting the "as run" scenario conditions but *without* any rough examiner notes regarding the applicant's performance (pen-and-ink markups of the original, approved scenarios are acceptable)
 - a copy of the applicant's written examination cover and answer sheets (as well as a copy of the master written examination and answer key if the applicant failed the written examination)
- c. The regional office shall send a copy of Form ES-501-2 to the NRR operator licensing program office. If any of the examinations are later regraded in response to an applicant's request for review (refer to ES-502, "Processing Requests for Administrative Reviews and Hearings After Initial License Denial"), the original Form ES-501-2 on file in the regional office shall be corrected by lining out the old grade, entering the new grade, and initialing the change. Whenever a change is made, the regional office shall mail a copy of the revised form to the program office.
- d. The responsible supervisor should consider phoning the facility licensee management counterpart to discuss the examination outcome and lessons learned. Any pertinent feedback on the examination process should be forwarded to the operator licensing program office for consideration.

2. Return the Facility Reference Material

If the facility licensee desires, the NRC's chief examiner shall ensure that the reference materials provided for NRC examiners to use in preparing for the examinations are returned to the facility licensee as soon as possible. If none of the applicants failed the examination, the materials should be returned as soon as the NRC issues the licenses. If any applicant was denied a license based on an examination failure, the reference materials should be retained pending expiration of the 20-day period during which the applicant may request a regrade. If an applicant requests a regrade in accordance with ES-502, the chief examiner shall determine which reference materials need to be retained and should return all unnecessary materials. All reference materials should be returned to the facility licensee within 30 days following the resolution of any appeals.

3. Prepare the Examination Report

The NRC's chief examiner shall prepare the final examination report when all portions of the examination have been graded and documented. If the regional office delays some licensing actions in accordance with Section D.3, it should issue and later amend the examination report. The examiner should follow the principles in NRC Manual Chapter 0612, "Power Reactor Inspection Reports," when preparing the report.

- a. The final examination report shall document the following considerations:
 - whether the quality of the submitted examination material was within the range of acceptability expected by the NRC. This will be determined as follows:
 - The NRC will evaluate the submitted written examination questions (RO and SRO questions shall be considered separately) using the guidance in Sections E.2-3 of ES-401 to determine the percentage of submitted questions that required replacement or significant modification or that clearly did not conform with the intent of the approved K/A statement. Any questions that were deleted during the grading process, or for which the answer key had to be changed, will also be included in the count of unacceptable questions.
 - The NRC will evaluate the submitted operating test material by combining the scenario events and JPMs (e.g., an operating test composed of 5 administrative JPMs, 10 systems JPMs, and 2 scenarios with 6 events or malfunctions each would total 27 proposed test items for evaluation). For the combined total, the NRC will determine the percentage of submitted test items that required replacement or significant modification to conform with the acceptance criteria in Section D of ES-301.

- Note: If the review indicated that a specific event in a scenario did not require significant, discriminatory operator actions, it should not be included in the total unless that event was one of the required minimum events for any of the applicants according to Form ES-301-5 or the entire scenario was inadequate. Specific malfunctions that were added to the scenarios to provide complications or distractions for other events should not be judged solely on their individual merits.
- If 20 percent or fewer of the test items for the submitted operating test, RO written examination, and SRO written examination (assessed separately) required replacement or significant modification, the report will simply state that the facility licensee's submittal was within the range of acceptability expected for a proposed examination. If applicable, an observation shall be included, indicating that the examination changes agreed upon between the NRC and the facility were made according to NUREG-1021.
- Note: NRC-validated questions, JPMs, and scenario events that required replacement or substantial modification will not be counted unless the facility licensee caused the current unacceptable flaw since the time the NRC previously approved the test item. (For example, the question's reference changed, but the question was not revised accordingly.)
- If more than 20 percent¹ of the submitted test items (with the operating test and RO/SRO written exams assessed separately) required replacement or significant modification, the report shall include a factual description of the test item changes (observations), including the number and types of test items replaced and/or significantly modified as a result of the joint NRC and facility licensee examination review process. The report shall also note that the overall submittal was outside the acceptable quality range expected by the NRC and that future examination submittals should incorporate any lessons learned from this effort.
- Negative observations regarding the adequacy of the facility licensee's proposed examination (e.g., stating that the proposed examination was not adequate for administration) shall only be made if the examination was not the facility's first submittal and the NRR operator licensing program office has concurred in the evaluation.

¹ Note that the nominal 20 percent threshold may be raised or lowered, based on the specific circumstances, with NRR operator licensing program office concurrence. For example, no comment may be warranted if the same error was made in a number of questions; conversely, a comment may be warranted based on the egregious nature of the deficiencies even though the 20 percent threshold was not reached.

- any delay in administering the examination and the reason for the delay, and any extensions of the written examination time beyond the nominal time limits specified in ES-402
- the results of the examination, including any significant grading deficiencies if the facility licensee graded the examinations
- an overview of the examination security measures and activities evaluated while preparing and administering the examinations and any examination security issues and incidents or other matters requiring facility attention

Note that initial examination security issues will generally be documented in the examination report if (1) the potential or actual compromise was discovered while developing the examination and resulted in replacing or modifying any proposed test item(s); (2) the potential or actual compromise was discovered after the examination was administered, but would have resulted in replacing or modifying test items if the NRC had known about it earlier; (3) two or more lesser security issues were discovered, but did not necessitate the replacement of test material; or (4) other security issues were discovered with extenuating circumstances (with concurrence from the NRR operator licensing program office).

- any other issues or findings discussed at the exit meeting

b. The report shall include (or cite the accession number for) the following items, as applicable:

- a copy of the final written examination(s) and answer key(s) with all changes (during and post-examination) incorporated
- a copy of the facility licensee's (and applicants') specific comments and recommended changes regarding the operating tests and written examination that were administered. If applicant comments were submitted, redact the applicant docket number from the examination report. The NRC regional office shall retain a non-redacted version, indicating applicant docket numbers, until any informal administrative reviews or hearings are complete (refer to ES-502).
- the specific NRC explanation for accepting or rejecting each facility recommendation and a specific justification for every additional item deletion or change (refer to Attachment 1 for examples of facility comments and NRC resolutions)
- a simulator fidelity report (as described below, when applicable)

Generic comments submitted by the facility licensee about the examinations or the administration process should also be included in the report, accompanied by regional office responses, as appropriate.

- c. The simulator fidelity report shall document the NRC examiners' evaluation of the performance or fidelity of the simulation facility during the preparation or conduct of the operating tests. Attachment 2 provides a sample report.

All previously undocumented simulator deficiencies encountered while preparing or conducting the operating tests should be described in sufficient detail to allow followup the next time the NRC staff conducts Inspection Procedure (IP) 71111.11, "Licensed Operator Requalification Program," at the facility. The NRC examiners may include in the simulator fidelity report any concerns about physical fidelity (hardware or equipment discrepancies) or functional fidelity (performance of the simulation facility during normal, surveillance, abnormal, or emergency events). Each deficiency should include a description of the operation, event, or transient that was in progress, and how the simulation facility failed to accurately model the expected performance of the reference plant.

- d. The applicants' names and specific grades (i.e., Form ES-501-2) shall *not* be published in the examination report.
- e. The NRC's regional office shall send the final examination report to the facility licensee and ensure that a copy is made available to the public.

4. **Perform Other Activities**

- a. If an applicant did not complete the SRO upgrade training program or failed the upgrade examination, regional management should ensure that the RO licensee complies with the requirements of 10 CFR 55.53(e), (f), and (h) and 10 CFR 55.59(a) before resuming active duties as an RO.

Similarly, the regional office should ensure that SRO upgrade applicants who did not participate in RO requalification training while they were enrolled in the upgrade training program comply with 10 CFR 55.59(a). If an applicant missed the annual operating test and/or the comprehensive written requalification examination required by 10 CFR 55.59(a)(2) and then did not take the RO portion of the written licensing examination, the applicant must complete additional training in accordance with 10 CFR 55.59(b) and must make up the missed requalification examination to verify proficiency in the 10 CFR 55.41 topics before resuming licensed duties as an RO **or an SRO** (which requires testing on both 10 CFR 55.41 and 55.43 items). However, the NRC would consider the requirements of 10 CFR 55.59(a)(2)(i) to be satisfied if the applicant repeats the applicable portions (to be determined using a systematic approach) of the license training program and passes a comprehensive audit examination covering the topics required by 10 CFR 55.41.

SRO applicants who passed the written examination overall but scored below 80 percent on either the RO or SRO-only portion will require additional review to determine the nature of their deficiencies and the need for additional training. Pursuant to 10 CFR 55.7, the NRC may, by rule, regulation, or order, impose upon any licensee additional requirements deemed appropriate or necessary to protect public health and to minimize danger to life and property. If the SRO applicant's deficiencies pose such a threat, the NRC may require

the facility licensee to provide remedial training and reevaluation and to submit evidence of its completion to the NRC.

- b. Once the licensing decisions are complete, the NRC examiners should discard any marked-up documentation or rough notes for those applicants who receive licenses (except as noted below). In accordance with ES-502, NRC examiners should retain all applicable notes and documentation associated with proposed denials until the denials become final; this may include simulator operating test notes regarding crew members who passed the test if the notes contain information relevant to the failing applicant's performance. Examiners are advised that such notes would be subject to disclosure if requested under the Freedom of Information Act.
- c. Agency policy requires that all documents that are not classified, proprietary, sensitive or otherwise protected (e.g., under the Privacy Act or Freedom of Information Act) must be made available to the public. Therefore, the NRC's regional office shall ensure that all documents associated with the licensing examination (i.e., those listed in Section F.1, below), excluding those containing the applicants' names or grades, are placed in the NRC's Public Document Room as soon as possible after the examinations have been completed. NRC Manual Chapter 0620, "Inspection Documents and Records," and SECY-04-0191, "Withholding Sensitive Unclassified Information Concerning Nuclear Power Reactors from Public Disclosure," provide additional policies and guidance in this area.

F. NRC Record Retention

- 1. The NRC's regional office shall ensure, for the most recent initial examination at each facility, that originals (whenever possible) or copies of the following items either are retained in the facility's master examination file or are electronically available via the NRC's Agencywide Documents Access and Management System (ADAMS). The italicized items should be retained or available for the last two examinations at each facility so that examiners can verify compliance with the guidelines for test item repetition.
 - a. ES-201, Attachment 4, "Corporate Notification Letter"
 - b. ES-201, Attachment 5, "Examination Approval Letter," with pen-and-ink changes on Form ES-201-4, "List of Applicants," to identify the applicants who were actually examined
 - c. Form ES-201-1, "Examination Preparation Checklist"
 - d. the written examination and operating test outline(s), along with Form ES-201-2, "Examination Outline Quality Checklist," and Form ES-401-4, "Record of Rejected K/As" (or the equivalent LSRO forms from ES-701)
 - e. the proposed NRC- or facility-developed operating tests and written examination (including comments made by the facility licensee or the NRC, as applicable)
 - f. *the final written examination and answer key with all changes incorporated* (the pen-and-ink corrections made for the applicants while the examination

was administered may be changed to typewritten corrections; however, all changes shall be annotated in such a way that they are evident),

Forms ES-401-6, "Written Examination Quality Checklist," and ES-401-9, "Written Examination Review Worksheet" (or the equivalent LSRO forms from ES-701), and any reference handouts (or a list thereof) provided to the applicants

- g. *the as-given scenarios including Forms ES-D-1, "Scenario Outline," and ES-D-2, "Required Operator Actions," for each scenario set administered, as well as the as-given walk-through tests including Forms ES-301-1, "Administrative Topics Outline," and ES-301-2, "Control Room/In-Plant Systems Outline," and the JPMs for each walk-through test (all record copies should reflect the "as run" test conditions; pen-and-ink markups of the original, approved forms are acceptable)*
 - h. for each operating test administered, Form ES-301-3, "Operating Test Quality Checklist," Form ES-301-4, "Simulator Scenario Quality Checklist," Form ES-301-5, "Transient and Event Checklist," and Form ES-301-6, "Competencies Checklist" (or the equivalent LSRO forms from ES-701)
 - i. Form ES-403-1, "Written Examination Grading Quality Checklist"
 - j. Form ES-501-2, "Power Plant Examination Results Summary Sheet"
 - k. *the final "Examination Report," with all enclosures*
 - l. Form ES-201-3, "Examination Security Agreements"
2. The NRC's regional office shall place the following items² in each applicant's docket file:
- a. Forms ES-303-1, "Individual Examination Report," ES-303-2, "Operating Test Comments" (original copies, all pages, including strip charts and other attachments that support the licensing decision), and ES-D-1, "Scenario Outline," as well as Form(s) ES-D-2, "Required Operator Actions," if the applicant failed the simulator operating test (all record copies should have the required signatures and reflect the "as run" test conditions; pen-and-ink markups of the original, approved forms are acceptable)
 - b. all correspondence with the applicant
 - c. the applicant's original written examination cover sheet (Form ES-401-7, ES-401-8, or ES-701-8) and answer sheet

² These paper documents are official agency records and need not be placed in ADAMS. If they are placed in ADAMS, the regional office shall exercise caution to ensure that they are not accessible to the public because they contain information that is protected under the Privacy Act.

G. Attachments/Forms

Attachment 1,	"Sample Facility Comments and NRC Resolutions"
Attachment 2,	"Sample Simulator Fidelity Report"
Attachment 3,	"Sample License Letters"
Attachment 4,	"Sample Proposed Denial Letter"
Attachment 5,	"Sample Notification Letter"
Form ES-501-1,	"Post-Examination Check Sheet"
Form ES-501-2,	"Power Plant Examination Results Summary"

Question #28

Comment: The question asks for the required method of securing a diesel generator and ensuring that an auto restart does not recur following auto initiation on receipt of a valid loss-of-coolant accident (LOCA) signal with offsite power still available to its associated emergency bus. The question is recommended for deletion because the system operating procedure directs that the diesel be unloaded, verifying that the 4KV bus auto transfer annunciator is reset, and then secured by placing the handswitch in "pull to lock." Therefore, the key answer (i.e., ensure that the "4KV AUTO TRANSFER INOP" annunciator is *lit* before placing the control switch in PULL TO LOCK) is incorrect.

NRC Resolution: Recommendation accepted. The question is deleted because there is no correct answer. The intended answer specified that the annunciator be confirmed as "lit" when it should have specified "reset" in accordance with System Operating Procedure No. 123, Section 5.1 (Rev. 29).

Question #51

Comment: The question asks for a description of the operation of the residual heat removal (RHR) Loop B outboard injection valve if the level rapidly decreases to 119.5 inches with RHR Loop B operating in the shutdown cooling mode. The question is recommended for deletion because the outboard injection valve reopens automatically when the Group 4 isolation is reset, if a low-pressure coolant injection (LPCI) loop selection is sealed-in. Therefore, the key answer (i.e., the operator must reset the shutdown cooling isolation and manually reopen the RHR Loop B outboard injection valve) is incorrect.

NRC Resolution: Recommendation not accepted. The RHR Loop B outboard injection valve will not auto-open unless the operator manually resets the shutdown cooling isolation signal. Therefore, the use of the phrase "manually reopen" is correct, and the key answer is correct. The facility-provided reference supports that manual action is required to open the injection valve.

Facility Licensee: _____ (Facility name)

Facility Docket No.: _____ (number)

Operating Tests Administered on: _____ (date)

This form is to be used only to report observations. These observations do not constitute audit or inspection findings and, without further verification and review in accordance with IP 71111.11, are not indicative of noncompliance with 10 CFR 55.46. No licensee action is required in response to these observations.

While conducting the simulator portion of the operating tests, examiners observed the following items:

(EXAMPLES)

Item	Description
HPSI Header B pressure (PI-301)	The pressure instrument read mid-scale regardless of actual pressure.
Head bubble	During a scenario that caused a rapid depressurization during natural circulation, the vessel head level indication indicated a void (bubble). The confirming indications (i.e., pressurizer level and pressure) failed to verify or confirm the bubble.
Steam Generator A wide-range level	The meter has been out of service for the last three operating tests (approximately 18 months).

NRC Letterhead

(Date)

LICENSE(Applicant's name)(Street address)(City, State Zip code)

Pursuant to the *Atomic Energy Act of 1954*, as amended; the *Energy Reorganization Act of 1974* (Public Law 93-438), as amended; and subject to the conditions and limitations incorporated herein, the U.S. Nuclear Regulatory Commission hereby licenses you to manipulate all controls of the (Name of facility, facility license number).

Your License No. is OP-(number), and your Docket No. is 55-(number). The effective date is (date). Unless sooner terminated, renewed, or upgraded, this license shall expire 6 years from the effective date.

This license is subject to the provisions of Title 10, Section 55.53, of the *Code of Federal Regulations* (10 CFR 55.53), with the same force and effect as if fully set forth herein.

While performing licensed duties, you shall observe the operating procedures and other conditions specified in the facility license authorizing operation of the facility.

The issuance of this license is based upon examination of your qualifications, including the representations and information contained in your application for this license.

A copy of this license has been made available to the facility licensee.

For the U.S. Nuclear Regulatory Commission,

(Name and title of licensing official)

Docket No. 55-(number)

cc: (Facility representative who signed the applicant's NRC Form 398)

NRC Letterhead

(Date)

LICENSE

(Applicant's name)

(Street address)

(City, State Zip code)

Pursuant to the *Atomic Energy Act of 1954*, as amended; the *Energy Reorganization Act of 1974* (Public Law 93-438), as amended; and subject to the conditions and limitations incorporated herein, the U.S. Nuclear Regulatory Commission hereby licenses you to direct the [licensed] [[fuel handling]] activities of [licensed] operators at, and to manipulate [all] [[fuel handling]] controls of the (Name of facility, facility license number).

Your License No. is SOP-(number), and your Docket No. is 55-(number). The effective date is (date). Unless sooner terminated, renewed, or upgraded, this license shall expire 6 years from the effective date.

This license is subject to the provisions of Title 10, Section 55.53, of the *Code of Federal Regulations* (10 CFR 55.53), with the same force and effect as if fully set forth herein.

While performing licensed duties, you shall observe the operating procedures and other conditions specified in the facility license authorizing operation of the facility. You shall also comply with the following condition(s):

- You shall wear corrective lenses while performing the activities for which you are licensed.

The issuance of this license is based upon examination of your qualifications, including the representations and information contained in your application for this license.

A copy of this license has been made available to the facility licensee.

For the U.S. Nuclear Regulatory Commission,

(Name and title of licensing official)

Docket No. 55-(number)

cc: (Facility representative who signed the applicant's NRC Form 398)

[] Include only for unrestricted senior operators.

[[]] Include only for senior operators limited to fuel handling.

NRC Letterhead

(Date)

(Applicant's name)

(Street address)

(City, State, Zip code)

Dear (Name):

This is to inform you that your grade on the (operating test, written examination, or both) taken on (date(s)), in connection with your application for a (reactor operator, senior reactor operator) license for the (facility name), indicates that you **did not** pass that (test, examination, or both). As a result, the U.S. Nuclear Regulatory Commission (NRC) proposes to deny your application. Enclosed is a copy of the (operating test, written examination, or both) results indicating those areas in which you exhibited deficiencies. (A copy of the master answer key is also provided.)

If you accept the proposed denial and decline to request either an informal NRC staff review or a hearing within 20 days, as discussed below, this proposed denial will become a final denial. You may then reapply for a license in accordance with Title 10, Section 55.35, of the *Code of Federal Regulations* (10 CFR 55.35), subject to the following conditions:

- * a. Because you passed (a written examination and/or the administrative/systems/simulator operating test) on (date(s)), you may request a waiver of (that or those) portion(s).
- * b. Because you did not pass the (SRO portion of or written examination overall or administrative/systems/simulator operating test) administered to you on (date), you will be required to retake that portion.
- * c. You may reapply for a license 2 months from the date of this letter.
- ** a. Because this is your (second, subsequent) examination failure, you will be required to retake both the written examination and the operating test.
- ** b. You may reapply for a license (6, 24) months from the date of this letter.
- *** a. Because you did not pass either the operating test or the written examination administered to you on (date(s)), you will be required to retake both the operating test and the written examination.
- *** b. You may reapply for a license (2, 6, 24) months from the date of this letter.

If you do not accept the proposed denial, you may, within 20 days of the date of this letter, take either of the following actions:

- You may request an informal NRC staff review of the grading of your examination. Send your written request to Director, Division of Inspection and Regional Support, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001. If submitting via private courier (e.g., FedEx, UPS), send your request to 11555 Rockville Pike, Rockville, Maryland 20852, instead of using the Washington, DC, address. Your request must identify the portions

of your examination that you believe were graded incorrectly or too severely. In addition, you must provide the basis, including supporting documentation (such as procedures, instructions, computer printouts, and chart traces), in as much detail as possible, to support your contention that certain of your responses were graded incorrectly or too severely.

The NRC will review your contentions, reconsider your grading, and inform you of the results. If the proposed denial is sustained, you will have the opportunity to request a hearing pursuant to 10 CFR 2.103(b)(2) at that time.

- You may request a hearing pursuant to 10 CFR 2.103(b)(2). Submit your request, in writing, to the Office of the Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, Attention: Rulemakings and Adjudications Staff, with a copy to the Associate General Counsel for Hearings, Enforcement, and Administration, Office of the General Counsel, at the same address. (Refer to 10 CFR 2.302 for additional filing options and instructions.) If submitting via private courier (e.g., FedEx, UPS), send your request to 11555 Rockville Pike, Rockville, Maryland 20852, instead of using the Washington, DC, address.

Pursuant to 10 CFR 55.35, you may not reapply for a license until your license has been finally denied. Failure on your part to exercise either of the above options within 20 days constitutes a waiver of your opportunity for informal review and your right to demand a hearing. For the purpose of re-application under 10 CFR 55.35, such a waiver renders this letter a notice of final denial of your application, effective as of the date of this letter.

If you have any questions, please contact (name) at (telephone number).

Sincerely,

(Name and title of licensing official)

Docket No. 55-(number)

Enclosures: As stated

cc: (Facility representative who signed the applicant's NRC Form 398)

CERTIFIED MAIL, RETURN RECEIPT REQUESTED

-
- * Use for initial RO or SRO license applicants who passed either the operating test or the written examination but failed the other.
 - ** Use for second and subsequent retake applicants.
 - *** Use for applicants who failed both the operating test and the written examination.

NRC Letterhead

(Date)

(Applicant's name)

(Street address)

(City, State Zip code)

Dear (Name):

The purpose of this letter is to forward the results of the site-specific operating test and written examination administered to you during the week of (date) in connection with your application for a (reactor operator, senior reactor operator, limited senior reactor operator) license for the (facility name). Copies of your operating test and written examination answer sheets are enclosed.

However, as explained in paragraph D.3.c of Examination Standard (ES) 501 in NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 9, we will not issue your license [until your employer certifies in writing that you have acquired all of the training and experience for which you were previously granted a waiver.] [until we determine that your medical condition and general health are satisfactory for licensing.] [because any written examination with a passing grade of 82 (74 for SRO-only) percent or below is normally held for review until those applicants who failed the examination have had an opportunity to appeal their license denials.]

After resolving potential changes from any appeal, the NRC will issue your license if your final grade remains above 80 (70 for SRO-only) percent. Should changes result in your final grade being below 80 (70 for SRO-only) percent, the NRC will send you a proposed denial letter, which will outline your response options.]]

If you have any questions, please contact (name) at (telephone number).

Sincerely,

(Name and title of licensing official)

Docket No. 55-(number)

Enclosures: As stated

cc: (Facility representative who signed the applicant's NRC Form 398)

- [] Use only for applicants who need to complete training or experience prior to licensing.
[[]] Use only for applicants whose medical condition is still under review.
[[[]]] Use only for applicants whose final licensing action is pending the resolution of written examination appeals.

Post-Examination Check Sheet	
Facility:	Date of Examination:
Task Description	Date Complete
1. Facility written exam comments or graded exams received and verified complete	
2. Facility written exam comments reviewed and incorporated and NRC grading completed, if necessary	
3. Operating tests graded by NRC examiners	
4. NRC chief examiner review of operating test and written exam grading completed	
5. Responsible supervisor review completed	
6. Management (licensing official) review completed	
7. License and denial letters mailed	
8. Facility notified of results	
9. Examination report issued (refer to NRC MC 0612)	
10. Reference material returned after final resolution of any appeals	

PRIVACY ACT INFORMATION — FOR OFFICIAL USE ONLY

Power Plant Examination Results Summary						
Facility:			Plant Status: Hot <input type="checkbox"/> Cold <input type="checkbox"/>			
Written Examination Date: Prepared by: Facility <input type="checkbox"/> NRC <input type="checkbox"/>			Operating Test Date(s): Prepared by: Facility <input type="checkbox"/> NRC <input type="checkbox"/>			
NRC Examiners:						
Overall Results						
Applicants:	Total #	# Passed	% Passed	# Failed	% Failed	
RO						
SRO						
Individual Results						
Name	Docket # 55-()	Type (1)	Written Grade RO / SRO / TOT	Operating Test(2)		
				W-T	ADM	SIM
			/ /			
			/ /			
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NOTES: (1) 1=RO; 2=SRO-I; 3=SRO-U; 4=RO-Retake; 5=SRO-I-Retake; 6=SRO-U-Retake; 7=SRO-Fuel (2) P=Passed; F=Failed; W=Waived						

PRIVACY ACT INFORMATION — FOR OFFICIAL USE ONLY

PRIVACY ACT INFORMATION — FOR OFFICIAL USE ONLY

Power Plant Examination Results Summary (Continuation Sheet)						
Facility:						
Examination Date(s):						
Individual Results						
Name	Docket # 55-()	Type (1)	Written Grade RO / SRO / TOT	Operating Test(2)		
				W-T	ADM	SIM
			/ /			
			/ /			
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NOTES:

(1) 1=RO; 2=SRO-I; 3=SRO-U; 4=RO-Retake; 5=SRO-I-Retake; 6=SRO-U-Retake; 7=SRO-Fuel

(2) P=Passed; F=Failed; W=Waived

PRIVACY ACT INFORMATION — FOR OFFICIAL USE ONLY

ES-502

**PROCESSING REQUESTS FOR ADMINISTRATIVE REVIEWS AND HEARINGS
AFTER INITIAL LICENSE DENIAL**

A. Purpose

This standard describes the options and associated responsibilities regarding administrative reviews and hearings related to license application denials and license denials resulting from examination failures. This standard also addresses license re-applications after a denial becomes final.

B. Background

Operator license applicants who are denied the opportunity to take an NRC licensing examination because they do not meet the eligibility requirements for a license pursuant to Title 10, Part 55, of the *Code of Federal Regulations* (10 CFR Part 55) and those applicants who are denied a license because they failed a written examination or operating test administered pursuant to 10 CFR Part 55 are notified of their denials in writing. The proposed denial letters describe the nature of the deficiencies noted and inform the applicants of their available response options. Applicants may reapply pursuant to the provisions of 10 CFR 55.35. However, the NRC will not accept a re-application as long as a request is pending for either an administrative NRC review or a hearing.

C. Responsibilities

1. Applicant

- a. An applicant who does not appear to meet the experience and training requirements for a license may be asked to provide additional information to the NRC's regional office in accordance with ES-202, "Preparing and Reviewing Operator License Applications." If the NRC still denies the application after the applicant provides the additional information requested by the NRC, the applicant may exercise one of the following options within 20 days after the date on the proposed denial letter from the regional office:
 - (1) Do nothing. The proposed denial letter then becomes the final denial. The applicant may reapply after obtaining the requisite training or experience.
 - (2) Request reconsideration of the application denial. Applicants must submit such requests to the Director, Division of Inspection and Regional Support, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001. If submitting via private courier (e.g., FedEx, UPS), send your request to 11555 Rockville Pike, Rockville, Maryland 20852, instead of using the Washington, DC, address. The applicant's submittal must clearly state the basis for the request.

- (3) Request a hearing pursuant to 10 CFR 2.103(b)(2). Applicants must submit such requests to the Office of the Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, Attention: Rulemakings and Adjudications Staff, with a copy to the Associate General Counsel for Hearings, Enforcement, and Administration, Office of the General Counsel, at the same address. (Refer to 10 CFR 2.302 for additional filing options and instructions.) If submitting via private courier (e.g., FedEx, UPS), send your request to 11555 Rockville Pike, Rockville, Maryland 20852, instead of using the Washington, DC, address.
- b. If an applicant fails the operator licensing written examination or operating test (or both) and receives a proposed license denial letter issued by an NRC regional office in accordance with ES-501, "Initial Post-Examination Activities," the applicant has 20 days from the date on the letter to exercise one of the following three options:
- (1) Do nothing. The proposed denial letter then becomes the final denial. The applicant may reapply, pursuant to 10 CFR 55.35, 2 months after the date on the first denial letter, 6 months after the second denial, and 24 months after each successive denial.
 - (2) Request that the NRC administratively regrade the written examination, the operating test, or both, in light of new information to be provided by the applicant. Applicants must submit such requests to the Director, Division of Inspection and Regional Support, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001. If submitting via private courier (e.g., FedEx, UPS), send your request to 11555 Rockville Pike, Rockville, Maryland 20852, instead of using the Washington, DC, address. If the applicant submits such a request, the NRC will not consider a re-application pursuant to 10 CFR 55.35 until a denial is final.

The applicant's request for administrative review must identify the item(s) for which additional review is requested and must include documentation supporting the item(s) in contention. The applicant is responsible for ensuring that the request and the supporting documentation are sent to the NRR operator licensing program office within 20 days after the date on the proposed denial letter.

If the NRC administratively reviews a failure and determines that the applicant did not provide sufficient basis to justify passing grades on all sections of the licensing examination, the NRC will issue a letter to the applicant sustaining the proposed denial. The applicant may then request a hearing pursuant to 10 CFR 2.103(b)(2). In such instances, the applicant must submit a request for a hearing after an administrative review within 20 days after the date on the letter from the NRR operator licensing program office sustaining the proposed denial. In addition, the applicant must submit the hearing request in accordance with Section C.1.b(3), below.

If the applicant does not request a hearing when the NRR operator licensing program office sustains the proposed denial, the proposed denial becomes the final denial. The applicant may then reapply for a license, pursuant to 10 CFR 55.35, 2 months after the date of the first sustained denial letter, 6 months after the second denial, and 24 months after each successive denial.

- (3) Request a hearing as provided by 10 CFR 2.103(b)(2). The applicant must submit the hearing request to the Office of the Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, Attention: Rulemakings and Adjudications Staff, with a copy to the Associate General Counsel for Hearings, Enforcement, and Administration, Office of the General Counsel, at the same address. (Refer to 10 CFR 2.302 for additional filing options and instructions.) If submitting via private courier (e.g., FedEx, UPS), send your request to 11555 Rockville Pike, Rockville, Maryland 20852, instead of using the Washington, DC, address. If the applicant requests a hearing, the NRC will not consider a re-application pursuant to 10 CFR 55.35 until the denial is final.

2. Facility Licensee

- a. The NRC may ask the facility licensee to provide reference materials, technical support, and (if the facility licensee prepared the examination) a confirmation of the validity of the test items, as necessary for the NRC staff to evaluate and resolve any concerns raised by a license applicant who asked the NRC to reconsider a proposed denial of an application or license.
- b. If the facility licensee prepared the examination, it should ensure that any written examination questions that are determined to be invalid (e.g., those that have no or multiple correct answers) are retrieved from any examination bank into which they have been deposited and corrected or discarded.

3. NRC

- a. The NRC will conduct administrative reviews of Part 55 license application denials based on eligibility as described in Section D.1, below.
- b. The NRC will conduct administrative reviews of Part 55 license denials based on examination failures as described in Section D.2, below.
- c. The NRC will conduct Part 55 operator licensing hearings in accordance with 10 CFR Part 2, "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders."

D. Administrative Review Procedures

1. Application Denial

If an applicant requests an administrative review in accordance with Section C.1.a, the NRR operator licensing program office will generally complete its review of the applicant's eligibility within 60 days of receiving the request. Upon completing its review, the NRR operator licensing program office will notify the applicant in writing as to whether he or she will be allowed to take the license examination. If the review leads the NRR operator licensing program office to sustain the original denial, the applicant may request a hearing pursuant to 10 CFR 2.103(b)(2).

2. Examination Results

If an applicant requests an administrative review in accordance with Section C.1.b, the NRR operator licensing program office will generally complete its review, as follows, within 75 days after receiving the request.

- a. The NRR operator licensing program office will determine whether to (1) review the appeal internally,; (2) have the regional office review the appeal, or (3) convene a three-person board to review the applicant's documented contentions. The appeal board will normally be composed of a branch chief and two examiners or subject matter experts; it may also include a representative from the affected region, but no one who was involved with the applicant's licensing examination.

For written examinations, the review will generally focus only on those questions that the applicant is contesting. The review shall evaluate the original grading of the applicant's (or applicants') examination(s), the reference material supplied by the facility licensee, and the contentions and supporting documentation provided by the applicant(s). If there are multiple appeals, all question deletions and answer key changes will be applied equally to each appellant's examination, without regard to who submitted the complaint. Moreover, in those rare instances when a generic finding results in an answer key change (e.g., failure to provide a print or other reference necessary to answer a question), the corrective action may be applied, as appropriate, to adjust the grading of other questions that were not contested.

For operating tests, the review shall evaluate the examiner's comments, the examination report, the test that was administered, and the contentions and supporting documentation provided by the applicant or facility licensee (e.g., plant system descriptions, operating procedures, logs, chart recorder traces, and process computer printouts).

- b. Based on the findings and recommendations from the review, the NRR operator licensing program office will decide whether to sustain or overturn the applicant's license examination failure. The NRR operator licensing program office will then notify the applicant in writing of the results of the review.

- c. When the NRR operator licensing program office has concurred in the results of the review, the NRC's regional office will (1) issue a license if the proposed denial was overturned, (2) review the examination results of the other applicants to determine whether any of the licensing decisions are affected, (3) update the master examination file to reflect any test item deletions or answer key changes, and (4) consider the need to correspond with the facility licensee regarding the quality of the examination, as discussed in Section C.2.c of ES-501.

ES-601

CONDUCTING NRC REQUALIFICATION EXAMINATIONS

A. Purpose

Title 10, Section 55.59(a), of the *Code of Federal Regulations* [10 CFR 55.59(a)] requires licensed operators and senior operators to complete a requalification program developed by the facility licensee and to pass a comprehensive requalification written examination and an annual operating test. In lieu of accepting the facility licensee's certification that the operator has passed the required examinations and tests administered within the facility licensee's Commission-approved program, the NRC may administer a comprehensive requalification written examination and an annual operating test.

This standard provides *general* guidance and requirements for conducting NRC requalification examinations. In addition this standard provides guidance and procedures for evaluating the facility licensee's licensed operator requalification training program to ensure it is effectively maintaining the competency of the licensed operators. Specific guidance and requirements for conducting the comprehensive requalification written examinations and the annual operating tests (including both the plant walk-through and dynamic simulator sections) are provided in ES-602 through ES-604. These standards are not a substitute for the operator licensing regulations and are subject to revision and other changes to the internal operator licensing program policy.

B. Background

Section 306 of the *Nuclear Waste Policy Act of 1982* (NWPAA) authorized and directed the NRC to promulgate regulations, or other appropriate guidance, for training and qualifying nuclear power plant operators. Those regulations were to include requirements governing the administration of requalification examinations and operating tests at nuclear power plant simulators. The NRC's requalification evaluation program consists primarily of periodic, onsite requalification inspections, supplemented with NRC examinations at facilities where the NRC believes that ineffective training is causing operators to commit errors. The NRC's Office of the General Counsel has concluded that this program satisfies the statutory requirements in Section 306 of the NWPAA. The oversight program will require the NRC to actively oversee each facility licensee's requalification training programs, and the Commission's regulations will continue to contain legally binding requirements that apply to the conduct of operator requalification examinations by facility licensees.

When determining the scope of a facility's requalification inspection and examination activities, regional managers will consider overall facility performance, the results of the NRC's inspection programs (e.g., requalification, emergency operating procedure, and resident), the results of routine initial and requalification examinations, and other factors. Generally, the facility will only need to meet the inspection requirements of Inspection Procedure (IP) 71111.11, "Licensed Operator Requalification Program"; however, when necessary, the NRC can initiate augmented activities in accordance with program office guidance to ensure safe plant operation. Those activities could include a training program inspection in accordance with IP 41500, "Training and Qualification Effectiveness," operational evaluations of on-shift crews, or NRC examinations conducted in accordance with this series of examination standards.

The NRC will conduct requalification examinations only when it has lost confidence in the facility licensee's ability to conduct examinations, or when the staff believes that the inspection process will not provide the needed insight. Regional management should consider conducting requalification examinations or operational evaluations when any of the following conditions exist:

- requalification inspection results indicate an ineffective operator requalification program
- operator errors are a major contributor to operational problems
- allegations have been raised regarding significant training program deficiencies

The decision to conduct NRC examinations should be implemented through the normal resource planning system, because an inspection activity will be replaced with examinations that are more resource-intensive. Using the existing inspection planning process will ensure that the regional office and the NRC's Office of Nuclear Reactor Regulation (NRR) will consider the need to conduct examinations, as well as the alternative expanded inspection tools, when allocating the required resources. Operational evaluations should be considered as a reactive effort based on immediate safety concerns.

C. Scope

The NRC-conducted requalification examinations will measure the effectiveness of a facility licensee's requalification program by evaluating the licensee's ability to adequately prepare written examination questions, job performance measures (JPMs), and simulator scenarios, as well as its ability to properly evaluate its operators' performance. The examination procedures are based on a systems approach to training (SAT) program, as defined in 10 CFR 55.4. To the extent possible, these procedures rely on existing requalification program standards for developing and implementing the NRC's examinations. The SAT approach allows the NRC to conduct requalification examinations that are fundamentally consistent with existing facility-developed programs. As such, this approach reduces the impact on the facilities and improves the reliability of the NRC's assessment of requalification training programs.

The NRC-conducted requalification examination will normally be composed of three parts, including a two-section open-reference written examination, a walk-through evaluation, and a dynamic simulator evaluation. The three examination parts are further described in ES-602, "Requalification Written Examinations," ES-603, "Requalification Walk-Through Examinations," and ES-604, "Dynamic Simulator Requalification Examinations," respectively. The NRC will consider preferentially using the facility licensee's requalification examination structure or methodology if it is different from that described herein, provided that it complies with 10 CFR 55.59 and is free of significant flaws; the NRC's regional office shall consult with the NRR operator licensing program office to determine the appropriate examination procedure.

To the extent practical, the examination will be based on the facility licensee's requalification program and learning objectives. The facility licensee is expected to use the plant-specific job and task analyses (JTAs) as the basis for developing the examination materials and substantiating the importance rating factors for each task. The facility licensee may also refer to the NRC's "Knowledge and Abilities Catalog[s] for Nuclear Power Plant Operators: Pressurized- [or Boiling-] Water Reactors" (NUREG-1122 or 1123, respectively), for additional guidance on identifying job-specific importance rating factors. The use of a JTA will result in more technically sound and operationally oriented examinations.

An examination team, composed of NRC examiners and facility representatives, will develop, review, and conduct each requalification examination. Parallel evaluation of operator performance by NRC examiners and facility evaluators will enhance the NRC's ability to assess both individual and program performance.

The administrative guidelines and procedures for conducting an NRC requalification examination are outlined in Attachment 1, "Examination Timetable."

D. Examination Preparations

1. Communication

- a. When the NRC determines that it is necessary to conduct a requalification examination, the regional office will notify the facility licensee to be evaluated at least 90 but preferably 120 days before the examination start date, using the corporate notification letter shown in Attachment 2. If possible, the NRC will schedule the site visits to coincide with the facility's requalification training cycle. Depending on the number of operators and crews at the facility, it may be necessary to conduct the examinations over a period of 2 or more weeks to attain the required sample size. The requalification training cycle, referenced herein and throughout NUREG-1021, is that continuous period of time (not to exceed 24 months) within which the facility licensee conducts its operator requalification training program.

If the purpose of the examination is to retest operators who previously failed an NRC-conducted requalification examination, the regional office should modify the corporate notification letter, as appropriate.

- b. The facility licensee is expected to respond to the corporate notification letter at least 60 days before the evaluation by submitting the materials and information requested in the letter.

The facility licensee may request that the NRC's chief examiner or another NRC representative meet with appropriate facility licensee managers and the operators to be examined. Such a meeting should be scheduled during the examination preparation week as discussed in Section D.5.

- c. At least 30 days before the examination, the NRC will confirm with the facility licensee which operators have been selected to participate in the evaluation.

2. Selection of Operators

- a. The NRC expects facility licensees to train and examine their operators in the same crew configurations with which they normally operate the plant. Generally, the NRC expects the crew to include no more than five operators, but the agency will consider larger crews on a case-by-case basis.

At times, to ensure an adequate sample size, the examination team may configure crews that do not routinely work together to perform shift duties. Mixed crews of shift and non-shift operators should not be configured unless the facility licensee routinely evaluates mixed crews in its requalification training program, or the facility licensee's normal crew size is so large that it is necessary to separate a normal crew for examination purposes.

- b. All crew members for requalification dynamic simulator examinations must be currently licensed on the facility and up-to-date in the facility licensee's requalification program.
- c. The selections will be made to minimize perturbation of the facility licensee's schedules and plant operations. Operating crew(s) in training will be given first priority during the examination week(s). If the NRC is reevaluating the facility's program after an unsatisfactory evaluation, the selection process should favor operators who either failed their previous NRC-conducted examinations or were not previously examined.
- d. During retake examinations, the dynamic simulator crew evaluation may include operators who have passed an NRC requalification examination. However, these operators will not be required to take the written or walk-through portions of that examination. The operators' performance on the simulator examination will be evaluated in accordance with the guidance of ES-604.
- e. A shift technical advisor (STA) may be added to the crew if the facility normally uses an STA during requalification training. In such instances, the NRC expects the STA's duties and responsibilities to be the same as those assigned during requalification training and plant operations.
- f. The NRC will review the list of crews and operators submitted by the facility licensee, and will recommend any necessary changes.