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Rev. 4

Operator Licensing Examiner Standards

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Division of Licensee Performance and Quality Evaluation
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

NOTICE

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

NUREG-1021, Rev 4 5/26/87

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ABSTRACT

The Operator Licensing Examiner Standards provide policy and guidance to NRC examiners and establish the procedures and practices for examining and licensing of applicants for NRC operator licenses pursuant to Part 55 of Title 10 of the Code of Federal Regualtions (10 CFR 55). They are intended to assist NRC examiners and facility licensees to understand the examination process better and to provide for equitable and consistent administration of examinations to all applicants by NRC examiners. These standards are not a substitute for the operator licensing regualtions and are subject to revision or other internal operator examination licensing policy changes.

As appropriate, these standards will be revised periodically to accommodate comments and reflect new information or experience.

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PURPOSE AND FORMAT OF OPERATOR LICENSING EXAMINER STANDARDS

A. Purpose

The Operator Licensing Examiner Standards establish the procedures and practices for examining and licensing candidates for NRC licenses pursuant to Part 55 of Title 10 of the Code of Federal Regulations (10 CFR 55). These standards will

1. describe the provisions of the act and regulations on which the program is based

2. provide for equitable and consistent administration of examinations to all candidates at all facilities subject to the regulations

3. provide guidance for training of new examiners or other interested parties with respect to the details of the examining program

B. Format

Each standard will explain rules, procedures, and practices for a particular aspect of the program. The designation of each standard will be in the form ES-xyy, where the xyy refers to a three-digit number designed to place the standards in logical groupings for ready reference. The digit symbolized by x ranges from 1 to 9. All standards beginning with each digit refer to aspects of the program in a given grouping, as follows:

1. general administrative standards

2. written examination, reactor operator

3. operating examination, senior reactor operator or reactor operator

4. written examination, senior reactor operator

5. unassigned

6. requalifications examination

7. unassigned

8. unassigned

9. unassigned

The two-digit number "yy" is a sequential number (01, 02, etc.) to differentiate standards within a particular group.

C. Reference

Code of Federal Regulations, Title 10, "Energy," U.S. Government Printing Office, Washington, D.C.

5. 10 CFR 20 - Standards for Protection Against Radiation

   The regulations in 10 CFR 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 operator or senior operator licenses. A candidate should have a knowledge of the implementing procedures, and an examiner should have a basic understanding of these regulations.

C. Regulatory Guides, NUREG Reports, and American National Standards Institute/American Nuclear Society (ANSI/ANS) Standards

Regulatory guides, NUREG reports, and industry standards are not requirements except as required by Commission orders or as committed to by the facility licensee. The appropriate revisions should be consulted as referenced in the facility FSAR or approved training program.

1. Regulatory Guide 1.8, Qualification and Training of Personnel for Nuclear Power Plants." This is the basic regulatory guide implementing the regulations concerning eligibility for licensing and what positions require licensing. It endorses ANSI/ANS 3.1-1981.

2. Regulatory Guide 1.33, "Q/A Program Requirements - Operations." Appendix A to this guide 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." This guide defines the extent of the control room and the appropriate duties of the operators. It also restricts the operators from performing certain duties.

4. Regulatory Guide 1.134, "Medical Evaluation of Licensed Personnel for Nuclear Power Plants." This guide endorses ANSI/ANS 3.4-1983, "Medical Certification and Monitoring of Personnel Requiring Operator Licenses for Nuclear Power Plants." The guide repeats part of 10 CFR 55 to explain when information should be provided to the NRC regarding the medical condition of each candidate for an operator license.

5. Regulatory Guide 1.149, "Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations." This guide endorses ANSI/ANS 3.5-1985 subject to the provisions shown in Section C of the guide.

APPLICABILITY OF COMMISSION REGULATIONS AND GUIDES TO OPERATOR LICENSES

A. Purpose

This standard lists the regulations of the U.S. Nuclear Regulatory Commission (NRC) that establish the requirements for content or procedures for operator licenses. It also includes regulatory guides, NUREG reports, and other published guidance intended to implement the regulations. Also included are American Nuclear Society (ANS) standards which are used for guidance in implementing the regulations. Interim standards may be used for guidance until revised versions are approved.

B. Regulations

1. 10 CFR 55 - Operator Licenses

10 CFR 55 is the basic implementing regulation for licensing reactor operators and senior reactor operators. This regulation establishes the basic requirements and the regulatory basis for licensing operators.

2. 10 CFR 50 - Licensing of Production and Utilization Facilities

The regulations in 10 CFR 50 provide for the licensing of production and utilization facilities. 10 CFR 50.34 requires that a description of the requalification program be included in the Final Safety Analysis Report (FSAR). This description forms the basis for the acceptability, inspection, and audit of requalification programs. 10 CFR 50.54 (k)-(m) contains the regulations restricting control manipulations to licensed operators and stands as a condition of all licenses for facilities licensed under 10 CFR 50. Licensing of reactor operators and senior reactor operators pursuant to 10 CFR 55 is required at these facilities.

3. 10 CFR 2 - Rules of Practice

The regulations in 10 CFR 2 govern the conduct of all proceedings before the NRC involving licensing and licenses. 10 CFR 2.103(b)(2) contains the rule applicable to a candidate's rights to review of a licensing decision, including appeal and hearing rights.

4. 10 CFR 9 - Public Records

The regulations in 10 CFR 9 prescribe the rules governing the NRC's public records that relate to any proceeding subject to 10 CFR 2. 10 CFR 9 describes and implements the requirements for balancing the public's rights to information under the Freedom of Information Act and NRC's responsibility to protect personal information under the Privacy Act.

6. NUREG-0737, "Clarification of TMI Action Plan Requirements," Nov. 1980. This document clarifies the following items: 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", and Item 11.B.4, "Training for Mitigating Core Damage." The purpose of these action plan items is 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.

7. 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," of this document describes the training and licensing of operators and includes the information which is to be submitted by applicants for construction permits and operating licenses.

8. ANSI/ANS 3.1-1981 "ANS Standard for Selection and Training of Nuclear Power Plant Personnel." This standard provides criteria for the selection and training of individuals at each functional level of assigned responsibility (e.g., managers, supervisors, operators, and technicians). See Regulatory Guide 1.8.

9. ANS 3.2 (ANSI N18.7-1976), "Administrative Controls and Q/A for the Operational Phase of Nuclear Power Plants." This standard provides guidance and recommendations for administrative rules of practice and preparation of procedures, audit programs, and related subjects. See Regulatory Guide 1.33.

10. ANS 3.4-1983, "Medical Certification and Monitoring of Personnel Requiring Operator Licenses for Nuclear Power Plants." This standard is the basic document covering the requirements applicable to the health of licensed personnel. See Regulatory Guide 1.134.

11. ANS 3.5, "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. See Regulatory Guide 1.149.

12. NUREG-0660, Vol. 1, "NRC Action Plan Developed as a Result of the TMI-2 Accident," May 1980. This document describes the requirements for long term simulator upgrades in task I.A.4.2.

ASSIGNMENT OF EXAMINERS TO ADMINISTER EXAMINATIONS

A. Purpose

This standard establishes the policy for the assignment of examiners for examination administration. Included in this standard are descriptions and use of examiner assignment sheets, assignments and duties of the chief examiner, and the number of examiners required to administer examinations to a group of applicants.

B. Initiation of Requirement for an Examination

The normal practice of scheduling examination assignments is for utilities to request specific dates in response to headquarters issued Generic Letters. Regional Section Chiefs are then responsible for scheduling dates to optimize utilization of examiner resources. No more than two site visits per year should be scheduled for each site. The annual generic letter is not addressed to research facilities. Therefore, the regional section chief should anticipate these assignments based on history or early contact with these facilities.

Section chiefs are responsible for ensuring that examination assignments are completed. A "Check Sheet for Completion of Examination Assignment," Attachment 1 to this standard, may be used to track examination progress. If completed, the checklist should be filed with the master copy of the examination. Section chiefs shall assign available examiners to administer the examinations on the dates arranged with the facility. Section chiefs should ensure that an Examination Assignment Sheet, Attachment 2 to this standard, is prepared as far in advance as possible, but at least 2 weeks before the examinations. Examination Assignment Sheet distribution shall include all examiners assigned, the facility resident inspector, appropriate regional distribution as established by the regional administrator, and the operating reactor project manager or licensing project manager. A copy should be filed with the master copy of the examination. Conflicts in scheduling contract examiners shall be resolved by the headquarters and regional section chiefs. If they cannot agree, the Branch Chief, OLB, and regional branch chiefs shall resolve the conflicts.

The chief examiner shall have the authority to resolve scheduling problems. Scheduling and rescheduling will be done directly by the facility contact and the chief examiner. The chief examiner shall be responsible for informing the section chief and assigned examiners of all scheduling changes. A letter confirming the examination dates and requesting submission of required information should be prepared by the section chief or chief examiner for signature by the appropriate regional authority. The letter normally should request information at least 60 days before the

scheduled examination dates and, therefore, should be signed out at least 90 days before the examinations to allow the facility time to respond.

C. Assignment of Examiners

The examiner's primary section assignment, other examination commitments, geographical location, and availability at the projected time should be considered in assignments. An examiner who administered the operating examination normally should not be assigned to administer the senior operating examination to the same candidate. An examiner who has failed a candidate normally should not be assigned to give the same candidate another oral examination. Examiners who have been previous employees of a facility shall not conduct or perform any portion of the examination process at that facility for a minimum period of 6 months. The extent and nature of the potential conflict of interest shall be made known to the section chief by the examiner. The level and amount of participation in the facility examination shall be at the discretion of the branch chief. An examiner who was previously employed by a facility is responsible for informing his immediate supervisor of any relevant facts or special circumstances pertaining to his examination assignment or other factors that might appear as being a conflict of interest. Other factors that should be disclosed by the examiner and considered by the supervisor are:

1. the length of time the examiner worked at the facility

2. the time that has elapsed since the examiner left the facility

3. the nature and extent of previous relationships with former associates being examined

4. reasons why the examiner terminated his employment

5. how the examiner regards the candidate(s) or his former associates at the facility

6. other factors that could impact upon the administration, performance, evaluation, or results of the examination.

Criteria that will identify every conflict of interest issue cannot be prescribed. The application of sound supervisory judgment on the facts of each case is necessary. In doubtful cases, advice from the Office of the General Counsel should be obtained.

When the regional office operator licensing section chief determines a need for contract examiners, he should request OLB to assign contract examiners. Formal requests should be made at least 6 months prior to the date of the examinations. OLB shall assign contract examiners at least 4 months in advance, or sooner if feasible, to allow for necessary adjustments to facility training or exam schedules. Requests for contract

examiners less than 4 months prior to the date of the examination should be made as early as possible by telephone. Telephone requests should be followed up with a formal written request. Requests for contract exminers should specify: (1) the facility requesting the examinations, (2) the types of examinations required, (3) the number of candidates for each type of examination, (4) the dates of the examinations, (5) the regional office contact, (6) the facility contact, and (7) the number of contract examiners required and the level of effort required of the contract examiners. The NIH schedule maintained on the NIH computer system is currently the preferred method for forwarding requests for contract examiner assistance to OLB.

D. Number of Examiners

The target average replacement examination shall be nine candidates and will require three examiners to prepare and administer the written examinations and operating tests. Normally, a sufficient number of examiners should be assigned so that each examiner will complete no more than four operating tests per visit regardless of whether the assignment is for cold or replacement tests. In exceptional cases five complete operating examinations per visit may be required. Requests by utilties for examinations for less than eight candidates or more than two exam visits per year shall be discouraged. When the operating test includes a simulator portion, the target average number of candidates shall be at least nine candidates during the week that the written examination is administered and twelve candidates in succeeding weeks. In order to accomplish this, three examiners per week will be required. Less than six candidates should be examined only under special extenuating circumstances such as a severe shortage of licensed operators or senior operators to operate a facility. When a facility has less than six candidates for examination, those examinations should be delayed until another class is added to bring the total of candidates to 6 or more.

E. Chief Examiner

Whenever a group of examiners are assigned to administer the examinations, one member of this group will be designated as chief examiner. The chief examiner is responsible for coordinating the details of the examination schedule with the facility contact and the other examiners, and for keeping the assigning section chief informed. Because the need for rescheduling can occur on short notice, the rescheduling can be most expeditiously accomplished directly between the facility contact and examining team through the chief examiner. If rescheduling of examinations involving contract examiners is required, the project manager for the contract shall be notified as soon as possible. It is NRC policy that one member of the examining team shall be a regional examiner who will be assigned as chief examiner. If no regional examiner is on the team, a contract examiner will be designated chief examiner.

F. Returning Facility-Provided Material

The chief examiner is responsible for ensuring that facility literature required by examiners to prepare for the examination is returned to the

facility as soon as possible. All literature should be returned to the facility soon after expiration of the 20-day period allowed for appealing denials. If denials have been appealed, the chief examiner shall determine if all or part of the information must be retained and shall be responsible for ensuring that it is returned. If the examination resulted in no failures, then the material should be returned as soon as the licenses are issued. The chief examiner shall inform the other examiners when the literature should be returned.

ATTACHMENT 1
CHECK SHEET FOR COMPLETION OF EXAMINATION ASSIGNMENT

Facility_____ Date of Exams_____

ITEM	DUE DAYS	DESCRIPTION	INITIALS	DATE
1	-120	Examination schedule agreement with facility		
2	-120	Assignment of examiners		
3	-90	Letter to vice-president sent		
4	-60	Proctoring arranged		
5	-60	Applications received (NRC 398 and 396)		
6	-45	Applications reviewed		
7	-60	Literature received		
8	-30	Travel arrangements made		
9	-30	Assignment sheet completed		
10	-15	Examinations prepared		
11	-7	Examinations reviewed and corrected		
12	0	Examinations administered		
13	15	Grading completed		
14	15	Graded examinations received by NRC		
15	20	Review completed		
16	28	Licenses/denials typed		
17	28	Licenses/denials mailed		
18	45	Final Exam report		
19	45	Contractor Evaluation Completed (ES 104-2)		
20	*	Literature returned		

* Within 30 days following final resolution of any appeals.

ATTACHMENT 2

REQUEST FOR ADMINISTRATION OF
OPERATOR LICENSING

NRC EXAMINER(S):

REQUEST FOR ADMINISTRATION OF OPERATOR LICENSING EXAMINATIONS

Please make arrangements to administer written examinations and operating tests to the following applicants:

APPLICANT	DOCKET NO.	EXAMINATION TYPE

Facility and Location:
Facility Contact:
Chief Examiner:
Written Examination To Be Prepared by RO:
SRO:
Dates of Examinations:

Branch Chief

cc:

PROCEDURES FOR POSTEXAMINATION ACTIVITIES

A. Purpose

This standard describes the procedures and policy for postexamination debriefing with facility management and the submission of reports and recommendations concerning the examination and the simulation facility at which the examination was conducted.

B. Debriefing Sessions

In addition to the written examination review conducted in conformance with ES 201 section H, the facility licensee is frequently interested in holding an exit meeting with the examiner(s) to discuss the performance of the candidates. Although this is not a part of the examination procedure and will not affect the results regarding licensing of any current candidate, it is appropriate for NRC to assist the facility licensee in their efforts to provide properly trained and qualified operators; therefore the examiner(s) should hold a debriefing session of this nature. The debriefing session is held with staff members designated by the facility licensee, usually the plant or operations supervisor and the training director. The current candidates shall not be present, and written examination comments should not be discussed. The NRC resident inspector shall be informed of the meeting so he can attend if he so desires. The chief examiner shall advise the resident inspector of plant deficiencies before the meeting and incorporate the resident inspector's comments as appropriate.

During the debriefing, the examiner(s) may detail areas of knowledge that were identified as strong and weak points of the candidates overall. The results of operating tests should not be given at the exit meeting because recommendations by the examiner are subject to review. In addition, discussions concerning recent licensing activities may be of interest to the facility personnel, and the chief examiner should make every effort to answer questions to the fullest extent possible. Questions that are policy matters, or for which there are no clear answers, shall be referred to the appropriate regional section chief or branch chief for response, and the facility licensee shall be informed that the matter is being referred for reply. The question will be referred to the Branch Chief, OLB, if it is a generic or major policy issue.

C. Submission of Reports and Recommendations

1. Final Examination Report

It is a policy goal of the NRC to complete licensing or denial actions within thirty (30) days of receipt of facility licensee comments. Section chiefs, chief examiners, and examiners shall establish priorities and schedules to achieve this goal. Grading of the written examination should be delayed for receipt and resolution of comments from the facility licensee. Operating examination report forms should be completed during and immediately following the operating examination.

The chief examiner shall be responsible for the preparation of the final examination report when the written examination grading has been completed in accordance with ES 201 K. The grading examiner shall prepare a summary for inclusion in the final report of changes to the master examination and answer key that resulted from the facility written comments and changes generated by candidate comments during the examination. The grading examiner shall also prepare a "Power Plant Examination Results Summary" Attachment 5 to ES 201. Contract examiners shall complete the summary of changes to the master examination and answer key for examinations that they grade and shall complete the result summary for the written examination graded by that lab and for operating examinations conducted by that lab.

Upon completion of the final report the regional office shall forward a copy of the report to the utility. The final examination report shall document the facility written comments on the written examination and answer key and the regional office resolution for each comment. Non-specific comments submitted by the facility about the exams or administration process should be included in the report, but do not necessarily require a regional response or resolution. The report shall include a copy of the written examination(s) and answer key(s) and shall document items discussed at the exit meeting. Copies of this report shall also be sent to public document rooms. A sample examination report is included as Attachment 1 to this standard for the purpose of promoting uniformity of form of Final Examination Reports. One copy of the results summary sheet shall be forwarded to the facility training coordinator, and one copy shall also be forwarded to the Management Assistant, Regional Support and Oversight Section OLB. The results summary sheet shall not be placed in the public document room or distributed with the final report. In the event of a regrade the original summary sheet on file in the regional office should be corrected by line-out and change with the initials of the person making the change. Whenever a change is made another copy shall be sent to OLB.

2. Final Requalification Program Evaluation Report

A final requalification program evaluation report similar to the final examination report for a licensing examination shall be prepared when the grading of requalification examinations has been completed. If Attachment 4 to ES 601 is not included in the report, the report shall contain the information required to complete Attachment 4. A complete copy of the report shall be filed in the facility requalification file. A copy of the NRC Administered Requalification Examination Results Summary, Attachment 3, ES 601, shall be forwarded to the Management Assistant, Regional Support and Oversight Section, OLB. Note: The results summary is required to verify OLTS data and for statistical data. Neither OLB nor the Regional Offices shall retain examination results identified to individuals except that individual results may be kept in the regional offices' facility requalification file for programs that are judged to be unsatisfactory. These individual results should be purged from the file when the requalification training program has been upgraded to satisfactory.

3. Simulation Facility Fidelity Report

For all simulator examinations conducted on certified or approved simulation facilities, a Simulation Facility Fidelity Report shall be prepared concurrently with the examination report and included as an enclosure. The purpose of this report is to document the examiner's concerns about the performance or fidelity

of the simulation facility. One copy of this report shall be forwarded to the Chief, Examination Development Section, OLB. A sample Simulation Facility Fidelity Report is included as Enclosure 2 of Attachment 1 to this standard for the purpose of promoting uniformity of reporting. This report will be used by the NRC's Simulation Facility Evaluation Team (SFET) as part of its periodic review of all certified or approved simulation facilities for compliance with 10 CFR 55, and to schedule simulation facility audits when questions of performance or fidelity have been raised.

The Simulation Facility Fidelity Report should contain brief but specific descriptions of the examiner's observations of the simulation facility's lack of fidelity to the reference plan, as identified during the preparation for or the conduct of the operating test. Included may be concerns about physical fidelity (human factors issues) or functional fidelity (performance of the simulation facility during normal, surveillance, abnormal or emergency events).

If there were no observed areas of lack of fidelity to the reference plant this should be stated on the form. For any observed lack of fidelity, the report should describe what operation, event or transient was in progress, and how the simulation facility failed to faithfully model the expected performance of the reference plant.

It should be noted that identification of possible instances of a simulation facility's lack of fidelity should be made only during the preparation for, and actual conduct of the operating test, and not at any other time.

Note that after May 26, 1991, the simulation facility portion of the operating examination will not be administered on other than a certified or an approved simulation facility.

D. Notifications of Results

All notifications regarding final examination results shall be made only after review and approval by the regional administrator or his delegate. A copy of the written examination and each candidate's answer sheet shall be forwarded to the candidate with either his license or a denial letter. An Operator License Examination Report (Form 157) with all attachments shall be included with the denial letter if a candidate has failed the operating test.

E. Evaluation of Contract Examiner Support

For examinations administered in whole or in part by contract or lab examiners a "Contract Examiner Evalution" form Attachment 2 (ES-104-2) to this standard shall be completed. A copy of the completed contract examiner evaluation form shall be sent to the Section Leader, Regional Support and Oversight Section.

F. References

1. Title 10 of the Code of Federal Regulations part 2.790.

ATTACHMENT 1

EXAMINATION REPORT

_____
_____

_____
_____
_____
_____

Gentlemen:

SUBJECT: EXAMINATION REPORT

On ___(DATE)_____, the NRC administered examinations to employees of your company who had applied for licenses to operate your ___(PLANT SITE)___. At the conclusion of the examination, the examination questions and preliminary findings were discussed with those members of your staff identified in the enclosed report.

In accordance with 10 CFR 2.790 of the Commissions regulations, a copy of this letter and the enclosure(s) will be placed in the NRC Public Document Room.

Should you have any questions concerning this examination, please contact us.

Sincerely,

John A. Doe, Chief
Operations Branch

Enclosures:
1. Examination Report
   No. _____
2. Examination(s) and
   Answer Key(s) (SRO/RO)
3. Simulation Facility Fidelity Report

cc w/enclosures:
(Standard Dist.)
_____, Plant Training Mgr.
_____, Branch Chief, OLB
_____, Project Manager, NRR
_____, Contract Exam Supervisor, _____

REQUALIFICATION EXAMINATION REPORT

_____
_____

_____
_____
_____
_____

Gentlemen:

SUBJECT: REQUALIFICATION EXAMINATION REPORT

On (DATE), the NRC administered requalification examinations to employees of your company who operate your (PLANT SITE). At the conclusion of the examination, any generic findings that evolved as a result of the examination were discussed with those members of your staff identified in the enclosed report.

As a result of this evaluation of your requalification program it has been assigned an overall program rating of (satisfactory, marginal, unsatisfactory) in accordance with the criteria of NUREG 1021, ES-601. (For those individuals with unsatisfactory results, the facility should take corrective action as required by its approved requalification program.)

In accordance with 10 CFR 2.790 of the Commissions regulations, a copy of this letter and the enclosure(s) will be placed in the NRC Public Document Room.

Should you have any questions concerning this examination, please contact us.

Sincerely,

John A. Doe, Chief
Operations Branch

Enclosures:
1. Examination Report
   No. _____
2. Examination(s) and
   Answer Key(s) (SRO/RO)
3. Simulation Facility Fidelity Report

cc w/enclosures:
(Standard Dist.)
_____, Plant Training Mgr.
_____, Branch Chief, OLB
_____, Project Manager, NRR
_____, Contract Exam Supervisor, _____

SAMPLE

EXAMINATION REPORT

Facility Licensee: North Carolina Power Authority
500A Chesnut Street
Anyplace, NC 37401

Facility Docket No.: 50-123

Facility License No.: CPPR-195

Examinations administered at Edison Nuclear Power Station near Spring City, North Carolina

Chief Examiner: _____ _____
Sam Y. Smith Date Signed

Approved by: _____ _____
Frank R. Adams, Section Chief Date Signed

Summary

Examinations on December 12-16, 1983

Written examinations and operator tests were administered to four SRO and three RO candidates. A written examination was administered to one additional RO candidate. Two SROs and two ROs passed these examinations. All others failed.

REPORT DETAILS

1. Examiners

*S. Y. Smith, NRC
J. M. Johnson, EG&G
R. F. Radio, EG&G

*Chief Examiner

2. Exit Meeting

At the conclusion of the site visit the examiners met with representatives of the plant staff to discuss the results of the examinations. The examiners made the following observations concerning your training program:

a. Areas of generic weaknesses were found in the use of procedures, radiation protection, and theory, both nuclear and thermodynamic. The facility committed to place more emphasis in these areas in future training programs (Open Item 84-).

b. Areas in which the examiners believe that the candidates exhibited good training and knowledge were control room familiarization, instrumentation, and facility administrative procedures.

3. Examination Review

As a result of the facility staff review, Questions 2.10 and 6.4 of the RO and SRO examinations respectively were deleted. It was determined that although these questions were obtained from facility supplied information, a recent vendor analysis negated the requirement for this system asked for in the questions. The design change was documented in DCM-83-16.

The facility questioned the applicability of Question 3.3 of the RO examination, but provided no supporting references. The question was considered appropriate by the staff and retained because the knowledge and skills covered by this question are important to the performance of his job as described in the job task analysis.

QUESTIONS DELETED FROM WRITTEN EXAMINATIONS

Question 2.10 a. Describe the accident which the Boron Injection Tank (BIT) is designed to mitigate. (1.0)

b. Describe the design features of the BIT, i.e., how does it accomplish its function during an accident situation. (1.0)

Answer 2.10 a. The ECCS including the BIT provides shutdown capability by means of boron injection. The most critical accident for shutdown capability in the main steam line break.

b. The BIT contains a nominal 12 wt.% boric acid and is connected to the discharge of the centrifugal charging pumps. Upon receipt of an SI signal, the charging pumps provide the pressure to inject the boric solution into the RCS when the isolation valves open.

REF: I&E Training Center, Systems Manual, Chapter 4.2. Also Edison NPS, STM 13-6.

Reason for deletion: Westinghouse Analysis, W-001, provided justification why the BIT was no longer required. The Tank is still in place, however, it's contents has been replaced with boron at RCS concentration. Automatic responses to SI signals have been removed (ref: DCM-83-16).

ATTACHMENT 2
SIMULATION FACILITY FIDELITY REPORT

Facility Licensee:

Facility Licensee Docket No.:

Facility Licensee No.:

Operating Tests administered at:

Operating Tests Given On:

During the conduct of the simulator portion of the operating tests identified above, the following apparent performance and/or human factors discrepancies were observed (if none, so state): Identify the event, operation or transient during which the discrepancy was observed. Describe the discrepancy between the simulation facility and the reference plant performance as clearly and succinctly as possible. If the lack of fidelity was a human factors issue, identify the issue, system, or component involved, and describe the difference between the simulation facility and the reference plant.

ATTACHMENT 2

CONTRACT EXAMINER EVALUATION

A. Examination Information

1. Facility Name _____

2. Dates Exam Administered: Written _____
   Orals _____
   Simulator _____

3. Number of Candidates RO _____
   SRO _____
   IC _____

4. Chief Examiner _____

5. Examiner Information

Name	Lab or Region	Level of Effort

CONTRACT EXAMINER EVALUATION
(Continued)

B. Pre-Administration Examination Review

1. Date Contract Examiner Assistance Requested _____

2. Date written exams received at Region Office _____

3. Evaluation of Contract Examiner Written Exam

	RO	SRO
a. Excellent (Required no significant changes)	_____	_____
b. Good (Required only minor rewording)	_____	_____
c. Satisfactory (Required some question replacement)	_____	_____
d. Poor (Required significant rewrite)	_____	_____

4. Requested changes were correctly and and promptly made. If No, attach explanation.

Yes	_____	_____
No	_____	_____

5. NRC Examiner Evaluation of Contract Examiner Prepared Simulator Scenario

	RO	SRO
a. Excellent (Required no significant changes and met the requirements of ES-502)	_____	_____
b. Good (Required only minor rewording and met the requirements of ES-502)	_____	_____
c. Satisfactory (Required some question replacement and met the requirements of ES-502)	_____	_____
d. Poor (Required significant rewrite and did not meet the requirements of ES-502)	_____	_____

6. Requested changes were correctly and and promptly made. If No, attach explanation.

Yes	_____	_____
No	_____	_____

7. All required QA forms completed:

ES-107-1 Yes _____ No _____
ES-107-1 Yes _____ No _____
ES-201-6 Yes _____ No _____

CONTRACT EXAMINER EVALUATION
(Continued)

C. Examination Administration

1. Region examiner present
   No _____ Yes _____ Name _____

2. Contract examiners arrived at exam site at scheduled time Yes _____ No _____

3. Contract examiners had adequate copies of exams for candidates and facility reviewers Yes _____ No _____

4. Contract examiners satisfactorily performed assigned proctor duties Yes _____ No _____

5. Contract examiners audited

Name	Oral	Simulator	RO	SRO
_____	____	____	____	____
_____	____	____	____	____
_____	____	____	____	____
_____	____	____	____	____
_____	____	____	____	____
_____	____	____	____	____
_____	____	____	____	____
_____	____	____	____	____

CONTRACT EXAMINER EVALUATION
(Continued)

D. Post Examination Review - Written Examinations

1. Facility review resulted in the following number of significant changes (A significant change is a change that alters the intent or format of a question.):

   a. < 5 significant changes _____
   b. 5 - 10 significant changes _____
   c. 10 - 15 significant changes _____
   d. > 15 significant changes _____

2. Date graded examinations received in Region Office _____

3. Review and QA forms Completed

   ES-201-5 Yes _____ No _____ ES-201-6 Yes _____ No _____

4. Review of graded examinations resulted in category grades within +/- 4 percent, and overall examination grades within =/- 2 percent Yes _____ No _____
   If NO, provide explanation on Comments page.

E. Post Examination Review - Oral/Simulator Examinations

1. Required systems and number of systems evaluated in at least the minimum areas required by the ES Yes _____ No _____

2. Summary evaluations supported by individual system evaluations Yes _____ No _____

3. Overall Pass/Fail recommendations consistent with summary evaluations and documentation Yes _____ No _____

F. Comments

1. Use the attached comment sheets for any additional comments.

2. Identify each comment by Section and Item Number.

CONTRACT EXAMINER EVALUATION
(Continued)

G. Certification

1. Form completed by

_____ _____
Signature Date

2. Regional Operator Licensing Section Chief

_____ _____
Signature Date

CONTRACT EXAMINER EVALUATION
(Continued)

Item Number	Comments

INDOCTRINATION PROGRAM FOR NEW EXAMINERS

A. Purpose

This standard describes the indoctrination program for all persons selected as NRC examiners for operator licenses. It is intended to ensure that persons initially participating in the examining program are given sufficient orientation to enable them to administer examinations in a manner consistent with current practices and standards. Although these standards apply directly to NRC examiners, similar procedures shall be applied for consultant and contractor examiners.

It is essential that all areas within the scope of 10 CFR 55 are equitably and completely covered in the examinations given to candidates and that examinations are administered with a high degree of consistency and uniformity in both level of knowledge required and content of the examination. This ensures that the basic requirement of equal treatment of all candidates is accomplished.

B. Indoctrination Program

The following program is recommended as a minimum indoctrination program for new examiners:

1. Headquarters/Region Indoctrination

Each new examiner should begin his indoctrination in the headquarters office of the Operator Licensing Branch (OLB) or in the regional offices. During a minimum period of 2 days, the branch chief or appropriate section leader or section chief should discuss the program, as outlined in Items 2 and 3 below, and acquaint the new examiner with branch administrative procedures that apply directly to operator licensing. Specifically, expected professional decorum during the conduct of an examination will be described. Examples of inappropriate behavior based on previous experience will be discussed, so that the new examiner will clearly understand the need to maintain the highest standards of professional presence when in contact with facility licensees and candidates. The section leader or section chief will develop and provide the new examiner with a training program, discuss the program with the new examiner, and determine a schedule for completion of the program. Special attention should be given to ensuring that the new examiner has firsthand knowledge of plant operations. Depending on education, training, and experience of a new examiner, the section leader or regional section chief may require that the examiner participate in one or more of the following training programs:

a. nuclear power plant fundamentals

b. plant systems

c. plant operations

(1) simulator

(2) onsite training and observation (guidelines are included as Attachment 1 to this standard. The scope and length of observation training should be tailored to the new examiner's previous experience.)

d. examination methods

2. Provision of Briefing Materials

Each new examiner shall be supplied by headquarters or the regional office with the following:

a. copies of 10 CFR 2, 9, 20, 50, and 55

b. copies of each Operator Licensing Examiner Standard

c. copies of instruction manuals for accessing the examination questions bank

d. other general information that may be considered pertinent to the program

3. Discussion of Briefing Materials

A certified examiner will discuss the program with the new examiner, using the briefing materials as a basis. This discussion will permit clarification of objectives and content which are often, by necessity, couched in statutory language. Use of computer aids will be demonstrated to ensure that the new examiner candidate has access to basic information.

4. Observation of Actual Examinations

Before administering an examination, each new examiner will observe an actual reactor operator and senior reactor operator operating test by one or more certified examiners to become familiar with the methods, techniques, and time elements involved. No written discussion can adequately describe items such as level of knowledge or operating test procedure; therefore, observation of at least one actual examination, preferably on a fairly complex facility, is necessary. The examiner debriefing the examiner candidate at the completion of the examination, shall, as a minimum, have the examiner candidate complete an Operator License Examination Report, and make a recommendation. Differences in observations should be discussed with the examiner candidates during the debriefing session.

5. Discussion of Initial Examination

During the first examination administered at a power plant by the new examiner, a certified examiner shall be present to observe and subsequently discuss the examination with the new examiner. The

certified examiner shall be an NRC examiner. This observation and discussion are necessary so NRC can ensure and document that consistent techniques and requirements are being used. They will further serve to identify improved ideas and methods that may be used and to incorporate them into the program. The examiner shall prepare a written evaluation of the examiner candidate including as a minimum the "Operating test Audit," NRC Form 308, included as Attachment 2 to this standard, and forward it to the appropriate section leader. The evaluation shall include an evaluation of the candidate's knowledge, an evaluation of the candidate's program preparation and effectiveness, and an evaluation of the candidate's demonstrated ability to examine. A recommendation for certification shall be included.

6. Other Indoctrination

If considered desirable or necessary, additional indoctrination may be provided. It is the responsibility of headquarters and/or regional offices to provide all examiners with sufficient information and guidance to participate effectively in the program. No examiner should be requested to administer an examination unless both he and headquarters and/or the regional office believe that he has received sufficient orientation and training. All deficiencies and weaknesses identified in the written examination and the observed oral examination shall be discussed with the candidate. All deficiencies shall be corrected before certification.

7. Certification of Examiners

At the completion of the indoctrination period, each new examiner shall be certified by the regional branch chief to the Branch Chief, OLB, as being qualified to conduct licensing examinations of reactor operators and senior reactor operators in accordance with 10 CFR 55. If the examiner is transferred to a section that conducts examinations for reactors significantly different from those for which he was previously certified, he should receive appropriate indoctrination and training. As a mimumum the examiner should be observed conducting an operating test on the new reactor type. Certification shall be vendor specific, and additional certification shall be made for each vendor type. Entries should be made in the examiner's personnel record and upon certification headquarters will issue a certificate to the examiner. Examiners who are not certified shall not be chosen to administer examinations.

8. Annual Review

At intervals of approximately 1 year, each examiner shall be accompanied by the appropriate section leader or regional section chief, or his designated alternate, during the administration of a written examination and a minimum of one operating test. If a contractor or consultant examiner accepts assignments from two section leaders

or regional section chiefs each year, he may be audited by each supervisor on an approximately annual basis.

During this annual review the examiner and the reviewing examiner will discuss at length current examining policies and practices and other appropriate examining activities, and openly exchange views on the general subject of operator training and licensing.

At the completion of the annual review, the reviewing examiner shall complete a review form, NRC Form 308, which should be filed with the appropriate office with a copy sent to the person reviewed. The reviewer shall discuss with the examiner the evaluation of his techniques and make any suggestions for improvement.

9. Maintenance of Examiner Certification (Power Reactors)

To maintain certification an examiner shall attend refresher training at the Technical Training Center at least once in every two years, and be evaluated by his supervisor during the administration of one complete examination. For contract examiners the supervisor's evaluation may be performed by a certified NRC examiner or by the contract or lab project manager if the project manager is a certified examiner. Any examiner who has not maintained certification shall be recertified before he is used to administer operating exams. Recertification shall consist of being observed and certified by a currently certified examiner as technically competent on the vender type power reactor and as possessing the knowledge and skills necessary to administer operating examinations.

There are no requirements for maintaining certification as an examiner on research reactors.

10. Examiner's Training Meeting

OLB will schedule a meeting of all examiners, usually annually, during which new examining methods and procedures and relevant operating experience will be discussed and all examiners will be able to exchange information and experience that will assist other examiners. All examiners will be expected to attend. Schedules for examinations and training should be adjusted as necessary to minimize conflicts with the examiner's conference. When sufficient examiner training and retraining programs are in place at the Technical Training Center or other facilities and effective procedures for exchange of operating experience and other information have been developed, the need for an annual training meeting will be reevaluated.

ATTACHMENT 1

OBSERVATION TRAINING PROGRAM

TRAINING OBJECTIVES

1. To familiarize the potential operator licensing examiner with an operating power plant of the same nuclear steam supply system (NSSS) type as that for which he will be conducting examinations

2. To acquaint the potential examiner with the day-to-day nuclear station routine

3. To acquaint the potential examiner with a typical station's records and procedures

4. To expose the potential examiner to nuclear plant maintenance conducted under radiological control regulations

GENERAL COMMENTS

1. The plant to be used may be any operating power plant - the objective will be to select a plant that is most typical of the majority of plants of the specific type the potential examiner will be examining.

2. The schedule for the plant also will consider that plant with the most significant upcoming events, i.e., fuel loading, turbine maintenance, load changes, surveillance testing, and plant startup/shutdown.

3. The course will be conducted after the potential examiner has completed the required academic courses - when the training will be most meaningful to him.

4. The observation guide is just that - a guide. If an event of interest occurs (such as a major surveillance or plant recovery from a scram), the potential examiner should adjust his schedule so that he will be able to observe the event.

5. The potential examiner shall observe all rules and regulations in effect at the facility.

6. The potential examiner shall only observe operation of equipment; he shall not actually operate equipment (with the exception of portable radio equipment, as authorized by the facility).

7. The potential examiner shall not request any equipment to be operated, nor any tests or surveillances to be conducted.

8. The potential examiner shall arrive at the site sufficiently early to observe the shift turnover.

9. After observing an event (e.g., surveillance, equipment test, maintenance, startup, and shutdown) or tracing a system, the potential examiner shall record it in the space provided on the daily training schedule. Once the observation training has been completed, the training schedule will be filed in the examiner's training folder.

10. The section leader or regional section chief or a certified examiner designated by him to be in charge of the potential candidates observation training will provide a list of systems to be traced out.

11. During this training period, the potential examiner should observe the use of procedures by the operators and follow the event with a spare copy of the procedures, if possible.

12. The potential examiner should pay attention to administrative procedures (e.g., tag outs, jumper log, and key log) used by the operator and shift supervisor.

TYPICAL DAY

1. Review previous day's control room log.

2. Review previous day's control room operation and discuss unusual events with instructor.

3. Review day's control room schedule and observe any periodic surveillance tests to be run, any load changes or equipment changes to be made, and startups or shutdowns.

4. Review previous day's chemistry and radiological logs.

5. Review day's radiological control schedule and observe any special sampling or radiological procedures to be performed.

6. Review previous day's maintenance log.

7. Review day's maintenance schedule and observe any special maintenance to be performed, e.g., control rod drives.

8. Proceed to scheduled plant area and begin day's tasks.

COURSE SCHEDULE

	WEEK 1							WEEK 2							WEEK 3							WEEK 4						
	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S
Shift	2	2	2	2	2	0	0	3	3	3	3	3	0	0	4	4	4	4	4	0	0	2	2	2	2	2	0	0
Day Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28

Shift:

2 - days (8 am-4 pm)
3 - afternoon (4 pm-12 midnight)
4 - graveyards (12 midnight-8 am)
0 - off

OBSERVATION TRAINING SCHEDULE

		Events Observed/Systems Traced
Day 1	Administrative Requirements (RADCON Training, Security Briefing)	
Day 2	Administrative Requirements	
Day 3	Plant Orientation - Control Room	_____
	- Shops	_____
	- General Plant Layout	_____
Day 4	Review Logs - Control Room	_____
	- Maintenance	_____
	- Rad Control	_____
	Tour - Control Room	_____
	Review - Plant Evacuation Procedure	_____
	Daily Recapitulation	
Day 5	Review Logs - Control Room	_____
	- Maintenance	_____
	- Rad Control	_____
	Tour - Control Room	_____
	Daily Recapitulation	
Day 6	Off	
Day 7	Off	
Day 8	Review Logs - Control Room	_____
	- Maintenance	_____
	- Rad Control	_____
	Tour - Electrical Distribution	_____
	- Breaker Operation	_____
	- Electrical Maintenance	_____
	Daily Recapitulation	
Day 9	Review Logs - Control Room	_____
	- Maintenance	_____
	- Rad Control	_____
	Tour - Control Room	_____
	Daily Recapitulation	

		Events Observed/Systems Traced
Day 10	Review Logs - Control Room	
	- Maintenance	
	- Rad Control	
	Tour - Control Room	
	- Turbine Auxiliary Systems	
	Daily Recapitulation	
Day 11	Review Logs - Control Room	
	- Maintenance	
	- Rad Control	
	Tour - Rad Waste	
	- Health Physics	
	Daily Recapitulation	
Day 12	Review Logs - Control Room	
	- Maintenance	
	- Rad Control	
	Tour - Refueling Floor	
	Daily Recapitulation	
Day 13	Off	
Day 14	Off	
Day 15	Review Logs - Control Room	
	- Maintenance	
	- Rad Control	
	Tour - Control Room	
	Daily Recapitulation	
Day 16	Review Logs - Control Room	
	- Maintenance	
	- Rad Control	
	Tour - Equipment Operator	
	Daily Recapitulation	
Day 17	Review Logs - Control Room	
	- Maintenance	
	- Rad Control	
	Tour - Instrumentation and Control Tech	
	Daily Recapitulation	

		Events Observed/Systems Traced
Day 18	Review Logs - Control Room	
	- Maintenance	
	- Rad Control	
	Tour - Reactor Building	
	Daily Recapitulation	
Day 19	Review Logs - Control Room	
	- Maintenance	
	- Rad Control	
	Tour - Reactor Building	
	(a) Emergency Core Cooling Systems	
	(b) Process Instrumentation	
	Daily Recapitulation	
Day 20	Off	
Day 21	Off	
Day 22	Review Logs - Control Room	
	- Maintenance	
	- Rad Control	
	Tour - Turbine Building	
	Daily Recapitulation	
Day 23	Review Logs - Control Room	
	- Maintenance	
	- Rad Control	
	Tour - Area Radiation Monitors (Observe Levels and Locations	
	- Turbine Building	
Day 24	Review Logs - Control Room	
	- Maintenance	
	- Rad Control	
	Tour - Results Shop/Rad Control Lab (Observe Rad Control Procedures and Analysis)	
	- Reactor Protection System and Reactor Process Instrumentation	
	Daily Recapitulation	

		Events Observed/Systems Traced
Day 25	Review Logs - Control Room	
	- Maintenance	
	- Rad Control	
	Tour - Control Room	
	Daily Recapitulation	
Day 26	Review Logs - Control Room	
	- Maintenance	
	- Rad Control	
	Tour - Control Room	
	Daily Recapitulation	
Day 27	Off	
Day 28	Off	

HOMEWORK

1. Read station Technical Specifications.
2. Review system description before inplant tour.
3. Review system operating procedures.
4. Review station emergency procedures.
5. Review radiological control fundamentals.

Attachment 2
Operating Test Audit

ES-105-2

NRC FORM 308 5/87 — U.S. NUCLEAR REGULATORY COMMISSION

OPERATING TEST AUDIT

TYPE OF EXAM: ☐ RO ☐ SRO UPGRADE ☐ SRO INSTANT ☐ INITIAL ☐ RETAKE ☐ REQUALIFICATION

EXAMINER	FACILITY	
APPRAISER	DATE APPRAISED	DATE OF LAST APPRAISAL

RATING FACTORS	EXCEL	GOOD	FAIR	POOR	COMMENTS
1. CONFORMANCE TO THE EXAMINER STANDARD ES-302					
a. Administrative Topics:					
b. Control Room Systems					
c. Facility Walkthrough					
d. Integrated Plant Operations					
2. KNOWLEDGE OF FACILITY AND ITS PROCEDURES					
a. General Knowledge of Facility					
b. Specific Knowledge of Facility					
c. Specific Knowledge of Facility Procedures					
3. ABILITY TO EVALUATE CANDIDATE'S KNOWLEDGE					
a. Quality of Questions					
b. Asks Follow Up Questions When Necessary					
c. Appropriate Questions for Type of Candidate					
d. Test of Candidate's "Boardsmanship"					

4. DEMEANOR OF EXAMINER (Comment Required)

5. EXAMINATION REPORT
   a. Comments Justified
   b. Summary Evaluations Adequately Supported
   c. Complete and Accurate Report

6. COMMENTS

Examiner Standards

ADMINISTRATION OF EXAMINATIONS AT MULTIUNIT POWER STATIONS

A. Purpose

This standard specifies the policy and evaluation methods for examination of reactor operators and senior reactor operators who apply for licenses at multiunit power stations. This standard also may be used for guidance on examination requirements for identical or similar units not located at the same site.

B. Background

In the construction of a dual or multiunit power station, the units are normally brought on line with approximately 1 to 2 years between the fuel load dates of each unit. When the second (or subsequent) unit is brought on line most, if not all, of the candidates will hold current licenses on the first unit. If the units are nearly identical, there are provisions for waiver of examination requirements providing certain conditions are met.

The three conditions specified in 10 CFR 55.47 are that the applicant

1. has had extensive actual operating experience at a comparable facility as determined by the Commission, within 2 years before the date of application;

2. has discharged his or her responsibilities competently and safely and is capable of continuing to do so and;

3. has learned the operating procedures for, and is qualified to operate competently and safely, the facility designated in the application.

Before 1979, it was the practice of the Operator Licensing Branch (OLB) to require each utility that wanted its operators and senior operators to be dual licensed to administer the appropriate training to fulfill the requirements of 10 CFR 55.47(a),(1),(2), and (3). The utility would be responsible for the evaluation of this training by administering an examination that was reviewed by the NRC.

As a result of the accident at Three Mile Island, Unit 2, the NRC required a higher level of training of the operators and greater confidence in the testing requirements. OLB, therefore, required a complete NRC-administered examination in view of the 10 CFR 55.47 waiver policy. The training programs have been significantly upgraded in the last few years, and the NRC has further increased confidence in the examination requirements through NRC-administered requalification examinations. Requests for waivers will be favorably considered providing the facility has sufficient justification concerning the degree of similarity between the units and the details of the training and certification program.

For replacement examinations at a dual or multiunit station, the candidate must have completed the training program for all units with emphasis on the differences. The NRC examination will then test the candidate on all features of the station.

C. Criteria for Dual Licensability

For a reactor operator or senior reactor operator to be eligible to hold simultaneous valid licenses on more than one nuclear facility, the utility must justify to the Commission that the differences between the units are not so significant that they impact the ability of the licensed personnel to operate safely and competently both or all facilities. Further, the utility must submit for NRC review the details of the training and certification program. The analyses and summary of the differences that must be performed will include

1. facility design and systems relevant to control room personnel
2. Technical Specifications
3. procedures, primarily abnormal and emergency operating procedures
4. control room design and instrument location
5. operational characteristics

The utility also should describe the expected method of rotating personnel between units and the refamiliarization to be conducted before responsibility on a new unit is assumed. Generally, only those facilities designed by the same nuclear steam supply system vendor and operated at approximately the same power level will be considered for dual licensability. Examples of facilities (and vendors) where dual (or multi) licenses have been issued are:

Facility	Vendor
Oconee 1, 2, and 3	Babcock & Wilcox
Calvert Cliffs 1 and 2	Combustion Engineering
Browns Ferry 1, 2, and 3	General Electric
Brunswick 1 and 2	General Electric
Dresden 2 and 3	General Electric
Peach Bottom 2 and 3	General Electric
Farley 1 and 2	Westinghouse
Point Beach 1 and 2	Westinghouse
Salem 1 and 2	Westinghouse
Surry 1 and 2	Westinghouse

Dual licensability will not be automatically denied for those facilities failing to meet the criteria of same vendor and similar power level. However, special justification must be submitted for review and approval by the NRC. Exceptions are rare and are usually limited to selected operations management personnel.

D. Waiver of Examination

In addition to the three criteria specified in 10 CFR 55.47, the NRC may require additional justification before granting waivers of examination requirements for second or subsequent units. The two criteria are

1. a formal training and evaluation program in the five categories of plant differences specified in Paragraph C of this standard

2. satisfactory performance on the most recent NRC-administered requalification examination

Instead of Criterion 2 above (or additionally if the situation warrants) other examination requirements may be imposed such as NRC-administered operating tests and/or written examinations on the plant differences. Submittals should be requested and evaluated by the regional office. Results of the evaluations should be submitted to the Director, Division of Licensee Performance and Quality Evaluation, NRC, for concurrence.

E. Hot or Replacement Examinations at Multiunit Stations

This section describes the examination requirements at those stations where both (or all) units are in an operational status (have received operating licenses and/or are commercial). Candidates may apply for dual or (multi) licenses, assuming the criteria are met, and be examined simultaneously on all applicable units. The operating tests and written examinations shall be developed in accordance with the appropriate standards but must include questions that investigate the candidate's knowledge of the different design, procedural, and operational characteristics. It is recommended that approximately 10% of the written examination include questions of this nature. These questions should not be confined to a specific category. For example, plant differences are most evident in system design, but design differences usually require different operating procedures. Identical plants may have different fuel designs, and pressurized-water reactors (PWRs) will have different boron concentrations. Questions on nuclear theory can be developed from these considerations.

During the course of the operating tests, the examiners should diversify their coverage of the units and not become predictable in conducting examinations only on one unit. Different candidates may be examined on different units, or a specific candidate may be asked to explain how control board layout or system/instrumentation differences may require different procedural actions between one unit and another.

Many dual or multiunit stations will have a simulation facility that is modeled after only one unit. During the course of the operating test, the examiner should ensure that the candidate is properly tested on the different systems, control board layout, and other aspects of the other unit(s). Following the simulation facility portion of the operating test on Brown's Ferry Unit 1, for example, the control room portions of the operating test should be conducted primarily on Unit 2 and/or Unit 3.

F. Examination Requirements on Different Units

Different units owned or managed by a single utility are defined for purposes of this standard as:

1. same vendor manufacturer but significantly different age and/or power level (e.g., Dresden Units 1 and 2).

2. same vendor manufacturer and similar units but different location (e.g., Sequoyah and Watts Bar, Byron and Braidwood).

3. different vendor manufacturer (PWR only) but located at the same site (e.g., Arkansas Units 1 and 2, Millstone Units 2 and 3).

Generally, personnel will not be examined on or allowed to hold licenses on different units simultaneously. Although some allowances have been made for this in the past, future exceptions will be rare.

G. Waivers of Portions of the Examinations for Previously Licensed Operators

Waivers of the examinations will be considered depending on the justification submitted by the utility as provided for in 10 CFR 55.47. For personnel licensed on one facility and transferring to another, written examination categories such as theory (Categories 1 and 5) may be waived and abbreviated operating tests concentrating on plant differences may be administered. Requests for waivers in these instances should be evaluated by the regional office. Headquarters should concur with the results of the evaluations. Examiners will be notified of such waivers through the appropriate section leader or regional section chief and on the Examination Assignment Form.

PRE-ADMINISTRATION QUALITY ASSURANCE PROGRAM FOR REVIEW OF WRITTEN EXAMINATIONS

A. Purpose

This standard defines the procedure to be followed for quality assurance (QA) review of written examinations before their administration.

B. Responsibility

Examiners should review their own examination in detail, as discussed in this standard and in Standard ES-201. The appropriate regional section chief is responsible for ensuring that an independent review is conducted of all written examinations. The review shall be performed by an examiner other than the author. The QA review required by this standard is a detailed review by the preparing examiner and an independent reviewer to ensure examination quality and consistency. The Section chief will then certify the review has been completed prior to examination administration.

C. Review Procedure

Both the examination author and the reviewer should use the "Written Examination Quality Assurance Checkoff Sheet," ES-107 Attachment 1, to document their review. As a minimum, the following items should be checked by the Exam Author and the reviewer.

1. Review all questions for clarity of intent.

2. Review all questions for applicability of terminology and systems to facility. Ensure all questions are in proper category.

3. Review all categories for weights assigned, in accordance with Standards ES-203 and ES-403.

4. Verify that the totals of points for questions in each category are correct and that these totals correspond to weights given on the cover sheet.

5. Verify that no single question and/or topic is worth more than 20% of that category.

6. Verify that a representative sampling from the items in 10 CFR 55.41 for reactor operators (ROs) and 55.43 senior reactor operators (SROs) are covered in the examination. Standards ES-202 and ES-402 group these subjects in the format required for power reactor examinations, and Standard ES-204 groups these subjects in the format required for non-power reactor examinations.

*7. Review all questions and answer keys to ensure there is no double jeopardy.

8. Review the answer key to ensure all questions are answered concisely and clearly. Each question should have numerical values assigned for partial credit; that is, when the question elicits a complex multifaceted response, a scheme should be enumerated for scoring each of these facets. For example, a single question worth 3 points of a 25-point category might have as many as 10 facets, each of which should be assigned a value.

9. Verify that there is a reference to the plant training material for each answer, if available.

10. Review questions and answers to ensure they correspond to the required level of knowledge (i.e., RO or SRO level) as described in Standard ES-202.

11. Ensure that "lone questions" of a section are flagged on a previous page by a "continued on next page" statement.

12. Ensure that each category is concluded with the statement "End of Category _____".

13. Verify proper distribution of topics within a category. For example, category 2 should include a variety of questions on major, auxiliary, engineered safety systems and electrical systems.

D. Documentation

When the review is completed, the "Written License Examination Quality Assurance Checkoff Sheet," attachment 1 of this standard, should be approved by regional section chief and filed with the record copy of the examination.

*See Standard ES-202, p. 4 of 6.

Attachment 1

WRITTEN EXAMINATION QUALITY ASSURANCE CHECKOFF SHEET

ITEM	DESCRIPTION	AUTHOR'S INITIALS/DATE	REVIEWER'S INITIALS/DATE
1	Clarity of intent of questions	_____	_____
2	Applicability of questions to facility	_____	_____
3	Category weights correct. All questions in proper category.	_____	_____
4	Each category total correct and corresponding to weights on the cover sheet	_____	_____
5	End of each category indicated by statement "End of category ____	_____	_____
6	No question worth more than 20% of that category weight	_____	_____
7	Verify that 10 CFR 55.41 and 55.43 sampling is appropriate.	_____	_____
8	No double jeopardy questions	_____	_____
9	Answers clear and concise on answer key	_____	_____
10	References to plant material for each question, as applicable	_____	_____
11	Proper level of knowledge (RO/SRO)	_____	_____
12	Partial credit points indicated, if applicable	_____	_____

Author: _____ Date: _____

Contract Reviewer:
(If applicable) _____ Date: _____

Region Reviewer: _____ Date: _____

Review Completed: _____ Date: _____
(Section Chief)

Facility/Unit: _____ Exam Date: _____

Senior / / Operator / /

POST-ADMINISTRATION QUALITY ASSURANCE PROGRAM FOR REVIEW OF GRADED EXAMINATIONS

A. Purpose

This standard defines the procedures to be followed for quality assurance (QA) review of written examinations after they are graded by the examiners.

B. Responsibility

Examiners should review their own grading in detail, as discussed in this standard and in Standard ES-201. The appropriate regional section chief is responsible for ensuring that an independent review is conducted of written examination grading. The QA review required by this standard is only a spot check, or sampling test, after the detailed review by the grading examiner.

Whenever possible the written examination shall be graded by the examiner who prepared the examination. If, due to class size or unavailability of the preparing examiner, the examination is graded in whole or in part by an examiner who did not prepare the examination, then a more thorough supervisory review of the grading should be made. The regional office operator licensing section chief shall be notified that an examiner who did not prepare the examination graded or participated in the grading of the written examination.

C. Review Procedure

The reviewer should use the "Examination Grading Quality Assurance Checkoff Sheet," Attachment 1 of this standard to document his review. As a minimum, the following items should be checked:

1. Spot check at least 50% of the examination category totals and overall grades assigned for errors in addition for each examination.

2. Review in detail the answers and grades assigned for at least one question in 50% of the categories for 50% of the applicants. This review will allow the examiner to determine consistency of response and grades, indications of cheating or collusion, and performance on individual questions.

3. Review and recalculate grading for all borderline cases (i.e., 70% ± 2% for each category or 80% ± 2% overall).

4. Compare the highest failing and lowest passing examination, to ensure that the fail/pass decision is justified. Check at least one question in every category in both cases. Confirm failures with the next highest failing examination, if appropriate.

5. Spot check other failing examinations to be assured of justification for denial of license.

6. Review overall performance in each category and individual questions to determine if there are problems in the facility training program, in the wording of the questions, or in other areas.

7. If the above reviews indicate significant problems, conduct a detailed review, as necessary.

D. Documentation

When the QA reviewer has completed his review, the "Examination Grading Quality Assurance Checkoff Sheet," ES-108 Attachment 1, should be approved by the regional section chief and filed with the record copy of the examination.

Note: Reviewers shall document all changes to grading. The original grade should be lined out, but still legible, and the revised grade added with a brief explanation on the exam paper for the change. The change should be initialed by the reviewer. "White out" or other methods that obscure the original grading shall not be used to change grades.

Attachment 1

EXAMINATION GRADING QUALITY ASSURANCE CHECKOFF SHEET

Grader(s) Name _____

Facility _____ Date of Exam _____

Examination: Operator _____ Senior _____

Post-Examination Procedures

Item	Description	Examiner Initial/date	Review Initial/date
1.	No apparent indication of cheating or collusion	_____	_____
2.	Partial credit consistent for each candidate	_____	_____
3.	Section and cumulative scores checked for addition (Reviewer spotcheck 25% of category totals)	_____	_____
4.	Grading for all borderline cases reviewed (70% ± 2%/ section or 80% ± 2% overall)	_____	_____
5.	Detailed review, 1 question per category, 50% of categories, 50% of applicants	_____	_____
6.	Highest failing/lowest passing examinations compared to justify fail/pass decision	_____	_____
7.	All other failing examinations checked to be assured of justification for failure	_____	_____
8.	Individual question performance check for training deficiencies, wording problems, etc.	_____	_____

Grader: _____ Date: _____

Contract Reviewer: _____ Date: _____
(If applicable)

Region Reviewer: _____ Date: _____

Review Completed: _____ Date: _____
Section Chief

ELIGIBILITY REQUIREMENTS FOR OPERATOR OR SENIOR OPERATOR LICENSE CANDIDATES AT POWER REACTORS.

A. Purpose

This standard lists the various requirements on training, educational experience, and certification that must be met before a candidate can apply for an NRC reactor operator or senior operator license. The purpose of this standard is to aid the examiners in their review of individual applications to determine the eligibility of candidates before the NRC reactor operator or senior reactor operator licensing examination.

B. Reactor Operator Eligibility Requirements

1. Experience Requirements

a. Minimum of 2 years of power plant experience of which at least 1 year shall be nuclear power experience. Training time to meet the requirements for this license shall not be counted as a part of this minimum 2 years of power plant experience, and;

b. Minimum of 6 months at the site for which the license is sought.

c. Military power (propulsion) plant operating experience may be substituted on a one for one basis for the power plant experience required in paragraph B.1.a.

2. Training Requirements

a. Minimum of 3 months training in the control room as an extra man on shift on a day-to-day basis, in the capacity of the position for which the applicant seeks a license and under the direct supervision of the licensed operator or senior operator assigned, to the licensed position in the control room and on the plant's operating shift.

b.[1] Training in (1) heat transfer, (2) fluid flow, (3) thermodynamics, (4) use of installed plant systems to control or mitigate an accident in which the core is severely damaged, and (5) reactor and plant transients.

c.[1] Total of 500 hours of lectures on: (1) principles of reactor operation, (2) design features of the nuclear power plant involved, (3) general operating characteristics of the nuclear power plant involved, (4) instrumentation and control systems, (5) safety and emergency systems, (6) standard and emergency operating procedures, and (7) radiation control and safety procedures.

d.[1] Satisfactory completion of a NRC approved training program of at least one week duration at a nuclear power plant simulator. The simulator training center should certify the applicant's ability during a reactor startup to manipulate the controls, keep the reactor under control, predict instrument response, use instrumentation,

follow procedures, and explain annunciator alarms that occur during operation.

e. Manipulation of the controls of the facility (actual plant, not simulator) during five significant control manipulations that effect reactivity or power level per 10 CFR 55.31(a)(5). Every effort should be made to diversify reactivity changes.

f. Participation in reactor and plant operation at power levels of at least 20% power operation for one month.

3. Education Requirements

a. High school diploma or equivalent.[2]

C. Senior Reactor Operator - Candidates Without 4-Year Degree in Engineering or Applied Science

1. Experience Requirements

a. Minimum of 4 years of responsible power plant experience as a control room operator (fossil or nuclear) or as a power plant staff engineer involved in the day-to-day activities of the facility commencing with the final year of construction. Of this, 2 years shall be nuclear power plant experience, and

b. Licensed reactor operator at the same facility for at least one year. Experience for 1 year as a licensed reactor operator or senior reactor operator at another nuclear power plant may be substituted. Actual operating experience for 1 year in a position that is equivalent to a licensed operator or senior reactor operator at military propulsion reactors may be substituted on a one-for-one basis. Navy ratings that are considered equivalent are (1) Propulsion Plant Watch Officer, (2) Engineering Watch Supervisor, (3) Engine Room Supervisor, (4) Reactor Operator, (5) Chief, Reactor Watch, (6) Engineering Officer of Watch, and (7) Propulsion Plant Watch Supervisor, and

c. Minimum of 6 months at the site for which the license is sought.

d. Candidates who substitute experience and who do not have at least one year as a licensed operator at the facility for which the license is sought, must also complete the training requirements of parts D.2.d, e and f of this standard; and these candidates shall receive an instant SRO operating examination.

2. Training Requirements

a. Minimum of 3 months on shift as an extra person in training for a position as senior reactor operator under the direct supervision of a licensed senior operator assigned to a licensed senior operator position on an operating shift.

b.[1] Training in (1) heat transfer, (2) fluid flow, (3) thermodynamics, (4) use of installed plant system to control or mitigate an accident in which the core is severely damaged, (5) reactor and plant transients, (6) reactor theory, (7) handling and disposal of radioactive materials, (8) specific operating characteristics of the plant(s) for which the license is sought, (9) fuel handling and core parameters, and (10) administrative procedures, conditions and limitations.

3. Education Requirements

a. High school diploma or equivalent.[2]

D. Senior Reactor Operator - Candidates With 4-Year Degree in Engineering or Applied Science

1. Experience Requirements

a. Minimum of 2 years of responsible nuclear power plant experience which may be as a staff engineer involved in the day-to-day operation of the plant, and,

Note: A plant staff engineer involved in the day to day operation of the plant is defined to be an individual whose normal duties require familiarity with the plant operating systems, integrated plant response and facility operating procedures.

b. Minimum of 6 months at the site for which the license is sought.

2. Training Requirements

a. Minimum of 3 months on shift as an extra person in training for an SRO position under the direct supervision of a licensed senior operator assigned to a licensed senior operator position on an operating shift. This training requirement is in addition to the experience requirement of D.1.b above.

b.[1] Training in (1) heat transfer, (2) fluid flow, (3) thermodynamics, (4) use of installed plant systems to control or mitigate an accident in which the core is severely damaged, (5) reactor and plant transients (6) reactor theory,(7) handling and disposal of radioactive materials, (8) specific operating characteristics of the plant(s) for which the license is sought, (9) fuel handling and core parameters, and (10) administrative procedures, conditions and limitations.

c.[1] Total of 500 hours of lectures on: (1) principles of reactor operation and reactor theory, (2) design features and specific operating characteristics of the plant(s) involved, (3) instrumentation and control systems, (4) safety and emergency systems, (5) standard and emergency operating procedures, (6) administrative procedures, conditions and limitations, (7) radiation control and safety procedures, and (8) handling and disposal of radioactive materials.

d.[1] Satisfactory completion of a NRC approved training program of at least one week duration at a nuclear power plant simulator. The simulator training center should certify the applicant's ability during a reactor startup to manipulate the controls, keep the reactor under control, predict instrument response, use instrumentation, follow procedures, and explain annunciator alarms that occur during operation.

e. Manipulation of the controls of the facility (actual plant, not simulator) during five significant control manipulations that effect reactivity or power levels per 10 CFR 55.31(a)(5). Every effort should be made to diversify reactivity changes.

f. Satisfactory completion of an SRO training program equivalent to a cold-license candidate training program.

g. Participation in reactor and plant operation at power levels of at least 20% power operation for one month.

3. Education Requirements

a. At least a 4-year degree in engineering or applied science.

E. Eligibility Requirements for Cold Examinations

1. Cold examinations are those examinations administered before initial criticality.

2. Each candidate has to satisfactorily complete the training programs that are submitted in Section 13.2 of the Final Safety Analysis Report and approved by the NRC. This review and approval is based on information contained in Section 13.2.1 of the Standard Review Plan (SRP) (NUREG-0800).

Note: It has been typical for these NRC approved training programs to require 10 reactor startups on a research reactor. This requirement may be waived if an Institute of Nuclear Power Operations (INPO) accredited plant reference simulator training program has been completed. (See ES 111)

3. The letter sent to all power reactor applicants and licensees from H. Denton, NRR, dated March 28, 1980, stated that precritical applicants (candidates) will be required to meet unique qualifications designed to accommodate the fact that their facility has not been in operation. Generally, these unique qualifications apply to areas of experience at their own plant because the plant has not yet been in operation. For example,

a. Cold training programs for persons with no previous experience are required to contain observation programs at plants that are as similar to their own as possible.

b. Cold training programs for persons with no previous experience usually contain simulator training programs.

The approved cold training program should be used as the basis for determining cold examination eligibility.

4. Eligibility for examinations for licenses at second or third units of multiunit stations is addressed in Standard ES-106.

F. Contents of Applications

1. Each application shall be made on NRC Forms 398 and 396. Forms 398 and 396 must be completely filled out and signed by the appropriate personnel.

2. A report of medical examination (NRC Form 396) completed by the facility licensee shall be submitted. The application is not complete until NRC forms 396 and 398 are received. The applications should be received by the region 60 days prior to the examination date.

3. For Plants which have NRC approved operator or senior operator training programs the listing of training, experience and experience details (blocks 12, 13 and 14 on NRC form 398) is not required for approval of the form. However, for record purposes, it is requested that these items still be listed. This is only applicable to candidates certified to have successfully completed an NRC approved training program. This training program shall include a systems approach to training and use of a simulation facility acceptable to the NRC.

4. If a candidate is reapplying following a denial, 10 CFR 55.35 applies and a new complete form 398 and 396 shall be submitted. Training received after the denial should be highlighted in item 15, comments. The NRC will not process a reapplication for a candidate with an outstanding appeal of a licensing decision.

   a. If a candidate's application has been denied because of failure of the written or operating test or both, a new application may be filed 2 months after the date of denial. A third application can be filed 6 months after date of denial and successive applications 2 years after date of denial. The NRC will not process a reapplication for a candidate with an outstanding appeal of a licensing decision.

   b. If the candidate passed either the written or operating portion of the test, he can request a waiver from that portion already passed.

   c. The reapplication should identify those areas in which the applicant demonstrated weaknesses during the previous examination and the additional training received to correct these specific deficiencies.

   d. The medical data in support of Form NRC 396, is good for 6 months from the date the candidate's physician signs it. For reapplication following a denial or withdrawal by the license candidate the regional office may waive the requirement for a new medical certificate if the date of the original medical was within one year of the scheduled reexamination and a waiver of the requirement for a new medical certificate is requested by the applicant. The request for waiver should be made in item 15, Comments, on NRC form 398 or by separate letter

with the reapplication. The disposition of the waiver request shall be documented by a note on the NRC Form 396 originally submitted and in accordance with ES-111.

G. Renewals

1. Each operator and senior operator license shall expire six years after the date of issue.

2. Renewal applications must be made on standard NRC forms 398 and 396 and both submitted not less than 30 days nor more than 60 days prior to date of expiration. If a licensee files a proper application for renewal at least 30 days prior to expiration, the license shall not expire until the application for renewal has been denied or a new license issued. Reapplications submitted more than 60 days prior to expiration may be returned to the facility to await a more timely submittal.

3. The NRC form 398 should be complete, including experience under the current license, the approximate number of hours that he has served on the operating shift, and the number of 8 hour or 12 hour shifts per calendar quarter. A statement that the applicant has satisfactorily completed the requalification program, and evidence that the applicant has discharged his responsibilities competently and safely. Evidence of safe and competent discharge of responsibility and satisfactory completion of the approved requalification program is provided by the appropriate facility licensee signatures in block 17.c. of the NRC form 398.

4. A certification that a physician has performed the medical examination required by 10 CFR 55.21 on the form prescribed in 10 CFR 55.23 (Form NRC 396) should accompany the NRC form 398 application.

5. The license will be renewed if:

   a. The physical condition and general health of the applicant is such as not to cause operational errors that might endanger public health and safety; and

   b. The applicant:

      (1) is capable of continuing to competently and safely assume licensed duties;

      (2) has successfully completed a requalification program that has been approved by the Commission as required by 10 CFR 55.59; and

      (3) has passed the requalification examinations and annual operating test as required by 10 CFR 55.59; and

      (4) has passed an NRC administered requalification written examination and operating test during the term of the current license.

   c. There is a continued need for the applicant to operate or for a senior operator direct operators at the facility designated in the application.

d. The past performance of the appliant has been satisfactory to the Commission. In making its finding, the Commission will include in its evaluations information such as notices of violations or letters of reprimand in the applicant's docket.

e. An application is filed on NRC forms 398 and 396 at least 30 days and not more than 60 days prior to the license expiration date.

H. Failure To Meet Eligibility Requirements

1. If an applicant fails to document or meet the eligibility requirements of this standard, he shall not be permitted to sit for the examination and the administrative procedure of ES-112 section E should be followed.

I. References

1. American National Standards Institute, ANSI N 18.1-1971, "Selection and Training of Nuclear Power Plant Personnel."

2. American National Standards Institute/American Nuclear Society, ANSI/ANS-3.1-1981, "Selection, Qualifications and Training of Personnel for Nuclear Power Plants."

3. Title 10 of the Code of Federal Regulations, Part 55, "Operators Licenses."

4. ---, NUREG-0737, "Clarification of TMI Action Plan Requirements," Nov. 1980.

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

6. Title 10 of the Code of Federal Regulations section 2.103(b)(1) and (2).

[1]These training requirements can be met by successful completion of an NRC-approved training program.

[2]Equivalent is a GED certificate. Some states (e.g., New York) use a term other than GED certificate, but these certificates are equivalent to a GED certificate.

ELIGIBILITY REQUIREMENTS FOR REACTOR OPERATOR OR SENIOR REACTOR OPERATOR LICENSE CANDIDATES - NONPOWER REACTORS

A. Purpose

The purpose of this standard is to aid the examiners in their review of individual applications to determine the eligibility of candidates to be administered the NRC reactor operator or senior reactor operator licensing examination at a non power reactor. This standard lists the various requirements on training, educational experience, and certification that must be met before a candidate can apply for an NRC reactor operator or senior operator license at non power reactors.

B. Reactor Operator Eligibility Requirements

1. Certification Requirements

a. Certification by responsible facility management that the individual has received sufficient training at the facility to safely assume the duties and responsibilities of a licensed operator. (Form 398, block 17.b)

2. Training Requirements

In consideration of the individual's previous experience, training and level of responsibility, the training performed shall:

a. Be adequate to ensure the safe operation of the facility.

b. Include the topics identified in reference 1, Section 5.4.

c. Include operation of the reactor and its related systems under the supervision of licensed operators and senior operators.

3. Education Requirements

There are no formal education requirements specifically endorsed by the NRC to be eligible for a non power reactor operator examination. However, historically the NRC has viewed the education requirements of candidates for power and non power licenses to be identical. If a candidate has not completed high school or received an equivalent certification, the number of years of education shall be identified on the candidates application and evaluated for eligibility prior to examination. Successful completion of the NRC operator licensing examinations requires a knowledge of reading, writing and mathematics equivalent to that possessed by a high school graduate with the proper academic subject background.

C. Senior Reactor Operator Eligibility Requirements

1. Experience and Certification Requirements

a. Minimum of 3 years of nuclear related experience. A maximum of 2 years equivalent full-time academic training may be substituted for 2 of the 3 years. (Reference 1)

b. Certification by responsible facility management that the individual has received appropriate and sufficient training at the facility to safely assume the duties and responsibilities of a licensed senior operator. (Form 398, Block 17b.)

2. Training Requirements

In consideration of the individual's previous experience, training and level of responsibility, the training performed shall:

a. Be adequate to ensure the safe operation of the facility.

b. Include the topics identified in reference 1, Section 5.3.

c. Include operation of the reactor and its related control systems.

3. Education Requirements

There are no formal education requirements specifically endorsed by the NRC to be eligible for a non power reactor senior reactor operator examination. However, historically the NRC has viewed the education requirements of candidates for power and non-power reactor licenses to be identical. If a candidate has not completed high school or received an equivalent certification, the number of years of education shall be identified on the candidates application (Form 398) and evaluated for eligibility. Successful completion of the NRC senior operator licensing examinations requires a knowledge of reading, writing and mathematics equivalent to that possessed by a high school graduate with the proper academic subject background.

D. Contents of Applications

1. Each application for reactor operator or senior reactor operator shall be made on personal qualifications statement (NRC Form 398). Each candidate is required to submit the original and two copies of NRC form 398. Form 398 must be completely filled out and signed by the appropriate personnel. Those sections or items that are not applicable to operators at non-power reactors shall be marked "NA" to indicate they are not applicable. Additionally, training criteria contained in ANSI/ANS-15.4 (1977) N380 should be followed in completing Item No. 12 (TRAINING) on NRC Form 398.

All sections of Form 398 should be completed as per the instructions. Other pertinent information specifically for Non-Power Reactor License candidates should be completed on NRC Form 398 as follows:

Section 4: Type of Application

Items: a.2 applies only to new reactor facilities prior to criticality

f.3 not applicable to non-power facilities

e. "Reapplication" and f. "Reapplication waiver request." If the application is a reapplication subsequent to a prior failure, the requirement of 10 CFR 55.35(a), Reapplications, regarding a statement on retraining, is to be included. This requirement may be met by detailing the information in Block 12 or 15, or by a separate letter attached to the application. On reapplications any waivers to be considered are requested by checking the appropriate blocks and identifying the categories of the written exam to be waivered, if applicable.

Section 10: Current position at facility

Items: a, b, c, e, f, i are not directly applicable to non-power reactors. Therefore, the item; "other" should be used for position descriptions. For example, Director of facility, Chief Reactor Supervisor, etc. Items g and h are only for licensed personnel. A non-licensed control room operator trainee should not be listed as a control room operator (item h) but, instead, should be listed as a trainee under item j.

Section 12: Training

This section should contain only training received specifically for the license for which the application is submitted. Non-power facilities normally do not have a formalized training program, therefore, the period of training should be identified (month and year from - to) and "condensed" to the appropriate number of weeks.

Example: A candidate spends four months in training from 1 June through 30 September with two hours a week devoted to fundamentals, two hours a week tracing systems, one hour a week in the control room, and one hour a week in actual manipulation (two reactivity changes per manipulation). The "condensed" training would be from 6/84 to 10/84; Fundamental (16 week x 2 hr/week); approximately one week, plant systems observation; one week, control room operations; one week, and reactivity manipulation 32. Numbers do not have to be precise, but should be representative.

Items: 3. "Simulator Operation" and "Simulator Name(s)," are not applicable to non-power facilities.

5. "Extra Person on Shift," is not applicable to non-power facilities.

6. The entry of "continuous" or similar entry for the number of weeks in requalification is not sufficient. The acutal number of weeks (condensed in one time period) spent in requalification must be listed as per the example in Section 12 "Training".

Section 13: Experience

Experience must be current up to the date of application and fitted into the categories as well as possible. Use of items 13.5, 13.9 and 13.16; "other", should be encouraged. In all cases the experience should be briefly and fully described in Block 14.

Section 17:

Item 17 a.: Signature - Applicant

The applicant's signatures must appear on the application.

Item b. or c.: Training Coordinator and Highest Level of Corporate Management for Plant Operations

This Item is normally the Non Power Facility Director or equivalent position. "Higher" authority is not needed. If the Facility Director is also the "Training Coordinator" then he/she must sign both items.

2. A report of medical examination completed by a physician. The application is not complete until the original of both NRC forms 398 and 396 are received in the regional office. The applicant should also supply two copies of the Form 398.

3. If the candidate is reapplying for a license, 10 CFR 35.35 applies and a new Form 398 should be used. The contents of 10 CFR 55.35 are very similar to those of 10 CFR 55.31, and information that has not changed should not be duplicated on the new form.

   a. If a candidate's application has been denied because of failure of the written or operating test or both, a new application may be filed 2 months after the date of denial. A third application can be filed 6 months after date of denial and successive applications after 2 years.

   b. If the candidate passed either the written or operating portion of the test, he can request a waiver from the portion already passed.

   c. The reapplication should identify those areas in which the applicant demonstrated weakness during the previous examination and the additional training received to correct these specific deficiencies.

   d. The medical data from the initial examination to support Form NRC 396 is good for 6 months from the date the physician signs it. However, this requirement may be waived in accordance with (ES-111) item G.

E. License Restrictions (Non-power Reactors)

1. For medical reasons an operator or senior operator license may be restricted to prohibit solo operations. This restriction requires that another individual be present when these individuals perform licensed activities. For the purpose of this restriction at non-power reactor facilities, "present" means that the second individual shall be physically located within the boundaries of the facility as identified in the facility license. The second individual must be capable of summoning medical assistance and reactor operations assistance if required.

REFERENCES

1. ANSI/ANS 15.4-1977 (N308), "Selection of Training of Personnel for Research Reactors."

2. 10 CFR Part 55, "Operators' Licenses."

3. Letter to "All Non-Power Reactor Licensees," from Darrell G. Eisenhut, July 11, 1983.

GRANTING OF WAIVERS FROM THE PROVISIONS OF OPERATOR LICENSING REQUIREMENTS REQUESTED BY OPERATOR AND SENIOR OPERATOR APPLICANTS

A. PURPOSE

This standard specifies and provides guidance to the examiner of the requirements for the granting or denial of waivers that may be requested by applicants for an NRC operators license. To maintain consistency and standardization across the regions, for the granting or denying of waivers, this standard lists those waiver requests that may be routinely granted by the Regional Offices. The purpose of this standard is to clarify both the NRR (OLB) policy pertaining to waivers of the Operator and Senior Operator Licensing examination requirements and the Regional and Headquarters responsibilities and interactions for granting or denying waivers.

B. BACKGROUND

As part of decentralization of the Operator Licensing Branch (OLB) the functions of the Operator Licensing Program were transferred to the Regional Offices. The delegation of authority to the Regional Offices regarding the operator licensing functions required that waivers to Operator and Senior Operator examination requirements be administered by OLB. Many requests were made by Regional Offices to clarify the OLB policies pertaining to the waiver of Operator and Senior Operator examination requirements. As a result, several types of waiver requests, submitted by applicants, have been identified to be of a recurring nature and classified as routine. In order to provide expediency in determining the resolution of waiver requests, these standard waiver items have been delegated to the Regional Office for administration. The waiver items are identified in Paragraph D of this standard.

C. ADMINISTRATION OF WAIVERS

1. It is not the general policy of OLB to delegate waiver responsibility. However in specific waiver request cases that have well defined acceptance criteria the waiver requested may be administered by Regional Office Management. None of the waivers from the provisions of the operator licensing examination requirements shall be granted automatically but will be evaluated on a case-by-case basis. This includes those listed in Section D. The waiver request may be denied if the evaluation and judgement of the case by the Regional or Headquarters Staff so warrants. All waivers, whether granted or denied, shall be documented on the Personal Qualifications Statement (NRC-398), on which the request for a waiver was made.

2. Operator and Senior Operator Waivers

   The following list (Paragraph D) of routine waivers may be granted by a Regional Office. For any other waiver requests or special cases, OLB shall be consulted in those instances for which the Regional Office recommends approval. Waivers of experience requirements, completion of training, or completion of examinations not specifically included in the List in paragraph D should not be granted unless approved by OLB.

3. Submittal of Waiver Requests

   All waiver requests, whether routine or special, should be submitted by the applicant to the responsible region for disposition. Any waivers forwarded to OLB for review and resolution will be evaluated in conjunction with the requesting region's input and recommendations.

4. Notification of Candidates

   When the decision to grant or deny a waiver is made, the regional office shall promptly notify the candidate in writing of the disposition of the request. If time is too short to notify the candidate in writing before the exam date, the facility training representative shall be notified by telephone of the disposition of waiver requests and then followed up by a written response to the candidate. The OLB Branch Chief shall be placed on courtesy copy for letters to candidates or facility representatives, in reference to waiver requests.

D. REGIONAL ADMINISTERED STANDARD WAIVERS

1. If a candidate fails one category of the written exam (<70%), but has an overall grade of >80% and satisfactorily completes the operating exams (if administered), the Region may waive those three categories of the written exam for which the candidate received >70% and the oral and simulator examinations. This standard waiver is only applicable for the first retake exam.

2. If a candidate fails only one portion of an examination area (i.e., one section of the written or part of the operating i.e., walkthrough or simulator), the Region may waive those areas which were passed. This is only applicable for first retake examination.

3. The requirement to perform actual plant start-up may be waived if simulator start-ups have been performed. (Some utilities have included this waiver request even though their candidates have received simulator start-up certification.) Provisions of the Examiner Standards regarding cross check during the operating exam should be followed. This waiver is not applicable to research reactors and Ft. St. Vrain. (Note: By May 26, 1991, all facility licensees will be required to have certified or approved simulation facilities.)

4. A utility's request for waiver of specific FSAR training requirements may be granted when waiver of those specific requirements is authorized by the approved FSAR and the candidate otherwise meets NRC requirements. (For example, waiver of some training requirements for candidates previously licensed at a comparable facility.)

5. The requirement for receipt of license renewal applications 30 days prior to the license expiration (timely submittal) may be waived for 5 days, to allow for transit time, if all signatures on the Forms 398 and 396 are dated prior to the 30 day cut-off. The submittal will not be considered timely if received less than 25 days prior to license expiration unless positive evidence (post mark, docketing stamp or

other evidence of receipt by the U.S. Postal Service or U.S.N.R.C.) is included. The waiver will not be granted unless both the application (Form 398) and Medical Certification (Form 396) are received. If the renewal application is received less than 25 days prior to the license expiration date, and too late for processing in the regional office, the license shall expire on the expiration date. A new license may be issued when regional processing of the application is completed.

6. Up to a maximum of one month of the three months on shift in training and 10% of the applicable experience requirement may be waived for determining eligibility to sit for an examination. The waiver should be granted only if there is good cause (i.e., good faith effort by utility to complete training, no other exam administration planned for some time, license needed to meet NRC requirement), the candidate has completed all other eligibility requirements, and the utility agrees to complete training in a timely manner and certify in writing as to successful completion prior to final licensing action. The region should ensure that the utility's schedule for completion is compatible with the schedule for finalizing licensing actions.

7. The medical data in support of Form NRC 396, is good for 6 months from the examination (physical) date. Waivers may be granted on a case-by-case basis for reapplications following a license denial, a voluntary withdrawal by the license candidate or a request for an upgrade examination, i.e., a new medical certificate need not be submitted if the original medical evaluation was performed within one year of the scheduled examination or re-examination.

8. Substitutions allowed by Regulatory Guide 1.8 and ANSI N18.1 or ANSI/ANS 3.1 (depending on the facility licensee's commitment) are not considered to be waivers and, therefore, do not require approval. For example, substitution of related technical training for up to two years of experience for an SRO or up to one year for an RO is not a waiver. However, related technical training would not include training required to be eligible for the examination applied for, e.g., an SRO candidate with one year of technical school (electrical technician training at a community college), one year of RO training including nuclear fundamentals, two years of experience as a licensed RO on-shift in the control room, and 9 months of SRO training would meet the eligibility requirements. However, if after 15 months as an RO on-shift, he had been put into the SRO training course, he would not be eligible because he does not have two years of experience as required. He has 15 months of experience and 9 months of required SRO training.

9. If the facility certifies that the candidate has successfully completed an Institute of Nuclear Power Operations (INPO) accredited training program using an acceptable Simulation Facility, the Region may waive the requirement for 10 reactor startups on a research reactor typically required by NRC approved cold license training programs.

REVIEW OF INITIAL APPLICATION REJECTIONS AND ELECTION FOR REAPPLICATION

A. PURPOSE

This standard specifies the policy and procedures for (1) processing informal NRC staff reviews of initial application rejections, (2) issuance of proposed and final denials of initial reactor operator license applications, and (3) election of an applicant to reapply upon issuance of a final license application denial to reapply. This standard does not apply to renewal of licenses.

B. BACKGROUND

A reactor operator license applicant (or candidate) who has failed an examination or test is notified of his failure in writing including the nature of the deficiencies noted. The applicant is informed that he may avail himself of NRC staff informal review of his examination or test failure. Should the applicant not choose informal review, or should further informal review indicate that the applicant's examination or test failure remains appropriate, a proposed denial of the license application will be issued to the applicant pursuant to 10 CFR 2.103(b)(2) and the applicant may then request a hearing regarding the proposed denial. An applicant who has failed an examination or test may reapply for a reactor operator license pursuant to the provisions of 10 CFR 55.35 but only after his application has been finally denied. A final denial may occur in one of two ways: (1) as a result of any hearing requested by the applicant following issuance of the proposed denial of his application, or (2) as a result of an applicant's request for a final denial from the NRC by signing an Acceptance of License Application Denial and Waiver of Hearing Rights. No reapplication pursuant to 10 CFR 55.35 will be accepted in the absence of a final denial from the NRC.

Similar procedures regarding informal NRC review and the issuance of proposed denials apply to those cases where an application for a reactor operator license has been rejected by the staff because the application is incomplete or the applicant failed to meet eligibility requirements set out in Examiner Standard ES-109 or 110 or 10 CFR 55.31.

C. PROCEDURES FOR PROCESSING INFORMAL REVIEWS OF EXAMINATION RESULTS

1. Upon receipt of the letter notifying him of the examination or test results (see Attachment 1), the applicant will have three options.

   a. He may accept the examination or test results, in which case a final denial will be issued (see Attachment 2), and, if he desires to do so, he may reapply for a license pursuant to 10 CFR 55.35. The final denial letter should be issued within 10 days of receipt of the applicant's Acceptance of License Application Denial and Waiver of Hearing Rights (see Attachment 3).

   b. Within 20 days of the date of receipt of the letter notifying him of the examination or test results, he may request, in writing, an informal review of the examination or test results by the regional division

director. However, if he requests an informal review of the examination or test results by the regional office division director, he may not reapply for a license pursuant to 10 CFR 55.35 because a final denial letter has not been issued.

c. He may allow the 20 days to expire, at which time the letter notifying him of the examination or test results constitutes the proposed denial of his application, and he may then request a hearing as provided by 10 CFR 2.103(b)(2). A hearing request must be submitted, in writing, within 40 days of the date of receipt of the letter notifying him of the examination or tests results. (If desired, the applicant may submit the letter requesting a hearing prior to the expiration of the 20 day period from the date of receipt of the letter notifying him of the examination or test results.) However, if he requests a hearing on the proposed denial of his license application, he may not reapply for a license pursuant to 10 CFR 55.35 because his application for a license has not been finally denied.

2. If he requests an informal review of the examination or test results by the regional division director, he should identify the written examination questions or portions of the operating test he is alleging were graded incorrectly or too severely. In addition, he should provide the bases, with plant system descriptions, operating instructions, procedures and other references, simulator logs, chart recorder traces, or computer printouts to support the alleged improper grading. The package containing the written examination questions or portions of the operating test for which the applicant is requesting the review and the supporting documentation must reach the regional office within 10 days of the date of receipt of the letter requesting an informal review of the examination or test results.

3. Upon receipt of the documentation supporting the applicant's informal appeal, the region should perform its review in accordance with the guidance in paragraph D. The region should complete their review and issue a letter either sustaining or overturning the examination or test results within 30 days of receiving the examination or test review package (see Attachment 4). If the examination or test failure is overturned, the license should be issued concurrently with the letter. The license is not to be backdated.

4. If the regional division director sustains the examination or test results, a letter (see Attachment 4) will be issued to the applicant informing him of his decision. Upon receipt of the letter sustaining the examination or test results, the applicant once again has three options.

a. He may accept the examination or test results, in which case a final denial will be issued (see Attachment 2), and, if he desires to do so, he may reapply for a license pursuant to 10 CFR 55.35. The final denial letter should be issued within 10 days of receipt of the applicant's Acceptance of License Application Denial and Waiver of Hearing Rights (see Attachment 3).

b. Within 20 days of the date of receipt of the letter sustaining the examination or test results, he may request, in writing, an informal review of the examination or test results by notifying the Director,

Division of Licensee Performance and Quality Evaluation (DLPQE). However, if he requests an informal review of the examination or test results, he may not reapply for a license because a final denial has not been issued.

c. He may allow the 20 days to expire, at which time the letter notifying him that the examination or test results have been sustained constitutes the proposed denial of his application and he may request a hearing as provided by 10 CFR 2.103(b)(2). A hearing request must be submitted, in writing, within 40 days of the date of receipt of the letter sustaining the examination or test results. (If desired, the applicant may submit the letter requesting a hearing prior to the expiration of the 20 day period from the date of receipt of the letter notifying him that the examination or test results have been sustained.) However, if he requests a hearing on the proposed denial of his license application, he may not reapply for a license pursuant to 10 CFR 55.35 because his application for a license has not been finally denied.

5. If he requests an informal review of the examination or test results by DLPQE, he should provide a review package similar, but not necessarily identical, to the one described in paragraph C.2 above, to the Director, DLPQE. This package shall include, as a minimum, the appeal package originally sent to the region and a copy of the region's response to the candidate, including grading changes made as a result of the review. The review package must reach DLPQE within 10 days of the date of receipt of the letter from the applicant to the Director, DLPQE, requesting an informal review of the examination or test results.

6. Upon receipt of the examination or test review package, the Director, DLPQE, will review and provide a written response to each contention put forth by the applicant. These responses will form the basis for sustaining or overturning the examination or test results.

7. The Director, DLPQE, will issue a letter either sustaining or overturning the examination or test results within 30 days of receiving the examination or test review package (see Attachment 4). If the examination or test results are overturned, the regional office will issue the license, with an effective date concurrent with the date of the Director, transmittal letter.

8. If the Director, DLPQE, sustains the examination or test results, he will issue a proposed denial of the applicant's license application (see Attachment 4). Upon receipt of the proposed denial, the applicant has two options.

   a. He may accept the proposed denial, in which case a final denial will be issued by the regional office (see Attachment 2), and, if he desires to do so, he may reapply for a license pursuant to 10 CFR 55.35. The final denial letter should be issued within 10 days of receipt of the applicant's Acceptance of License Application Denial and Waiver of Hearing Rights (see Attachment 3).

b. Within 20 days of the date of receipt of the proposed denial, he may submit a hearing request pursuant to 10 CFR 2.103(b)(2). However, if he requests a hearing on the proposed denial of his license application, he may not reapply for a license pursuant to 10 CFR 55.35 because his application for a license has not been finally denied.

D. SCOPE OF REVIEW OF A WRITTEN OR OPERATING EXAMINATION

1. Written Examination Review

a. A certified examiner who was not involved in the original grading of the examination should regrade the examination for which the results are being contested.

b. The assigned examiner shall review the written examination grading against the master examination answer key for the specific examination, the reference material that was provided by the facility for preparation of the examination, and the comments and supporting material provided by the applicant. The review should include the entire examination, not just the failed category or the disputed portions of the examination.

c. If, as a result of the examination regrade, the applicant's examination score (total or category) changes significantly, examinations of other applicants who scored similarly to the reviewed applicant will also be subject to review and regrading. (A significant change is defined as a change in points that would result in a reversal of a applicant's examination results, either from fail to pass or vice versa.)

d. Changes to the examination scoring, the reasons for the changes, and citation to additional supporting material, if appropriate, shall be documented. A summary of the reasons for grading changes and the region's resolution to each of the applicant's contentions shall be developed.

The regional division director shall make the license decision on sustaining or overturning the written examination failure.

e. If the examination failure is sustained by the regional division director, the process continues in accordance with paragraph C.3 of this standard.

2. Operating Test Review

a. The review should consist of evaluating the examiner's comments, operating examination report, and simulator scenarios. The applicant's contentions should be reviewed against the information and documentation provided for the informal review (i.e., plant systems description, operating instructions, procedures and simulator logs, charts, recorder traces, snapshop data or process computer printouts, etc.) to determine if the applicant's contentions have merit. The review should ensure that specific examples of unsatisfactory performance are used to document each "U" rating and that all comments

are technically and procedurally correct. Based on the documented results of this review, a determination to overturn or sustain the examination failure will be made.

The regional division director shall make the license decision on sustaining or overturning the operating test failure.

b. If the test failure is sustained by the regional division director, the process continues in accordance with paragraph C.3 of this standard.

E. SCOPE AND PROCEDURES FOR PROCESSING REVIEWS BASED ON APPLICATION REJECTIONS

1. Upon review of NRC Forms 396 and 398 submitted by an applicant to demonstrate that he meets the eligibility requirements for taking a licensing examination, if the regional office staff concludes that an applicant does not meet requirements as set out in CFR 55.31 and NRC staff guidance regarding an applicant's eligibility outlined in ES-109 or ES-110, the applicant's training coordinator should be contacted and the deficiencies noted. The applicant should be given the opportunity to supply supplemental information or a new and more complete Form 396 or 398. If, after supplying additional information, the applicant still does not meet the requirements to sit for the examination, the applicant shall be informed of the rejection of his application including the deficiencies noted in his application.

2. The applicant may accept the rejection of his application. If he accepts the rejection, he may now reapply for a license at any time he believes he meets the eligibility requirements. The re-application provisions of 10 CFR 55.35 are not applicable to applications which have been denied for other than examination failures. If the applicant does not accept the rejection of his application he has two options from which to choose:

   a. Within 20 days of the date of receipt of the letter notifying him of the deficiencies in his license application, he may request, in writing, an informal review of his application by the regional division director.

   b. He may allow the 20 days to expire at which time the letter notifying him of his application rejection constitutes the proposed denial of his application and he may request a hearing pursuant to 10 CFR 2.103(b)(2). The request for a hearing must be submitted within 40 days of the date of receipt of the letter informing him of the rejection of his license application.

3. The remainder of the review process is identical to that of paragraphs C.2 through C.8 with the following exceptions.

   a. The supporting documentation will be reviewed against the eligibility requirements of 10.CFR 55.31 and the guidance of ES-109 or ES-110.

   b. If the license application rejection is overturned, the applicant should be informed in writing that his license application has been accepted and he will be allowed to take the examination.

c. If a regional and DLPQE review of his application rejection both sustain the application rejection, the applicant may request a hearing and reapply concurrently. There is, therefore, no Acceptance of License Application Denial and Waiver of Hearing Rights form required.

d. There is no final denial associated with an application rejection.

F. REVIEW OF DOCUMENTS

1. The election by an applicant for re-application pursuant to 10 CFR 55.35 includes the waiver of significant hearing rights. All correspondence received from an applicant which has any modification or caveat from that of Attachment 3 is to be reviewed by regional counsel to ensure that the waiver is unequivocal.

G. NOTES:

1. Letters informing an applicant of an examination failure or license application rejection must be signed by a branch chief or higher.

2. When sending out the Waiver form (Attachment 3) as an enclosure, all blocks with the exception of the one provided for the applicant's signature and date should be filled out. In addition, include a self-addressed, stamped envelope for the applicant to use in mailing back the waiver form.

3. The utility's authorized representative who signed the applicant's application should receive a copy of all correspondence generated as a result of this standard.

4. Attachment 5 represents a flow chart depiction of the review/hearing process and assumes decisions are not overturned along the way.

5. If, upon receipt of a letter of notification that he failed an examination or test or that his examination or test results were sustained, the applicant allows the initial 20 day period to expire, causing the letter of notification to become a proposed denial, and subsequently allows the additional 20 days within which he must request a hearing to expire, a final denial will not be automatically issued and he may not reapply for a license examination without first providing the NRC with an Acceptance of License Application Denial and Waiver of Hearing Rights form signed by him.

ATTACHMENT 1

September 10, 1986

Dear Mr. Bones:

(INSERT A) [This is to inform you that a grading of your [written examination] [operating test] taken on August 19, 1986 in connection with your application for a reactor operator license for the Large Nuclear Facility indicates that you did not pass that examination. Enclosed is a copy of the [written examination] [operating test] results, indicating those areas in which you exhibited deficiencies.

At this time, you may request informal NRC staff review of the grading of your examination. Should it be determined that failure of the [written examination] [operating test] remains appropriate, the NRC staff will issue a proposed denial of your application. Upon issuance of the proposed denial, you would have the right to a hearing pursuant to 10 CFR § 2.103(b)(2).

Please inform this office whether you wish further informal review of the grading of your [written examination] [operating test] by the NRC staff. Should you request further informal review, include with your identification which of your responses to the [examination questions] [portions of your operating tests] you believe were graded incorrectly or too severely. In addition, provide the basis, including supporting documentation, such as [procedures and instructions] [computer printouts, chart traces, or simulator snapshots] in as much detail as possible, for your opinion that those responses were graded incorrectly or too severely.]

(INSERT B) [This is to inform you that your application for a reactor operator license submitted on August 19, 1986 in connection with the Large Nuclear Facility is hereby rejected [Region to discuss deficiencies and which part of ES-109, ES-110, 10 CFR 55.31, facility training program, or Regulatory Guide 1.8 was involved.]

At this time, you may request informal NRC staff review of the rejection of your application. Should it be determined that rejection of your application remains appropriate, the NRC staff will issue a proposed denial of your application. Upon issuance of the proposed denial, you would have the right to a hearing pursuant to 10 CFR § 2.103(b)(2).

Please inform this office in writing whether you wish further informal review of the rejection of your application by the NRC staff. Should you request further informal review, include with your request specific reasons for your feeling that your application was improperly rejected.]

If you do not request an informal review in writing within 20 days of the date of this letter, this letter will constitute the proposed denial of your application and you may request a hearing as provided by 10 CFR § 2.103(b)(2).

CERTIFIED MAIL -
RETURN RECEIPT REQUESTED

A hearing request shall be submitted to the Assistant General Counsel for Enforcement, Office of the General Counsel, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, in writing, within 40 days of the date of this letter.

(INSERT A) [If you request a hearing on the proposed denial of your license application, you may not re-apply for a license pursuant to 10 CFR § 55.35 until your application has been finally denied as a result of the hearing, should that be the case. Should you request informal review of your examination failure, you may not reapply until determination of a final denial of your application has been made. If you wish to re-apply for a license now pursuant to 10 CFR § 55.35, you must inform the NRC that you accept the results of the examination that has been administered to you and that you waive all rights to a hearing pursuant to 10 CFR § 2.103(b)(2) regarding the proposed and final denials of your license application. You may do so by signing and returning to me the enclosed "Acceptance of License Application Denial and Waiver of Hearing Rights". Upon so informing me, I will issue a letter to you finally denying your application for a reactor operator license pursuant to 10 CFR § 2.103(b)(2). Such a final denial letter will permit you to avail yourself of the re-application provisions of 10 CFR § 55.35. The NRC will not entertain any re-application pursuant to 10 CFR § 55.35 in the absence of a final denial letter from the NRC.]

If you have any questions, please contact me at _____.

FOR THE NUCLEAR REGULATORY COMMISSION

Branch Chief
Region I

Enclosure: As stated

ATTACHMENT 2

Dear Mr. Bones:

My letter of September 10, 1986 to you informed you that you had failed the [written] [operating] examination administered to you on August 19, 1986. By signing and returning to me the "Acceptance of License Application Denial and Waiver of Hearing Rights" dated _____, you indicated that you did not wish to contest the proposed license denial and you waived any right to a hearing pursuant to 10 CFR § 2.103(b)(2) with regard to the proposed and final denials of your license application. Consequently, it is appropriate at this time to issue this final denial letter with respect to your application for a reactor operator license.

Please be advised that, in light of this final denial of your license application, you may avail yourself of the re-application provisions of 10 CFR § 55.35 after _____ from the date of this letter.

Branch Chief
Region I

CERTIFIED MAIL -
RETURN RECEIPT REQUESTED

ATTACHMENT 3

ACCEPTANCE OF LICENSE APPLICATION DENIAL
AND
WAIVER OF HEARING RIGHTS

Name: _____
Docket No.: _____
Operator License Application Date: _____
Examination Date: _____

I accept the License Application Denial regarding the above-referenced operator license application. I further waive all rights to a hearing pursuant to 10 CFR § 2.103(b)(2) regarding the proposed and final denials of my operator license application, and request that the U.S. Nuclear Regulatory Commission issue a final denial in this matter.

_____ _____
(Name typed) Date

ATTACHMENT 4

November 10, 1986

Dear Mr. Bones:

(INSERT A) [In response to your letter dated _____ requesting informal NRC review of the grading of your [written examination] [operating test], the grading of the examination administered to you on August 19, 1986 has been reviewed. I find that you did not pass the examination. The result of our reviews are enclosed. (INSERT B) [You may request further informal review of your examination by notifying the Director, Division of Licensee Performance and Quality Evaluation (DLPQE), Office of Nuclear Reactor Regulation. If you request further review, you should forward a review package, identifying any [examination questions] [portions of your operating test] you feel were graded unfairly either in the original grading or in the review contained herein, to the Director, DLPQE, with a copy of your request to this region for your Docket File.]

(INSERT B) [If you do not request further informal review, in writing, within 20 days of this letter, this letter will constitute the proposed denial of your license application pursuant to 10 CFR § 2.103(b)(2).] (INSERT C) [This letter constitutes the proposed denial of your license application pursuant to 10 CFR § 2.103(b)(2).] You have a right to a hearing with regard to this proposed denial. A hearing request shall be submitted to the Assistant General for Enforcement, Office of the General Counsel, United States Nuclear Regulatory Commission, Washington, D.C. 20555, in writing, within 40 days from the date of this letter.

If you request a hearing on the proposed denial of your license application, you may not re-apply for a license pursuant to 10 CFR § 55.35 until your application has been finally denied as a result of the hearing, if that is the case. (INSERT B) [Should you request informal review of your examination failure you may not reapply until determination of a final denial of your application has been made.] If you wish to re-apply for a license now pursuant to 10 CFR § 55.35, you may inform the NRC that you accept the proposed denial of your license application and that you waive all rights to a hearing pursuant to 10 CFR. § 2.103(b)(2) regarding the proposed and final denials of your license application. You may do so by signing and returning to me the enclosed "Acceptance of License Application Denial and Waiver of Hearing Rights".' Upon receiving it, a letter finally denying your application for a reactor operator license pursuant to 10 CFR § 2.103(b)(2) will be issued. Such a final denial letter will permit you to avail yourself of the re-application provisions of 10 CFR § 55.35. The NRC will not entertain any re-application pursuant to 10 CFR § 55.35 in the absence of a final denial letter from the NRC.]

(INSERT D) [In response to your letter dated _____, requesting informal NRC review of the rejection of your application for a reactor operator license, the application has been reviewed by the Regional staff. We still find that you did not submit an application meeting the eligibility requirements. The results of our review are enclosed. You may request further informal review of the rejection of your application by notifying, in writing, the Director, Division of Licensee Performance and Quality Evaluation (DLPQE), Office of Nuclear Reactor Regulation. If you request further review, you should forward

a review package, with any additional comments you wish to make regarding the rejection of your application and the review just completed by the Region, to the Director, DLPQE, with a copy of your request to this Region for inclusion in your docket file.]

If you do not request an informal review in writing within 20 days of the receipt of this letter, this letter constitutes the proposed denial of your application and you may request a hearing as provided by 10 CFR § 2.103(b)(2). A hearing request shall be submitted to the Assistant General Counsel for Enforcement, Office of the General Counsel, U. S. Nuclear Regulatory Commission, Washington, D.C. 20555, in writing, within 40 days of the date of receipt of this letter.]

If you have any questions, please contact me at _____.

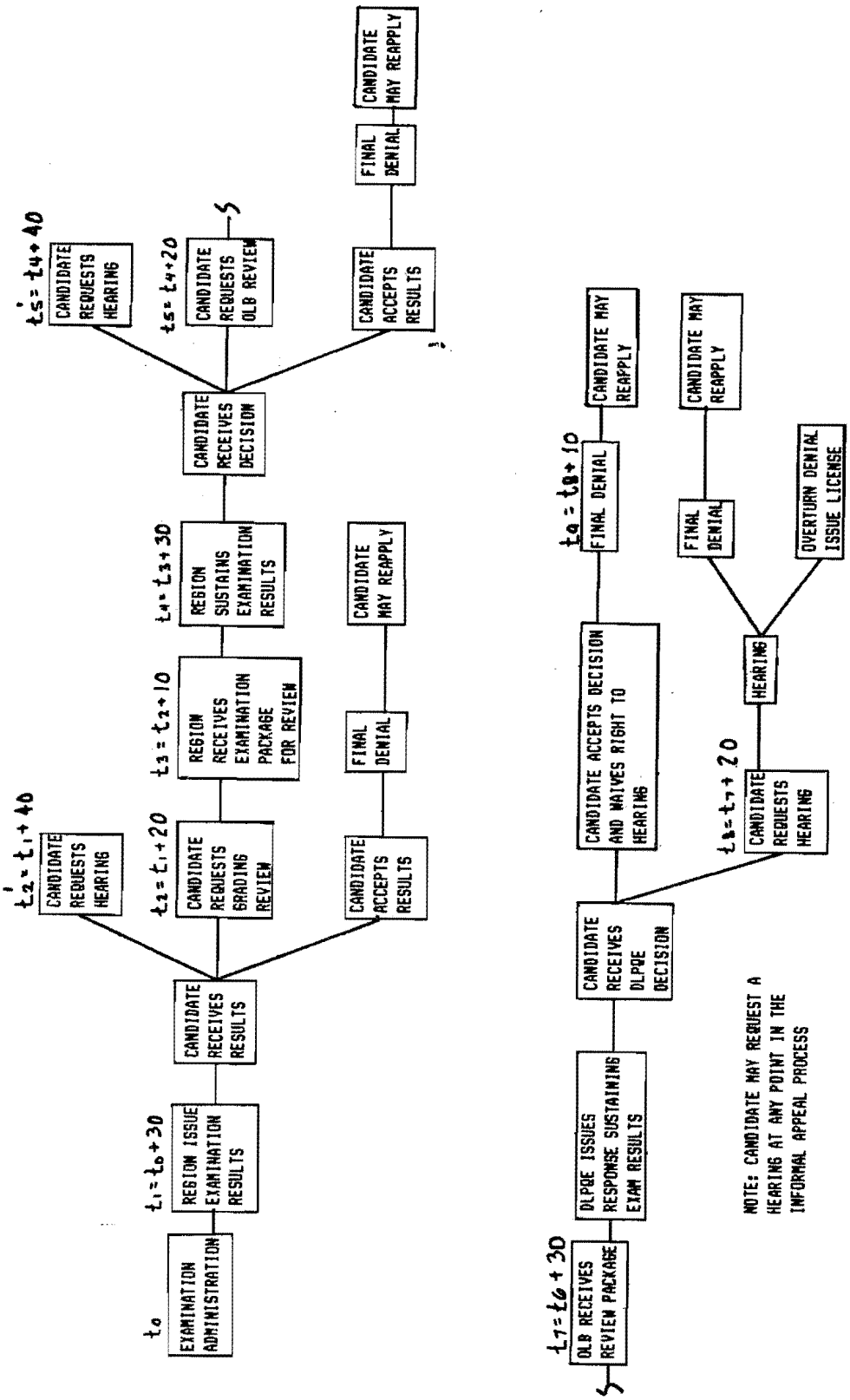
Sincerely,

Regional Administrator or Division Director
Region 1
[Director, Division of Licensee Performance
and Quality Evaluation
Office of Nuclear Reactor Regulation]

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Enclosure: As stated

ATTACHMENT 5



ADMINISTRATION OF WRITTEN EXAMINATIONS TO REACTOR OPERATOR CANDIDATES - POWER REACTORS

A. Purpose

This standard specifies the various requirements and procedures for the preparation, administration, and grading of reactor operator license examinations. Examiner preparation, examination review by the facility staff, and proctor requirements also are included.

B. Assignment

The assignment of a chief examiner will be indicated on Attachment 2 ES 103-2, the Request To Administer an Examination. The chief examiner shall be responsible for ensuring that the written examination is prepared, administered, and graded in accordance with the examiner standards.

The assignment of the examination includes preparing, administering, and grading the examination unless other arrangements have specifically been made.

C. Orientation Trips

All examiners will prepare written examinations periodically. Preparation of an examination at a facility that the examiner has not previously visited may require that the examiner make an orientation trip to the facility a few weeks before the scheduled examination. The need for an orientation trip shall be determined by the examiner in consultation with the appropriate section chief. To minimize the need for orientation trips, examiners are expected to make maximum use of training material provided by the facility through self study and discussions with other examiners.

D. Provision of Literature

Reference material to be used in preparing examinations should be requested from the facility staff far enough in advance of the examination to allow for possible delivery delays and for inventorying the material received. If the material is inadequate, it is essential to request additional material immediately from the facility training personnel. The training coordinator is usually the best person to contact for the material.

A list of appropriate reference material to be used as a guide is given in Enclosure 1 of Attachment 1 to this standard. The examiner who requests this information shall inform the appropriate section chief of the date of request and the person contacted. During these initial contacts, the examiner shall inform the facility contact of the requirements for administration of the examination, as given in Enclosure 2 of Attachment 1 to this standard.

Attachment 1 to this standard contains an example of the letter that will be mailed to the facility, formalizing the examination schedule and statement of requirements. Enclosures 1, 2, and 3 of attachment 1 to this standard are examples for enclosures to the letter. The appropriate section leader or chief is responsible for having this letter typed, signed by the regional branch chief, and sent. 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 Operations) and should be mailed 90 days before the first examination date. The exact wording of the letter may be modified as necessary to reflect the situation.

E. Preparation of Examination

The examiner shall prepare the examination and answers using Standards ES-202 and ES-203 as guidance. The examiner should conduct a detailed review of the examination using Attachment 1 of ES-107 as a guide. Attachment 1 of ES-107 should be filed with the master copy of the examination. NRC Rules and Guidelines for License Examinations in Enclosure 2 of Attachment 1, should be included following the cover page in each copy of the examination.

F. Quality Assurance Review of Examination

The regional section chief, or his designee, shall review the examination in accordance with Standard ES-107. The completed examination shall be submitted for review at least 1 week before the scheduled date of its administration. If changes to the examination are necessary, the examiner shall be notified at least two working days before the administration of the examination, provided the necessary lead time was allowed. If no instructions to the contrary have been received, the examination should be given as prepared.

G. Administration of Examination

1. The examiner should distribute the examination questions to the candidates.

2. The examiner should read the following instructions verbatim to the candidates. Additional items from Enclosure 2 of Attachment 1 ES 201-1 may be discussed, as necessary.

   During the administration of this examination the following rules and guidance apply:

   a. Cheating on the examination means an automatic denial of your application and could result in more severe penalties.

   b. You should sign the statement on the cover sheet that indicates that the work is your own and you have not received or been given assistance in completing the examination. This should be done after the examination has been completed.

3. After passing out the examination, the examiner should ask the candidates to verify that all parts of the examination are in their copy by page checking the examination, and then distribute answer sheet paper that has been furnished to the chief examiner by the facility in unopened packages.

4. The examiner should repeat the instructions that are included on the facing sheet of the examination by reading the following instructions verbatim:

   a. Use only the paper provided by the examiner for answers.

   b. Staple your copy of the examination questions on top of the answer sheets before turning in your papers.

   c. The point value for each question is indicated in parentheses after the question and can be used as a rough guide for the depth of answer required. If more points are assigned to a question, the question requires that more items be discussed.

5. The examiner should inform the candidates that to pass the examination they must achieve an overall grade of 80% or greater and at least 70% in each category.

6. The examiner should inform the candidates that there is a time limit of 6 hours for completion of the examination. For candidates taking one or more sections of a written examination, each section should be limited to one-quarter of the allotted time per section.

After the examiner has completed the instructions, and answered any questions, the examiner should start the examination, record the time, and keep the candidates advised periodically of the amount of time that remains to complete the examination. Normally, a chalkboard is available and can be used for this purpose.

During the examination, candidates are not permitted to communicate or refer to any texts or descriptive material other than those furnished by the examiner. If the examiner has asked a question that involves use of a formula or infrequently used constant, then this formula or constant will be supplied on the equation sheet. All reference material shall be furnished by the examiner.

H. Facility Staff Review of the Written Examination

1. There shall be no review of the written examination by the facility staff before or during the administration of the examination. Following the administration of the written examination, the facility staff shall be provided a marked-up copy of the examination and the answer key. The copy of the written examination provided should include pen and ink corrections for changes made to questions during the administration of the examination. The facility shall then have five working days from the day the exam is given to provide formal comment submittal in accordance with the requirements of Enclosure 3 of Attachment 1 to this standard.

2. A two hour post exam reivew attended by the NRC examiners may be held at the discretion of the chief examiner, if requested by the facility training staff. If this review is held the facility staff should be informed that only written comments that are properly supported will be considered in the grading of the exam.

3. The examination and answer key, as provided to the facility staff, along with comments and the NRC resolution of those comments shall be included in the final examination report. The final examination report is required by ES-104.C.1. Pen and ink corrections made for the applicants during administration of the written examination and supplied to the facility staff following administration may be changed to type written corrections for the final report.

I. Proctoring of Examinations

All written examinations shall be adequately proctored to ensure the integrity of the examinations. Two individuals shall be available for proctoring. One proctor shall be in the examination room at all times giving his full attention to the candidates taking the examination. The proctor shall not read facility procedures or other material, grade examinations, or engage in any other activities in a manner or depth that may divert his attention from the candidates and possibly cause the examination to be compromised.

Before the administration of the examination, the proctors shall have a clear understanding of their responsibilities. The chief examiner is responsible for ensuring 100% proctoring of the examination.

The chief examiner shall determine the means to be used to ensure adequate proctoring of the examination. Consideration shall be given to

1. using NRC local part-time secretarial help

2. using more than one examiner

3. using resident inspectors

4. using local high school and/or college teachers/professors or other Federal, State, or local employees.

If a proctor who is not an NRC employee is used, the chief examiner shall be responsible for obtaining the proctor and ensuring that a contract has been properly placed with the proctor.

At least one examiner shall be available to provide clarification to the candidates on the examination questions. Therefore, if the person writing the examination is not available, the other examiners must be certain that they are familiar with the intent of the questions.

During the written examination the examiner responsible for answering candidate questions shall be particularly alert to questions indicating that terminology used in the examination is not familiar to candidates at that facility. The examiner should determine the terminology used at the facility and correct the terminology for all of the candidates sitting for the exam. The change may be made on a chalkboard, if available, and called to the attention of all the candidates. When changes are made to questions during the exam, these corrections should be made in pen and ink to the master copy and to the copy that is to be provided to the facility staff for review.

J. Length of Examinations

Although the written examinations must be appropriately thorough and comprehensive, they should not be so long that a knowledgeable candidate cannot complete the examination in the time allotted. The duration of a power reactor examination is 6 hours. Refer to Standard ES-202 for information on the scope of the written examinations. Reexaminations, which are partial examinations containing only one category, will be limited to one-quarter of the allotted time. All candidates shall be informed of the time limits at the beginning of the examination.

K. Grading of Examinations

Grading should be performed as expeditiously as possible. The number of points given to, or taken off, for each answer should be indicated on the candidate's answer sheet, in red pen or pencil. Also, a brief notation as to the reason for less than full credit should be entered. This may be a notation of the correct answer, a missing item, an indication of poor method, or some suitable brief notation. The points and notations should be reproducible and distinguishable from the candidates answer when reproduced.

Grading of the written examination should be delayed while awaiting facility comments. All corrections to questions and answer keys shall be made before grading is considered complete and the grading of the questions for which the answer was changed must be reviewed. The original copy or legible, reproducible copies of the original proposed corrections shall be annotated with their disposition and kept with the copy of the master examination.

After the grading is completed, Columns 3 and 4, "Candidate's Score" and "% of Category Value," on the cover sheet shall be filled out. These scores shall also be entered on the front page of the Operator License Examination Report (Form 157) and on a results summary sheet (Attachment 2 to this standard). Lab examiners shall complete these forms for those exams which they administered or graded and shall forward the forms to the chief examiner. The chief examiner shall be responsible for ensuring that all forms are completed and summarized. The examiner shall conduct a detailed review of his grading using Attachment 1, ES-108, as a guide. Sufficient copies of the master examination and answer key shall be reproduced so that at least one copy is forwarded to or retained in the regional office. If an appeal of the graded reactor operator written examination is received, the procedures in Standard ES-112 should be followed.

Changes to grading during the grading or review process shall be done by lining out the original grade in such a manner that the original grade is legible and a brief explanation for the change should be made on the candidates answer sheet. The change should be initialed by the examiner making the change. Under no circumstances shall white out or other change obscuring methods be used to change the grading of examinations.

L. Administrative Details

The grading examiner shall complete the written examination cover sheet showing the results of the grading and the appropriate portions of the "Power Plant Examination Results Summary," ES-201 attachment 2, and the "Examination Grading Quality Assurance Checkoff Sheet" Attachment 1, ES-108-1. The examiners in

the team shall communicate the written grades to the grading examiner so that Operator License Examination Reports (Form 157) and the "Power Plant Examination Results Summary Sheet" (ES-201 Attachment 2) are filled out as completely as possible before being forwarded to the regional office by certified mail. Written examination results should not be held pending completion of other portions of the examination. If operating examination results are not available at the same time as the written results, then appropriate sections of Form 157 should be completed and forwarded to the regional section chief. The chief examiner is responsible for ensuring that all results are reported to the section chief.

The chief examiner shall complete ES-201 Attachment 2 and assemble the following in one package to be forwarded to the regional section chief.

1. original and one copy of master examination and answers
2. all written examinations
3. all Operator License Examination Reports (NRC Form 157s)
4. Attachments ES-107-1, ES-108-1, ES-201-2, and ES-201-3.
5. copy of the corrected Examiner Assignment Sheet
6. copies of the as given simulator examination scenarios

When the final results have been approved by the regional office section chief and branch chief, a copy of ES 201-2 shall be mailed to the facility training manager and to the Management Assistant, Regional Support and Oversight section OLB.

If the written examination is administered much earlier than the operating examination, the results of the written examination should be recorded on the "Power Plant Examination Results Summary Sheet" (ES-201, Attachment 2.) The graded written examinations, the results summary sheet and the grading quality review form shall be forwarded to the Regional Section Leader. After these results have been approved by the Regional Section Leader and Branch Chief, a copy of ES-201, Attachment 2 should be mailed to the facility training manager and the Management Assistant, Regional Support and Oversight Section, OLB. The final Examination Report (ES-104) should not be written until all portions of the examination have been completed.

M. Quality Assurance Review of Graded Examinations

The appropriate section chief, or his designee, shall ensure that all examination results and documentation are completed and shall conduct an independent review of written answers after the examinations are graded, as required in Standard ES-108.

ATTACHMENT 1

LETTER TO FACILITY FORMALIZING EXAMINATION SCHEDULE

To:

Date:

Subject: Reactor Operator and Senior Reactor Operator Licensing Examinations

In a telephone conversation between Mr. _____ (title, i.e., training coordinator) and Mr. _____ (section leader, OLB) arrangements were made for the administration of the examinations at the (facility name).

The written examinations are scheduled for (date). The simulator/operating examinations are scheduled for (date) and the (name) simulation facility. The plant oral examinations are scheduled for (date).

In order for us to meet the above schedule, it will be necessary for the facility to furnish the approved reference material listed in Enclosure 1, "Reference Material Requirements for Reactor/Senior Reactor Operator Licensing Examinations," by (date). Any delay in receiving properly bound and indexed reference material will result in a delay in administering the examinations. Our examinations are scheduled far in advance with considerable planning to utilize our present limited examiner manpower and to meet the examination dates requested by the various facilities. Therefore, missing the (date) deadline, even by a few days, likely will result in a long delay because it may not be possible to reschedule examinations at other facilities. Mr. _____ has been advised of our reference material sets that are required, and the examiner's names and addresses where each set is to be mailed.

The facility management is responsible for providing adequate space and accommodations in order to properly conduct the written examinations. Enclosure 2, "Administration of Reactor/Senior Reactor Operator Licensing Written Examinations," describes our requirements for conducting these examinations. Mr. _____ has also been informed of these requirements.

In addition, to better document simulator examinations, the chief examiner will have the facility simulator operator record prespecified plant conditions (i.e., plant pressure, temperature, pressurizer level, etc.), for each simulator scenario. The candidate will be responsible for providing this information, along with any appeal of his simulator operating examination. Therefore, the facility training staff should retain the simulator examination scenario information until all candidates taking the examination have either passed the operating examination or all appeals filed by the candidates who failed the operating examination have been completed.

Enclosure 2, also contains the Rules and Guidance that will be in effect during the administration of the written examination. The facility management is responsible for ensuring that all candidates are aware of these Rules.

All reactor operator and senior reactor operator license applications should normally be submitted at least 60 days before the first examination dates so that we will be able to review the training and experience of the candidates, process the medical certifications, and prepare final examiner assignments after candidate eligibility has been determined. If the applications are not received at least 30 days before the examination dates, it is likely that a postponement will be necessary.

This request for information was approved by the Office of Management and Budget under Clearance Number 3150-0101, which expires May 31, 1989. Comments on burden and duplication may be directed to the Office of Management and Budget, Reports Management Room 3208, New Executive Office Building, Washington, DC 20503.

The facility staff review of the written examination will be conducted in accordance with requirements specified in Enclosure 3, "Requirements for Facility Review of Written Examination." Mr. _____ has been informed of these requirements.

Thank you for your consideration in this matter. If you have any questions regarding the examination procedures and requirements, please contact Mr. _____ (appropriate section leader and telephone number), or Mr. _____ (OLB Branch Chief) or regional section chief and telephone number).

Sincerely,

(OLB Branch Chief or appropriate regional representative)

Enclosures:
1. Reference Material Requirements
2. Written Exam Administration Requirements
3. Facility Review Requirements

Distribution: Project Manager
Resident Inspector
Regional Section Leader
Examiners
Chief Examiner
NRC Project Offices

ATTACHMENT 1 (continued)
Enclosure 1

REFERENCE MATERIAL REQUIREMENTS FOR REACTOR/SENIOR REACTOR OPERATOR LICENSING EXAMINATIONS

1. Existing learning objectives and lesson plans (including training manuals, plant orientation manual, system descriptions, reactor theory, thermodynamics, etc.)

   Training materials should include all substantive written material used for preparing candidates for initial RO and SRO licensing. The written material should be inclusive of learning objectives and the details presented during lecture, rather than outlines. Training materials should be identified by plant and unit, bound, and indexed. Failure to provide complete properly bound and indexed plant reference material will result in canceling or rescheduling of the examinations. Training materials which include the following should be provided:

   - System descriptions including descriptions of all operationally relevant flow paths, components, controls and instrumentation. System training material should draw parallels to the actual procedures used for operating the applicable system.

   - Complete and operationally useful descriptions of all safety-system interactions and, where available, BOP system interactions under emergency and abnormal conditions, including consequences of anticipated operator error, maintenance error, and equipment failure.

   - Training material used to clarify and strengthen understanding of emergency operating procedures.

   - Comprehensive theory material that includes fundamentals in the area of theory of reactor operation, thermodynamics, heat transfer and fluid flow, as well as specific application to actual in-plant components. For example, mechanical theory material on pumps should include pump theory as well as descriptions of how these principles actually apply to major plant pumps and the systems in which they are installed (i.e., Reactor Coolant Pumps, all ECCS pumps, Recirculation pumps, Feedwater pumps and Emergency Feedwater pumps). Reactor Theory material should include descriptions that draw explicit ties between the fundamentals and the actual operating limits followed in the plant (i.e., reactor theory material should contain explanations how principles relate to the actual curves used by operators to verify shutdown margin or calculate an ECP).

2. Procedure Index (alphabetical by subject)

3. All administrative procedures (as applicable to reactor operation or safety)

4. All integrated plant procedures (normal or general operating procedures)

5. Emergency procedures (emergency instructions, abnormal or special procedures)

6. Standing orders (important orders that are safety related and may supersede the regular procedures)

7. Fuel-handling and core-loading procedures, (initial core-loading procedure, when appropriate)

8. Annunciator procedures (alarm procedures, including set points)

9. Radiation protection manual (radiation control manual or procedures)

10. Emergency plan implementing procedures

11. Technical Specifications

12. System operating procedures

13. Piping and instrumentation diagrams, electrical single-line diagrams, or flow diagrams

14. Technical Data Book, and/or plant curve information as used by operators and facility precautions, limitations, and set points (PLS) for the facility,

15. Questions and answers that the facility licensee has prepared (voluntary by facility licensee)

16. The following on the plant reference simulation facility

    a. List of all readily available initialization points.

    b. List of all preset malfunctions with a clear identification number. The list should include cause and effect information. Specifically, for each malfunction a concise description of the expected result, or range of results, that will occur upon implementation should be provided. Additionally, an indication of which annunciators are to be initially expected should be given.

    c. A description of simulator failure capabilities for valves, breakers, indicators and alarms.

    d. Where the capability exists, an explanation of the ability to vary the severity of a particular malfunction should be provided, i.e., ability to vary the size of a given LOCA or steam leak, or the ability to cause a slow failure of a component such as a feed pump, turbine generator or major valve (e.g., drifting shut of a main feedwater control valve.

    e. An identification of modeling conditions/problems that may impact the examination.

f. Identification of any known Performance Test Failures not yet completed.

g. Identification of differences between the simulator and the reference plant's control room.

h. Copies of facility generated scenarios that expose the candidates to situations of degraded pressure control (PWR), degraded heat removal capability (PWR and BWR) and containment challenges (BWR) may be provided (voluntary by licensee).

i. Simulator instructors manual (voluntary by licensee)

j. Description of the scenarios used for the training class (voluntary by licensee)

17. Additional material required by the examiners to develop examinations that meet the requirements of these standards and the regulations.

The above reference material should be approved, final issues and should be so marked. If a plant has not finalized some of the material, the chief examiner shall verify with the facility that the most complete, up-to-date material is available and that agreement has been reached with the licensee for limiting changes before the administration of the examination. All procedures and reference material should be bound with appropriate indexes or tables of contents so that they can be used efficiently.

ATTACHMENT 1 (continued)

Enclosure 2

REQUIREMENTS FOR ADMINISTRATION OF WRITTEN EXAMINATIONS

1. A single room shall be provided for completing the written examination. The location of this room and supporting restroom facilities shall be such as to prevent contact with all other facility and/or contractor personnel during the duration of the written examination. If necessary, the facility should make arrangements for the use of a suitable room at a local school, motel, or other building. Obtaining this room is the responsibility of the licensee.

2. Minimum spacing is required to ensure examination integrity as determined by the chief examiner. Minimum spacing should be one candidate per table, with a 3-ft space between tables. No wall charts, models, and/or other training materials shall be present in the examination room.

3. Suitable arrangements shall be made by the facility if the candidates are to have lunch, coffee, or other refreshments. These arrangements shall comply with Item 1 above. These arrangements shall be reviewed by the examiner and/or proctor.

4. The facility staff shall be provided a copy of the written examination and answer key after the last candidate has completed and handed in his written examination. The facility staff shall then have five working days to provide formal written comments with supporting documentation on the examination and answer key to the chief examiner or to the regional office section chief.

5. The facility licensee shall provide pads of 8-1/2 by 11 in. lined paper in unopened packages for each candidate's use in completing the examination. The examiner shall distribute these pads to the candidates. All reference material needed to complete the examination shall be furnished by the examiner. Candidates can bring pens, pencils, calculators, or slide rules into the examination room, and no other equipment or reference material shall be allowed.

6. Only black ink or dark pencils should be used for writing answers to questions.

NRC RULES AND GUIDELINES FOR LICENSE EXAMINATIONS

During the administration of this examination the following rules apply:

1. Cheating on the examination means an automatic denial of your application and could result in more severe penalties.

2. Restroom trips are to be limited and only one candidate at a time may leave. You must avoid all contacts with anyone outside the examination room to avoid even the appearance or possibility of cheating.

3. Use black ink or dark pencil only to facilitate legible reproductions.

4. Print your name in the blank provided on the cover sheet of the examination.

5. Fill in the date on the cover sheet of the examination (if necessary).

6. Use only the paper provided for answers.

7. Print your name in the upper right-hand corner of the first page of each section of the answer sheet.

8. Consecutively number each answer sheet, write "End of Category __" as appropriate, start each category on a new page, write only one side of the paper, and write "Last Page" on the last answer sheet.

9. Number each answer as to category and number, for example, 1.4, 6.3.

10. Skip at least three lines between each answer.

11. Separate answer sheets from pad and place finished answer sheets face down on your desk or table.

12. Use abbreviations only if they are commonly used in facility literature.

13. The point value for each question is indicated in parentheses after the question and can be used as a guide for the depth of answer required.

14. Show all calculations, methods, or assumptions used to obtain an answer to mathematical problems whether indicated in the question or not.

15. Partial credit may be given. Therefore, ANSWER ALL PARTS OF THE QUESTION AND DO NOT LEAVE ANY ANSWER BLANK.

16. If parts of the examination are not clear as to intent, ask questions of the examiner only.

17. You must sign the statement on the cover sheet that indicates that the work is your own and you have not received or been given assistance in completing the examination. This must be done after the examination has been completed.

18. When you complete your examination, you shall:

    a. Assemble your examination as follows:

        (1) Exam questions on top.

        (2) Exam aids - figures, tables, etc.

        (3) Answer pages including figures which are a part of the answer.

    b. Turn in your copy of the examination and all pages used to answer the examination questions.

    c. Turn in all scrap paper and the balance of the paper that you did not use for answering the questions.

    d. Leave the examination area, as defined by the examiner. If after leaving, you are found in this area while the examination is still in progress, your license may be denied or revoked.

ATTACHMENT 1 (Continued)

Enclosure 3

Requirements for Facility Review of Written Examination

1. There shall be no review of the written examination by the facility staff before or during the administration of the examination. Following the administration of the written examination, the facility staff shall be provided a marked-up copy of the examination and the answer key.

2. The facility will have five (5) working days from the day of the written examination is given to provide formal comment submittal. The submittal will be made to the responsible Regional Office by the highest level of corporate management for plant operations, e.g., Vice President for Nuclear Operations. A copy of the submittal will beforwarded to the chief examiner, as appropriate. Comments not submitted within five (5) working days will be considered for inclusion in the grading process on a case by case basis by the Regional Office section leader. Should the comment submittal deadline not be met, a long delay for finalization of the examination results may occur.

3. The following format should be adhered to for submittal of specific comments:

   a. Listing of NRC Question, answer and reference.

   b. Facility comment

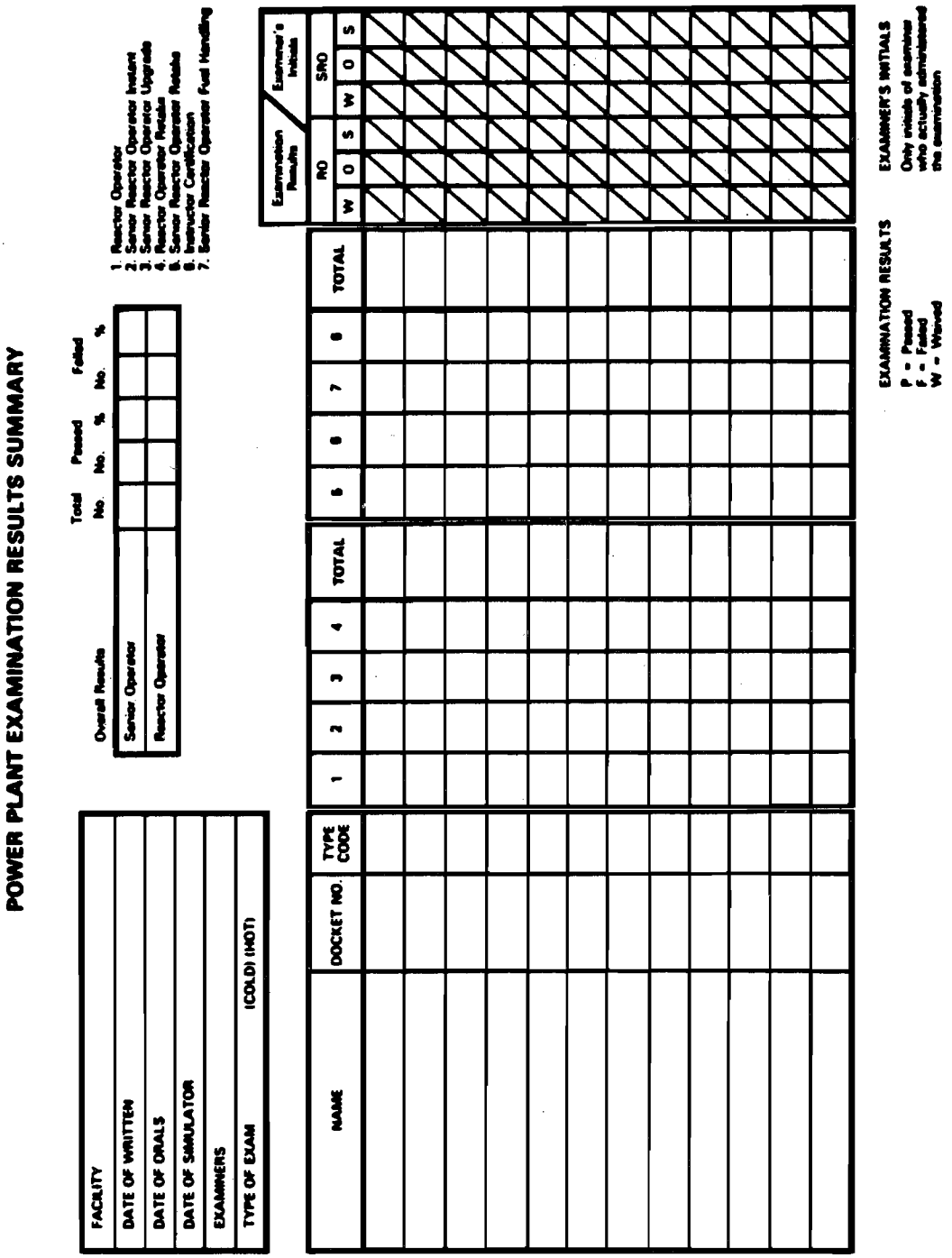
   c. Supporting documentation

   NOTES:
   1. No change to the examination will be made without submittal of complete, current, and approved reference material.

   2. Comments made without a concise facility recommendation will not be addressed.

ATTACHMENT 2

POWER PLANT EXAMINATION RESULTS SUMMARY



ATTACHMENT 3

EXAMINATION ADMINISTRATION QUALITY ASSURANCE CHECKOFF SHEET

Plant/Unit _____ Examination Date _____

Examiner(s) _____ Proctor(s) _____

EXAMINATION: Operator _____ Senior _____

Examination Administration

Item	Description	Chief Examiner Initial/date
1.	Adequate Spacing during examination	_____
2.	Examination Room and Restroom facilities adequate to prevent examination compromise.	_____
3.	Continuous proctoring maintained throughout examination	_____
4.	Examination and answer key provided to facility reviewers after completion of written examination.	_____

_____ _____

Chief Examiner Signature Date

SCOPE OF WRITTEN EXAMINATIONS ADMINISTERED TO REACTOR OPERATORS - POWER REACTORS

A. Purpose

This standard provides guidelines for the content of each category of the reactor operator written examination. Guidance on question depth, format, sources and general preparation is also presented.

B. Scope

The required scope of the written examination is set forth in 10 CFR 55.41. To implement this scope and to provide for identification and documentation of strengths and weaknesses within certain areas of knowledge, the written examination shall be divided into the following four categories:

1. Principles of Nuclear Power Plant Operation, Thermodynamics, Heat Transfer, and Fluid Flow

   This category shall contain questions relating to basic nuclear reactor behavior, elementary nuclear reactor theory, technical terminology, and an appreciation of the processes taking place in a nuclear power plant. These processes include controlled and variable parameters of the reactor, primary and secondary coolant, and auxiliary systems. Values that are expressed as normal or operating parameters or values that are measured as resultant characteristics shall be included in this category.

   Also included shall be questions relating to the traces that one would see on recorders during normal and abnormal transients, with the emphasis on facility behavior rather than instrument characteristics. Secondary system transients that induce reactor transients also shall be subject questions in this category.

   This category also shall contain questions on fundamentals of hydraulics and fluid flow, heat transfer and heat generation, and thermodynamics and simple calculational problems to determine understanding in this area. These questions will test the candidates' knowledge and understanding of the concepts of temperature measurement, density, viscosity, pressure, and volume and the effects of parametric changes on fluids. Questions relating to the use of steam tables may also be included. The principles of heat transfer by conduction, convection, and radiation, as well as characteristics of heat exchanger operation and natural circulation, shall be investigated in this category. Also included may be questions concerning the applicability of these fundamentals to operational situations and transients and the ability to recognize and mitigate the consequences of core damage.

   Answering these questions may require mathematical ability including algebra and fundamental knowledge in reactor physics. Questions in this category shall be related to reactors in general and reactors of the type used at the facility.

2. Plant Design, Including Safety and Emergency Systems

This category shall contain questions on the design features of the particular facility, with emphasis on those systems that are designed to maintain, and protect against, the uncontrolled release of radioactive materials. The candidate should be able to reproduce, from memory, sketches or descriptions of various hydraulic, pneumatic, or electrical distribution systems and mechanical components. Questions on design intent, construction, operation, and interrelationships of those systems most directly associated with normal nuclear power plant operation and reactor safety can also be included. The candidate should be familiar with the conditions that require the use of safety and emergency systems and why such protection is required, with emphasis on areas where a malfunction will require immediate operator action.

3. Instruments and Controls

This category shall contain questions on the characteristics and interrelationship of the nuclear, process, and radiological instrumentation and facility control systems. The candidate should have sufficient knowledge of the nuclear instruments (e.g., source, intermediate, and power), the process instruments (e.g., temperature, pressure, level, and flow), and radiological instruments (e.g., ionization, G-M, and scintillation), to answer questions concerning principles of detector operations, location and setpoints of instruments, and diagrammatic representation of instrumentation systems. Questions on control systems (e.g., control rod drive, level, pressure, electrohydraulic control, and integrated control) will include function, operation, interlocks, and interrelationships with other plant systems.

A candidate is not expected to have the knowledge of an instrument technician, but answers should indicate the ability to recognize the indications and consequences of improper instrument performance (e.g., overcompensation, power failure, air supply failure, and signal failure), including the traces that recorders would show. He also should be able to make use of all available instrumentation to provide checks or verification of observed readings.

4. Procedures - Normal, Abnormal, Emergency, and Radiological Control

This category shall contain questions on the knowledge and use of facility procedures including normal, abnormal, emergency, administrative, and radiological control procedures. The candidate is not expected to have normal procedures committed to memory but should be able to explain reasons, cautions, and limitations of normal operating procedures. In general, the candidate must demonstrate complete knowledge and understanding of the symptoms, automatic actions, and immediate action steps specified by abnormal and emergency procedures. Questions concerning radiological control procedures will be asked to the extent that the operator is responsible for personnel protection against the hazards of radiation and for controlling, discharging, and monitoring radiological releases. Administrative procedures, including operating restrictions, limitations in the facility license, and Technical Specifications, may be included to the extent they are directly applicable to an operator and the safe operation of the facility.

C. Facility Management Control

The scope of the written examination will include aspects of the management philosophy as set forth in facility documents. Because the examination and license are applicable only at the facility under application, it is appropriate for the examiner to include the applicable administrative controls. These questions are best included in the categories covering operating procedures and health physics.

The continuous availability of health physics and chemistry personnel for routine and emergency monitoring and investigation reduces the need for an operator to be proficient in the use of portable monitoring equipment. This fact should be considered when questions are constructed in this category.

D. Accident-Related Questions

It is recognized that the study of incidents or accidents at other reactor facilities can provide valuable lessons for an operator at his facility. It is appropriate and desirable to hypothesize accidents or circumstances leading to accidents at the facility under application and examine the candidate's analysis, corrective actions, and other responses. Therefore, postulating circumstances, in the examination, that are similar to those that have occurred elsewhere is both appropriate and realistic.

E. General Guidance

1. Technical Specification questions for reactor operators should be conceptual in nature (e.g., recognition of limiting conditions for operation and Technical Specifications that exist for a given area).

2. Memorization of symptoms and automatic and operator actions of all procedures that require immediate action is necessary for the examination.

3. The examination should include questions to determine a candidate's understanding of his responsibilities related to the administrative procedures, precautions, environmental and radiation release requirements, and pressure/temperature limits.

4. Questions on health physics and chemistry procedures should be determined on the basis of the facility's type of health physics coverage.

5. Extended definitions questions (e.g., 6-factor formula) should be avoided.

6. Questions on detailed system characteristics or instrumentation, such as annunciator logic or setpoints, should be avoided unless required for safety system operations.

7. Topics for the written examination should be based on the following:

   a. for examinations at PWR facilities, the knowledges and abilities in NUREG-1122 (RO/SRO K/A Catalog) that have sufficiently high importance ratings, as well as being deemed important by the exam developer; for examinations at BWR facilities, NUREG-1123.

b. facility reference material, including facility learning objectives used in the candidates' training program(s).
c. past examinations given at the facility should also be reviewed to avoid unnecessary redundancy in topics covered at the same site over short periods of time.

8. Sources of examination questions include:

   a. the Examination Question Bank
   b. examinations at similar facilities
   c. personal files of questions and answers (yours as well as other examiners)

9. Examinations shall be 6 hours long. Include as many questions on the examination as can be reasonably answered in that time period. A rule of thumb is:

   a. multiple-choice, true-false, matching, and completion items generally require no longer than 2 minutes to answer
   b. short answer questions generally require 3-4 minutes to answer

10. All examination questions should be "objective" in the following regard:

    a. there should be only one correct answer
    b. all qualified graders would agree on the amount of credit alloted for any given candidate response.

    To meet the above stipulations, short answer questions should be as precise and specific as possible to ensure that the candidate clearly knows what constitutes a fully correct response. "Discuss" type questions and other relatively vague wording of the requirements for a correct answer should be avoided.

11. The format of test questions should conform to the following stipulations:

    a. at least 50% of sections 2-4 and 6-8 should consist of short-answer questions
    b. no more than 25% of sections 2-4 and 6-8 should consist of questions requiring longer (essay) type responses
    c. no more than 25% of sections 2-4 and 6-8 should consist of multiple-choice, true-false, matching, or completion (fill in the blank) questions
    d. sections 1 and 5 should consist of objective questions in the format of part c above to the maximum extent possible.

12. Multipart questions should be broken down into logical sequential parts. The answer sheet should show points assigned for subparts of answers.

13. Double-jeopardy questions should not be used.

    An example of a double-jeopardy question is:

    1.3(a) Draw a single-line diagram of the cleanup system showing all automatic control valves.

(b) Explain the principal of operation for each control valve in part (a) above. (Rationale - If a candidate shows only (3) of (4) valves in part (a), he would lose points in part (b).)

A better way to state the question is:

1.3 Attached is a single-line diagram of the cleanup system. For the valves marked A-D on the diagram:

(a) Identify the valve, and
(b) Explain the principal of operation for the valve.

14. The value of a question should be based on its importance to safe, competent operator performance, the amount of time required to answer the question, level/depth of knowledge required to answer the question, and question difficulty. The value of a question should be compared with that of other questions in the category to determine if the value is appropriate.

15. Questions should be read and reviewed for content and wording by the author and at least one other examiner or supervisor. Reviewers should try to put themselves in the position of the candidate when reviewing questions to ensure that the stipulations and requirements posed in the question are complete and unambiguous, that all necessary information is provided, that all unnecessary information is deleted, and that the answer in the answer key clearly follows from what is asked in the question.

16. Vague, "Open-ended" questions should be avoided. If a specific number of responses are required, the question should clearly state that expectation so the candidate will know when the answer is complete.

An example of an open-ended question is:

3.1 List the signals that will automatically isolate the charging and letdown systems.

A better way to state the question is:

3.1(a) List three signals that will isolate the letdown system.
(b) List two signals that will both isolate the letdown system and trip the charging (makeup) pumps.

17. The examination should be submitted to the appropriate regional section chief at least 5 working days before the examination date for review and comment by an independent reviewer.

18. The examination should be verified to see if it satisfies the requirements of Standards ES-201 through ES-203 and a quality assurance review sheet, Attachment 1 ES-107 shall be completed.

19. All equations required to answer parts of the examination should appear in the equation sheet or be explicitly asked for in the question itself.

20. Diagrams or sketches should be used as attachments to written examinations. Questions that request candidates to identify components and other items on these attachments should be asked. The use of these attachments is

preferred over the alternative that requires candidates to construct time-consuming, single-line diagrams and sketches. Make sure that diagrams and sketches are easy to read, clearly marked, and provide an effective and easily interpretable way for the candidate to demonstrate his knowledge of the topic/concept.

STRUCTURE OF WRITTEN EXAMINATION ADMINISTERED TO REACTOR OPERATORS - POWER REACTORS

A. Purpose

This standard specifies the format, category weights and depth of knowledge for reactor operator written examinations.

B. General Structure

Each written examination shall be divided into four categories in accordance with Standard ES-202.

C. Cover Sheet

A cover sheet, with the format shown in Attachment 1 of this standard, shall be used on all written examinations. This sheet will provide for ready identification of the structure of the examination and, subsequently, of the relative strengths and weaknesses of the candidate.

All items in the upper corner of the cover sheet, except the name of the candidate (and sometimes the date administered), should be filled out when the examination is prepared and reproduced. The reactor type assists headquarters in comparing examinations of similar facilities and should be as descriptive as possible (e.g., BWR and PWR-W). The "Examiner" block should contain the name of the author(s). The first two columns on the cover sheet should be filled out at the time of the initial preparation.

D. Weighting of Categories

The relative weight of each category in the examination, as a percentile of total worth, shall be 25% + 3% for each category. Category 1 shall be weighted so that 15% ± 1% (60% ± 4% of the category) consists of principles of nuclear power plant operations and 10% ± 1% (40% ± 4% of the category) consists of principles of thermodynamics, heat transfer, and fluid flow.

E. Value of Questions

The general structure of the examination shall be such that a safe operator will score above 80% on the entire test and above 70% in each category. The percentage attained in each category will be used, in conjunction with oral and operating test results, to identify strengths and deficiencies of the candidate.

The examiner shall assign a point value to each question and indicate this value in parentheses after the question. The value of a question is a judgment factor based on the combination of the following factors:

significance of the knowledge to the operator, difficulty of the question, amount of time required to answer the question, depth of knowledge required to answer the question, and the content areas addressed in the question.

F. Depth of Knowledge

For depth of knowledge, the written questions can be divided into five categories:

1. Knowledge and recall (Example - Define natural circulation.)

2. Comprehension and interpretation (Example - Give two examples of natural circulation; include sketches.)

3. Application of rules and principles (Example - Describe the natural circulation flow path for your reactor. List the primary indications you would monitor and give representative readings within 2 hours after shutdown assuming the reactor had been at 100% power for 30 days. List any assumptions.)

4. Analysis and deduction (Example - List primary indications and representative readings for natural circulation within 2 hours after shutdown (from 100% power for 30 days). How would these readings change (direction and magnitude) 2 weeks later?)

5. Synthesis and evaluation (Example - List primary indications and representative readings for natural circulation within 2 hours after shutdown (from 100% power for 30 days). How would these readings change if (a) the difference between the hot- and cold-leg temperature doubled? (b) the difference in height between the reactor core and the heat sink was halved?)

The content areas for questions have been addressed in Standard ES-202.

In all cases, the candidate shall receive a copy of his graded examination for his use in evaluation of weak areas and retraining.

Attachment 1

U.S. NUCLEAR REGULATORY COMMISSION
REACTOR OPERATOR LICENSE EXAMINATION

Facility: _____

Reactor Type: _____

Date Administered: _____

Examiner: _____

Candidate: _____

INSTRUCTIONS TO CANDIDATE

Use separate paper for the answers. Write answers on one side only. Staple question sheet on top of the answer sheets. Points for each question are indicated in parentheses after the question. The passing grade requires at least 70% in each category and a final grade of at least 80%. Examination papers will be picked up six (6) hours after the examination starts.

Category Value	% of Total	Candidate's Score	% of Category Value	Category
_____	_____	_____	_____	1. Principles of Nuclear Power Plant Operation, Thermodynamics, Heat Transfer and Fluid Flow
_____	_____	_____	_____	2. Plant Design Including Safety and Emergency Systems
_____	_____	_____	_____	3. Instruments and Controls
_____	_____	_____	_____	4. Procedures - Normal, Abnormal, Emergency, and Radiological Control
_____		_____		TOTALS
		Final Grade	_____%	

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

_____
Candidate's Signature

ADMINISTRATION AND PREPARATION OF WRITTEN EXAMINATIONS FOR REACTOR OPERATOR CANDIDATES - NON-POWER REACTORS

A. Purpose

This standard specifies the difference in preparation and administration of non-power reactor operator written examinations and power reactor operator examinations. The specifications in Standard ES-201, 202 and 203 apply when no difference exists for non-power reactors. Sections of ES-201, ES-202, or ES-203 which are different for non-power reactors are indicated in parenthesis after each paragraph heading.

B. Examination Administration

The administration of the written examination will be consistent with that for power reactors as specified in ES-201 with the following exceptions:

1. Provision of Literature (ES-201, paragraph D)

The reference material available from a non-power reactor facility may be significantly more limited than the list indicated in Enclosure 1 to Attachment 1 to ES-201. Reference material which is unavailable should be deleted from the list on a case-by-case basis. Additionally, the letter sent to the facility formalizing the examination arrangements should be addressed to the facility director or equivalent. If the letter to the facility director cannot be mailed in the time specified in ES-201, Paragraph D., due to scheduling conflict, the letter formalizing the examination should be sent immediately after an informal schedule is agreed upon by the region and the facility.

2. Administration of Examination (ES-201, paragraph G.5 and G.6 and paragraph J)

i) The examiner should inform the candidates that to pass the examination they must achieve at least 70% in each category.

ii) The examiner should inform the candidates that there is a time limit of 6 hours for completion of the examination. For candidates taking one or more sections of a written examination, each section should be limited to 1 hour.

C. Examination Preparation (ES 201, paragraph E)

The examiner shall prepare the examination and answers using Standards ES-202 and ES-203 as guidance, except as modified by this standard. The examiner should use Attachments ES-107-1, ES-108-1, and ES-201-6 for quality assurance checks of the examination, the examination grading, and the administration of the examination. The passing grade for non power written examinations is at least 70% in each category. A copy of the examination and answer key should be forwarded to the appropriate regional Section Chief for review. Attachments ES-107-1, ES-108-1, and ES-201-6 should be filed with the master copy of the examination.

D. Examination Scope (ES-202, paragraph B.)

The required scope of the written examination is set forth in 10 CFR 55. To implement this scope and to provide for identification and documentation of strengths and weaknesses within certain areas of knowledge, the written examination shall be divided into seven categories:

Category A. - Principles of Reactor Operation

This category contains questions relating to basic nuclear reactor behavior, elementary nuclear reactor theory, technical terminology and an appreciation of processes taking place in a reactor. Answering these questions does not require mathematical ability in excess of ordinary algebra or detailed and advanced knowledge in reactor physics. Questions in this category relate to reactors in general or to reactors of the appropriate class.

Category B - Features of Facility Design

This category contains questions about the design features of the particular facility, with emphasis on the reactor, auxiliary systems and experimental facilities, as applicable. It generally requires the candidate to reproduce, from memory, fairly detailed diagrammatic sketches or descriptions of various hydraulic, pneumatic or power distribution systems or reactor vessel and core components. It also inquires into design intent and the more important design parameters. Generally, parameters expressed as limits (e.g., maximum flow, maximum excess reactivity, maximum step reactivity insertion, maximum pressure) or fixed numerical values for fabrication (e.g., enrichment, dimensions) are investigated. Elements of design and operation of the experimental facilities associated with the reactor should also be explored in this category.

Category C - General Operating Characteristics

This category contains questions on controlled and variable parameters of the reactor and auxiliary systems. Values which are expressed as normal or operating parameters (e.g. purification flow rate, reactor tank temperature, fuel temperature, storage tank level) or values which are measured as resultant characteristics (e.g., temperature coefficient, reactivity worth, pressure drop) are investigated. Questions relating to the manner in which power, reactivity, rod worths, or other parameters of this facility would change in response to rod manipulations, heatup, core burn up, experiment insertion or other stimuli are in this category. Questions relating to the traces that one would see on recorders, in response to these changes should also be included. The questions should emphasize facility behavior rather than instrument characteristics.

Category D - Instruments and Control

This category contains questions on the characteristics and interrelationships of the nuclear and process instrumentation and control systems. These questions will inquire into the principles of operation of detectors, location and settings of instruments, diagrammatic representation of instrument and control systems and details of control rod drives design operation. It is not intended that a candidate must display the knowledge of an instrument technician (unless

it is part of his licensed responsibilities at a particular facility), but his answers should indicate the ability to recognize the indications and consequences of improper instrument performance (e.g., over-compensation, power failure, air supply failure, signal failure) including the traces that recorders would show. He should also be able to use all available instruments to provide checks or verification of observed readings.

Category E - Safety and Emergency Systems

This category contains questions on the design, construction, operation and interrelationships of the systems most directly associated with reactor safety, such as scram and other power reduction systems, pressure relief, spray systems, emergency power systems, and annunciated malfunctions. The candidate should demonstrate thorough knowledge of detailed design, characteristics, and operating methods for these systems. He should also be familiar with the conditions which require the use of such systems, and the reasons why such protection is required.

Category F - Standard and Emergency Operating Procedures

This category contains questions on the procedures for the operation of the reactor and auxiliary systems, including administrative controls. In general, a candidate must demonstrate complete understanding of the immediate action steps specified by abnormal or emergency procedures and to describe generally, the normal, abnormal and emergency operating procedures. If he is given several steps in a normal operating procedure, he should be able to put them in proper sequence. Operating restrictions in the facility license may be included herein, to the extent they are directly applicable to an operator.

Category G - Radiation Control and Safety

This category contains questions on terminology, radiation hazards, radiological safety practices and fixed and portable radiation monitoring equipment. The candidate should demonstrate knowledge of the type and magnitude of radiation hazards which might be expected to be present and knowledge of the methods to cope with them. He should know facility regulations and the general provisions and precautionary procedures of 10 CFR Part 20. The candidate should be able to understand and utilize portable equipment and describe type, location, approximate range and alarms associated with fixed equipment. He should know the limitations as well as the applications of this equipment.

E. Facility Management Control (ES-202, paragraph C)

The scope of the written examination is influenced, to a certain extent, by aspects of the management philosophy as set forth in facility documents. Since the examination and license are applicable only at the facility under application, the examiner shall consider the administrative controls in effect. This aspect is usually reflected in the examination areas of operating procedures and health physics. Procedures which clearly and comprehensively elicit the required operator action and require that even minor irregularities be immediately referred to senior operators necessitate less analysis and judgment by the operator. The continuous availability of health physics personnel for routine and emergency monitoring and investigation reduces the need of an operator

for proficiency with portable monitoring equipment. The converse of each of these examples is also valid. However, in order for management controls to be considered as sufficiently established, they should be reflected in the facility license or literature in a form binding on the operating staff. In all cases, the examination shall reflect (1) the level of knowledge necessary for the safe operation of the facility; and (2) the responsibility delegated by the facility to the operator.

F. General Guidance (ES-201, paragraph E)

The general guidance contained in Standard ES-201, is also applicable to written examinations for non-power reactors. Attachment 1 is a results summary sheet for non-power license examinations.

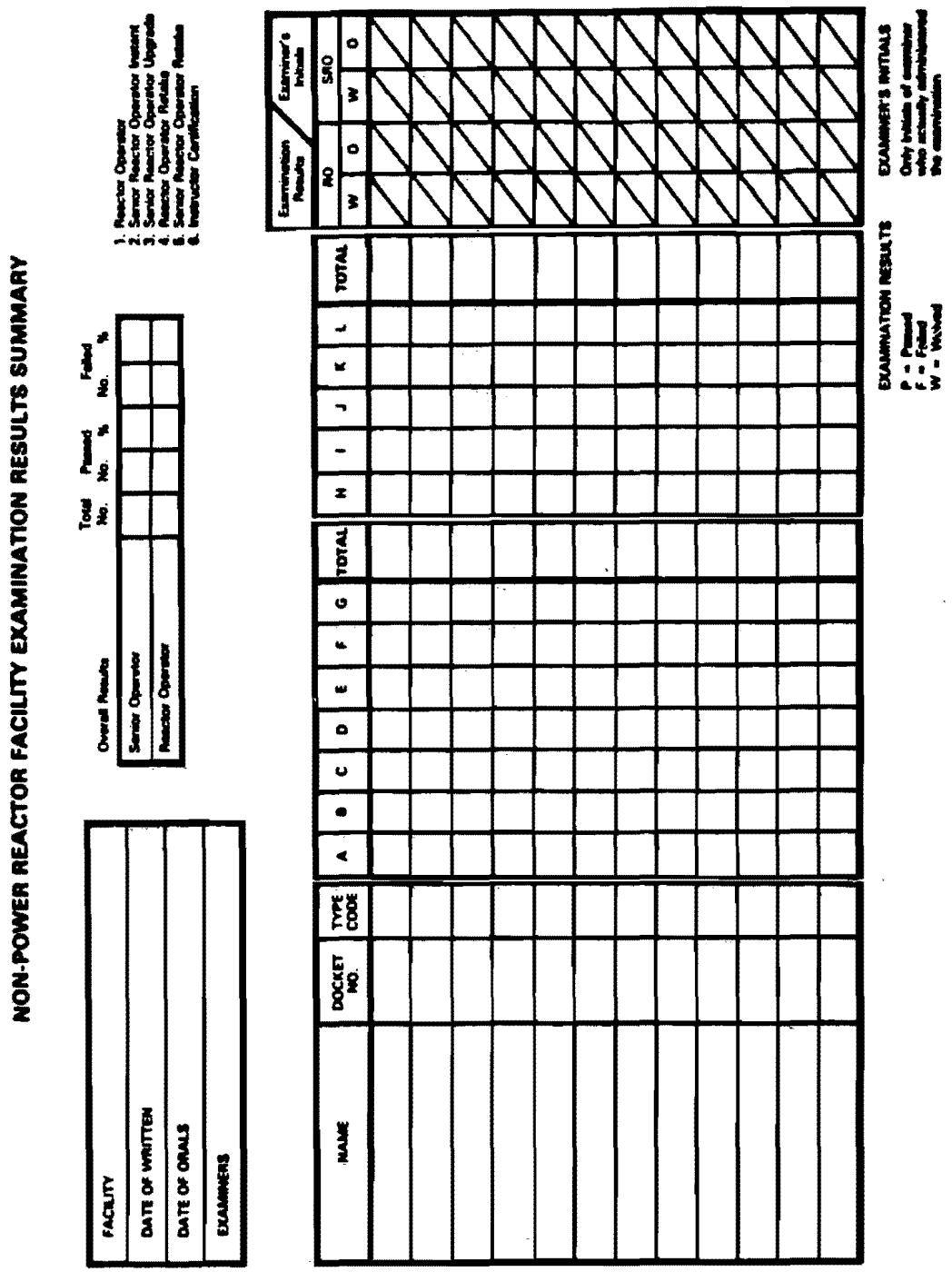
G. Examination Structure (ES-203, paragraph B, C, D, E)

1. Each written examination shall be divided into seven categories in accordance with Section D of this standard. A cover sheet, with the format shown in Attachment 2, ES-204-1, shall be used on all written examinations.

2. The relative weight of each category in the examination, as a percentile of total worth, should be 14% ±2% for each category, whenever possible. However the relative importance of safety and emergency systems vary significantly over the range of sizes and types of Research Reactors. Therefore, in order to comply with the 10 CFR 55 criteria "...to the extent applicable to the facility..." the weighting of the examination categories should be based on the professional judgement of examiners experienced in the operation and examination of non-power reactor facilities and approved by supervision. The general structure of the examination shall be such that a safe operator will score 70% or greater in each category. In addition, the length of the examination shall be such that a candidate would complete the examination within five hours, thus leaving one hour for review.

Attachment 1

Examination Results Summary - Non Power



Attachment 2

U.S. NUCLEAR REGULATORY COMMISSION
REACTOR OPERATOR LICENSE EXAMINATION

Facility: _____

Reactor Type: _____

Date Administered: _____

Examiner: _____

Candidate: _____

INSTRUCTIONS TO CANDIDATE

Use separate paper for the answers. Write answers on one side only. Staple question sheet on top of the answer sheets. Points for each question are indicated in parentheses after the question. The passing grade requires at least 70% in each category. Examination papers will be picked up six (6) hours after the examination starts.

Category Value	% of Total	Candidate's Score	% of Cat. Value		
_____	_____	_____	_____	A.	Principles of Reactor Operation
_____	_____	_____	_____	B.	Features of Facility Design
_____	_____	_____	_____	C.	General Operating Characteristics
_____	_____	_____	_____	D.	Instruments and Controls
_____	_____	_____	_____	E.	Safety and Emergency Systems
_____	_____	_____	_____	F.	Standard and Emergency Operating Procedures
_____	_____	_____	_____	G.	Radiation Control and Safety
_____		_____			

Final Grade _____%

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

_____
Candidate's Signature

ADMINISTRATION OF OPERATING EXAMINATIONS TO REACTOR OPERATORS AND SENIOR REACTOR OPERATORS - POWER REACTORS

A. Purpose

This standard specifies the procedure for the administration of operating tests to applicants for reactor operator and senior reactor operator licenses.

B. Definitions

As used in this and the following two standards (ES-301, ES-302, ES-303):

"Plant-referenced simulator" means a simulator modeling the systems of the reference plant with which the operator interfaces in the control room, including operating consoles, and which permits use of the reference plant's procedures. A plant-referenced simulator demonstrates expected plant response to operator input, and to normal, transient, and accident conditions to which the simulator has been designed to respond.

"Reference plant" means the specific nuclear power plant from which a simulation facility's control room configuration, system control arrangement, and design data are derived.

"Simulation facility" means one or more of the following components, alone or in combination, used for the partial conduct of operating tests for operators, senior operators, and candidates: (1) the plant, (2) a plant-referenced simulator, (3) another simulation device.

The definition of a "simulation facility" is intended to provide for flexibility in the conduct of the simulator (non-plant-walkthrough) portion of the operating test. The intent is to permit, under circumstances specified in 10 CFR 55.45(b), the use of the plant itself, and/or a plant-referenced simulator, and/or some other type of simulation device such as part-task or basic-principles simulator, for the conduct of the simulator portion of the operating test.

The definition of an "operating test" is that portion of the operator licensing process that provides information for making a pass/fail decision based upon direct interaction between an examiner and the applicant (candidate). The operating test is a practical oral examination that tests the candidate on operation of the reactor and associated plant systems. It shall include an in-plant portion on plant systems and their operation and may also include examination on a simulation facility or a startup demonstration (examination) on the facility reactor. The wide variations in concepts, design, and operation of licensed facilities make it impossible to delineate precise procedures applicable to all facilities.

The content of the examinations, as described in ES-302, should be applied, as appropriate, to allow the examiner to make the pass/fail judgments.

C. Clarification for Administering Operating Tests

For those facilities that have a certified or approved simulation facility, the simulation facility portion of the operating test, (Category D, Integrated Plant Operations) will be required for reactor operator and senior operator (instant and upgrade) applicants. When the certified or approved simulation facility is used for administering the operating test, the in-plant portion of the operating test should be shortened to account for the operations observed at the simulation facility.

It is not the intent of NRC to permit or encourage the initiation of transients on the plant when it is used as part of an approved simulation facility. The use of the plant will be specified in the simulation facility approval documentation submitted by facilities which propose to conform with 10 CFR 55.45(b)(1)(i).

After May 26, 1991 the simulation facility portion of the operating test will not be administered on other than a facility certified or an NRC approved simulation facility.

D. Scheduling

As a general rule, operating examinations are scheduled after the written examinations; however, other sequences are permissible.

One examiner shall administer the entire operating test to an applicant. If this is not possible because of unavoidable schedule conflicts, the one examiner may administer the simulation facility portion of the operating test and a second examiner administer the remaining portions of the operating test. In this rare case both examiners must ensure they have completely documented the evaluations of their respective portions of the operating test.

When large groups of applicants are to be examined at power facilities, the chief examiner should schedule the operating tests so that examiner utilization is maximized (See ES-103 paragraph D). Under no circumstances should an examiner be required to administer more than five examinations in any one week. There is no specified time for the minimum or maximum length of an operating test. However, for scheduling and resource efficiency purposes, the normal length of the exam should be 6 to 8 hours. Operating tests normally will be administered on regular work days although overtime may be required. It is desirable, whenever possible, to complete the operating test of a candidate on the same day it started. Occasionally examinations may involve weekend or shift work which will require prearrangement by the examiner (or chief examiner) and the facility licensee.

Although operating tests are audits of selected areas, it is sometimes necessary to go significantly beyond the average time periods to complete the operating test. In a relatively few cases where a candidate has clearly shown deficiencies and there is no doubt of a denial, the examiner may omit some required coverage. However, the examiner should administer as complete a test as possible within the "average" operating test period.

At a facility where the candidates have not received start-up certification, it may be necessary to administer all of the reactor startup portions of the operating tests (section II Integrated Plant Operations, simulation facility not available) in one specified period of time to accommodate utility load demands.

The simulation facility portion (Integrated Plant Operations) of the operating tests should be scheduled reasonably close to the administration of the remainder of the operating tests and the written examinations, in order to use examiner resources efficiently and to minimize the length of time between the start and finish of the entire examination process. The following guidelines should be followed unless special conditions exist:

1. Cold Examinations

   The written examinations should be scheduled sufficiently before the fuel loading date so as not to impact the facility licensee scheduling.

2. Hot Examinations

   Normally the operating and written examinations shall be scheduled to be completed during one visit by a group of examiners at facilities where the simulation facility is located on the plant site. Special scheduling arrangements shall be negotiated with the facility when the simulation facility is remote from the plant site. In this case, the written examination may be conducted at the plant site or the simulation facility site.

3. General

   Several alternate methods can be used to complete the combination simulation facility and in-plant portions of the operating test when the simulation facility and plant are located on the same site. When this situation exists, every effort should be made to complete all portions of the operating tests on the same day. The ideal situation is three examiners examining one senior and two operator candidates or other combinations of three candidates. The following alternatives shown below are examples of schemes that can be used if less than the ideal situation exists. It is the responsibility of the chief examiner to ensure that all candidates are examined in accordance with the standards (See ES-302 for other details).

   a. Alternative 1

      Day 1 - Two examiners work as a team on the simulator. Examiner A administers the examination to Candidates 1, 2, and 3, while Examiner B administers the examination to Candidates 4, 5, and 6. The candidates are paired off so that two examiners and two candidates are in the simulation facility control room simultaneously. Each simulation facility portion lasts about 4 to 6 hours.

      Day 2 - Examiner A administers the in-plant portion of the operating test to his three candidates as does Examiner B. Each in-plant portion of the test shall last about 2 hours.

b. Alternative 2

Day 1 - Examiner A administers the simulator facility portion to candidate 1; simultaneously, examiner B administers the examination to candidate 2. Both examiners and candidates proceed to the plant to conduct the in-plant portion of the operating test thus completing the tests for candidates 1 and 2. Afternoon tests are similar except that the in-plant portion of the tests are conducted first so that examiners do not have to reenter the plant security area. Each examiner completes two full operating tests.

Senior operators and operators should be scheduled for an optimum mixture. It is not acceptable to evaluate an operator in a senior operator's position. However, Senior Operators may be evaluated in ALL positions. Refer to ES-302-7 for minimum requirements.

E. Orientation of Examiners

Each examiner should become as familiar as possible with the specific facility through previous visits and review of information supplied by the facility in preparation for the examinations. As a minimum, the chief examiner should arrange for a tour of the facility by each examiner accompanied by a facility staff member. This tour, usually made the day before oral tests are scheduled to begin, should concentrate on the control room, and should not be conducted by one of the candidates. For examiners visiting the facility for the first time or who have not made a site visit in a considerable length of time, a more extensive orientation may be necessary. Orientation may also include use of the simulation facility if it is available without impacting the facility's training. Preplanned simulation facility operating test scenarios may be tried out during the orientation period. For reasons of examination security, the scenarios used during the orientation periods should be different than those developed for use during the actual operating tests. Arrangements should be made by the chief examiner for more extended or additional orientation visits if required.

F. Candidates

All candidates for licenses at the facility under application listed on Attachment 2, ES 103, the Request To Administer the Examination should be administered written and operating tests as indicated under "Examination Type". For facilities with a large number of applicants, the written examination will often be given a few weeks before the operating tests. In these cases, where the written examinations under 10 CFR 55.41 and 55.43 have been graded and the facility licensee has been informed of the candidates who have failed, the persons who have failed will not be given an operating test.

Candidates will occasionally withdraw from the examination at the last moment. If the examiner encounters this situation after arriving on site, he should inform the Chief Examiner and request a letter withdrawing the application of the individual(s). This letter should be forwarded to the appropriate regional administrator.

In rare instances, candidates may withdraw after the examination has begun. The examiner will inform such candidates that this is cause for automatic denial of application and request that the candidate sign a voluntary withdrawal statement.

G. Personnel Present

The number of persons present during an examination should be limited to ensure the integrity of the examination and to minimize distractions to the candidates. If an actual reactor startup or other reactivity manipulation is performed as part of the examination, a licensed operator or senior operator must be present in accordance with 10 CFR 55.13(a)(2). During control room discussions, additional shift crew personnel will be present as required by NRC regulations. If the examiner believes that the number of persons or the noise level in the control room is excessive, he should request the shift supervisor or other facility staff personnel to take appropriate action.

Except for the simulation facility operator no member of the facility training staff or other candidate shall be allowed to witness an operating test. Operating tests are not to be used as training vehicles for future candidates.

Another examiner may be present either to witness the operating test as part of his training, or to audit the performance of the examiner administering the operating test. Other observers, such as resident inspectors, regional personnel, researchers, or NRC supervisors, may be allowed to observe operating examinations if (1) the chief examiner has approved the request to observe the test, and (2) the candidate does not object to the observer's presence.

A simulation facility operator may assume the role of personnel outside the control room that senior operators and operators direct or notify regarding plant operations. Additional member(s) of the facility training staff may be used, as required, to augment the operating shift team as deemed necessary by the chief examiner. Such individual(s) shall be fully briefed before the operating test as to their responsibilities, reporting requirements, duties and level of participation.

H. Pre-Test Administrative Procedures

The content of the operating test will be identified, in part, from learning objectives derived from a systematic analysis of licensed operator or senior operator duties performed by each facility licensee and contained in its training program and from information in the Final Safety Analysis Report, system description manuals and operating procedures, facility license and license amendments, Licensee Event Reports, and other materials requested from the facility licensee by the Commission.

Reference material needed for preparing operating tests should be requested from the facility in accordance with the requirements of Examiner Standard ES-201. A list of appropriate references is provided in Attachment 1 to ES-201.

When operating tests are being developed for plants with a simulation facility, pre-planned scenarios are developed, in accordance with ES-302. Contractor developed scenarios shall be transmitted to the appropriate NRC regional office so that they are received five working days prior to the scheduled start of

operating tests. The regional section chief or his designee shall review the scenarios prior to the operating test.

Prior to the administration of the operating test, the examination team should review the scenarios together and discuss required procedures, technical specifications and special circumstances, etc., related to the scenarios. If circumstances permit, the examiners will practice representative programs or specific malfunctions at the simulation facility with the simulation facility instructor.

Prior to the administration of the operating test, the examiner should review the Scenario Event attachments with the simulation facility operator. The review should be aimed at instructing the facility operator concerning the sequence of the scenario events to ensure the scenario will proceed as planned, with respect to both the capabilities of the simulation facility and the likelihood of the expected candidate actions. Any revisions to the scenarios should be documented on all examiners' copies of the Scenario Event page (ES-302-3).

Before administering the simulator portion of the test, a suitable communication system should be set up between the examiners and the simulation facility operator to enable the insertion of malfunctions without cuing the candidates. For example, predetermined times or power levels for the sequence of malfunctions can be assigned so that examiners and the facility operator are aware of the event that is about to occur or is occurring. Sufficient precautions should be taken so that the scenarios are not revealed to the candidates before the test begins.

The scenario attachments (ES-302-3 and ES-302-4), should be reviewed to identify important plant parameters to be monitored during the performance of the scenarios. Prior to the administration of the test, the examiner should consider requesting printed records of selected parameters from the facility's plant parameter display system(s). For example, some of the useful parameters to collect during a steam generator tube rupture may include:

- Main steam header pressures
- Steam generator steam pressures
- Pressurizer levels (narrow and wide range)
- Pressurizer pressures
- One loop leg narrow range pressure
- Loop Tave
- RCS loop hot and cold leg wide range temperature
- Feed water flow

Parameter readings should be collected at meaningful time intervals, (typically once every three minutes), although this may vary depending upon the parameter, the nature of the event, and the simulation facility. These printouts could serve as back-up documentation to augment the examiner's notes made during the operating test.

The chief examiner should consider requesting the facility to retain copies of logs, charts, etc. until all candidates are licensed or all appeals are settled, as suggested by the letter as written in standard ES-201 attachment 3.

I. Test Administrative Procedures

An examiner shall brief the candidate(s) prior to the administration of the operating test. Attachment 1 (ES-301-1) to this standard should be used to assist the examiner performing this briefing. To effectively use examiner resources, it is recommended that this briefing be presented to all operator license candidates who are scheduled to be examined during the facility visit at the same time.

An Operator License Examination Report, NRC Form 157, (ES-302-1) has been developed to reporting examination results. The instructions for using this report are contained in ES-302. The front page of the report form will be completed for each candidate. If only a portion of the examination, (i.e., written or operating test) is administered by an examiner, the front page of the form will be completed for the portion completed.

Throughout the administration of the operating test, the examiner should allow, and in fact encourage, the candidate to draw diagrams, flow paths, or other visual representations. This serves two purposes:

1. It allows candidates to better express themselves when providing an answer or explanation to the examiner.

2. It provides additional documentation to support a pass or fail determination.

These visual representations may not be made on the reverse pages of the forms pertaining to the operating test. These diagrams should be on one side of a separate sheet of 8 1/2 x 11 paper. Notes should not be made on the back of any page of the NRC Form 157. Additional pages may be added for examiner notes.

If an operating test is administered at a plant with a simulation facility, the chief examiner should ensure that the simulation facility operator (or examiner) playing the role of other plant personnel is aware of the time scale for returning information to the candidates. For example, fast time could be specified for auxiliary operator checks or line ups to prevent long delays in simulated operations while maintenance and chemistry sample information can be returned with normal time delays to present the candidates with the same analysis problems that they will face as operators.

When facility operators are acting in the role of support staff outside the control room and they are in communication with the candidates, examiners should listen to both sides of the conversation. The simulation facility operator shall be cautioned prior to the start of the examination to provide only information that is specifically requested by the candidates.

Examiners should use the expected actions/behaviors listed on the Operator Actions page (Attachment ES-302-4) to cue them as to what to look for. If the candidates perform as expected, there is no need to make any note other than a check next to the expected action. However, if the candidate performs in a way other than expected, the examiner should note the candidate's actions (or lack of actions) next to or below the expected action. These notes should provide sufficient information to allow the examiner to confidently judge candidate

competence, but they need not include a moment-by-moment account of everything that transpired during the scenario. (See ES-302 for more detailed instructions).

The examiners should limit discussions with the candidates during the scenario performance to both maintain realism and to avoid distracting candidates from operating the simulation facility. The questions asked by examiners during the scenario performance should be limited to those that are necessary for assessing the candidate's understanding of plant conditions and required operator actions during the scenario. Even these questions should be deferred until a time (such as during certain normal operations) when the candidate is not responsible for operating or close monitoring of the simulation facility.

If the simulation facility should become inoperable, causing excessive delay of the examination, the chief examiner should discuss the situation with the responsible regional section chief so that a decision on the conduct of the operating test can be made.

The responsible regional offical will review the examination results and sign the appropriate block to issue or deny a license. If the regional official does not agree with the recommendation, the examiner or chief examiner shall be conferred with before the recommendation is overturned. Although such disagreements are not common, they usually arise because of inadequate documentation for a failing recommendation. It is therefore important for examiners to be complete and accurate in their evaluations and comments. See ES-302 for guidance on evaluations and justification comments for operating tests.

J. Actual Reactor Startups Performed for the Operating Test

For those operating tests that require an actual reactor startup or other manipulation of controls of the facility to be performed, the following applies:

1. The candidate and the licensed operator present and/or the responsible supervisor should be informed that the examiner will never intentionally ask the candidate to perform an act that violates facility regulations or procedures or which places the facility in a hazardous situation. If a requested act falls in these categories, then the candidate, operator, or supervisor should indicate this immediately. If the examiner's intent is to determine whether the candidate would perform such an act, the question can be phrased in some manner other than requesting the act be performed.

2. Candidates are to be made aware that the examiner's presence does not alter the normal chain of command and that the candidate, during the examination, should make all reports and obtain all permissions that normally would be required. All directions to the candidate shall come from the responsible supervisor in accordance with the facility administrative procedures. The examiner shall only question and make requests of the candidate. The examiner should avoid asking questions that will distract the candidate during the manipulation of controls.

3. The examiner shall not alter the set points or calibrations of any instrument or manipulate any control.

examiner should avoid asking questions that will distract the candidate during the manipulation of controls.

3. The examiner shall not alter the set points or calibrations of any instrument or manipulate any control.

4. The licensed operator on duty should be informed that it is the operator's responsibility to step in and take over control of the reactor any time there is an unsafe condition or there is reasonable assurance, in the operator's opinion, that the reactor will shut down if conditions are not corrected.

K. Post-Test Administrative Procedures

After administering the operating test the examiner is to ensure the Operator License Examination report (Attachment to ES-302), with appropriate attachments is completed in accordance with ES-302. The examiner will recommend passing or failing the candidate on the bottom portion of the cover page. The chief examiner will also recommend passing or failing the candidate based on the results of the entire examination. If one of the four categories of the test is evaluated as unsatisfactory the examiner must recommend failing the candidate on the operating test.

The responsible regional official, branch chief or above, will review the examinations results and sign the appropriate block to issue or deny a license. In no case will the designated regional official for issuing the license or signing the decision block at the bottom of the Form 157 be delegated below the branch chief level. If the regional official does not agree with the recommendation, the examiner or chief examiner shall be conferred with before the recommendation is overturned. Although such disagreements are not common, they usually arise because of inadequate justification in a denial recommendation. It is therefore very important for examiners to be complete and accurate in their grading and comments. See ES-302 and 303 for guidance on evaluations and justification comments for operating tests.

L. Reference

1. Title 10, Code of Federal Regulations part 55.45

ATTACHMENT 1

Briefing Checklist - Operating Test

The following candidate briefing is required.

Part A - Applicable to all operating tests

1. The senior operator is tested at the level of responsibility of the senior licensed shift position (i.e., shift supervisor, senior shift supervisor or whatever the position may be titled).

2. The examiner is a visitor. Escort responsibility for ensuring compliance with safety, security and radiation protection procedures is the responsibility of the candidate escorting the examiner.

3. Plant equipment should no be operated without appropriate permission from the operating crew. Nothing the examiner says or asks will be intended to violate that principle.

4. If clarification of questions is needed during the operating test, there should be no hesitation to request the examiner reword or clarify the question.

5. The examiner will be taking notes throughout the test to document candidate performance. Frequently an examiner will stop questioning for this purpose. The amount of note-taking is not dependent upon the candidate's level of performance. The examiner must document satisfactory as well as less than satisfactory performance.

6. The operating test is considered "open book." The reference material in the facility/control room which is normally available to operators is also available to the candidates, including calibration curves, previous log entries, piping and instrumentation diagrams, calculation sheets, and procedures. However, candidates are responsible for knowing from memory the immediate actions of emergency and other procedures as appropriate to the facility.

7. There is no specific time limit for the operating test. The examiner will take whatever time is necessary to cover the areas selected, in the depth and scope required. Here the examiner may also discuss the scope and estimated length of the exam. Scope and estimated length of categories may be influenced by the amount of material covered during the Integrated Plant Operations portion (Category D) of the test.

8. The examiner is not allowed to reveal the results of the operating test at its conclusion.

9. If a candidate feels the need for a break during the operating test, the candidate should request this from the examiner.

Part B - For tests with simulation facility available

1. The primary responsibility is to operate the facility as if it were the plant.

2. The examiner's questions should be answered only if doing so will not interfere with simulation facility operations.

3. Team work and communication between candidates is evaluated. It benefits the exam process to verbalize observations, analysis and reasons for actions more than normally would be done during plant operations.

4. If a candidate recognizes an incorrect decision, response, answer, analysis, action taken or interpretation of the team which the candidate is a part of but fails to correct, than the examiner may assume that that candidate agrees with the incorrect item.

5. A rough log may be kept during each exercise that would be sufficient to complete necessary formal log entries which may be evaluated under administrative topics.

6. A designated facility instructor (or an examiner) will act as the auxiliary operators, radiation health and chemistry technician, maintenance supervisors, plant management and anyone else needed outside the control room area.

7. The facility instructor (or examiner) will provide a shift turnover before the exercise begins. The shift turnover will include present plant conditions, power history, equipment out of service, abnormal conditions, surveillance due, and instructions for the shift.

8. Control board switches may be purposely misaligned to enhance a simulated scenario or transient where appropriate and is not part of the evaluation. If misaligned, they should be tagged or otherwise highlighted as appropriate to the facility. The examiner will not misalign switches during the scenario as an awareness drill.

Note: Chief examiner has the option to tell the candidates that no control board switches will be misaligned on a given scenario or set of scenarios. If no switches are misaligned, the chief examiner may wish to reduce the time it takes for the candidates to complete the board walk down and accept the shift.

9. Candidates will be allowed three to five minutes to familiarize themselves with the status/conditions of the control boards prior to the start of the exercise.

10. The simulation facility part of the examination will consist of two or three exercises lasting between 4 to 6 hours. There will be a short break between exercises to set up the initial conditions for the next exercise.

11. If candidates have any questions concerning the administration of the operating test, those questions should be answered prior to the start of the test.

CONTENT AND DOCUMENTATION GUIDELINES FOR OPERATING TESTS

A. Purpose

This standard explains the content of the operating test, in accordance with the requirements of 10 CFR 55.45. This standard also provides guidance to the examiner on the use of the examination forms and attachments for the operating test.

The Operator License Examination Report (NRC Form 157), Attachment 1 to this standard, was developed for use during the administration of operating tests for all types of candidates, (i.e., Reactor Operator; Senior Reactor Operator, Instant; Senior Reactor Operator, Upgrade; Senior Reactor Operator, Limited to Fuel Handling) for initial, retake and requalification examinations.

All candidates for reactor operator (RO) and senior reactor operator (SRO) licenses are required to be administered an operating test except in cases where a waiver has been granted in accordance with 10 CFR 55.47. The content of the examinations will depend on the type of license applied for (RO, instant SRO, upgrade SRO) and the availability of a simulation facility.

B. Definitions

"Candidate" is the applicant for an operator license.

"Candidate's License Level" is the level to which the candidate has applied for an operator license, i.e., RO, SRO.

"Category" means a major subdivision of related subjects in the operating test.

"Subject" is one of several specific topics covered in a category.

"Simulation facility" means one or more of the following components, alone or in combination, used for the partial conduct of operating tests for operators, senior operators, and candidates: (1) the plant, (2) a plant-referenced simulator, (3) another simulation device.

"Scenario Set" is a group of scenarios which comprise one Integrated Plant Operations with Simulation Facility Available, operating test.

"Scenario" is an integrated group of events which replicate a set of plant malfunctions and/or evolutions on a simulation facility.

C. General Evaluation Guidelines

The examiner is ultimately responsible for making a professional judgment on whether a candidate should pass or fail this segment of the operator licensing process. The attachments pertaining to the operating test are a means of documenting the operating test process and the bases for the examiner's pass or fail recommendation.

Examiners will specify their evaluation of the candidate by placing an "S" for satisfactory, or a "U" for unsatisfactory in the appropriate spaces. The following general criteria are to be used for these evaluations.

S - Satisfactory Working Knowledge and Understanding of the Subject or Systems

The candidate may have some slight or minor difficulty relating to system interactions. Competence in the operation of equipment associated with system is very good although there may be some hesitation while performing some tasks. The candidate, however, appears to be familiar with the equipment and procedures.

U - Not Satisfactory With Poor Working Knowledge and Understanding of Subject Or System

Candidate has difficulty answering questions in depth and in relating the interactions of systems. Competence in operation of equipment shows lack of familiarity with the equipment and procedures. Answers given by the candidate are incorrect and incomplete and/or he is unable to provide an answer. The candidate shows obvious unfamiliarity with subject and/or system as evidenced by hesitant answers, inability to locate information, inability to locate control board indications and/or controls, and lack of knowledge of procedural steps to operate systems.

All evaluations, especially unsatisfactory evaluations shall be supported by detailed notes stating the particular action or response that resulted in the unsatisfactory evaluation. The use of general statements such as "did not know decay heat removal system" is inadequate.

During questioning, the examiner should avoid true/false-type questions or questions with only two possible answers. Questions of this type increase the difficulty of determining satisfactory or unsatisfactory responses, particularly if the candidate changes his mind because of prompting by the examiner. For example, instead of asking, "If the steam generator safety failed open with rod control in automatic, would rods move in or out?," the examiner should ask, "If a steam generator safety failed open, what would be the primary effect on reactivity initially?" He should then discuss rod control response and protective system response or reactivity principles in more depth depending on the candidate's answer.

D. General Content of the Operating Test

The operating test, to the extent applicable, (10 CFR 45.a.) requires the applicant to demonstrate an understanding of and the ability to perform the actions necessary to accomplish a representative sample from among the following 13 items:

1. Perform pre-startup procedures for the facility, including operation of those controls associated with plant equipment that could affect reactivity.

2. Manipulate the console controls as required to operate the facility between shutdown and designated power levels.

3. Identify annunciators and condition-indicating signals and perform appropriate remedial action where appropriate.

4. Identify the instrumentation systems and the significance of facility instrument readings.

5. Observe and safely control the operating behavior characteristics of the facility.

6. Perform control manipulations required to obtain desired operating results during normal, abnormal, and emergency situations.

7. Safely operate the facility's heat removal systems, including primary coolant, emergency coolant, and decay heat removal systems, and identify the relation of the proper operation of these systems to the operation of the facility.

8. Safely operate the facility's auxiliary and emergency systems, including operation of those controls associated with plant equipment that could affect reactivity or the release of radioactive materials to the environment.

9. Demonstrate or describe the use and function of the facility's radiation monitoring systems, including fixed radiation monitors and alarms, portable survey instruments, and personnel monitoring equipment.

10. Demonstrate knowledge of significant radiation hazards, including permissible levels in excess of those authorized, and ability to perform other procedures to reduce excessive levels of radiation and to guard against personnel exposure.

11. Demonstrate knowledge of the emergency plan for the facility, including, as appropriate, the operator's or senior operator's responsibility to decide whether the plan should be executed and the duties under the plan assigned.

12. Demonstrate the knowledge and ability as appropriate to the assigned position, to assume the responsibilities associated with the safe operation of the facility.

13. Demonstrate the 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.

When a simulation facility is not available, the examiner will base his decision on discussions with the candidate to ascertain the extent to which the candidate demonstrates an understanding of, and the ability to perform the actions necessary to accomplish the representative sample of the previously listed 13 items.

Generic lists of systems and subjects have been developed for both boiling-water reactors and pressurized-water reactors (Attachments 9 and 10 to this standard). While these lists are intended to be comprehensive, they are not all-inclusive. The examiner may select from these lists, or from a list specific to the applicable vendor type and model of the nuclear steam supply system, those areas that he chooses to cover during the operating test. The examiner should vary coverage of systems and subjects across test administrations.

The conduct of a senior reactor operator (SRO) operating test is aimed at evaluating the candidate's knowledge of his responsibilities as a shift supervisor. The SRO candidate should demonstrate supervisory ability and an attitude of responsibility for safe operation and assume a management role during plant transient and upset conditions.

Differences in administrative controls and facility design will affect the SRO's responsibilities, but in general the following items should be used as guides for the content of the SRO operating test, as compared to an RO test.

1. The senior operator, in directing licensed activities, must evaluate plant performance, particularly during nonroutine events, and make operational judgments accordingly. He should therefore have a higher degree of knowledge in areas such as operating characteristics, reactor behavior, and instrument interpretation.

2. The senior operator, in directing licensed activities, must have a wider and more thorough knowledge of facility administrative controls and methods, including limitations imposed by regulations, particularly the limitations set forth in the Technical Specifications and the bases for each of the specifications.

3. The senior operator often will be assigned comprehensive actions during facility emergencies and abnormal conditions and should demonstrate knowledge of these assignments.

4. The senior operator often will be assigned responsibilities for auxiliary systems that are outside the control room and are not normally operated by licensed operators. The most common example is a waste disposal and handling system for which the licensed operator's responsibility ends when the fluid passes the last instrument that has console display. However, due to his additional responsibilities the senior operator candidate must demonstrate knowledge of system design concerning maximum permissible concentration, effluent release rates, and other aspects as appropriate.

The conduct of an instant SRO operating test is the most difficult and time consuming to administer because the candidate must be evaluated for both RO and SRO levels of responsibility. The examiner must be assured that the candidate has the necessary skills and abilities as a reactor operator and has the required knowledge and supervisory capabilities to function as a senior reactor operator. Therefore, the instant senior reactor operator examination must be a combination of the RO and the SRO operating tests.

E. Documentation Instructions and Specific Content

The operating test results and comments for less than satisfactory performance will be documented on the Operator License Examination Report (NRC Form 157), ES-302-1, and appropriate attachments.

The report has five pages.

Page 1 - Cover/Summary

Page 2 - Administrative Topics (Category A)

Page 3 - Control Room Systems and Facility Walkthrough
(Categories B and C)

Page 4 - Integrated Plant Operations (Category D)
(Simulation Facility/ Plant Available)

Page 5 - Integrated Plant Operations (Category D)
(Simulation Facility Not Available)

All four categories (A through D) must be completed for RO and Instant SRO candidates. For an Upgrade SRO candidate Categories A, C, and D must be completed and if weaknesses in system knowledge are noted during the administration of the operating test, then it is appropriate that Category B also must be completed for the upgrade SRP candidate. If the examiner does not evaluate the Upgrade SRO candidate in System Knowledge then the examiner must indicate N/E (not evaluated) on the Report Cover page in the Category B block.

The operating test for an instant SRO candidate must be an appropriate blend of the test requirements for a reactor operator and for an upgrade SRO. The examiner must determine that the instant SRO candidate has the requisite knowledge and ability as a reactor operator and also can function in a supervisory capacity as a senior reactor operator. The SRO candidate, whether upgrade or instant, must be aware that he is being examined for the highest position for which the SRO's license is applicable on shift. Even if the SRO candidate is to be given a shift foreman's (or assistant shift supervisor's) position when he receives an SRO license, the test must be conducted assuming the candidate will function in the highest licensed shift position (i.e. shift supervisor).

The remainder of this section is a detailed description of the use of each page of the examination report.

1. Page 1 - Cover Summary

The cover includes summary examination information including:

(1) the applicant name, plant involved, and type of examination;

(2) a summary of the results of the entire examination;

(3) recommendations of the examiners and the final action taken on the applicant's license.

a. Candidate/Facility Information Area

The examiner will complete the top area of the page with the applicant's name, docket number, and facility on which the applicant is being examined. By placing an "x" in the appropriate box, the examiner will indicate the type of examination and facility description.

b. Examination Summary Area

The center area of the page contains the summary data. For the written examination summary, the results are to be taken from the cover page of the written examination and transposed to the appropriate category blocks as indicated in each block.

Place the overall grade for the written examination in the far right hand block. Above the grades, print the name of the examination author, the date on which the examination was administered, and the name of the examiner who graded the examination. Fill in both blocks, even if the author and grader are the same examiner.

For the operating test summary, the examiner who administered the test will place a summary rating in the appropriate category box. From this assessment, the examiner will consider the significance of each documented evaluation and determine the candidate's performance in this category as being satisfactory (S) or unsatisfactory (U). Above the category evaluations is to be printed the name of the examiner who administered the operating test and the date the test was administered.

c. Examiner Recommendations and License Action Area

The bottom area of the cover page is used to document the associated examiner's recommendation as to whether the candidate passed or failed a given examination. For the written examination, the recommendation is made by the grader and is based on the grading requirements stated in ES-201. In the operating test block, the examiner who administered the test must make a recommendation by reviewing the applicable category evaluations previously determined.

For the operating test, all four areas must be evaluated as satisfactory or not evaluated in order to recommend a pass. Each recommendation must have the associated examiner's signature in the block to the right of the recommendation.

The last recommendation is that of the chief examiner. The chief examiner will review the entire examination, including grades, evaluations and recommendations. As a result of this review, the chief examiner will make an independent recommendation and place his/her signature in the appropriate block. If the previous recommendation for the written examination and/or operating test was made by the chief examiner, another examiner should be assigned to make the independent final examination. The final action is taken by the Regional Administrator or his designee who, by taking all recommendations into consideration, will either issue or deny the operator license.

2. Page 2 - Administrative Topics (Category A)

This page covers topics that are generally associated with the administrative operation of the plant.

Some subjects in this category appear to be redundant with those found in Category D, Integrated Plant Operations. These subjects, however, are intended to serve as discussion items for the examiner to explore the candidate's depth of knowledge and understanding (e.g. Technical Specification basis) which may not be evident during the integrated plant operation portion of the operating test.

The examiner should not give duplicate credit in these Category A subjects from observation of operator actions evaluated during the administration of the simulation facility portion of the operating test. Evaluations on this page should be made based on direct discussion with the candidates rather than inferred.

The subjects on this page have been divided into six groups. As indicated on this page, the examiner should cover all but one topic in each group. The topics to be examined, in each group, are at the discretion of the examiner, however, if one subject is evaluated as unsatisfactory, the remaining subject in that group must be evaluated. The exception is subject No.. 11 in Group 3; "Emergency Plan." This line item is designated as mandatory and must be covered. Each individual subject carries no minimum evaluation guidance, and it is left to the examiner's discretion to determine when each subject is adequately covered. Therefore, all subjects on the page can be used to examine at all license levels. The examiner must be sensitive to the candidate's license level and ask questions to the appropriate knowledge depth. An example of this would be Technical Specifications. The level of knowledge for an SRO would involve the LCO, action statements involved, and basis for the LCO. An RO would only need to know basic LCO information or be able to recognize a potential LCO situation and possibly find the associated LCO in the book.

The following table establishes the relationship between the operating test and 10 CFR 55.45.

Group 1

Group 1 subjects are primarily used to record and track important administrative information concerning the daily operation of the facility. These items can be covered either in a shift turnover style discussion or they can be integrated into other discussions as they apply throughout the examination. They are not intended to duplicate administrative system requirements in the control room (e.g., valve line ups form and signature requirements, control room data system administration and use, etc.). The level of candidate knowledge should be consistent with the type of license they are seeking. For example the RO should be familiar with the mechanics of issuing, hanging and clearing facility tags while the SRO may need to understand the responsibility associated with the authorizing clearances in addition to the mechanics. Similarly the RO may only need to understand the process of obtaining a controlled key whereas the SRO needs to understand the responsibility and authority associated with the key control system.

Group 2

Group 2 items are generally those administrative requirements associated with reactor/plant startup and power escalations. They may be covered in a separate discussion or during a startup certification/demonstration. Items 7 and 9 could also be included in Control Room discussions or scenarios developed to demonstrate Integrated Plant Operations. For example it would be expected that any candidate would ensure that Technical Specifications were met prior to a mode change in a discussion or operating demonstration.

Table 302-1
Relationship Between Operating Test and 10 CFR 55.45

10 CFR 55.45.a Items	Related Operating Test Item
1. Perform Pre-Startup Procedures	Category A: Administrative Topics, Group 2, Items 7 and 8
2. Manipulate Console Controls	Category A: Administrative Topics, Group 2, Item 9 Category B: Integrated Plant Operations, Item C
3. Identify Annunciators and Signals	Category D: Integrated Plant Operations, Item B
4. Identify Instrumentation Systems	Category C: Control Room Systems Category D: Integrated Plant Operations, Item A
5. Observe and Control Behavior of Facility	Generically applicable to all categories
6. Perform Control Manipulations in Normal, Abnormal, and Emergency Situations.	Category C: Control Room Systems Category D: Integrated Plant Operations, All topics
7. Operate Heat Removal Systems	Category A: Administrative Topics, Group 6, Item 24
8. Operate Auxiliary and Emergency Systems	Category A: Administrative Topics, Group 5, all items, Group 6, Item 24
9. Demonstrate/Describe Radiation Monitoring Systems	Category A: Administrative Topics, Group 4, Item 18 Category C: Control Room Systems
10. Knowledge of Radiation Hazards	Category A: Administrative Topics, Group 4, Items 14, 15, 16, 17 and 19
11. Knowledge of Emergency Plan	Category A: Administrative Topics, Group 3, Item 11 and Group 6, Item 25
12. Assume Responsibilities Associated with Safe Operation	Category A: Administrative Topics, Groups 1 and 3 all items, Group 6, Item 23
13. Function As Control Room Team Member	Category A: Administrative Topics, Group 3, Items 10, 12 and 13 Category D: Integrated Plant Operations, Items D, E, F, G and H

Group 3

Group 3 contains administrative items which deal with broader areas than those in Group 1. It is recommended that each of the selected Group 3 subjects be integrated into other discussions throughout the test, returning to them several times and at different entry points to check for comprehensive understanding. The examiner should, however, be particularly sensitive to the level for which the candidate is being examined, when evaluating Group 3 subjects.

Because of the importance of the emergency plan Item 11, it is designated for mandatory coverage to the extend applicable to the candidate license. Although the senior operator in charge is usually responsible for classifying and implementing the appropriate action levels, the RO should know those levels and his response and duties for each one. The examiner should make the discussion comprehensive and may find it appropriate to address this area as part of a transient discussion that necessitates an emergency response.

Group 4

The six items in Group 4 can be discussed in the control room or as part of an entry into a controlled area in the Facility Walkthough, Category C. The candidate's responsibility for personnel protection and for the control and discharge of radioactive wastes should be thoroughly tested to ensure vigilance.

Group 5

Group 5 contains subjects dealing exclusively with fuel handling. Due to the importance of proper fuel handling, three subjects are used to address the topic which are applicable to all facilities. These subjects can be covered in the control room, but it is recommended that, when possible, these subjects be covered in the fuel handing areas of the plant. The three subjects cover information such as the delivery of new fuel, moving new/spent fuel, storage of new/spent fuel, design of the fuel handling area, tools used and casualties such as a dropped assembly.

The RO should be aware of duties relative to the control room during fuel handling such as, communication with the fuel storage facility, systems operated from the control room in support of fueling operations and supporting instrumentation.

Group 6

Group 6 subjects are the least related to each other as compared to the other five categories. Item 24 in this group is frequently demonstrated during discussions in the Control Room. To evaluate the candidate's knowledge and ability for this item, the examiner should explore the ability of the candidate to find and read the plant's system drawings. This item may also included logic/ coincidence prints and electrical wiring diagrams. Security Familiarity and Awareness item No. 25 may be discussed with the emergency plan as a separate subject by observation of the candidate throughout the test.

For SRO candidates the following requirements must be followed:

For Group 1, the examiner should use at least one piece of existing or out-of-service equipment (or hypothesize one) and follow through with the required procedural and administrative requirements for removing from service, issuing a work permit (may include a radiation work permit), tagging out of service and system restoration.

For Subject No. 11, Group 3, the shift supervisor is designated as the emergency plan coordinator until appropriately relieved. Each SRO candidate will be evaluated in this capacity including event classification, plan implementation and communication with outside agencies (e.g., state police, NRC, FEMA).

For Group 4, the examiner should discuss at least one type of planned radioactive waste release (gaseous, liquid, containment purge) with the candidate.

For Group 5 discussions concerning fuel handling should be conducted at the appropriate location (e.g., fuel-handling bridge and spent fuel pool), if at all feasible.

Examiner comments concerning the candidate's performance are to be documented on Attachment 2 to this standard, Operating Test Comment Page. Each comment must be referenced to the category (in this case A) and the subject the comment concerns (1-25) in the alpha/numeric column. This page is an attachment to NRC Form 157 and all comments and documentation which form the basis for evaluation on candidate performance must accompany the examination report. Documentation may include, in addition to Attachment 2, display system printouts, strip charts, candidate written material, logs generated during integrated plant operations, etc.

3. Page 3 - Control Room Systems, (Category B)

This category is used by the examiner to determine if the candidate possesses adequate knowledge in the area of plant systems and the operation of these systems. When questioning a candidate in this category, the examiner must cover four major subjects; System Equipment/Components, System Instrumentation/ Protection/Interlocks, Procedural Knowledge/Use, and Administrative Requirements. Each subject covers a broad array of knowledge and it is the responsibility of the examiner to preplan the discussion to ensure adequate coverage. An evaluation in all four subject areas for each system selected is mandatory. If a candidate's knowledge is evaluated as unsatisfactory for a system, it is recommended that the examiner, if practical, choose another system of the same type (auxiliary, emergency etc.) and evaluate the candidate additional system, in all four subject areas.

The conduct of the operating test for a Senior Reactor Operator Upgrade is to be administered at the same level as that of the instant, however credit is to be given for the upgrade's previous knowledge demonstrated by his RO license. To accommodate this, Category B, Control Room Systems, is not required to be covered, and may be marked N/E on the cover page in the Category B block. However, should the examiner detect weaknesses in this category, the examiner should explore this category to a depth necessary to assure candidate competency. If this category is entered, the minimum number of systems covered must be sufficient to allow the examiner to make a summary evaluation of the candidate. All four subjects must be evaluated for each system and the summary evaluation entered on the cover page.

System Equipment/Components incorporates the system hardware design, and components. This subject should also include the basic flowpath (explanation, free-hand drawings or tracing piping and instrument drawings), sources, power supplies, system backups, system operation to perform its function and its relationship with connecting systems.

System Instrumentation/Protection/Interlocks incorporates instrumentation associated with the system, its purpose, normal readings, expected readings during normal off-normal and emergency situations, component protection and interlock functions and location of local and remote instrumentation. Also any automatic protection afforded by the system, setpoints, coincidences and reason for the protection is appropriately evaluated in this subject.

Procedural Knowledge/Use subject area incorporates normal, abnormal or emergency procedures associated with the system, including procedural prerequisites and precautions and limitations. Also included in this subject are special tests and valve lineup checklists. The examiner shall sample a candidate's knowledge in normal, abnormal, emergency procedures to a depth necessary to ensure minimum competency.

Administrative Requirements will document knowledge in the area of Technical Specifications, surveillance testing, documentation associated with the system, and any special restrictions or instruction placed on the system by the facility.

The left hand column of the page is used by the examiner to list those systems covered in this category. Attachments ES-302-9 and ES-302-10 provide names of systems for use during this portion of the test. The minimum number of systems required varies with the type of operating test administered, as follows:

Simulation Facility Available

For operating tests administered with a simulation facility available, the minimum number of systems evaluated is six; one from Auxiliary, Emergency, Radiation Monitoring and Instrumentation and Control lists and two systems from the Heat Removal List, one of which must be from emergency coolant.

It is not the intent of that this category be redundant to the evaluations made in "Integrated Plant Operations," Category D. It is, rather, to serve as a source of additional systems knowledge or follow-up discussion as a result of candidate performance in Category D. Evaluations in Category B are generally the result of direct discussion with the candidate and not inferred from observed actions. For each system chosen to meet the minimum requirements, all four subjects must be evaluated.

Simulation Facility Not Available

In operating tests where a simulation facility is not available, the minimum number of systems evaluated is ten; two systems from each of the Auxiliary, Emergency, Instrumentation and Control lists, one system from each type of Heat Removal systems and one from the Radiation Monitoring list. The coverage of the subjects for each system may be incorporated into the discussion generated in the "Integrated Plant Operations" portion, Category D (simulation facility not available). All four subject areas, however, shall be evaluated for all systems.

Examiner comments concerning the candidate's performance are to be documented on Attachment 2 of this standard. Each comment must be referenced to the category (in this case B) and the alpha-numeric grid location of the evaluation being commented on (3B, 1A, 2C, etc.). This page is an attachment to NRC Form 157 and all comments and documentation which form the basis for evaluation on candidate performance must accompany the examination report form. Documentation may include, in addition to Attachment 2, display system printouts, strip charts, candidate written material, logs generated during integrated plant operations, etc.

4. Page 3 - Facility Walkthrough, (Category C)

The intent of this category is to determine the candidate's knowledge in the supervision and operations of the plant and individual systems from outside the control room.

The subjects to be covered in the discussion are the same as those in Category B, previously explained in Paragraph E.3 of this standard. The only difference is that all subject matter is to be oriented to local information and operations.

At a minimum, the candidate's knowledge of <u>two</u> systems shall be evaluated. The examiner must evaluate <u>all</u> four subject areas for each of the systems discussed.

The examiner may use several methods to achieve a complete evaluation in this category. Procedures may be selected which have actions to be performed outside the control room. A list of systems or local actions that require local monitoring, verification or manipulation generated from previous control room discussions may be used as a basis for the facility walkthrough. Two systems of different types from Attachments ES-302 9 or 10 may be chosen. The examiner may ask the candidate to go to areas identified on a non-licensed operator's log sheet.

During the facility walkthrough the examiner must ensure that one of the procedures discussed is a local emergency or abnormal procedure and should make an entry into a radiologically controlled area (RCA). The examiner may prefer to discuss the majority of the radiological subjects located in Group 4 of Category A, while in the RCA.

5. Scenario Development for Integrated Plant Operations (Category D) with Simulation Facility Available

To adequately evaluate candidates in Category D using a simulation facility, scenarios must be prepared by the examiner in advance of the operating test to ensure there is a proper balance of operator actions/competencies for evaluation.

Each scenario set should require candidates to operate during normal evolutions, instrument failures, component failures, and a major plant transient. The minimum requirements for the types and number of events for a scenarios set are depicted in Attachment 7 to this standard. The four types of events are defined as follows:

- Normal evolutions: evolutions such as boration power changes, power maneuvering with rods or core flow, or reactor start-up.

- Instrument failures: includes nuclear or process instrumentation failures.

- Component failures: a failure which involves a significant system response and requires operator action to correct.

- Major plant transients: significant transients, such as a loss-of-coolant accident or loss of electrical power, that would lead to an automatic protective action such as a scram (reactor trip) and possibly engineered safety system actuation.

As depicted in Attachment 7, RO candidates should be required to operate during at least two normal evolutions. One of these evolutions should involve a significant change in reactivity, during which time the candidate should be positioned as the lead or reactor operator. The candidate may be placed in either the lead or balance of plant (BOP) position during the other normal evolution(s). RO candidates should also be required to operate in the lead and/or BOP position during at least two instrument failures and two component failures. RO candidates should also be positioned as lead operator or BOP during at least one major plant transient.

SRO candidates who have not previously held a license (SRO Instants) are subject to the same requirements as RO candidates, as describe above. In addition, SRO Instants must be evaluated as an SRO during each of the four types of events.

SRO candidates who have previously held an operator's license (SRO Upgrades) should be positioned as an SRO at least once during each of the four types of events. The upgrade is given credit for the previous RO license by not being required to manipulate the control board. If weaknesses are detected by the examiner during the test, the scenarios may be modified to allow the examiner to observe control board manipulations and an evaluation should be made of the upgrade candidate.

The minimum requirements for scenario set events stipulated in Attachment 7 are intended to ensure that a range of events and evolutions are represented in each simulation facility test. It is also suggested that, during the development of scenarios, examiners consider the range of events within each type of event (i.e., normal evolutions, instrument failures, component failures, major plant transients). For PWR examinations, an attempt should be made to include events resulting in degraded heat removal, degraded electrical power, and degraded pressure control. For BWR examinations, a balance should be made among events that result in core cooling challenges, containment challenges, and degraded electrical power. Moreover, the severity of events, as well as the demands they place on the candidates, should be balanced to allow each candidate to demonstrate competence across a range of conditions.

In addition to providing broad, balanced coverage of plant events and evolutions, scenarios should be developed to ensure that there will be ample opportunities to observe and evaluate candidates on all required competencies. The competencies are:

1. Understanding/Interpretation of Annunciators/Alarm Signals

2. Diagnosis of Events/Conditions Based on Signals/Readings

3. Understanding of Plant/System Response

4. Compliance/Use of Technical Specifications

5. Compliance/Use of Procedures

6. Control Board Operations

7. Responsibility (Supervisory Ability/Responsiveness to Supervision)

8. Communication/Crew Interactions

Scenario Development: When developing simulation facility scenarios, three attachments to this standard will be used.

1. ES-302-3: Scenario Events

2. ES-302-4: Operator Actions

3. ES-302-1, page 4: NRC Form 157, Integrated Plant Operations (Simulation Facility/Plant Available)

Each planned scenario should be recorded on a Scenario Event page, ES-302-3 (Attachment 3 to this standard). Each event comprising the scenario should be briefly described in the right column. The approximate time that each event will occur from the beginning of the scenario should be indicated in the left column, and the malfunction number should be listed in the middle column. Attachment 5 is an example of a completed Scenario Event page. At the top of the Scenario Event page will be listed the name of the utility that the simulation facility is modeled after and the scenario number. This page should be referred to when completing the Operator Actions page ES-302-4 (Attachment 4 to this standard) and should be reviewed with the simulation facility operator (just prior to the test) to ensure that the events can be run successfully on the simulation facility. The Scenario Event page can then be left with the facility operator for use during the administration of the test.

To document the anticipated results of each event on the Scenario Event page, the examiner must use the Operator Actions page. The page serves to expand each event by describing the communications and actions anticipated for each operator and the reference material to be used by the candidates. An example of an Operator Action page can be found in Attachment 6.

Every expected operator action need not be included on the Operator Action page. The examiner should list those actions/behaviors that will provide a useful basis for evaluating the candidate. When possible, setpoints and other parameters should be included to provide an objective method for evaluating candidate erformance.

Although expected candidate actions should be listed (to the extent possible) in chronological order, there are often certain actions that are required throughout the event (for instance, in the SRV failure example, candidates should monitor pressure and water level throughout the event). An asterisk can be placed next to these actions to show that they occur throughout the event.

The examiner should list the scenario number, event number and the page number on the top of the Operator Action page. Below this is to be a brief description of the event which usually can be found in the malfunction description book supplied by the facility. The examiner should then document the expected actions (including communications and procedures to be used). To the left of these actions, in the center column, the examiner lists the position responsible for the action(s).

The Operator Actions page is used during the administration of the examination to record examiner observations of candidate performance. Therefore, candidate expected actions should be widely spaced to allow examiners to annotate the expected actions and note other candidate actions/behavior as they occur.

The far left column of the page is to be left blank to serve as an area where the examiner, while observing a candidate, can record the actual time that each action within the event occurred.

The use of these three attachments for developing scenarios are discussed on the following pages.

To achieve maximum evaluative benefit using the simulation facility during a limited amount of time, the following guidelines are recommended in preparing scenarios:

a. Normal evolutions can be used as a backdrop on which to stage the emergency or abnormal situations. For example, an examiner may arrange to have a main feedwater control valve fail passively (i.e., as is) and then ask the candidates to conduct a normal power change.

b. Selected short surveillances may be used to examine panel dexterity (for example, exercising safety rods, paralleling the emergency diesel generator with the grid), and should be combined with other activities such as a reactor startup, which leaves one operator unoccupied.

c. Slower scenarios can be used for evaluating SRO supervisory or resource management skills. For example, a normal evolution, such as a power escalation from low power, can be used as the main scenario event. Other events such as component or instrument failures can be added to challenge the operators while continuing the power escalation.

d. A scenario should contain failures that challenge Technical Specifications and administrative requirements.

e. Failures can be entered simultaneously at separate board locations if each event can be handled by an individual operator and does not require extensive assistance.

f. Knowledge and abilities for PWR emergency evolutions and numerous abnormal and normal tasks can be found in NUREG 1122: "Knowledges and Abilities Catalog for Nuclear Power Plant Operators: Pressurized Water Reactors." It is recommended that this list of events and tasks be reviewed. Symptom-based emergencies and abnormal events are included in NUREG-1123, "Knowledge and abilities catalog for Nuclear Power Plant Operators: Boiling Water Reactors. If an event selected for a scenario is included in

NUREG 1122 or NUREG 1123, the associated knowledges and abilities should be reviewed as a source of topics for use in evaluating candidate competence.

6. Documenting As Run Conditions/Candidates Actions <u>During</u> Integrated Plant Operations Tests with a Simulation Facility.

Just prior to the start of a scenario, the examiner will record each candidate's name, the position the candidate is responsible for and the examiner assigned to that candidate. During the administration of the Integrated Plant Operations test using prepared scenarios, it is reasonable to expect that the scenarios may not be presented as prepared because of computer programming problems, operator actions that were not expected, misunderstndings or many other possble factors. When this happens, the examiner responsible for coordinating the scenarios should select another event that meets the same requirements as the one that could not be performed, make pen and ink corrections on the Scenario Event page and ensure the other examiners and the facility operator have been informed of the new event.

As an examiner observes the assigned candidate's actions throughout the scenario, notes should be kept in the open spaces on the Operator Actions page. If a candidate performs an action depicted on the page, the examiner need only place check mark next to the action, indicating the action was satisfactorily completed. Written notes will be necessary to record unpredicted correct or incorrect actions or to make amplifying remarks. If a situation arises in which a scheduled event either had to be replaced by a new one or the scheduled event did not occur as predicted, the examiner will record the actions observed for the candidate on a blank Operation Action page. The examiner may choose to meet briefly after each scenario to compare notes.

As scenarios are run, the examiner will note in the left hand column of the Operator Actions page, the actual time that each action took place in the event. The first time at the top of the column should be the start time of the event. It is recommended that the examiner note on the last Operator Action page "end (time)" at the termination of the scenario. Time recording is important because it provides an accurate record of the actual scenario events and related candidate actions.

When assembling a completed scenario, the examiner must ensure that the Scenario Events page reflects "as run" events. The Operator Actions pages should be placed in order of actual performance. If any of the original pages of actions were not used, they should be marked "not run" or discarded. Any new pages recording events that were inserted at the facility shall be placed in their proper order within the original set of pages and sequentially numbered with actual data and actions noted.

The Examiner must ensure that all marks and comments concerning the candidate's actions are clear, specific and legible.

7. Evaluation and Documentation of Integrated Plant Operations with Simulations Facility Available (Page 4, Category D).

As soon after the completion of the Integrated Plant Operations testing as possible, the examiner must evaluate the performance of the candidate in all

competencies. To do this, the examiner uses Page 4 of NCR Form 157, Integrated Plant Operations with Simulation Facility Available, (Category D). In the left hand column of the page, the examiner will list all scenario numbers, all event numbers for each scenario and the position of the candidate for the event. The examiner will then review the candidate's actions and behaviors that relate to each competency and considering things such as how correctly the action was performed, the significance of any inappropriate actions taken and the candidate's position during the action. Based on this detailed review, the examiner will assign an evaluation of satisfactory (S) or unsatisfactory (U) for each competency covered by an event. The examiner may refer to the Page 4 used to check competency balance when the scenarios were developed for assistance in determining the competencies covered by each event. As the examiner reviews and evaluates each event, the letter from page 4 of NRC Form 157 corresponding to the competency evaluated should be written on the Operator Action page next to the comments/actions that contributed to the examiner's evaluation. For simplicity, only those comments/actions on the Operator Action page that contributed to an unsatisfactory evaluation need be identified with a letter, "A" through "H". For example, "Did not look up T.S. for diesel generator failure" would have the letter "E" handwritten by the examiner next to the comment. If a competency is not evaluated the examiner should so indicate by a dash (-) or entering N/E in the block. When all competencies for each event have been evaluated, the examiner will enter his summary evaluation of satisfactory (S) or unsatisfactory (U) on the front cover page of Form 157 in the Category D block. The assignment of an overall evaluation must be based on the examiner's evaluation of the specific circumstances of candidate's performance during the test.

8. Page 5 - Integrated Plants Operations, Simulation Facility Not Available (Category D)

When an acceptable simulation facility does not exist, the examiner will conduct a scenario discussion of plant transients and integrated plant response with the candidate, evaluating the same competency subjects as those used during operating tests at simulation facilities. The examiner will document the results on page 5 of the NRC Form 157. This portion of the examination need not be a separate discussion. In fact, it may more useful and efficient to combine this phase with other portions of the examination. For example, by postulating a plant abnormal condition such as a reactor scram, the examiner may include in the discussion one or more of the plant systems required to be covered in the control room systems discussion.

After choosing the discussions/transients, the examiner should fill out the simulation facility Operator Actions page with the basic steps through which each discussion will progress. Space is to be left between steps to allow room for examiner notes and comments. At the top of each Operator Actions page, the scenario number will reflect the same number as the discussion (i.e., 1, 2, or 3). Event number has not significance. The transient or evolution being discussed should be written in the brief description area on the top of the Operator Action page.

During the administration of the Integrated Plant Operations, the examiner should fully utilize the control room. In the space between actions on the Operator Action page, the examiner should note the responses of the candidate. The examiner should be aware that in a discussion situation, several questions

may be required to elicit responses, however, the examiner must guard against telegraphing his reactions to or expectations of candidate responses.

An evaluation for a startup audit is provided at the bottom of page 5. In lieu of an actual plant startup, the candidate may have successfully completed a startup certification program by using an acceptable simulator. An audit should be performed by a "talk-through" of a startup with a candidate for most initial and replacement examination assignments. The chief examiner will specify this examination assignment. The audit will sample the knowledge of the requirements that must be met prior to a startup, the prediction of criticality, the use of the reference data needed to support the discussion and the coefficients that apply during a startup. The audit will also sample the candidate's familiarity with control board and startup procedures.

If an actual reactor startup is to be performed for the operating test, the startup certification audit section of page 5 may be used in conjunction with a startup program developed and evaluated in the same manner as that of a simulation facility scenario, described in Sections 6 and 7 of this standard.

As soon as possible after the discussions are completed, the examiner will indicate each discussion topic in the left hand column of the Integrated Plant Operations page. The examiner will then review the comments concerning the candidate's responses that were documented on the Operator Actions pages for each discussion and make an evaluation for every applicable competency subject. For each comment on the Operator Action pages which contributes to an unsatisfactory evaluation, the examiner will write the letter "A" through "H" from page 5 of NRC Form 157, corresponding to the competency evaluated next to the comment on the Operator Action page. For example, "Did not look up T.S. for diesel generator failure" would have the letter "E" handwritten by the examiner next to the comment.

The examiner will then evaluate the entire Integrated Plant Operations page and all Operator Action pages and the startup audit, if performed, and assign an overall evaluation of satisfactory (S) or unsatisfactory (U) on the front cover in the Category D, Integrated Plant Operations block.

ES 302

NRC FORM 157, Page 1 (5/87) U.S. NUCLEAR REGULATORY COMMISSION

OPERATOR LICENSE EXAMINATION REPORT

Candidate's Name:	Docket Number: 55-	Facility:

Examination Type

- ☐ Reactor Operator
- ☐ Initial
- ☐ Senior Reactor Operator Instant
- ☐ Retake
- ☐ Senior Reactor Operator Upgrade
- ☐ Requalification
- ☐ Senior Reactor Operator Limited to Fuel Handling

Facility Description

- ☐ HOT ☐ POWER
- ☐ COLD ☐ NON-POWER

Simulation Facility Available?

- ☐ YES ☐ NO

WRITTEN EXAMINATION SUMMARY

Written by: (Print)	Date Given:	Graded by: (Print)

CATEGORY GRADES	1/5 %	2/6 %	3/7 %	4/8 %	OVERALL: %
	A/H/M %	B/I/N %	C/J/O %	D/K/P %	E/L/Q %	F %	G %

OPERATING TEST SUMMARY

Administered by: (Print)	Date Administered:

A. Admin. Topics:	B. Control Room Sys.:	C. Facility Walkthrough:	D. Integrated Plant Operations:

EXAMINER RECOMMENDATIONS

Written Examination: ☐ Pass ☐ Fail ☐ Waived	Signature of Grader:
Operating Test: ☐ Pass ☐ Fail ☐ Waived	Signature of Administrator:
Final Recommendation: ☐ Pass ☐ Fail ☐ Waived	Signature of Chief Examiner:

LICENSE ACTION

☐ ISSUE LICENSE ☐ DENY LICENSE	Signature/Title/Date

NRC FORM 157, Page 2 (5/87) CANDIDATES DOCKET NO: ES 302 -1

A. ADMINISTRATIVE TOPICS

	Evaluation		Evaluation
Group 1, Minimum 5 of 6		Group 4, Minimum 5 of 6	
1. Shift Turnover Logs/Records		14. Radiation Sources & Hazards	
2. Operating Logs		15. Radiation Exposure Limits	
3. Jumper/Lifted Lead		16. Radiation Work Permits	
4. Tagging/Clearance		17. Radiation Release Control (Permits, Rates, Limits)	
5. Key Control		18. Radiation/Contamination Personnel Monitoring Equipment	
6. Maintenance		19. Contamination Control	
Group 2, Minimum 2 of 3		Group 5, Minimum 2 of 3	
7. Plant Parameter Verification (ECP, Heat Balance, etc.)		20. Fuel Handling (New/Spent)	
8. Reactor/Plant Startup Requirements		21. Fuel Storage	
9. Mode Changes		22. Fuel Handling Casualties	
Group 3, Minimum 3 of 4		Group 6, Minimum 2 of 3	
10. Technical Specifications Understanding/Familiarity		23. Short Term Information (Night Orders, Standing Orders, Procedure Mods & Changes, etc.)	
11. Emergency Plan Understanding/Familiarity (Mandatory)		24. Piping & Instrumentation Drawing Use/Familiarity	
12. Administrative Procedures Understanding/Familiarity		25. Security Familiarity and Awareness	
13. Surveillance Testing (Frequency, Logging, Tracking, Familiarity, etc.)			

NRC FORM 157, Page 3 (5/87) CANDIDATE DOCKET NO: ES 302 - 1

B. CONTROL ROOM SYSTEMS Heat Removal, Auxiliary, Emergency, Instrumentation and Control, and Radiation Monitoring	SYSTEM EQUIPMENT/COMPONENTS SYSTEM INSTRUMENTATION/PROTECTION/ INTERLOCKS PROCEDURAL KNOWLEDGE/USE ADMINISTRATIVE REQUIREMENTS				
	A	B	C	D	Notes/Comments:
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
C. FACILITY WALKTHROUGH Supervision and Local System/Plant Operations from Outside the Control Room	A	B	C	D	
16.					
17.					
18.					
19.					
20.					
21.					

NRC FORM 157, Page 4 (5/87) CANDIDATE DOCKET NO: ES 302

D. INTEGRATED PLANT OPERATIONS (Simulation Facility/Plant Available)

Scenario Number	Event Number	Candidate Position	A: Understanding of Plant/System Response	B: Understanding/Interpretation of Annunciators/Alarm Signals	C: Control Board Operations	D: Diagnosis of Events/Conditions Based on Signals/ Readings	E: Compliance/Use of Tech Specs	F: Compliance/Use of Procedures	G: Communication/Crew Interactions	H: Responsibility/Supervision	Notes/Comments:

NRC FORM 157, Page 5 (5/87) CANDIDATES DOCKET NO: ES 302

D. INTEGRATED PLANT OPERATIONS (Simulation Facility Not Available)

I. DISCUSSION	A	B	C	D	E	F	G	H	Notes/Comments:
	Understanding of Plant/System Response								
		Understanding/Interpretation of Annunciators/Alarm Signals							
			Control Board Operations						
				Diagnosis of Events/Conditions Based on Signals/Readings					
					Compliance/Use of Tech Specs				
						Compliance/Use of Procedures			
							Communication/Crew Interactions		
								Responsibility/Supervision	
1.									
2.									
3.									
4.									
5.									
6.									

II. STARTUP CERTIFICATION AUDIT

☐ NOT APPLICABLE

	Evaluation
1. Prestartup/Startup Requirements	
2. Prediction of Critical Conditions and Use of Reference Data	
3. Knowledge of Coefficients and Their Effects	
4. Procedural Knowledge/Use	
5. Control Board Familiarization	

ES 302 -2

ATTACHMENT TO NRC FORM 157

OPERATING TEST COMMENTS

Category	Alpha/Numeric Subject Index	Comment

ATTACHMENT 3

SCENARIO EVENTS

Simulation Facility: _____ Scenario No. ____

Examiners: _____ Candidates: _____

_____ _____

_____ _____

Initial Conditions: _____

Event Number	TIME	MALF. NO.	DESCRIPTION

ATTACHMENT 4

OPERATOR ACTIONS

Scenario No. _____ Event No. _____ Page ____ of ____

Brief Description:

Time	Position	Candidate Actions/Behavior

ATTACHMENT 5

EXAMPLE OF COMPLETED SCENARIO EVENTS PAGE

Simulation Facility: Boiler 1 **Scenario No.** 1

Examiners: A Smith, B Doe, C Jones **Candidates:** Casey Jones (RO), Babe Ruth (BOP), Howard Johnson (SRO)

Initial Conditions: 100% power, Steady State Xenon

Event Number	TIME	MALF. NO.	DESCRIPTION
1	0	N/A	Startup and Sync. Emergency Diesel
2	0	N/A	Perform Surveillance on HPC-1
3	0	N/A	Order power decrease to 65%
4	+10	009B	APRM F failure downscale
5	+20	015F	HPC1 turbine speed control fails high
6	+30	032A	SRV failure open (not repairable)

ATTACHMENT 6

EXAMPLE OF COMPLETED OPERATOR ACTIONS PAGE

Scenario No. 1 Event No. 6 Page X of X

Brief Description: SRV failure open with no repair which causes either manual or automatic scram.

Time	Position	Candidate Actions/Behavior
0900	SRO/RO/BOP	Observe alarm
0902	RO/BOP	Report SRV open after investigating control board and accoustic monitor.
0903	BOP	Determine the failed SRV and report same to SRO
0903		Attempt to close SRV. Report to SRO that the valve will not close.
0907	SRO	Acknowledge operator reports. Order BOP to close valve. Order RO to manually scram reactor when required by time or suppression pool temperature.
		Refer to scram procedure for guidance

ATTACHMENT 6

EXAMPLE OF COMPLETE OPERATOR ACTIONS PAGE

Scenario No. 1 Event No. 6 Page X of X

Brief Description: SRV (cont)

Time	Position	Candidate Actions/Behavior
0907	RO	Manually scram reactor, carry out immediate actions required
		Carry out subsequent actions as ordered by SRO
0907	BOP	Carry out scram immediate actions and subsequent actions as ordered by SRO.
0910	SRO	Referring to scram procedure, ensure operators carry out immediate actions and order RO/BOP step by step through subsequent actions. Refer to Emergency Plan to classify event.

ATTACHMENT 7

MINIMUM SIMULATION FACILITY SCENARIO SET EVENTS

RO	Normal Evolutions	Instrument Failures	Component Failures	Major Plant Transients
RO	1ρ + 1 or + 1	2	2	1
BOP				
SRO	N/A	N/A	N/A	N/A

SRO Instant*	Normal Evolutions	Instrument Failures	Component Failures	Major Plant Transients
RO	1ρ + 1 or + 1	2	2	1
BOP				
SRO	1	1	1	1

SRO Upgrade	Normal Evolutions	Instrument Failures	Component Failures	Major Plant Transients
RO	optional	optional	optional	optional
BOP				
SRO	1	1	1	1

ATTACHMENT 8

INTEGRATED PLANT OPERATIONS COMPETENCY GUIDELINES

1. Understand/Interpretation of Annunciators/Alarm Signals:

The ability to perceive, identify, and interpret, correctly and in a timely manner, (using references as appropriate) information from annunciator panels, status lights (bistable) and alarms and to carry out the appropriate action in response to that information.

2. Diagnosis of Events/Conditions Based on Signals Readings:

The ability to diagnose correctly current and developing plant conditions and to guard against or mitigate out-of-spec conditions (using appropriate indicators and reference materials).

3. Understanding the Plant/System Response:

The ability to identify, understand, and interpret, correctly and in a timely manner, instrument and system responses and their interrelationships.

4. Compliance/Use of Technical Specifications:

The ability to identify technical specifications appropriate for plant conditions and to operate the plant in accordance with these specifications.

5. Compliance/Use of Procedures:

The ability to identify and apply procedures appropriate for normal, abnormal, emergency, and administrative conditions.

6. Control Board Operations:

The ability to identify, locate, and/or manipulate/operate, correctly and in a timely manner, controls on the control boards to attain desired plant/system response/condition.

7. Responsibility (Supervisory Ability/Responsiveness to Supervision)

(a) for SROs: the ability to supervise control room activities and to assume the responsibility for decision-making and coordination; or

(b) for control board operators: the ability to actively participate in decision-making processes, the demonstrate initiative by providing/searching for information, to respond appropriately to direction from supervisory personnel, and to coordinate activities outside of the control room.

8. Communication/Crew Interactions:

The ability to identify relevant information, to provide/elicit accurately information necessary for decision-making, to clarify duties and/or establish authority, and to express/elicit cooperation among control room operators.

ATTACHMENT 9

TOPICS FOR OPERATING TESTS - BWR

A. Systems

1. Heat Removal

a. Primary

Turbine Generator
Recirculation
Control Rods and Control Rod Drives
Turbine Bypass
Auto-Depressurization
Reactor Water Cleanup
Condensate/Feedwater
Main Condenser

b. Emergency Core Cooling (Emergency Coolant)

Residual Heat Removal
Low Pressure Coolant Injection
High Pressure Core Spray
Core Flooding
High Pressure Coolant Injection
Reactor Core Isolation Cooling
Low Pressure Core Spray
Standby Coolant Supply

c. Decay

Residual Heat Removal
Isolation Condenser
Auto-Depressurization
Condensate/Feedwater
Reactor Water Cleanup
Shutdown Cooling
Turbine Bypass
Main Condenser
Circulating Water
Reactor Building Closed Water
Condenser Circulating Water
Head Cooling

2. Auxiliary

Reactor Building Closed Cooling Water
Turbine Building Closed Cooling Water
Control, Instrument, and Service Air
Fire Protection
Service Water
Equipment and Floor Drainage
Condensate Storage and Transfer
Radioactive Waste (Solid and Liquid)
Fuel Pooling Cooling and Cleanup
Demineralized Water
Augmented Off Gass
Condenser Circulating Water
Process Sampling
Heating, Ventilation, and Air Conditioning
Reactor Water Cleanup
Shutdown Cooling
Containment Inerting
Gland Seal and Exhaust
Turbine - Generator Lube Oil
Steam Jet Air Ejectors

2. Auxiliary (continued)

Circulating Water
Off Gas System
Normal AC Supply
Normal DC Supply

3. Emergency (Engineered Safety Features)

Residual Heat Removal
Standby Gas Treatment
Isolation Condenser
Primary Containment
Containment Spray
Auto-Depressurization
Main Steam Line Restrictions
Control Rod Velocity Limiter
Main Steam Line Isolation Valves
Standby Liquid Control
Pressure Relief
Secondary Containment
Diesel Generators
Emergency AC Supply
Emergency DC Supply

4. Instrumentation and Control

Source Range Monitors
Average Power Range Monitors
Rod Worth Minimizer
Traveling Incore Probe
Rod Sequence Control
Uninterruptible Power Supply
Control Rods and Control Rod Drives
Turbine Bypass
Intermediate Range Monitors
Local Power Range Monitors
Rod Block Monitor
Process Computer
Reactor Protection System
Reactor Level Control
Electrohydraulic Control

5. Radiation Monitoring

Liquid Effluent
Gaseous Effluent
Main Steam Line Radiation
Area Radiation
Stack Gas
Off-Gas System

B. Reactor and Auxiliary Building Systems

Any system listed above including systems covered during the control room portion of the examination may also be covered during the walkthrough. The systems listed below are also convenient for coverage during the plant walkthrough.

Shutdown Outside the Control Room
Fuel Handling and Storage
Rad Waste

C. Integrated Plant Operations Abnormal and Emergency

Turbine Trip
Emergency Shutdown From Full Power
Scram - Hot Restart
Subcritical to Critical
Maneuver to Hot Critical
Feedwater Pump Trip
Fuel Cladding Failure
Loss of Generator Load
Scram - Cold Restart
Load Change (at least 20%)
Normal Shutdown From Full Power
Recirculation Pump Trip

C. Integrated Plant Operations Abnormal and Emergency (continued)

Recirculation Line Break
Loss of Instrument Air
Rod Malfunction
Steam Pipe Break
Loss of Reactor Building Closed Cooling Water
Control Instrument Failure

The examiner should be aware that the above lists are not to be considered all-inclusive.

ATTACHMENT 10

TOPICS FOR OPERATING TESTS - PWR

A. Systems

1. Heat Removal

a. Primary

Reactor/Reactor Coolant System
Pressurizer
Main Steam
Steam Dumps
Steam Generators
Reactor Coolant Pumps
Turbine Generator/Condenser
Condensate/Main Feedwater
Condenser Circ Water

b. Emergency Core Cooling (Emergency Coolant)

High Pressure Injection
Low Head Injection
Refueling Water Storage Tank
Intermediate Pressure Injection
Accumulators (Safety Injection Tanks)

c. Decay

Residual Heat Removal
Service Water
Steam Dumps
Component Cooling Water
Auxiliary Feedwater
S/G Relief
Condensate Storage Tank

2. Auxiliary

Chemical and Volume Control System (CVCS)
CVCS - Makeup/Letdown
CVCS - Boration/Deboration
Component Cooling Water
Spent Fuel Pit Cooling
Fire Protection System
Containment Air Recirculation and Cooling System
Quench Tank
Service Water
Compressed Air System
Normal AC Supply
Normal DC Supply
Lighting
Control Rod Drive
Off-Gas
Liquid/Solid Waste
S/G Blowdown

3. Emergency (Engineered Safety Features)

High-Pressure Safety Injection System
Low-Pressure Safety Injection System
Safety Injection Tanks (Accumulators, Core Flood Tanks)
Containment Spray System
Reactor Building Isolation
Refueling Water Tank (Refueling Water Storage Tank, Borate Water Storage Tank)
Containment Iodine Removal System
Hydrogen Removal System
Actuation Signals
Auxiliary Feedwater
Emergency AC Power (including diesels)
Emergency DC Power (including batteries)

4. Instrumentation and Control

Startup Channels
Intermediate Channel
Power Range Channels
In-Core Instrumentation
Temperature Circuits (OT, OP delta T)
Reactor Protection System and Logics
ESF Actuation Signals and Logics
Steam Dump Control
SGWLC
Pressurizer Level Control
Automatic Rod Control
Electro-Hydraulic Control

5. Radiation Monitoring

Process Monitors
Area Monitors

B. Reactor and Auxiliary Building Systems

Any system listed above including systems covered during the control room portion of the examination may also be covered during the walkthrough. The systems listed below are also convenient for coverage during the plant walkthrough.

Sampling System
Fuel Handling and Storage (Cold Plant)
Liquid Waste Handling and Disposal
Gaseous Waste Handling
Solid Waste Handling and Disposal
Diesel Generators
Shutdown Outside Control Room - Charging Sysyem
Shutdown Outside Control Room - FeedWater Station
Shutdown Outside Control Room - Control Panel
Shutdown Outside Control Room - Boration
Chemical Addition

Hydrogen Recombiners
Station Gas (N_2H_2) Supplies
Intermediate Cooling Systems
Main Condenser Level Control System
Auxiliary Feedwater Systems

C. Integrated Plant Operating Abnormal and Emergency Transients

Load Rejection
Turbine Trip
Feedwater Pump Trip
Rod Malfunction
Priaary System Leak
Steam Leak
Reactor Coolant Pump Trip
Control Instrument Malfunction
Steam Generator Tube Failure
Fuel Cladding Failure
Loss of Feedwater
Loss of Component Cooling
Reactor Scram
Subcritical to Critical
Loss of Instrument Air

The examiner should be aware that the above lists are not to be considered all-inclusive.

INSTRUCTIONS FOR OPERATING TESTS

ADMINISTERED AT NON-POWER REACTORS

A. Purpose

This standard specifies the difference in the content of the operating tests administered at non-power reactors from those administered at power reactors. Instructions specifically for operating tests at non-power reactors are included. The specifications in Standards ES-301 and ES-302 apply when no differences exist for non-power reactors. Where no differences exist, the specifications are not repeated in this standard, therefore, a knowledge of ES-301 and ES-302 is necessary when using this standard.

B. General Administration

Non-power reactor facilities do not have simulation facilities. References throughout standards ES-301 and ES-302 to the situation where a simulation facility exists will not be applicable to non-power reactor facilities. Non-power operator candidates will be required to perform actual reactor startups and other demonstrations appropriate to the facility.

C. Scheduling

The nominal length of operating tests is shorter for non-power reactors due to the limited size and complexity. There is no minimum or maximum length of operating tests, however, for scheduling purposes, the normal length of the tests is as follows:

1. RO - 2 1/4 to 3 1/4 hours

2. upgrade SRO - 1 1/4 to 2 hours

3. instant SRO - 3 to 4 hours

D. Reports of Examinations

The Examination Report described in Standard 302 (ES-302, Attachment 1) is designed to be used for all operating tests. The general guidance contained in Standards 301 and 302 is also applicable to non-power reactor operating tests. Detailed instructions for completing Examination Reports for non-power reactors are contained in this standard.

E. Administration

The administration specified in ES-301 is applicable to non-power reactor examinations also. Note that most non-power operator candidates are required to conduct an actual reactor startup.

F. General Content of Operating Tests

The guidelines provided in ES-302 for reactor operators and senior operators are also applicable at non-power reactors.

G. Systems and Subjects

A generic list of systems and subjects has been developed (Attachment 1 to this standard) for the examiner to use in preparing an operating test. A list specific to the vendor type and model of the reactor to be examined should be used if available. The examiner should diversify his coverage and discuss as many of the systems and subjects as feasible during a specific assignment.

H. General Instructions for Completing Notes

General guidance for completing the Examination Report is contained in Standard 302, paragraph C, and is fully applicable for a non-power reactor operating test. An operating test administered to a reactor operator or an instant senior reactor operator candidate at a non-power reactor facility requires an actual reactor startup by the candidate. Upgrade senior reactor operator candidates will not normally be required to start up the reactor, however, the examiner may include one in the operating test if deemed necessary. If a malfunction should prevent actual operation of the reactor after the examiners have arrived at the facility, the reactor startup may be "walked-through." If the malfunction occurs prior to the examiner's departure from the home office, the operating tests should be delayed until corrected.

The most common method of testing for reactor operators and instant senior operators is to have a "sit-down" period during which discussion items are covered, and a typical reactor startup checklist is completed for the operating test. A facility tour is usually completed before the reactor startup. Typical time requirements for this test are:

1. discussion - 1/2 to 3/4 hour

2. walk through - 3/4 to 1 hour

3. control room - 1 to 1 1/2 hours

If possible, operating tests should be scheduled so that reactor startup demonstrations coincide with predicted or scheduled facility downtimes.

The upgrade senior operator examination typically will have a "sit-down" period during which administrative topics are covered and a facility tour which will stress administrative aspects of radiation safety and details of fuel handling. Typical time requirements for this examination are:

1. discussion - 1/2 to 3/4 hour

2. walkthrough - 3/4 to 1 1/4 hour

I. Specific Administration of Exams (ES-301)

1. Integrated Plant Operations

This phase of the operating test for the reactor operator and instant senior operator will be completed by the candidate performing an actual reactor startup and other reactivity manipulation on the reactor as appropriate. Instant senior operator candidates are required to perform the actual manipulations of a startup

and should be placed in the position of a reactor operator for the test. The examiner shall evaluate the candidate's knowledge and/or performance for every subject on the top of this page that is applicable to the facility. In general, the operating test should require the candidate to manipulate the controls to achieve criticality, attain a specified period during a power increase, steady the reactor at a predetermined power level and place the reactor controls in automatic. The candidate should also demonstrate the ability to conduct a normal reactor shutdown or manual reactor scram.

If a reactor malfunction prevents actual reactivity manipulations after the operating test process has begun, the Integrated Plant Operations portion may be performed as a "walk-through." An appropriate explanation of the circumstances resulting in a walk-though demonstration should be included on the operating test comment page.

2. Control Room Systems

The portion of the Examination Report pertaining to the control room systems is the top portion of page 3. The examiner selects the systems he wishes to discuss from Attachment 1 or if possible the facility furnished reference material.

The system selected shall be listed in the space provided. Consideration should be given to covering the unique features of each facility.

During the course of the discussions the examiner should require the candidate to demonstrate his understanding and familiarity by locating and explaining:

(1) control board instrument
(2) control board controls
(3) piping and instrument diagrams
(4) procedures
(5) other related reference data (such as logs, tag outs, and Technical Specifications)

A reactor operator candidate's response to at least two abnormal and/or emergency procedures should be evaluated during the Integrated Plant portion of the examination. An instant senior reactor operator candidate's response to at least four abnormal and/or emergency procedures should be evaluated during this phase. For those non-power reactor facilities that do not have sufficient abnormal and/or emergency procedures in use, the examiner should evaluate abnormal and/or emergency procedures to the extent possible at that facility.

3. Administrative Topics

This phase of the examination will normally be completed in the control room and consists of a "talk-through" of various administrative controls necessary for the safe operation of the reactor. Portions of this phase may also be completed concurrently with the facility walk-through. The Integrated Plant Operations discussion should emphasize supervisory responsibilities for senior reactor operator candidates.

The examiner should evaluate the candidate's knowledge of the facility's Emergency Plan as it pertains to the candidate's operator license level job responsibilities, i.e. reactor operator or senior reactor operator. Although the

senior reactor operator in charge is usually responsible for classifying and implementing the appropriate action levels, the RO should know those levels and his response and duties for each one. In addition the operator must be able to respond to other emergencies such as fire and security intrusion as appropriate to the facility.

The Radiation Protection and Safety (page 2 group 4) portion will be completed by the examiner exploring those areas with the candidate's responsibility for personnel protection and for the control and discharge of radioactive wastes during the Administrative Topics discussion.

Senior Operator candidates should also be evaluated on their knowledge of fuel-handling operations and equipment.

4. Facility Walk Through

Control room licensed personnel are responsible for directing the activities of all facility personnel in areas which could affect the safety of the plant. As such they should be familiar with plant layout, design, local procedures, and radiological and safety conditions. The examiner may evaluate the candidate's knowledge in this phase by a variety of methods:

a. He or she may select at least four systems from the list of items and discuss them.

b. He or she may generate a list of items which from control room discussions require local monitoring, verification or manipulation.

c. He or she may select at least two procedures whose actions must be performed in the plant.

These or alternate methods should be used for the plant "walk-through" phase of the examination with the following guidelines:

a. The response to at least one local emergency procedure should be evaluated.

b. One entry into a radiation controlled area should be made. As an alternate a discussion of handling radioactive materials may be conducted.

c. The examiner should diversify his coverage of the plant for a group of candidates.

d. For non-power reactors having associated experimental facilities the examiner should include discussions related to insertion, removal and handling of experiments including administrative controls, to the extent the operator or senior reactor operator is responsible.

During the course of the control room and facility walk-through portions, the examiner shall evaluate the candidate's responsibility associated with the safe operation of the facility. This evaluation need not be performed by direct questioning of the candidate but may be accomplished by observing his or her response to unexpected or incorrect existing plant conditions.

Since an upgrade senior reactor operator has previously passed an operating test, the facility walk-through for these candidates is limited primarily to aspects of reactor facility operations for which a senior reactor operator is solely responsible or for which a senior reactor operator's responsibilities are significantly different than those of an operator. The following guidelines apply to the facility walk-through for upgrade senior operators:

a. The candidate's knowledge of fuel handling should be evaluated at an appropriate location outside the control room from which core alterations are performed.

b. One entry into a radiation controlled area should be made if feasible. As an alternate, a discussion of handling radioactive materials may be conducted.

In the area of facility operations, the candidate's knowledge and use of local procedures or experimental facilities shall be evaluated. Additionally, a brief check of the candidate's systems and operational knowledge should be made. If a candidate appears to be weak in these areas, more extensive coverage in these areas should be performed and documented in the comments section.

During the Integrated Plant Operations portion, the examiner shall examine in detail the candidate's knowledge of the reactor transient response including applicable procedures for at least one transient. The back of the examination notes may not be used for sketches: additional sheets may be attached for this purpose. This portion of the examination need not be a separate discussion. In fact, it may be more useful and efficient to combine this phase with other portions of the examination. For example, by postulating plant upset condition such as a reactor scram, the examiner may include in the discussion one or more of the plant systems required to be covered in the Control Room Systems discussion.

ATTACHMENT 1

TOPICS FOR OPERATING EXAMINATIONS - NON-POWER

MAJOR SYSTEMS:

reactor
reactor power level control
control rods
control rod drives
primary system
secondary system
mechanical design (fuel assembly)
reactor vessel - pool
core construction

AUXILIARY SYSTEMS:

reactor building cooling water
control, instrument, service air (compressed air system)
sampling system
fire protection system
service water system
equipment and floor drainage
containment air recirculation
radioactive waste (solid and liquid)
demineralized water
heating ventilation and air conditioning
reactor water clean-up/make-up
beam tubes
thermal columns
pneumatic tube systems
incore experiment tubes
chemical additions

Engineered Safety Features:

decay heat removal
core spray
core flooding
control rod velocity limiter
containment/reactor building isolation
reactor building isolation
reactor protective system

Nuclear and Radiation Systems:

startup channels
log N channels
safety channels

Nuclear and Radiation Systems: (continued)

incore instrumentation/incore probe
liquid effluent monitors
process radiation monitors
area radiation monitors
gaseous effluent
stack gas

Electrical

normal AC supply
emergency AC supply
normal DC supply
emergency DC supply
reactor protection electrical power system
batteries

Reactor Facilities

fuel handling and storage
exposure rooms
beam tubes
thermal columns
pneumatic tube facilities
liquid waste handling and disposal
gaseous waste handling
solid waste handling and disposal

Reactor Transient Response

Power increase/decrease - auto control
Power increase/decrease - manual control
emergency shutdown from full power
scram - hot restart
sub critical to critical
normal shutdown from full power
rod malfunction
primary system leak
control instrument malfunction
fuel clad failure

ADMINISTRATION OF WRITTEN EXAMINATIONS TO SENIOR REACTOR OPERATORS - POWER REACTORS

A. Purpose

This standard specifies the difference in preparation of senior reactor operator written examinations and reactor operator examinations.

B. Preparation of Examination

The examiner shall prepare the examination questions and answers using Standards ES-402 and ES-403 for guidance. One copy of the examination and one copy of the answers shall be forwarded to the appropriate regional section chief for review. The "Written Examination Quality Assurance checkoff sheet," attachment 1, ES-107, should be filed with the master copy of the examination. The examiner shall conduct a detailed review of his examination using attachment 1, ES-107. A second examiner shall perform a brief review of the written examination and answer key using attachment 1, ES-107; and the regional office operator licensing section chief should sign attachment 1 ES-107 to indicate that the examination has been reviewed.

C. Administration and Grading

Administration and grading of the senior reactor operator written examination is the same as for the reactor operator written examination as specified in ES-201. ES-104 describes the post examination activities and reports. ES-107 and ES-108 describe the quality assurance programs for review of the examination and the grading.

SCOPE OF WRITTEN EXAMINATIONS ADMINISTERED TO SENIOR REACTOR OPERATORS - POWER REACTORS

A. Scope

The required scope of the examination is set forth in 10 CFR 55.43. To implement this scope and to provide for identification and documentation of strengths and weaknesses within certain areas of knowledge, the written examination is divided into four categories, which are listed below with a description of the content of each. They are designated by the Numbers 5 through 8 to differentiate them from Categories 1 through 4 in the reactor operator examination as set forth in Standard ES-202. The scope of the examination is identical for both instant senior operators and upgrade senior reactor operators.

1. Category 5 - Theory of Nuclear Power Plant Operation, Fluids, and Thermodynamics

   This category contains questions on principles of reactor theory, including details of the fission process, neutron multiplication, source and control rod effects, and criticality indications. It also contains questions on specific operating characteristics of the reactor and auxiliary systems, including the nuclear, hydraulic, thermal, pneumatic, electrical, and coolant chemistry systems, and turbines and turbine generators. Further, it contains questions relating to fuel element characteristics, rupture detection, and effects of boiling and control rod programming.

   This category includes questions to determine the candidate's understanding and use of curves depicting reactor behavior that may be beyond the scope of knowledge needed by operators for routine operation. These may include, as applicable, differential and integral control rod worth curves (single or group), period versus reactivity curves, temperature and power coefficient curves, and poison (e.g, xenon, samarium, and boron) worth curves. The candidate should be able to determine the reactivity status of the reactor on the basis of the facility's parameters and coefficients. Any curves needed will be given with the examination questions. Whenever possible, actual curves of the facility will be used; otherwise, applicable sample illustrative curves will be prepared.

   The candidate should be able to demonstrate quantitative as well as qualitative knowledge of reactor behavior. He should be able to understand and use mathematical expressions regarding reactor behavior; however, these expressions (or formulae) and nuclear constants (e.g, fission factors and half-lives) usually need not be committed to memory and will be supplied in the examination when questions requiring them are included. Further, this category may

contain questions, as applicable to the facility, concerning some aspects of basic reactor core and vessel design limits.

This category also contains questions to determine the candidate's understanding of the heat and energy cycles involved with nuclear power plant operations, the heat transfer process involved with reactor core cooling, and reactor thermal limits, and his ability to identify plant parameters that can be used to quantify plant heat generation and heat transfer information. Questions to determine the candidate's understanding of the mechanisms of fluid flow as they are encountered in nuclear power plants during normal and casualty conditions are also asked. The candidate should understand the relationship of fluid properties and flow characteristics to the thermal condition of a nuclear reactor and be able to identify plant parameters that can be used to determine fluid flow within the nuclear plant systems associated with heat removal from the reactor core.

Further, this category contains questions on alternate methods of core cooling that are available when primary systems are inoperable, variable parameter changes that effect cooling mechanisms (such as boron precipitation), utilization of saturation curves, and the effects of gas/steam binding. It also contains questions to determine the candidate's ability to recognize and mitigate the consequences of core damage.

2. Category 6 - Plant Systems: Design, Control, and Instrumentation

This category contains questions on the design features of the particular facility with emphasis on those systems that are designed to maintain, and protect against, the uncontrolled release of radioactive materials. The candidate should be able to reproduce, from memory, sketches or descriptions of various hydraulic, pneumatic, or electrical distribution systems and mechanical components. Questions are asked about design intent, construction, operation, and interrelationships of those systems most directly associated with normal nuclear power plant operation and reactor safety.

Further, this category contains questions on the characteristics and interrelationships of the nuclear, process, and radiological instrumentation and control systems. These questions will focus on the principles of operation of detectors, location and setpoints of instruments, and diagrammatic representation of instrument and control systems. A candidate is not expected to have the knowledge of an instrument technician, but his answers should indicate the ability to recognize the indications and consequences of improper performance (e.g., overcompensation, power failure, air supply failure, and signal failure), including the traces that recorders would show. He also should be able to make use of all available instrumentation to provide checks or verification of observed readings.

3. Category 7 - Procedures: Normal, Abnormal, Emergency, and Radiological Control

This category contains questions on the procedures for the operation of the reactor and auxiliary systems, including administrative controls and Technical Specifications. In general, a candidate must demonstrate complete knowledge and understanding of the symptoms, automatic actions, and immediate action steps specified by offnormal or emergency operating procedures. The candidate should be able to describe generally the objectives and methods used in the normal, offnormal, and emergency operating procedures and the methods used to perform the verifications. Operating restrictions and limitations in the facility license, including Technical Specifications, may be included to the extent they are directly applicable to a senior reactor operator.

This category also contains questions on radiation hazards that may arise during operation or maintenance activities. The candidate should be familiar with the provisions of 10 CFR 20 and supplementary facility regulations and be able to use a common-sense approach to radiological safety situations. Questions may include calculation of effluent discharge limits and conversion of measured radiation intensities to rem values. The candidate should be able to fill out and review radiation work permits and releases for discharge of radioactive material and describe methods for performing maintenance so that he, his crew, and the general public are protected. He should be familiar with the concept of as low as is reasonably achievable (ALARA) and be able to demonstrate his knowledge regarding this concept. Also included are questions relating to the procedures and equipment (processing and monitoring) for the handling and disposal systems of the facility, and the associated hazards.

This category may also contain questions regarding fuel, fuel handling, and core loading, including procedures and limitations concerning core loading and alteration, fuel transfer and storage, and detection and prevention of criticality.

4. Category 8 - Administrative Procedures, Conditions, And Limitations

This category contains questions on administrative, procedural, and regulatory items that affect safe operation of the facility. Included are questions on design and operating considerations and limitations as specified in the facility license, including the Technical Specifications; the procedures required to obtain authority for design changes; the procedures regarding formation and approval of operating procedures; the authority to approve deviations from operating procedures on either a permanent or temporary basis; and emergency situations as they affect the entire plant's operation or security. Questions concerning the Technical Specifications will require a thorough knowledge of what items are addressed

in the specifications, the basis for the requirements, and how to comply with the requirements. The candidate is not expected to memorize the exact details, numbers, and surveillance requirements contained therein. Questions may also cover the requirements for certain personnel to be present at certain times, the types of records that must be maintained in the control room, the facility's radiological emergency plan, and pertinent provisions of 10 CFR 50 and 10 CFR 55.

STRUCTURE OF WRITTEN EXAMINATIONS ADMINISTERED TO SENIOR REACTOR OPERATORS - POWER REACTORS

A. Purpose

This standard specifies the format, category weights, and depth of knowledge for senior reactor operator written examinations.

B. General Structure

Each written examination shall be divided into four categories in accordance with Standard ES-402.

C. Cover Sheet

A cover sheet, with the format shown in attachment 1 ES-403-1, shall be used on all written examinations. This sheet will provide for ready identification of the structure of the examination and, subsequently, of the relative strengths and weaknesses of the candidate after the examination has been graded.

All items in the upper corner of the cover sheet, except the name of the candidate (and sometimes the date administered), should be filled out when the examination is prepared and reproduced. The reactor type aids headquarters in readily correlating the examinations of similar facilities and should be as descriptive as possible (e.g., BWR and PWR-W). The "Examiner" line shall contain the name of the examination author. The first two columns on the cover sheet should be filled out at the time of the initial preparation.

D. Weighting of Categories

The relative weight of each category in the examination, as a percentile of total worth, shall be 25% ± 3% for each section. Category 5 shall be weighted so that 15% ± 1% (60% ± 4% of the category) consists of theory of nuclear plant operations and 10% ± 1% (40% ± 4° of the category) consists of theory of fluids and thermodynamics.

E. Value of Questions

The examiner shall assign a point value to each question and indicate this value in parentheses after the question. The point value of a question is a judgment factor based on the combination of the following factors: significance of the knowledge to the senior reactor operator, difficulty of the question, amount of time required to answer the question, depth of knowledge required to answer the question, and the content of the question.

The general structure of the examination should be such that a safe and competent operator will score above 80% on the entire test and above 70% in each

category. The percentage attained in each category will be used, in conjunction with operating test results, to identify strengths and deficiencies of the candidate.

When the candidate is sent the results of his examination, a copy of the graded examination shall be forwarded to the candidate. If a candidate failed the written examination, a copy of the final approved answer key shall also be forwarded to the candidate.

A copy of the "Examination Results Summary Sheet" (Attachment 2 ES 201) shall be sent to plant management (training department) for their use in developing retraining and requalification programs, and to the Management Assistant, OLB.

Attachment 1

U.S. NUCLEAR REGULATORY COMMISSION
SENIOR REACTOR OPERATOR LICENSE EXAMINATION

Facility: _____
Reactor Type: _____
Date Administered: _____
Examiner: _____
Candidate: _____

INSTRUCTIONS TO CANDIDATE:

Use separate paper for the answers. Write answers on one side only. Staple question sheet on top of the answer sheets. Points for each question are indicated in parentheses after the question. The passing grade requires at least 70% in each category and a final grade of at least 80%. Examination papers will be picked up six (6) hours after the examination starts.

Category Value	% of Total	Candidate's Score	% of Category Value	Category
_____	____	_____	_____	5. Theory of Nuclear Power Plant Operation, Fluids, and Thermodynamics
_____	____	_____	_____	6. Plant Systems Design, Control, and Instrumentation
_____	____	_____	_____	7. Procedures - Normal, Abnormal, Emergency, and Radiological Control
_____	____	_____	_____	8. Administrative Procedures, Conditions, and Limitations
_____		_____		Totals

Final Grade

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

_____
Candidate's Signature

SCOPE AND STRUCTURE OF WRITTEN EXAMINATIONS FOR SENIOR OPERATOR CANDIDATES - NON-POWER REACTORS

A. Purpose

This standard specifies the difference in preparation of senior reactor operator written examinations and reactor operator examinations.

In general, the provisions contained in Standard ES-204 apply equally to the Senior Reactor Operator examination.

B. Preparation of Examination (ES-410, paragraph B)

The examiner shall prepare the examination questions and answers using guidance contained in paragraphs C, D and E below. The examiner should conduct a detailed review of his examination using Attachment ES-107-1. A copy of the examination and answer key should be forwarded to the appropriate regional section chief for review. Attachment ES-107-1, ES-108-1, and ES-201-3 should be filed with the master copy of the examination.

C. Scope

The required scope of the examination is set forth in 10 CFR 55. To implement this scope and to provide for identification and documentation of strengths and weaknesses within certain areas of knowledge, the written examination is divided into five categories. These five categories are listed below with a description of the content of each. They are designated by the letters H through L to differentiate them from categories A through G in the operator exam as set forth in ES-204.

1. Category H - Reactor Theory

This category contains questions on principles of reactor theory including details of the fission process, neutron multiplication, source and control rod effects and criticality indications. It has more advanced content than the operator category A but is not advanced to the level of a nuclear physicist or engineer. The candidate should be able to demonstrate quantitative as well as qualitative knowledge of reactor behavior. He should be able to understand and utilize mathematical expressions regarding reactor behavior; however, these expressions (or formulae) and nuclear constants (fission factors, half lives, etc.) usually need not be committed to memory and will be supplied in the examination when questions requiring them are included. Further, this category may contain questions applicable to the facility, concerning some aspects of basic reactor engineering, e.g., heat transfer and fluid flow which affect the safety of the reactor.

The primary emphasis throughout will be on understanding and practical application of the theory rather than mere memorization of technical facts.

2. Category I - Radioactive Material Handling, Disposal and Hazards

This category contains questions on radiation hazards which may arise during operation or the performance of experiments, shielding alterations or maintenance activities. Close familiarity with the provisions of 10 CFR Part 20 and

supplementary facility regulations is required as well as a good common sense approach to radiological safety situations. Questions may include calculations involving inverse square law, activation, decay rates, half-value or tenth value thicknesses and conversions of measured radiation intensities to rem, as well as other calculations of a similar nature. Here, operational "Rules of thumb" methods of calculation are acceptable wherever applicable.

Also included are questions relating to procedures and equipment (processing and monitoring) available for handling and disposal of radioactive materials and effluents. Although an operator's knowledge of this aspect is generally limited to discharge from the reactor proper, the senior operator should have familiarity with the radioactive processing and disposal systems of the facility and the hazards associated therewith.

In special situations, such as facilities which produce and ship isotopes or irradiated experiments, the senior operator may need some knowledge of packaging and shipping regulations for radioactive materials, if the scope of his activities at the facility encompasses such responsibilities.

3. Category J - Specific Operating Characteristics

This category contains questions on specific operating characteristics of the reactor and auxiliary systems, including nuclear, hydraulic, thermal, pneumatic, electrical and coolant chemistry. Questions regarding quantitative as well as qualitative explanations of causes, limitations, effects and consequence of changes are included. Questions addressing behavior during normal, abnormal and transient operations are also included in this section.

The category includes questions on the understanding and use of curves depicting reactor behavior which may be beyond the scope of knowledge needed by operators for routine operation. These may include, as applicable, differential and integral control rod worth curves (single or group) period vs. reactivity curves, temperature and power coefficient curves, and poison (e.g., Xenon, Samarium and Boron) worth curves. Whenever possible, actual curves of the facility will be utilized; otherwise applicable sample illustrative curves will be prepared.

4. Category K - Fuel Handling and Core Parameters

This category contains questions regarding fuel, fuel handling and core loading and alteration, fuel transfer and storage, and detection and prevention of criticality. Questions relating to fuel element characteristics and limitations include consideration of reactivity worths, burnup, hot spots, leakage/rupture detection, and effects of core geometry changes.

Curves and mathematical expressions may be utilized to the extent described in category H. Knowledge of special equipment, procedures and personnel requirements regarding fuel handling and core loading is expected.

5. Category L - Administrative Procedures, Conditions and Limitations

This category contains questions on administrative, procedural and regulatory items which affect operation of the facility. Included are questions on design and operating considerations and limitations as specified in the facility license, including technical specifications, the procedures required to obtain

authority for design changes, the procedures regarding formation and approval of operating procedures, and the authority to approve deviations from operating procedures on either a permanent or temporary basis. Questions may also cover the requirements for certain personnel to be present at certain times, the types of records that must be maintained and pertinent provisions of 10 CFR Parts 50 and 10 CFR Part 55.

D. Facility Management Controls and Accident Questions

These areas are applicable to the SRO exam as described under the RO section in ES-204. In all cases, the examination should, to the extent possible, reflect the level of knowledge necessary for the safe operation of the facility and responsibility delegated by the facility to the senior operator by virtue of the senior operator holding an NRC license.

E. Structure of Written Exam

1. Each written examination should be divided into five categories in accordance with section B of this standard. A cover sheet, with the format shown in Attachment 1, shall be used on all written examinations. This sheet will provide for ready identification of the structure of the examination and, subsequently, of the relative strengths and weaknesses of the candidate.

2. The relative weight of each category in the examination, as the percentile of total worth should be 20% ± 3% for each category whenever possible. However, the relative importance of safety and emergency systems vary significantly over the range of size and the type of Research Reactors. Therefore, in order to comply with the 10 CFR criteria "... to the extent applicable to the facility..." the weighting of the examination categories should be based on the professional judgement of examiners experienced in the operation and examination of non-power reactor facilities and approved by supervision. The general structure of the examination shall be such that a safe operator will score above 70% in each category. In addition, the length of the examination shall be such that a candidate would complete the examination within five hours, thus leaving one hour for review.

Attachment 1

U.S. NUCLEAR REGULATORY COMMISSION
SENIOR REACTOR OPERATOR LICENSE EXAMINATION

Facility: _____
Reactor Type: _____
Date Administered: _____
Examiner: _____
Candidate: _____

INSTRUCTIONS TO CANDIDATE

Use separate paper for the answers. Write answers on one side only. Staple question sheet on top of the answer sheets. Points for each question are indicated in parentheses after the question. The passing grade requires at least 70% in each category. Examination papers will be picked up six (6) hours after the examination starts.

Category Value	% of Total	Applicant's Score	% of Cat. Value	Category
_____	_____	_____	_____	H. Reactor Theory
_____	_____	_____	_____	I. Radioactive Materials Handling Disposal and Hazards
_____	_____	_____	_____	J. Specific Operating Characteristics
_____	_____	_____	_____	K. Fuel Handling and Core Parameters
_____	_____	_____	_____	L. Administrative Procedures, Conditions and Limitations
_____	_____	_____	_____	Totals

Final Grade _____%

All work done on this exam is my own. I have neither given nor recieved aid.

_____
Candidate's Signature

ADMINISTRATION OF NRC REQUALIFICATION PROGRAM EVALUATION

A. Purpose

This standard establishes the procedures for administering the NRC evaluation of utility requalification programs. Included are methods of selecting utilities to be evaluated, methods of auditing, evaluation criteria, action guidelines, and required administrative forms and records. It should be noted that these represent minimums and that due to the recent revision to 10 CFR 55 more examinations than those listed below will be required. A new revision to this standard will be issued to take into account the added examinations required by 10 CFR 55.57. We are also evaluating the results of the pilot requalification program involving NRC audits of utility administered requalification examinations and its potential impact on programmatic reviews.

B. Program Description

The NRC regional staff will determine the facilities to schedule for audit based on the criteria described in Paragraph C below. During these audits, the staff shall evaluate the strengths and weaknesses of the facility requalification program. The methods to be used to conduct this evaluation are (1) to administer an NRC-developed written examination, and (2) to conduct NRC operating examinations.

The evaluation program will include as a minimum (1) operating examinations administered by NRC-certified examiners and (2) a complete NRC prepared written examination for each facility selected for audit. The examinations should emphasize operational rather than theoretical knowledge. The content of the examination should be about 60% of that for a standard licensing examination, and time allowed to complete the written examination shall be limited to 4 hours. Review of facility grading of previously administered written requalification examinations also may be performed. This effort, together with an evaluation of actual operating experience, will provide an indication of the effectiveness of the licensee's overall operator requalification training program. The intent of this program was to conduct the full evaluation of 20% of the operators and senior operators at 50% of the facilities each year. Due to recent revision to 10 CFR 55, the NRC has been tasked with the added requirement to ensure that each operator and senior operator licensed at all facilities pass an NRC administered requalification examination within the six year term of his license. This means that in actuality the number of operators and senior operators given NRC administered requalification examinations will be higher than the 20% of operators, at 50% of the facilities each year (10% per year) mentioned above and will actually be on the order of 20% of the operators each year. Requalification program evaluations should be scheduled in conjunction with replacement examination visits to make the best possible use of examiner resources.

C. Selection Criteria

The regional administrator or his designee will establish the priority of facilities to be evaluated based on the following inputs:*

1. licensee event report history and recent facility performance, which relates to licensed operator performance

2. previous ratings on Systematic Assessment of Licensee Performance (SALP), Criterion 7, Training Effectiveness and Qualification

3. recent operator licensing and NRC requalification examination results

4. licensed operator and senior operator training program accreditation (such as the Institute of Nuclear Power Operations' (INPO) Facility Training Accreditation Program)

5. recommendations by senior resident inspectors or NRC examiners

6. results of routine inspection of the facility licensed operator training program

7. number of shifts and number of licensed operators

8. size of plant training staff in relation to the number of licensed operators

9. meeting the requirement of 10 CFR 55.57 to ensure that all operators are given an NRC administered requalification examination during the period of their license.

For the above criteria, the following policies apply:

1. Any plant evaluated as SALP Category 3 in the area of licensed operator training effectiveness and qualifications or any plant with a large number of errors by licensed operators or that has had a particularly serious error committed by licensed operators should be assigned the highest priority.

2. Except as specified in (3) below, any plant that has not been evaluated in the previous 2 years shall be selected.

3. Any plant evaluated as SALP Category 1 in the area of licensed operator training or having an INPO-accredited Operator Requalification Program may be considered for a 50% extension of the nominal biennial evaluation (e.g., NRC participation every 3 years).

D. Examination Format

The following guidelines should be observed:

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*These are not intended to be all inclusive. Other selection criteria may be appropriate as determined by the region.

1. During every site visit to conduct requalification program evaluations, the NRC examiners shall administer an NRC prepared written examination and operating examinations to 20% of the operators and senior operators (minimum of 12). The minimum sample size is intended to increase the validity of the sampling process. The 20% should include a representative sample of licensed personnel; for example, 20% of on shift operators and senior operators and 20% of non operating shift operators and senior operators. Personnel who have passed an NRC license or requalification examination within the last year may be excluded from consideration for the 20% sample. NRC-administered oral examinations are permitted regardless of whether they are normally administered as part of the facility's NRC-approved requalification program.

2. In addition to the written examinations prepared by NRC examiners, copies of a previous facility-administered written examination may be graded by an NRC examiner. The examiner should compare NRC grading and facility grading as part of the requalification program evaluation.

3. For facilities with certified or approved simulation facilities, the requalification audit examination should include an evaluation of 20% of the operators and senior operators on the simulator.

4. The NRC administered requalification examination shall be comprehensive to test the overall requalification training program. The exam shall not be limited to the particular cycle or module just completed at the time of the exam.

E. Program Administration

Program administration is the responsibility of the NRC regional offices. Each regional office should maintain a current facility requalification schedule for each facility in its region. NRC will request facility schedules annually when the generic letter requesting replacement and instructor certification examinations is issued and will provide these schedules to the regional offices. Facilities may adjust their program examination dates to even out NRC examiner workload, if agreed to by the facility and the regional staff. Once a schedule is mutually agreed upon by the NRC regional office and the facility, it should not be changed except for special circumstances (such as outages). Facilities should normally be contacted at least 3 months before the scheduled requalification examination dates. Tentative examiner assignment(s) should be made at this time (see Attachment 1). Following the guidelines of Paragraphs C and D above, the extent of the requalification program evaluation will be determined by the region. Reference material required from the facility to prepare for the requalification audit should be requested from the facility approximately 60 days before the scheduled visit, using the format of Attachment 2 as a guide. The assigned examiner(s) should prepare for the written and operating examinations to be conducted in accordance with the appropriate operator licensing standards for licensing examinations. Once at the site, the examiner(s) shall meet with facility management, review with them the schedule for NRC participation in their program, and arrange the details necessary to conduct the evaluation. The requalification examination conducted by the NRC examiner(s) should be operationally oriented and conducted in accordance with this and existing

operator licensing standards for written and operating examinations. The facility learning objectives for the requalification program shall be the primary subject areas tested on a requalification examination, and to the extent that these subject areas overlap with replacement training objectives overlap of replacement and requalification examinations may occur. However, the length of the examinations should be about 60% of the standard licensing examinations. The NRC written examination should be reviewed by facility personnel in accordance with the review policy established in ES 201.H.

Required forms and reports are included as Attachments 3 and 4. The appropriate portions of NRC Form 157, "Operator Examination Report," shall be used for NRC-administered oral examinations and the appropriate portions of Attachments 5 and 11 to ES-302, shall be used for NRC administered simulator examinations. When the program evaluation is completed, an exit briefing should be conducted and any significant program deficiencies noted should be discussed. The examiner(s) shall not indicate whether the program is evaluated as satisfactory or unsatisfactory at the exit briefing.

After returning to the regional office, the examiner(s) shall grade the written examinations and review the results of his (their) evaluation. The examiner(s) shall then recommend an overall satisfactory or unsatisfactory evaluation of the facility licensee's requalification program (Attachment 4) and forward the results for approval as established by regional directives. Included, as an attachment to the form, will be the names of those individuals with unsatisfactory results on some portion of the examination and for whom the facility should take corrective action as required by its approved requalification program.

F. Program Evaluation

1. Evaluation

   a. Any program where at least 80% of the evaluated operators pass all portions of the NRC administered examinations shall be evaluated as "Satisfactory."

   b. Any program where between 60% and 80% of the evaluated operators passed all portions of the NRC administered examinations shall be evaluated as "Marginal."

   c. Any program where less than 60% of the evaluated operators pass all portions of the NRC administered examinations shall be evaluated as "Unsatisfactory."

   d. Any program falling within the "Marginal," category two consecutive evaluations shall be evaluated as "Unsatisfactory."

   e. For any program evaluated as less than satisfactory, the following factors should be carefully considered as mitigating factors:

      1. Trends indicated by the selection criteria in Paragraph C.

      2. Facility management response to the program rating.

3. Efforts by the facility to upgrade training (i.e., staffing, accreditation, physical facilities, etc.).

4. Deficiencies identified and corrective actions proposed.

2. Action

a. No additional actions are required for a satisfactory program.

b. For any program evaluated as marginal, the following actions are recommended but not required:

1. Recommend to the facility licensee that they identify program deficiencies and corrective actions required to improve operator performance.

2. Schedule follow-up inspections or examinations to assure implementation of corrective actions.

c. For any program evaluated as unsatisfactory, the following actions are REQUIRED unless findings indicate otherwise. Additional actions may be taken at the discretion of the Regional Administrator or his designee. The sequence of actions below is not required. The determination whether plant shutdown is required should be ongoing until the Regional Administrator or his designee has reviewed all the items in paragraphs C and F.4.

(1) Require the licensee to identify program deficiencies and corrective actions required to improve operator performance, before reexaminations will be given.

(2) Meet with senior facility management to review audit findings, identified deficiencies, root causes, corrective actions proposed and follow-up inspections and examinations.

(3) Conduct complete examinations for a second sample of at least 12 licensed operators or 20% of the licensed personnel at the facility, whichever is larger.

(4) The Regional Administrator or designee shall determine whether plant shutdown pending completion of corrective actions is necessary. This determination shall be based on the significance of generic deficiencies related to the ability of operators to safely continue operation of the facility.

d. For a program evaluated as unsatisfactory, the region may elect to perform a reactive performance-based training inspection per IE MC if no training inspection has been conducted in 12 months.

G. Renewals

If a satisfactory evaluation is reached, requests for renewals will be made based on proper certification by facility officials until the next program

evaluation. The facility certification shall include certification of accelerated retraining completion for individuals who have failed either an NRC or facility administered requalification examination.

If an evaluation clearly falls between a satisfactory and an unsatisfactory rating, renewals should be made if the corrective actions identified are being implemented to the extent and in accordance with the schedule established above.

If an evaluation is unsatisfactory, renewals will be issued only for those operators who pass an examination administered by the NRC until identified corrective actions have been implemented. The regional administrator or his designee may agree to accept facility certification and issue renewals based on this certification when they have determined that program quality has been upgraded to satisfactory as indicated by additional audits, inspections, or other reviews of the facility licensee's performance.

H. Final Requalification Program Evaluation Report

A final requalification program evaluation report similar to the final examination report for a licensing examination shall be prepared when the grading of requalification examinations has been completed. If Attachment 4 (to ES 601) is not included in the report, the report shall contain the information required to complete Attachment 4. A complete copy of the report shall be filed in the facility requalification file. A copy of the NRC Administered Requalification Examination Results Summary, Attachment 3, ES 601, shall be forwarded to the Management Assistant, Regional Support and Oversight Section, OLB. Note: The results summary is required to verify OLTS data and for statistical data. Neither OLB nor the Regional Offices shall retain examination results identified to individuals except that individual results may be kept in the regional offices' facility requalification file for programs that are judged to be unsatisfactory. These individual results should be purged from the file when the requalification training program has been upgraded to satisfactory.

I. Records

1. A facility requalification file shall be maintained for each facility. All evaluation forms, records, assignment sheets, and correspondence relating to the requalification program audit for the latest two evaluations shall be retained.

2. When the requalification evaluation has been completed by the Regional Office, a copy of all NRC administered written, oral and simulator examination results shall be supplied to the facility. The facilities are required to maintain these records until the operator's or senior operator's license is renewed in accordance with 10 CFR 55.59.

3. A copy of the results summary (Attachment 3) shall be sent to the Management Assistant, Regional Support and Oversight Section, OLB. These summaries shall be used for statistical data gathering, and neither OLB or the Regional Office shall retain test results or summary sheets that identify individuals to requalification examination results.

J. Cover Sheet

A cover sheet, with the format shown in attachments 5 or 6 of this standard shall be used on all written requalification examinations, and the rules and guidance from ES 201-2 should be placed in the examination package following the cover sheet.

ATTACHMENT 1

ASSIGNMENT TO EVALUATE LICENSED OPERATOR REQUALIFICATION PROGRAM

NRC Examiner(s):

Assignment To Evaluate Licensed Operator Requalification Program at _____.

You are assigned to evaluate the requalification program at the above named facility. Please make arrangements to perform the following aspects of the evaluation program:

___ Generate a complete written examination to replace the facility reactor operator (RO) examination.

___ Generate a complete written examination to replace the facility senior reactor operator (SRO) examination.

___ Administer plant oral examinations to _____ operators and _____ senior operators.

___ Administer simulator examinations to _____ operators and _____ senior operators.

___ Review grading of previous examinations.

Date(s) of Evaluation: _____
Facility Contact: _____
Simulator Location: _____
Comments: _____
_____

ATTACHMENT 2

FORM LETTER TO FACILITY VICE PRESIDENT - REFERENCE MATERIAL REQUIRED

Date:

To:

Subject: Requalification Program Evaluation

In a telephone conversation between Mr. _____ (title, i.e., training coordinator) and Mr. _____ (section chief), arrangements were made for an evaluation of the requalification program at the (facility name). The evaluation visit is scheduled for the week of (date).

For this visit, the NRC examiner will administer NRC prepared written, oral, and simulator examinations. When the NRC examiner arrives at the site, he will meet with the appropriate facility personnel to review the schedule for these examinations. For the examiner to adequately prepare for this visit, it will be necessary for the facility to furnish the approved reference material listed in Enclosure 1 "Reference Material Requirements for Requalification Program Evaluations," by (date). Mr. _____ has been advised of our reference material requirements and where they are to be sent.

This request for information was approved by the Office of Management and Budget under Clearance Number 3150-0101, which expires June 30, 1986. Comments on burden and duplication may be directed to the Office of Management and Budget, Reports Management Room 3208, New Executive Office Building, Washington, D.C. 20503.

Thank you for your consideration in this matter. If you have any questions on the evaluation process, please contact _____ (regional section chief and telephone number).

Sincerely,

(Appropriate Regional Representative)

DISTRIBUTION:

Project Manager
Resident Inspector
Regional Section Leader
Examiner(s)
Facility Training Coordinator

ENCLOSURE 1

REFERENCE MATERIAL REQUIREMENTS FOR REQUALIFICATION PROGRAM EVALUATION

1. An index of administrative, operating, abnormal and emergency procedures.

2. All administrative procedures (as applicable to reactor operation or safety)

3. All integrated plant procedures (normal or general operating procedures)

4. Emergency procedures (emergency instructions, abnormal, or special procedures)

5. Standing orders (important orders which are safety related to and may supersede the regular procedures)

6. Fuel-handling and core-loading procedures (initial core-loading procedure, when appropriate)

7. Annunciator procedures (alarm procedures, including set points)

8. Radiation protection manual (radiation control manual or procedures)

9. Emergency plan

10. Technical Specifications

11. Plant technical data (curve) book

12. Lesson plans (training manuals, learning objectives, plant orientation manual, systems descriptions)

13. Systems operating procedures

14. Piping and instrumentation diagrams, electrical single-line diagrams, or flow diagrams

15. Copies of facility RO and SRO requalification examinations administered during the past 2 years

16. Simulator malfunction list with descriptive summary of malfunction effects.

All of the above referenced material should be approved, final issues and should be so marked. Uncontrolled, preliminary, or other such issues will not be acceptable. All procedures and reference material should be bound or in the form used by the control room operators, with appropriate indexes or tables of contents to ensure efficient use.

ATTACHMENT 3

NRC ADMINISTERED REQUALIFICATION
EXAMINATION RESULTS SUMMARY

ES-601

NRC FORM 71
(6-84)
NUREG 1021

U.S. NUCLEAR REGULATORY COMMISSION

NRC ADMINISTERED REQUALIFICATION EXAMINATION RESULTS SUMMARY

FACILITY	EXAMINATION DATES		
	WRITTEN (W)	ORAL (O)	SIMULATOR (S)

EXAMINERS

NAME	DOCKET NUMBER	GRADING	1	2	3	4	TOTAL	5	6	7	8	TOTAL	EXAMINATION RESULTS / EXAMINER'S INITIALS REACTOR OPERATOR			SENIOR REACTOR OPERATOR		
													W	O	S	W	O	S
		NRC																
		FACILITY																
		NRC																
		FACILITY																
		NRC																
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ATTACHMENT 4

REQUALIFICATION PROGRAM EVALUATION REPORT

Facility: _____
Examiner: _____
Date(s) of Evaluation: _____
Areas Evaluated: _____ Written _____ Oral _____ Simulator

Examination Results:

	RO Pass/Fail	SRO Pass/Fail	Total Pass/Fail	Evaluation (S, M or U)
Written Examination	_____	_____	_____	_____
Operating Examination				
Oral	_____	_____	_____	_____
Simulator	_____	_____	_____	_____
Evaluation of facility written examination grading				_____

Overall Program Evaluation

Satisfactory ____ Marginal ____ Unsatisfactory ____ (List major deficiency areas with brief descriptive comments)

Submitted: Forwarded: Approved:

_____ _____ _____
Examiner Section Chief Branch Chief

Attachment 5

U.S. NUCLEAR REGULATORY COMMISSION
REACTOR OPERATOR REQUALIFICATION EXAMINATION

Facility: _____
Reactor Type: _____
Date Administered: _____
Examiner: _____
Candidate: _____

INSTRUCTIONS TO CANDIDATE:

Read the attached instruction page carefully. This examination replaces the current cycle facility administered requalification examination. Retraining requirements for failure of this examination are the same as for failure of a requalification examination prepared and administered by your training staff. Points for each question are indicated in parentheses after the question. The passing grade requires at least 70% in each category and a final grade of at least 80%. Examination papers will be picked up four (4) hours after the examination starts.

Category Value	% of Total	Candidate's Score	% of Category Value	Category
_____	____	_____	_____	1. Principles of Nuclear Power Plant Operation, Thermodynamics, Heat Transfer and Fluid Flow
_____	____	_____	_____	2. Plant Design Including Safety and Emergency Systems
_____	____	_____	_____	3. Instruments and Controls
_____	____	_____	_____	4. Procedures - Normal, Abnormal, Emergency, and Radiological Control
_____		_____		Totals

Final Grade

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

_____
Candidate's Signature

Attachment 6

U.S. NUCLEAR REGULATORY COMMISSION
SENIOR REACTOR OPERATOR REQUALIFICATION EXAMINATION

Facility: _____
Reactor Type: _____
Date Administered: _____
Examiner: _____
Candidate: _____

INSTRUCTIONS TO CANDIDATE:

Read the attached instruction page carefully. This examination replaces the current cycle facility administered requalification examination. Retraining requirements for failure of this examination are the same as for failure of a requalification examination prepared and administered by your training staff. Points for each question are indicated in parentheses after the question. The passing grade requires at least 70% in each category and a final grade of at least 80%. Examination papers will be picked up four (4) hours after the examination starts.

Category Value	% of Total	Candidate's Score	% of Category Value	Category
_____	____	_____	_____	5. Theory of Nuclear Power Plant Operation, Fluids, and Thermodynamics
_____	____	_____	_____	6. Plant Systems Design, Control, and Instrumentation
_____	____	_____	_____	7. Procedures - Normal, Abnormal, Emergency, and Radiological Control
_____	____	_____	_____	8. Administrative Procedures, Conditions, and Limitations
_____		_____		Totals
		Final Grade		

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

_____
Candidate's Signature

NRC FORM 336 (2-84) NRCM 1102, 3201, 3202

U.S. NUCLEAR REGULATORY COMMISSION

BIBLIOGRAPHIC DATA SHEET

SEE INSTRUCTIONS ON THE REVERSE.

1. REPORT NUMBER *(Assigned by TIDC, add Vol. No., if any)*
NUREG-1021
Rev. 4

2. TITLE AND SUBTITLE
Operator Licensing Examiner Standards
NUREG-1021, Revision 4

3. LEAVE BLANK

4. DATE REPORT COMPLETED
MONTH: May YEAR: 1987

5. AUTHOR(S)
NRR/DLPQ/OLB Staff

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MONTH: May YEAR: 1987

7. PERFORMING ORGANIZATION NAME AND MAILING ADDRESS *(Include Zip Code)*
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Washington, DC 20555

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9. FIN OR GRANT NUMBER

10. SPONSORING ORGANIZATION NAME AND MAILING ADDRESS *(Include Zip Code)*
Same as 7 above.

11a. TYPE OF REPORT
Operator Licensing Examination Standards for NRC Examiners

b. PERIOD COVERED *(Inclusive dates)*

12. SUPPLEMENTARY NOTES

13. ABSTRACT *(200 words or less)*

The Operator Licensing Examiners Standards provides policy and guidance to NRC examiners and establishes the procedures and practices for examining and licensing of applicants for NRC operator licenses pursuant to Part 55 of Title 10 of the Code of Federal Regulations (10 CFR 55). It is intended to assist NRC Examiners and facility licensees to understand the examination process better and to provide for equitable and consistent administration of examinations to all applicants by NRC examiners. This standard is not a substitute for the Operator Licensing Regulations.

As appropriate, this standard will be periodically revised to accommodate comments and reflect new information or experience.

14. DOCUMENT ANALYSIS - a. KEYWORDS/DESCRIPTORS
Examiner Standards

b. IDENTIFIERS/OPEN-ENDED TERMS

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Unlimited

16. SECURITY CLASSIFICATION
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