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Dresden Generating Station  
6500 North Dresden Road  
Morris, IL 60450  
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August 31, 1999

JMHLTR: #99-0097

U.S. Nuclear Regulatory Commission  
ATTN: Regional Administrator – Region III  
801 Warrenville Road  
Lisle, IL 60532-4351

Dresden Nuclear Power Station, Units 2 and 3  
Facility Operating License Nos. DPR-19 and DPR-25  
NRC Docket Nos. 50-237 and 50-249

Subject: Request to Administer BWR Generic Fundamentals Examination

In accordance with 10 CFR 55.41, "Written Examination: Operators," and NUREG 1021 Revision 8, "Operator Licensing Examination Standards for Power Reactors," Section ES-205, "Procedure For Administering The Generic Fundamentals Examination Program," the Commonwealth Edison (ComEd) Company, Dresden Nuclear Power Station requests to have the thirteen individuals listed below take the BWR generic fundamentals examination (GFE) section of the written operator licensing examination. The GFE is scheduled to be administered on Wednesday, October 6, 1999.

<u>Name</u>	<u>Date of Birth</u>	<u>Previous Docket No.</u>
Robert D. Brock	03/25/1972	None
Lawrence D. Callaway	05/04/1961	None
Warren E. Deagle	02/18/1964	None
Mark R. Hanneman	12/30/1958	None
Kenneth J. Housh	11/22/1962	None
Vernon E. Leineweber	09/04/1952	None
Thomas A. McGowan Jr.	04/27/1965	None
David W. Meznarsic	03/05/1956	None
Heather J. Oclon	03/05/1966	None
Rick E. Schladenhauffen	04/02/1956	None
Daniel Verjinsky	04/17/1966	None
Stanley L. Vick	09/01/1956	None
Leonard H. Young	06/11/1956	None

All of the listed personnel are enrolled in the Dresden Nuclear Power Station operator licensing training program and will have completed the generic fundamentals portion of the program by the examination date.

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

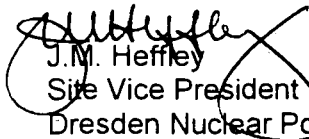
<u>Name</u>	<u>Title</u>
John S. Almon	Training Manager
Michael A. Perry	Initial License Training Specialist
David J. Carlson	Initial License Training Specialist

The examinations should be sent to the following address:

Mr. Michael A. Perry  
Training Department  
Dresden Nuclear Power Station  
Commonwealth Edison Company  
6500 North Dresden Road  
Morris, IL 60450-9765

Should you have any questions, please contact Mr. D.F. Ambler at (815) 942-2920 extension 3800.

Sincerely,

  
J.M. Heffley  
Site Vice President  
Dresden Nuclear Power Station

cc: Chief Operator Licensing, Human Performance, and Plant Support Branch –  
NRC Region III  
NRC Senior Resident Inspector – Dresden Nuclear Power Station

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## EXECUTIVE SUMMARY

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Title 10, Part 55, of the *Code of Federal Regulations* (10 CFR Part 55) requires applicants for reactor operator (RO) and senior reactor operator (SRO) licenses to pass a written examination and an operating test that are developed and administered in accordance with 10 CFR 55.41 and 55.45 or 55.43 and 55.45, respectively. Although license examiners from the U.S. Nuclear Regulatory Commission (NRC) have historically prepared all of the licensing examinations using facility-provided reference materials, the NRC has now amended Part 55 by adding a new section (§55.40) that allows facility licensees to develop and submit, upon approval by an authorized representative of the facility licensee, proposed examinations for NRC review and approval. The NRC will prepare the examinations if requested in writing by a facility licensee and may elect to prepare the examinations, in lieu of allowing a specific facility licensee to do so, as necessary to maintain the proficiency of its examiners or the quality of the examinations.

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

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

For Revision 8, NUREG-1021 was reorganized to more clearly identify the various organizational responsibilities. It incorporates the methodology and lessons learned from the pilot examination program described in GL 95-06 and changes made in response to the public comments on interim Revision 8 solicited in connection with the regulatory amendment noted above. This revision also formally implements Revision 2 of NUREGs-1122 and 1123, the "Knowledge and Abilities Catalogs" for pressurized and boiling water reactors, respectively.

In addition, Revision 8 of NUREG-1021 supersedes Revision 5 of NUREG/BR-0122, "Examiners' Handbook for Developing Operator Licensing Written Examinations," dated March 1990.

The following list summarizes the significant changes from Revision 7.

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## EXECUTIVE SUMMARY

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**Abbreviations** This list has been added to provide a central location for defining the acronyms and abbreviations used throughout this NUREG.

**ES-101** No significant changes.

**ES-102** NUREG-1560, "Individual Plant Examination Program: Perspectives on Reactor Safety and Plant Performance," and NUREG-1600, "General Statement of Policy and Procedure for NRC Enforcement Actions," have been added to the list of documents applicable to the operator licensing program.

**ES-201** Each NRC regional office will prepare at least one examination per year. Facility licensees that elect to have the NRC prepare their examinations shall submit a written request per 10 CFR 55.40(c), and the NRC will schedule the examination consistent with staff availability.

Facility licensees that write their own examinations will conduct the following activities based on the guidance in NUREG-1021:

Observe various examination security and integrity criteria, including limits on the activities of personnel having knowledge of the examination contents, physical security expectations and considerations, and limits on the use of examination banks.

Approximately 75 days before the scheduled examination date, prepare and submit for NRC review and comment an integrated examination outline, in accordance with ES-301, ES-401, and the associated quality checklist.

Approximately 45 days before the scheduled examination date, prepare and submit for NRC review and comment the complete examination, in accordance with ES-301 and ES-401, along with a statement indicating the source of each test item proposed for use on the examination.

Make examination changes as agreed upon with the NRC.

Facility licensees shall designate a point of contact to work with the NRC chief examiner. Pursuant to 10 CFR 55.40(b)(3), an authorized representative of the facility licensee shall approve the submittals before sending them to the NRC for review and comment.

The amount of reference material requested from the facility licensee will be adjusted based on the NRC's level of involvement in the examination development process.

The NRC regional offices may separate the written examinations and operating tests by up to 30 days without NRR program office approval.

**ES-202** The eligibility criteria for senior reactor operators limited to fuel handling (LSROs) have been moved from ES-701 to ES-202.

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## EXECUTIVE SUMMARY

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ES-202 To make the standard conform with 10 CFR 55 and current practice, ES-202 now includes a provision requiring that facility licensees submit a written request to have a license examination administered to an applicant.

If more than six months pass since an applicant's medical examination, the facility shall certify that the applicant has not developed any condition reportable under 10 CFR 55.25.

The regions will verify that an applicant's name does not appear on the "Restricted Individuals List" before accepting the application.

The requirement for five significant reactivity manipulations has been clarified.

ES-204 The provision for LSROs to be licensed at more than one site has been moved from ES-701 to ES-204.

The regions may, under certain circumstances, waive the requirement for an examination for applicants that were previously licensed at the same facility.

The regions may, under the long-term shutdown conditions specified in 10 CFR 55.31(a)(5), accept an application and administer an examination before the applicant completes the required control manipulations.

The regions may waive the requirement for a new medical examination for up to two years from the date of the last examination if the facility licensee certifies that the applicant has not developed any medical condition reportable under 10 CFR 55.25.

ES-205 Facility licensees should notify the NRR operator licensing program office if they must modify their previously submitted registration letter for the generic fundamentals examination by adding or deleting a person.

ES-301 Dominant accident sequences, as determined by the facility licensee's probabilistic risk assessment or individual plant examination, should be considered for sampling during the operating test.

A site-specific task list may be used to supplement or override, on a case-by-case basis, selected individual items in the NRC's knowledge and abilities catalog.

The instructions for developing the operating test outline and the final test items have been separated to facilitate their sequential preparation, review, and approval.

Generic guidelines (i.e., those that apply to both initial and requalification examinations) for developing the walk-through and dynamic simulator tests have been relocated to Appendix C, "Job Performance Measure Guidelines," and Appendix D, "Simulator Testing Guidelines," respectively.

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## EXECUTIVE SUMMARY

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ES-301 The job performance measures (JPMs) used in Category B, "Control Room Systems and Facility Walk-through," of the operating test will no longer include prescribed follow-up questions. Examiners may continue to ask follow-up questions for cause based on the applicant's performance of each JPM. The number of alternate path JPMs has been increased to 40 percent of the category.

No more than 80 percent of any applicant's walk-through test may be taken directly from the facility licensee's item bank without significant modification, and no more than 30 percent of the walk-through may be repeated from the last NRC license examination at the facility. A quality checklist has been included as an attachment to this standard to highlight various criteria and promote consistency.

Each applicant's dynamic simulator test shall include at least one new or significantly modified scenario. The required reactivity manipulation may be conducted under normal or controlled abnormal conditions. A quality checklist has been included as an attachment to this standard to promote consistency by highlighting and suggesting target ranges for various criteria, including simulator critical tasks. The target ranges are based on a study of simulator scenarios used during past initial operator licensing examinations.

No dynamic simulator scenarios or JPMs will be repeated on successive days.

ES-302 NRC examiners may use additional surrogate operators to augment the simulator crews if the technical specifications require the facility licensee to operate with more than two ROs in the control room. A shift technical advisor (STA) may also be used consistent with facility operating practice. SRO-upgrade applicants, while in an RO position during the simulator test, do not have to be monitored individually by an NRC examiner.

The facility licensee and NRC chief examiner should confirm that the simulator instructor's station, programmers' tools, and external interconnections do not compromise the integrity of the operating test. Appendix D briefly describes a number of vulnerabilities.

The practice of conducting an exit briefing with the facility licensee after the operating tests are complete has been adopted as policy.

The operating test briefing for the applicants has been moved to Appendix E, "Policies and Guidelines for Taking NRC Examinations."

ES-303 The simulator operating test grading guidelines for errors having serious safety consequences (including critical tasks) have been clarified. Missing a critical task does not necessarily mean that an applicant will fail the simulator test, nor does success on every critical task prevent the examiner from recommending a failure if the applicant had other deficiencies that, in the aggregate, justify the failure based on the competency evaluations.

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## EXECUTIVE SUMMARY

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ES-303 The operating test documentation requirements have been clarified: examiners must now briefly describe the error that the applicant made to justify a grade of "2" on any rating factor, but unsatisfactory grades on specific systems or rating factors that do not result in a test failure do not necessarily require detailed documentation.

The applicants' responses to JPM follow-up questions will be evaluated based primarily on safety-significance.

ES-401 This standard now includes instructions, an example method, and forms for use in systematically developing the written examination outline. References to NUREG/BR-0122, "Examiners' Handbook for Developing Operator Licensing Written Examinations," have been deleted.

References for guidance in developing multiple choice test items have been changed from NUREG/BR-0122 to Appendix B, "Written Examination Guidelines."

Facility licensees shall submit an outline approximately 75 days before the examination date, followed by the "ready-to-use" examination approximately 45 days before the examination date.

A site-specific task list may be used to supplement or override, on a case-by-case basis, selected individual items in the NRC's knowledge and abilities catalog; a site-specific task list may not be used in place of the entire catalog.

This standard now includes several criteria to ensure the integrity of examinations developed by facility licensees. These criteria include limits on the number of questions that can be taken directly from the facility licensee's item bank or can be repeated from earlier quizzes and examinations.

In an effort to maintain examination quality and consistency, 50 to 60 percent of the questions on the examination (including 10 new questions) shall be written at the comprehension/analysis level.

The NRC regional office will conduct a 30-question acceptance review of the written examination upon receipt. The region is expected to communicate the results of the review to the facility licensee if six or more questions are found to be unacceptable.

As a final check for technical accuracy, facility licensees should consider administering the examination to one or more previously uninvolved licensed personnel (under security agreements).

ES-402 The time permitted to take the written examination has been increased from four to five hours. If necessary on a case-by-case basis, the NRC regional office may authorize additional extensions in 30-minute intervals.

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## EXECUTIVE SUMMARY

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ES-402 Facility licensees that prepare their own examinations will generally administer the written examinations after they are approved by the NRC. The NRC may delay an examination if necessary to achieve a quality product. The facility licensees will document for subsequent review by the NRC any questions posed by and answers provided to the license applicants during the examination. If NRC examiners are on site, they may periodically monitor the administration process.

The guidelines for briefing the applicants who will take the examination have been moved to Appendix E.

ES-403 Facility licensees should collect and consider any questions and comments made by the applicants after the examinations are administered. Facility licensees that prepare and administer the written examinations will grade the examinations, review the grading, evaluate the applicants' performance, and submit the results to the NRC for review and approval. The facility licensee shall justify all recommended question deletions and changes to the answer key.

The discussion of examination grading quality reviews has been moved to ES-501.

ES-501 This standard summarizes the documentation that facility licensees are expected to provide to the NRC if they develop and administer (in the case of the written) the license examinations.

In addition, the standard now summarizes the post-examination quality review process that was previously contained in ES-403.

If a facility licensee recommends deleting or changing five percent or more of the questions on a written examination that it developed, it may be asked to explain why the changes were necessary.

The NRC regional offices may delay issuing the licenses for applicants who pass the written examination with insufficient margin to ensure that the licensing decision will be sustained if additional questions are deleted or changed upon appeal. Applicants will be notified in writing if their licensing action is delayed.

The examination report shall address any significant issues that the region or facility licensee encountered in developing the examination.

The record keeping requirements, including the submittal of proposed examinations to the public document room (PDR), have been revised to reflect the new examination process and document management system.

ES-502 The NRR operator licensing program office will determine whether to refer an appeal to the affected regional office, evaluate the appeal internally, or convene a panel. Appeal panels, when required, will normally consist of a branch chief and two examiners or subject matter experts.

Facility licensees may be requested to provide reference materials and technical information as necessary for the NRC to evaluate informal appeals.



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## EXECUTIVE SUMMARY

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- ES-502 The detailed administrative review procedures and sample letters have been removed and incorporated in a separate internal document.
- ES-601 The NRC will continue to monitor licensees for indications of undue stress during requalification examinations, however the stress feedback forms have been eliminated.
- The amount of test item duplication from recent examinations, which could affect examination validity and integrity, will be considered when evaluating the effectiveness of the requalification program.
- ES-602 References to NUREG/BR-0122 have been changed because the guidance for developing multiple choice test questions is now in Appendix B.
- Because the guidelines previously documented in Attachment 1 to ES-602, "Policies and Guidelines for Taking NRC Written Examinations," are generally the same for initial and requalification examinations, they have been consolidated in Appendix E.
- ES-603 Attachment 1 to ES-603, "Guidelines for the Development and Use of Alternate Path JPMs," Attachment 3, "Walk-Through Evaluation Guidelines," Form ES-603-1, "JPM Quality Checklist," and Form ES-603-2, "JPM Worksheet," have been moved to Appendix C because they apply to both initial and requalification examinations. Attachment 2 to ES-603, "Briefing Checklist - System Walk-Through," has been moved to Appendix E.
- ES-604 Attachment 1 to ES-604, "Critical Task Methodology," and Attachment 3, "Quantitative and Qualitative Scenario Attributes," have been moved to Appendix D because they apply to both initial and requalification examinations. Attachment 2, "Dynamic Simulator Briefing Checklist," has been moved to Appendix E.
- ES-605 The policy on standing proficiency watches and renewing inactive licenses has been clarified.
- The NRC regional offices may, under certain circumstances, authorize an operator to temporarily suspend participation in the facility licensee's requalification training program.
- ES-701 The eligibility criteria for LSROs have been moved to ES-202, and the provision for LSROs to be licensed at more than one site is now discussed in ES-204.
- The standard has also been edited to clarify the differences between the full-scope SRO and the LSRO examinations.
- The number of systems tested in Category B of the operating test has been decreased from six to five, and the requirement to test a normal evolution during each of the two discussion scenarios in Category C has been eliminated.

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## EXECUTIVE SUMMARY

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ES-701 The number of subject areas to be evaluated with questions when it is not practical to conduct or simulate a job performance measure has been decreased.

ES-702 This standard has been edited to clarify the differences between the full-scope and the LSRO requalification examinations.

Whenever possible, the facility licensee should include an LSRO on the requalification examination team.

Appendix A This new appendix discusses the generic examination concepts that play a role in the operator licensing process. It includes much of the information that was previously contained in NUREG/BR-0122 as well as discussions of new topics that have a bearing on the level of difficulty of an examination.

Appendix B This new appendix incorporates the guidance for developing written test questions that was previously contained in NUREG/BR-0122. It focuses primarily on multiple-choice questions, the only type currently permitted on the initial operator licensing examination, and includes examples to illustrate various psychometric concepts.

Appendix C This new appendix summarizes the guidelines concerning job performance measures that apply to both initial and requalification examinations. Much of this information was previously contained in Attachments to ES-603. There are no significant policy changes.

Appendix D This new appendix summarizes the dynamic simulator scenario guidelines that apply to both the initial and requalification examination programs. Much of the information was previously contained in ES-301 and Attachments to ES-604.

Appendix D also describes a number of simulator security vulnerabilities (related to features of the instructor's station, programmers' tools, and external interconnections) that NRC examiners and facility personnel should consider when preparing and administering operating tests.

Appendix E This new appendix summarizes all of the policies and guidelines applicable to examinees who will be taking an initial or requalification examination. The information was previously contained in ES-302, ES-402, ES-602, ES-603, and ES-604.

The policy on examining senior reactor operator upgrade applicants on the control boards has been added to the simulator test briefing list.

Appendix F This new appendix provides a central location for defining terms used throughout this NUREG.

Any reference to the plant's technical specifications includes the plant's other technical requirements documents.

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## ABBREVIATIONS

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AC	alternating current
ADS	automatic depressurization system
AFW	auxiliary feedwater
ANSI/ANS	American National Standards Institute/American Nuclear Society
AO	auxiliary operator
AOP	abnormal operating procedure
APRM	average power range monitor
ARP	alarm (or annunciator) response procedure
ATWS[T]	anticipated transient without scram [trip]
B&W	Babcock and Wilcox
BWR	boiling water reactor
CAL	confirmatory action letter
CCW	component cooling water
CFR	<i>Code of Federal Regulations</i>
CRD	control rod drive
CRT	criterion-referenced test
CT	critical task
CTMT	containment
CVCS	chemical and volume control system
DAS	dominant accident sequence
DC	direct current
DHR	decay heat removal
DIPM	Division of Inspection Program Management
EAL	emergency action level
ECA	emergency contingency action (procedure)
ECCS	emergency core cooling system
ECP	estimated critical position
EDG	emergency diesel generator
EHC	electrohydraulic control
EOP	emergency operating procedure
EPIP	emergency plan implementing procedure
EQB	examination question bank
ES	examination standard
ESF	engineered safety feature
FHE	fuel handling equipment
FRP	functional recovery procedure
FSAR	final safety analysis report
GFE	generic fundamentals examination
GL	generic letter
GUI	graphic user interface
HP	health physics
HPCI	high pressure coolant injection
HPCS	high pressure core spray
HVAC	heating, ventilation, and air conditioning
IC	instrumentation and control
INPO	Institute of Nuclear Power Operations

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## ABBREVIATIONS

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IP	inspection procedure
IPE	individual plant examination
IRM	intermediate range monitor
JPM	job performance measure
JTA	job task analysis
K/A	knowledge and ability
KSA	knowledge, skill, and ability
LCO	limiting condition for operation
LER	licensee event report
LOCA	loss of coolant accident
LPCI	low pressure coolant injection
LPCS	low pressure core spray
LPRM	local power range monitor
LSRO	limited senior reactor operator
MIP	master inspection plan
MSIV	main steam isolation valve
NEI	Nuclear Energy Institute
NRC	Nuclear Regulator Commission
NOP	normal operating procedure
NRR	Office of Nuclear Reactor Regulation
NRT	norm-referenced test
NWPA	<i>Nuclear Waste Policy Act (of 1982)</i>
OJT	on-the-job training
OLA	operator licensing assistant
OLTS	operator licensing tracking system
OMB	Office of Management and Budget
PCIS	primary containment isolation system
PDR	public document room
PORV	power-operated relief valve
PPR	plant performance review
PRA	probabilistic risk assessment
PWR	pressurized water reactor
QA	quality assurance
RBM	rod block monitor
RCA	radiologically controlled area
RCIC	reactor core isolation cooling
RG	Regulatory Guide
RHR	residual heat removal
RMCS	reactor manual control system
RO	reactor operator
ROI	report on interaction
RM	radiation monitor
RPIS	rod position indication system
RPS	reactor protection system
RPV	reactor pressure vessel
RWST	refueling water storage tank

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## ABBREVIATIONS

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S	satisfactory
SALP	systematic assessment of licensee performance
SAT	systems approach to training
SGTS	standby gas treatment system
SD	standard deviation
SGTR	steam generator tube rupture
SI	safety injection
SLC	standby liquid control
SME	subject matter expert
SRO	senior reactor operator
SRP	Standard Review Plan
SRV	safety relief valve
STA	shift technical advisor
TDAFW(P)	turbine-driven AFW (pump)
TS	technical specification (or other technical requirements document)
U	unsatisfactory
UPS	uninterruptible power supply
W/T	walk-through

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ES-205  
PROCEDURE FOR ADMINISTERING THE GENERIC FUNDAMENTALS  
EXAMINATION PROGRAM

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A. PURPOSE

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

B. BACKGROUND

Sections 55.41 and 55.43 of 10 CFR Part 55 require that the written operator licensing examinations for reactor operators (ROs) and senior reactor operators (SROs) include questions on various mechanical components, principles of heat transfer, thermodynamics, and fluid mechanics. These regulations also require that the written examination address fundamentals of reactor theory, including the fission process, neutron multiplication, source effects, control rod effects, criticality indications, reactivity coefficients, and poison effects.

The fundamental knowledge and abilities (K/As) required of an operator do not vary significantly between license levels or among facilities of the same vendor type. As a result, the NRC implemented the GFE program to standardize the fundamental examination coverage for all applicants at pressurized and boiling water reactors (PWRs and BWRs). Having passed a GFE as an RO or an SRO applicant, an operator will not have to take another GFE unless he or she transfers to a facility of the other vendor type. The GFE program does not pertain to limited senior reactor operator (LSRO) license applicants.

Applicants do not need to take the GFE (nor obtain a waiver) if they were previously issued an RO or SRO license or an instructor certificate based on a site-specific written examination (on the same type of facility) that was administered between February 1982 and November 1989 and included the material covered by the GFE. Applicants who were issued a license before 1982 will have to take the examination or apply for a waiver in accordance with ES-204.

The GFE examinations for BWRs and PWRs are typically administered twice a year, on the Wednesday following the first Sunday in April and October.

C. RESPONSIBILITIES

1. Facility Licensee

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

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

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

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

- d. No later than the day after the GFE is administered, the facility licensee shall send the following items via overnight mail to the name and address designated in the examination package:

- the original answer sheets
- the signed exam cover sheets
- the signed security statements

## 2. NRR Operator Licensing Program Office and GFE Contractor

- a. The NRR operator licensing program office will designate a coordinator to oversee the GFE activities with the regional offices, the GFE contractor, and the facility licensees.
- b. The NRC will send a notification letter (Attachment 1) to each facility licensee 60 days before the GFE administration date. The letter will notify the facility licensee of the date of the examination and request a registration letter listing the licensed operator trainees to whom the facility licensee plans to administer the examination. A sample registration letter is enclosed with the notification letter.
- c. The GFE contractor will prepare the examinations as described in Section D of this ES. The examiner assigned responsibility for developing the GFE shall submit the examinations to the NRR GFE coordinator and any other designated reviewers at least 20 calendar days before the scheduled administration date. The NRR operator licensing program office will provide comments and

recommended changes to the examination author as soon as possible. The final examinations should be ready at least 14 days before the GFE administration date.

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

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

- cover letter (Attachment 2 is a sample letter)
- proctor instructions
- security agreement
- single copies of appropriate exam, forms A and B
- exam time zone map
- sample answer sheet
- facility docket number sheet
- applicant docket number sheet
- appropriate number of answer sheets
- applicant answer sheet instructions

- e. On the day that the GFE is administered, the NRR GFE coordinator and GFE contractor shall be available to answer questions from facility proctors if the need arises.

- f. When the examination answer sheets are received from the facility licensees, the GFE contractor shall score, grade, and tabulate the overall item statistics, and generate facility and regional grade reports for each GFE examination. The contractor shall forward the regional and facility grade reports, including individual scores and copies of individual answer sheets, and corrected answer keys to the applicable regional office for distribution.

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

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

- exam-wide item statistics (PWR and BWR)
- analysis reports of specific items deleted or answers changed
- corrected answer keys
- original answer sheets
- original signed exam cover sheets
- signed security statements



- g. The NRR operator licensing program licensing assistant will ensure that copies of the final master BWR and PWR examinations are placed in the NRC's Public Document Room.

3. NRC Regional Office.

- a. Regional management should assign an individual to coordinate GFE administration in the region.
- b. The regional operator licensing assistant (OLA) shall assign a docket number to each individual identified in the facility licensee's registration letter. The OLA shall forward the list of names and docket numbers for each facility to the GFE contractor, with a copy to the NRR GFE coordinator, no later than 20 days before the examination administration date.
- c. The regional GFE coordinator should keep the NRR GFE coordinator informed of any changes in the number of applicants scheduled to take the GFE at any facility.
- d. The regional office shall distribute the GFE examinations to their respective facility licensees. Sample cover letters for facility licensees that did and did not participate in the examination are provided in Attachment 3.
- e. The regional OLA shall update the applicants' status (pass or fail) in the operator licensing tracking system (OLTS) and ensure that a hard copy of the GFE results is placed in each applicant's docket file.

D. EXAMINATION SCOPE AND STRUCTURE

Each GFE shall contain 100 questions covering the "Components" and "Theory" (including reactor theory and thermodynamics) sections of NUREG-1122, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Pressurized Water Reactors," or NUREG-1123, "Knowledge and Abilities Catalog for Nuclear Power Plant Operators: Boiling Water Reactors." The passing grade for the GFE is 80 percent.

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

The NRC will use Institute of Nuclear Power Operations (INPO) Academy Documents 89-003, "Generic Fundamentals Test Item Catalog - PWR Operator," and 89-004, "Generic Fundamentals Test Item Catalog - BWR Operator," as the primary sources of test questions when developing the GFE. The ratio of previously used (i.e., "validated") test questions to new or unvalidated test questions will be adjusted as the size of the validated question bank increases.

The questions used on the GFE examination shall conform with the applicable construction and style guidelines in Appendix B.

E. ATTACHMENTS/FORMS

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

## NRC Letterhead

(Date)

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

The NRC plans to administer the generic fundamentals examination (GFE) section of the written operator licensing examination on (date).

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

Chief, Operator Licensing, Human Performance, and Plant Support Branch  
Mail Stop OWFN 9 D24  
U.S. Nuclear Regulatory Commission  
Washington, DC. 20555

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

Sincerely,

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

Enclosure: As stated

Enclosure

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

Dear (Name),

(Facility name) requests to have the following (number) individuals take the (BWR or PWR) generic fundamentals examination (GFE) section of the written operator licensing examination to be administered on (date):

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

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

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

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

Please address the examinations as follows:

Name, Title  
Street address  
City, State Zip code

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

Sincerely,

Name, title

cc:  
 Chief, Operator Licensing, Human Performance, and Plant Support Branch

(Date)

(Name, Title of designated addressee)

(Facility name)

(Street address)

(City, State Zip code)

Dear (Name):

Your facility is scheduled to administer the generic fundamentals examination (GFE) section of the NRC's written operator licensing examination on (date). (Name of contractor) is authorized under contract to support the NRC in the administration of GFE activities.

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

(Name), (Telephone Number)

(Name), (Telephone Number)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(Name)

(Name of contractor)

(Street address)

(City, State Zip code)

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

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

(Name), Chief

Operator Licensing, Human Performance,  
and Plant Support Branch

Division of Inspection Program Management  
Office of Nuclear Reactor Regulation

Enclosures:

As stated

Distribution: w/o enclosures:

Director, DIPM

Chief, Operator Licensing, Human Performance, and Plant Support Branch

NRR GFE Coordinator

Project Manager

Public

NRC Letterhead

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

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

(\*\*) On (date), the NRC administered the generic fundamentals examination (GFE) section of the written operator licensing examination.

(\*\*) Your facility did not participate in this examination. However, a copy of the master (BWR or PWR) examination, with the answer key, is enclosed for your information.

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

Sincerely,

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

(\*) Enclosures:

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

(\*\*) Enclosure: As stated

[Paragraphs marked (\*) apply only to those facility licensees that participated in the examination, while paragraphs marked (\*\*) apply only to those facility licensees that did not participate in the examination.]



K/A	Pressurized Water Reactors Topic	No. of Items
191001 191002 191003 191004 191006 191008	<u>Group I Components</u> Valves Sensors and Detectors Controllers and Positioners Pumps Heat Exchangers and Condensers Breakers, Relays, and Disconnects	4 10 5 7 3 7
191005 191007	<u>Group II Components</u> Motors and Generators Demineralizers and Ion Exchangers	5 3
192004 192005 192008	<u>Group I Reactor Theory</u> Reactivity Coefficients Control Rods Reactor Operational Physics	4 4 8
192003 192006	<u>Group II Reactor Theory</u> Reactor Kinetics and Neutron Sources Fission Product Poisons	2 6
192001 192002 192007	<u>Group III Reactor Theory</u> Neutrons Neutron Life Cycle Fuel Depletion and Burnable Poisons	1 2 1
193009 193010	<u>Group I Thermodynamics</u> Core Thermal Limits Brittle Fracture and Vessel Thermal Stress	2 5
193003 193007 193008	<u>Group II Thermodynamics</u> Steam Heat Transfer Thermal Hydraulics	2 2 8
193001 193004 193005 193006	<u>Group III Thermodynamics</u> Thermodynamic Units and Properties Thermodynamic Processes Thermodynamic Cycles Fluid Statics and Dynamics	1 2 1 5
<u>Total Items</u>		100

K/A	Boiling Water Reactors Topic	No. of Items
	<u>Components</u>	
291001	Valves	5
291002	Sensors and Detectors	9
291003	Controllers and Positioners	3
291004	Pumps	8
291005	Motors and Generators	5
291006	Heat Exchangers and Condensers	6
291007	Demineralizers and Ion Exchangers	3
291008	Breakers, Relays, and Disconnects	5
	<u>Group I Reactor Theory</u>	
292004	Reactivity Coefficients	2
292005	Control Rods	4
292008	Reactor Operational Physics	8
	<u>Group II Reactor Theory</u>	
292001	Neutrons	2
292002	Neutron Life Cycle	2
292003	Reactor Kinetics and Neutron Sources	3
292006	Fission Product Poisons	6
292007	Fuel Depletion and Burnable Poisons	1
	<u>Group I Thermodynamics</u>	
293007	Heat Transfer and Heat Exchangers	3
293009	Core Thermal Limits	7
	<u>Group II Thermodynamics</u>	
293003	Steam	2
293004	Thermodynamic Processes	2
293008	Thermal Hydraulics	7
293010	Brittle Fracture and Vessel Thermal Stress	2
	<u>Group III Thermodynamics</u>	
293001	Thermodynamic Units and Properties	1
293005	Thermodynamic Cycles	1
293006	Fluid Statics	3
<u>Total Items</u>		100