



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

December 11, 2013

Mr. Joseph W. Shea
Vice President, Nuclear Licensing
Tennessee Valley Authority
1101 Market Street, LP 3D-C
Chattanooga, TN 37402-2801

**SUBJECT: WATTS BAR NUCLEAR POWER PLANT – NRC OPERATOR LICENSE
EXAMINATION REPORT 05000390/2013302**

Dear Mr. Shea:

During the period of October 22 – 25, 2013, the Nuclear Regulatory Commission (NRC) administered operating tests to employees of your company who had applied for licenses to operate the Watts Bar Nuclear Power Plant. At the conclusion of the tests, the examiners discussed preliminary findings related to the operating tests and the written examination submittal with those members of your staff identified in the enclosed report. The written examination was administered by your staff on October 30, 2013.

One Reactor Operator (RO) and five Senior Reactor Operator (SRO) applicants passed both the operating test and written examination. One RO applicant and one SRO applicant, who were granted waivers for a previously passed operating test, passed the written exam. One SRO applicant passed the operating test, but failed the written examination. There were two post-administration comments concerning the written examination. These comments, and the NRC resolution of these comments, are summarized in Enclosure 2. A Simulator Fidelity Report is included in this report as Enclosure 3.

The initial written SRO examination submitted by your staff failed to meet the guidelines for quality contained in NUREG-1021, Operator Licensing Examination Standards for Power Reactors, Revision 9, Supplement 1, as described in the enclosed report.

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

If you have any questions concerning this letter, please contact me at (404) 997-4550.

Sincerely,

/RA/

Malcolm T. Widmann, Chief
Operations Branch 1
Division of Reactor Safety

Docket No: 50-390
License No: NPF-90

Enclosures:

1. Report Details
2. Facility Comments and NRC Resolution
3. Simulator Fidelity Report

cc: Distribution via Listserv

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 ADAMS: Yes
 ACCESSION NUMBER: ML13346A983 _____
 SUNSI REVIEW COMPLETE
 FORM 665 ATTACHED

OFFICE	RII:DRS	RII:DRS	RII:DRS	RII:DRS	RII:DRS		
SIGNATURE	RA	RA	RA	RA	RA		
NAME	MEEKS	GOLDAU	DONITHAN	VIERA	WIDMANN		
DATE	12/10/2013	12/11/2013	12/10/2013	12/11/2013	12/11/2013	12/ /2013	12/ /2013
E-MAIL COPY?	YES NO	YES NO	YES NO				

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-390

License No.: NPF-90

Report No.: 05000390/2013302

Licensee: Tennessee Valley Authority

Facility: Watts Bar

Location: Spring City, Tennessee

Dates: Operating Test – October 22 – 25, 2013
Written Examination – October 30, 2013

Examiners: M. Meeks, Chief Examiner, Senior Operations Engineer
A. Goldau, Operations Engineer
M. Donithan, Operations Engineer
J. Viera, Operations Engineer (in training status)

Approved by: Malcolm T. Widmann, Chief
Operations Branch 1
Division of Reactor Safety

SUMMARY OF FINDINGS

ER 05000390/2013302; Operating Test, October 22 – 25, 2013, & Written Examination, October 30, 2013; Watts Bar Nuclear Power Plant; Operator License Examinations.

Nuclear Regulatory Commission (NRC) examiners conducted an initial examination in accordance with the guidelines in Revision 9, Supplement 1, of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors." This examination implemented the operator licensing requirements identified in 10 CFR §55.41, §55.43, and §55.45, as applicable.

Members of the Watts Bar Nuclear Power Plant staff developed both the operating tests and the written examination. The NRC developed the written examination outline. The initial written Senior Reactor Operator (SRO) examination submittal did not meet the quality guidelines contained in NUREG-1021.

The NRC administered the operating tests during the period of October 22 – 25, 2013. Members of the Watts Bar Nuclear Power Plant training staff administered the written examination on October 30, 2013. One Reactor Operator (RO) and five SRO applicants passed both the operating test and written examination, and were issued licenses commensurate with the level of examination administered.

One SRO applicant passed the operating test, but failed the written examination.

One RO applicant, who was granted a waiver for a previously passed operating test, passed the written examination with a score between 80 and 82 percent. One SRO applicant passed the operating test, but passed the SRO-only portion of the written examination with a score between 70 and 74 percent. Each of these applicants were issued a letter stating that they passed the examination and issuance of their license has been delayed pending any written examination appeals that may impact the licensing decision for their application.

There were two post-examination comments submitted on the written exam.

No findings were identified.

REPORT DETAILS

4. OTHER ACTIVITIES

4OA5 Operator Licensing Examinations

a. Inspection Scope

Members of the Watts Bar Nuclear Power Plant staff developed both the operating tests and the written examination. The written examination outline was developed by the NRC. All examination material was developed in accordance with the guidelines contained in Revision 9, Supplement 1, of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors." The NRC examination team reviewed the proposed examination. Examination changes agreed upon between the NRC and the licensee were made per NUREG-1021 and incorporated into the final version of the examination materials.

The NRC reviewed the licensee's examination security measures while preparing and administering the examinations in order to ensure compliance with 10 CFR §55.49, "Integrity of examinations and tests."

The NRC examiners evaluated two Reactor Operator (RO) and seven Senior Reactor Operator (SRO) applicants using the guidelines contained in NUREG-1021. The examiners administered the operating tests during the period of October 22 – 25, 2013. Members of the Watts Bar Nuclear Power Plant training staff administered the written examination on October 30, 2013. Evaluations of applicants and reviews of associated documentation were performed to determine if the applicants, who applied for licenses to operate the Watts Bar Nuclear Power Plant, met the requirements specified in 10 CFR Part 55, "Operators' Licenses."

b. Findings

The NRC determined that the licensee's SRO written examination submittal was outside the range of acceptable quality specified by NUREG-1021, because more than 20 percent (10 of 25) of questions sampled for review contained unacceptable flaws. Individual questions were evaluated as unsatisfactory for the following reasons:

- One question failed to meet the K/A statement contained in the examination outline.
- Five questions contained two or more implausible distractors.
- Two questions were not written at the SRO license level.
- Two questions contained multiple unacceptable flaws.

The NRC determined that the licensee's initial operating test submittal and the initial RO written examination submittal were within the range of acceptability expected for a proposed examination.

One RO and four SRO applicants passed both the operating test and written examination, and were issued licenses commensurate with the level of examination administered. One SRO applicant, who was granted a waiver for a previously passed operating test, also passed the written examination and was issued a license.

One SRO applicant passed the operating test, but failed the written examination.

One RO applicant, who was granted a waiver for a previously passed operating test, passed the written examination with a score between 80 and 82 percent. One SRO applicant passed the operating test, but passed the SRO-only portion of the written examination with a score between 70 and 74 percent. Each of these applicants were issued a letter stating that they passed the examination and issuance of their license has been delayed pending any written examination appeals that may impact the licensing decision for their application.

Copies of all individual examination reports were sent to the facility Training Manager for evaluation of weaknesses and determination of appropriate remedial training.

The licensee submitted two post-examination comments concerning the written examination. A copy of the final written examination and answer key, with all changes incorporated, and the licensee's post-examination comments may be accessed not earlier than December 2, 2015, in the ADAMS system (ADAMS Accession Numbers ML13312A419, ML13312A425, and ML13312A453).

40A6 Meetings, Including Exit

Exit Meeting Summary

On October 25, 2013, the NRC examination team discussed generic issues associated with the operating test with Mr. T. Cleary, Site Vice President, and other members of the Watts Bar Nuclear Power Plant staff. The examiners asked the licensee if any of the examination material was proprietary. No proprietary information was identified.

On December 6, 2013, the NRC examination team discussed the final exam results via phone call with Ms. Eiford-Lee, Training Director, and other members of the Watts Bar Nuclear Power Plant staff.

ATTACHMENT: SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

A. Bergeron, Corporate Operations Training Manager
G. Boerschig, Plant Manager
M. Bottorff, Operations Superintendent
T. Cleary, Site Vice President
L. Cross, Assistant Operations Manager
B. Eiford-Lee, Training Director
R. Fruth, Initial License Training Supervisor
R. Joplin, Corporate Exam Manager
J. Keczy, Simulator Manager
K. Skubisz, Principal Exam Author
B. Sprinkle, Operations Support Superintendent
J. Thompson, Instructor

NRC personnel

None

FACILITY POST-EXAMINATION COMMENTS AND NRC RESOLUTIONS

A complete text of the licensee's post-examination comments can be found in ADAMS under Accession Number ML13312A453.

Item

Question 55, K/A 103 K1.08

Comment

The facility licensee recommends that the correct answer be changed from the keyed answer of 'B,' to 'A.'

After listing the text of the question and the distractor analysis, the facility licensee submitted a detailed analysis of the safeguards circuitry included in Watts Bar/Westinghouse print 1082H70-1. The facility licensee provided discussion and detailed circuit analysis for three cases: (1) no actuation signal (Safety Injection) exists and no reset push-button is depressed, (2) an actuation signal exists and the reset push-button is not depressed, and (3) the actuation signal exists and the reset push-button is depressed. These circuit analyses result in the conclusion that the ON/OFF retentive memory affiliated with the Phase A isolation signal will change to the OFF state with a safety injection signal present when the reset push-button is depressed, and will remain in the OFF state after the reset push-button is released.

The answer as listed in the key is 'B,' which states that the Phase A containment isolation signal will not be removed. Question 55 asked the applicants to consider whether the Phase A containment isolation could be reset if its initiating signal had NOT been reset. Given the aforementioned circuit design, the correct answer should be that it could. Therefore, the keyed answer to question 55 should be A.

The facility recommends changing the answer to question 55 to A.

NRC Resolution

The licensee's recommendation was accepted.

An analogous argument to the facility licensee's more detailed examination of the circuit in question can be made using the Watts Bar Unit 1 functional logic diagram 1-47W611-88-1, "ELECTRICAL LOGIC DIAGRAM CONTAINMENT ISOLATION," which diagrams the 'A' train portion of the phase 'A' containment isolation logics. A NOTE on this print explains that 'B' train operation is the same.

With an SI actuation signal present, when the operator depresses the RESET button, the upper 'OR' gate output becomes a logical "1." This output, along with the logical "1" of the SI signal present, generates a logical "1" output from the following 'AND' gate. This output is then routed back into the upper 'OR' gate as a 'seal in' circuit. The logical "1" output from the 'AND' gate is then inverted (logical "0") and sent to a final 'AND' gate along with the SI actuation signal. The output of this final 'AND' gate is therefore switched to a logical "0" and the phase A containment isolation signal is turned "off/reset."

After the operator releases the RESET button to neutral, with an SI actuation signal present, the upper 'OR' gate output remains a logical "1" due to the 'seal in' circuit input. This output, along with the continued logical "1" of the SI signal present, continues the logical "1" output from the first 'AND' gate, which keeps the 'seal in' present. The logical "1" output from the first 'AND' gate remains inverted (logical "0") when it is sent to the final 'AND' gate, and the containment isolation signal remains "off/reset."

Therefore, the facility licensee is correct that 'A' is the one and only correct answer to question 55 on the written examination. The correct answer was changed to 'A.'

Item

Question 88, K/A 059 A2.05

Comment

The facility licensee recommends that the correct answer be changed from the keyed answer of 'B' to 'D.'

After listing the text of the question and the distractor analysis, the facility licensee submitted the following:

The facility's intent in constructing this question was to elicit the knowledge that 1-E-0 did not contain any guidance to ensure that the feedwater leak was isolated. The facility did not consider the fact that TI-12.04, "User's Guide For Abnormal And Emergency Operating Instructions" contains the following in section 2.2.4 Immediate Action Steps:

B. During immediate operator action steps the operators will ensure automatic actions have occurred or initiate signals as appropriate. Diagnostic or repair actions will be delayed until the immediate actions are complete to allow for evaluation of plant response.

One comment is that while the Operator at the controls is performing the immediate actions of 1-E-0, the Balance of Plant Operator (and the Unit Supervisor) would verify that as Reactor Coolant System average temperature lowered to less than 564°F, a feedwater isolation occurred. Therefore, three facts exist:

1. TI-12.04 contains the verbiage that "operators will ensure automatic actions have occurred."
2. TI-12.04 is in effect when 1-E-0 is entered.
3. A feedwater isolation is an automatic action.

When a feedwater isolation signal occurs, both the Main Feed Regulating Valves and the Main Feed Isolation valves will close. The Main Feed Regulating Valves are located inside of the Turbine Building and the Main Feed Isolation Valves are located inside of the applicable Valve Vault Room. For the #4 Steam Generator, the Main Feed Isolation Valve is located inside of the South Valve Vault Room. Because the question indicated that the Feedwater leak was on the #4 S/G supply line between the Turbine Building wall and the South Valve Vault Room, the feedwater isolation would cause the leak to be isolated.

The facility considered the amount of time between a reactor trip (initiated on the basis of a sufficiently sized feedwater leak. Using its simulator, the facility ran a test case which placed a 3% feedwater leak on the feed line for the #4 S/G (the criteria presented in AOI-38, "MAIN STEAM OR FEEDWATER LINE LEAK" which requires a reactor trip). The facility validated that a feedwater isolation occurred well before the OAC completed his immediate actions. Because the isolation occurs before the OAC had completed his immediate actions, it occurs before a transition out of 1-E-0 exists.

Given the aforementioned, the following deductions must be made:

1. Procedural guidance exists which directs the operators to ensure that a feedwater isolation occurs.
2. The feedwater isolation will isolate the leak presented in the question.
3. The isolation will occur before a transition out of 1-E-0.

Therefore, the facility agrees that procedural direction to ensure the leak is isolated will be directed prior to the transition from 1-E-0, "Reactor Trip or Safety Injection," to the applicable procedure.

The facility recommends that the correct answer be keyed as D.

NRC Resolution

The licensee's recommendation was partially accepted.

The first part of the question specifically asks when "Procedural direction to ensure the leak is isolated will be directed" [underlines not in original]. The applicant is to decide whether this direction will occur either "prior to" a transition from 1-E-0, or "only after" a transition from 1-E-0. As specified in the facility licensee's discussion, it would be acceptable for a SRO to direct leak isolation before transition from 1-E-0 by invoking guidance contained in Watts Bar procedure TI-12.04. However, it would also be acceptable for a SRO to wait until a transition from 1-E-0 when direct procedural guidance in the EOP/AOP procedural network could also be invoked. Therefore, the question forces the applicant to make unwarranted assumptions regarding the situation; *i.e.*, the question stem did not provide all necessary information.

Furthermore, it is logically incompatible (contradictory) that the feedwater leak isolation can be directed both "prior to" and "only after" a transition from 1-E-0 as stated in the question. NUREG 1021 ES-403 section D.1.c states the following:

If it is determined that there are two correct answers, both answers will be accepted as correct. If, however, both answers contain conflicting information, the question will likely be deleted. For example, if part of one answer states that operators are required to insert a manual reactor scram, and part of another answer states that a manual scram is not required, then it is unlikely that both answers will be accepted as correct, and the question will probably be deleted. [...]

In this case, the two first-part answers contained conflicting information (specifically via use of the unique distractor "only after"). Therefore, in accordance with NUREG 1021 ES-403, question 88 was deleted from the SRO-only written examination, which was graded using a final total of 24 questions on the SRO-only portion and a total of 99 questions overall for the SRO applicants.

SIMULATOR FIDELITY REPORT

Facility Licensee: Watts Bar Nuclear Power Plant

Facility Docket No.: 05000390/2013-302

Operating Test Administered: October 22 – 25, 2013

This form is to be used only to report observations. These observations do not constitute audit or inspection findings and, without further verification and review in accordance with Inspection Procedure 71111.11 are not indicative of noncompliance with 10 CFR 55.46. No licensee action is required in response to these observations.

No simulator fidelity or configuration issues were identified.