



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
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ATLANTA, GEORGIA 30303-1200

December 16, 2024

James Barstow
Vice President, Nuclear Regulatory
Affairs and Support Services
Tennessee Valley Authority
1101 Market Street, LP 4A
Chattanooga, TN 37402-2801

SUBJECT: WATTS BAR NUCLEAR PLANT – NRC OPERATOR LICENSE EXAMINATION
REPORT 05000390/2024301 and 05000391/2024301

Dear James Barstow:

During the period October 21-25, 2024 the Nuclear Regulatory Commission (NRC) administered operating tests to employees of your company who had applied for licenses to operate the Watts Bar Nuclear 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, 2024.

Five Reactor Operator (RO) and four Senior Reactor Operator (SRO) applicants passed both the operating test and written examination. One RO applicant failed the written examination. One SRO applicant failed the operating test. There were four post-administration comments concerning both the operating test and 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 examination submittal was within the range of acceptability expected for a proposed examination. All examination changes agreed upon between the NRC and your staff were made according to NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 12.

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) 997-4718

Sincerely,



Signed by Endress, Matthew
on 12/16/24

Matthew F. Endress, Chief
Operations Branch
Division of Operating Reactor Safety

Docket Nos: 50-390, 50-391
License Nos: DRP-90, DRP-96

Enclosures:

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

cc: Distribution via Listserv

SUBJECT: WATTS BAR NUCLEAR PLANT – NRC OPERATOR LICENSE EXAMINATION
REPORT 05000390/2024301 and 05000391/2024301
DATED DECEMBER 16, 2024

DISTRIBUTION:

K. Wallace, RII
J. Viera, RII
M. Endress, RII

ADAMS ACCESSION NUMBER: ML24351A085

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NAME	K. Wallace	J. Viera	M. Endress		
DATE	12/16/24	12/16/24	12/16/24		

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Examination Report

Docket No.: 05000390, 05000391

License No.: NPF-90, NPF-96

Report No.: 05000390/2024301 and 05000391/2024301

Enterprise Identifier: L-2024-OLL-0044

Licensee: Tennessee Valley Authority

Facility: Watts Bar Nuclear Plant, Units 1 and 2

Location: Spring City, TN

Dates: Operating Test – October 21-25, 2024
Written Examination – October 30, 2024

Examiners: J. Viera, Chief Examiner, Senior Operations Engineer
M. Bates, Senior Operations Engineer
N. Lacy, Operations Engineer
P. Meier, Senior Resident Inspector

Approved by: Matthew F. Endress, Chief
Operations Branch
Division of Operating Reactor Safety

SUMMARY

ER 05000390/2024301 and 05000391/2024301; operating test October 21-25, 2024 & written examination October 30, 2024; Watts Bar Nuclear Plant, Units 1 and 2; Operator License Examinations.

Nuclear Regulatory Commission (NRC) examiners conducted an initial examination in accordance with the guidelines in Revision 12, 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 Plant staff developed both the operating tests and the written examination. The initial operating test, written RO examination, and written SRO examination submittals met the quality guidelines contained in NUREG-1021.

The NRC administered the operating tests during the period October 21-25, 2024. Members of the Watts Bar Nuclear Plant training staff administered the written examination on October 30, 2024. Five Reactor Operator (RO) and four Senior Reactor Operator (SRO) applicants passed both the operating test and written examination. Nine applicants were issued licenses commensurate with the level of examination administered.

There were four post-examination comments.

No findings were identified.

REPORT DETAILS

4. OTHER ACTIVITIES

4OA5 Operator Licensing Examinations

a. Inspection Scope

The NRC evaluated the submitted operating test by combining the scenario events and JPMs in order to determine the percentage of submitted test items that required replacement or significant modification. The NRC also evaluated the submitted written examination questions (RO and SRO questions considered separately) in order to determine the percentage of submitted questions that required replacement or significant modification, or that clearly did not conform with the intent of the approved knowledge and ability (K/A) statement. Any questions that were deleted during the grading process, or for which the answer key had to be changed, were also included in the count of unacceptable questions. The percentage of submitted test items that were unacceptable was compared to the acceptance criteria of NUREG-1021, "Operator Licensing Standards for Power Reactors."

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 performed an audit of license applications during and after the preparatory site visit in order to confirm that they accurately reflected the subject applicants' qualifications in accordance with NUREG-1021.

The NRC administered the operating tests during the period October 21-25, 2024. The NRC examiners evaluated six Reactor Operator (RO) and five Senior Reactor Operator (SRO) applicants using the guidelines contained in NUREG-1021. Members of the Watts Bar Nuclear Plant training staff administered the written examination on October 30, 2024. 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 Plant, met the requirements specified in 10 CFR Part 55, "Operators' Licenses."

The NRC evaluated the performance or fidelity of the simulation facility during the preparation and conduct of the operating tests.

b. Findings

No findings were identified.

The NRC developed the written examination sample plan outline. Members of the Watts Bar Nuclear Plant training staff developed both the operating tests and the written examination. All examination material was developed in accordance with the guidelines contained in Revision 12, of NUREG-1021. 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 determined, using NUREG-1021, that the licensee's initial examination submittal was within the range of acceptability expected for a proposed examination.

Five RO applicants and four SRO applicants passed both the operating test and written examination. One RO applicant passed the operating test but did not pass the written examination. One SRO applicant passed the written examination but did not pass the operating test. Five RO applicants and four SRO applicants were issued licenses.

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 operating test and two comments concerning the written examination. A copy of the licensee's post-examination comments may be accessed in the ADAMS system (ADAMS Accession Number ML24339A020). A copy of the final written examination and answer key, with all changes incorporated, may be accessed not earlier than October 30, 2026, in the ADAMS system (ADAMS Accession Numbers ML24340A021 and ML24340A022).

4OA6 Meetings, Including Exit

Exit Meeting Summary

On October 24, 2024 the NRC examination team discussed generic issues associated with the operating test with Kevin Michael, Plant Manager, and members of the Watts Bar Nuclear Plant staff. The examiners asked the licensee if any of the examination material was proprietary. No proprietary information was identified.

KEY POINTS OF CONTACT

Licensee personnel

Kevin Michael, Plant Manager

Justin Gallagher, Director, Nuclear Site Training

Matthew Robertson, Manager, CMO (OPS Director)

Thomas Fowler, Program Manager, Operations Training

Jonathon Johnson, Manager, Nuclear Site Licensing

Michael Bruchey, RMD, Nuclear Shift Operations

Brian McInay, Shift Manager, Nuclear Plant Shift Operations

Michael Petersen, Instructor, Operations Lead

Richard Drehs, Manager, Nuclear Operations Training

Patrick O'Brien, Manager, Nuclear Operations Training

Jeremy Thompson, Manager, Nuclear Operations Training

Russell Joplin, Program Manager, Corporate Nuclear Examinations

Keith Skubisz, Program Manager, Site Nuclear Licensing

Leon Neat, Senior Manager, Nuclear Operations Training

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 ML24339A020.

Item 1

Question 6, K/A 026AK1.05

Comment

The licensee recommended question deletion following a review of newly discovered technical information where the station concluded the question had no correct answer.

The question asks the applicant to identify the reason the Residual Heat Removal (RHR) pump 1A is secured during a loss of Component Cooling System (CCS) flow. The answer key states steam hammer [answer choice A] and appears to be based on the CAUTION in 1-AOI-14 Section 3.8 between step 1 (Stop the affected RHR Pump) and step 2 (Ensure affected RHR HX FCV closed).

The CAUTION does not apply to step 1 based on EPM-4, EOI Program User Guide, Section 4.1.3 which states "In general, special messages apply to the step which they precede."

The CAUTION applies to step 2 which directs closing the affected RHR Heat Exchanger (HX) Flow Control Valve (FCV) to isolate RHR flow through the RHR HX and precludes the possibility of natural circulation.

... the CAUTION referring to steam hammer is after the step in question and does not apply to stopping the RHR Pump as explained in EPM-4.

The licensee also provided a thermodynamic evaluation using given conditions provided by the question as additional information to support a conclusion that the question has no correct answer.

Since the given RCS temperature [240°F] is below the saturation temperature for the CCS system provided in this question [242.9°F], it is not plausible that steam formation or steam hammer would occur in the CCS system at this time. Based on this newly discovered technical information, steam hammer is not a valid answer to the question.

Lastly, the licensee commented on the validity of the other answer choices for this question.

Distractors B through D are as discussed in the exam submittal [incorrect]. The remaining incorrect answers are still incorrect. Thus, there is no correct answer to the question as written. The station believes the question should be removed from the exam.

NRC Resolution

The licensee's recommendation was rejected.

During examination development, this question was proposed as a new question with the following question statement wording (option A was the proposed answer). Note that question given conditions did not change between draft and final question versions.

Consider each condition separately.

CCS Pump 1B-B ___(1)___ required to be STARTED to restore TRAIN 1A CCS flow.

RHR Pump 1A ___(2)___ required to be STOPPED to prevent severe steam hammer in the stagnant CCS system.

- A. (1) is
(2) is
- B. (1) is
(2) is NOT
- C. (1) is NOT
(2) is
- D. (1) is NOT
(2) is NOT

As a result of modifications proposed during question development and validated by the facility, the as-administered version contained the following question statement wording (option A was the proposed answer).

RHR Pump 1A is required to be STOPPED to prevent _____.

- A. steam hammer
- B. impeller damage
- C. damage due to high temperature
- D. damage due to loss of lube oil cooling

During written examination administration on October 30, 2024, there were no applicant questions asked that pertained to Question 6.

While also stating "In general, special messages apply to the step which they precede," Emergency Operating Instruction (EOI) Program Users Guide, EPM-4, Section 4.1.3, Entry Conditions, provides additional information regarding the procedural presentation of special information, such as CAUTIONS.

- CAUTIONS contain information about potential hazards to equipment. They also advise on actions or transitions which may become necessary depending on changes in plant conditions.

For context, the relevant portion of 1-AOI-14, Loss of RHR Shutdown Cooling, used to justify selection of the correct answer choice for Question 6 is included below.

3.8 Loss of CCS to RHR System

1. **STOP** the affected RHR Pump.

CAUTION Continued RHR flow through Hx with stagnant CCS can result in severe steam hammer in CCS.

2. **ENSURE** affected RHR Hx FCV CLOSED:
 - 1-FCV-74-16, RHR Hx A, OR
 - 1-FCV-74-28, RHR Hx B.

While the AOI-14 Section 3.8 CAUTION is procedurally presented before the directed action of ensuring heat exchanger flow control valve closure (FCV) within step 2, the technical justification offered by the facility for FCV closure is to preclude the possibility of natural circulation, thereby assuring the termination of RHR flow. Stopping of the affected pump is linked to completing the evolution of RHR system flow termination to prevent system damage due to steam hammer. EPM-4 addresses this situation when it states, 'In general', "In general, special messages apply to the step which they precede."

The provided thermodynamic evaluation reinforces the operational validity of this question. From a conservatively calculated perspective where a calculated 2.9°F margin to saturation is obtained, system conditions are approaching values where equipment hazards are impending. As discussed in the EPM-4 Section 4.1.3 bullet, "CAUTIONS contain information about potential hazards to equipment. They also advise on actions or transitions which may become necessary depending on changes in plant conditions."

The lack of applicant questions asked during examination administration, the presented newly discovered technical information from EPM-4, and the offered thermodynamic evaluation conclusion each fails to justify question deletion.

Item 2

Question 68, K/A G2.3.5

Comment

The licensee recommended question deletion following a review of newly discovered technical information where they concluded the question had no operational validity at this station.

The intent of question 68 is to determine the applicants understanding of required dosimetry when working in a Radiologically Controlled Area (RCA) at Watts Bar as specified by facility procedural guidance. The question asks the applicant to determine if a Pocket Ion Chamber (PIC) can or can not be used when working in the RCA.

Fleet governance under NPG-SPP-05.1, Radiological Controls, does allow the use of a PIC as self-reading dosimetry (SRD) for entry into the RCA. Further investigation determined that a PIC is NOT used at Watts Bar for RCA entry.

Additional technical information was found under NPG-SPP-05.18, Radiological Work Permits (RWP), section 3.2.7 which requires that a SRD provide audible dose and dose rate alarms to be used. This procedural requirement can not be met with a PIC. In addition, NPG-SPP-05.18 contains no information supporting the use of a PIC for RCA entries.

ES-1.2.B.8 specifies that the candidate should “answer all questions based on actual plant operation, procedures, and references.” Based on the current procedural guidance for the issuance of SRD at Watts Bar, an applicant would determine that a PIC can not be used for RCA entry when answering this question.

NRC Resolution

The licensee’s recommendation was accepted.

The presented newly discovered technical information and its relevance to station operations justifies question deletion.

All applicants were graded with Question 68 removed (RO examination of 74 questions).

Item 3

Job Performance Measure “c”

- 3R, 2-SI-74-902-A Evaluate valve stroke testing results (RO)
- 3S, Perform 2-SI-74-902-A, Quarterly Valve Full Stroke Exercising – RHR System Train A (SRO)

Comment

The licensee recommended that step 5 within both the 3R and 3S administrative JPM guides be modified to require applicant identification of LCO 3.6.6, Condition B.

Verifying the correct alignment for manual, power operated, and automatic valves in the ECCS flow paths provides assurance that the proper flow paths exist for ECCS operation. Based on the situation established in the JPM, the automatic operation of the RHR Pump mini flow recirculation valve is in question. Therefore, presumption of Operability cannot be maintained.

This was correctly listed in the JPM as TS LCO 3.5.2 not met for the RHR pump and thus the low head injection piece of the overall ECCS Injection specification.

There is historical data within the WBN Operations Narrative logs showing where we routinely state that TS LCO 3.6.6 is not met and required action Condition B is applicable due impacts to the Mini Flow Recirc valves under various conditions.

Based upon the above, the guide for that JPM should have listed TS LCO 3.6.6 as NOT met. An IDO that results in an RHR Pump being INOPERABLE due to the inability to meet the requirements of SR 3.5.2.2 (Automatic Valve Operation) should also result in TS LCO 3.6.6. not met.

NRC Resolution

The licensee's recommendation was accepted.

The provided technical information supports the following changes to JPM 3R/3S step 5.

- 3R: identify that both LCOs 3.5.2 and 3.6.6 are NOT MET
- 3S: identify LCO 3.5.2 Condition A and LCO 3.6.6 Condition B are both NOT MET

All applicants were graded with the changes listed above.

Item 4

Scenario 1 (Event 4), SG 2 ADV 1-PCV-1-12 fails OPEN

Comment

The licensee recommended that Scenario 1, Event 4 be modified to state that following applicant Technical Specification evaluation, LCO 3.7.4 remained MET.

Scenario 1, Form 3.3-1, Scenario Outline, and Form 3.3-2, Required Operator Actions, Event 4, Technical Specification evaluation grading criteria included LCO 3.7.4, Atmospheric Dump Valves (ADV)s, Condition A, as being required to be entered.

From the bases for TS 3.7.4: An ADV is considered OPERABLE when it is capable of controlled relief of the main steam flow and capable of fully opening and closing on demand. Based on the verbiage in the associated SRs, controlled includes opened/closed AND/OR throttled to control and maintain the required cooldown to mitigate the chapter 15 accident analysis.

SR 3.7.4.1 Bases states: To perform a controlled cooldown of the RCS, the ADVs must be able to be opened either remotely or locally and throttled through their full range. Based on this statement and in the event, one could not be controlled from the MCR, it would not preclude the ability to throttle the valve through its full range either locally or at the nitrogen control stations.

If an ADV fails open but can still be opened and closed from the MCR switch and or locally, the valve remains operable. Surveillances that are performed to satisfy SR 3.7.4.1 and 3.7.4.2 are 1-SI-1-902-A/B and 1-SI-1-906-A/B. These surveillances perform stroke times of the ADVs by using the pistol grip switches in the MCR not the controller.

Based upon the above, the guide for that scenario should have maintained that TS 3.7.4 was still met, even with the failed ADV hand switch in the CLOSE position.

NRC Resolution

The licensee's recommendation was accepted.

The provided technical information supports modifying Scenario 1, Event 4 to state that following applicant Technical Specification evaluation, LCO 3.7.4 remained MET.

All applicants were graded with the change listed above.

SIMULATOR FIDELITY REPORT

Facility Licensee: Watts Bar Nuclear Plant

Facility Docket No.: 050000390 and 050000391

Operating Test Administered: October 21-25, 2024

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.