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

January 13, 2016

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

SUBJECT: BROWNS FERRY NUCLEAR PLANT – NRC OPERATOR LICENSE EXAMINATION REPORT 05000259/2015302, 05000260/2015302, 05000296/2015302

Dear Mr. Shea:

During the period November 16 – 19, 2015, the Nuclear Regulatory Commission (NRC) administered operating tests to employees of your company who had applied for licenses to operate the Browns Ferry 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 November 24, 2015.

All the applicants passed both the operating test and written examination. There were three post-administration comments concerning the operating test. 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 10.

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) 997-4551.

Sincerely,

/RA: Eugene F. Guthrie for:/

Gerald J. McCoy, Chief
Operations Branch 1
Division of Reactor Safety

Docket Nos: 50-259, 50-260, 50-296
License Nos: DPR-33, DPR-52, DPR-68

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:_____ ☒ SUNSI REVIEW COMPLETE ☐ FORM 665 ATTACHED

OFFICE	RII:DRS	RII:DRS	RII:DRS				
SIGNATURE	**JXV3 VIA EMAIL**	**PGC1 VIA EMAIL**	**EFG FOR GJM2**				
NAME	JVIERA	PCAPEHART	GMcCOY				
DATE	1/12/2016	1/12/2016	1/13/2016				
E-MAIL COPY?	YES NO	YES NO	YES NO	YES	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: G:\OLEXAMS\BROWNS FERRY EXAMINATIONS\BF 2015-302 INITIAL EXAM (PHIL)\CORRESPONDENCE\BFN 2015-302 EXAM REPORT.DOCX

U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.:	50-259, 50-260, 50-296
License No.:	DPR-33, DPR-52, DPR-68
Report No.:	05000259/2015302, 05000260/2015302, 05000296/2015302
Licensee:	Tennessee Valley Authority (TVA), LLC
Facility:	Browns Ferry Nuclear Plant, Units 1, 2, and 3
Location:	Athens, AL 35611
Dates:	Operating Test – November 16-19, 2015 Written Examination – November 24, 2015
Examiners:	P. Capehart, Chief Examiner, Senior Operations Engineer M. Emrich, Senior Reactor Technology Instructor J. Viera, Operations Engineer
Approved by:	Gerald J. McCoy, Chief Operations Branch 1 Division of Reactor Safety

SUMMARY

ER 05000259/2015302, 05000260/2015302, 05000296/2015302; operating test November 16 – 19, 2015 & written exam November 24, 2015; Browns Ferry Nuclear Plant; Operator License Examinations.

Nuclear Regulatory Commission (NRC) examiners conducted an initial examination in accordance with the guidelines in Revision 10, 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 Browns Ferry Nuclear Plant staff developed both the operating tests and the written examination. The initial operating test, written Reactor Operator (RO) examination, and written Senior Reactor Operator (SRO) examination submittals met the quality guidelines contained in NUREG-1021.

The NRC administered the operating tests during the period November 16 – 19, 2015. Members of the Browns Ferry Nuclear Plant training staff administered the written examination on November 24, 2015. All six RO and two SRO applicants passed both the operating test and written examination. All eight applicants were issued licenses commensurate with the level of examination administered.

There were three post-examination comments related to the operating examination.

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 administered the operating tests during the period November 16 – 19, 2015. The NRC examiners evaluated six RO and two SRO applicants using the guidelines contained in NUREG-1021. Members of the Browns Ferry Nuclear Plant training staff administered the written examination on November 24, 2015. Evaluations of applicants and reviews of associated documentation were performed to determine if the applicants, who applied for licenses to operate the Browns Ferry 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 Browns Ferry 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 10 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.

No issues related to examination security were identified during preparation and administration of the examination.

All applicants passed both the operating test and written examination and were issued licenses. Six RO applicants and two SRO applicants passed both the operating test and written examination.

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 three post-examination comments concerning the operating test. A copy of the final written examination and answer key, with all changes incorporated, may be accessed not earlier than November 24, 2017, and a copy of the licensee's post-examination comments may be accessed in the ADAMS system (ADAMS Accession Numbers ML15342A368, ML15342A373 and ML15351A118).

4OA6 Meetings, Including Exit

Exit Meeting Summary

On November 19, 2015 the NRC examination team discussed generic issues associated with the operating test with Steve Bono, Site Vice President, and members of the Browns Ferry 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

Steve Bono, Site Vice President
Denny Campbell, Superintendent, Nuclear Operations
Chris L. Vaughn, Manager Nuclear Operations Training
Donald C. Binkley, Supervisor, Nuclear Operations Training
Michael Barton, Exam Developer
Keith Nichols, Operations Exam Representative
Michael Schulte, Nuclear Operations Training
Russell Joplin, Corporate Exam Program Manager
Eric Bates, Site Licensing
Todd Anderson, Quality Assurance

NRC personnel

Thomas Stephen, Resident Inspector

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 ML15351A118.

Item #1: Administrative Job Performance Measure (JPM) "EP", JPM 679, Upgrade PAR on wind shift

Post-Examination Comment

The licensee contended that the standard for JPM Step 2, associated with completion of Emergency Plan Implementing Procedure (EPIP) – 5, Appendix F, General Emergency Follow-Up Information Form, was incorrect. The licensee contended that the Critical Step standard for JPM Step 2 should be revised to include applicant identification of 'Shelter' sector A5 only. They also contended that applicant identification of 'Shelter' sectors B5 and E5 should be revised to not be included in the JPM Step 2 Critical Step standard.

NRC Resolution

The licensee's recommendation was not accepted.

During the JPM, applicants were expected to conclude that completion of EPIP-5, Appendix F, was required. As part of the given information for this JPM, applicants were supplied with information that outlined the classification of a General Emergency (GE) and prior state notification of an initial Protective Action Recommendation (PAR) (which affected sectors B5 and E5) with new meteorological data (which affected sectors A5 and B5). To complete the JPM, applicants were expected to complete Appendix F in accordance with the JPM Step 2 standard, a Critical Step.

The original version of the task standard for JPM Step 2 required that the applicant identify the following 5 mile 'Shelter' sectors on Appendix F:

Shelter (do not check sectors evacuated above)											
2 Mile	☐ A2	☐ B2	☐ F2	☐ G2							
5 Mile	☒ A5	☒ B5	☒ E5	☐ F5	☐ G5						
10 Mile	☐ A10	☐ B10	☐ C10	☐ D10	☐ E10	☐ F10	☐ G10	☐ H10	☐ I10	☐ J10	☐ K10

Following administration of this JPM, both SRO applicants identified on their respective Appendix F forms that the sectors requiring 'Shelter' were A5 and B5 only. The basis for this determination was the change in meteorological data provided during performance of this JPM (new wind direction of 280° vs. initial wind direction of 323°).

In Post Operating Exam Comment #1, the licensee recommended adoption of new JPM Step 2 acceptance criteria requiring applicant identification of only 'Shelter' sector A5 as the Critical Step portion. This recommendation was submitted based on licensee conclusion that EPIP-5 Appendix F does not address the use of previously identified PAR sectors in subsequent reporting. Additionally, the licensee contended that EPIP-5, Appendix J, Upgrade – Protective Action Recommendation, was not referenced for use within the body of EPIP-5. Based on the issues presented by the licensee, CR 1106129 and CR 1112692 were generated.

Based on the guidance provided in NUREG-0654, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, the original version of the task standard for JPM Step 2 was confirmed to comply with the NRC's guidance concerning the reporting of initial PAR sectors in subsequent PAR notifications. Additionally, EPIP-5 Appendix F, procedurally directs the identification of "Affected Sectors" when completing Step 9 as indicated below.

9. **Offsite Protective Actions**											
A) AFFECTED SECTORS											
Evacuate											
2 Mile	☐ A2	☐ B2	☐ F2	☐ G2							
5 Mile	☐ A5	☐ B5	☐ E5	☐ F5	☐ G5						
10 Mile	☐ A10	☐ B10	☐ C10	☐ D10	☐ E10	☐ F10	☐ G10	☐ H10	☐ I10	☐ J10	☐ K10
Shelter (do not check sectors evacuated above)											
2 Mile	☐ A2	☐ B2	☐ F2	☐ G2							
5 Mile	☐ A5	☐ B5	☐ E5	☐ F5	☐ G5						
10 Mile	☐ A10	☐ B10	☐ C10	☐ D10	☐ E10	☐ F10	☐ G10	☐ H10	☐ I10	☐ J10	☐ K10

Therefore, the required 'Shelter' PAR sectors acceptable as the standard for JPM Step 2 will consist of the sector's identified in the original task standard, identification of 'Shelter' sectors A5, B5, and E5 with identification of all three sectors as the Critical Step portion of the task standard.

Item #2: Control Room JPM "g", JPM 631, Restore Offsite Power to 4 Kilovolt (KV) shutdown board at PNL 9-23

Comment

The licensee contended that an applicant error performed during JPM Step 10, matching of Emergency Diesel Generator (EDG) 'A' voltage with offsite system voltage, did not result in the creation of a Critical Task. JPM Step 10 was not designated as a Critical Step in the original task standard.

NRC Resolution

The licensee's recommendation was not accepted.

During the JPM, applicants were expected to match the incoming offsite Alternating Current (AC) source voltage with the running EDG 'A' AC source voltage prior to paralleling these sources in accordance with 0-OI-82, Standby Diesel Generator System, Section 8.3, Restoring Offsite Power to 4-kV Shutdown Board at Panel 9-23, Step [10]. This step corresponds to JPM Step 10 in the task standard used during JPM performance. Upon arriving at Section 8.3, Step [10], EDG 'A' was the sole AC source tied to 4-kV Shutdown Board 'A'. During performance of Section 8.3, Step [10], one SRO applicant lowered EDG 'A' below the minimum output voltage required to cause receipt of two annunciators after a time delay (~ 3920 Volts lowering after ~ 4.3 second delay):

- Panel 0-9-23-7 Window 28, 4160V SD BD A DEGRADED VOLTAGE and
- Panel 9-8 Window 31, 4KV SHUTDOWN BD A DEGRADED VOLTAGE 2-EA-57-86

The following is an excerpt of 0-OI-82, Section 8.3, Step [10]:

[10] **USE** the associated Diesel Generator voltage regulator control switch to match Diesel Generator and System voltages. ☐

Diesel	Instrument Name	Inst No.	Panel
A	DG A VOLT REGULATOR CONT	0-HS-82-A/2A	0-9-23-7
	GEN SYNC REF VOLTAGE	0-EI-82-AB	
	SYSTEM SYNC REF VOLTAGE	0-EI-211-AB	

In the Post Operating Exam Exit Comment, the licensee concluded by simulator testing that amperage limits to running safety-related AC components supplied by 4-kV Shutdown Board 'A' would not be reached unless bus voltage had been further lowered to ~ 3350 Volts. The licensee initiated CR 1112700 to address the need for a JPM 631 degraded voltage contingency.

The approximate amperage limit voltage of 3350 Volts was far below the value experienced during the errant performance of Section 8.3, Step [10]. Additionally, prior to receipt of the degraded voltage annunciators, the SRO applicant had concluded that EDG 'A' output voltage was adjusted incorrectly and had taken positive action to restore EDG 'A' output voltage to comply with Section 8.3, Step [10].

While the Post Operating Exam Exit Comment specified that "no new critical tasks were created by the error", usage of the term Critical Task is uniquely specified to describe objective measures by which to perform applicant competency evaluations on the Simulator portion of the Operating Test as delineated by NUREG-1021, Operator Licensing Examination Standards for Power Reactors, Appendix D, Simulator Testing Guidelines. This term is not consistent with applicant JPM performance evaluation and cannot be created during applicant performance of a JPM.

Additionally, since JPM Step 10 contained a "procedural step that the examinee must perform correctly to accomplish the task standard" in accordance with NUREG-1021 Appendix C, Job Performance Measure Guidelines, this step should have been categorized as a JPM Critical Step on the original task standard.

Therefore, since amperage limits for running safety significant loads were not exceeded and positive applicant corrective action was in progress during receipt of the degraded voltage annunciators, the applicant successfully completed JPM Step 10, a re-characterized Critical Step.

Item #3: In-Plant JPM "k", JPM 307, Startup and Synchronize Unit 3 Preferred MMG Set

Comment

The licensee contended that the performance of JPM Step 8 should not have been marked as a Critical Step. JPM Step 8 was designated as a Critical Step in the original task standard.

NRC Resolution

The licensee's recommendation was accepted.

During the JPM, applicants were expected to verify proper operation of the recently onlined Unit 3 Motor-Motor Generator (MMG) in accordance with 0-OI-57C, 208V/120V AC Electrical System, Section 5.5, Unit Preferred MMG Set Startup and Synchronization, Step [22]. This was accomplished by performing a check of amperage values obtained at the local control panel.

The following is an excerpt of 0-OI-57C, Section 5.5, Step [22]:

> [22] **CHECK** generator is loaded by observing UNIT 2(3) MMG GENERATOR amps, 2(3)-II-252-02C/1AMR L2 rise, "N" should be approximately the difference of L1& L2 (UNIT 2(3) MMG GENERATOR amps, 2(3)-HS-252-02CH positions 1, 2, & 3 are respective to L1, L2 & N). □

Following administration of this JPM, one SRO applicant did not perform JPM Step 8 in accordance with 0-OI-57C, Section 5.5, Step [22]. However, the applicant was able to successfully accomplish the JPM directed task.

In the Post Operating Exam Clarification, the licensee concluded that accomplishment of JPM Step 8 was not required to successfully perform the task due to being comprised solely of a local ammeter check to verify proper operation of the running MMG Set. The licensee has initiated CR 1112686 to address the post exam identification of JPM 307 Critical Step misclassification.

The Critical Step classification conclusion reached by the licensee is consistent with NUREG-1021, Appendix C, Section B.3, which states, in part:

> The JPM must clearly identify the *task standard* (i.e., the predetermined qualitative or quantitative outcome) against which task performance will be measured. Every procedural step that the examinee must perform correctly (i.e., accurately, in the proper sequence, and at the proper time) to accomplish the task standard shall be identified as a *critical step* and shall have an associated performance standard.

Since the accomplishment of JPM Step 8 was not required to successfully complete the JPM directed task and since it consisted solely of a local ammeter check to verify proper MMG Set operation, JPM Step 8 was not a Critical Step.

SIMULATOR FIDELITY REPORT

Facility Licensee: Browns Ferry Nuclear Plant

Facility Docket No.: 50-259, 260, and 296

Operating Test Administered: November 16 – 19, 2015

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.