



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

August 15, 2017

Mr. Tom Simril
Site Vice President
Duke Energy Carolinas, LLC
Catawba Nuclear Station
4800 Concord Road
York, SC 29745

**SUBJECT: CATAWBA NUCLEAR STATION – NRC OPERATOR LICENSE EXAMINATION
REPORT 05000413/2017301 AND 05000414/2017301**

Dear Mr. Simril:

During the period June 26 – 30, 2017, the Nuclear Regulatory Commission (NRC) administered operating tests to employees of your company who had applied for licenses to operate the Catawba Nuclear Station. 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 July 6, 2017.

One Reactor Operator (RO) and nine Senior Reactor Operator (SRO) applicants passed both the operating test and written examination. There was one post-administration comment concerning the written examination and two 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 (the Public Electronic <https://www.nrc.gov/reading-rm/adams.html> Reading Room).

If you have any questions concerning this letter, please contact me at (404) 997-4551.

Sincerely,

/RA/

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

Docket Nos: 50-413, 50-414
License Nos: NPF-35, NPF-52

Enclosures:

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

SUBJECT: CATAWBA NUCLEAR STATION – NRC OPERATOR LICENSE EXAMINATION
 REPORT 05000413/2017301 AND 05000414/2017301

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 50-413, 50-414

License No.: NPF-35, NPF-52

Report No.: 05000413/2017301, 05000414/2017301

Licensee: Duke Energy Carolinas, LLC

Facility: Catawba Nuclear Station, Units 1 & 2

Location: York, SC 29745

Dates: Operating Test – June 26 – 30, 2017
Written Examination – July 6, 2017

Examiners: M. Bates, Chief Examiner, Senior Operations Engineer
D. Bacon, Senior Operations Engineer
J. Bundy, Operations Engineer
T. Stephen, Operations Engineer (Trainee)

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

SUMMARY

ER 05000413/2017301, 05000414/2017301; June 26 – 30, 2017 & July 6, 2017; Catawba Nuclear Station; 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 Catawba Nuclear Station 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 June 26 – 30, 2017. Members of the Catawba Nuclear Station training staff administered the written examination on July 6, 2017. One RO and nine SRO applicants passed both the operating test and written examination. Ten applicants were issued licenses commensurate with the level of examination administered.

There were three 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 Job Performance Measures (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 (Reactor Operator (RO) and Senior Reactor Operator (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 June 26 – 30, 2017. The NRC examiners evaluated one RO and nine SRO applicants using the guidelines contained in NUREG-1021. Members of the Catawba Nuclear Station training staff administered the written examination on July 6, 2017. Evaluations of applicants and reviews of associated documentation were performed to determine if the applicants, who applied for licenses to operate the Catawba Nuclear Station, 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 Catawba Nuclear Station 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.

One RO applicant and nine SRO applicants passed both the operating test and written examination and 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 one post-examination comment concerning the written examination. A copy of the final written examination and answer key, with all changes incorporated, may be accessed not earlier than August 21, 2019, in the ADAMS system (ADAMS Accession Number(s) ML17215A794 and ML17215A801). A full copy of the licensee's post-examination comments may be accessed in the ADAMS system as ML17215A779.

40A6 Meetings, Including Exit

Exit Meeting Summary

On June 30, 2017, the NRC examination team discussed generic issues associated with the operating test with T. Simril, Site Vice President, and members of the Catawba Nuclear Station staff via telephone. The examiners asked the licensee if any of the examination material was proprietary. No proprietary information was identified.

On August 4, 2017, the NRC examination team discussed the results of the examination with S. Trippi, Operations Training Manager, via telephone.

ATTACHMENT: SUPPLEMENTARY INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

T. Simril, Site Vice President
C. Curry, Plant General Manager
B. Foster, Operations Manager
B. Leonard, Training Manager
B. Boyette, NRC Exam Developer
R. Exley, ILT Lead Instructor
S. Tripi, Operations Training Manager
W. Jarman, Assistant Operations Manager (Shift)
R. Miller, NRC exam developer
B. Webster, Initial License Training Supervisor
T. Thompson, Initial License Exam Development Supervisor

NRC personnel

J. Austin, Senior 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 ML17215A779.

Item

Written Examination Question 79

Facility Comment

"The original intent of the question was to test knowledge of a failure of the Reactor Protection System by describing a failed Reactor Trip due to a signal generated by failed instrumentation in conjunction with a vital AC channel failure. During exam administration, an applicant requested status of the main turbine. This request prompted further discussion between the CNS Exam Team and Chief Examiner, and it was determined that the incorrect answer had been identified during the original submittal for this question.

Explanation: Safety Injection and Reactor Trip signals would be generated due to the initial failed instrumentation and subsequent loss of a vital AC channel. Additionally, a Main Turbine trip signal would be generated directly from the Safety Injection signal. Since no information regarding the Main Turbine was provided in the stem, the applicant is required to determine that it has tripped. Given that a separate Reactor Trip signal is generated based on a Main Turbine Trip greater than 69% power, the failed Reactor Trip listed in the question is no longer only based on instrument/vital channel failure. An ATWS would exist under these conditions due to the Unit being in a "transient" following the main turbine trip.

Resolution: Request the correct answer for Question 79 to be changed from "D" to "C".

Note to Examiner: The preliminary grades provided via "Written Exam Performance Analysis" include this change."

NRC Resolution

The licensee's recommendation was accepted.

The loss of Containment Pressure Channel I had no effect on Reactor Trip signal generation since this logic utilized channels 2, 3, & 4 of Containment Pressure and required a 2/3 coincidence. Therefore, a loss of 1ERP (channel 2) resulted in a 1/3 coincidence for this actuation. However, a Reactor Trip/Safety Injection signal would have resulted due to Lo PZR pressure. Per OMP 1-7 (Emergency/Abnormal Procedure Implementation Guidelines) General Statements of Philosophy, an instrument failure alone did not constitute an ATWS, which was the original justification for "D" being the correct answer.

OMP 1-7 defined an ATWS as an Anticipated Operational Occurrence (AOO) followed by a failure of the reactor to trip. OMP 1-7 lists tripping of the main generator as an example of an AOO. Therefore, because a main turbine trip resulted from the safety injection signal, an ATWS did occur (vs. "an instrument failure alone.") Thus, the correct answer was changed to "C".

Item

Dynamic Simulator Scenario 2 / Event 3 – Technical Specification 3.7.4, Condition A

Facility Comment

“Based on the failure of 1B S/G PORV, no applicable Tech Spec/ SLC determination was identified in the CNS original submittal documents. Following exam administration, it has been determined that the required actions of T.S. 3.7.4, Condition “A” should be declared.

Explanation:

The following information was documented by CNS Operations Management (Wayne Jarman, Assistant Operations Manager – Shift) and forwarded to the Regulatory Affairs Department for concurrence/clarification.

It is Operations Management position that when a SG PORV has failed open and is subsequently isolated by the associated PORV block valve, the affected SG PORV is inoperable. This conclusion was reached for the following reasons:

- *Technical Specification 3.7.4 (Steam Generator Power Operated Relief Valves (SG PORVs) contains Surveillance Requirement (SR) 3.7.4.2 which states: Verify one complete cycle of the SG PORV.*

The Tech Spec Bases for this Surveillance Requirement states the following: To perform a controlled cooldown of the RCS, the SG PORVs must be able to be opened remotely and throttled through their full range using the safety-related nitrogen gas supply. This SR ensures that the SG PORVs are tested through a full control cycle at least once per fuel cycle. Performance of inservice testing or use of an SG PORV during a unit cooldown may satisfy this requirement. The Surveillance Frequency is based on operating experience, equipment reliability, and plant risk and is controlled under the Surveillance Frequency Control Program. With a SG PORV failed open (and unable to close) this Surveillance Requirement cannot be met, thus the affected PORV is inoperable.

- *Technical Specification 5.5.8 (In Service Testing Program) requires SG PORVs to be stroked from open to closed on a quarterly basis. The procedure governing this valve stroke is PT/1(2)/4200/031 (SV Valve Inservice Test). Per this test procedure, should a SG PORV not stroke within the allowable stroke time, the affect PORV is declared inoperable.*

Conclusion: When a SG PORV is failed open, the surveillance for a valve stroke cannot be met. The SG PORV is also not available for a "controlled" cooldown.

The following response was received from regulatory affairs (Cecil Fletcher, Regulatory Affairs Manager):

*I agree with your original conclusion regarding the SG PORV being **Inoperable**. Specifically, for the reasons that you stated for not being able to meet the TS surveillance and another reason that I will discuss as well.*

Addressing the TS surveillance issue first. IMC 326 Section 03.08 states in part:

“An SSC that does not meet an SR must be declared inoperable because the LCO operability requirement(s) are not met...When an SSC capability is degraded to a point where it cannot perform with reasonable expectation or reliability, the SSC should be judged inoperable, even if at this instantaneous point in time the system could provide the specified safety function.”

Also, IMC 326 Section C.05 states the following regarding the use of temporary manual actions in place of automatic actions in support of operability:

*“Automatic action is frequently provided as a design feature specific to each SSC to ensure that specified safety functions will be accomplished. Limiting safety system settings for nuclear reactors are defined in 10 CFR Part 50.36, “Technical Specifications,” as settings for automatic protective devices related to those variables having significant safety functions. Where a limiting safety system setting is specified for a variable on which a safety limit has been placed, the setting must be so chosen that automatic protective action will correct the abnormal situation before a safety limit is exceeded. **Accordingly, it is not appropriate to consider SSCs operable by taking credit for manual action in place of automatic action for protection of safety limits.** This does not forbid operator action to put the plant in a safe condition, but operator action cannot be a substitute for automatic safety limit protection.”*

CNS TS section B 2.0 SAFETY LIMITS specifically states in part that the safety analyses assumes that the safety valves on the secondary plant are assumed to open when the steam pressure reaches the secondary plant safety valve settings...”

Resolution: Request the applicable ES-D-2 be updated to include required application of T.S. 3.7.4 Condition A following the failure of the 1B S/G PORV.”

NRC Resolution

The licensee’s recommendation was accepted.

As described in the facility Technical Specification, Surveillance Requirement (SR) 3.0.1, SRs shall be met during the MODES or other specified conditions in the Applicability for individual Limiting Conditions for Operation (LCOs), unless otherwise stated in the SR. Failure to meet a Surveillance, whether such failure is experienced during the performance of the Surveillance or between performances of the Surveillance, shall be failure to meet the LCO.

SR 3.7.4.2 states, “Verify one complete cycle of each SG PORV.” The scenario was designed such that the SG PORV failed open and was unable to be closed, which then required closing the associated isolation valve to stop the leak. The inability to cycle the SG PORV resulted in a failure to meet the SR. In accordance with SR 3.0.1, failure to meet the SR shall be failure to meet the LCO. Therefore, Technical Specification 3.4.7, Condition A, was added to form ES-D-2 for this event.

Item

Dynamic Simulator Scenario 3 / Event 4 – Technical Specification 3.4.18, Condition B

Facility Comment

“During administration of Scenario #3 of the operating exam, an approximate 50-60 GPM S/G Tube Leak on 1B S/G was given to the applicants. The original submittal identified Tech Spec 3.4.13 (RCS Operational Leakage) condition ‘B’ and SLC 16-7.9 (Standby Shutdown System (SSS)) condition ‘B’ as being the applicable Tech Specs and SLCs for this failure. It has since been determined that Tech Spec 3.4.18 (SG Tube Integrity) Condition ‘B’ is also applicable for this particular scenario. The following information is from the Tech Spec 3.4.18 Bases:

“A SG tube has tube integrity when it satisfies the SG performance criteria. The SG performance criteria are defined in Specification 5.5.9, “Steam Generator (SG) Program,” and describe acceptable SG tube performance. The Steam Generator Program also provides the evaluation process for determining conformance with the SG performance criteria.

There are three SG performance criteria: structural integrity, accident induced leakage, and operational LEAKAGE. Failure to meet any one of these criteria is considered failure to meet the LCO.”

Based on the fact that the operational LEAKAGE for this scenario exceeded the limit of 150 Gallons Per Day identified in Tech Spec 3.4.13, it is the opinion of the station (Operations Management and Regulatory Affairs) that Tech Spec 3.4.18 LCO is also not met, and that Condition ‘B’ is applicable.

Resolution: Request the applicable ES-D-2 be updated to include required application of T.S. 3.4.18 Condition B following the 1B S/G Tube Leak.”

NRC Resolution

The licensee’s recommendation was accepted.

As described in the facility Technical Specification, LCO 3.4.18, Condition B and its associated actions were required when steam generator tube integrity was not maintained. The scenario presented adequate indication for the status of tube integrity, including radiation alarms and calculated leak rates. Therefore, Technical Specification 3.4.18, Condition B, was added to form ES-D-2 for this event.

SIMULATOR FIDELITY REPORT

Facility Licensee: Catawba Nuclear Station

Facility Docket No.: 50-413, 50-414

Operating Test Administered: June 26 – 30, 2017

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.