



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION IV
1600 E LAMAR BLVD
ARLINGTON, TX 76011-4511

September 4, 2014

Mr. Jeremy Browning, Site Vice President
Arkansas Nuclear One
Entergy Operations, Inc.
1448 SR 333
Russellville, AR 72802-0967

**SUBJECT: ARKANSAS NUCLEAR ONE, UNIT 2 - NRC RETAKE EXAMINATION
REPORT 05000368/2014302**

Dear Mr. Browning:

On July 31, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed initial operator license retake examinations at Arkansas Nuclear One, Unit 2. The enclosed report documents the examination results and licensing decisions. The preliminary operating test results were discussed on July 31, 2014, with you and other members of your staff. A telephonic meeting was conducted on August 21, 2014, with Mr. R. Martin, Operations Training Superintendent, who was provided the NRC licensing decisions.

The examinations included the evaluation of two applicants for a written retake examination, one being a reactor operator applicant, and one being an upgrade senior reactor operator applicant. The examinations also included one operating test retake for an upgrade senior reactor operator applicant that consisted of job performance measures only. The NRC examiners determined that the reactor operator written retake applicant and the upgrade senior reactor operator operating test retake applicant satisfied the requirements of 10 CFR Part 55. One license has been issued and one license is being held in abeyance by NRC Region IV until proposed license denials become final or resolution of any examination appeal. There were three post-examination comments submitted by your staff. Enclosure 1 contains details of this report and Enclosure 2 summarizes post-examination comment resolution.

No findings were identified during this examination.

J. Browning

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Sincerely,

/RA/

Vincent G. Gaddy, Chief
Operations Branch
Division of Reactor Safety

Docket: 50-368

License: NPF-6

Enclosure:

1. NRC Examination Report 05000368/2014302
w/Attachment
2. NRC Post-Examination Comment Resolution

Electronic Distribution for Arkansas Nuclear One

J. Browning

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See next page

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Letter to Jeremy Browning from Vincent G. Gaddy, September 4, 2014

SUBJECT: ARKANSAS NUCLEAR ONE, UNIT 2 - NRC RETAKE EXAMINATION
REPORT 05000368/2014302

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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket: 05000368

License: NPF-6

Report: 05000368/2014302

Licensee: Entergy Operations, Inc.

Facility: Arkansas Nuclear One, Unit 2

Location: Junction of Hwy. 64 West and Hwy. 333 South
Russellville, Arkansas

Dates: July 30 – August 21, 2014

Inspectors: C. Osterholtz, Chief Examiner, Senior Operations Engineer
C. Steely, Senior Operations Engineer

Approved By: Vincent G. Gaddy, Chief
Operations Branch
Division of Reactor Safety

SUMMARY

ER 05000368/2014302; 07/30/2014 – 08/21/2014; Arkansas Nuclear One, Unit 2; Initial Operator Licensing Retake Examination Report.

NRC examiners evaluated the competency of one applicant for a reactor operator license and two applicants for upgrade senior reactor operator licenses at Arkansas Nuclear One, Unit 2.

The licensee developed the examinations using NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 9, Supplement 1. The written examination was administered by the licensee on July 30, 2014. NRC examiners administered the operating test on July 30-31, 2014.

The examiners determined that two of the applicants satisfied the requirements of 10 CFR Part 55. One license has been issued and one license is being held in abeyance by NRC Region IV until proposed license denials become final or resolution of any examination appeal.

A. NRC-Identified and Self-Revealing Findings

None

B. Licensee-Identified Violations

None

REPORT DETAILS

4. OTHER ACTIVITIES (OA)

4OA5 Other Activities (Initial Operator License Retake Examinations)

.1 License Applications

a. Scope

NRC examiners reviewed all license applications submitted to ensure each applicant satisfied relevant license eligibility requirements. Examiners also audited the three license applications in detail to confirm that they accurately reflected the subject applicant's qualifications. This audit focused on the applicant's experience and on-the-job training, including control manipulations that provided significant reactivity changes.

b. Findings

No findings were identified.

.2 Examination Development

a. Scope

The NRC developed the written examination outline and reviewed all other outlines, draft examination, and test submitted by the licensee against the requirements of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors." The NRC examination team conducted an onsite validation of the operating test.

b. Findings

No findings were identified.

NRC examiners provided outline, draft examination, and post-validation comments to the licensee. The licensee satisfactorily completed comment resolution prior to examination administration.

NRC examiners determined that the written examinations initially submitted by the licensee were not within the range of acceptability expected for a proposed examination. There were 36 questions categorized as unsatisfactory per NUREG-1021 requirements, with the 2 most common issues being stem focus or 2 or more distractors that were not credible. This is of particular concern, as it is a repeat observation from the last initial examination administered in February 2014. Consistent with the corporate notification letter sent to licensees at the start of examination development for each examination, future unsatisfactory examination submittals may cause the examinations to be rescheduled or cancelled. The licensee wrote Condition Report CR-ANO-2-2014-02517 to address these exam development issues. Five of the questions that were

unsatisfactory were administered on previous NRC initial examinations. These questions had deficiencies that were previously missed by both licensee personnel and NRC examiners, and were not considered in determining an unsatisfactory licensee submittal.

NRC examiners determined the operating test initially submitted by the licensee was within the range of acceptability expected for a proposed examination.

.3 Operator Knowledge and Performance

a. Scope

The NRC examination team administered the retake job performance measure operating test to the upgrade senior reactor operator applicant on July 30-31, 2014.

On July 30, 2014, the licensee proctored the administration of the retake written examination to a reactor operator applicant and an upgrade senior reactor operator applicant. The licensee staff graded the written examinations, analyzed the results, and presented their analysis to the NRC on August 14, 2014.

b. Findings

No findings were identified.

The reactor operator applicant passed the written examination and the upgrade senior reactor operator, who was administered only the job performance measure portion of the operating test, also passed. The final written examination, final operating test, post-examination analysis, and comments may be accessed in the ADAMS system under the accession numbers noted in the Supplemental Information attachment. (Public release of the final written examination has been delayed for 24 months from the date of administration at the request of the licensee.) There were three post-examination comments submitted by the licensee (see Enclosure 2 for the question, licensee comment, and recommendation and the NRC resolution).

The inspectors noted that the remediation program the licensee implemented for the applicants retaking the written examination was not fully successful, in that one applicant failed the retake examination and one applicant marginally passed (81.0 percent). The licensee acknowledged the deficiency and entered it into their corrective action program as Condition Report CR-ANO-C-2014-02019.

.4 Simulation Facility Performance

a. Scope

The NRC examiners observed simulator performance with regard to plant fidelity during examination validation and administration.

b. Findings

No findings were identified.

.5 Examination Security

a. Scope

The NRC examiners reviewed examination security during both the onsite validation week and examination administration week for compliance with 10 CFR 55.49 and NUREG-1021. Plans for simulator security and applicant control were reviewed and discussed with licensee personnel.

b. Findings

No findings were identified.

40A6 Meetings, Including Exit

Exit Meeting Summary

The chief examiner presented the preliminary operating test results to Mr. Jeremy Browning, Site Vice President, and other members of the staff on July 31, 2014. A telephonic meeting was conducted on August 21, 2014, with Mr. R. Martin, Operations Training Superintendent, who was provided the NRC licensing decisions.

The licensee did not identify any information or materials used during the examination process as proprietary.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

J. Browning, Site Vice President
T. Arnold, Training Manager
L. Barr, Simulator Instructor
M. Hall, Licensing Specialist
J. Hathcote, Operations Manager
J. Horton, Operations Support Manager
D. James, Regulatory Affairs Director
R. Keele, Operations Training Superintendent
R. Martin, Operations Training Superintendent
C. Miller, Initial Licensed Operator Program Lead
C. Odell, Production Manager
C. Simpson, Examination Assessment Lead

NRC Personnel

M. Young, Resident Inspector

ADAMS DOCUMENTS REFERENCED

Accession No. ML14237A172 - FINAL WRITTEN EXAM (Delayed Release for 24 Months)
Accession No. ML14237A175 - FINAL OPERATING TEST
Accession No. ML14237A179 - POST EXAM ANALYSIS AND COMMENTS

NRC Resolution of Arkansas Nuclear One, Unit 2 Post Written Examination Comments

Note: A complete text of the licensee's post-examination analysis and comments can be found in ADAMS under Accession Number ML14237A179.

RO QUESTION # 11

Consider the following:

- Unit 2 has been tripped due to a Steam Generator Tube Rupture in "A" S/G
- "A" S/G has been isolated
- RCS pressure 1650 psia
- "B" hot leg temperature 572°F and trending up
- "B" cold leg temperature 549°F and trending up
- CET average temperature 580°F and trending up
- PZR level 30% and trending up
- RVLMS LVL 02 indicates WET
- "A" S/G level 56% and trending up
- "B" S/G level 21% and trending down

Criteria for securing/throttling HPSI flow has NOT been met based on _____

- A. Pressurizer level
- B. Margin to Saturation (MTS)
- C. Steam Generator heat removal
- D. Reactor Vessel Level Monitoring System (RVLMS) level

Correct Answer: C

Licensee Comment

Question is lacking sufficient initial data in the stem regarding RCP status.

This question had a 100% miss rate. Both the RO and SRO applicant selected the same wrong distractor which was B: Margin to Saturation (MTS). The question topic is on ECCS throttling criteria during a SGTR. The criterion is listed in SGTR EOP 2202.004 floating step 17. The correct answer discriminates from the list of given parameters that the applicant can remember these criteria. The question design was based on the assumption that RCPs were still running during this event and the given data would indicate that the parameters for the unaffected SG make it unavailable for RCS heat removal. Post-examination analysis of this question reveals that there is not enough information in the given parameters to completely determine the status of the RCPs. Although the question design assumption was for RCPs to be running, the given differential temperature between core exit temperature (CET) and Thot is indicative that forced circulation is no longer in progress. This gives the question the potential for two correct answers (B and C) as CETs are used for MTS calculation without RCPs in operation and Thot temperatures are used for MTS with RCPs in operation. Using the given conditions, MTS using CETs vs RCS pressure is at the 30F MTS limit and degrading while the Thot is well above the 30F criteria of the EOP for throttling ECCS flow.

Recommend accepting choices B and C in the final grading of this exam.

NRC RESOLUTION

Licensee Comment Summary: The licensee recommends accepting answers “B” and “C” as both being correct. This question provides the applicant with a list of plant variables and based on the information provided, asks why the criteria for throttling high-pressure safety injection (HPSI) has NOT been met. The licensee argues the stem of the question does not include the status of the reactor coolant pumps and depending on how the applicant interprets the data provided, they may conclude the reactor coolant pumps (RCPs) are running or may conclude they are not running. If the RCPs are running, the correct answer is “C” and if they are not running the correct answer is “B.”

Panel Recommendation: Delete the question from the exam

There are several reasons for deleting this question.

1. The licensee stated the question design assumption was that RCPs were operating. However, the difference in the hot leg and cold leg temperatures (loop ΔT) is 23°F, which is indicative of natural circulation (Loop ΔT less than 50°F). The difference between the Core Exit Thermocouples (CETs) and the hot leg (Thot) from the data provided is 8°F, also indicative of natural circulation (ΔT between Thot and average CETs less than 10°F). If it is assumed the RCPs are not running, then the Margin To Saturation (MTS) is determined using CET temperatures. At 1650 psia, the saturation temperature is 609°F and using the given CET temperature of 580°F, MTS is 29°F. This does not meet the HPSI throttling criteria of 30°F, making answer “B” correct. However, steam generator (SG) heat removal is also not available (inadequate feed flow to SG B and SG A is isolated), so answer “C” is also correct. Summary – if it is assumed RCPs are not running, there are two correct answers (“B” and “C”).
2. Based on the question design assumption, if the applicant assumed RCPs were running, then the MTS is determined using Thot temperatures. For the provided Thot temperature of 572°F, MTS is 37°F. This meets the MTS criteria so answer “B” is not the right answer. So in the case of RCPs running, answer “C” is the only correct answer. But as stated above, it’s not operationally valid to assume RCPs were running given the conditions in the question stem that are indicative of natural circ.
3. Nothing in the stem is provided to inform the applicant that RCPs were secured. NUREG-1021, Appendix E states the applicant should assume no operator actions unless specified in the stem. For a SGTR, there is no reason for RCPs to be secured automatically or as a direct result of the event. Also, per AOP 2203.013, "Natural Circulation Operations," natural circulation is confirmed, in part, if RCS MTS is 50°F or greater, but using information in the question stem, the most MTS can be calculated is 37°F.
4. Since the data provided in the stem is inconsistent and confusing, the question should be deleted.

SRO QUESTION 79

Consider the following:

- Unit 2 has tripped from 100% power
- Containment pressure is 24.4 psia and trending up
- Containment temperature is 205°F and trending up
- Containment High Range Radiation monitors are in alarm reading 1500 R/hr
- Pressurizer level is 35% and trending down
- RCS pressure is 1600 psia and trending down
- Average CET temperature 520°F and trending down

The CRS should enter _____ based on _____ indications.

- A. OP-2202.003, Loss Of Coolant Accident (LOCA); containment pressure
- B. OP-2202.003, Loss Of Coolant Accident (LOCA); MTS trend
- C. OP-2202.006, Excess Steam Demand (ESD); containment pressure
- D. OP-2202.006, Excess Steam Demand (ESD); MTS trend

Correct Answer: D

Licensee Comment

Question is lacking sufficient initial data in the stem regarding MTS trend.

The SRO applicant selected the correct mitigating procedure in the 2-part choices but the basis selected was wrong according to the intended design of the question. The question topic is based on parameters used to discriminate between a LOCA event and an ESD (Excess Steam Demand or steam line rupture). The choices for the basis of procedure selection are between the margin to saturation (MTS) trend and containment pressure. This question was revised after submittal to improve the distracter choices and replaced containment radiation as a discriminator to MTS trend as a choice. MTS trend is correct as a discriminator between these events; however, the initial data was not revised to positively identify the trend. The initial data gives a lowering RCS temperature and pressure but the rates of change or any other parameters are not given to positively conclude that MTS is lowering. Post-examination review with the applicant determined that the RCS parameters compared to the containment parameters were adequate for determining the event, however, since the MTS trend could not be distinguished from the given parameters and there was positive indication of “containment pressure” trend, MTS trend was excluded as a possible choice.

Recommend accepting choices C and D in the final grading of this exam.

NRC RESOLUTION

Licensee Comment Summary: The licensee recommended accepting answers “C” and “D” as both being correct. This question provides the applicant with a list of plant variables and based on the information provided, asks what procedure should be entered and the basis for entering that procedure. The licensee argues the applicant chose the correct procedure, OP-2202.006, "Excess Steam Demand," but chose the wrong basis for entering this procedure. The reason for choosing the incorrect basis, containment pressure, was that the stem of the question did not provide an explicit value for MTS trend.

Panel Recommendation: Delete the question from the exam

While the licensee stated the applicant correctly chose the procedure from information provided in the stem, EOP 2202.005, "Excess Steam Demand," does not identify containment pressure alone as a valid entry condition. The ESD procedure lists the following as the entry conditions:

ENTRY CONDITIONS

Rise in RCS MTS combined with ANY of the following:

1. Lowering RCS temperature and pressure.
2. Lowering SG pressure.
3. Rise in CNTMT temperature, pressure, humidity, and sump level.

Therefore, in order to meet the entry conditions for this procedure there must be both a rise in the RCS MTS and either lowering RCS temperature and pressure or lowering SG pressure or rising containment temperature, pressure, humidity, and sump level. One condition, in and of itself does not meet the entry conditions listed. Because the distractors only list one variable when two are required for entry, none of them are correct. In addition, information in the question stem does not allow for determination of MTS trend; therefore, the first part of the entry condition requirement cannot be determined either.

The panel concludes there are no correct answers and, therefore, the question is deleted from the exam in accordance with ES-403, D.1.c.

It is also noted that the question has additional flaws that support its removal from the exam:

1. The question could be argued as not SRO-Only since the answer can be determined using EOP entry knowledge, which is RO level knowledge.
2. The question provides an average CET temperature and trend that implies RCPs are secured. However, nothing in the stem is provided to inform the applicant that RCPs were secured. NUREG-1021, Appendix E, states the applicant should assume no operator actions unless specified in the stem. For an ESD, there is no reason for RCPs to be secured automatically or as a direct result of the event.

SRO QUESTION 80

Consider the following:

- Unit 2 is operating at 100% power
- AFW Pump (2P75) is OOS for pump bearing replacement
- Control Room receives a report of a steam leak in the Turbine Building
- Reactor is tripped and the MSIVs are manually closed
- "A" and "B" Steam Generator pressures are being controlled by the MSSVs
- "A" EFW Pump (2P-7A) trips on overspeed
- "B" EFW Pump (2P-7B) fails to start
- SPTAs are complete

The CRS should enter _____ and direct _____

A. OP-2202.006, Loss of Feedwater, EOP;

securing all running RCPs to minimize the amount of heat input into the RCS

B. OP-2202.009, Functional Recovery, EOP;

securing all running RCPs to minimize the amount of heat input into the RCS

C. OP-2202.006, Loss of Feedwater, EOP;

securing ONLY 2 RCPs to maintain forced circulation for precise plant control

D. OP-2202.009, Functional Recovery, EOP;

securing ONLY 2 RCPs to maintain forced circulation for precise plant control

Correct Answer: A

Licensee Comment

Question initial data does not positively indicate that the reported steam leak is isolated by the manual actions.

The SRO applicant selected the correct mitigating action in the 2-part choices but the procedure selected was wrong according to the intended design of the question. The question design assumed that the reported steam leak was isolated with the given manual action to close the MSIVs. Question revision after submittal attempted to improve the indications regarding leak isolation as this is the discriminator between the 2 procedure choices, however, post-examination review reveals that it was still not explicit. Since the steam leak could still be assumed active through the end of SPTAs, two events would be diagnosed and the Functional Recovery EOP would be the correct choice. Securing all RCPs is the correct mitigating action regardless of the procedure selected. This makes both A and B credible choices.

Recommend accepting choices A and B in the final grading of this exam.

NRC RESOLUTION

Licensee Comment Summary: The licensee recommends accepting answers "A" and "B" as both being correct. This question provides the applicant with a list of plant variables and based on the information provided, asks what procedure should be entered and what action should be taken. The distractors included two procedures and two different actions to select from. The licensee argues the applicant chose the correct mitigating action, but chose the wrong procedure. They argue the applicant chose the wrong procedure because the stem of the question does not explicitly state the steam leak in the Turbine Building had been isolated before the SPTAs were complete. This would result in diagnosing two events, leading the applicant to enter Procedure OP-2202.009, "Functional Recovery," rather than OP-2202.006, "Loss of Feedwater."

Panel Recommendation: Accept as is, no changes to the Answer Key

Plant conditions provided in the stem of the question can be considered to occur in chronological order as follows:

- Unit 2 is operating at 100% power
- AFW Pump (2P75) is OOS for pump bearing replacement
- Control Room receives a report of a steam leak in the Turbine Building
- Reactor is tripped and the MSIVs are manually closed
- "A" and "B" Steam Generator pressures are being controlled by the MSSVs
- "A" EFW Pump (2P-7A) trips on overspeed
- "B" EFW Pump (2P-7B) fails to start
- SPTAs are complete

The panel believes, and was not provided with any documentation to the contrary, that any steam leak in the Turbine Building would be isolated by closing of the MSIVs. Based on the completion of SPTAs after the MSIVs were manually closed, the diagnostic determination of an appropriate EOP(s) would have occurred after the steam leak in the Turbine Building was isolated. This would result in diagnosing only one event, Loss of Feedwater. This diagnosis requires entry into EOP 2202.006, "Loss of Feedwater," and not 2202.009, "Functional Recovery."

Therefore, the panel concludes the only correct answer is "A" and that no changes to the Answer Key are required.