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7/10/2012



Tennessee Valley Authority, Post Office Box 2000, Decatur, Alabama 35609-2000

May 24, 2012

10 CFR 55.5

Mr. Victor M. McCree  
Regional Administrator  
U.S. Nuclear Regulatory Commission  
Marquis One Tower  
245 Peachtree Center Avenue, NE, Suite 1200  
Atlanta, Georgia 30303-1257

Attention: Mark A. Franke

Browns Ferry Nuclear Plant, Units 1, 2, and 3  
Facility Operating License Nos. DPR-33, DPR-52, and DPR-68  
NRC Docket Nos. 50-259, 50-260, and 50-296

Subject: **Reactor Operator and Senior Reactor Operator Initial License  
Written Examinations - Post Examination Response**

The Tennessee Valley Authority (TVA) administered the final NRC Written Examination for the Browns Ferry Nuclear Plant Reactor Operator and Senior Reactor Operator Initial License Training (ILT) Class 1205 on May 18, 2012. The supporting documentation specified by Section ES-501 of NUREG 1021, Revision 9, Supplement 1, "Operator Licensing Examination Standards for Power Reactors," for Post Examination Activities is enclosed. The enclosures' content listing is provided at the end of this letter.

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Analysis of the preliminary facility graded examination results indicated eight questions; numbers 29, 79, 83, 84, 86, 92, 93, and 100 had a 50 percent or greater failure rate. The results of this analysis, where applicable, will be forwarded to the ILT Supervisor for potential inclusion in the appropriate training material.

The enclosures to this letter are considered by TVA to be of a personal nature and, as such, are requested to be withheld from public disclosure in accordance with 10 CFR 2.390(a)(6).

If you have any questions or comments, please telephone Mr. Michael D. Gibson at (256) 729-2783.

Respectfully,



K. J. Polson  
Vice President

Enclosures:

- Enclosure 1 - Form ES-403-1, Written Examination Grading Quality Check
- Enclosure 2 - Graded Written Examinations (Each Applicant's Original Answer and Examination Cover Sheets) and a Clean Copy of Each Applicant's Answer Sheet
- Enclosure 3 - Questions Asked By and Answers Given to the Applicants During the Written Examination
- Enclosure 4 - Examination Seating Chart
- Enclosure 5 - Results of Written Examination Performance Analysis that was Performed

~~Personally Identifiable Information - Withhold Under 10 CFR 2.390~~

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**Enclosure 5**

**Browns Ferry Nuclear Plant  
Units 1, 2, and 3**

**Reactor Operator and Senior Reactor Operator Initial  
License Written Examination - Post Examination Response**

**Results of Any Written Examination Performance Analysis That Was Performed**

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(See Attached)

**QUESTION 92**

Unit 2 is operating at rated power.

- A sustained loss of Panel 2-9-9 Cabinet 6, Unit Preferred, occurs

Which ONE of the following completes the statements below?

Entry into a Required Action statement in TRM 3.3.5, Surveillance Instrumentation, \_\_ (1) \_\_ required.

Given the power loss, in accordance with Tech Spec SR 3.1.3.1, Control Rod positions can still be determined by the use of \_\_ (2) \_\_.

**Reference Provided**

- A. (1) is  
(2) OPERABLE position indicators
- B. (1) is  
(2) other methods
- C. (1) is NOT  
(2) OPERABLE position indicators
- D. (1) is NOT  
(2) other methods

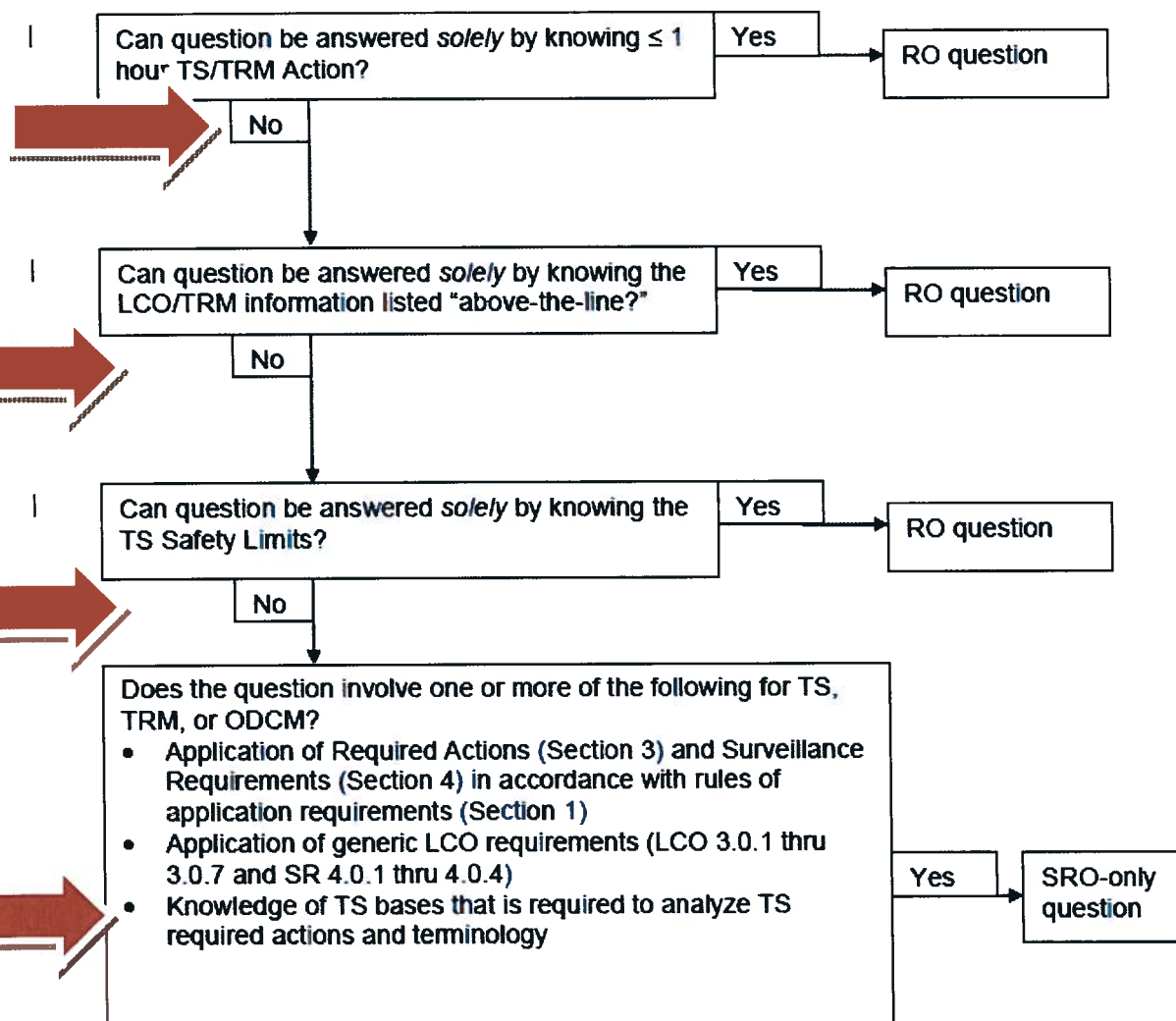
<b>Examination Outline Cross-Reference</b>	Level:	RO	SRO
	Tier #		2
	Group #		2
	K/A#	214000 G2.2.42	
	Importance Rating		4.6
214000 RPIS: G 2.2.42 Ability to recognize system parameters that are entry level conditions for technical specifications.			
<p>Explanation: CORRECT – D, Loss of Pnl 2-9-9, Cab 6 will cause Loss of RPIS for TRM 3.3.5 control rod motion requires either rod position or neutron monitoring entry to a condition is not required. Rod Position must be verified every 24 hours, this can accomplished by an alternate method</p> <p>A. Incorrect – first part incorrect TRM 3.3.5 entry is not required because neutron monitoring is available. Second part incorrect position indication is NOT operable.</p> <p>B. Incorrect - first part incorrect see above and second part correct</p> <p>C. Incorrect - first part correct and second part incorrect see above</p>			
Technical Reference(s): TS 3.1.3 and Bases, TRM 3.3.5			
Proposed references to be provided to applicants during examination: TRM 3.3.5			
Learning Objective (As available): OPL171.029 V.B.7			
Question Source:	Bank:		
	Modified Bank:		
	New	X	
Question History:	Previous NRC		
Question Cognitive Level:	Memory or Fundamental Knowledge		
	Comprehension or Analysis X		
10 CFR Part 55 Content:	55.41		
	55.43 X b(2)		

**Level of Knowledge Justification:** This question is rated as *C/A* due to the requirement to assemble, sort, and integrate the parts of the question to decide on a tech spec lco condition entry for a loss of RPIS.

**SRO Only Justification:** This question is SRO Only because it meets the requirements of "Clarification Guidance for SRO," Section II. B - Facility operating limitations in the TS and their bases. [10 CFR 55.43(b)(2)] See Attached.

**KA Justification:** The KA is met because the question tests knowledge of LCO entry criteria on a loss of RPIS.


**Figure 1: Screening for SRO-only linked to 10 CFR 55.43(b)(2) (Tech Specs)**



<b>BFN Unit 2</b>	<b>Loss of RPIS</b>	<b>2-AOI-85-4 Rev. 0020 Page 4 of 17</b>
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## 1.0 PURPOSE

This abnormal operating instruction provides symptoms, automatic actions and operator actions for a total or partial loss of Rod Position Information System (RPIS) or an individual rod position indication.




Control Rod Position may be determined by the use of operable position indicators, by moving a Control Rod to a position with an operable indicator or by the use of other approved methods. Control Rods need **NOT** be immediately declared INOPERABLE upon discovery of inoperable position indication. The Tech Spec Bases should be referred to for Control Rod Position verification methods to satisfy the requirements of TS SR 3.1.3.1.

Operable Position indicators include, but are NOT limited to the following:

- Full Core Digital Display
- Four Rod display
- Full Core Display green background lighting (Full In)
- Full Core Display red background lighting (Full Out)
- Full Core Display double green dashes (Full In Overtravel)
- Full Core Display double red dashes (Full Out Overtravel)
- ICS display
- RWM

### SR 3.1.3.1 REQUIREMENTS



The position of each control rod must be determined to ensure adequate information on control rod position is available to the operator for determining control rod OPERABILITY and controlling rod patterns. Control rod position may be determined by the use of OPERABLE position indicators, by moving control rods to a position with an OPERABLE indicator, or by the use of other appropriate methods. The 24 hour Frequency of this SR is based on operating experience related to expected changes in control rod position and the availability of control rod position indications in the control room.

### 3.1 REACTIVITY CONTROL SYSTEMS

#### 3.1.3 Control Rod OPERABILITY

LCO 3.1.3      Each control rod shall be OPERABLE.

APPLICABILITY:    MODES 1 and 2.

#### ACTIONS

-----NOTE-----  
 Separate Condition entry is allowed for each control rod.  
 -----

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One withdrawn control rod stuck.	-----NOTE----- Rod worth minimizer (RWM) may be bypassed as allowed by LCO 3.3.2.1, "Control Rod Block Instrumentation," if required, to allow continued operation. -----	
	A.1    Verify stuck control rod separation criteria are met.  <u>AND</u>  A.2    Disarm the associated control rod drive (CRD).  <u>AND</u>	Immediately   2 hours   (continued)



**ACTIONS**

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.3 Perform SR 3.1.3.3 for each withdrawn OPERABLE control rod.	24 hours from discovery of Condition A concurrent with THERMAL POWER greater than the low power setpoint (LPSP) of the RWM
	<p style="text-align: center;"><u>AND</u></p> A.4 Perform SR 3.1.1.1.	
B. Two or more withdrawn control rods stuck.	B.1 Be in MODE 3.	12 hours
C. One or more control rods inoperable for reasons other than Condition A or B.	<p style="text-align: center;">-----NOTE-----</p> RWM may be bypassed as allowed by LCO 3.3.2.1, if required, to allow insertion of inoperable control rod and continued operation. <p style="text-align: center;">-----</p> Fully insert inoperable control rod.	3 hours
	<p style="text-align: center;"><u>AND</u></p> C.2 Disarm the associated CRD.	4 hours

(continued)



TABLE 3.3.5-1 (page 1 of 2)  
Surveillance Instrumentation

PARAMETER AND INSTRUMENTS	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS REFERENCED FROM REQUIRED ACTION A.1	TECHNICAL SURVEILLANCE REQUIREMENTS	TYPE INDICATION AND RANGE
1. Deleted					
2. Control Rod Motion					
a. Control Rod Position (a)	1,2	1(b)	C	TSR 3.3.5.2	Indicators 00-48
b. Neutron Monitoring (a)	1,2	1(c)	C	TSR 3.3.5.3 TSR 3.3.5.4 TSR 3.3.5.7 TSR 3.3.5.8 TSR 3.3.5.9	SRM Indicators 0.1-10 <sup>6</sup> cps IRM Indicators 0-125 LPRM Indicators 0-125

- (a) The channel of Control Rod Position instruments and the channel of Neutron Monitoring instruments are considered redundant to each other for the parameter of Control Rod Motion.
- (b) The Control Rod Position channel consists of full core display position indicators or four-rod display position indicators capable of determining position of all OPERABLE control rods. Position indicators are considered to be capable of determining rod position when they display the rod position or the rod can be moved to a position where rod position is displayed.
- (c) The Neutron Monitoring channel contains the following:
1. In MODE 2 with IRMs on Range 2 or below a minimum of 3 OPERABLE channels of SRMs.
  2. In MODE 2 a minimum of 6 OPERABLE channels of IRMs.
  3. In MODES 1 and 2, 43 LPRM detector assemblies, each containing four fission chambers. Individual failed chambers can be bypassed to the extent that APRMs remain OPERABLE.
- (d) The channel of Drywell Pressure and the channel of Drywell Temperature and Pressure and Timer instruments are considered redundant to each other for the parameter of Drywell Pressure/Temperature Alarm.

## TR 3.3 INSTRUMENTATION

## TR 3.3.5 Surveillance Instrumentation

LCO 3.3.5 The surveillance instrumentation for each parameter in Table 3.3.5-1 shall be OPERABLE .

APPLICABILITY: According to Table 3.3.5-1

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~~NOTE~~

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TRM LCO 3.0.4 is not applicable.

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## ACTIONS

CONDITION		REQUIRED ACTION	COMPLETION TIME
A.	One or more required channels inoperable.	A.1 Enter the Condition referenced in Table 3.3.5-1 for the channel.	Immediately
B.	Deleted.		
C.	As required by Required Action A.1 and referenced in Table 3.3.5-1.	C.1 Restore one of the required control room indication channels for each associated parameter to OPERABLE status.	7 days from discovery of both redundant channels for one or more associated parameters not indicating in the control room
		<u>AND</u> C.2 Restore required control room indication channels to OPERABLE status.	30 days

(continued)

**ACTIONS**

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>D. As required by Required Action A.1 and referenced in Table 3.3.5-1.</p>	<p>D.1 Monitor torus temperature to observe any unexplained temperature increase which might be indicative of an open relief valve.</p>	<p>Once per 12 hours</p>
	<p><u>AND</u></p> <p>D.2 Restore control room indication by either the Tailpipe Thermocouple Temperature or Acoustic Monitor to OPERABLE status for each relief valve.</p>	<p>30 days</p>
	<p><u>AND</u></p> <p>D.3 When inoperable for more than 30 days, initiate a Problem Evaluation Report (PER).</p>	<p>24 hours</p>

**ACTIONS**

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>E. As required by Required Action A.1 and referenced in Table 3.3.5-1.</p>	<p>-----NOTE-----                      Required Actions E.1.1 and E.1.2 are not applicable when in MODES 4 and 5.</p>	
	<p>E.1.1 Restore required control room indication channel to OPERABLE status.</p> <p><u>OR</u></p>	72 hours
	<p>E.1.2 Initiate the preplanned alternate method of monitoring the parameter.</p>	72 hours
	<p>AND</p> <p>E.2 When inoperable for more than seven days, initiate a Problem Evaluation Report (PER).</p>	24 hours

(continued)

**ACTIONS**

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>F. Required Action and associated Completion Time of Condition D not met.</p> <p><u>OR</u></p> <p>Required Action and associated Completion Time of Condition C not met for Instruments 3.a or 3.b.</p>	<p>F.1 Be in MODE 4.</p>	<p>24 hours</p>
<p>G. Required Action and associated Completion Time of Condition C not met for Instruments 2.a, 2.b, 4.a, or 4.b.</p>	<p>G.1 Be in MODE 3.</p>	<p>12 hours</p>
<p>H. Required Action and associated Completion Time of Condition C not met for Instrument 5 channels.</p>	<p>H.1 Reduce THERMAL POWER to <math>\leq 15\%</math> RTP.</p>	<p>12 hours</p>

## Facility response to Applicants comments on question 92

A combination of TRM 3.3.5 Bases and TRM Table 3.3.5-1 notes show that entry into TRM LCO 3.3.5.C.2 is required.

-TRM Table 3.3.5-1, requires one channel of control rod position and one channel of neutron monitoring to be operable for the function of Control Rod Motion.

-Note (b) to the table defines the requirements for operability of control rod position:

"(b) The Control Rod Position channel consists of full core display position indicators or four-rod display position indicators capable of determining position of all OPERABLE control rods. Position indicators are considered to be capable of determining rod position when they display the rod position or the rod can be moved to a position where rod position is displayed."

With a total loss of Unit Preferred, no full core display or four-rod display position indications are available. Therefore, control rod position indication is INOPERABLE.

-Note (a) to the table describes that neutron monitoring and Control rod position are redundant to each other:

"(a) The channel of Control Rod Position instruments and the channel of Neutron Monitoring instruments are considered redundant to each other for the parameter of Control Rod Motion."

With all control rod position indication inoperable, the redundant method for the function of Control Rod Motion is unavailable.

-Therefore, entry into TRM 3.3.5.C.2 is required due to TRM 3.3.5 bases:

"When required control room indication channels are inoperable but the redundant channels for the parameters are still OPERABLE, the required control room indication channels must be returned to OPERABLE status in 30 days (Required Action C.2)."

### **CONCLUSION**

**Operations, Licensing (James Emens, see attached e-mail), and Training have confirmed that question 92 is keyed wrong, and that B is the correct answer.**



## Gibson, Michael David

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**From:** Emens, James E Jr  
**Sent:** Tuesday, May 22, 2012 1:44 PM  
**To:** Zielinski, Daniel Kenneth; Rasmussen, Matthew; Hakenewerth, Douglas G  
**Cc:** Gibson, Michael David; Green, Daniel  
**Subject:** RE: NRC ILT Exam

Mr. Zielinski,

Attachment 2 of 2-AOI-57-4 indicates that RPIS is powered from Panel 2-9-9 Cabinet 6, Unit Preferred (Note: Neutron Monitoring Instrumentation is not listed as being powered from this panel). As a result of a sustained loss of this panel, RPIS is inoperable. Therefore, TRM Table 3.3.5-1, Instrument 2.a, Control Rod Position, requirements are not met and the specified Condition (Condition C) is required to be entered. Based on Note (a) to TRM Table 3.3.5-1, the channel of Instrument 2.a is considered to be redundant to the channel of Instrument 2.b, Neutron Monitoring, for the function of Control Rod Motion. Therefore, the appropriate Required Action to take is Required Action C.2, since Required Action C.1 only applies when both redundant channels for Control Rod Motion are inoperable.

I concur with the applicants, answer B is correct. The submitted answer of D for Question 92 is not correct.

James Emens

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**From:** Zielinski, Daniel Kenneth  
**Sent:** Tuesday, May 22, 2012 8:14 AM  
**To:** Emens, James E Jr; Rasmussen, Matthew; Hakenewerth, Douglas G  
**Cc:** Gibson, Michael David  
**Subject:** NRC ILT Exam

MR. Emens

Matt Rasmussen asked me to contact you regarding the just completed ILT Exam.

The applicants are challenging question 92, and we need to know if the plant supports their argument or if the original answer is correct for this question.

The answer as submitted was D.

Attached is Question 92, the reference provided was TRM 3.3.5 without the bases document.

Also attached is the applicants discussion why they believe that answer B should be the correct answer.

The submittal is due to be sent to the NRC on Thursday, so that they have it Friday.

Please contact Mike Gibson or myself with any questions extension is 2783.

In addition can contact Matt or Doug Hakenewerth.

Thank You for your assistance

Dan Zielinski