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10 CFR 55.57(a)

Palo Verde Nuclear
Generating Station

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102-05931-RSB/FJB
November 21, 2008

Mr. E. E. Collins Jr.
Regional Administrator, Region IV
U.S. Nuclear Regulatory Commission
612 E. Lamar Blvd., Suite 400
Arlington, TX 76011-4125

Dear Mr. Collins:

**Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2 and 3
Docket Nos. STN 50-528/529/530
2008 Reactor Operator and Senior Reactor Operator Written
Examination Results**

Arizona Public Service Company (APS) has completed its review of the Operator Examination conducted November 7, 2008, thru November 14, 2008. The examination documents referenced in NUREG 1021, Rev 9, Supplement 1, Section ES-501 (C.1.a) have been provided to the chief examiner, with two exceptions:

- The results of any written examination performance analysis that was performed had not been completed prior to the chief examiner's departure. Please find a copy of it on the enclosed confidential CD.
- The second outstanding item, original Form(s) ES-201-3, "Examination Security Agreement," with the appropriate pre and post signatures, will be forwarded under separate cover by December 12, 2008. This will allow time for the Training Department to obtain signatures for the individuals who had detailed knowledge of any part of the operating tests or written examination.

There are no commitments made to the NRC by this letter.

Should you have any additional information requests or questions, please contact Warren Potter, Section Leader, Nuclear Training Department, at 623-393-6165 or Larry Burton, Training Instructor, Nuclear Training Department, at 623-393-5354.

Sincerely,



RSB/DCM/TNW/FJB/gat

Enclosure

1. Confidential CD containing post examination materials

cc:

w/enclosure

T. O. McKernon NRC Region IV, Chief Examiner

w/o enclosure

R. E. Lantz NRC Region IV, Chief, Operations Branch
L. A. Hurley NRC Region IV, Licensing Assistant, Operations Branch
B. K. Singal NRC NRR Project Manager
R. I. Treadway NRC Senior Resident Inspector for PVNGS

PVNGS 2008 License Examination
Post-examination Assessment

Written Examination Question Assessment

50% or more of the candidates answered these questions incorrectly.

Question #	Success Rate	Description
SRO Q-5	33%	<p>Question asked which at EOP should be entered for the given conditions. Answer key and worksheet listed “A” (Reactor Trip) as the correct answer, after review it has been determined that “B” (LOAF) should be the correct answer. Modified the question, worksheet and answer key to reflect this change.</p> <p>This change has been submitted in the Post Exam submittal.</p>
SRO Q-7	44%	<p>Question asked for 2 preferred methods of contamination control during a SGTR/LOOP event. All candidates who missed the question chose distracter “B” which included increasing the cooldown rate to 100 degrees per hour. The SGTR procedure limits the CD rate to 30 degrees during a LOOP due to ensure asymmetric cooldown.</p> <p>The question is valid as written.</p>
SRO Q-13	44%	<p>Question asked what signal would stop the SG overflow event and which EOP should be entered. All picked correct signal MSIS but some chose Reactor Trip vs. Excessive Steam Demand. The excessive cooldown required ESD to be entered.</p> <p>The question is valid as written.</p>
SRO Q-21	33%	<p>Question asked Operability status of ECCS (HPSI pumps) with the “A” DG OOS and a subsequent loss of the “B” HPSI pump room essential cooler. The correct answer on the worksheets and answer key was both HPSI pumps Inoperable. All those who missed chose distracter “C” which stated that “A” HPSI was operable if the PBA-S03 was powered by offsite power, this can be considered correct since TS allows a 4 hour period before A HPSI must be declared Inoperable. “A & C” are both considered correct answers.</p> <p>This change has been submitted in the Post Exam submittal.</p>

PVNGS 2008 License Examination
Post-examination Assessment

RO Q-34	32%	<p>Question asked for the response of the Reactor Drain Tank as saturation conditions are reached in the Pressurizer when forming a bubble. The correct answer was smaller pressure increases accompanied by larger level increases, most examinees picked distracter “D” greater pressure increase accompanied by smaller level increases. In review the question should have been worded more clearly.</p> <p>The question is valid as written.</p>
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All examination questions missed by any candidate have been reviewed and there are no other issues identified with any other questions.

Written Exam Results

SROs	SRO	RO	Combined	Reactor Operators	
Sensitive Information	76	90	86	Sensitive Information	86
	80	95	91		85
	92	93	92		91
	76	85	82		83
	84	93	90		97
	76	86	83		90
	84	90	88		94
	72	93	87		86
	72	89	84		86
				98	

ENCLOSURE 1

“Confidential”

Palo Verde Nuclear Generating Station

**2008 Reactor Operator and Senior Reactor Operator
Post Examination Materials**



EXAMINATION ANSWER KEY

2008 Senior Reactor Operator Exam

1

ID: Q10469

Points: 1.00

Given the following conditions:

- Unit 1 was manually tripped 10 minutes ago due to lowering Pzr pressure and level
- SIAS/CIAS/MSIS have properly initiated
- ADVs are maintaining T-cold at 551°F
- RCS pressure is stable at 1500 psia
- HPSI flow is adequate
- RU-148 is reading 7.1E +06 mrem/hr
- RU-149 is reading 7.2E +06 mrem/hr
- Wind is from 210°

What (if any) Protective Action Recommendations (PARs) should be made for these conditions?

- A. No PARs are required
- B. Shelter within a 2-mile radius
- C. Evacuation for a 2-mile radius and 5 miles in sectors A-B-C
- D. Evacuation for a 2-mile radius and 5 miles in sectors B-C-D

Answer: Changed correct answer from B to C during Exam administration.

The stem was changed from RU readings of E +05 to the current value of E +06 prior to the final submittal; however I failed to update the answer key. This was discovered while exam proctors were reviewing the exam.

Radiation Monitor readings indicate a loss of Fuel Clad Barrier (1-4), RCS Barrier (1-16) and potential loss of Containment (1-11). This combination meets General Emergency criteria and requires Evacuation for a 2-mile radius and 5 miles in potentially affected sectors A-B-C.

EPIP STANDARD APPENDICES

EPIP-99

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Table 1: Fission Product Barrier Reference (Modes 1-4)

FUEL CLAD BARRIER		RCS BARRIER		CONTAINMENT BARRIER	
POTENTIAL LOSS	LOSS	POTENTIAL LOSS	LOSS	POTENTIAL LOSS	LOSS
Highest valid CET temperature > 700°F [1-1]	Highest valid CET temperature > 1200°F [1-1]	RCS leak > 44 gpm [1-6]	RCS leak rate > available makeup capacity as indicated by a loss of RCS subcooling (i.e., RCS at saturation conditions) [1-6]	CTMT pressure 50 psig and increasing [1-10]	Rapid unexplained CTMT pressure decrease following initial increase [1-10]
RCS activity > 300 µCi/gm Dose Equivalent [1-3]	RCS activity > 300 µCi/gm Dose Equivalent [1-3]	CTMT radiation monitor RU-148 > 2.1E+05 mrem/hr, or RU-149 > 2.4E+05 mrem/hr, or RCS radiation monitor (Post Reactor Shutdown) RU-150 or RU-151 > 2.2E+04 mrem/hr [1-4]	CTMT radiation monitor RU-148 > 5.0E+04 mrem/hr, or RU-149 > 5.6E+04 mrem/hr [1-16]	CTMT pressure > 8.5 psig with both CTMT Spray Systems not operating [1-10]	CTMT pressure or sump level response not consistent with LOCA conditions [1-10]
Valid RVLMS level < 2% plenum [1-2]	LOAF such that minimum acceptable feedwater flow cannot be maintained [1-8]	SGTR > 44 gpm [1-7]	SGTR > 132 gpm with a prolonged release of contaminated secondary coolant occurring from the ruptured S/G to the environment (see Limitations in Section 1) [1-7]	CTMT radiation monitor: RU-148 > 6.8E+06 mrem/hr, or RU-149 > 7.8E+06 mrem/hr [1-11]	Failure of both CTMT isolation valves in any one line to close and pathway to the environment exists [1-13]
Any condition that, in the opinion of the SM/EC, indicates loss or potential loss of Fuel Clad Barrier [1-5]	Any condition that, in the opinion of the SM/EC, indicates loss or potential loss of RCS Barrier [1-9]			H ₂ concentration > 3.5% by volume [1-10]	Release of contam. Secondary side to atmosphere (i.e., S/G safety or ADV) with S/G P/S leakage > Tech Spec allowable S/G P/S leakage [1-14]
APPLY THE CRITERIA ABOVE TO THE CONDITIONS BELOW					
UNUSUAL EVENT (NUE)	ALERT	SITE AREA EMERGENCY (SAE)	GENERAL EMERGENCY (GE)		
Any loss OR any potential loss of Containment	Any loss OR any potential loss of either Fuel Clad or RCS	Loss of both Fuel Clad and RCS OR Potential loss of both Fuel Clad and RCS OR Potential loss of either Fuel Clad or RCS AND less of any additional barrier	Loss of any two barriers AND Potential loss of a third barrier		

3.0 Protective Action Recommendations

- 3.1 Update the PAR if changes occur that impact radiological conditions, (e.g., stability class, radiation levels, wind direction, etc.). The updated PAR should include all the sectors affected by the changed conditions. Any previously affected sector(s) not impacted by the changed conditions should remain at their previous PAR. Withdrawal of PARs in sector(s) where they have already been implemented is not advisable because of the potential for public confusion, (e.g., event downgrade, event termination, etc.).
- 3.2 Consult with Radiation Protection personnel if available.
- 3.3 For all EVACUATION PAR's consider SHELTER for areas:
 - That cannot be evacuated before plume arrival for a "puff" release where evacuation may take longer than the expected release duration.
 - Where a known impediment to evacuation exists.
- 3.4 For all EVACUATION PARs reanalyze potentially affected sectors when increasing the evacuation area from a 2-mile radius to a 5-mile radius.
- 3.5 Select the applicable PAR for the existing conditions in the table below.

Condition	Protective Action Recommendation
NOTIFICATION OF UNUSUAL EVENT OR ALERT declared	NONE
SITE AREA EMERGENCY declared	<ul style="list-style-type: none"> • SHELTER within a 2-mile radius
GENERAL EMERGENCY DECLARED	<ul style="list-style-type: none"> • EVACUATION for 2-mile radius and 5 miles in potentially affected sectors.
Thyroid CDE \geq 5 Rem and $<$ 10 Rem projected to be exceeded at Site Boundary	<ul style="list-style-type: none"> • EVACUATION for 2-mile radius and 5 miles in potentially affected sectors. • KI - recommend consideration of KI for general public.
Thyroid CDE \geq 10 Rem and $<$ 25 Rem projected to be exceeded at Site Boundary	<ul style="list-style-type: none"> • EVACUATION for 2-mile radius and 5 miles in potentially affected sectors. • KI - recommend consideration of KI for general public and emergency workers.
Large fission product inventory (Fuel Damage Category 5 or greater, Ref App G) has been released to containment OR TEDE \geq 5 Rem projected to be exceeded at Site Boundary OR Thyroid CDE \geq 25 Rem projected to be exceeded at Site Boundary OR Substantial core damage (Fuel Damage Category 3 or greater) in conjunction with a potential loss or loss of the containment barrier.	<ul style="list-style-type: none"> • EVACUATION for 5 -mile radius and 10 miles in potentially affected sectors. • KI - recommend consideration of KI for general public and emergency workers.
Detectable radiation levels will be seen beyond 10 miles radius	Develop a PAR for the affected areas beyond 10 miles using guidance from Section 5.

EPIP STANDARD APPENDICES

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NOTE

The Palo Verde Hills lie in Sectors N, P, and Q. If the plume is in any of those sectors, an additional sector on each side, has been added.

Wind from (degrees)	Potentially Affected Sectors	Distance to Site Boundary (miles) Unit One	Distance to Site Boundary (miles) Unit Two	Distance to Site Boundary (miles) Unit Three
169 - 191	R-A-B	0.64 (A)	0.82 (A)	1.03 (A)
192 - 213	A-B-C	0.66 (B)	0.83 (B)	1.05 (B)
214 - 236	B-C-D	1.25 (C)	1.58 (C)	1.71 (C)
237 - 258	C-D-E	1.22 (D)	1.37 (D)	1.45 (D)
259 - 281	D-E-F	1.20 (E)	1.34 (E)	1.42 (E)
282 - 303	E-F-G	1.22 (F)	1.28 (F)	1.30 (F)
304 - 326	F-G-H	1.27 (G)	1.31 (G)	1.40 (G)
327 - 348	G-H-J	1.70 (H)	1.88 (H)	1.73 (H)
349 - 011	H-J-K	2.84 (J)	2.66 (J)	2.45 (J)
012 - 033	J-K-L	1.40 (K)	1.14 (K)	1.00 (K)
034 - 056	K-L-M	0.92 (L)	0.75 (L)	0.66 (L)
057 - 078	L-M-N	0.78 (M)	0.63 (M)	0.55 (M)
079 - 101	L-M-N-P-Q	0.76 (N)	0.62 (N)	0.54 (N)
102 - 123	M-N-P-Q-R	0.77 (P)	0.63 (P)	0.55 (P)
124 - 146	N-P-Q-R-A	0.78 (Q)	0.74 (Q)	0.65 (Q)
147 - 168	Q-R-A	0.66 (R)	0.83 (R)	0.97 (R)

EXAMINATION ANSWER KEY

2008 Senior Reactor Operator Exam

#21
21

ID: Q10482

Points: 1.00

Given the following conditions:

- Unit 1 is operating at rated power
- DG "A" is under clearance and OOS for planned maintenance
- A low level alarm is received on the "B" Essential Chill water surge tank
- Area 3 reports a leak on the HPSI pump room "B" Essential ACU, HAB-Z01
- Chill Water (EC) is isolated to HAB-Z01

Which one of the following correctly reflects the current HPSI pump status?

- A. HPSI pumps A/B are both Inoperable but available
- B. HPSI pumps A/B are both Inoperable and not available
- C. HPSI pump A is Operable and available provided offsite power is available to PBA-S03
- D. HPSI pump B is Operable and available provided room temperature is maintained < 104 °F

Answer: A and C are both correct.

This question was designed to test two facts:

1. The definition of Operability
2. Evaluate if the examinee understood that although supported systems such as ECCS are not declared Inoperable when a DG is declared Inoperable, however both trains are considered Inoperable if the redundant becomes Inoperable

A is correct based on an Inoperable "A" DG concurrent with a loss of the HPSI "B" essential room cooler. Both condition B of LCO 3.8.1 and Surveillance test 41ST-1ZZ02 require both trains of ECCS to be declared Inoperable within 4 hours.

C is correct based on the 4 hour allowance within both the ST and LCO. The LCO allows a 4 hour window to restore either train of ECCS before both trains must be declared Inoperable.

Since no time frame is referenced in the stem both answers are correct

"B & D" are wrong because B HPSI is Inoperable with no essential cooling. Reference 40ST-9EC03

NUCLEAR ADMINISTRATIVE AND TECHNICAL MANUAL

Inoperable Power Sources Action Statement

41ST-1ZZ02

Revision 41

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2.0 Within 1 hour and once per 8 hours thereafter, evaluate required redundant features as follows:

2.1 Check the operability of the following systems or components that are powered from the redundant, operable train of AC power by reviewing the Unit Log, Open Log Items, TSCCR book, and by observing the SEIS. (To be performed by the CRS/SM):

Systems/Components

Redundant Train OPERABLE? (circle)

Charging Pumps - TLCO T3.1.103 (Note - Charging Pump CHE-P01 may be considered the "redundant component" if its power is aligned to the redundant train.)	YES / NO
Radiation Monitors RU-29 (Train A) or RU-30 (Train B) - LCO 3.3.9	YES / NO
Radiation Monitors RU-31 (Train A) or RU-145 (Train B) - TLCO T3.3.108 and ODCM 2.1	YES / NO / NA
Pressurizer Heaters - LCO 3.4.9 (Not required in Mode 4)	YES / NO / NA
ECCS - LCO 3.5.3 or LCO 3.5.4 (as applicable)	YES / NO
Containment Spray - LCO 3.6.6	YES / NO
Ctmt Isol Valves NCA-UV-402 or NCB-UV-403 - LCO 3.6.3	YES / NO
Ctmt Isol Valves WCA-UV-62 or WCB-UV-61 - LCO 3.6.3	YES / NO
Hydrogen Monitors - LCO 3.3.10 (Not required in Mode 4)	YES / NO
H2 Recombiners - LCO 3.6.7 (Not required in Modes 3 & 4)	YES / NO / NA
Auxiliary Feedwater Pumps (AFA-P01 or AFB-P01) and components - LCO 3.7.5	YES / NO
Essential Cooling Water - LCO 3.7.7	YES / NO
Essential Spray Pond - LCO 3.7.8	YES / NO
Essential Chilled Water - LCO 3.7.10	YES / NO
Control Room Essential Filtration - LCO 3.7.11	YES / NO
Control Room Emergency Air Temperature Control - LCO 3.7.12	YES / NO
ESF Pump Room Air Exhaust Cleanup - LCO 3.7.13	YES / NO
Shutdown Cooling - TLCO T3.5.201 or LCO 3.4.6 (Not required in mode 4 if neither train of SDC is required to be OPERABLE)	YES / NO / NA
Fuel Building Essential Ventilation - TLCO T3.9.104	YES / NO

The required systems or components that are powered from the redundant, operable train of AC power are operable:

SM/CRS Signature: _____ Date: _____ Time: _____

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Inoperable Power Sources Action Statement

41ST-1ZZ02

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2.2 **IF** the redundant train is inoperable for any system or component checked, **THEN** within 4 hours from the time that both of the following conditions coexisted declare both trains of that particular system or component inoperable and enter the appropriate action statement.

- An inoperable EDG exists
- A required feature on the redundant train is inoperable

3.0 Within 24 hours from the time the diesel generator was discovered inoperable, the CRS/SM shall evaluate the remaining operable diesel generator.

3.1 Inform the CRS/SM of the following:

Within 24 hours from the time the diesel generator was discovered inoperable, evaluate the remaining operable diesel generator by recording ONE of the following in the Unit log:

- Determined the operable EDG is not inoperable due to a common mode failure.
- Performed SR 3.8.1.2 for the operable Diesel Generator
- The Inoperable DG has been restored to OPERABLE status prior to completion of LCO actions 3.8.1 B.3.1 or B.3.2. and the plant corrective action program (*document PVAR number in Unit Log*) will continue to evaluate the common cause possibility. (*not subject to 24 hour time constraint*)

_____/_____/_____
CRS/SM Signature Date Time

3.2 Place entries on the CORA timer to ensure step 3.1 completion **prior to 24 hours** from the time the diesel generator was discovered inoperable.

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3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources – Operating

- LCO 3.8.1 The following AC electrical sources shall be OPERABLE:
- a. Two circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System;
 - b. Two diesel generators (DGs) each capable of supplying one train of the onsite Class 1E AC Electrical Power Distribution System; and
 - c. Automatic load sequencers for Train A and Train B.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

-----NOTE-----
LCO 3.0.4.b is not applicable to DGs.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required offsite circuit inoperable.	A.1 Perform SR 3.8.1.1 for required OPERABLE offsite circuit.	1 hour <u>AND</u> Once per 8 hours thereafter
	<u>AND</u> A.2 Declare required feature(s) with no offsite power available inoperable when its redundant required feature(s) is inoperable.	24 hours from discovery of no offsite power to one train concurrent with inoperability of redundant required feature(s)
	<u>AND</u>	(continued)

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ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.3 Restore required offsite circuit to OPERABLE status.	72 hours <u>AND</u> 13 days from discovery of failure to meet LCO
B. One DG inoperable.	B.1 Perform SR 3.8.1.1 for the OPERABLE required offsite circuit(s).	1 hour <u>AND</u> Once per 8 hours thereafter
	<u>AND</u> B.2 Declare required feature(s) supported by the inoperable DG inoperable when its redundant required feature(s) is inoperable.	4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s)
	<u>AND</u> B.3.1 Determine OPERABLE DG is not inoperable due to common cause failure.	24 hours
	<u>OR</u> B.3.2 Perform SR 3.8.1.2 for OPERABLE DG. <u>AND</u>	24 hours (continued)

Essential Chilled Water & Ventilation Systems
Inoperable Action Surveillance

40ST-9EC03

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ECCS B Inop.

8.9 HPSI Pump Room Ess ACU Train B, HAB-Z01 Inoperable

8.9.1 Record the date and time the SM/CRS declared HAB-Z01 inoperable. Declare ECCS Train B inoperable per the applicable referenced LCO. Enter the associated Conditions and Required Actions.

_____ / _____
Date Time

Train	LCO
ECCS Train B	3.5.3 or 3.5.4

_____ / _____ / _____
Signature Date Time

___ 8.9.2 **IF** ECCS Train B is the required train per LCO 3.5.4, **THEN within 1 hour, complete** LCO 3.5.4 REQUIRED ACTION A. (NA if not the required train)

___ 8.9.3 Establish OPERABILITY of ECCS Train A by performing **ALL** the following:

___ Review the Unit Log (current shift) for items which may affect the OPERABILITY requirements of the required ECCS Train A.

___ Evaluate **ALL** TSCCRs associated with required components upon which the ECCS Train A relies.

___ Evaluate **ALL** alarms associated with required components upon which the ECCS Train A relies.

A Train Systems	LCO	OPERABLE (circle one)
ECCS Train A	3.5.3	Yes / No / NA
	3.5.4	Yes / No / NA

Completed by SM/CRS: _____ Date: _____ Time: _____

___ 8.9.3.1 **IF** ECCS Train A is inoperable per LCO 3.5.3 **AND** the requirements of LCO 3.5.3 CONDITION B can not be met, **THEN enter** LCO 3.0.3 for **BOTH** trains inoperable.

___ 8.9.3.2 **IF** ECCS Train A is inoperable per LCO 3.5.4, **THEN within 1 hour, complete** LCO 3.5.4 REQUIRED ACTION A.

EXAMINATION ANSWER KEY

2008 Senior Reactor Operator Exam

#5

5

ID: Q10471

Points: 1.00

Given the following conditions:

- Unit 1 was manually tripped from 100% power
- RU-142 (N-16 Main steam Line Monitor) channel 1 was reading 92 cpm at the time of the trip
- RU-142 (N-16 Main steam Line Monitor) channel 2 was reading 96 cpm at the time of the trip
- RCS pressure 2150 psia and slowly lowering
- Pressurizer level 31% and recovering
- SG 1 level is 65% WR and lowering
- SG 2 level is 60% WR and lowering
- NAN-S01 is de-energized
- PBA-S03 is de-energized
- NNN-D11 is de-energized
- RCS Thot is 565°F and slowly lowering
- RCS Tcold is 562°F and slowly lowering
- Main Feedwater flow is 0 gpm to each SG

The CRS should enter ...

- A. Reactor Trip (40EP-9EO02) and stabilize Tcold 560 to 570 °F
- B. Loss of All Feedwater (40EP-9EO06) and restore SG levels to 45 to 60% NR
- C. Steam Generator Tube Rupture (40EP-9EO04) and lower Thot to less than 540°F
- D. Loss of Offsite Power/Loss of Forced Circulation (40EP-9EO07) and initiate MSIS

Answer: During the post exam review (Exam Team and Management) it has been determined that the CORRECT answer should be changed from A to B due to the Reactor Trip Safety Function acceptance criteria (RCS Heat Removal) not being met in the stem of the question.

At least one SG has level 45 - 60% NR and feedwater is available

OR

Feedwater is restoring level in at least one SG to 45 - 60% NR

Based on the stem the Examinees have reasonable indications that the Standard Post Trip Actions have been completed. The SPTAs include contingency actions to restore SG levels with levels still lowering it is reasonable to conclude that no Feedwater is currently available and therefore entry into the Loss of All Feedwater procedure is justified.

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STANDARD POST TRIP ACTIONS

INSTRUCTIONS

CONTINGENCY ACTIONS

7. Determine that RCS Heat Removal acceptance criteria are met by the following:
- a. Check that at least one Steam Generator meets **BOTH** of the following conditions:
- Level is 35% WR or more
 - Feedwater is restoring or maintaining level 45 - 60% NR

- a.1 Restore and maintain level in at least one Steam Generator 45 - 60% NR.

(continue)

SRO QUESTION # 5

REACTOR TRIP

SAFETY FUNCTION:

6. RCS Heat Removal

ACCEPTANCE CRITERIA:

- a. RCS T_c is 560 - 570° F.
- b. At least one Steam Generator has level 45 - 60% NR and feedwater is available.

CRITERIA SATISFIED

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

OR

Feedwater is restoring level in at least one Steam Generator to 45 - 60% NR.

SAFETY FUNCTION:

7. Containment Isolation

ACCEPTANCE CRITERIA:

- a. Containment pressure is less than 2.5 psig.
- b. No valid containment area radiation monitor alarms or unexplained rise in activity.
- c. No valid steam plant activity radiation monitor alarms or unexplained rise in activity.

CRITERIA SATISFIED

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#5

LOSS OF ALL FEEDWATER

1.0 ENTRY CONDITIONS

1. The Standard Post Trip Actions have been performed.

or

BOTH of the following conditions exist:

- A LOAF initiated from Mode 3 or Mode 4.
- LTOP is **NOT** in service.

and

2. Plant conditions indicate that a Loss of All Feedwater has occurred. **ANY** or all of the following may be present or have occurred:

- 
- Lowering steam generator water level.
 - "LO SG 1 LVL CH TRIP" (5A09C) / "LO SG 2 LVL CH TRIP" (5A10C).
 - "FWPT A TRIP CKT ENERGIZED" (6A03B) / "FWPT B TRIP CKT ENERGIZED" (6A09B).
 - Low main feedwater pump flow (possible high flow for a feedwater line break).
 - Low main feedwater pump suction pressure.
 - Auxiliary feedwater pumps fail to operate.
 - No auxiliary feedwater to both Steam Generators.

2008 Reactor Operator Exam

11

This Exam Level RO
Appears on: RO EXAM
2008
Tier 1
Group 1
K/A # 42056AK1.04
Importance 3.10
Rating:

Given the following conditions:

- Main Spray valves 100E & 100F failed open
- SIAS/CIAS/MSIS automatically initiated
- Offsite power was lost when the reactor tripped
- Offsite power has been restored
- PZR level is 7% and slowly increasing
- RCS Tcold temperature is 510°F
- RCS Thot temperature is 520°F
- REP CET temperature is 550°F
- RCS pressure is 1044 psia

The RCS is currently

- A. 24°F subcooled. HPSI flow may be throttled at the current RCS conditions.
- B. at saturation conditions. HPSI flow may be throttled if RCS pressure is raised to 1350 psia.
- C. 24°F subcooled. RCP restart is permitted per Standard Appendix 1 at the current RCS conditions.
- D. at saturation conditions. RCP restart is permitted per Standard Appendix 1 if RCS pressure is raised to 1350 psia.

Answer: D

Associated KA:
30267

RCP restart

Reference Id:

Q10498

Difficulty:

3.00

Time to complete:

3

10CFR Category:

CFR 55.41 (10) 55.41 (10) Administrative, normal, abnormal, and emergency operating procedures for the facility.

Cognitive Level:

Comprehension / Anal

Question Source:

New

Comment:

Proposed reference to be provided to applicant during examination: Steam Tables / Standard App. 2 (RCP curves)

Technical Reference: Standard Appendices 2 (RCP curves only), 40EP-9E007, LOOP

K&A: Knowledge of the operational implications of the following concepts as they apply to Loss of Offsite Power: Definition of saturation conditions, implication for the systems

Justification:

2008 Reactor Operator Exam

A & C are Wrong - RCS is 24 degrees subcooled by T_{hot} but must use CET temp when in Natl Circ

B is Wrong - RCS is at saturation but HPSI can not be throttled with < 10% PZR level

D is Correct - RCS is at saturation and minimum RCS pressure for 550 degrees is 1320 psia per provided reference

As Given D – There is NO correct answer. App 1 requires RVUH 100% and Pressurizer level is 36- 67% [46 – 64%] to start an RCP

STANDARD APPENDICES

INSTRUCTIONSCONTINGENCY ACTIONS

___ 8. **IF** any RCS cold leg temperature is 217°F or less during cooldown, **OR** any RCS cold leg temperature is 294°F or less during heatup, **THEN** ensure the secondary side water temperature in each Steam Generator is less than 100°F above each of the RCS cold leg temperatures.

___ 9. Check that at least one Steam Generator meets **BOTH** of the following:

- Capable of supporting adequate heat removal
- Steam Generator level is being maintained or restored to 45 - 60% [45 - 60%] NR

___ 10. Ensure **ONE** of the following conditions is met:

- RVUH level is 100% and pressurizer level is 36 - 67% [46 - 64%]
- RVUH level is 67% and pressurizer level is 67% [79%] or more

___ 9.1 Ensure proper control of Steam Generator feeding and steaming.