

Surry Power Station

2017 NRC LICENSE EXAM

POST EXAM COMMENTS

&

EXAM ANALYSIS

A. Post Exam Comments:

Source: Applicant 55-23557

Question: 1

Given the following:

- A Reactor Trip occurs on Unit 1 from 100% power.
- 1-ES-0.1, Reactor Trip response, has been implemented.
- Control Bank D Rod H14 IRPI indicates 218 steps.
- All other control rods indicate 0 steps.
- T_{AVG} is 547 °F and stable.

Which ONE of the following completes the statements below?

- 1) One minute after the trip, shutdown margin is rising due to the decay of __ (1) __.
 - 2) In accordance with 1-ES-0.1, Reactor Trip Response, Emergency Boration __ (2) __ required.
- A. 1) Iodine 2) is NOT
 - B. 1) Iodine 2) is
 - C. 1) Xenon 2) is
 - D. 1) Xenon 2) Is NOT

Answer: A

Reference: 1-ES-0.1

Comment: **There is some ambiguity with the term “shutdown margin” vice reactivity.**

Facility Position: The question is adequate as written, no change is required.

Change Reference: None required.

Source: Applicant 55-23557

Question: 8

The Crew is responding to a SGTR in accordance with 1-E-3, Steam Generator Tube Rupture.

- The Rapid RCS cooldown has been completed.

Which ONE of the following describes:

- 1) The subcooling value for RCS depressurization termination.
 - 2) The purpose for the RCS depressurization.
- A. 1) 50 °F.
2) Minimize break flow and refill the pressurizer.
- B. 1) 50 °F.
2) Minimize Reactor Vessel stress for PTS concerns.
- C. 1) 30 °F.
2) Minimize break flow and refill the pressurizer.
- D. 1) 30 °F.
2) Minimize Reactor Vessel stress for PTS concerns.

Answer: C

Reference: 1-E-3

Comment: **Is 50 °F a potential subset of the answer, 30 °F**

Facility Position: We don't agree, there is no subset issue. The question is adequate as written.

Change Reference: None

Source: Applicant 55-23930

Question: 13

Initial Condition

- Unit 1 is operating at 100% power.
- Unit 2 is in RSD with core off-load to the SFP complete 10 hours ago.

Current Condition

- A tagging error results in isolation of SW flow to all CC HXs.
- CC surge tank level is 55% and rising.
- CC HX Disch Temp is 76°F and rising.

Which ONE of the following describes:

- 1) CC Surge Tank High Level alarm setpoint is ___(1)___.
- 2) The CC Surge Tank Vent Valve ___(2)___ automatically close on high level.

- A. 1) 93%
2) will not
- B. 1) 93%
2) will
- C. 1) 70%
2) will not
- D. 1) 70%
2) will

Answer: A

Reference: ARP 0-VSP-D7, 1-AP-15.00

Comment: **Is there a PCS alarm to support 70%?**

Facility Position: There is no PCS alarm for this function. Although this question had the highest "Miss rate" the question meets the K/A. The question is adequate as written.

Change Reference: None

Source: Applicants 55-23931, 55-23930, and 55-72754

Question: 15

Initial Conditions:

- Unit 1 and Unit 2 are operating at 100%.
- The plant has been notified by SOC that there are significant grid instabilities due to numerous base load plants being out of service.
- The SOC has requested maximum power generation from both units.

Current Conditions:

- The SOC reports that the 500 KV system is most impacted and the Emergency Low Limit for that network has been reached.
- The BOP reports the following Unit 1 changes (Note: Unit 2 parameters are comparable):

	GEN MWe	GEN MVARs	Grid Freq	Gen Amps	Gen Volts	Gen H2 Press
Initial	907	+ 10	60 Hz	23,500	22.3 KV	75 psig
Current	1020	- 210	58.0 Hz	27,500	21.6 KV	75 psig

Which ONE of the following completes the statements below?

- 1) Based on the information given the Reactor ___(1)___ required to be tripped.
- 2) Which Emergency buses are most affected by the current conditions stated above?

(REFERENCE PROVIDED)

- A. 1) is
2) Buses 1J and 2H.
- B. 1) is not
2) Buses 1J and 2H.
- C. 1) is not
2) Buses 1H and 2J.
- D. 1) is

Answer: A

Reference: ARP 1E-D9, 1-E-0

Comment: **Stem is confusing. Current conditions, 2nd bullet states, that “(Unit 2 parameters are comparable).”**

Facility Position: Although this was another high miss question, the current conditions given indicate a grid frequency below the RCP breaker trip setpoint. The question is adequate as written

Change Reference: None required.

Source: Applicant 55-72748

Question: 18

Initial Conditions:

- Unit 1 reactor operating at 100% power.
- The reactor is tripped and safety injection actuated.
- A steam leak is reported in Unit 1 Safeguards.

Current Conditions:

- The Crew has entered ECA-2.1, Uncontrolled Depressurization of All Steam Generators.
- All SG NR levels are off-scale low.
- RCS Cooldown rate is 155°F/hour.

Which ONE of the following states:

- 1) What is the MINIMUM AFW flow (gpm) to each SG?
- 2) Will a transition to 1-FR-H.1 be required after AFW has been throttled?

- A. 1) 60
2) No
- B. 1) 100
2) No
- C. 1) 60
2) Yes
- D. 1) 100
2) Yes

Answer: C

Reference: ECA-2.1, FR-H.1

Comment: **ND-95.3-LP-41, FR-H.1 states the following; “If feed flow is reduced due to operator action to minimize feed flow as instructed in these guidelines and the capability of providing the minimum feed flow is available, then a transfer from these procedures is not required and FR-H.1 should not be performed.”**

Reference: ND-95.3-LP-41:

1. **CAUTION #1 PRIOR TO STEP 1: IF TOTAL FEED FLOW IS LESS THAN 350 GPM [450 GPM] DUE TO OPERATOR ACTION, THIS PROCEDURE SHOULD NOT BE PERFORMED.**
 - a. The purpose of this step is to alert the team that the performance of FR-H.1 is required only if minimum feed flow capability is lost.
 - b. During the performance of certain guidelines (e.g., ECA-2.1, FR-P.1, FR-S.1 and FR-Z.1), it is possible that the SG level is below the narrow range and the total feed flow is throttled to less than the minimum AFW flow requirement.
 - c. If the feed flow is reduced due to operator action to minimize feed flow as instructed in these guidelines and the capability of providing the minimum

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feed flow is available, then a transfer from these procedures is not required and FR-H.1 should not be performed.

Facility Position: It is correct that FR-H.1 should not be performed, but the crew is still required to transition to FR-H.1 to read the caution, and then exit FR-H.1. License candidates are trained to transition to appropriate FR and then exit if appropriate. The question is adequate as written.

Change Reference: None required.

Source: Applicants 55-72754 and 55-23930

Question: 21

Given the following:

- Fuel movement is in progress in the Fuel Building.
- Fuel Handlers report an assembly has been dropped and appears to be damaged.
- 1-RM-RI-153, FUEL PIT BRIDGE, HIGH Alarm is received.
- The Crew has initiated 0-AP-22.00, Fuel Handling Abnormal Conditions.

Which ONE of the following identifies:

- 1) The MCR must be ISOLATED within ___(1)___ minutes.
 - 2) The release is monitored using ___(2)___.
- A. 1) 2
2) 1-VG-RI-104, Vent Vent 1 Gas
- B. 1) 2
2) 1-VG-RI-131 A/B/C, Vent #2 Gas/Particulate
- C. 1) 60
2) 1-VG-RI-104, Vent Vent 1 Gas
- D. 1) 60
2) 1-VG-RI-131 A/B/C, Vent #2 Gas/Particulate

Answer: B

Reference: ARP 0-RM-D3, 0-AP-22.00

Comment: **(55-72754) The labeling for A2 and C2 is “confusing”, we don’t call it that. (55-23930) Couldn’t flow be aligned to Vent Stack #1?**

Facility Position: Regarding the label for A2 and C2; this is the label found in the plant.
Regarding the alignment to Vent Stack #1; yes the flow can be aligned to Vent stack #1 but there is nothing in the question to indicate a different alignment than the normal alignment. No change required, the question is adequate as written.

Change Reference: None required.

Source: Applicant 55-23932

Question: 24

Given the following:

- Unit 1 is operating at 100% power.
- The reactor is tripped and SI actuated.
- Containment pressure is 25 psia and rising slowly.

Which ONE of the following completes the statement:

1-RM-TV-100C, CTMT ATMOS RM INLET I/S TV, closes on a ___(1)___ containment isolation signal, and is checked in the required position using ___(2)___ of 1-E-0, Reactor Trip or Safety Injection.

- A. 1) Phase I
2) Attachment 1, System Alignment Verification
- B. 1) Phase I
2) Attachment 4, CLS Component Verification
- C. 1) Phase II
2) Attachment 4, CLS Component Verification
- D. 1) Phase II
2) Attachment 1, System Alignment Verification

Answer: C

Reference: 1-E-0

Comment: **Attachment 1, also has direction to check the position of 1-RM-TV-100C.**

Facility Position: While the applicant is correct in that Attachment 1 step 8RNO has the position of 1-RM-TV-100A/B/C checked. This is only done if step 8a is answered as "NO". The stem of the question clearly states that CTMT pressure is 25 psia, which is above step 8a setpoint of 23 psia. Therefore step 8 RNO should not be performed and Attachment 4 should be entered at step 8e. The question is adequate as written, no change is required. Step 8 reference is included on next page.

Change Reference: E-0 Attachment 1 step 8 RNO. No change to question is required.

NUMBER 1-E-0	ATTACHMENT TITLE SYSTEM ALIGNMENT VERIFICATION	ATTACHMENT 1
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
*8. ____	CHECK IF CS REQUIRED:	
<input type="checkbox"/>	a) CTMT pressure - HAS EXCEEDED 23 PSIA	a) Do the following: 1) <u>IF</u> CTMT pressure has exceeded 17.7 psia, <u>THEN</u> check or align the following valves: <input type="checkbox"/> • 1-RM-TV-100A - CLOSED <input type="checkbox"/> • 1-RM-TV-100B - CLOSED <input type="checkbox"/> • 1-RM-TV-100C - CLOSED <input type="checkbox"/> • 1-SV-TV-102 - CLOSED <input type="checkbox"/> • 1-IA-TV-101A - CLOSED <input type="checkbox"/> • 1-IA-TV-101B - CLOSED <input type="checkbox"/> • 1-IA-AOV-103 - OPEN <input type="checkbox"/> 2) GO TO Step 10.
<input type="checkbox"/>	b) Manually initiate HI HI CLS	
<input type="checkbox"/>	c) Trip all RCPs	
<input type="checkbox"/>	d) Check CS pumps - RUNNING	<input type="checkbox"/> d) Manually start pump(s).
<input type="checkbox"/>	e) Initiate Attachment 4	

Source: Applicant 55-72748

Question: 28

Given the following:

- Unit 1 is operating at 29% power.
- 1-RC-P-1A breaker spuriously trips open on overcurrent.

With no operator actions which of the following describes:

- 1) How Loop 'A' Tavg will change as compared to previous Tave Loop 'A'.
- 2) The reason for the Loop 'A' Tavg change?

- A. 1) Lower 2) due to no forced flow in the loop A.
- B. 1) Lower 2) due to reverse flow in the loop A.
- C. 1) Higher 2) due to reverse flow in the loop A.
- D. 1) Higher 2) due to no forced flow in the loop A.

Answer: B

Reference: ND-95.3-LP-3, Loss of RCS Flow

Comment: **For Part 1, why is Tave Lower? Couldn't it be higher? What is the difference between Reverse Flow and Forward Flow?**

Facility Position: Tave is lower because at this power level 'B' and 'C' loops will provide load demand. Tave is lower because as flow is reversed, Tc rises, Th lowers and TC is greater than Th. It is not correct to state that there is no forced flow such as would exist if there was a locked rotor, because flow is reversed due to forced flow from 'B' and 'C' loops. Re-ran this on the classroom simulator with the same results. The question is adequate as written, no change is required.

Change Reference: None

Source: Applicant 55-23930

Question: 31

Initial Conditions:

- Unit 1 is in CSD with the PRZR solid.
- 1-RC-P-1C, "C" RCP running for crud burst cleanup.
- RCS temperature is 158 °F and lowering.
- RCS pressure is 305 psig.
- Station Instrument Air is supplying containment, the CMT IA compressors are in OFF.

Current Conditions:

- Unit 1 Instrument Air header ruptures.

Which ONE of the following completes the statements below:

- 1) RCS pressure will ___(1)___.
- 2) Procedure ___(2)___ is used to mitigate the effects of this transient.

- A. 1) rise
2) 1-AP-27.00, Loss of Decay Heat Removal Capability
- B. 1) lower
2) 1-AP-27.00, Loss of Decay Heat Removal Capability
- C. 1) rise
2) 0-AP-40.00, Non-Recoverable Loss of Instrument Air
- D. 1) lower
2) 0-AP-40.00, Non-Recoverable Loss of Instrument Air

Answer: C

Reference: 1-AP-27.00, 1-AP-40.00

Comment: **Stem is confusing by use of the term "Station Instrument Air..." in last bullet of stem.**

Facility Position: The question is adequate as written, no change is required.

Reference: None required.

Source: Applicant 55-23930

Question: 42

Given the following:

- Unit 1 Turbine Control is in IMP IN.
- Control rods are in MANUAL.
- The following parameters are given:

<u>Rx. Pwr</u>	<u>Delta T</u>	<u>Tave</u>	<u>T ref.</u>	<u>Gen MWe</u>
89%	90%	569.7	569.7	784

- 1-MS-SOV-104, MSR Steam Supply fails CLOSED.

With no operator action which ONE of the following parameters would be higher when steady-state conditions are reached?

- A. Reactor Power.
- B. Generator MWe.
- C. T ref.
- D. Tave.

Answer: D

Reference: ND-89.3-LP-3, Aux Steam

Comment: **Are you sure that Tave will rise? IMP IN vs. IMP OUT appears to support this question.**

Facility Position: Re-ran the question scenario on the classroom simulator with similar results, that support Tave rising, steady state to steady state. No change in the question is required.

Reference: None

Source: Applicants 55-72746 and 55-72748

Question: 53

Initial Conditions:

- 1-SW-P-10A, CHG Pump SW Pump, is running in HAND
- 1-SW-P-10B, CHG Pump SW Pump is in AUTO and OFF.
- 1D-G5, SW or CC PPS DISCH TO CHG PPS LO PRESS has just alarmed.

Current Conditions (2 minutes later):

- 1-SW-P-10A, CHG Pump SW Pump, continues running in HAND.
- 1-SW-P-10B, CHG Pump SW Pump is in AUTO and OFF.
- The Service Building Inside Operator reports the following readings:

<u>Parameter</u>	<u>Previous</u>	<u>Current</u>
1-SW-DPI-100A, 1-VS-S-1A, SW Strainer D/P	0.8 psid	0.8 psid
1-SW-DPI-27, 1-SW-S-2A, SW Suct. Strainer D/P	0.2 psid	1.8 psid
1-SW-PI-140A, 1-SW-P-10A, Suction press	3.8 psig	0.8 psig
1-SW-PI-26, 1-SW-P-10A, discharge pressure	27.5 psig	6 psig

Which of the following describes the actions the operator must take per 0-AP-12.00, Service Water System Abnormal Conditions?

- A. Start 1-SW-P-10B, place duplex strainer 1-SW-S-10 in service, and open Cross-tie.
- B. Place 1-SW-S-2A, suction strainer standby basket in service, and vent 1-SW-P-10A.
- C. Start 1-SW-P-10B, stop and vent 1-SW-P-10A, place 1-SW-S-2A, suction basket in service.
- D. Place additional SW header in service, vent all three SW headers, vent 1-SW-P-10A pump.

Answer: C

Reference: 0-AP-12.00

Comment: **Choice 'B' is also correct. 0-AP-12.00 Step 4 RNO supports choice B also since the sub steps are bulleted and not numbered those steps can be performed in any order.**

Facility Position: We agree with the applicants that choice B and C are both correct. Supporting documentation attached on the next page.

Change 0-AP-12.00 (below)
Reference

Problem Statement: Although the correct answer “*Start 1-SW-P-10B, stop and vent 1-SW-P-10A, place 1-SW-S-2A, suction strainer standby basket in service*” is correct, conditions in the stem draw for a conclusion that the suction strainer is fouled. The strainer DP is outside acceptable limits (Log Spec) and therefore it is reasonable to conclude that placing the standby suction strainer would restore pump function. Therefore, distracter “B - *Place 1-SW-S-2A, suction strainer standby basket in service, and vent 1-SW-P-10A*” is not only a reasonable response, but is an allowable course of action within AP-12.00.

Supporting Facts:

- Refer to the associated steps of AP-12.00 (full marked up and non-marked up copies are attached to the email).

Step 4 flows as given below on page 3 using information provided in stem

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
	<p>NOTE: A vacuum condition in the SW header(s) is indicated by abnormal conditions on multiple SW header loads.</p>	
	<p>4. <u>or</u> CHECK SW PARAMETERS - NORMAL</p> <p>a) MER 4:</p> <ul style="list-style-type: none"> <input type="checkbox"/> • 1-VS-S-1A differential pressure (1-SW-PDI-100A) less than 3 psid <input type="checkbox"/> • 2-SW-P-10A suction pressure (2-SW-PI-240A) greater than 0 psig <input type="checkbox"/> • 2-SW-P-10A discharge pressure (2-SW-PI-25) greater than 15 psig <input type="checkbox"/> • 1-SW-P-10A suction pressure (1-SW-PI-140A) greater than 0 psig <input checked="" type="checkbox"/> • 1-SW-P-10A discharge pressure (1-SW-PI-26) greater than 15 psig <p>b) MER 3:</p> <ul style="list-style-type: none"> <input type="checkbox"/> • 1-SW-P-10B suction pressure (1-SW-PI-140B) greater than 0 psig <input type="checkbox"/> • 1-SW-P-10B discharge pressure (1-SW-PI-23) greater than 15 psig <input type="checkbox"/> • 2-SW-P-10B suction pressure (2-SW-PI-240B) greater than 0 psig <input type="checkbox"/> • 2-SW-P-10B discharge pressure (2-SW-PI-24) greater than 15 psig <input type="checkbox"/> • 1-VS-S-1B differential pressure (1-SW-PDI-100B) less than 3 psid 	<p><i>NO</i></p> <p><i>?</i></p> <p><u>IF</u> a vacuum condition exists in the SW header(s), <u>THEN</u> perform the following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> a) <u>IF</u> two MER 3 chillers running, <u>THEN</u> stop one chiller by placing the local control switch to OFF, <u>AND THEN</u> place the MCR switch to OFF. <input type="checkbox"/> b) <u>IF</u> both CHG pump SW pumps running on a unit, <u>THEN</u> place the pump with the lowest flow in OFF. <input type="checkbox"/> c) <u>IF</u> operating CHG pump SW pump has zero flow, <u>THEN</u> place in OFF. d) <u>IF</u> vacuum condition still exists in the SW header(s), <u>THEN</u> locally place 1-SW-S-10 in service IAW Shift Supervision direction: <ul style="list-style-type: none"> <input type="checkbox"/> 1) Open 1-SW-264, 1-SW-S-10 Inlet. <input type="checkbox"/> 2) Vent from 1-SW-304, Inlet Hdr Vent. <input type="checkbox"/> 3) Override 1-SW-263 OPEN by turning handwheel fully clockwise. 4) Vent 1-SW-S-10 at 1-SW-PDI-29: <ul style="list-style-type: none"> <input type="checkbox"/> • 1-SW-ICV-3385, High Side <input type="checkbox"/> • 1-SW-ICV-3386, Low Side <input type="checkbox"/> 5) Open 1-SW-265, 1-SW-S-10 Outlet. <input type="checkbox"/> e) <u>IF</u> a SW supply header is suspected of being clogged, <u>THEN</u> place three headers in service IAW Attachment 1.
	<p>(STEP 4 CONTINUED ON NEXT PAGE)</p>	

Step 4 continued (page 4)

Substep (marked "A" and "B" below) are of the same level of indent and although "A" is the more appropriate action, "B" contains corrective actions for this scenario. It would be reasonable for a team, performing a scenario with the given conditions, could choose either the "A" or "B" path.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
4.	CHECK SW PARAMETERS - NORMAL (Continued)	<p><input type="checkbox"/> f) <u>WHEN</u> SW header is greater than 0 psig, <u>THEN</u> vent and start a CHG pump SW pump.</p> <p><input type="checkbox"/> <u>IF</u> SW header(s) <u>NOT</u> in a vacuum, <u>THEN</u> perform the following:</p> <p><input type="checkbox"/> a) Check running or Start standby CHG pump SW pump(s).</p> <p><input type="checkbox"/> b) Stop and vent the affected pump(s).</p> <p><input type="checkbox"/> <u>IF</u> a CHG pump SW pump has low suction pressure due to a clogged suction strainer, <u>THEN</u> place standby basket In Service <u>AND</u> vent pump.</p> <p><input type="checkbox"/> <u>IF</u> system leakage suspected, <u>THEN</u> inspect Aux Bldg piping.</p>
5. ____	CHECK CHG PUMP SW PUMPS - ABNORMAL CONDITION CORRECTED	<p><input type="checkbox"/> Continue efforts to vent and restore a CHG pump SW pump.</p> <p><u>IF</u> restoration unlikely <u>AND</u> opposite unit unaffected, <u>THEN</u> locally cross tie SW:</p> <p><input type="checkbox"/> a) <u>IF</u> ()-SW-P-10B running, <u>THEN</u> open 2-SW-443 (MER 3).</p> <p><input type="checkbox"/> b) <u>IF</u> ()-SW-P-10A running, <u>THEN</u> open 1-SW-269 (MER 4).</p>

Conclusion:

- Question 53 contains two correct answers as the reference given (AP-12.00) contains response actions that support “B” and “C” answers.

Statement from Operations (Jim Shell – Assistant Operations Manager)

Question 53 - both answers B and C will restore the function of cooling to the charging/HHSI pumps by restoring charging service water flow and in AP-12, procedurally both are acceptable solutions the way the procedure is currently written with the indications provided.

Source: Applicant 55-23931

Question: 57

Given the following:

- A steam generator tube rupture has occurred.
- Due to multiple failures, the PRZR spray and PORVs are unavailable to depressurize the RCS.
- PRZR level is offscale low.
- The Crew is attempting to re-establish Letdown flow in accordance with ECA-3.3, SGTR with loss of Pressure Control.

In accordance with 1-ECA-3.3, which ONE of the following identifies:

- 1) The _____ fuses for LC-1-460C and LC-1-459C are removed.
- 2) 1-CH-LCV-1460A and B _____.

- A. 1) input
2) open automatically
- B. 1) input
2) are opened manually
- C. 1) output
2) open automatically
- D. 1) output
2) are opened manually

Answer: D

Reference: 1-ECA-3.3

Comment: **Isn't "B" also correct? Wouldn't pulling the input fuses also allow 1-CH-LCV-1460 A and B to be opened?**

Facility Position: No ECA-3.3 specifically states the "output" fuses. The question is adequate as written, no change required.

Change Reference: None

Source: Applicant 55-72746

Question: 62

Given the following:

- Unit 1 is operating at 100%.
- Condenser Vacuum is 27.6 inches Hg and is lowering 0.4 inches Hg/minute.
- Turbine 1 and 2 operators dispatched to look for leaks.
- Generator Megawatts are 890 Mwe and lowering rapidly.
- Annunciator 1A-G1, Traveling Screens Hi Diff Lvl is Lit.

Which of the following completes the following statements:

- 1) (1) is required to be entered.
- 2) 1-E-0 is required to be entered if Main Condenser Vacuum lowers to (2) .

- A. 1) 0-AP-12.01, Loss of Intake Canal Level
2) 25.0 in-Hg
- B. 1) 0-AP-12.01, Loss of Intake Canal Level
2) 22.5 in-Hg
- C. 1) 1-AP-14.00, Loss of Main Condenser Vacuum
2) 25.0 in-Hg
- D. 1) 1-AP-14.00, Loss of Main Condenser Vacuum
2) 22.5 in-Hg

Answer: D

Reference: 1-AP-14.00

Comment: **Wouldn't choice "C" also be correct? I based my answer on 'C' because at this vacuum, steam dumps will be lost?**

Facility Position: 1-AP-14.00 specifically states that if Condenser vacuum lowers to 22.5 in – Hg, the turbine must be tripped (if power is > 10%). The question is adequate, no change is required.

Reference None

Source: Applicant 55-72748

Question: 63

Unit 1 is operating at 100% when the Reactor Operator notices that Main Feed Pump suction pressure has lowered on both Main Feed pumps and is now reading 400 psig (20 psig lower than before).

Which one of the following identifies a possible cause for this lower reading.

- A. 1-SD-LCV-106, HP Heater Drain Pump Level Control valve fails OPEN.
- B. 1-CN-FCV-107, Condensate Recirculation valve inadvertently opened.
- C. 1-CP-MOV-100, Condensate Polisher Bypass valve fails OPEN.
- D. 1-CN-126, Condensate bypass for LP FW Heaters 2, 3 and 4 inadvertently opened.

Proposed Answer: B

Answer: B

Reference: ND-89.3-LP-2

Comment: **Why wouldn't choice A also be correct? Isn't 1-SD-LCV-106 the divert valve?**

Facility Position: 1-SD-LCV-106 is the normal Discharge LCV to the Feed Pump Suctions. 1-SD-LCV-107 is the divert valve. Opening 1-SD-LCV-106 further will cause a rise in Feed pump suction pressure. No change is required, the question is adequate.

Reference None

Source: Applicant 55-72748

Question: 67

Which ONE of the following completes the statement from 1-GOP-1.4, Unit Startup, HSD to 2% Reactor Power, concerning the Reactivity Plan provided by Reactor Engineering?

The plan shall contain recommendations for control of Delta Flux, rod height and/or Boron adjustments, and _____.

- A. expected Xenon transient
- B. startup rate limitations
- C. RCS temperature control
- D. source range counts at doubling points

Answer: A

Reference: 1-GOP-1.4

Comment: **Choice 'C' is also correct per GOP-1.4, Attachment 6 and 7.**

Facility Position: We agree. Although the correct answer "expected Xenon transient" is correct, 1-GOP-1.4 also references the distractor "RCS temperature control" in attachment 7 (refer to following pages).

Reference 1-GOP-1.4

Supporting Facts:

- This question references step 5.1.3 to support the correct answer:
 - 5.1.3 Check that a Reactivity Plan has been provided by Reactor Engineering. The plan shall contain recommendations for control of core parameters:
 - Delta Flux Control
 - Recommendations for rod height and/or RCS Boron adjustments
 - Expected Xenon transient

And in this reference, Tave is not listed, but upon review of attachment 7 (Reactivity Control and Monitoring During Startup), the following is given:

(Page 1 of 3)
Attachment 7
REACTIVITY CONTROL AND MONITORING DURING STARTUP

- _____ 1. Begin logging data on Attachment 7 (page 2 of 3) at a maximum interval of 15 minutes. Use multiple sheets as required.
- _____ 2. Begin logging reactivity manipulations on Attachment 7 (page 3 of 3) as applicable. Use multiple sheets as required.
- _____ 3. Maintain Tave and Tref approximately matched and Delta Flux in band (use Control Rods, Boration and/or Dilution) as discussed during the pre-job brief. Use the Reactivity Plan as a guide. (Reference 2.4.13)

The statement “Use the Reactivity Plan as a guide” infers that the plan contains this information.

- Upon review of an engineering supplied reactivity plan, Tave is a parameter given as a reference (see next page)

S1C28 RXMANP03.3		DATA LOADED VERSION OK		S1C28 BOC-Online and 30% Hold											
Number of cases =	22	HFP Depletion Rate (ppm/epfd):	2.32	Maximum (+) Ramp Rate (% / min)	0.80	Maximum (-) Ramp Rate (% / min)	0.00	Minimum margin to the RIL (steps):	106						
Cycle Burnup (MMWD/MTU)	0	RCS Boron (ppm)	1488	RCS B10/B ratio	0.2000	BAST Boron (% or ppm)	14350	BAST B10/B (Ratio)	0.2	RCS Leak Rate (gpm)	0.1	Boration Dilution Filter (ppm)	0.0	HFP ARO A/O Bias (%)	0.0
S1C28 BOC-Online and 30% Hold															
Prepared: _____ Date: 11/10/17 Reviewed: _____ Date: _____															
Date	Elapsed Time (Hours)	Time Interval (Hours)	Core Power (%)	D-Bank (Steps)	RCS Tave (°F)	Boration Rate (gal/s/min)	Step (gallons)	Total (gallons)	Dilution Rate (gal/s/min)	Step (gallons)	Total (gallons)	Critical Boron (ppm)	Δ Flux Estimate (%)	Xe Worth (pcm)	
10/23/17 15:00	0.00	0.00	6.0	149	548.6	N/A	0	0	N/A	0	0	1488	-0.2	-491	
10/23/17 15:15	0.25	0.25	6.0	149	548.6	0.0	0	0	2.5	38	38	1487	-0.2	-491	
10/23/17 15:30	0.50	0.25	18.0	163	551.7	0.0	0	0	37.7	565	603	1471	0.4	-488	
10/23/17 15:45	0.75	0.25	30.0	177	554.8	0.0	0	0	35.3	529	1133	1456	2.1	-482	
10/23/17 16:00	1.00	0.25	30.0	177	554.8	0.1	1	1	0.0	0	1133	1456	2.1	-479	
10/23/17 16:15	1.25	0.25	30.0	177	554.8	0.1	1	2	0.0	0	1133	1457	2.1	-478	
10/23/17 16:30	1.50	0.25	30.0	177	554.8	0.0	1	3	0.0	0	1133	1457	2.1	-477	
10/23/17 16:45	1.75	0.25	30.0	177	554.8	0.0	0	3	0.0	0	1133	1457	2.1	-477	
10/23/17 17:00	2.00	0.25	30.0	177	554.8	0.0	0	3	0.2	3	1135	1457	2.1	-478	
10/23/17 17:15	2.25	0.25	30.0	177	554.8	0.0	0	3	0.5	7	1142	1457	2.0	-480	
10/23/17 17:30	2.50	0.25	30.0	177	554.8	0.0	0	3	0.7	11	1154	1456	2.0	-483	
10/23/17 17:45	2.75	0.25	30.0	177	554.8	0.0	0	3	1.0	15	1169	1456	2.0	-486	
10/23/17 18:00	3.00	0.25	30.0	177	554.8	0.0	0	3	1.2	19	1187	1455	2.0	-491	
10/23/17 18:15	3.25	0.25	30.0	177	554.8	0.0	0	3	1.5	22	1209	1455	2.0	-495	
10/23/17 18:30	3.50	0.25	30.0	177	554.8	0.0	0	3	1.7	25	1234	1454	1.9	-501	
10/23/17 18:45	3.75	0.25	30.0	177	554.8	0.0	0	3	1.9	28	1262	1453	1.9	-507	
10/23/17 19:00	4.00	0.25	30.0	177	554.8	0.0	0	3	2.1	31	1293	1452	1.9	-514	
10/23/17 19:15	4.25	0.25	30.0	177	554.8	0.0	0	3	2.2	33	1327	1451	1.9	-521	
10/23/17 19:30	4.50	0.25	30.0	177	554.8	0.0	0	3	2.4	36	1362	1450	1.8	-529	
10/23/17 19:45	4.75	0.25	30.0	177	554.8	0.0	0	3	2.5	38	1400	1449	1.8	-537	
10/23/17 20:00	5.00	0.25	30.0	177	554.8	0.0	0	3	2.7	40	1441	1448	1.8	-546	
10/23/17 20:15	5.25	0.25	30.0	177	554.8	0.0	0	3	2.8	42	1483	1447	1.8	-555	

Conclusion:

- Question 67 contains two correct answers as the reference given (GOP-1.4) contains supportive information for “A” and “C”.

Statement from Operations (Jim Shell – Assistant Operations Manager)

Question 67. Based on the reactivity plan provided by reactor engineering referenced in GOP-1.4, although A is correct as we submitted, C is also a correct answer since RCS temp control is specifically on the reactivity plan and referenced in GOP-1.4 attachment 7.

Source: Applicant 55-23930

Question: 69

According to surveillance procedure 1-OPT-RC-10.00, Reactor Coolant Leakage-Computer Calculated, which of the following parameters is an input into the calculation for IDENTIFIED RCS leakage?

- A. Pressurizer Level.
- B. VCT Level.
- C. Pressurizer Relief Tank Level.
- D. Containment Sump Level.

Answer: C

Reference: 1-OPT-RC-10.00

Comment: **Believe choice 'B' is also correct as VCT level is used to determine how you calculate identified leakage.**

Facility Position: VCT, and Pressurizer level are used to calculate Total Leakage. Total leakage minus Identified leakage (PRT and PDTT level) would equal Unidentified leakage. The question is adequate, no change is required.

Reference: None required.

Source: Applicant 55-23930

Question: 75

Given the following:

- 0130 Unit 1 was at 100% power when a spurious Safety Injection occurred.
- 0131 The crew enters 1-E-0, Reactor Trip or Safety Injection.
- 0145 The crew transitions to 1-ES-1.1, SI Termination.
- 0155 The RCS is solid and PRZR PORV, 1-RC-PCV-1456 begins to cycle.
- 0158 HHSI flow has been isolated and charging placed in service.
- 0212 While placing letdown in service 1-RC-PCV-1456 opens and will not close.
- 0217 The block valve for 1-RC-PCV-1456 will not close.
 - RCS pressure is 1000 psig and lowering rapidly.
 - All steam generators are at 900 psig and slowly lowering.

Which ONE of the following describes the correct actions and procedure implementation.

- A. Initiate Safety Injection and go to 1-E-0, Reactor Trip or Safety Injection.
- B. Transition to 1-E-1, Loss of Reactor or Secondary Coolant, and use 1-E-1 guidance to reinitiate Safety Injection.
- C. Manually start charging pumps and align HHSI flow path, and go to 1-ES-1.2 Post LOCA Cooldown and Depressurization.
- D. Manually start charging pumps and align HHSI flow path, and go to 1-E-1, Loss of Reactor or Secondary Coolant.

Answer: D

Reference: 1-ES-1.1

Comment: The "CAP" page of 1-ES-1.1 affirms the answer of D.

Facility Position: We agree, the question is adequate, no change is required.

Reference: None required.

B. EXAM ANALYSIS

2017 NRC Exam Questions with High Miss Rate (>50%)

Question: 13

Initial Condition

- Unit 1 is operating at 100% power.
- Unit 2 is in RSD with core off-load to the SFP complete 10 hours ago.

Current Condition

- A tagging error results in isolation of SW flow to all CC HXs.
- CC surge tank level is 55% and rising.
- CC HX Disch Temp is 76°F and rising.

Which ONE of the following describes:

- 1) CC Surge Tank High Level alarm setpoint is ___(1)___.
- 2) The CC Surge Tank Vent Valve ___(2)___ automatically close on high level.

- A. 1) 93%
2) will not
- B. 1) 93%
2) will
- C. 1) 70%
2) will not
- D. 1) 70%
2) will

Proposed Answer: A.

Analysis: Question Miss Rate 80%. Seven (7) Candidates chose C, One (1) chose B, 2 chose correct answer. Question dealt with knowledge of CC surge tank high level alarm setpoint and conditions the tank vent valve to close. Part 1) Annunciator Response Procedure high level alarm setpoint is 93%; distractor setpoint (70%) based on reasonable assumption that tank low level alarm is approximately 20% below normal level, the high alarm would be approximately 20% above normal. Part 2) tests knowledge of signals that close tank vent; vent closes on CC system High Radiation. Distractor based on Candidate confusion of operation of tank vent valve with feed heater high level which secures flow to the feed heater.

Question is acceptable, no change required.

Question: 15

Initial Conditions:

- Unit 1 and Unit 2 are operating at 100%.
- The plant has been notified by SOC that there are significant grid instabilities due to numerous base load plants being out of service.
- The SOC has requested maximum power generation from both units.

Current Conditions:

- The SOC reports that the 500 KV system is most impacted and the Emergency Low Limit for that network has been reached.
- The BOP reports the following Unit 1 changes (Note: Unit 2 parameters are comparable):

	GEN MWe	GEN MVARs	Grid Freq	Gen Amps	Gen Volts	Gen H2 Press
Initial	907	+ 10	60 Hz	23,500	22.3 KV	75 psig
Current	1020	- 210	58.0 Hz	27,500	21.6 KV	75 psig

Which ONE of the following completes the statements below?

- 3) Based on the information given the Reactor (1) required to be tripped.
- 4) Which Emergency buses are most affected by the current conditions stated above?

(REFERENCE PROVIDED)

- A. 1) is
2) Buses 1J and 2H.
- B. 1) is not
2) Buses 1J and 2H.
- C. 1) is not
2) Buses 1H and 2J.
- D. 1) is
2) Buses 1H and 2J.

Proposed Answer: A

Analysis: Question Miss Rate 60%. Four (4) Candidates chose correct response, Two (2) chose distractor B, two (2) chose distractor C, and two (2) chose distractor D. Question based on Candidate analysis of data provided to determine that a reactor trip is required based on 2/3

Station service bus underfrequency (<58.05 Hz), and knowledge of 500 kV distribution from switchyard to emergency buses via the RSSTs. Part 1) distinguishes Candidate knowledge of reactor trip setpoints. Part 2) assesses Candidate knowledge of Electrical Distribution.

Question is acceptable, no change required.

Question: 69

According to surveillance procedure 1-OPT-RC-10.00, Reactor Coolant Leakage-Computer Calculated, which of the following parameters is an input into the calculation for IDENTIFIED RCS leakage?

- A. Pressurizer Level.
- B. VCT Level.
- C. Pressurizer Relief Tank Level.
- D. Containment Sump Level.

Proposed Answer: C

Analysis: Question Miss Rate 60%. Four (4) Candidates chose correctly, four (4) chose distractor B, one (1) chose distractor A, and one (1) chose distractor D. Question dealt with determination of RCS leak rate. Leak rate is determined by calculating the Total change in RCS Inventory and subtracting Identified Leakage to determine Unidentified leakage. "A" and "B" responses are used in the calculation of the change in RCS Inventory. Change in PRT and PDTT are considered Identified leakage (response "C"). Response "D" is Unidentified since any condensation or leakage of any component/system inside of containment would be collected in the containment sump.

Question is acceptable, no change required.