Oconee Nuclear Station

June 2015 (ILT47) Initial License Examination

Question #11

Given the following Unit 1 conditions:
Initial conditions:

- Reactor power = 100%
- Both Main FDW pumps trip
- 1A and 1B MDEFDW pumps did NOT start
- TDEFWP did NOT start

Current conditions:

- Tave = 566°F stable
- Recovery from CBP feed with the TDEFDW pump is in progress
- TDEFWP is running and flow has been verified

Which ONE of the following describes how Tave and SG levels will be controlled INITIALLY during the recovery from CBP feed?

Tave will INITIALLY be controlled by throttling ____(1)____ and INITIALLY a SG level ____(2)____ be established.

A. 1. EFDW flow
2. will NOT

B. 1. the TBVs
2. will NOT

C. 1. EFDW flow
2. will

D. 1. the TBVs
2. will

In accordance with NUREG-1021, Operator Licensing Examination Standards for Power Reactors, ES-403, Section D.1.b and c, the facility recommends that the correct answer be changed from A to B.

Basis

Part 1 of this question is what is being addressed here. The stem of this question establishes conditions where Tave is 566°F and stable and being maintained by Condensate Booster Pump

feed. Procedural guidance for establishing these conditions is provided in Rule 3 (Loss of Main or Emergency FDW) of EP/1/A/1800/001 (Emergency Operating Procedure) at step 14 RNO. Although not given in the stem of the question, Steam Generator pressure is being controlled at approximately 500 psig as directed by step 1 of the RNO:

1. **Lower SG pressure in available SGs to ~500 psig.**

Maintaining Steam Generator (SG) pressure is a critical element of Condensate Booster Pump feed because the design discharge pressure of a Condensate Booster Pump is 695 psig. As such, maintaining SG pressure is a critical element of controlling Condensate Booster Pump feed to the SG which in turn is maintaining Tave. The Turbine Bypass Valves (TBVs) are being used to control SG pressure.

Additional guidance is provided in Rule 3 step 14 RNO step 2 which says:

2. **Control FDW flow to stabilize RCS P/T by throttling the following as necessary:**
   - **Startup Control valves**
   - **TBVs**

Therefore with the conditions established in the stem, The Startup Control Valves and the TBVs are being used to control Tave.

The stem of the question also informs the applicants that the TDEFWP is running and flow has been verified. This means that 1FDW-315 and 1FDW-316 have been throttled open, flow to the SG verified, and the valves returned to the closed position. This is accomplished at step 56 of EP/1/A/1800/001 (Emergency Operating Procedure) LOHT tab:

56. **Confirm ability to feed any intact SG:**
    A. **__ Throttle EFDW control valve on each intact SG until flow confirmed.**
    B. **__ WHEN flow confirmed, THEN close valve on each intact SG.**

With those conditions established, the stem of the question asks whether throttling Emergency Feedwater (EFDW) or the Turbine Bypass Valves (TBV) will INITIALLY be used to control Tave. The original intent of the question was to determine the applicants knowledge of how Tave is controlled after EFDW flow is established to the SG but prior to the time where a SG level has been established. For that question, throttling EFDW flow is the correct answer.

However the question specifically asks about "INITIALLY" controlling Tave during the recovery from Condensate Booster Pump feed. Initial actions of recovering are based on current Tave. With Tave > 547 °F, Step 59 RNO of the LOHT tab takes initial actions to begin recovery. The applicant is directed as follows:

1. **__ Set THP setpoint at ~ 885 psig.**
2. **__ GO TO Step 62.**

The turbine header pressure setpoint would already be at 885 psig so no actual actions are taken at this step. Step 62 then directs:

62. **Place TBVs in AUTO for available SGs.**

Since Turbine Header Pressure is being controlled with the TBV's in manual, placing the TBV's in auto will result in the TBV's throttling closed. As the TBV's throttle close, Condensate Booster Pump flow to the SG will begin to decrease. Step 66 then directs:

66. Initiate feed to available SGs per Rule 7 (SG Feed Control).

The sequence of these steps ensures that we begin throttling closed on the Turbine Bypass Valves before establishing EFDW flow to the SG. This is done to ensure Tave is controlled during this evolution. If the operator were to establish EFDW flow to the SG prior to using the Turbine Bypass Valves being throttled, the result would be a decreasing Tave and the possibility of prematurely establishing a level in the SG. Establishing a level in the SG at this time of the recovery could result in an overcooling event since temperatures would decrease to approximately 470 °F.

Since actions to decrease Condensate Booster Pump flow (accomplished by throttling TBV's closed) are taken prior to establishing EFDW flow to the SG, then the TBV's are throttled prior to EFDW being throttled. Both actions are taken in an effort to control Tave. Since throttling the TBV's occurs prior to throttling EFDW, throttling Turbine Bypass Valves would be what is initially used to control Tave. This would change the correct answer to throttling TBV's and since not done "initially", throttling EFDW would actually be a wrong answer to part 1 of question 11 .

Based on the above information, Oconee is requesting that the correct answer to Question 11 be changed from A to B.

Question #48 (Bank question from ILT 43 NRC Exam)

Given the following plant conditions:

- ACB-2 (Keowee 2 Generator BKR) CLOSED
- ACB-3 (Keowee 1 Emergency Feeder BKR) CLOSED
- A LOOP (Switchyard Isolation) causes ALL 4160 V switchgear (1TC, 1TD, and 1TE) to de-energize.

Which ONE of the following describes the response of Keowee switchgear power supplies?

A. 1X switchgear de-energizes and then is restored 15 seconds later

B. 1X switchgear de-energizes and then is restored 36 seconds later

C. 2X switchgear de-energizes and then is restored 15 seconds later

D. 2X switchgear de-energizes and then is restored 36 seconds later

In accordance with NUREG-1021, Operator Licensing Examination Standards for Power Reactors, ES-403, Section D.1.b and c, the facility recommends that the question be deleted from the exam.

Basis:

The stem of the question indicates KHU 2 is aligned to the overhead power path and generating to the grid with ACB-2 (Keowee 2 Generator BKR) closed, and KHU 1 is aligned to the underground power path with ACB-3 (Keowee 1 Emergency Feeder BKR) closed.

Per Design Basis Specification for the Keowee Emergency Power OSS-0254.00-00-2005:

The Keowee 600V Load Centers 1X and 2X with their normal and alternate feeder breakers will provide power to the Keowee auxiliary loads. These switchgears receive power from either of the following sources (Reference 2.5.2.3.4, "K-700, Keowee Hydro Station 13.8-230KV System One-Line"):

1. **The Keowee Generator through transformers 1X and 2X and ACB-5, 6**
2. **The Oconee switchgear 1TC through transformer CX and ACB-7, 8**
3. **The 230KV switchyard through the main step-up transformer, transformer 1X or 2X, and ACB-5 or 6**

The normal alignments for the Keowee auxiliaries are:

1. **The unit selected to the overhead will receive normal power as discussed in #1 or #3 above.**
2. **The unit selected to the underground will receive normal power as discussed in #2 above.**
3. **The incoming ACB normally closed for each unit (ACB-5 or 6 for the overhead unit, ACB-7 or 8 for the underground unit) is referred to as the normal breaker, and the associated source is called the normal source.**
4. **The other ACB and source for each unit is referred to as the alternate breaker and source.**

If any Keowee units are in operation when an emergency start signal is received, all closed generator breakers, including the underground path breaker of operating Keowee units, as well as the SK breakers shall be automatically tripped.

Therefore in the question, 1X switchgear is receiving power from 1TC and 2X switchgear is receiving power from KHU-2 through ACB-2.

Switchyard Isolation (External Grid Trouble Protective System)

Per Design Basis Specification for the 230 KV Switchyard System OSS-0254.00-00-2004:

> **The External Grid Trouble Protective System (EGTPS) consists of two redundant undervoltage and two redundant underfrequency relaying channels. Each channel can initiate the operation of the External Grid Trouble Protective System. After initiation, the system will emergency start both Keowee units and energize to the Oconee Start-Up Transformers CTI, CT2, and CT3 by tripping PCB's 8, 9, 12, 15, 17, 21, 24, 26, 28, and 33 (to isolate the yellow bus). Following a time delay (8.5 seconds per OSS-0254.00-00-2005) PCB-9 will close, auxiliary relays will also close PCBs 18, 27, and 30 (if open without delay).**

When the Switchyard Isolation stated in the question is initiated, the following will occur:

- As stated, 1TC de-energizes and therefore 1X switchgear de-energizes. Both Keowee units receive an emergency start signal. KHU-2 (overhead unit) will restore power to the 4160V switchgear 1TC, 1TD, and 1TE through ACB-2, the overhead power path, 230KV Yellow Bus, and CT-1 in 15 seconds. Therefore, answer A is correct.
- ACB-2 (Keowee 2 Generator BKR), PCB- 8, and PCB-9 will trip open, de-energizing the 2X switchgear. KHU-2 will restore power to 2X switchgear through ACB-2 in 15 seconds. Therefore, answer C is correct.

Answer B is also correct due to a subset issue. Since power is restored to 1X switchgear 15 seconds later, it is also restored 36 seconds later.

Answer D is also correct due to a subset issue. Since power is restored to 2X switchgear 15 seconds later, it is also restored 36 seconds later.

Based on the above information, Oconee is requesting that Question 48 be deleted from the exam.

Question #62:

Unit 1 plant conditions:

- A gaseous waste release at 1/3 station limit is being performed

1) The Alert and High setpoints for ____(1)____ are based on this limit.

2) If the High alarm setpoint is reached on ____(2)____, the gaseous waste release will be automatically terminated.

Which ONE of the following completes the statements above?

1. 1RIA-38
2. 1RIA-38

1. 1RIA-38
2. 1RIA-45

1. 1RIA-45
2. 1RIA-38

1. 1RIA-45
2. 1RIA-45

In accordance with NUREG-1021, Operator Licensing Examination Standards for Power Reactors, ES-403, Section D.1.b and c, the facility recommends that both A and C be accepted as correct answers.

Basis:

Part one of this question is the subject of this post exam comment. In the stem it is stated that a 1/3 station limit GWD tank release is being performed and then part 1 of the question asks which RIA setpoints are based on not exceeding those limits.

The following information is provided to explain the direct correlation between a 1/3 station limit release and the limits provided in SLC 16.11.2 (Radioactive Gaseous Effluents). It is taken from operations lesson plan WE-GWD on page 25 of 45:

a) **1/3 Station Limit and 2/3 Station Limit refer to the fraction of the instantaneous release limits in SLC 16.11.2. If all 3 units were releasing at exactly 1/3 Station Limit values (RIA-45 set at their normal 1/3 Station Limit values and all 3 units operating just at alarm setpoint), then the station would be at the limits set in SLC 16.11.2. GWR procedure ensures that this limit is not exceeded by a hierarchy of approval that has been set up for various levels of instantaneous release rate approvals. These approval levels are listed in the Limits and Precautions section of the GWD procedure.**

1) **Actual breakdown is:**
   (a) **30% station limit for each unit (total of 90%).**
   (b) **5% station limit for Interim Radwaste facility.**
   (c) **5% station limit for Radwaste facility.**

1RIA-45 is a correct answer based on the following information in the Radiation Protection procedure HP/0/A/1008/005 (RIA Setpoints) Enclosure 5.5 (Process Monitor Setpoint Bases):

1, 2, 3 RIA-45

Function: Monitor noble gas effluent from station vent.
Bases: 10 CFR 50 - 50.73(a) (2) (viii) (A)
SLC 16.11-2
DPC Offsite Dose Calculation Manual

"Alert" alarm setpoints are set to alarm if 3% of reporting limit of 10 CFR 50.73 (a) (2)
(viii) (A) (20 times EC limit) for noble gases is exceeded based upon Xe-133 as major
noble gas contributor. The reporting limit is divided as follows; 3% of the limit for each
of the three Unit Vents, 0.5% for the Rad Waste Facility Vent (4RIA-45) and 0.5% for
the Interim Radwaste Facility Vent (RIA-53). Correlation Factor = 7.09E-8 µCi/ml/cpm.
"Purge On" release at < 1/3 station release limit with no unit having a release in progress
at 2/3 station release limit.

Purge Off (65,000 cfm): 4.17 x 10-3 µCi/ml. Alert Setpoint = 5.88E+4 cpm
Purge On (100,000 cfm): 2.72 x 10-3 µCi/ml. Alert Setpoint = 3.80E+4 cpm

"High" alarm setpoints are set to alarm if 30% of instantaneous dose rate limit of SLC 16.11-2 is exceeded based upon Xe-133 as major noble gas contributor. The instantaneous dose limit is divided as follows; 30% of the limit for each of the three Unit Vents, 5% for the Rad Waste Facility Vent (4RIA-45) and 5% for the Interim Radwaste Facility Vent (RIA-53). Correlation Factor = 7.09E-8 µCi/ml/cpm. "Purge On" release at < 1/3 station release limit with no unit having a release in progress at 2/3 station release limit.

Purge Off (65,000 cfm): 9.95 x 10-3 µCi/ml. High Setpoint = 1.40E+5 cpm
Purge On (100,000 cfm): 6.47 x 10-3 µCi/ml. High Setpoint = 9.10E+4 cpm

It should also be noted that the highlighted portion of the above information also demonstrates the direct link between the "1/3 station limit" referenced in the stem of the question and the dose limits in SLC 16.11.2

HP/0/A/1008/005 (RIA Setpoints) Enclosure 5.5 (Process Monitor Setpoint Bases) also contains a section describing the bases for RIA-38 setpoints (which is the alternate choice in part 1 of Question 62). That information is provided below.

1, 3 RIA-38

> **Function: Monitor noble gas radwaste effluent from site. (Extended Range of 1, 3 RIA-37)**
> **Bases: SLC 16.11-2**
> **DPC Offsite Dose Calculation Manual**
>
> **"Alert" alarm setpoint is set at same value as "High" alarm setpoint.**
>
> **"High" alarm setpoint is set to close discharge valve if effluent activity exceeds activity determined by laboratory analysis used to calculate release rate. Release rate is calculated to assure that effluent activity (at recommended flow rate) does NOT exceed SLC 16.11-2 dose rate limits for unrestricted areas.**

The above information demonstrates the link between RIA-38 setpoints and limits provided in SLC 16.11.2. The recommended release flow rate is calculated to ensure that the dose limits of SLC 16.11.2 are not exceeded. The High alarm setpoint of RIA-38 is based on ensuring that the dose limits in SLC 16.11.2 are not exceeded when releasing at the recommended flow rate.

There is also information in SLC 16.11.3 (Radioactive Effluent Monitoring Instrumentation) that supports the conclusion that both RIA-38 and RIA-45 setpoints are set to ensure the 1/3 station limits are not exceeded. The commitment section of SLC 16.11.3 states the following:

> **b. Gaseous Process and Effluents**
>
> > **The radioactive gaseous process and effluent monitoring instrumentation channels shown in Table 16.11.3-2 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of SLC 16.11.2.a are not exceeded.**

Since table 16.11.3-2 includes both RIA-38 and RIA-45, the SLC clearly identifies both RIA's as being based on the dose limits of SLC 16.11.2 and since those dose limits are what determine the 1/3 station release limits then both RIA-38 and RIA-45 setpoints are based on not exceeding the 1/3 station limits.

Based on the above information, Oconee is requesting that both A and C be accepted as correct answers