

December 24, 1998

Duke Energy Corporation  
ATTN: Mr. W. R. McCollum  
Vice President  
Oconee Site  
P. O. Box 1439  
Seneca, SC 29679

SUBJECT: NRC EXAMINATION REPORT NOS. 50-269/98-301, 50-270/98-301 AND  
50-287/98-301

Dear Mr. McCollum:

On November 30 through December 3, 1998, the NRC administered operating examinations to employees of your company who had applied for licenses to operate the Oconee Nuclear Station Units 1, 2, and 3. The written examination was administered on December 7, 1998 by members of your training staff. At the conclusion of the examination, the examiners discussed the examination questions and preliminary findings with those members of your staff identified in the enclosed report.

Of the five SRO applicants and two RO applicants who received the written examinations and operating tests, all candidates passed the examination, representing a 100% pass rate.

A Simulation Facility Report is included in this report as Enclosure 2. A copy of the written examination questions and answer key, as noted in Enclosure 3, is available from the members of your training staff.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be placed in the NRC Public Document Room.

Sincerely,

(Original signed by T. A. Peebles)

Thomas A. Peebles, Chief  
Operator Licensing and Human  
Performance Branch  
Division of Reactor Safety

Docket Nos.: 50-269, 50-270 and 50-287  
License Nos.: DPR-38, DPR-47 and DPR-55

Enclosures: {See page 2}

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- Enclosures: 1. Report Details  
2. Simulation Facility Report  
3. Written Examination and Answer Key (SRO)  
(Document Control Desk Only)

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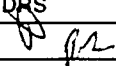
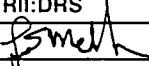


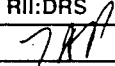
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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-269, 50-270 and 50-287

License Nos.: DPR-38, DPR-47 and DPR-55

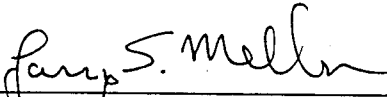
Report No.: 50-269/98-301, 50-270/98-301 AND 50-287/98-301

Licensee: Duke Energy Company

Facility: Oconee Nuclear Station Units 1, 2, and 3


Location: Seneca, SC

Dates: November 30 - December 3, 1998  
Written Exam December 7, 1998

Examiners:   
George T. Hopper, Chief License Examiner

Michael Ernstes, License Examiner

Larry Mellen, License Examiner

Approved by:   
Thomas A. Peebles, Chief,  
Operator Licensing and Human Performance Branch  
Division of Reactor Safety

Enclosure 1

~~9901210267~~

## EXECUTIVE SUMMARY

NRC Examination Report Nos. 50-269/98-301, 50-270/98-301 AND 50-287/98-301

During the period November 30 through December 3, 1998, NRC examiners conducted an announced operator licensing initial examination in accordance with the guidance of Examiner Standards, NUREG-1021, Interim Revision 8. This examination implemented the operator licensing requirements of 10 CFR §55.41, §55.43, and §55.45.

### Operations

- Five Senior Reactor Operator (SRO) candidates and two Reactor Operator (RO) candidates received written examinations and operating tests. NRC licensing examiners administered the operating tests during the period November 30 through December 3, 1998. The written examination was administered by members of your training staff on December 7, 1998.

- Candidate Pass/Fail

	SRO	RO	Total	Percent
Pass	5	2	7	100
Fail	0	0	0	0

- The NRC concluded that the licensee's examination submittal met NRC expectations and was of significantly higher quality than the previous year's submittal. This is indicative of improved performance in the licensee's licensed operator training and evaluation program (Section O5.2).
- The examiners concluded that RO candidate performance on the written examination was weak and SRO performance was satisfactory. Overall performance on the operating test was satisfactory with some weaknesses noted in the areas of diagnosis of events and understanding integrated plant system response (Section O5.3).

## Report Details

### Summary of Plant Status

During the period of the examinations Unit 1 and 2 were at 100 percent power, and Unit 3 was in an outage.

## I. Operations

### **O5 Operator Training and Qualifications**

#### **O5.1 General Comments**

NRC examiners conducted regular, announced operator licensing initial examinations during the period November 30 through December 3, 1998. The written examination was administered by members of your training staff on December 7, 1998. Five SRO upgrade applicants and two RO applicants received written examinations and operating tests. NRC examiners administered examinations developed by the licensee's training department, under the requirements of an NRC security agreement, in accordance with the guidelines of the Examiner Standards (ES), NUREG-1021, Interim Revision 8.

#### **O5.2 Pre-Examination Activities**

##### **a. Scope**

The NRC reviewed the licensee's examination submittal using the criteria specified for examination development contained in NUREG 1021, Interim Revision 8.

##### **b. Observations and Findings**

The licensee developed the SRO written examination, one Job Performance Measure (JPM) set, and two dynamic simulator scenarios for use during this examination. All materials were submitted to the NRC on time. NRC examiners reviewed, modified, and approved the examination prior to administration. The NRC conducted an on-site preparation visit during the week of November 16, 1998, to validate examination materials and familiarize themselves with the details required for examination administration.

##### **(1) Written Examination Development**

The written examination was submitted on time. The organization of the examination material expedited the examination review process. The NRC reviewed material and provided feedback to the licensee. Overall the NRC considered the quality of the submittal to be above average. The final version of the original written examination met the criteria specified in NUREG 1021, Interim Revision 8 and contained an acceptable distribution of memory level and comprehension/analysis questions.

(2) Operating Test Development

The NRC reviewed one JPM set and administrative section of the examination for the walk-through portion of the examination. Overall quality of the JPMs was satisfactory and at the appropriate level of difficulty. The NRC also noted that the quality of the JPM and administrative questions was satisfactory. Most of the questions were operationally valid and discriminatory. Some changes to the answer keys had to be made due to post-examination validation of the candidate's responses.

The NRC reviewed two simulator scenarios for the examination. Some minor changes and additions were made to the scenarios to provide the examiners sufficient opportunity to observe candidates perform the required competencies. Overall, the scenarios were found to be challenging and at the right level of difficulty.

c. Conclusion

The NRC concluded that the licensee's examination submittal met NRC expectations and was of significantly higher quality than the previous year's submittal. This is indicative of improved performance in the licensee's licensed operator training and evaluation program.

O5.3 Examination Results and Related Findings, Observations, and Conclusions

a. Scope

The examiners reviewed the results of the written examination and evaluated the candidates' compliance with and use of plant procedures during the simulator scenarios and JPMs. The guidelines of NUREG-1021, Forms ES-303-3 and ES-303-4, "Competency Grading Worksheets for Integrated Plant Operations," were used as a basis for the operating test evaluations.

b. Observations and Findings.

The examiners reviewed the results of the written examination and found that all of the candidates passed. Review of the grading, however, revealed that the licensee had incorrectly graded two examinations. One candidate's grade was changed from 85 to 82 and another from 84 to 82. The cause of the grading errors was due to the licensee using a template to grade the answer sheets. A lined through answer was counted as correct when viewed through the small hole in the template.

Overall RO candidate performance on the written examination was weak with both candidates achieving grades of 82. The average of the SRO grades was 86.2. The licensee conducted a post-examination item analysis and identified 10 questions that 50 percent or more of the candidate's answered incorrectly. This indicates that generic weaknesses may exist in the candidate's and /or the training program. Guidelines in NUREG 1021, ES 403.D.3.a, state "If it appears that the training program was deficient,

determine the need for remedial training and/or a program upgrade." Examiners also identified the following performance deficiencies during the operations portion of the examination.

- Candidates displayed weaknesses in understanding plant response when manually controlling the Integrated Control System (ICS) at low power levels.
- One candidate manually tripped the reactor because he incorrectly diagnosed an event as an unexplained reactivity addition when, in fact, plant power was responding to a decrease in Tave that was caused by the ICS responding to a failed RCS pressure instrument.
- During an Anticipated Transient Without Scram (ATWS) event, one candidate did not manually decrease feed flow to the steam generators as power was decreasing due to emergency boration and manual rod insertion. Feed flow rate exceeded reactor power generation for approximately five minutes. This caused generator levels to increase and steam generator 1B pressure to decrease to 700 psig. The candidates overfilled the steam generators which caused pressure in the 1B SG to decrease and resulted in an incorrect diagnosis of the system response as a faulted steam generator. The candidates then unnecessarily isolated the 1B SG which was needed for natural circulation cooldown. The mitigation strategy of this transient was unnecessarily complicated by the candidate's actions.
- During a total loss of feedwater event caused by a loss of the running Condensate Booster Pump (CBP) with a failure of the standby pump to automatically start, two crews of candidates did not attempt to manually start the available CBP and assumed none of the CBPs were operable. This resulted in the need to initiate High Pressure Injection forced cooling which unnecessarily breached the Reactor Coolant System, releasing primary coolant to the containment.

Details of these discrepancies are described in each individual's examination report, Form ES-303-1, "Operator Licensing Examination Report," which have been forwarded under separate cover to the Training Manager. This will enable you to evaluate the weaknesses and provide appropriate remedial training for those operators as necessary.

During a scenario involving an ATWS in conjunction with a small break Loss of Coolant Accident, candidates tripped the Reactor Coolant Pumps (RCP) after the two minute criteria specified in OMP2-1 upon loss of subcooling margin. Candidates followed the training recommendation found in OP-OC-EAP-E21 which states, "...if RCP amps are steady, go ahead and secure the RCPs, since it is unlikely that significant voiding had yet occurred, even though the operator is certain that it has been longer than two minutes since shutdown cooling margin (SCMs) were lost." NRC examiners noted that candidates followed this training guideline. However, this training guidance is not included in the Oconee Emergency Operating Procedures as a written instruction and is inconsistent with the instructions contained in the B&W Owners Group Emergency



Operating Procedures Technical Bases Document Volume 1, Section III.B, "Lack of Adequate Subcooling Margin." This item will be reviewed during a future inspection.

c. Conclusion

The examiners concluded that RO candidate performance on the written examination was weak and SRO performance was satisfactory. Overall performance on the operating test was satisfactory with some weaknesses noted in the areas of diagnosis of events and understanding integrated plant system response.

**V. Management Meetings**

**X1. Exit Meeting Summary**

At the conclusion of the site visit, the examiners met with representatives of the plant staff listed on the following page to discuss the results of the examinations and other issues. None of the material provided to the examiners was identified by the licensee as proprietary.

## PARTIAL LIST OF PERSONS CONTACTED

Licensee

B. Ayers, Nuclear Instructor  
T. Cotu, Superintendent of Operations  
C. Eflin, Nuclear Instructor  
J. Forbes, Station Manager  
A. Hollingsworth, Operations Human Performance Manager  
B. Jones, Site Training Manager  
R. Lingle, Shift Operations Manager  
R. Robinson, Operations Training Coordinator  
P. Stovall, Operator Training Manager

NRC

M. Scott, Senior Resident Inspector

## ITEMS OPENED, CLOSED, AND DISCUSSED

Closed

None

## SIMULATION FACILITY REPORT

Facility Licensee: Oconee Nuclear Station Units 1, 2, and 3

Facility Docket Nos.: 50-269, 50-270 and 50-287

Operating Tests Administered on: November 30 - December 3, 1998

This form is to be used only to report observations. These observations do not constitute audit or inspection findings and are not, without further verification and review, indicative of a noncompliance with 10 CFR 55.45(b). These observations do not affect NRC certification or approval of the simulation facility other than to provide information that may be used in future evaluations. No licensee action is required in response to these observations.

While conducting the simulator ~~portion~~ of the operating tests, the following items were observed (if none, so state):

<u>ITEM</u>	<u>DESCRIPTION</u>
-------------	--------------------

No discrepancies were noted.

**U.S. Nuclear Regulatory Commission  
Site-Specific  
Written Examination****Applicant Information**

Name:	Region: I / <u>(II)</u> / III / IV
Date: <u>12-7-98</u>	Facility/Unit: <u>OCONRE / 1, 2, &amp; 3</u>
License Level: <u>(RO)</u> / SRO	Reactor Type: W / CE / <u>(BW)</u> / GE
Start Time:	Finish Time:

**Instructions**

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. The passing grade requires a final grade of at least 80.00 percent. Examination papers will be collected four hours after the examination starts.

**Applicant Certification**

All work done on this examination is my own. I have neither given nor received aid.

\_\_\_\_\_  
Applicant's Signature

**Results**

Examination Value	_____ Points
Applicant's Score	_____ Points
Applicant's Grade	_____ Percent

QVALUE 1.0

QUESTION 1

R3

Unit 3 Plant Conditions:

- A SBLOCA is in progress.
- All NI's indicate 1% and are decreasing.
- ICCM "A" and "B" subcooling margin programs = 0°F.

Which ONE of the following provides the reason that the operator is required to immediately trip all RCPs?

- A. To reduce RCS inventory loss and prevent overcurrent damage to RCPs.
- B. To reduce RCS inventory loss and prevent core uncover due to phase separation when RCPs trip.
- C. To enhance core cooling by promoting core nucleate boiling and prevent overcurrent damage to RCPs.
- D. To enhance core cooling by promoting core nucleate boiling and prevent core uncover due to phase separation when RCPs trip.

QVALUE 1.0

QUESTION 3

R13

Unit 1 Plant Conditions:

- Reactor is tripped.
- LOCA is in progress.
- CETCs are 725°F increasing.
- ECCS operating in a degraded mode.

Which ONE of the following is the core condition?

- A. The core is covered with saturated liquid.
- B. The core is partially covered with a steam blanket.
- C. The fuel clad is exposed to fuel melt temperatures.
- D. The fuel clad is exposed to the boric acid-stainless steel (SS) reaction.

QVALUE 1.0

QUESTION 4

R26

Fuel is being removed from Unit 2 reactor vessel. Which ONE of the following NI signals provides an input for the Reactor Building Evacuation alarm?

- A. NI-1 (Wide Range)
- B. NI-2 (Source Range)
- C. NI-3 (Wide Range), Start Up Rate
- D. NI-4 (Source Range), Start Up Rate

QVALUE 1.0

QUESTION 5

R33

Unit 2 Conditions:

- Loss of power event in progress

Which ONE of the following completes the following statements.

The Emergency CCW (ECCW) system is actuated by the opening of the CCW-8 (ECCW Discharge to Tailrace) when the (1) \_\_\_\_\_. / The Turbine Bypass Valves will (2) \_\_\_\_\_.

**(Assume the TBVs are open and in AUTO ICS control.)**

- A. (1) condenser outlet valves (2CCW-20, 21, 22, 23, 24, 25) close / (2) close at 7" Hg vacuum and remain closed if vacuum is restored
- B. (1) condenser outlet valves (2CCW-20, 21, 22, 23, 24, 25) close / (2) close at 7" Hg vacuum and reopen if vacuum is restored
- C. (1) Unit 2 Waterbox Emergency Discharge (2CCW-7) reaches full open / (2) close at 7" Hg vacuum and remain closed if vacuum is restored
- D. (1) Unit 2 Waterbox Emergency Discharge (2CCW-7) reaches full open / (2) close at 7" Hg vacuum and will reopen if vacuum is restored



QVALUE 1.0

QUESTION 6

R43

Plant conditions

- Unit 1 is at 100% reactor power.
- All ICS Stations are in Automatic.

If the NI-5 Power Range upper detector FAILS HIGH, indicated RPS Channel "A" Reactor Imbalance becomes more \_\_\_\_\_. (Choose ONE)

- A. positive and ICS does not move control rods
- B. negative and ICS does not move control rods
- C. positive and ICS inserts control rods
- D. negative and ICS inserts control rods

QVALUE 1.0

QUESTION 7

R44

Unit 2 Plant Conditions:

- Unit 2 is shutdown.
- RCS heatup and pressurization is in progress.
- HPI ES bistable's are BYPASSED.

Which ONE of the following describes the required operator action in regard to the HPI ES bistable's?

- A. Manually restore the HPI ES bistable to operation when RCS pressure is 1750 psig and increasing.
- B. Manually restore the HPI ES bistable to operation when RCS pressure is 900 psig and increasing.
- C. Verify automatic restoration of HPI ES bistable to operation when RCS pressure is 1750 psig and increasing.
- D. Verify automatic restoration of HPI ES bistable to operation when RCS pressure is 900 psig and increasing.

QVALUE 1.0

QUESTION 8

R48

Initial Unit 3 Plant Conditions:

- GWD Tank 3B discharge is in progress.
- Unit 3 RB Purge System is operating.

Current Plant Conditions:

- 3RIA-37 (Waste Gas Effluent Low Range Monitor) has failed upscale.
- 3RIA-38 (Waste Gas Effluent High Range Monitor) is indicating below alarm setpoints.

Which ONE of the following describes the plant response?

- A. 3GWD-5 (GWD-Tank 3B discharge) closes and 3PR 2, 3, 4, and 5, (RB purge Isolation Valves) close.
- B. 3GWD-5 (GWD-Tank 3B discharge) closes and RB purge continues.
- C. RB Purge Fan trips and GWD Tank 3B release continues.
- D. RB Purge Fan trips, 3PR 2, 3, 4, and 5 (RB purge Isolation Valves) close, and GWD Tank 3B release continues.

QVALUE 1.0

QUESTION 9

R62

Unit 2 Plant Conditions:

- Yesterday an electrical test was aborted before the associated procedure was completed
- The electrical test is being resumed today, approximately 20 hours after the electrical test was aborted.

Which ONE of the following actions is required for using the procedure to complete the electrical test?

- A. With the approval of a licensed SRO, a blank copy of the procedure may be used with the completed steps marked N/A and initialed.
- B. If the working copy of the aborted procedure is reused, repeated steps are lined out, initialed, and initials are reentered as repeated steps are performed.
- C. The SRO must forward the aborted procedure to document control and a new procedure copy must be used to document completion, previously completed step signatures may be transferred.
- D. If the abortion of the procedure was not caused by a component failure, the working copy of the aborted procedure may be reused provided that the procedure is resumed at the last completed step.

QVALUE 1.0

QUESTION 10

R68

Unit 2 Plant Conditions:

- Core Reload completed.
- Fuel Transfer Canal is being drained via LPI and SF Cooling systems.

Which ONE of the following indicates the MINIMUM number of source range detectors required to be operable while draining the Fuel Transfer Canal using the LPI and SFC systems?

- A. None (0).
- B. One (1).
- C. Two (2).
- D. Three (3).

QVALUE 1.0

QUESTION 11

R69

Which ONE of the following curves will be different for Unit 1 and Unit 3 for the operation of the CBAST?

- A. Boron solubility in water.
- B. Concentration vs. Level
- C. (ppm Cl-) 30 minute pumping rate .
- D. Volume vs. Level.

QVALUE 1.0

QUESTION 12

R73

Given the following plant conditions:

- The dose rate from a small valve is 6 R/hr at 6 inches away
- You are working at a distance of 4 feet from the valve
- Your TEDE exposure for the current calendar year is 1.0 rem

Which ONE of the following times describes how LONG you can work BEFORE you must obtain an extension of your total dose equivalent exposure (TEDE)?

- Point =  $I_1 D_1^2 = I_2 D_2^2$
- Line =  $I_1 D_1 = I_2 D_2$  (TP = .5 x length)
- Plane =  $I_1 \sqrt{D_1} = I_2 \sqrt{D_2}$  (TP#1 = .7 x eff. Radius TP#2 = 3 x longest length)

- A. 1 hour 20 minutes.
- B. 2 hours 40 minutes.
- C. 10 hours 40 minutes.
- D. 21 hours 20 minutes.

QVALUE 1.0

QUESTION 13

R77

Plant conditions:

- Unit 3 has tripped from 50% power
- All RCPs have tripped
- RCS pressure is 2305 psig
- PZR level 190 inches slowly decreasing
- LDST level 44 inches slowly decreasing
- EFDW feeding SG 3B
  - 3FDW-316 (EFDW to 3B SG) throttled
  - "3B" OTSG level 240 inches XSUR
- "3A" OTSG isolated
- HPI flow is degraded

Which ONE of the following actions is performed by the Control Board Operator (RO) prior to receiving EOP guidance?

- A. Increase makeup to restore and maintain PZR level.
- B. Initiate High Pressure Injection (HPI) forced cooling.
- C. Initiate a rapid RCS cooldown for degraded HPI flow.
- D. Raise OTSG "3B" level to promote natural circulation.



QVALUE 1.0

QUESTION 14

R78

The Emergency Plan has been implemented and you are called in as the Duty Person for support during a security event as protesters gather at the site. Which ONE of the following is the maximum time frame for operations personnel to report to the Operations Support Center (OSC)?

**(ASSUME all roads to enter the plant are open)**

- A. 45 Minutes.
- B. 60 Minutes.
- C. 75 Minutes.
- D. 90 Minutes.

QVALUE 1.0

QUESTION 15

R82

Plant conditions:

- Unit 3 is being refueled.
- Spent Fuel Pool level is +0.1 feet
- Sample results indicate Spent Fuel Pool boron concentration is 2980 ppm.

Which ONE of the following describes the action that the operator must take?

- A. addition of boron to the pool is required and level must be increased.
- B. addition of boron to the pool is required and any fuel handling must be stopped.
- C. dilution of boron concentration in the pool is required and level must be increased.
- D. dilution of boron concentration in the pool is required and any fuel handling must be stopped.

QVALUE 1.0

QUESTION 16

R93

Plant conditions:

- Both SGs are operating on Low Level Limits.
- Tave is 577° F.
- ICS is in integrated operating mode.

Which ONE of the following describes the response of the control rods?

**Rods ...**

- A. ...remain in their current position because the Tave error is blocked from providing a rod movement signal.
- B. ...remain in their current position because the Tave error is too small to demand a change in reactor reactivity.
- C. ...withdraw as demanded by the Tave error after modification by the reactor calibrating integral.
- D. ...withdraw as demanded by the summation of the Tave error and the CTPD error signals.

QVALUE 1.0

QUESTION 17

R94

Plant Conditions:

- Reactor Building Cooling Units (RBCU) 2B and 2C are running in high speed.
- RBCU 2A has been OFF for 3 days and is ready to be started.

Which ONE of the following is the PREFERRED method for starting and placing RBCU 2A into high speed operation?

- A. Stop RBCU 2B; then place RBCU 2A control switch to HIGH; then observe the 2A RBCU auto sequence to high speed.
- B. Maintain RBCUs 2B and 2C in HIGH then, place RBCU 2A control switch to HIGH; then observe the RBCU auto sequence to high speed.
- C. Place RBCU 2A control switch to LOW; after 30 minutes, place RBCU 2A control switch to HIGH.
- D. Shift RBCUs 2B and 2C to LOW, then place RBCU 2A control switch to LOW; after RBCUs 2B and 2C run for 30 minutes in LOW, shift all RBCUs to HIGH.

QVALUE 1.0

QUESTION 18

R98

Unit 1 Plant Conditions:

- Reactor has tripped from 75% power.
- All RCPs have tripped.
- OTSG 1A and 1B levels are 30 inches XSUR.

At this time, the startup FDW control valves will automatically be positioned to a maximum of \_\_\_\_\_ AND / \_\_\_\_\_.

- A. 40% open / can NOT be manually throttled
- B. 40% open / can be manually throttled as desired
- C. 90% open / can NOT be manually throttled
- D. 90% open / can be manually throttled as desired

QVALUE 1.0

QUESTION 19

R99

Unit 2 Plant Conditions:

- Unit 2 is in Hot Shutdown
- RCS pressure is 2210 psig and increasing slowly
- RCP 2A2 and 2B1 have been secured
- 2RC-1 (PZR Spray) is indicating throttled
- PZR level indicates 270 inches and increasing slowly
- RC makeup flow equals RC letdown flow
- PZR temperature is 650°F

Which ONE of the following is the reason for the plant response?

- A. Spray flow is filling the PZR.
- B. PZR spray flow is insufficient.
- C. PZR saturation has been lost.
- D. A hard bubble has developed in the PZR.

QVALUE 1.0

QUESTION 20

R102

Unit 2 Plant Conditions:

- LPI is in the RBES recirculation mode.
- HPI is aligned for piggyback operation.

Alignment of the Reactor Building Spray system into the piggy back mode to take a suction on the discharge of the LPI coolers \_\_\_\_\_.

- A. will NOT be performed because HPI pumps would become degraded from cavitation problem.
- B. will NOT be performed because insufficient NPSH would be provided to RBS pumps
- C. will be performed for low RBES levels because additional NPSH is provided to the RBS pumps
- D. will be performed for high RB pressures because suction head to the HPI pumps would be improved.

QVALUE 1.0

QUESTION 21

R111

Which ONE of the following describes a CC system operational limit and precaution?

- A. RCP thermal barriers are required per SLC when RCPs are operable.
- B. Prior to energizing CRDMs when RCS temperature is 120°F
- C. Prior to establishing HPI letdown when RCS temperature is 90°F.
- D. Quench Tank is aligned to recirc when HPI Forced Cooling is established.



QVALUE 1.0

QUESTION 22

R112

Unit 3 Plant Conditions:

- Reactor trip from 100% power.
- SG 3A pressure is 977 psig and decreasing.
- SG 3B pressure is 1010 psig and steady.
- ICS demand to TBV's
  - 3MS-19 & 22 (3A Turbine Bypass Valves) demand is 0%
  - 3MS-28 & 31 (3B Turbine Bypass Valves) demand is 17%
- Turbine Bypass Valve (TBV) positions:
  - 3MS-19 (3A Turbine Bypass Valve) is closed.
  - 3MS-22 (3A Turbine Bypass Valve) is open.
  - 3MS-28 (3B Turbine Bypass Valve) is throttled open
  - 3MS-31 (3B Turbine Bypass Valve) is throttled open

Which ONE of the following describes the PREFERRED CRO action that is allowed by the design of the main steam system to mitigate the plant conditions?

**Isolate...**

- A. Steam Generator 3A.
- B. 3MS-22 (3A Turbine Bypass Valve) by closing 3MS-17(3A TBV Block) and 3MS- 26 (3B TBV Block).
- C. 3MS-19 and 22 (3A Turbine Bypass Valve) by closing 3MS-17 (3A TBV Block).
- D. the Main Steam lines 3A by initiating Train A of the Main Steam Line Break (MSLB) Circuitry.

QVALUE 1.0

QUESTION 23

R116

Initial Plant Conditions:

- Unit 2 is operating at 85% power.
- PZR level 1 is selected and indicating 220 inches.
- 2HP-120 (RC Volume control) is in AUTO.
- PZR level 2 is indicating normal 221 inches.
- PZR level 3 is out of service.
- SASS in Manual.

Current Plant Conditions:

- PZR level 1 fails high to 400" and the operator selects PZR Level 2.
- PZR temperature Channel A indicates 200 deg. F and slowly decreasing.

Which ONE of the following describes the effect on PZR level control and the PZR heater cut-out circuit?

2HP-120 (RC Volume control) throttles\_\_\_\_\_ / If a transient causes a PZR outsurge, PZR heaters will \_\_\_\_\_

- A. open and increases actual PZR level / uncover before tripping.
- B. open and increases actual PZR level / deenergize before uncovering.
- C. closed and decreases actual PZR level / uncover before tripping.
- D. closed and decreases actual PZR level / deenergize before uncovering.

QVALUE 1.0

QUESTION 24

R123

Unit 3 Plant Conditions:

- The SSF is manned.
- SSF diesel generator surveillance testing is in progress.
- The SSF diesel generator room Rate-of-Rise temperature detector is spontaneously actuated.

Which ONE of the following describes the SSF fire protection system response to this event?

- A. The SSF Fire control unit is in ALARM condition and the Rate-of-Rise temperature detector actuation is identified by the heat collector disc that will have dropped away from the detector housing.
- B. If another alarm is received from the same fire protection detector string, a REFLASH alarm will occur to notify the operators of degrading fire conditions in the affected fire protection zone.
- C. If the alarm that was received is ACKNOWLEDGED, another alarm may be received in the SSF Control Room if the new alarm is received from a different detector string.
- D. The SSF Fire Alarm Control Panel zone alarm lamp will turn off and the audible alarm will stop when the Rate-of-Rise temperature detector is returned to normal

QVALUE 1.0

QUESTION 25

R126

A complete loss of DC power to the Unit 3 Turbine Driven Emergency Feedwater Pump (TDEFDWP) has occurred.

Which ONE of the following describes how the TDEFDWP will be started if an AUTOMATIC initiation signal is received?

- A. Automatically started because the steam supply valve, MS-93 (EFDWPT Steam Supply), will be opened when its pilot solenoid deenergizes.
- B. Manually started by pulling up on the local hand starting lever manually opening MS-95 (TDEFDWP Gov. Valve), steam admission valve.
- C. Manually started by placing the Control Room control switch to RUN due to a loss of auto initiation logic control power.
- D. Automatically starts due to Aux. Oil Pump supplying oil pressure to MS-95 (TD EFDWP Gov. Valve).

QVALUE 1.0

QUESTION 26 B1

Unit 2 Plant Conditions:

- Reactor power is 80%.
- RCS Pressure = 2117 psig steady
- PZR Heater Banks 1 and 2 ON
- SG tube leak (SGTL) event in progress on 2B SG.
- HPI pumps 2A and 2B are running.
- HPI pump 2C will not start.
- PZR level is 215 inches and decreasing at 1 inch per minute.
- 2HP-5 (Letdown Isolation Valve) is open.
- 2HP-120 (RC Volume Control) is fully open.
- 2A Injection flowrate indicates 160 gpm.
- 2HP-26 (2A HP Injection) red and green valve position indication lights OFF.

Which ONE of the following is the next operator actions that should be taken?

- A. Place the 2HP-26 switch to open and increase injection flow.
- B. Manually trip the reactor to prevent the loss of subcooling margin.
- C. Manually trip the reactor in anticipation of the imminent low pressure reactor trip.
- D. Close 2HP-5 to prevent a reactor trip and reduce the probability of lifting the MSRVs.

QVALUE 1.0

QUESTION 27

B7

Unit 1 Plant Conditions:

- A valid reactor trip signal has been received.
- Main FDW pump 1A is operating.
- Power Range NI indications are fluctuating as follows:
  - NI-5: 4 to 7%
  - NI-6: 3 to 5%
  - NI-7: 3.5 to 5%
  - NI-8: 5.5 to 7%
- RCS pressure is 1900 psig.
- CETCs indicate 625°F.

Which ONE of the following describes the immediate operator action to respond to these conditions?

- A. Open the CRD normal or alternate 600 volt supply breakers.
- B. Open 1HP-24 (BWST suction), 1HP-25 (BWST suction), 1HP-26 (HP A Injection), and commence HP injection.
- C. Trip the main turbine and manually drive any control rods not fully inserted to its "IN LIMIT."
- D. Trip the RCPs and send operators to the Cable Room to deenergize the CRD system by opening the AC and DC supply breakers.

QVALUE 1.0

QUESTION 28

B8

With Unit 1 in HPI Forced Cooling, both MDEFDWP's have been returned to service and EFDW flow has been verified. The following plant conditions exist:

- RCS pressure = 1700 psig
- PZR temperature = 568°F
- Both Loop SCM's = 4°F
- CETC's = 584°F
- All RCPs secured
- PZR at 400 inches
- CT-1 has locked-out
- Keowee is supplying 4160 volt loads via CT-4

Which ONE of the following describes the intent of the INITIAL actions the operator would take in regard to establishing FDW flow during the recovery from HPI Forced Cooling?

**Initiate EFDW flow to the unaffected S/G(s) to...**

- A. establish 200 gpm per S/G and raise S/G levels to 240 inches XSUR.
- B. establish 200 gpm per S/G and maintain turbine bypass valve pressure setpoint at 1010 psig.
- C. match decay heat by raising S/G levels to 50% Operating Range.
- D. match decay heat by steaming S/G to maintain RCS pressure and temperature stable or slightly decreasing.

QVALUE 1.0

QUESTION 29

B9

Unit 2 Plant Conditions:

- Section 504, SG Tube Leak is in progress.
- 2A SG leak rate is 20 gpm.
- 2A SG has been isolated.
- Reactor has been tripped for 1 hour from 100% power.
- 2A and 2B SG Outlet pressure = 800 psig

Which ONE of the following describes the FIRST method the operator will use to control the affected SG level and what is the required level that will be maintained?

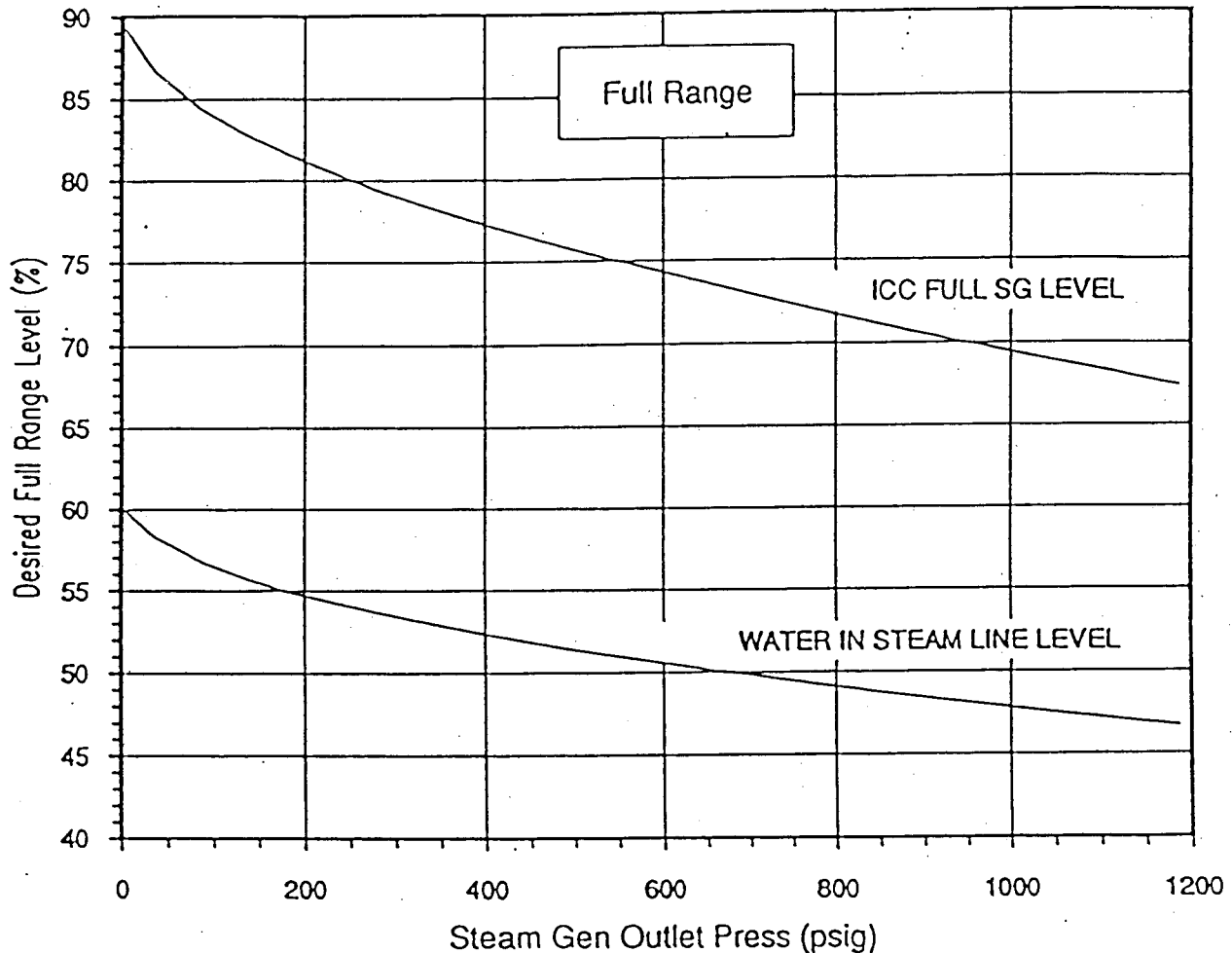
(See Curve ATTACHMENT)

- A. Line up a hot blowdown path to the condenser to drain the SG and maintain level between 25" SUR to 48% Full Range.
- B. Line up a hot blowdown path to the condenser to drain the SG and maintain level between 25" SUR to 51% Full Range.
- C. Steam the SG to lower and maintain level between 25" SUR to 48% Full Range.
- D. Steam the SG to lower level and maintain between 25" SUR to 51% Full Range.



EMERGENCY OPERATING PROCEDURE  
EP/3/A/1800/01

ENCLOSURE 7.3B  
Full Range SG Level Temperature Compensation



DIRECTIONS: To Temperature Compensate Full Range Level:

- 1) Read STEAM GEN OUTLET PRESS for desired SG from Control Room indication.
- 2) Intersect this Pressure line with the Full Range Level Curve.
- 3) Read DESIRED FULL RANGE LEVEL at intersection.
- 4) REFER TO Encl 7.5 (Level Corrections for High Reactor Building Temperature) to correct the DESIRED FULL RANGE LEVEL as necessary.

QVALUE 1.0

QUESTION 30

B10

Unit 1 Plant Conditions:

- Reactor Building pressure is 3.7 psig.
- ICCM Train B has failed.
- ICCM Train A is operating.
- The SCM program is in MANUAL and selected to OAC.
- All PR NIs indicate 7%.

The SCM windows (indicators) will display SCM calculations based ONLY on \_\_\_\_\_.

- A. RC loop A and B WR RCS pressure; RC hot leg A and B WR temperature; and the average of the 47 qualified and non-qualified CETCs
- B. RC loop A and B WR RCS pressure; RC hot leg A & B WR temperature; and the average of the 5 highest qualified CETCs
- C. ICCM RCS pressure and the average of the 5 highest CETCs for ICCM Train A and B
- D. ICCM RCS pressure and the average of the 47 CETCs not being used by the SSF for train A.

QVALUE 1.0

QUESTION 31

B11

Unit 3 Initial Plant Conditions:

- Reactor startup and power increase in progress.
- Reactor power is 50%.

Unit 3 Current Plant Conditions:

- Reactor has tripped.
- Startup FDW control valves (3FDW-35 and 44) failed closed.
- Main FDW block valves (3FDW-31 and 40) failed closed.
- 3FDW-315 (SG EFDW Control Valve to 3A SG) failed closed.
- Main FDW pump 3A operating (i.e., did not trip).

Which ONE of the following provides the levels at which SG 3A and 3B will stabilize? (Assume no operator actions.)

	<u>SG A XSUR Level</u>	<u>SG B XSUR Level</u>
A.	30 inches	25 inches
B.	25 inches	20 inches
C.	14 inches	20 inches
D.	14 inches	30 inches

QVALUE 1.0  
QUESTION 32

B12

Unit 3 Plant Conditions:

- Reactor has tripped from 90% power on RPS Anticipatory Trip.
- EOP immediate manual actions have been performed.
- Main Steam Stop Valves (MSSVs) are OPEN
- Main Steam Control Valves (MSCVs) are CLOSED
- Both Main FDWPs are operating.
- MSRVs are open; SG outlet press ~ 1030 psig.

Which ONE of the following is the required operator action?

**PLACE the ...**

- A. EHC pumps control switches to the OFF position.
- B. EHC pumps control switches to the PULL-TO-LOCK position.
- C. ICS Turbine station to HAND and lower ICS turbine demand to 0%.
- D. ICS Turbine Bypass Valves to HAND and lower setpoint to reseal MSRVs.

QVALUE 1.0

QUESTION 33

B14

Unit 3 Plant Conditions:

- CP-602, SG Cooldown with Saturated RCS is in progress.
- No HPI available.
- ICCM train "A" CETC's indicate 600°F.
- ICCM train "B" CETC's indicate 590°F.
- RCS pressure is 1540 psig and slowly decreasing.
- Reactor Building temperature is 95°F.
- Reactor Building pressure is 0 psig.
- EFDW is available to both SGs.

Which ONE of the following provides a set of SG conditions that satisfy the requirements for performing a rapid cooldown? (See ATTACHMENT)

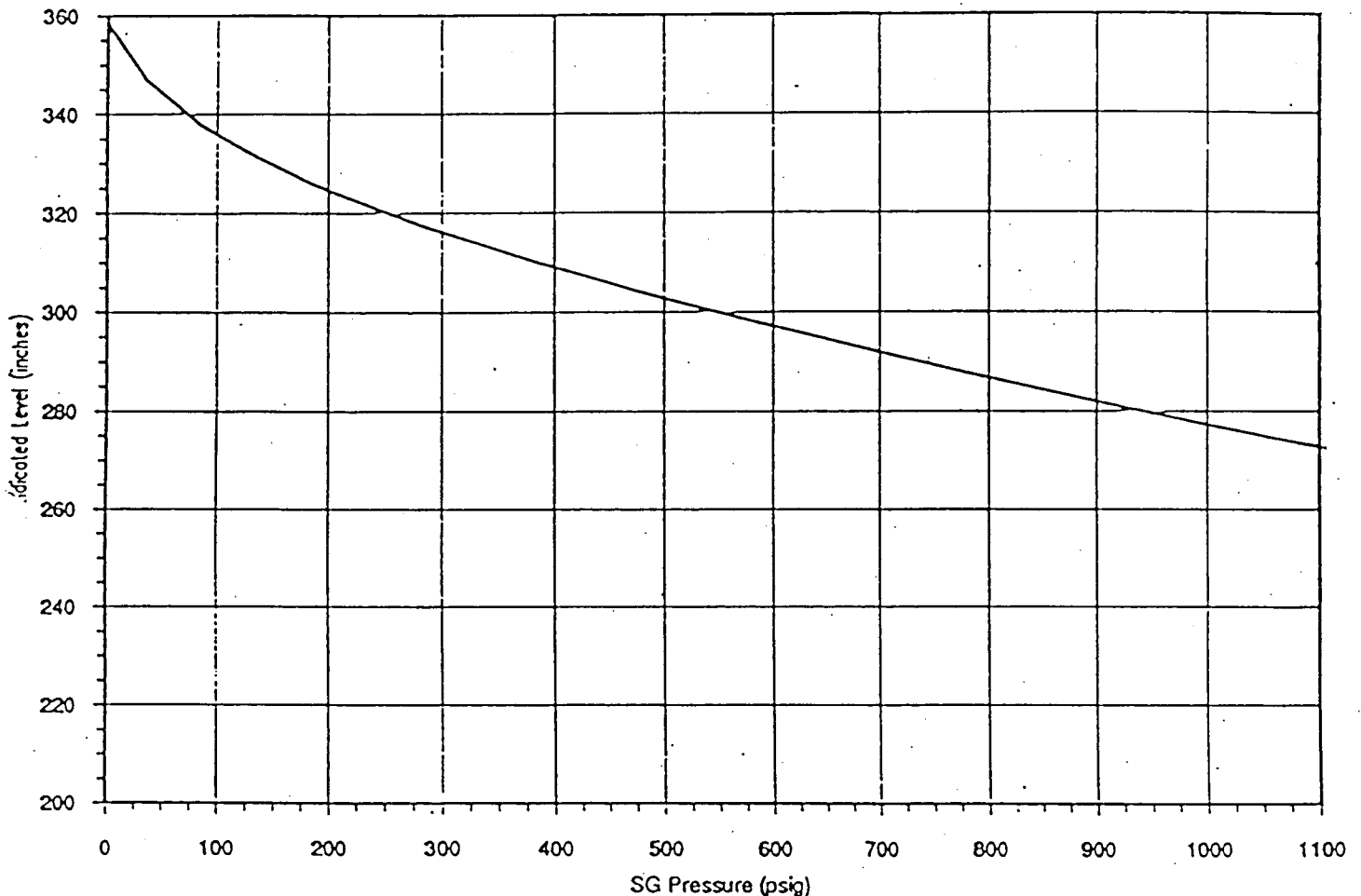
	<u>SG A XSUR</u>	<u>SG B XSUR</u>	<u>SG A and B Pressures</u>
A.	300 inches	295 inches	725 psig
B.	280 inches	290 inches	725 psig
C.	290 inches	300 inches	625 psig
D.	295 inches	280 inches	625 psig

Both 33

Unit 3  
Page 1 of 2

EMERGENCY OPERATING PROCEDURE  
EP/3/A/1800/01

ENCLOSURE 7.3A  
Extended Startup Range Loss of Subcooled  
Margin Setpoint



DIRECTIONS: To Determine the Loss of Subcooled Margin Setpoint:

- 1) Read STEAM GEN OUTLET PRESS for the desired SG from Control Room indication.
- 2) Intersect this Pressure line with the Loss of Subcooled Margin Setpoint curve.
- 3) Read DESIRED XSUR LEVEL at intersection.
- 4) REFER TO Encl 7.5 (Level Corrections for High Reactor Building Temperature) to correct the DESIRED XSUR LEVEL as necessary.

QVALUE 1.0

QUESTION 34

B15

Unit 1 Initial Plant Condition:

- MS Line B rupture at 100% power

Current Plant Conditions:

- Plant has been stabilized with 1B OTSG isolated.
- RCS "A" Loop Tc is 495°F and steady.
- RCS pressure is 1300 psig and steady.
- All RCPs are secured.
- Reactor Building pressure is 4.1 psig.

Which ONE of the following describes the action that must be taken by the operating crew?

Operation in TSOR is ...

(SEE ATTACHMENT)

- A. ...required; cooldown RCS as necessary to establish approximately 5°F SCM.
- B. ...required; prevent RCS repressurization and heatup.
- C. ...NOT required; cooldown RCS as necessary to establish approximately 5°F SCM.
- D. ...NOT required; prevent RCS repressurization and heatup.

# EMERGENCY OPERATING PROCEDURE

EP/1/A/1800/01

## ENCLOSURE 7.1B

### Abnormal Containment Cooldown Limits

**CAUTION** All subcooling margins should be maintained  $\geq 5^\circ\text{F}$  while depressurizing onto TSOR.

1.0 Maintain the RCS within the TSOR when either of the following conditions exist:

1.1 WHEN RCPs off

AND RCS temp ( $T_c$ )  $< 300^\circ\text{F}$ .

AND HPI operation in injection mode (IHP-26 or IHP-27 used).

THEN depressurize the RCS to maintain core subcooling margin =  $5^\circ\text{F}$ , if possible.

1.2 WHEN RCPs on.

AND Cooldown rate exceeds  $50^\circ\text{F}/\text{one-half Hr.}$

AND  $100^\circ\text{F}$  temperature change in  $T_c$  occurs.

THEN depressurize the RCS to maintain  $T_c$  in the TSOR.

**NOTE** 2.0 The TSOR 1 hour hold is not applicable for SBLOCAs or SG tube ruptures.

2.0 IF operation in the TSOR is required.

THEN stabilize RCS conditions in the TSOR.

AND maintain for 1 hour:

- Prevent heatup or repressurization.

3.0 IF depressurization is required.

THEN methods for depressurization are:

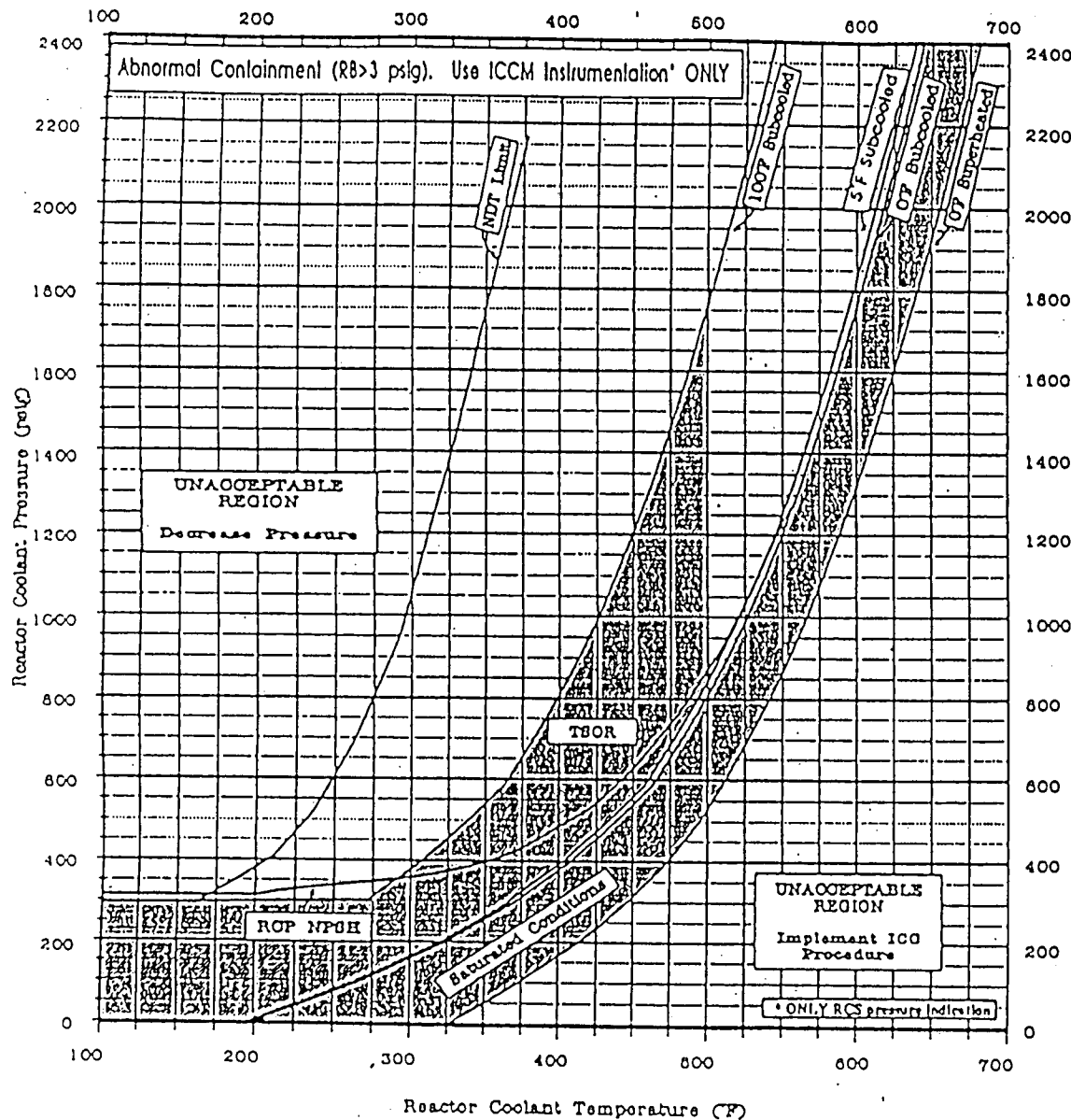
3.1 Use normal PZR spray (RCPs on).

3.2 Turn PZR heaters off and lower level.

3.3 If  $\Delta T < 410^\circ\text{F}$ , Aux. PZR Spray.

3.4 Open IRC-66 (PORV).

3.5 If  $\Delta T > 410^\circ\text{F}$ , Aux PZR spray (Emergency Coordinator authorization to violate  $410^\circ\text{F}$  AT).



Both 34



QVALUE 1.0

QUESTION 35

B16

Unit 3 Initial Plant Conditions:

- At 0811 the Reactor tripped on "RCS Low Pressure"
- At 0812 the "B" Loop SCM indicated 0°F.

Unit 3 Current Plant Conditions:

- Present time = 0815
- CETC's = 584°F
- RCS pressure = 1370 psig
- Reactor power level = 0%
- RCP's 3A1 and 3B2 are operating; motor ammeter fluctuating from 0.3 to 0.7 KA.

Which ONE of the following is the appropriate operator action?

- A. Trip operating RCPs and secure seal injection, CC, and LPSW to tripped RCPs.
- B. Trip one operating RCP and secure seal injection, CC, and LPSW to tripped RCPs.
- C. Leave operating RCPs running and maintain seal injection, CC, and LPSW to running RCPs.
- D. Start all available RCPs, and maintain seal injection, CC, and LPSW to running RCPs.

QVALUE 1.0

QUESTION 36

B18

Unit 1 Plant Conditions following a trip from 100%:

- EOP in progress.
- Reactor Building (RB) pressure is 2.8 psig and steady.
- RCS pressure is 250 psig and decreasing at 30 psig/minute.
- ES is injecting and PZR level is 50 inches and increasing.
- BWST level is 6 feet.
- Emergency Sump level is 1.8 feet and steady.
- 1A and 1B CFT level is 2.5 feet and decreasing slowly

Which ONE of the following is the adverse condition that the operating crew must consider when determining the mitigating actions that must be taken?

- A. An unmonitored release of radioactive water/gas from the Reactor Building may be occurring.
- B. Reactor Building Emergency Sump (RBES) level is too low for instrumentation to properly indicate level.
- C. LPIPs should be secured to allow RC pressure to decrease until both CFTs have completely dumped.
- D. Insufficient Reactor Building Emergency Sump (RBES) level is available for initiation of caustic addition.

QVALUE 1.0

QUESTION 37

B20

Unit 2 Plant Conditions:

- CP-601, Cooldown Following Large Break LOCA, is in progress
- 2A and 2B LPIP operating.
- 2LP-28 (BWST Outlet) locked OPEN
- Swap to the RBES is in progress:
  - 2LP-21 (BWST Suction to LPIP) failed OPEN.
  - 2LP-19 (RBES Suction to LPIP) failed CLOSED.
  - 2RIA-35 (LPSW Discharge) alarm.
  - RIA-31 (6-Point LPI Cooler Discharge), Point #4 2B LPI Cooler, HIGH alarm actuated.

Which ONE of the following describes the required operator actions?

**The operator will OPEN 2LP-20 (RBES Suction to LPIP) and...**

- A. ...close 2LP-28 (BWST Outlet), adjust 2A LPSW to 5500 gpm.
- B. ...close 2LP-28 (BWST Outlet), adjust 2A and 2B LPI header flow to 1500 gpm per header.
- C. ...start 2C LPIP, isolate LPI and LPSW to 2B LPI Cooler, close 2LP-22 (BWST Suction to LPIP).
- D. ...close 2LP-22 (BWST Suction to LPIP), start 2C LPIP and align it to the 2A LPI Header then adjust 2A LPI header flow to 5500 gpm.

QVALUE 1.0

QUESTION 38

B21

Unit 3 Plant Conditions:

- Reactor trip has occurred on Unit 3 at 0330 / 12-7-98 from 50% power.
- At 2130 / 12-7-98, the control room is recovering from HPI cooling.
- EFDW has become available and is being restored to SG 1A and 1B.
- RCP 1B2 is operating.

Which ONE of the following is the feed flow rate that must be established to EACH INDIVIDUAL SG to match reactor decay heat?

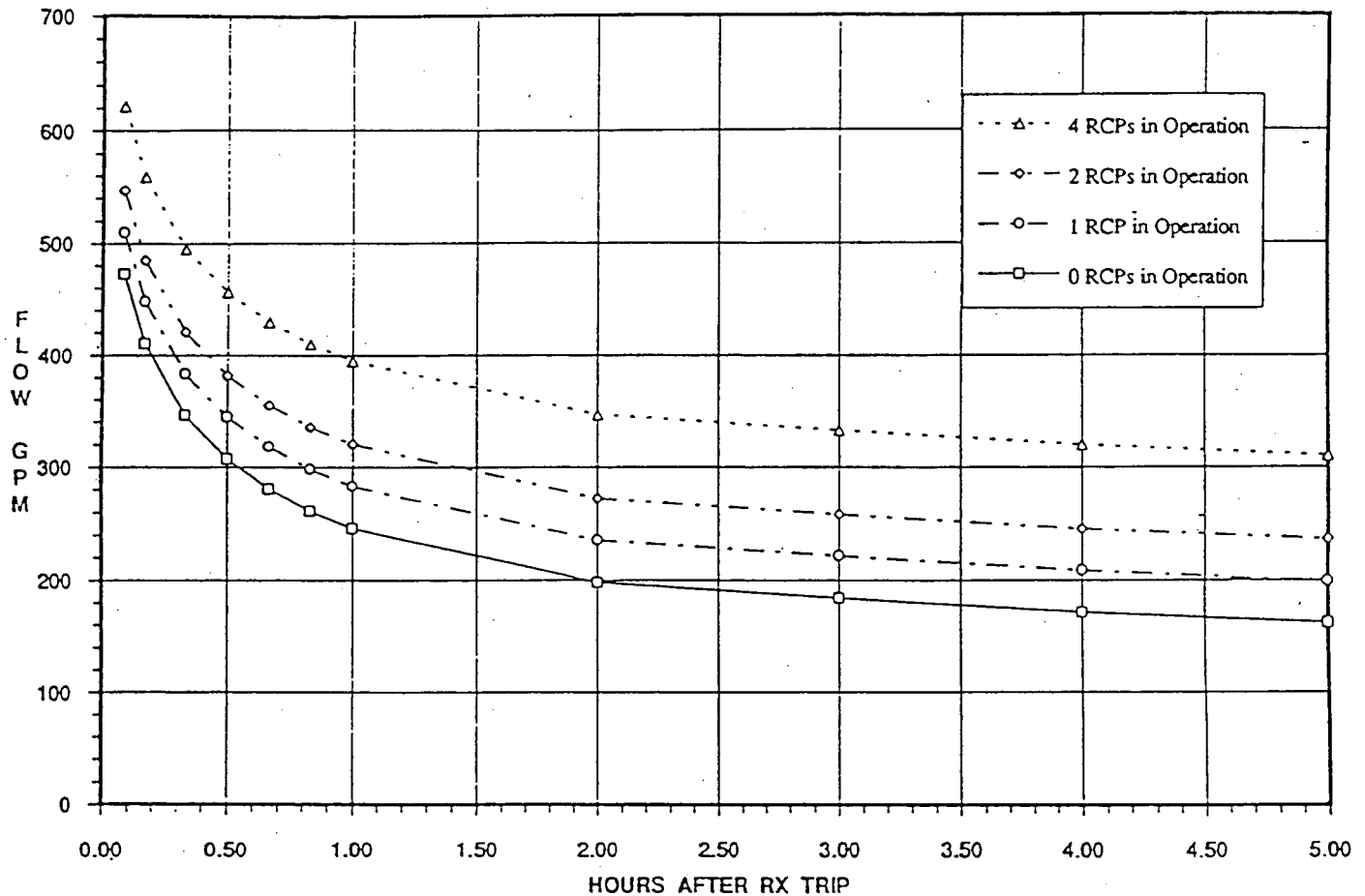
(SEE ATTACHMENT)

- A. 40 gpm
- B. 80 gpm
- C. 160 gpm
- D. 190 gpm

Booth 38

EMERGENCY OPERATING PROCEDURE  
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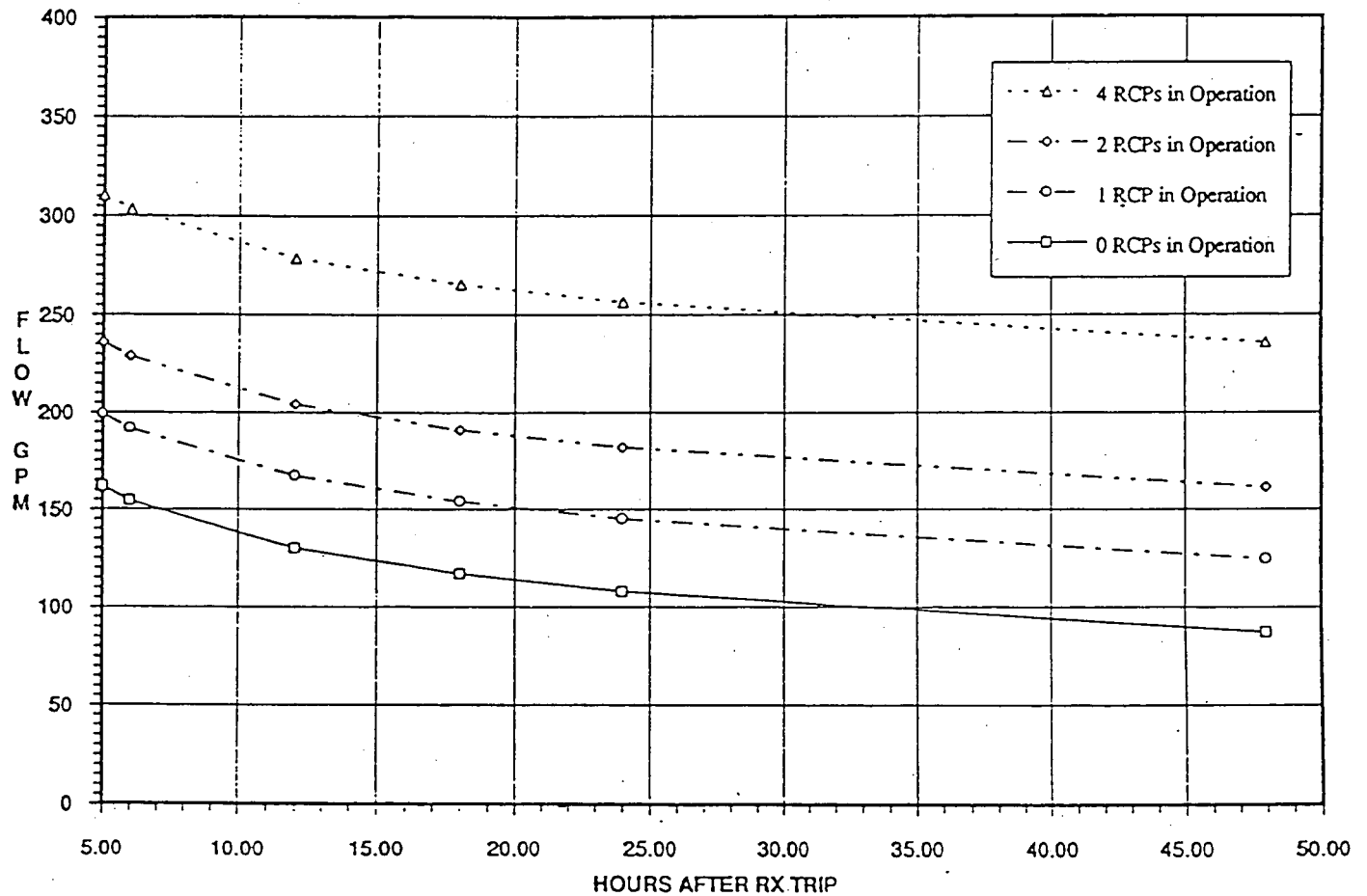
ENCLOSURE 7.6  
Total Feedwater Flow Required To Match NSSS Heat



Both 38

EMERGENCY OPERATING PROCEDURE  
EP/1/A/1800/01

ENCLOSURE 7.6  
Total Feedwater Flow Required To Match NSSS Heat



QVALUE 1.0

QUESTION 39

B22

During alignment of the SSF DC electrical system, the operator is cautioned NOT to open the SSF inverter DC input power breaker (CB-1) until the inverter is swapped to AC line.

Which ONE of the following is the expected adverse consequence if the operator fails to adhere to this precaution?

- A. KSF inverter power fuses may blow.
- B. SSF 600 volt load center XSF will be lost.
- C. Voltage spikes may damage loads on the bus.
- D. Automatic transfer of ES valves control power to SSF control room will occur.

QVALUE 1.0

QUESTION 40

B23

Unit 3 Plant Conditions:

- Section 507, Inadequate Core Cooling is in progress.
- RCS pressure is 183 psig.
- All HPIPs are operating.
- HPI header 3A flow is 600 gpm.
- HPI header 3B flow is 450 gpm.
- LPI header 3A flow is 1100 gpm.
- LPI header 3B flow is 3800 gpm.
- RB pressure is 22 psig
- RBES level is 2.5 feet and increasing.
- SG 3A and 3B pressures are 650 psig decreasing.
- SG 3A and 3B levels at 128 inches XSUR and increasing

Which ONE of the following plant conditions is indicated?

**A LOCA and ...**

- A. steam line rupture, HPIP 3B and LPIP 3B are in runout conditions.
- B. steam line rupture, HPI flow rates are less than the runout limits and an LPIP header 3B leak is indicated.
- C. the HPIP 3A and LPIP 3B are in runout conditions
- D. the HPI flow rates are less than runout limits and an LPI header 3B leak is indicated.



QVALUE 1.0

QUESTION 41

B24

Plant Conditions:

- Station Blackout is in progress.
- SSF D/G cannot be started due to fuel line rupture.
- SSF has been manned.
- No loads can be removed from SSF battery system.

Which ONE of the following is the TOTAL amount of time by design that BOTH the 125V DC DCSF and DCSFS batteries could provide DC power to the SSF?

- A. One hour
- B. Two hours
- C. Four hours
- D. Eight hours

QVALUE 1.0

QUESTION 42

B25

Plant Conditions:

- Unit 1 has experienced a total loss of AC power.
- The SSF has been manned and the RCS is being maintained at hot shutdown conditions.
- RCS temperature and pressure are stable at 555°F and 2155 psig.
- The PZR level is 200 inches and continuing to increase.

Which ONE of the following is the method for stabilizing PZR level at its present indication?

- A. Open 1HP-20 (RCP Seal Return) to establish seal leakoff flow to reduce RCS inventory.
- B. Throttle open SSF-1HP-426 (RC Letdown to SFP) to establish letdown to reduce RCS inventory.
- C. Throttle closed SSF-1HP-398 (RCMU Pump Discharge Valve) to reduce makeup flow rate
- D. Throttle open 1HP-405 (RCMU Test Line Valve) to reduce makeup flow rate.

QVALUE 1.0

QUESTION 43

B29

Unit 1 Conditions:

- LDST makeup is in progress from 1A BHUT.
- A Reactor trip occurs from 100% power.

3 minutes following the reactor trip:

- Instrument air (IA) header pressure instantaneously decreases to 30 psig and continues to decrease.

Which ONE of the following describes the expected position of 1HP-15 (LDST Makeup Control) and 1FDW-35 and 44 (Startup FDW Control)? (Assume NO operator actions)

	<u>1HP-15</u>	<u>1FDW-35 and -44</u>
A.	Closed	Closed
B.	Closed	Open
C.	Open	Open
D.	Open	Closed

QVALUE 1.0

QUESTION 44

B30

The following conditions exist:

- Keowee Hydro Unit (KHU) 1 is generating to the grid.
- KHU 2 is in Standby aligned to the Underground Power Path.
- ES 1 and 2 occur on Oconee Unit 2.
- A Switchyard Isolation Signal occurs and due to a fault, PCB-8 fails CLOSED.

Which ONE of the following describes KHU's 1 and 2 emergency power lineup, following these events?

**KHU-1... / KHU-2....**

- A. ...continues operating at rated speed and supplies the Yellow Bus via the Overhead Power Path and PCB-9. / ...emergency starts and supplies both Standby Buses via the Underground Power Path and CT-4.
- B. ...trips due to overspeed, emergency starts, operates at rated speed-no load / ...emergency starts and supplies the Standby Buses via the Underground Power Path and CT-4.
- C. ...trips and emergency lockout on overspeed / ...emergency starts and supplies the Yellow Bus via the Overhead Power Path and PCB-9.
- D. ...trips due to the fault on PCB-8 / ...emergency starts and supplies only Standby Bus #2 via the Underground Power Path and CT-4.

QVALUE 1.0

QUESTION 45

B31

Plant Conditions:

- Keowee Unit 1 is generating to the grid at 30 MWe.
- Keowee Unit 2 is aligned to the Underground.
- SL<sub>1</sub> and SL<sub>2</sub> (CT-5 STBY BUS 1&2 to MFB 1&2 FDR) CLOSED.
- S1<sub>1</sub> and S2<sub>1</sub> (Unit 1 - STBY Bus 1&2 to MFB 1&2) are in AUTOMATIC and CLOSED
- S1<sub>2</sub> and S2<sub>2</sub> (Unit 2 - STBY Bus 1&2 to MFB 1&2) are in AUTOMATIC and OPEN
- S1<sub>3</sub> and S2<sub>3</sub> (Unit 3 - STBY Bus 1&2 to MFB 1&2) are in AUTOMATIC and OPEN
- Transformer lockout occurs on 2T, (Unit 2 Aux. Transformer)
- Transformer lockout occurs on CT-2, (Unit 2 Startup Transformer)

Which ONE of the following occurs when power is regained to Unit 2 MFBs? (Assume NO operator action.)

- A. 2X4 will immediately energize.
- B. 2X5 and 2X6 will immediately energize.
- C. 2X4 will load shed and automatically reenergize after 30 seconds.
- D. 2X5 and 2X6 will load shed and automatically reenergize after 30 seconds.

QVALUE 1.0

QUESTION 46

B32

Unit 2 Plant Conditions:

- Unit 2 is being shutdown from 100% power using Emergency Boration in accordance with EOP Section 506, "Unanticipated Nuclear Power Production."
- Emergency boration has been in progress for 20 minutes.
- Flux levels on all NIs are decreasing.

Emergency Boration can be secured per the EOP when: (Choose ONE)

Less than 1% on the \_\_\_\_\_ and core subcooling margin is \_\_\_\_\_.

- A. Power Range NI's / 4°F.
- B. Power Range NI's / 9°F.
- C. Wide Range NI's / 4°F.
- D. Wide Range NI's / 9°F.

QVALUE 1.0

QUESTION 47

B34

Unit 1 Plant Conditions:

- CP-605, Subcooled Cooldown is being implemented.
- Vessel head level is 155 inches and increasing.
- Hot leg level A is 596 inches and steady.
- Loop B SCM = 90°F.
- All PZR heaters are on.
- PZR level is 210 inches and decreasing.
- HPI injection rate equals letdown flow rate with 1HP-120 (RC volume) in Manual.

Which ONE of the following describes the condition of voids in the reactor coolant system?

**A void exists ...**

- A. ...in the vessel head and both hot legs; the voids are collapsing in both the head and the hot legs.
- B. ...in the vessel head and both hot legs; excessive RCS leakage is preventing the collapse of the voids.
- C. ...only in the reactor vessel; the void in the vessel head is collapsing.
- D. ...only in the reactor vessel; excessive RCS leakage is preventing the collapse of the voids.

QVALUE 1.0

QUESTION 48

B35

Unit 3 Plant Conditions at the SSF:

- Plant has been placed in Hot Shutdown from the SSF, following a trip from 100% power.
- The plant has run for 360 days
- RCS pressure is 2150 psig.
- PZR level is 110 inches slowly increasing.
- All RCPs are OFF.
- $T_c$  is 535°F and slowly decreasing.
- 3A OTSG level is 180".
- 3B OTSG level is 180".

Which ONE of the following RCS conditions positively indicates that natural circulation is occurring?

	$T_h$	<u>Average CETCs</u>
A.	565°F, slowly decreasing	580°F, constant
B.	565°F, slowly decreasing	575°F, slowly decreasing
C.	580°F, slowly decreasing	590°F, constant
D.	580°F, slowly decreasing	575°F, slowly increasing



QVALUE 1.0

QUESTION 49

B37

Unit 1 Plant Conditions:

- AP/1/A/1700/21, High Activity in RC System is being implemented.
- Reactor Engineering has calculated that 0.75% of the fuel has failed.
- The reactor is being shutdown by reducing power at 3% FP/hour.
- A small SG 1A tube leak exists.

AP/1700/21 directs the operator to reduce power slowly instead of immediately tripping the reactor because a reactor trip would cause \_\_\_\_\_.

- A. an inaccurate calculation of the SG tube leak rate.
- B. the iodine activity in the reactor coolant to rapidly increase during fission product buildup.
- C. Dose Equivalent Iodine (DEI) activity to be masked by crud burst radioactive particulates.
- D. a required delay of more than 8 hours before initiating sampling activities for RCS Dose Equivalent Iodine (DEI) activity.

QVALUE 1.0

QUESTION 50

B38

Plant Conditions:

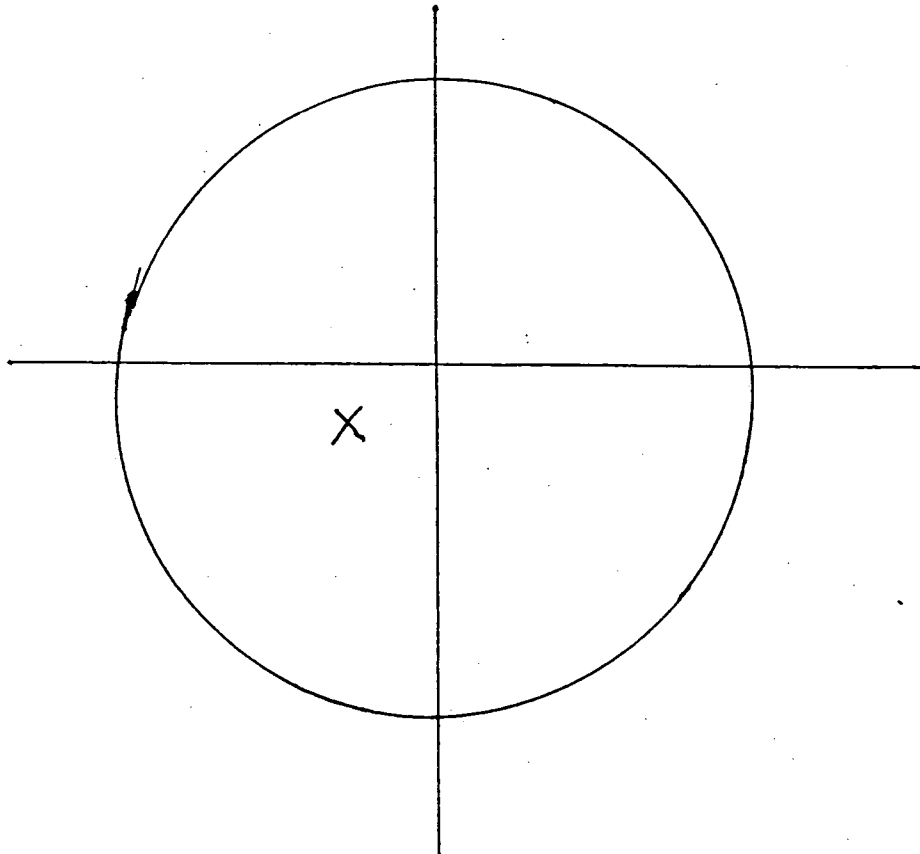
- Unit 2 at 70%
- ICS Reactor and Diamond is in MANUAL
- ALL other ICS stations are in AUTOMATIC
- Group 5 Rod 6 is dropped fully into the core

Which ONE of the following indicates the operators main concern with core power distribution?

**ASSUME NO OPERATOR ACTION.**

**REFER TO ATTACHEMENT for location of dropped rod.**

- A. Imbalance becomes more negative; Tave decreases and remains low.
- B. Imbalance becomes more positive; Tave decreases and returns to setpoint .
- C. Quadrant power tilt becomes more negative; Tave decreases and remains low.
- D. Quadrant power tilt becomes more positive; Tave decreases and returns to setpoint.



QVALUE 1.0

QUESTION 51

B39

Unit 2 Plant Conditions:

- Reactor power is 100%.
- SASS is in MANUAL
- PZR Level #2 selected
- An electrical "SHORT" of the PZR Temperature RTD "A" has just occurred.
- An electrical "OPEN" of the PZR Temperature RTD "B" has just occurred.

Unit 2 Control Room indications for PZR Level #1 and 3 will \_\_\_\_ / \_\_\_\_ , and PZR Saturation Pressure will \_\_\_\_\_.

- A. decrease / increase / increase
- B. increase / decrease / decrease
- C. increase / decrease / increase
- D. decrease / increase / decrease

QVALUE 1.0

QUESTION 52

B40

Unit 3 conditions:

- 25% turbine load
- 3MS-112 and 173, Second Stage Reheat (SSRH) valves are in AUTO.
- 3MS-77, 78, 80, & 81 (SSRH Steam Supply) valves are in AUTO.

Which ONE of the following describes the response of the SSRH valves for a loss of power to the SSRH Moore controllers?

- A. 3MS-77, 78, 80, & 81 (SSRH Steam Supply) valves will open and remain open after power is regained to the Moore controllers.
- B. 3MS-77, 78, 80, & 81 (SSRH Steam Supply) valves will close and remain closed if power is restored to the Moore controllers.
- C. 3MS-112/173 (SSRH Steam Supply) control valves will close and remain closed after power is regained to the Moore controllers.
- D. 3MS-112/173 (SSRH Steam Supply) control valves will fail "as-is" until power is restored to the Moore controllers.

QVALUE 1.0

QUESTION 53

B41

Which ONE of the following transient conditions will prevent the Turbine Master from automatically transferring to "HAND" on Unit 3?

- A. Power load unbalance at 56% reactor power.
- B. Loss of both Stator Coolant Pump at 789 Mwe.
- C. Loss of 2 operating RCPs at 56% reactor power.
- D. Dropped Reg. rod with Diamond in automatic at 798 MWe.

QVALUE 1.0

QUESTION 54

B42

Plant conditions:

- 1A GWD tank is being released from Unit 1 at 2/3 station release limit.
- Unit 2, PROCESS RADIATION MONITOR statalarm is received.
- 2RIA-45 (Norm Vent Gas) ALERT and HIGH alarms are indicated.
- (1)(2)(3)RIA-45 (Norm Vent Gas) have been properly set on each unit per PT/0/A/230/01, Radiation Monitor Check.

Which ONE of the following describes the action to be taken for this condition?

- A. Verify that 2RIA-45 (Norm Vent Gas) has automatically terminated the release.
- B. Manually terminate the 1A GWD tank release and investigate the cause of the high alarm on 2RIA-45 (Norm Vent Gas).
- C. Double the alarm setpoints for 2RIA-45 (Norm Vent Gas) and reduce 1&3 RIA-45 (Norm Vent Gas) setpoints by half and continue the release.
- D. Reduce the 1A GWD tank release flow rate by half and continue the release while obtaining revised release setpoints for 2RIA-45 (Norm Vent Gas).

QVALUE 1.0

QUESTION 55

B45

Unit 2 Plant Conditions:

- Reactor power is 16%.
- SG 2A and 2B levels are each at 24 inches and steady.
- ICS is in automatic.

Which ONE of the following describes the response of ICS if Tave is 578°F and decreasing?

- A. Reduce feed flow rate to each OTSG and withdraw control rods.
- B. Reduce feed flow rate to each OTSG and maintain current position of control rods.
- C. Maintain current feed flow rate to each OTSG and withdraw control rods.
- D. Maintain current feed flow rate to each OTSG and maintain current position of control rods.

QVALUE 1.0

QUESTION 56

B46

Unit 2 Plant Conditions:

- Reactor has tripped.
- 2KVIA AC vital power panelboard supply breaker trips
- RCS pressure is 900 psig, decreasing slowly.
- RB pressure is 3.4 psig, increasing slowly.

Which ONE of the following describes the Engineered Safeguards Channels that are expected to actuate?

**ANALOG CHANNELS... / DIGITAL CHANNELS...**

- A. ...B and C / ...1 and 2
- B. ...B and C / ...5 and 6
- C. ...A, B, and C / ...2, 4, 6
- D. ...A, B, and C / ...1, 3, 5



QVALUE 1.0

QUESTION 57

B47

Select the choice that completes the following statement for the Unit 2 Control Rod Drive System.

The control rod relative position indication (RPI) circuit provides a signal to the ...

- A. ...ICS dropped runback circuit
- B. ...Control rod sequence monitor
- C. ...Asymmetric rod alarm circuit
- D. ...Group average position indication

QVALUE 1.0

QUESTION 58

B49

During a Unit 1 reactor startup following a reactor trip (BOL), the following conditions occur:

The OATC and SRO in the Control Room are monitoring the approach to the ECP of 55% on Group 6, when, the operator notices the following withdrawn Rod positions:

Group 1-4	@	100%
Group 5	@	95%
Group 6	@	5%
Group 7	@	0%
Group 8	@	32%

Which ONE of the following describes the IMMEDIATE corrective operator action required to meet Technical Specifications for Control Rod Group and Power Distribution?

- A. Insert group 5 rods to 80%.
- B. Insert group 5 rods to 70%.
- C. Withdraw group 6 rods to 10%.
- D. Withdraw group 6 rods to 30%.

QVALUE 1.0

QUESTION 59

B50

Which ONE of the following conditions must the operator mitigate the QUICKEST ?

- A. CC inlet header to the CRDMs ruptures.
- B. 1A1 RCP Seal Cooler Outlet valve fails closed.
- C. Both Letdown Coolers develop a leak requiring isolation.
- D. RCP Seal Return filter clogs and  $\Delta P$  increases above 25 psid.

QVALUE 1.0

QUESTION 60

B53

Unit 1 Plant Conditions:

- A LOCA has occurred.
- RB Pressure is 9 psig and slowly approaching 10 psig.
- All ESF systems have actuated as expected.

Which ONE of the following statements describes the proper operation of the RB Spray system as RB pressure continues to increase?

- A. RB spray may be defeated if all RBCUs are operating in slow speed to minimize RB equipment degradation from acidic spray
- B. RB spray is manually initiated and remains in operation to prevent exceeding RB design pressure of 10 psig and Hydrogen concentration < 3%.
- C. Verify proper actuation of RB spray and operate spray flow to reduce containment pressure to less than 3 psig, then spray may be secured.
- D. Verify proper actuation of RB spray and operate spray flow to reduce containment pressure to less than 10 psig, then spray may be secured if all RBCUs are operating in high speed.

QVALUE 1.0

QUESTION 61

B54

Unit 2 Plant Conditions:

- A normal plant startup is in progress.
- RCS WR Pressure at 885 psig and slowly decreasing.
- PZR Saturation Pressure at 885 psig and slowly decreasing.
- PZR Level at 120" (inches) and slowly decreasing.
- Quench Tank Pressure is 45 psig and slowly increasing.

Which ONE of the following is the expected PORV tailpipe temperature if the PZR PORV is leaking by?  
(Assume PZR steam quality is 100%.)

- A. 532°F
- B. 360°F
- C. 325°F
- D. 300°F

QVALUE 1.0

QUESTION 81

B95

Unit 2 Plant Conditions:

- Unit 2 is shutdown and a heatup is in progress.
- RCS pressure is 445 psig and increasing.
- PORV setpoint selector switch is in LOW.
- Quench tank pressure is 3.5 psig.
- Quench tank level is 84 inches and increasing.
- Quench tank temperature is 100° F and slowly increasing.
- RC-66 (PORV) tailpipe temperature 211°F and increasing slowly.
- RC-67 (Safety) tailpipe temperature 235°F and increasing.
- RC-68 (Safety) tailpipe temperature 213°F and increasing slowly..

Which ONE of the following would result in these plant conditions?

- A. The PORV has lifted as required and is not reseated.
- B. The PORV is chattering at the low pressure lift setpoint.
- C. One of the PZR code safety valves is not properly seated.
- D. Both of the PZR code safety valves are chattering.

QVALUE 1.0

QUESTION 82

B96

Unit 3 RBCU conditions:

- RBCU 3A is operating in HIGH.
- RBCU 3B is operating in HIGH.
- RBCU 3C is operating in HIGH.
- RBCU 3B damper is open (vertical).

Current plant conditions:

- A grid electrical transient has just occurred.
- RBCU 3C tripped
- RBCU 3B damper remains open (vertical).

**If Unit 3 RBCUs respond as expected, operator action will be required because**

\_\_\_\_\_.

- A. Unit 3 can be operated in this configuration with no time limit.
- B. Running RBCUs will experience high vibration requiring shifting to low speed.
- C. 3B RBCU damper position will cause abnormally high temperature pockets in the A SG RB compartment.
- D. 3B RBCU damper position will cause abnormally high temperature pockets in the B SG RB compartment.

QVALUE 1.0

QUESTION 83

B101

Unit 3 Plant Conditions:

- LT-5 A/B (RV Level) indicates 84 inches
- LPI is operating in the purification mode.
- Reactor vessel level must be lowered 4 inches during maintenance.

Which ONE of the following is the LPI flow path that is used to lower reactor vessel level?

- A. LDST bypass valve to BHUT
- B. Loop cold leg drains to the BHUT
- C. Bleed Transfer Pump to the BWST
- D. Component Drain Pump to the BWST



QVALUE 1.0

QUESTION 84

B103

Unit 2 Plant Conditions:

- RCS temperature is 100° F.
- RCS pressure is 29 psig.
- RB equipment hatch is open.

Which ONE of the following describes a RB purge lineup that would PREVENT a radioactive release?

- A. Main purge fan is operating at full flow and < GWR limitations.
- B. Mini purge fan is operating at full flow and < GWR limitations.
- C. Main purge fan operating at a reduced flow rate of 9,000 cfm.
- D. Mini purge fan operating at a reduced flow rate of 9,000 cfm.

QVALUE 1.0  
QUESTION 85

B104

Plant conditions:

- 2MS-104 and -105 (2B OTSG Main Steam Stop Valves) have just failed shut.
- Reactor has tripped from 100% power.
- SG 2B pressure is 1025 psig and decreasing.

Which ONE of the following explains the response of OTSG 2B Main Steam Relief Valves (MSRVs) to the closure of the Main Steam Stop Valves, including maximum expected blowdown?

- A. MSRV (Main Steam Relief Valve) is stuck open, all MSRVs should reclose by 1060 psig
- B. MSRV is stuck open, all MSRVs should reclose by 1039 psig
- C. Normal response, all MSRVs should reclose by 1010 psig
- D. Normal response, all MSRVs should reclose by 977 psig

QVALUE 1.0

QUESTION 86

B105

Unit 2 Plant Conditions:

- A LOCA is in progress.
- 2SA-8, B10 (Process Radiation Monitor) statalarm actuated
- RIA-39 (Control Room radiation gas monitor) high alarm is received

Which ONE of the following describes the appropriate operator actions?

Manually start \_\_\_\_\_ outside air booster fan(s) AND verify control room manometer pressure indicates \_\_\_\_\_

- A. both / + .15 inches of water.
- B. both / - .15 inches of water.
- C. one / - 1.5 inches of water.
- D. one / + 1.5 inches of water.

QVALUE 1.0

QUESTION 87

B106

Plant Conditions:

- Unit 2 is operating at 75% power.
- IA header pressure is 85 psig and decreasing rapidly.
- IA compressor B is operating (Worthington).
- IA compressor A is out of service (Worthington).
- AIA compressor for Unit 2 cannot be started.
- AIA pressure at 90 psig for Unit 1 and 3.

Which ONE of the following describes the expected response of Auxiliary Instrument Air (AIA) and the Unit 2 CRDM cooling (CC) system?

AIA ...

- A. ...provides air pressure to hold 2CC-8 (CRDM cooling valve) open, supply cooling water to the CRDMs.
- B. ...pressure not adequate, and 2CC-8 will close at 80 psig but the operator can manually open it locally to supply cooling water to CRDMs.
- C. ...pressure not adequate, and 2CC-8 will close at 80 psig preventing the restoration of cooling water before CRDMs temperatures require a manual reactor trip.
- D. ...compressor will recover IA pressure to 2CC-8 but the operator must open 2CC-8 and restart 2CC pumps from the control room to provide cooling water to the CRDMs.

QVALUE 1.0

QUESTION 88

B107

Plant conditions:

- The air supply to the Elevated Water Storage Tank (EWST) level indicator is accidentally pinched closed UPSTREAM of the sensor during maintenance activities.

Which ONE of the following describes the expected response of the EWST level indication and the response of the operator? (Assume the HPSW pump automatic controls are functioning properly.)

- A. High EWST level is indicated and the operator should verify both HPSW pumps are OFF.
- B. High EWST level is indicated, and the operator should start HPSW pumps as necessary to maintain EWST level.
- C. Low EWST level is indicated, and the operator must stop HPSW pumps as necessary to prevent the EWST from overflowing.
- D. Low EWST level is indicated, and the operator should start HPSW pumps as necessary to maintain EWST level.

QVALUE 1.0

QUESTION 89

B108

Which ONE of the following describes a design basis function of the HPSW pumps and the elevated water storage tank?

- A. Full backup for the LPSW system upon a loss of all LPSW pumps during a station blackout.
- B. Full backup for sealing water flow to the CCW pumps during a station blackout.
- C. Automatic backup cooling water to the primary instrument air compressor upon loss of all LPSW during a LOOP.
- D. Automatic backup cooling water to the MDEFDW pumps during loss of LPSW.

QVALUE 1.0

QUESTION 90

B109

Unit 1 Plant conditions:

- Preparations for reactor startup are in progress.
- RCS temperature is 190 deg. F.
- RCS has been filled and vented.
- A nitrogen bubble has been established in the PZR.
- Quench tank level is 80 inches and steady.
- Quench tank temperature is 82 deg. F and steady.
- Quench tank pressure is 4.5 psig.
- PZR vent valve (1GWD-17) is throttled 50% open.
- Quench tank vent path aligned and vent valve (1GWD-13) is closed.
- Lineup to draw a steam bubble in the PZR has just been completed.

Which ONE of the following indicates that a saturated steam bubble without non-condensable gasses is being established in the PZR?

- A. RCS pressure starts to increase, and 1GWD-17 is fully open.
- B. PZR Aux spray is open (flow steady), and RCS pressure is 46 psig and increasing.
- C. Quench tank pressure 6 psig and increasing, while venting through its vent path.
- D. After cycling 1GWD-13 open then closed, quench tank pressure is at 1 psig and steady.

QVALUE 1.0

QUESTION 91

B110

Plant Conditions:

- Unit 3 shutdown and cooldown is in progress.
- RCS pressure is 375 psig and decreasing.

As RCS pressure decreases, which ONE of the following is the LPI mode of decay heat removal that FIRST becomes available and the RCS pressure at which this mode may be started?

- A. 350 psig and decreasing; high pressure mode
- B. 320 psig and decreasing; high pressure mode
- C. 290 psig and decreasing; normal decay heat removal mode
- D. 125 psig and decreasing; normal decay heat removal mode



QVALUE 1.0

QUESTION 92

B113

Unit 3 Plant Conditions:

- Unit 3 has been operating at 100% power for 15 days.
- 3RIA-40 (Air Ejector Off Gas) count rate has doubled over the past 4 hours.
- 3RIA-32 (Penetration Room Point) has alarmed high.
- Penetration Room Ventilation fans are off.
- Penetration Room Ventilation fan discharge damper is closed.
- 3A GWD tank release is in progress (1/3 station limit).
- GWR Flow Discharge Controller is 100% open.
- Release flow rate and RIA-37 and 38 within release limits.

Which ONE of the following conditions is indicated by radiation process monitors 3RIA-40 AND 3RIA-32?

**3RIA-40 indicates that... / 3RIA-32 indicates that...**

- A. ...a SG tube leak has developed / ...radioactive gasses are leaking into the Penetration Room.
- B. ...a SG tube leak has developed / ...an abnormal radiation condition exists in the vent stack.
- C. ...the GWD release is increasing vent stack radiation / ...radioactive gasses are leaking into the Penetration Room.
- D. ...the GWD release is increasing vent stack radiation / ...an abnormal radiation condition exists in the vent stack.

QVALUE 1.0

QUESTION 93

B114

Unit 1 Plant Conditions:

- The CRO is transferring Group 6 control rods from the NORMAL to AUXILIARY power supply
- The CRO has performed all actions in accordance with OP/0/A/1105/009, CRD System.

The following indications/actions have occurred:

- JOG speed switch selected
- SEQUENCE OVERRIDE light - ON
- AUXILIARY light - ON
- CLAMP light - ON
- MANUAL TRANSFER pushbutton depressed
- TRANSFER CONFIRM light - OFF.
- Group 6 CONTROL ON light - OFF.

Which ONE of the following describes the response of the group 6 control rods if the operator places the rod movement switch ("joy stick") to the drive "IN" position and then releases it after 3 seconds?

- A. Will drive in continuously.
- B. Will drive in then stop.
- C. Will not move.
- D. Will drop.

QVALUE 1.0

QUESTION 94

B115

Initial Plant Conditions:

- Stations are in AUTOMATIC.
- Unit 3 is at 80% power.

Current Plant Conditions occur concurrently:

- Statalarm FWP 3B tripped.
- Total RC flow is 74%.
- RCP 3A1 ammeter reads 0.55 KA
- RCP 3A2 ammeter reads 0.10 KA
- RCP 3B1 ammeter reads 0.52 KA
- RCP 3B2 ammeter reads 0.51 KA

Which ONE of the following describes the response of Unit 3?

(Assume reactor trip does not occur).

Reactor power decreases to \_\_\_\_\_ / at \_\_\_\_\_ / ...

- A. 74% / 20%/min. / then decreases to 65% at 25%/min.
- B. 65% / 20%/min. / and stabilizes.
- C. 74% / 25%/min / then decreases to 65% at 20%/min.
- D. 65% / 25%/min. / and stabilizes.

QVALUE 1.0

QUESTION 95

B118

Initial Plant Conditions:

- Unit 3 is operating at 98% power.
- All ICS stations are in AUTOMATIC.

Current Plant Conditions:

- Unit 3 condenser vacuum has degraded slowly from 28.5 to 26.5 inches Hg.

Which ONE of the following describes the response of the plant?

**Reactor power ...**

- A. remains the same, and FDW flow and main steam flow remain the same.
- B. remains the same, and FDW flow and main steam flow decrease and stabilize.
- C. decreases slightly and stabilizes, as FDW and main steam flow remains the same and FDW temperature increases and stabilizes.
- D. decreases slightly and stabilizes, as FDW and main steam flow decreases and FDW temperature increases and stabilizes.

QVALUE 1.0

QUESTION 96

B119

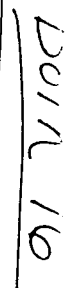
Unit 3 Plant Conditions:

- Unit 3 has tripped.
- Unit 3 control room has been evacuated.
- SSF has been manned.
- OTSG A and B are being fed using SSF Auxiliary Service Water (ASW).
- SSF 3CCW-268 (SSF ASWP to SG Supply) is fully closed.
- SSF 3CCW-410 (SSF ASWP to SG Supply Bypass) has been throttled fully open.
- CETCs are increasing slowly
- OTSG 3A and 3B levels are 55 inches and slowly decreasing.

Which ONE of the following describes the proper operator action required to control plant decay heat removal per AP/1700/25, SSF Emergency Operating Procedure, Enclosure 6.7, CCW-268 and 410 Operating Guidelines?

**SEE ATTACHMENT**

- A. Throttle 3CCW-287 (SSF ASWP to SG Supply Block) open .
- B. Cycle 3CCW-268 (SSF ASWP to SG Supply) open and closed.
- C. Open 3CCW-268 (SSF ASWP to SG Supply) and close 3CCW-410 (SSF ASWP to SG Supply Bypass).
- D. Cycle 3CCW-268 (SSF ASWP to SG Supply) and 3CCW-410 (SSF ASWP to SG Supply Bypass) open and closed.



THIS DRAWING SHOWS ALL UNITS

NOTE: BEARING IS A MAGNETIC NORTH BEARING FOR COMPOSITE SECTION  
NORTH TO SOUTH FROM WEST TO EAST BEARING LISTED BELOW

QFD-1210-1.1, 2.1, 3.1 QFD-1220-2.5	EPW HEADERS TO S/G'S SSF AUT. SERVICE WATER MAIN
--	---

[illegible]

QVALUE 1.0

QUESTION 97

B121

Unit 1 Initial Plant conditions:

- Unit 1 is at 45% power and ramping to full power.
- S/G Master Red lamp is OFF and White lamp is ON.
- All other ICS Stations are in AUTOMATIC.

Current Plant Conditions:

- All Load Control Panel indications go blank.
- S/G Master Bailey Hand lamp goes OFF and Automatic lamp remains OFF.
- ICS AUTO POWER FAILURE statalarm is lit.
- EL ICS INVERTER SYSTEM TROUBLE statalarm is lit.

Which ONE of the following describes the initial response of the MFDW flow control valves and the Feedwater Pump Turbines (FWPT)? (Assume no operator action is taken.)

Main FDW flow control valves will \_\_\_\_ AND / FWPT speed will \_\_\_\_.

- A. open / increase.
- B. open / remain the same.
- C. remain in their last position / increase.
- D. remain in their last position / remain the same.

QVALUE 1.0

QUESTION 98

B122

Unit 3 Plant Conditions:

- Unit 3 has been shutdown to Hot Shutdown to inspect for unidentified primary leakage.
- Statalarm PROCESS MONITOR RADIATION HIGH has just been received.
- 3RIA-45 (Unit 3 Normal Vent Gas Radiation Monitor) indicates  $8.2 \times 10^5$  cpm in yellow and increasing slowly on the Sorrento Screen.
- 3RIA-46 (Unit 3 High Vent Gas Radiation Monitor) indicates 0 cpm
- 3RIA-49 (Unit 3 Normal Gas Radiation Monitor) indicates 0 cpm.
- 3RIA49A (Unit 3 High Gas Radiation Monitor) indicates 0 cpm.
- RB mini purge is operating.
- RBES is being pumped to radwaste.

Which ONE of the following describes the status of the plant?

- A. RB sump has failed to isolate and LWD-2 (RB normal sump isolation) must be manually isolated immediately.
- B. RB purge has failed to isolate and PR-2, 3, 4, and 5 (purge isolations) must be manually isolated immediately.
- C. RIA-49/49A are indicating as expected at the point of switchover and the RB sump automatic isolation trip setpoint has not been reached.
- D. RIA-45/46 are indicating as expected prior to the point of switchover and the RB purge automatic isolation trip setpoint has not been reached.



QVALUE 1.0

QUESTION 99

B124

Initial Plant Conditions:

- Unit 1 shutdown for outage with welding in progress in 1UB2.
- Unit 2 at 100% power.
- Unit 3 at 90% power.

Current Plant Conditions:

- Fire in 1UB2 resulted in heavy smoke in control room.
- Unit 2 Statalarm received:
  - ICS AUTO POWER FAILURE
  - ICS INVERTER SYSTEM TROUBLE
- The Unit 1 and Unit 2 Control Rooms have been evacuated.
- Unit 2 CRD breakers have been opened and the reactor has tripped.
- An operator has been stationed at the Unit 2 Auxiliary Shutdown Panel (ASP) in the Turbine Building.

Which ONE of the following describes the operator action that will provide control of turbine bypass valves (TBVs) using the TBV Loop A and B controllers from the ASP?

- A. Adjust POS demand to zero, select HAND mode, then manually adjust the TBV position using the "Hand" knob.
- B. Match POS demand with MEAS VAR, select AUTOMATIC mode, then manually adjust the TBV pressure setpoint using the "Hand" knob.
- C. Adjust POS demand to zero, select HAND mode, place TBV Power Transfer switch to KU EMERG, then manually adjust the TBV position using the "Hand" knob.
- D. Match POS demand with MEAS VAR, select AUTOMATIC mode, place TBV Power Transfer switch to KU EMERG, then manually adjust the TBV position using the "Hand" knob.

QVALUE 1.0

QUESTION 100

B125

Unit 1 Plant Conditions:

- Power Range (PR) NI's indicate approximately 1%.
- Source Range (SR) NI-1, 2, 3, and 4 indicate full scale.
- Wide Range (WR) NI-1, 2, and 4 indicate 1% to 2%.
- WR NI-3 indicates failed low.

Which ONE of the following describes the expected indications and operation for the safety related nuclear instrument recorder on VB-1?

Recorder will indicate...

- A. lower, and the operator may select NI-1, 2, or 4 for indication.
- B. lower, and the operator will not be able to select an alternate indication.
- C. 1% to 2%, and the operator will not be able to select an alternate indication.
- D. 1% to 2%, and the operator may select between NI-1, 2, or 4 for indication.

SRO and RO Answer Key - 1-25

SRO #

S2 1 D  
S4 2 A  
S6 3 C  
S17 4 A  
S19 5 D  
S27 6 D  
S28 7 D  
S51 8 D  
S52 9 B  
S55 10 D  
S64 11 C  
S65 12 A  
S66 13 B  
S70 14 B  
S71 15 B  
S74 16 B  
S75 17 B  
S76 18 B  
S79 19 B  
S80 20 A  
S81 21 B  
S97 22 C  
S100 23 C  
S117 24 C  
S120 25 C

RO

R3 1 B  
R5 2 C  
R13 3 B  
R26 4 B  
R33 5 D  
R43 6 A  
R44 7 C  
R48 8 B  
R62 9 B  
R68 10 B  
R69 11 B  
R73 12 C  
R77 13 A  
R78 14 C  
R82 15 D  
R93 16 A  
R94 17 B  
R98 18 B  
R99 19 B  
R102 20 A  
R111 21 A  
R112 22 C  
R116 23 B  
R123 24 C  
R126 25 B

ANSWER KEY - BOTH 26 - 100

B1	26	D	B91	79	A
B7	27	B	B92	80	D
B8	28	D	B95	81	C
B9	29	C	B96	82	D
B10	30	A	B101	83	A
B11	31	D	B103	84	A
B12	32	B	B104	85	D
B14	33	A	B105	86	A
B15	34	B	B106	87	A
B16	35	C	B107	88	D
B18	36	A	B108	89	B
B20	37	A	B109	90	D
B21	38	A	B110	91	C
B22	39	A	B113	92	B
B23	40	D	B114	93	D
B24	41	B	B115	94	D
B25	42	B	B118	95	A
B29	43	A	B119	96	B
B30	44	B	B121	97	D
B31	45	D	B122	98	D
B32	46	D	B124	99	A
B34	47	C	B125	100	B
B35	48	B			
B37	49	B			
B38	50	D			
B39	51	D			
B40	52	C			
B41	53	D			
B42	54	B			
B45	55	D			
B46	56	C			
B47	57	B			
B49	58	A			
B50	59	A			
B53	60	C			
B55	61	C			
B56	62	C			
B57	63	D			
B58	64	A			
B59	65	A			
B60	66	D			
B61	67	C			
B63	68	B			
B67	69	A			
B72	70	C			
B83	71	D			
B84	72	C			
B85	73	B			
B86	74	C			
B87	75	B			
B88	76	B			
B89	77	B			
B90	78	A			

QVALUE 1.0

QUESTION 31

B11

Unit 3 Initial Plant Conditions:

- Reactor startup and power increase in progress.
- Reactor power is 50%.

Unit 3 Current Plant Conditions:

- Reactor has tripped.
- Startup FDW control valves (3FDW-35 and 44) failed closed.
- Main FDW block valves (3FDW-31 and 40) failed closed.
- 3FDW-315 (SG EFDW Control Valve to 3A SG) failed closed.
- Main FDW pump 3A operating (i.e., did not trip).

Which ONE of the following provides the levels at which SG 3A and 3B will stabilize? (Assume no operator actions.)

	<u>SG A XSUR Level</u>	<u>SG B XSUR Level</u>
A.	30 inches	25 inches
B.	25 inches	20 inches
C.	14 inches	20 inches
D.	14 inches	30 inches

QVALUE 1.0  
QUESTION 32

B12

Unit 3 Plant Conditions:

- Reactor has tripped from 90% power on RPS Anticipatory Trip.
- EOP immediate manual actions have been performed.
- Main Steam Stop Valves (MSSVs) are OPEN
- Main Steam Control Valves (MSCVs) are CLOSED
- Both Main FDWPs are operating.
- MSRVs are open; SG outlet press ~ 1030 psig.

Which ONE of the following is the required operator action?

**PLACE the ...**

- A. EHC pumps control switches to the OFF position.
- B. EHC pumps control switches to the PULL-TO-LOCK position.
- C. ICS Turbine station to HAND and lower ICS turbine demand to 0%.
- D. ICS Turbine Bypass Valves to HAND and lower setpoint to reseal MSRVs.

QVALUE 1.0

QUESTION 33

B14

Unit 3 Plant Conditions:

- CP-602, SG Cooldown with Saturated RCS is in progress.
- No HPI available.
- ICCM train "A" CETC's indicate 600°F.
- ICCM train "B" CETC's indicate 590°F.
- RCS pressure is 1540 psig and slowly decreasing.
- Reactor Building temperature is 95°F.
- Reactor Building pressure is 0 psig.
- EFDW is available to both SGs.

Which ONE of the following provides a set of SG conditions that satisfy the requirements for performing a rapid cooldown? (See ATTACHMENT)

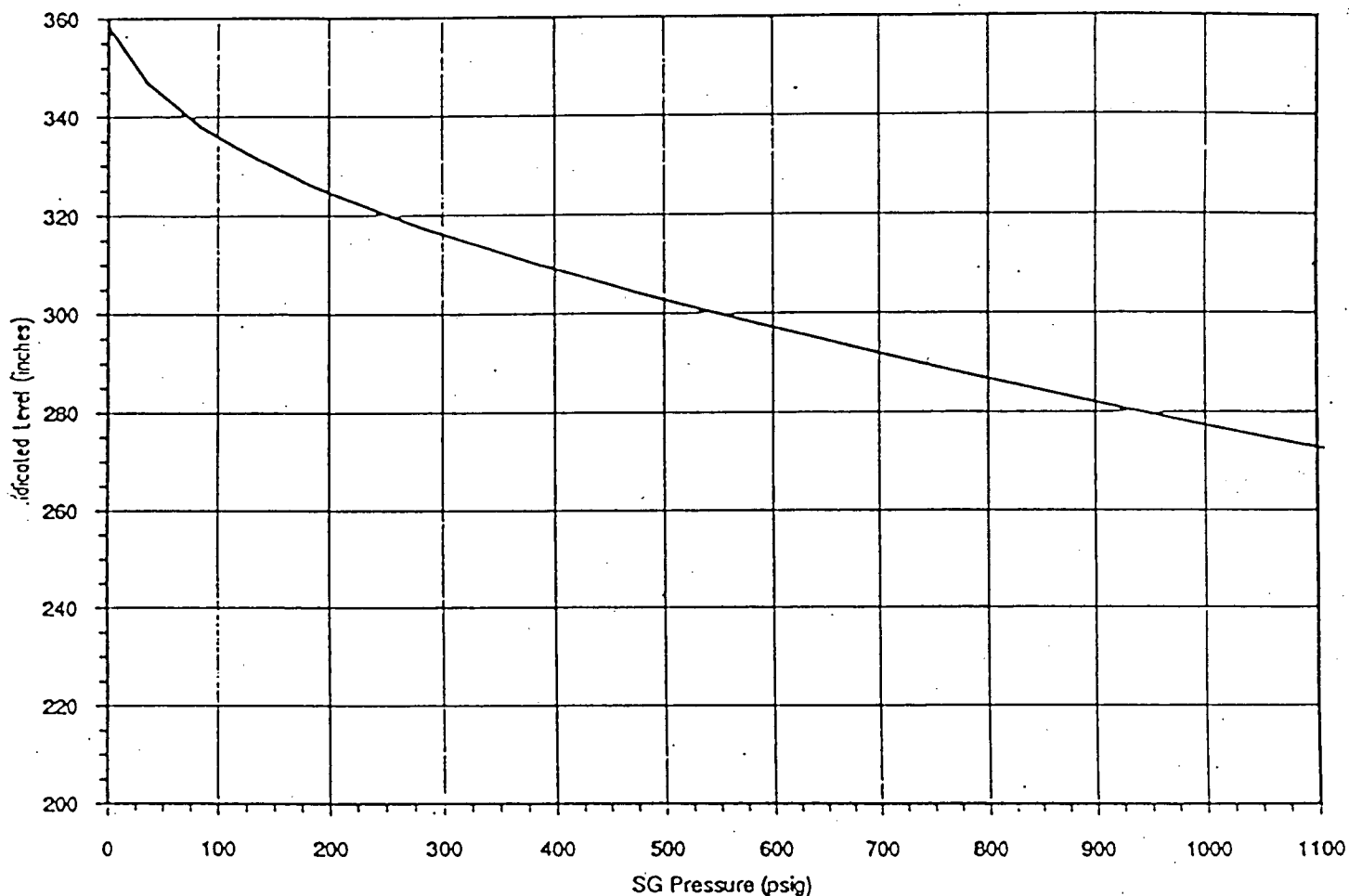
	<u>SG A XSUR</u>	<u>SG B XSUR</u>	<u>SG A and B Pressures</u>
A.	300 inches	295 inches	725 psig
B.	280 inches	290 inches	725 psig
C.	290 inches	300 inches	625 psig
D.	295 inches	280 inches	625 psig

Both 33

Unit 3  
Page 1 of 2

EMERGENCY OPERATING PROCEDURE  
EP/3/A/1800/01

ENCLOSURE 7.3A  
Extended Startup Range Loss of Subcooled  
Margin Setpoint



DIRECTIONS: To Determine the Loss of Subcooled Margin Setpoint:

- 1) Read STEAM GEN OUTLET PRESS for the desired SG from Control Room indication.
- 2) Intersect this Pressure line with the Loss of Subcooled Margin Setpoint curve.
- 3) Read DESIRED XSUR LEVEL at intersection.
- 4) REFER TO Encl 7.5 (Level Corrections for High Reactor Building Temperature) to correct the DESIRED XSUR LEVEL as necessary.



QVALUE 1.0

QUESTION 34

B15

Unit 1 Initial Plant Condition:

- MS Line B rupture at 100% power

Current Plant Conditions:

- Plant has been stabilized with 1B OTSG isolated.
- RCS "A" Loop Tc is 495°F and steady.
- RCS pressure is 1300 psig and steady.
- All RCPs are secured.
- Reactor Building pressure is 4.1 psig.

Which ONE of the following describes the action that must be taken by the operating crew?

Operation in TSOR is ...

(SEE ATTACHMENT)

- A. ...required; cooldown RCS as necessary to establish approximately 5°F SCM.
- B. ...required; prevent RCS repressurization and heatup.
- C. ...NOT required; cooldown RCS as necessary to establish approximately 5°F SCM.
- D. ...NOT required; prevent RCS repressurization and heatup.

ENCLOSURE 7.1B

Abnormal Containment Cooldown Limits

**CAUTION** All subcooling margins should be maintained  $\geq 5^\circ\text{F}$  while depressurizing onto TSOR.

1.0 Maintain the RCS within the TSOR when either of the following conditions exist:

1.1 WHEN RCPs off  
AND RCS temp ( $T_c$ )  $< 500^\circ\text{F}$ .  
AND HPI operation in injection mode (IHP-26 or IHP-27 used).  
THEN depressurize the RCS to maintain core subcooling margin =  $5^\circ\text{F}$ , if possible.

1.2 WHEN RCPs on.  
AND Cooldown rate exceeds  $50^\circ\text{F}/\text{one-half Hr.}$ .  
AND  $100^\circ\text{F}$  temperature change in  $T_c$  occurs.  
THEN depressurize the RCS to maintain  $T_c$  in the TSOR.

**NOTE** 2.0 The TSOR 1 hour hold is not applicable for SBLOCAs or SG tube ruptures.

2.0 IF operation in the TSOR is required,  
THEN stabilize RCS conditions in the TSOR,  
AND maintain for 1 hour:  
• Prevent heatup or repressurization.

3.0 IF depressurization is required,  
THEN methods for depressurization are:

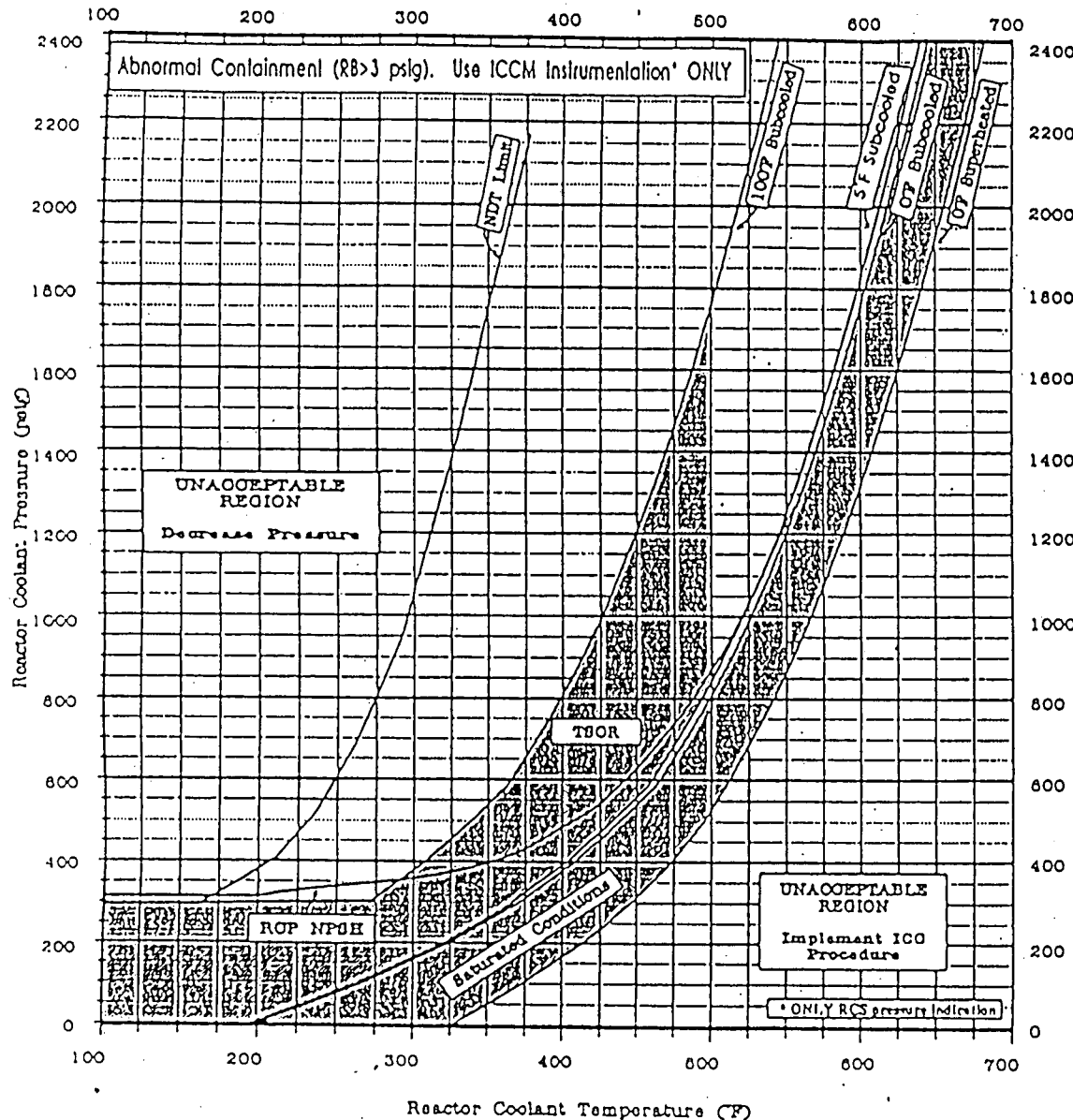
3.1 Use normal PZR spray (RCPs on).

3.2 Turn PZR heaters off and lower level.

3.3 If  $\Delta T < 410^\circ\text{F}$ , Aux. PZR Spray.

3.4 Open IRC-66 (PORV).

3.5 If  $\Delta T > 410^\circ\text{F}$ , Aux PZR spray (Emergency Coordinator authorization to violate  $410^\circ\text{F } \Delta T$ ).



Both 34

QVALUE 1.0

QUESTION 35

B16

Unit 3 Initial Plant Conditions:

- At 0811 the Reactor tripped on "RCS Low Pressure"
- At 0812 the "B" Loop SCM indicated 0°F.

Unit 3 Current Plant Conditions:

- Present time = 0815
- CETC's = 584°F
- RCS pressure = 1370 psig
- Reactor power level = 0%
- RCP's 3A1 and 3B2 are operating; motor ammeter fluctuating from 0.3 to 0.7 KA.

Which ONE of the following is the appropriate operator action?

- A. Trip operating RCPs and secure seal injection, CC, and LPSW to tripped RCPs.
- B. Trip one operating RCP and secure seal injection, CC, and LPSW to tripped RCPs.
- C. Leave operating RCPs running and maintain seal injection, CC, and LPSW to running RCPs.
- D. Start all available RCPs, and maintain seal injection, CC, and LPSW to running RCPs.

QVALUE 1.0

QUESTION 36

B18

Unit 1 Plant Conditions following a trip from 100%:

- EOP in progress.
- Reactor Building (RB) pressure is 2.8 psig and steady.
- RCS pressure is 250 psig and decreasing at 30 psig/minute.
- ES is injecting and PZR level is 50 inches and increasing.
- BWST level is 6 feet.
- Emergency Sump level is 1.8 feet and steady.
- 1A and 1B CFT level is 2.5 feet and decreasing slowly

Which ONE of the following is the adverse condition that the operating crew must consider when determining the mitigating actions that must be taken?

- A. An unmonitored release of radioactive water/gas from the Reactor Building may be occurring.
- B. Reactor Building Emergency Sump (RBES) level is too low for instrumentation to properly indicate level.
- C. LPIPs should be secured to allow RC pressure to decrease until both CFTs have completely dumped.
- D. Insufficient Reactor Building Emergency Sump (RBES) level is available for initiation of caustic addition.

QVALUE 1.0

QUESTION 37

B20

Unit 2 Plant Conditions:

- CP-601, Cooldown Following Large Break LOCA, is in progress
- 2A and 2B LPIP operating.
- 2LP-28 (BWST Outlet) locked OPEN
- Swap to the RBES is in progress:
  - 2LP-21 (BWST Suction to LPIP) failed OPEN.
  - 2LP-19 (RBES Suction to LPIP) failed CLOSED.
  - 2RIA-35 (LPSW Discharge) alarm.
  - RIA-31 (6-Point LPI Cooler Discharge), Point #4 2B LPI Cooler, HIGH alarm actuated.

Which ONE of the following describes the required operator actions?

The operator will OPEN 2LP-20 (RBES Suction to LPIP) and...

- A. ...close 2LP-28 (BWST Outlet), adjust 2A LPSW to 5500 gpm.
- B. ...close 2LP-28 (BWST Outlet), adjust 2A and 2B LPI header flow to 1500 gpm per header.
- C. ...start 2C LPIP, isolate LPI and LPSW to 2B LPI Cooler, close 2LP-22 (BWST Suction to LPIP).
- D. ...close 2LP-22 (BWST Suction to LPIP), start 2C LPIP and align it to the 2A LPI Header then adjust 2A LPI header flow to 5500 gpm.

QVALUE 1.0

QUESTION 38

B21

Unit 3 Plant Conditions:

- Reactor trip has occurred on Unit 3 at 0330 / 12-7-98 from 50% power.
- At 2130 / 12-7-98, the control room is recovering from HPI cooling.
- EFDW has become available and is being restored to SG 1A and 1B.
- RCP 1B2 is operating.

Which ONE of the following is the feed flow rate that must be established to EACH INDIVIDUAL SG to match reactor decay heat?

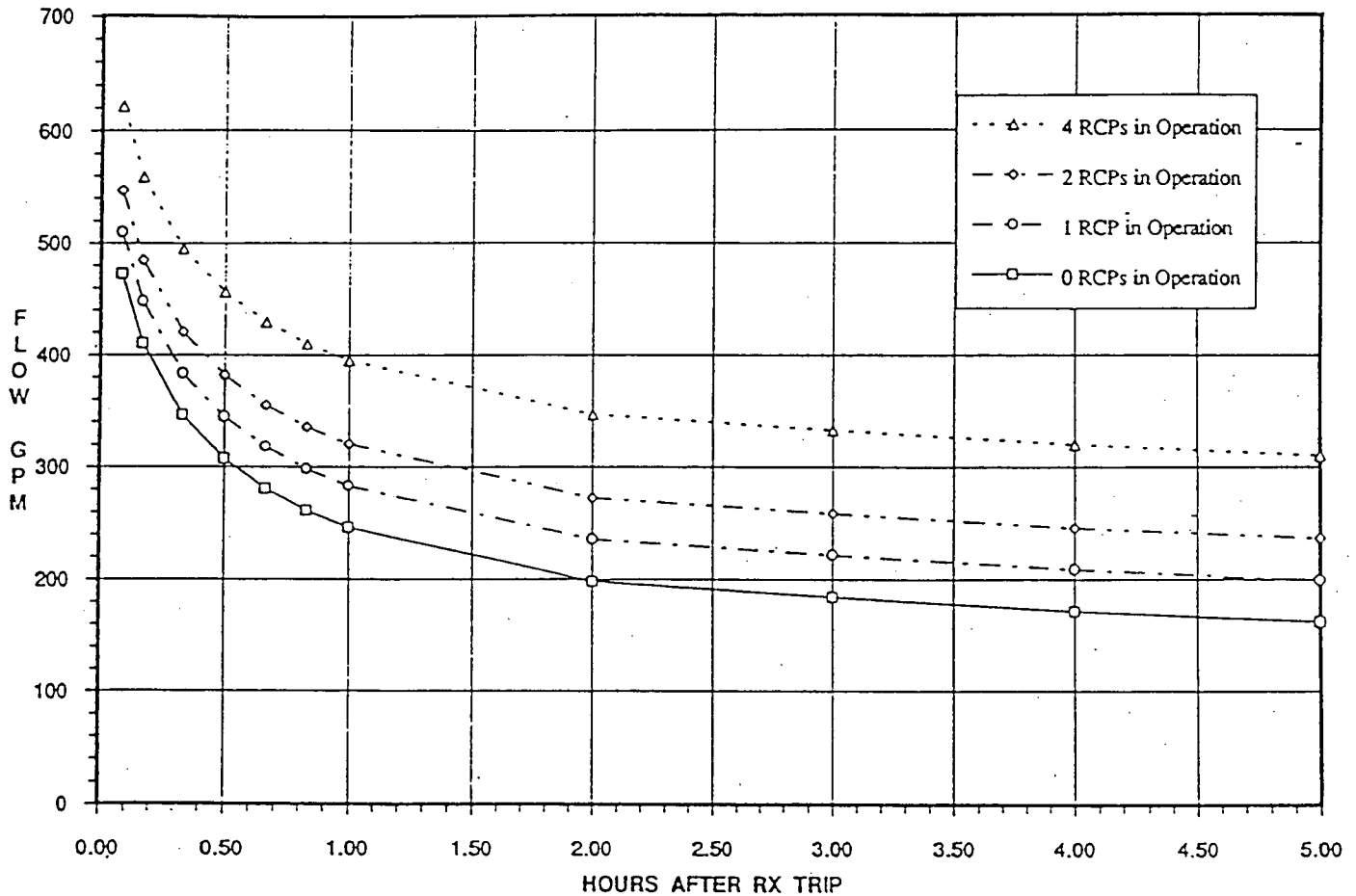
(SEE ATTACHMENT)

- A. 40 gpm
- B. 80 gpm
- C. 160 gpm
- D. 190 gpm

Booth 38

EMERGENCY OPERATING PROCEDURE  
EP/1/A/1800/01

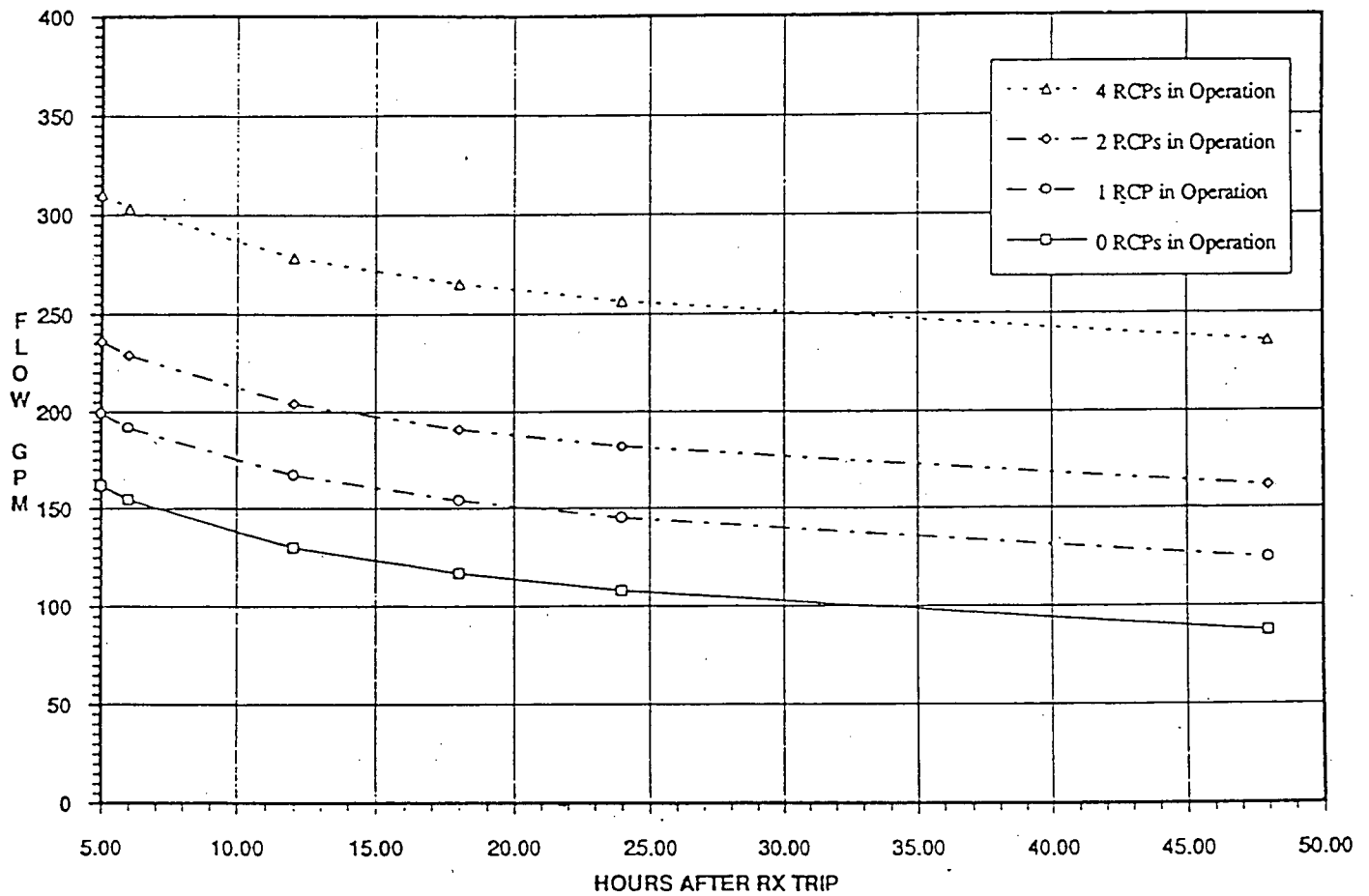
ENCLOSURE 7.6  
Total Feedwater Flow Required To Match NSSS Heat



Both 38

EMERGENCY OPERATING PROCEDURE  
EP/1/A/1800/01

ENCLOSURE 7.6  
Total Feedwater Flow Required To Match NSSS Heat





QVALUE 1.0

QUESTION 39

B22

During alignment of the SSF DC electrical system, the operator is cautioned NOT to open the SSF inverter DC input power breaker (CB-1) until the inverter is swapped to AC line.

Which ONE of the following is the expected adverse consequence if the operator fails to adhere to this precaution?

- A. KSF inverter power fuses may blow.
- B. SSF 600 volt load center XSF will be lost.
- C. Voltage spikes may damage loads on the bus.
- D. Automatic transfer of ES valves control power to SSF control room will occur.

QVALUE 1.0

QUESTION 40

B23

Unit 3 Plant Conditions:

- Section 507, Inadequate Core Cooling is in progress.
- RCS pressure is 183 psig.
- All HPIPs are operating.
- HPI header 3A flow is 600 gpm.
- HPI header 3B flow is 450 gpm.
- LPI header 3A flow is 1100 gpm.
- LPI header 3B flow is 3800 gpm.
- RB pressure is 22 psig
- RBES level is 2.5 feet and increasing.
- SG 3A and 3B pressures are 650 psig decreasing.
- SG 3A and 3B levels at 128 inches XSUR and increasing

Which ONE of the following plant conditions is indicated?

**A LOCA and ...**

- A. steam line rupture, HPIP 3B and LPIP 3B are in runout conditions.
- B. steam line rupture, HPI flow rates are less than the runout limits and an LPIP header 3B leak is indicated.
- C. the HPIP 3A and LPIP 3B are in runout conditions
- D. the HPI flow rates are less than runout limits and an LPI header 3B leak is indicated.

QVALUE 1.0

QUESTION 41

B24

Plant Conditions:

- Station Blackout is in progress.
- SSF D/G cannot be started due to fuel line rupture.
- SSF has been manned.
- No loads can be removed from SSF battery system.

Which ONE of the following is the TOTAL amount of time by design that BOTH the 125V DC DCSF and DCSFS batteries could provide DC power to the SSF?

- A. One hour
- B. Two hours
- C. Four hours
- D. Eight hours

QVALUE 1.0

QUESTION 42

B25

Plant Conditions:

- Unit 1 has experienced a total loss of AC power.
- The SSF has been manned and the RCS is being maintained at hot shutdown conditions.
- RCS temperature and pressure are stable at 555°F and 2155 psig.
- The PZR level is 200 inches and continuing to increase.

Which ONE of the following is the method for stabilizing PZR level at its present indication?

- A. Open 1HP-20 (RCP Seal Return) to establish seal leakoff flow to reduce RCS inventory.
- B. Throttle open SSF-1HP-426 (RC Letdown to SFP) to establish letdown to reduce RCS inventory.
- C. Throttle closed SSF-1HP-398 (RCMU Pump Discharge Valve) to reduce makeup flow rate
- D. Throttle open 1HP-405 (RCMU Test Line Valve) to reduce makeup flow rate.

QVALUE 1.0

QUESTION 43

B29

Unit 1 Conditions:

- LDST makeup is in progress from 1A BHUT.
- A Reactor trip occurs from 100% power.

3 minutes following the reactor trip:

- Instrument air (IA) header pressure instantaneously decreases to 30 psig and continues to decrease.

Which ONE of the following describes the expected position of 1HP-15 (LDST Makeup Control) and 1FDW-35 and 44 (Startup FDW Control)? **(Assume NO operator actions)**

	<u>1HP-15</u>	<u>1FDW-35 and -44</u>
A.	Closed	Closed
B.	Closed	Open
C.	Open	Open
D.	Open	Closed

QVALUE 1.0

QUESTION 44

B30

The following conditions exist:

- Keowee Hydro Unit (KHU) 1 is generating to the grid.
- KHU 2 is in Standby aligned to the Underground Power Path.
- ES 1 and 2 occur on Oconee Unit 2.
- A Switchyard Isolation Signal occurs and due to a fault, PCB-8 fails CLOSED.

Which ONE of the following describes KHU's 1 and 2 emergency power lineup, following these events?

**KHU-1... / KHU-2....**

- A. ...continues operating at rated speed and supplies the Yellow Bus via the Overhead Power Path and PCB-9. / ...emergency starts and supplies both Standby Buses via the Underground Power Path and CT-4.
- B. ...trips due to overspeed, emergency starts, operates at rated speed-no load / ...emergency starts and supplies the Standby Buses via the Underground Power Path and CT-4.
- C. ...trips and emergency lockout on overspeed / ...emergency starts and supplies the Yellow Bus via the Overhead Power Path and PCB-9.
- D. ...trips due to the fault on PCB-8 / ...emergency starts and supplies only Standby Bus #2 via the Underground Power Path and CT-4.

QVALUE 1.0

QUESTION 45

B31

Plant Conditions:

- Keowee Unit 1 is generating to the grid at 30 MWe.
- Keowee Unit 2 is aligned to the Underground.
  
- SL<sub>1</sub> and SL<sub>2</sub> (CT-5 STBY BUS 1&2 to MFB 1&2 FDR) CLOSED.
- S1<sub>1</sub> and S2<sub>1</sub> (Unit 1 - STBY Bus 1&2 to MFB 1&2) are in AUTOMATIC and CLOSED
- S1<sub>2</sub> and S2<sub>2</sub> (Unit 2 - STBY Bus 1&2 to MFB 1&2) are in AUTOMATIC and OPEN
- S1<sub>3</sub> and S2<sub>3</sub> (Unit 3 - STBY Bus 1&2 to MFB 1&2) are in AUTOMATIC and OPEN
  
- Transformer lockout occurs on 2T, (Unit 2 Aux. Transformer)
- Transformer lockout occurs on CT-2, (Unit 2 Startup Transformer)

Which ONE of the following occurs when power is regained to Unit 2 MFBs? (Assume NO operator action.)

- A. 2X4 will immediately energize.
- B. 2X5 and 2X6 will immediately energize.
- C. 2X4 will load shed and automatically reenergize after 30 seconds.
- D. 2X5 and 2X6 will load shed and automatically reenergize after 30 seconds.

QVALUE 1.0

QUESTION 46

B32

Unit 2 Plant Conditions:

- Unit 2 is being shutdown from 100% power using Emergency Boration in accordance with EOP Section 506, "Unanticipated Nuclear Power Production."
- Emergency boration has been in progress for 20 minutes.
- Flux levels on all NIs are decreasing.

Emergency Boration can be secured per the EOP when: (Choose ONE)

Less than 1% on the \_\_\_\_\_ and core subcooling margin is \_\_\_\_\_.

- A. Power Range NI's / 4°F.
- B. Power Range NI's / 9°F.
- C. Wide Range NI's / 4°F.
- D. Wide Range NI's / 9°F.



QVALUE 1.0

QUESTION 47

B34

Unit 1 Plant Conditions:

- CP-605, Subcooled Cooldown is being implemented.
- Vessel head level is 155 inches and increasing.
- Hot leg level A is 596 inches and steady.
- Loop B SCM = 90°F.
- All PZR heaters are on.
- PZR level is 210 inches and decreasing.
- HPI injection rate equals letdown flow rate with 1HP-120 (RC volume) in Manual.

Which ONE of the following describes the condition of voids in the reactor coolant system?

**A void exists ...**

- A. ...in the vessel head and both hot legs; the voids are collapsing in both the head and the hot legs.
- B. ...in the vessel head and both hot legs; excessive RCS leakage is preventing the collapse of the voids.
- C. ...only in the reactor vessel; the void in the vessel head is collapsing.
- D. ...only in the reactor vessel; excessive RCS leakage is preventing the collapse of the voids.

QVALUE 1.0

QUESTION 48

B35

Unit 3 Plant Conditions at the SSF:

- Plant has been placed in Hot Shutdown from the SSF, following a trip from 100% power.
- The plant has run for 360 days
- RCS pressure is 2150 psig.
- PZR level is 110 inches slowly increasing.
- All RCPs are OFF.
- $T_c$  is 535°F and slowly decreasing.
- 3A OTSG level is 180".
- 3B OTSG level is 180".

Which ONE of the following RCS conditions positively indicates that natural circulation is occurring?

	$T_h$	<u>Average CETCs</u>
A.	565°F, slowly decreasing	580°F, constant
B.	565°F, slowly decreasing	575°F, slowly decreasing
C.	580°F, slowly decreasing	590°F, constant
D.	580°F, slowly decreasing	575°F, slowly increasing

QVALUE 1.0

QUESTION 49

B37

Unit 1 Plant Conditions:

- AP/1/A/1700/21, High Activity in RC System is being implemented.
- Reactor Engineering has calculated that 0.75% of the fuel has failed.
- The reactor is being shutdown by reducing power at 3% FP/hour.
- A small SG 1A tube leak exists.

AP/1700/21 directs the operator to reduce power slowly instead of immediately tripping the reactor because a reactor trip would cause \_\_\_\_\_.

- A. an inaccurate calculation of the SG tube leak rate.
- B. the iodine activity in the reactor coolant to rapidly increase during fission product buildup.
- C. Dose Equivalent Iodine (DEI) activity to be masked by crud burst radioactive particulates.
- D. a required delay of more than 8 hours before initiating sampling activities for RCS Dose Equivalent Iodine (DEI) activity.

QVALUE 1.0

QUESTION 50

B38

Plant Conditions:

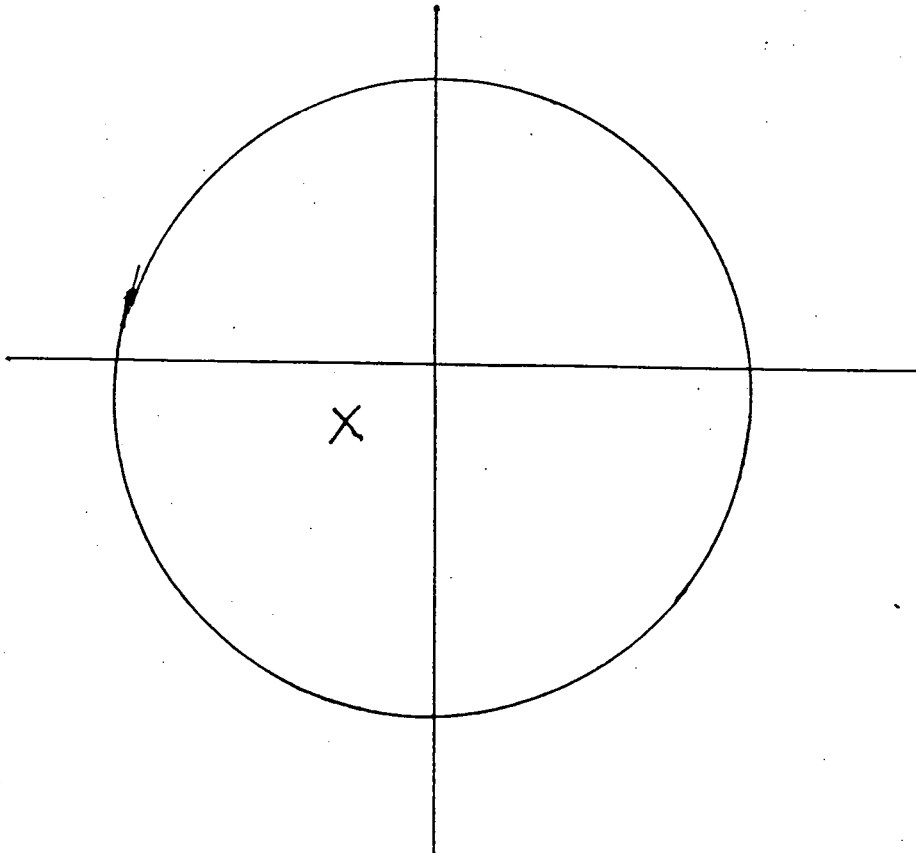
- Unit 2 at 70%
- ICS Reactor and Diamond is in MANUAL
- ALL other ICS stations are in AUTOMATIC
- Group 5 Rod 6 is dropped fully into the core

Which ONE of the following indicates the operators main concern with core power distribution?

**ASSUME NO OPERATOR ACTION.**

**REFER TO ATTACHEMENT for location of dropped rod.**

- A. Imbalance becomes more negative; Tave decreases and remains low.
- B. Imbalance becomes more positive; Tave decreases and returns to setpoint .
- C. Quadrant power tilt becomes more negative; Tave decreases and remains low.
- D. Quadrant power tilt becomes more positive; Tave decreases and returns to setpoint.



QVALUE 1.0

QUESTION 51

B39

Unit 2 Plant Conditions:

- Reactor power is 100%.
- SASS is in MANUAL
- PZR Level #2 selected
- An electrical "SHORT" of the PZR Temperature RTD "A" has just occurred.
- An electrical "OPEN" of the PZR Temperature RTD "B" has just occurred.

Unit 2 Control Room indications for PZR Level #1 and 3 will \_\_\_\_ / \_\_\_\_ , and PZR Saturation Pressure will \_\_\_\_\_.

- A. decrease / increase / increase
- B. increase / decrease / decrease
- C. increase / decrease / increase
- D. decrease / increase / decrease

QVALUE 1.0

QUESTION 52

B40

Unit 3 conditions:

- 25% turbine load
- 3MS-112 and 173, Second Stage Reheat (SSRH) valves are in AUTO.
- 3MS-77, 78, 80, & 81 (SSRH Steam Supply) valves are in AUTO.

Which ONE of the following describes the response of the SSRH valves for a loss of power to the SSRH Moore controllers?

- A. 3MS-77, 78, 80, & 81 (SSRH Steam Supply) valves will open and remain open after power is regained to the Moore controllers.
- B. 3MS-77, 78, 80, & 81 (SSRH Steam Supply) valves will close and remain closed if power is restored to the Moore controllers.
- C. 3MS-112/173 (SSRH Steam Supply) control valves will close and remain closed after power is regained to the Moore controllers.
- D. 3MS-112/173 (SSRH Steam Supply) control valves will fail "as-is" until power is restored to the Moore controllers.

QVALUE 1.0

QUESTION 53

B41

Which ONE of the following transient conditions will prevent the Turbine Master from automatically transferring to "HAND" on Unit 3?

- A. Power load unbalance at 56% reactor power.
- B. Loss of both Stator Coolant Pump at 789 Mwe.
- C. Loss of 2 operating RCPs at 56% reactor power.
- D. Dropped Reg. rod with Diamond in automatic at 798 MWe.

**U.S. Nuclear Regulatory Commission  
Site-Specific  
Written Examination****Applicant Information**

Name:	Region: I / <u>II</u> / III / IV
Date: <u>12-7-98</u>	Facility/Unit: <u>Oconee / 1, 2 &amp; 3</u>
License Level: RO / <u>SRO</u>	Reactor Type: W / CE / <u>BW</u> / GE
Start Time:	Finish Time:

**Instructions**

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. The passing grade requires a final grade of at least 80.00 percent. Examination papers will be collected four hours after the examination starts.

**Applicant Certification**

All work done on this examination is my own. I have neither given nor received aid.

\_\_\_\_\_  
Applicant's Signature

**Results**

Examination Value	_____ Points
Applicant's Score	_____ Points
Applicant's Grade	_____ Percent



QVALUE 1.0

QUESTION 1

S2

During alignment for piggyback operation, in preparation for taking a suction from the RBES, the following conditions exist on Unit 1.

- RCS pressure is 1700 psig.
- 1LP-10 ("1C" LPIP discharge to "1B" LPI header) failed closed.
- LPIP "1A" will not start.
- LPI "1B" pump ON with 0 gpm header flow indicated.

Which ONE of the following statements describes HPI operation after an LPI Pump is taking suction from the RBES?

- A. The "A" train of HPI CANNOT be operated in piggyback, but "B" train of HPI can be operated at 450 gpm and LPIP "B" can be continuously operated.
- B. The "A" train of HPI CANNOT be operated in piggyback, but "B" HPI train can be operated at 450 gpm and 1LP-10 manually opened within 3 hours.
- C. Both trains of HPI can be operated in piggyback mode at a total flow rate of 650 gpm, and LPIP "B" can be operated continuously.
- D. Both trains of HPI can be operated in piggyback mode at a total flow rate of 650 gpm, and 1LP-10 manually opened within 3 hours.

QVALUE 1.0

QUESTION 2

S4

Unit 1 Plant Conditions:

- A complete loss of Main FDW occurred at 50% power.
- All PR and WR NI's indicate 6% and are steady.
- ICCM "A" and "B" subcooling margin programs have indicated 0°F for 2 minutes.
- RCPs are operating.
- RV level = 170 inches
- Loop A and B level = 590 inches

Which ONE of the following provides the action that the CR SRO would direct and the reason for this action?

- A. Leave RCPs operating because ES and EFDW alone are insufficient to remove the heat load being generated by the core.
- B. Leave RCPs operating because tripping the RCPs will cause phase separation which would inhibit natural circulation and render ES and EFDW insufficient to remove the heat load being generated by the core.
- C. Trip RCPs because ES and EFDW are designed to remove the heat load being generated by the core.
- D. Trip RCPs because tripping the RCPs will reduce the heat load on ES and EFDW and allow natural circulation cooldown without damaging RCPs.

QVALUE 1.0

QUESTION 3

S6

Unit 3 Plant Conditions:

- CP-605, Subcooled Cooldown is in progress using natural circulation.
- Th is 440°F and decreasing slowly.
- RCS pressure is 1465 psig and decreasing slowly.
- CETCs 445°F and decreasing slowly.
- Loop subcooling margins indicate 100°F.

Which ONE of the following is the action the Control Room SRO is required to direct to the crew?

**SEE ATTACHMENT**

- A. Continue the plant cooldown at less than 25°F per ½ hour and de-energize PZR heaters as necessary to maintain loop subcooling margin less than 100°F but > 20°F.
- B. Stop the plant cooldown and deenergize PZR heaters to prevent violation of the NDT curve.
- C. Energize PZR heaters to raise plant pressure to establish greater than 150°F loop subcooling margin.
- D. Stop the plant cooldown and energize all PZR heaters to stabilize plant pressure while maintaining P/T above and to the left of the NDT curve.

EMERGENCY OPERATING PROCEDURE  
EP/3/A/1800/01

ENCLOSURE 7.1A

Normal Containment Cooldown Limits

**CAUTION** All subcooling margins should be maintained  $\geq 5^\circ\text{F}$  while depressurizing into TSOR.

1.0 Maintain the RCS within the TSOR when either of the following conditions exist:

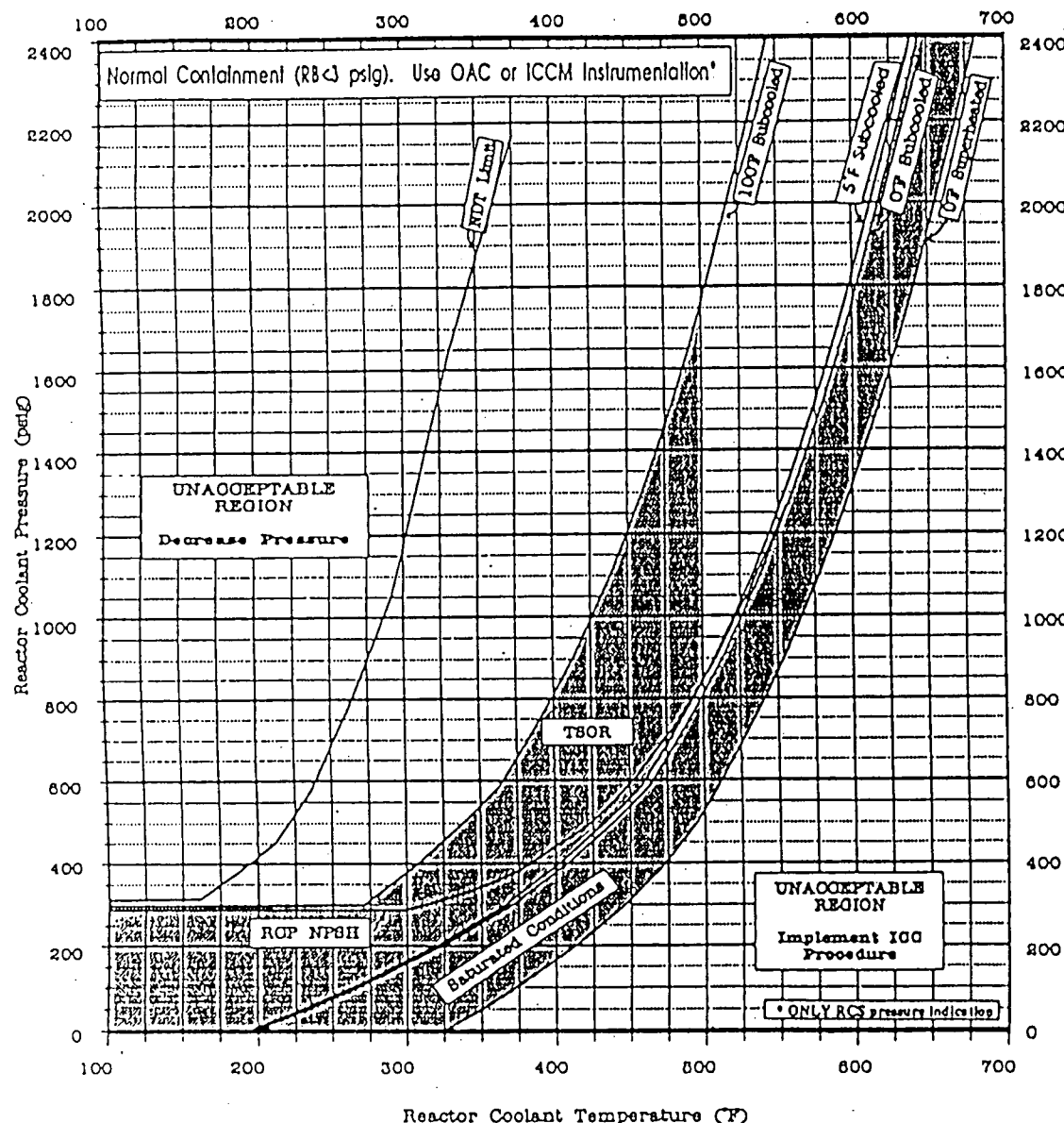
- 1.1 WHEN RCPs off  
AND RCS temp ( $T_r$ )  $< 500^\circ\text{F}$ ,  
AND HPI operation in injection mode (JHP-26 or JHP-27 used),  
THEN depressurize the RCS to maintain core subcooling margin =  $5^\circ\text{F}$ , if possible.
- 1.2 WHEN RCPs on,  
AND Cooldown rate exceeds  $50^\circ\text{F}/\text{one-half Hr.}$ ,  
AND  $100^\circ\text{F}$  temperature change in  $T_r$  occurs,  
THEN depressurize the RCS to maintain  $T_r$  in the TSOR.

**NOTE** 2.0 The TSOR 1 hour hold is not applicable for SBLOCAs or SG tube ruptures.

2.0 IF operation in the TSOR is required,  
THEN stabilize RCS conditions in the TSOR,  
AND maintain for 1 hour:  
• Prevent heatup or repressurization.

3.0 IF depressurization is required,  
THEN methods for depressurization are:

- 3.1 Use normal PZR spray (RCPs on).
- 3.2 Turn PZR heaters off and lower level.
- 3.3 If  $\Delta T < 410^\circ\text{F}$ , Aux PZR Spray.
- 3.4 Open JRC-66 (PORV).
- 3.5 If  $\Delta T \geq 410^\circ\text{F}$ , Aux PZR spray (Emergency Coordination authorization to violate  $410^\circ\text{F}$   $\Delta T$ ).



SRO #3

QVALUE 1.0

QUESTION 4

S17

Unit 1 Plant Conditions:

- Section 507, Inadequate Core Cooling is in progress.
- All RCPs are off.
- RCS pressure is 1800 psig and decreasing slowly.

Which ONE of the following provides a set of conditions for which the control room operators are required to **START** RCPs to provide core cooling without the TSC permission?

CETCs

STATUS OF REFLUX BOILING

- A. 725°F and increasing; SG reflux boiling has not occurred.
- B. 725°F and decreasing; SG reflux boiling has occurred.
- C. 1210°F and increasing; SG reflux boiling has occurred on SG B but has stopped
- D. 1210°F and decreasing; SG reflux boiling has occurred on SG B but has stopped

QVALUE 1.0

QUESTION 5

S19

Which ONE of the following describes the use of Place-Keeping aids in the EOP?

- A. Blanks are provided for each "WHEN and THEN" statement.
- B. Each completed blank constitute an official record of the chronological actions taken during the transient.
- C. Blanks must be initialed by the EOP reader when completed.
- D. Each valve contained in a list without a blank should be checked/marked as it is appropriately positioned.

QVALUE 1.0

QUESTION 6

S27

Initial Plant Conditions at 0900:

- The reactor is in Refueling Shutdown.
- A fuel assembly is being removed from the core.
- NI-1, 2, 3 and 4 Source Ranges are operable.
- NI-1, 2, 3 and 4 Wide Ranges are operable.

Change in Plant Conditions at 0910:

- The Reactor Engineer has designated NI-2 Source Range as one of the two dedicated NI's for refueling.
- NI-2 Source Range fails offscale low and remains pegged low.

Which ONE of the following explains the required action of the CR SRO?

- A. Continue defueling because two source range NIs remain operable as required by Technical Specifications.
- B. Continue defueling because two source range instruments remain operable as assumed in the defuel/refuel procedure.
- C. Stop defueling because the source range channels required by Technical Specifications are no longer operable.
- D. Stop defueling because the source range instruments required for the defuel/refuel procedure are no longer operable.

QVALUE 1.0

QUESTION 7

S28

Site Conditions:

Unit 1

- Cold Shutdown both 1A and 1B LPI trains aligned for DHR

Unit 2

- Tripped from 100% power.
- RCS pressure is 300 psig decreasing.
- RB pressure is 29.6 psig increasing.

Unit 3

- 100% power
- Primary Instrument Air (IA) compressor has tripped.
- Auxiliary IA compressor has started.
- Backup IA compressor 2A has tripped.
- Backup IA compressor 1A is operating.
- IA pressure is 85 psig and decreasing at 5 psig/min.

Which ONE of the following should the Unit 1 CRSRO direct?

- A. Unit 1 to start the Diesel Air Compressor, and open SA-143, Service Air to IA Controller Bypass.
- B. Unit 3 to start the Diesel Air Compressor and open SA-143, Service Air to IA Controller Bypass and throttle Unit 3 LPSW to establish less than 3000 gpm to each LPI cooler.
- C. Unit 1 to start the Diesel Air Compressor and throttle Unit 2 LPSW to establish less than 3,000 gpm to each LPI cooler.
- D. Unit 3 to start the Diesel Air Compressor and Unit 1 to throttle Unit 1 LPSW to establish less than 3000 gpm to each LPI cooler.



QVALUE 1.0

QUESTION 8

S51

As the Unit 1 and 2 Control Room SRO you have taken the turnover for both Units. The following equipment is out of service:

Unit 1 - 120 VAC Vital Instrument Power Panelboard, KVIC, is deenergized and isolated as I&E is in the process of replacing a breaker.

Unit 2 - 120 VAC Vital Instrument Inverter, KVIA is on AC line as problems were encountered during the last shift with cycling voltage. I&E is investigating this problem.

Which ONE of the following describes the Tech Spec LCO concerning the Vital Power system for the two Units.

Unit 1 is restricted to \_\_\_\_ / Unit 2 is restricted to \_\_\_\_.

- A. 4 hours / 7 days
- B. 7 days / 4 hours
- C. 7 days / 24 hours
- D. 24 hours / 7 days

QVALUE 1.0

QUESTION 9

S52

Unit 3 is operating at 100% power with the following plant conditions:

- The Unit 3 TDEFWP Deluge Sprinkler is isolated for maintenance.
- The Fire Protection Engineer notifies the OSM that ONE smoke detector directly above the Unit 3 TDEFWP is inoperable.

Which ONE of the following describes the required fire watch?

**REFER TO ATTACHMENT**

A required fire watch shall be established conducting a tour at least, \_\_\_\_\_.

- A. once every 15 minutes for the TDEFWP, back-up suppression not required.
- B. every 60 minutes between tours for the TDEFWP, back-up suppression is required.
- C. once every 15 minutes for BOTH the TDEFWP and TDEFWP Deluge Valve, back-up suppression is required.
- D. every 60 minutes between tours, for BOTH the TDEFWP and TDEFWP Deluge Valve, back-up suppression not required.

FIRE PROTECTION SYSTEMS

## 16.9.2 SPRINKLER AND SPRAY SYSTEMS

COMMITMENT

Sprinkler and Spray Systems in safety related areas listed in Table 16.9-2 shall be OPERABLE.

APPLICABILITY: Whenever equipment protected by the Sprinkler or Spray System is required to be OPERABLE.

ACTION:

- a. If a Sprinkler or Spray System is determined to be inoperable, the following corrective action shall be taken:
  - i. With no operable fire detection in the area, a continuous fire watch with backup fire suppression equipment shall be established in the area within 1 hour.
  - ii. With operable fire detection in the area, a hourly fire watch with backup fire suppression equipment shall be established in the area within 1 hour.
  - iii. Operation under these action statements is not reportable under Technical Specification 6.6.2.1.

SURVEILLANCE:

- a. Each of the Sprinkler and Spray Systems listed in Table 16.9-2 shall be documented operable as follows:
  - i. Annually, each system, shall be functionally tested, except in the cable spreading rooms, equipment rooms, and cable shafts.
  - ii. Annually, the sprinkler system spray headers and nozzles, shall be inspected.
  - iii. During refueling, a visual inspection of each nozzle's spray area shall be conducted to verify the spray pattern is not obstructed.

BASES:

The OPERABILITY of the Fire Suppression System ensures that adequate fire suppression capability is available to confine and extinguish fires occurring in any portion of the facility where safety-related equipment is located. The Fire Suppression Systems consist of the water system, spray and/or sprinklers, Keowee CO<sub>2</sub> System and fire hose stations. The collective capability of the Fire Suppression Systems is a major element in the facility fire protection program.

During periods of time when the Sprinkler or Spray system is not operable and detection instrumentation is operable, a hourly fire watch patrol will be required to inspect the affected area frequently as a precaution. If the sprinkler or spray system in the area is not operable and no detection instrumentation is operable, a continuous fire watch is required to be maintained in the vicinity of the affected sprinkler or spray system until the system is restored to operable status.

In the event that portions of the Fire Suppression Systems are inoperable, alternate backup fire-fighting equipment is required to be made available in the affected areas until the inoperable equipment is restored to service.

The test requirements provide assurance that the minimum OPERABILITY requirements of the Fire Suppression Systems are met.

This Selected Licensee Commitment is part of the Oconee Fire Protection Program and therefore subject to the provisions of Oconee Facility Operating License Conditions.

REFERENCES:

- 1) Oconee FSAR, Chapter 9.5-1.
- 2) Oconee Fire Protection SER dated August 11, 1978.
- 3) Oconee Fire Protection Review, as revised.
- 4) Oconee Plant Design Basis Specification for Fire Protection, as revised.

STATION MANAGER APPROVAL B.L. Pule / R. Swartz DATE 11/10/94

Sprinkler and Spray Systemsa. Oconee Nuclear Station

- |      |                                      |                              |
|------|--------------------------------------|------------------------------|
| i.   | Turbine Driven<br>Emergency FDW Pump | Units 1, 2, and 3            |
| ii.  | Transformers                         | CT-1, CT-2, CT-3, CT-4, CT-5 |
| iii. | Cable Room                           | Units 1, 2, and 3            |
| iv.  | Equipment Room                       | Units 1, 2, and 3            |
| v.   | Cable Shaft<br>(3rd Level)           | Units 1, 2, and 3            |
| vi.  | Cable Shaft<br>(4th & 5th Level)     | Units 1, 2, and 3            |

b. Keowee Hydro Station

- |     |                            |
|-----|----------------------------|
| i.  | Main Lube Oil Storage Room |
| ii. | Main Transformer           |

FIRE PROTECTION SYSTEMS

## 16.9.6 FIRE DETECTION INSTRUMENTATION

COMMITMENT

The provided Fire Detection Instrumentation for each equipment/location shall be OPERABLE as listed in Table 16.9-6.

APPLICABILITY:

Whenever equipment in the area covered by the Fire Detection Instrumentation is required to be OPERABLE. The Fire Detection Instrumentation located within containment is not required to be OPERABLE during the performance of Type A Containment Leakage Rate Tests.

ACTION:OCONEE

- a. When more than 50% of the provided detectors for each equipment/location, or any 2 adjacent detectors for each equipment/location as shown in Table 16.9-6 are not OPERABLE, appropriate action shall be taken consisting of the following:
  - i. Within 1 hour, a fire watch patrol shall be established to inspect the accessible equipment/location with the inoperable instrumentation at least once per hour or as permitted by Site Directives.
  - ii. An hourly firewatch is not required for inaccessible equipment/locations such as the Reactor Building at power operation. Periodic inspections using a TV camera (if available) are permitted as described in Site Directives, or, the inaccessible equipment condition may be monitored by remote indications which would provide early warning of a fire.
  - iii. Operation under these action statements is not reportable under Technical Specification 6.6.2.1.

#### KEOWEE

- a. When more than 50% of the provided detectors for each equipment/location, or any 2 adjacent detectors for each equipment/location as shown in Table 16.9-6 are not OPERABLE, the appropriate action shall be taken consisting of the following:
  - i. Within 1 hour, a fire watch patrol shall be established to inspect the accessible equipment/ location with the inoperable instrumentation at least once per hour.
  - ii. Operation under the above action statement is not reportable under Technical Specification 6.6.2.1.

#### OCONEE & KEOWEE

- b. Operability of fire detection instrumentation for adequate equipment/location coverage may also be determined by the Site Fire Protection Engineer or designee.

#### SURVEILLANCE:

##### OCONEE

- a. Each of the fire detection instruments listed in Table 16.9-6 shall be tested for operability monthly by performance of a Channel Functional Test using the Fire Detection Instrumentation Control Board Panel Test Switch.
- b. Each of the fire detection instruments listed in Table 16.9-6 shall be visually inspected semiannually, except those detectors inaccessible during power operation. Inaccessible detectors shall be inspected at each refueling outage.
- c. Each of the fire detectors listed in Table 16.9-6 shall be tested for sensitivity at least annually.

##### KEOWEE

- a. Each of the fire detectors listed in Table 16.9-6 shall be visually inspected semiannually.
- b. Each of the fire detectors listed in Table 16.9-6 shall be tested for operability annually by performance of a Channel Functional Test.

- c. Each of the fire detectors listed in Table 16.9-6 with the exception of generator detectors shall be tested for sensitivity at least annually.

BASES:

OPERABILITY of the Fire Detection Instrumentation ensures that adequate warning capability is available for the prompt detection of fires. This capability is required in order to detect and locate fires in their early stages. Prompt detection of fires will reduce the potential for damage to safety related equipment and is an integral element in the overall facility fire protection program.

In the event that a portion of the Fire Detection Instrumentation is inoperable, the establishment of compensatory actions in the affected areas is required to provide detection capability until the inoperable instrumentation is restored to operability.

This Selected Licensee Commitment is part of the Oconee Fire Protection Program and therefore subject to the provisions of Oconee Facility Operating License Conditions.

REFERENCES:

- 1) Oconee FSAR. Chapter 9.5-1.
- 2) Oconee Fire Protection SER dated August 11, 1978.
- 3) Oconee Fire Protection Review, as revised.
- 4) Oconee Plant Design Basis Specification for Fire Protection, as revised.
- 5) Oconee Plant Design Basis specification for Fire Detection, as revised.

STATION MANAGER APPROVAL



DATE

5/7/98



TABLE 16.9-6

## FIRE DETECTION INSTRUMENTATION

OCONEE NUCLEAR STATIONUnits 1, 2, and 3 Reactor Buildings

<u>Equipment</u>	<u>Detectors Provided</u>
Reactor Building Penetrations	8 (each unit)
Reactor Building Cooling Units	6 (each unit)
Reactor Coolant Pumps	8 (each unit)

Units 1, 2, and 3 Auxiliary BuildingsEL. 822' + 0

<u>Room No.</u>	<u>Equipment</u>	<u>Detectors Provided</u>
71-Q	Unit 1 Cable Shaft	2
510	Unit 1 and 2 Control Room	9
75-Q	Unit 2 Cable Shaft	2
552	Unit 3 Control Room	8
90-Q	Unit 3 Cable Shaft	2

EL. 809' + 3"

<u>Room No.</u>	<u>Equipment</u>	<u>Detectors Provided</u>
400	Unit 1 Control Battery Room	5
402	Unit 1 East Penetration Room	12
403	Unit 1 Cable Room and Cable Shaft	19
404	Unit 2 Cable Room and Cable Shaft	18
407'	Unit 2 East Penetration Room	20
408	Unit 2 Control Battery Room	5
409	Unit 1 West Penetration Room	5
410	Unit 2 West Penetration Room	5
450	Unit 3 Cable Room	28
452	East Penetration Room	10
455	Ventilation Equipment	2
456	Unit 3 West Penetration Room	5
458	Unit 3 Control Battery Room	2

EL. 796' + 6"

<u>Room No.</u>	<u>Equipment</u>	<u>Detectors Provided</u>
300	Unit 1 Work Area	9
310	Unit 1 Equipment Room and Cable Shaft	13
311	Unit 2 Equipment Room and Cable Shaft	15
313	Janitor's Closet (Unit 1)	1
314	Clean Protective Clothing Storage (Unit 1)	1
322	Protective Clothes Storage (Unit 2)	1
329	Hot Lab	1
330	Cold Lab	1
331	Counting Room (Unit 2)	1
333	Health Physics (Unit 2)	1
334	Office (Unit 2)	1

# FIRE DETECTION INSTRUMENTATION

335	Environmental Lab (Unit 2)	1
337	Laundry Sorting (Unit 2)	1
338	Laundry Storage (Unit 2)	1
339	Laundry (Unit 2)	2
347	Work Area (Unit 2)	8
354	Unit 3 Equipment Room and Cable Shaft	21
357	Janitor's Storage (Unit 3)	1
364	Towel Storage (Unit 3)	1
365	Janitor's Storage (Unit 3)	1
366	Protective Clothing (Unit 3)	1
369	HP Office (Unit 3)	1
369A	Supv. Technicians Office	1
369B	Secondary Chemistry Lab	1
369C	I.C. Computer	1
376	Unit 3 Work Area	10

## EL. 771' + 0

<u>Room No.</u>	<u>Equipment</u>	<u>Detectors Provided</u>
119	Unit 1 and 2 LPI Hatch Area	3
159	Unit 3 LPI Hatch Area	2

## EL. 838' + 0

<u>Room No.</u>	<u>Equipment</u>	<u>Detectors Provided</u>
611	Protective Clothing Storage (Unit 2)	1
658	Protective Clothing Storage (Unit 3)	1

## EL. 783' + 9"

<u>Room No.</u>	<u>Equipment</u>	<u>Detectors Provided</u>
204	Storage (Unit 1)	1
207	Chemical Handling and Storage (Unit 1)	1
220	Hot Instrument Shop (Unit 2)	1
224	Storage (Unit 2)	1
264	Storage (Unit 3)	1

## EL. 758' + 0

<u>Room No.</u>	<u>Equipment</u>	<u>Detectors Provided</u>
54	Unit 1 High Pressure Injection Pumps	1
56	Unit 1 and 2 High Pressure Injection Pumps	1
58	Unit 2 High Pressure Injection Pumps	1
61	Unit 1 Low Pressure Injection Pumps	2
62	Unit 1 and 2 Low Pressure Injection Pumps	2
63	Unit 2 Low Pressure Injection Pumps	2
76	Unit 3 High Pressure Injection Pumps	1
77	Unit 3 High Pressure Injection Pumps	1
81	Unit 3 Low Pressure Injection Pumps	2
82	Unit 3 Low Pressure Injection Pumps	2

# FIRE DETECTION INSTRUMENTATION

## Units 1, 2, and 3 Turbine Buildings

### EL. 775' + 0

<u>Equipment</u>	<u>Detectors Provided</u>
MCC 1XC, 1XD, 1XE, 1XF; Unit 1 FDW Turbines; Unit 1 Emergency Feedwater Turbine; Unit 1 H <sub>2</sub> Panel; Unit 1 EHC Unit	10
MCC 2XB, 2XC, 2XD, 2XE, 2XF; Unit 2 FDW Turbine; Unit 2 Emergency Feedwater Turbine; Unit 2 H <sub>2</sub> Panel; Unit 2 EHC Unit	11
MCC 3XC, 3XD, 3XE, 3XF; Unit 3 FDW Turbines; Unit 3 Emergency Feedwater Turbine; Unit 3 H <sub>2</sub> Panel; Unit 3 EHC Unit	10

### EL. 796' + 6"

<u>Equipment</u>	<u>Detectors Provided</u>
Switchgear 1TA, 1TB, 2TA, 2TB; Load Centers 1X1, 1X2, 1X3, 1X4, 1X5, 1X6, 2X1, 2X2, 2X3, 2X4, 2X5, 2X6	8
Switchgear B1T, B2T; Transformer CT4	5
Switchgear 3B1T, 3B2T	3
MCC 1XA	1
ITTC5 and ITTC6	1
Unit 1 Main Turbine Oil Tank	1
Unit 2 Main Turbine Oil Tank	1
Unit 3 Main Turbine Oil Tank	2
DC Distribution Center 1DA; Switchgear 1TC, 1TD, 1TE	7
MCC 1XGA	1
DC Distribution Center 2DA; Switchgear 2TC, 2TD, 2TE	7
MCC 3XGA	1
MCC 2XGB	1
Load Center 3X1, 3X2, 3X3, 3X4; MCC 3XGA; Switchgear 3TC, 3TD, 3TE	5
MCC 3XGB	1

### EL. 822' + 0

<u>Equipment</u>	<u>Detectors Provided</u>
Bearing Oil Lift Pumps for All Units	4 ea unit
High Pressure Unit for All Units	2 ea unit

TABLE 16.9-6

## FIRE DETECTION INSTRUMENTATION

Keowee Hydro Station

<u>Equipment</u>	<u>Detectors Provided</u>
Control Room	4
Battery Room	4
Mechanical Equipment Gallery	3
Main Lube Oil Storage Room	1
Generators 1 and 2	6 ea
Operating Floor	6

Essential Siphon Vacuum Building

6

QVALUE 1.0

QUESTION 10

S55

Unit 1 conditions:

- 90% power
- 1HP-5 (Letdown Isolation) failed closed.
- Attempts to MANUALLY open 1HP-5 have failed.
- PZR level is 311 inches and slowly increasing.
- 1HP-120 (RC Volume Control) is closed and in manual.
- Tave has been reduced to 574°F.

Which ONE of the following describes a shutdown rate and a target CTPD setting that the Control Room SRO would direct to satisfy procedure requirements?

	<u>Shutdown Rate</u>	<u>Target CTPD</u>
A.	30% FP/hour	40%
B.	30% FP/hour	25%
C.	5% FP/minute	40%
D.	5% FP/minute	25%

QVALUE 1.0

QUESTION 11

S64

Given the following conditions:

- Unit 1 is in a heatup mode with the RCS at 240 psig and 340°F.
- Unit 2 is at 30% and performing a power ramp to 100%.
- Unit 3 is at Cold Shutdown preparing for a OTSG tube leak inspection.

Which ONE of the following is the **MINIMUM** number of Licensed RO's required per OMP 1-2, Rules and Practice and their normal control room positions, for the conditions stated above?

		<u>UNIT 1</u>	<u>UNIT 2</u>	<u>Unit 3</u>
A.	4 RO's total; positions:	1	2	1
B.	5 RO's total; positions:	2	2	1
C.	6 RO's total; positions:	2	2	2
D.	7 RO's total; positions:	3	2	2

QVALUE 1.0

QUESTION 12

S65

Unit 1 Plant Conditions:

- You are the Control Room SRO (CRSRO).
- A power increase 60% power to 85% power was completed 7 hours ago.
- Shift turnover is in progress.
- The Reactor Operator (OATC) reports that reactor power has decreased to 84% over the past half hour.
- ICS neutron error is +0.9%.
- Diamond in MANUAL

Which ONE of the following statements describes the method the CRSRO would direct to control the reactivity effects of Xenon during the shift turnover?

- A. Feed demin water and bleed to 1A BHUT.
- B. Manual control rod pull using Diamond controls.
- C. Feed demin water and bleed to 1B BHUT.
- D. Place ICS Reactor Master (Bailey) to MANUAL to "null" Neutron error.

QVALUE 1.0

QUESTION 13

S66

Which ONE of the following statements describes the approval required when it is necessary to perform maintenance on a Block Tagout (BTO) boundary valve on Unit 2?

- A. WCC SRO and Work Window Manager.
- B. WCC SRO and BTO Administrator .
- C. Work Window Manager and BTO Administrator.
- D. Work Window Manager and Mechanical Maintenance Supervisor.



QVALUE 1.0

QUESTION 14

S70

Which ONE of the following indicates the Oconee Management personnel that is responsible for acknowledging that a "Stop Work" has been initiated and ensures work does not restart AND the Oconee Management personnel who provides proper authorization and approves work restart?

ACKNOWLEDGMENT

APPROVAL TO RESTART

- |    |                          |                              |
|----|--------------------------|------------------------------|
| A. | Operations Manager       | Station Manager              |
| B. | Operations Shift Manager | Site Vice President          |
| C. | Work Window Manager      | Shift Operations Manager     |
| D. | Work Control Manager     | Senior VP Nuclear Production |

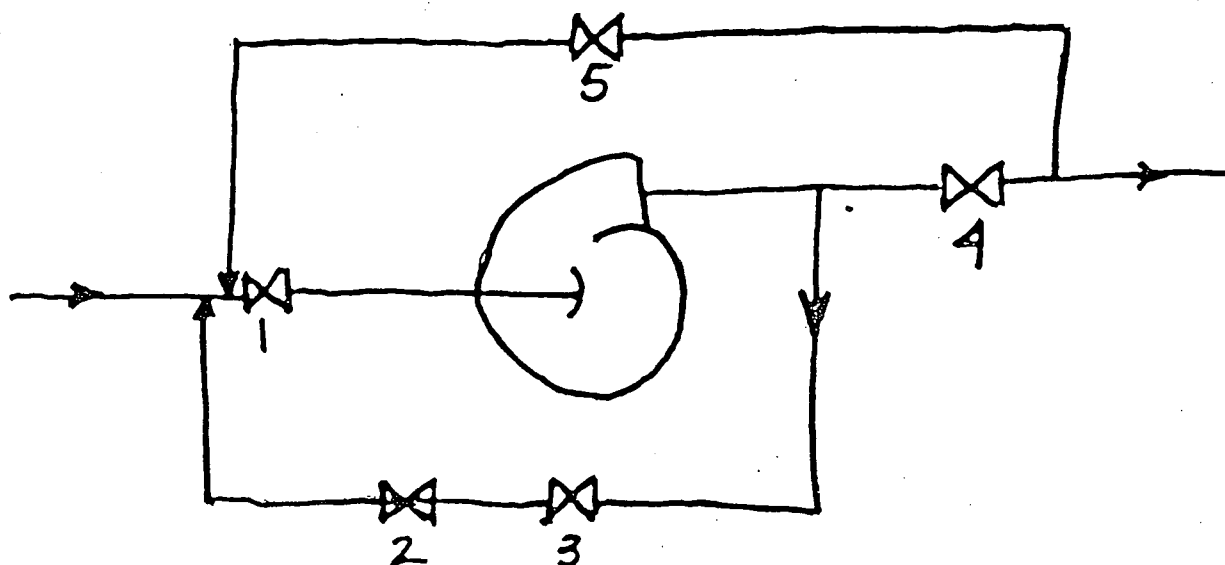
QVALUE 1.0

QUESTION 15

S71

Which ONE of the following indicates the proper sequence to perform an isolation of the pump illustrated below?

- A. 1, 2, 3, 4, 5
- B. 4, 5, 3, 2, 1
- C. 5, 1, 4, 2, 3
- D. 2, 3, 1, 5, 4



QVALUE 1.0

QUESTION 16

S74

Plant Conditions:

- Unit 1 1/3 "A" GWD tank is ready to release; waiting for approval.
- Unit 2 1/3 RB purge in progress.
- Unit 3 1/3 "3C" GWD tank completed 2 hours ago.

Which ONE of the following is correct?

REFER TO ATTACHEMENT

The release paper work for the 1A GWD tank is \_\_\_\_; the \_\_\_\_ is required as minimum approval.

- A. correct / Shift Supervisor.
- B. incorrect / Operations Shift Manager.
- C. correct / Operations Duty Engineer
- D. incorrect / Operations Superintendent.

### 1. Initial Conditions

- ☒ 1.1 GWD Tank 1A has been isolated for decay.
- ☒ 1.2 Additional GWD tank space is needed.

NOTE: 1. Gaseous waste releases should be coordinated as far as practicable with favorable meteorological conditions. If a temperature inversion (Temp Inversion indicated by (+) on temp chart) exists or wind speed is very low, postpone the release if possible, until the inversion no longer exists or until the wind speed has increased.

2. Meteorological instrumentation may be inoperable for short periods of time during unusual weather and/or icy conditions; applicable steps are to be N/A.

- ☒ 1.3 Meteorological conditions are favorable for release or release cannot be postponed until more favorable conditions exist.
- ☒ 1.4 The Waste Gas discharge flow instrument is operable.
- ☒ 1.5 Limits and Precautions have been reviewed.

### 2. Procedure

- ☒ 2.1 Initiate Enclosure "Gaseous Waste Sample Request."
- ☒ 2.2 Obtain sample per Enclosure "Sampling Of GWD Tanks."

NOTE: If GWR is terminated, no sign-offs are required beyond this point

- ☒ 2.3 IF sample results prohibit release at this time, complete the Gaseous Release Volume Update portion of Enclosure "Gaseous Waste Sample Request" and return it to RP.

GWR is to be Released Terminated. (circle one).

### 3. To Be Completed Prior to Release:

- ☒ 3.1 Determine what other GWRs (Reactor Building Purges or GWD Tanks) are in progress at the station or will be in progress at the start of this release, and list its corresponding release rate limit (1/3 Station Limit or 2/3 Station Limit).

Releases in Progress

Unit 2 RB Purge

Release Rate Limit

1/3

NOTE: The individual granting approval for this release is responsible for ensuring that:

This release, in combination with all other GWRs (RB Purges and GWD Tanks) that are released at the same time as this one, will NOT exceed the Station Limit for release rate per Selected Licensee Commitment (SLC) 16.11.

3.2 Approval received from \_\_\_\_\_  
by \_\_\_\_\_ as per the following:

Releases at the Station in Progress  
(Including this one)

Required Level of Approval  
(Circle One)

1/3 Station Limit - 1GWR in progress

Shift Supervisor

1/3 Station Limit - 2GWRs in progress

OPS Shift Manager

1/3 Station Limit - 3GWRs in progress

Duty Engineer

2/3 Station Limit - 1GWR in progress

Duty Engineer

1/3 Station Limit on 1 GWR and 2/3  
Station Limit on Another GWR

Operations Superintendent

\_\_\_\_\_ 3.3 IF the release will be made at 1/3 of the station limit, verify that 1RIA-43, 44 and 45 are operating normally and that alarm setpoints (High and Alert) are set as per PT/0/A/0230/001 (Radiation Monitor Check).

\_\_\_\_\_ 3.4 IF the release is at 2/3 of the station release limit, multiply the Alert and High setpoints for 1RIA-45 per PT/0/A/0230/001 (Radiation Monitor Check) by two.

\_\_\_\_\_ 3.5 IF the release is at 2/3 of the station release limit, reduce the Alert and High setpoints for the non releasing Unit(s) RIA-45 per PT/0/A/0230/001 (Radiation Monitor Check) by 1/2.

\_\_\_\_\_ 3.6 1RIA-45 is set at 1/3 or 2/3 (circle one) of the station limit.

\_\_\_\_\_ 3.7 2RIA-45 is set at 1/3 of the station limit or reduced by 1/2 per step 3.5 (circle one).

\_\_\_\_\_ 3.8 3RIA-45 is set at 1/3 of the station limit or reduced by 1/2 per step 3.5 (circle one).

#### 4. Gaseous Waste Release

\_\_\_\_\_ 4.1 Record readings of 1RIA-37 & 1RIA-38 on Enclosure "Gaseous Waste Sample Request" as the background readings.

QVALUE 1.0

QUESTION 17

S75

Which ONE of the following sets of atmospheric conditions is favorable for conducting a gaseous waste release?

- A. Clear, calm nighttime,  $\Delta T = +5$ , and a wind speed 10 mph at  $183^\circ$ .
- B. Cloudy daytime,  $\Delta T = -5$ , and a wind speed 10 mph at  $183^\circ$ .
- C. Clear calm nighttime,  $\Delta T = -10$  and a wind speed 2 mph at  $15^\circ$ .
- D. Cloudy daytime,  $\Delta T = +10$ , and a wind speed 2 mph at  $15^\circ$ .

QVALUE 1.0

QUESTION 18

S76

Unit 1 Plant Conditions:

- Unit 1 has been tripped
- Reactor power is 18%
- Core Subcooling indicates -24°F and flashing.
- CETCs indicate 625°F
- RCS pressure is 1500 psig
- Steam Generator level 15 inches (SUR) in both Steam Generators
- EP/1/A/1800/01 Section 501, Loss of Subcooling Margin is in progress.

Which ONE of the following Emergency Operating Procedures must FIRST be performed by the CR SRO?

**INITIATE Section... AND / COMPLETE Section...**

- A. ...505, ES Actuation / ...507, Inadequate Core Cooling.
- B. ...505, ES Actuation / ...506, Unanticipated Nuclear Power Production.
- C. ...502, Loss of Heat Transfer / ...507, Inadequate Core Cooling.
- D. ...502, Loss of Heat Transfer / ...506, Unanticipated Nuclear Power Production.

QVALUE 1.0

QUESTION 19

S79

Which ONE of the following describes use of CAUTIONS and NOTES in the EOP?

CAUTIONS

NOTES

- |    |                                      |   |
|----|--------------------------------------|---|
| A. | Intended for information purposes    | shall be read aloud                         |
| B. | Shall be read aloud                  | Intended for information purposes           |
| C. | Shall be read aloud                  | If numbered, pertains to more than one step |
| D. | Always appear before applicable Step | If not numbered, pertains to only one step  |



QVALUE 1.0

QUESTION 20

S80

Plant Conditions:

- A SBLOCA on Unit 1, ECCS operating correctly
- Bomb threat in Unit 2 Control Room
- Fire in Unit 3 HPIP room unit; person injured

Which ONE of the following is the responsibility as the Emergency Coordinator?

- A. Activate the alternate TSC and OSC.
- B. Recommend evacuation of 5 mile radius and 10 miles down wind.
- C. Designate an individual to receive more than 25 rem TEDE to save an employee life.
- D. Require an evacuation of NON-ESSENTIAL site personnel if TEDE radiation exposure is 2 mrem in any one hour.

QVALUE 1.0

QUESTION 21

S81

A sample indicates that the spent fuel pool boron concentration is 100 ppm less than the limit specified in the COLR. Which ONE of the following describes the most severe accident scenario for which the soluble boron concentration no longer provides protection against inadvertent criticality?

- A. misloading of spent fuel into a pool rack location.
- B. misloading of new fuel assemblies into the pool.
- C. dilution of the pool to 100 ppm over a 24 hr. period.
- D. draining of the pool to below top of spent fuel racks.

QVALUE 1.0

QUESTION 22

S97

Unit 1 Plant conditions:

- Instantaneous loss of all Main FDW.
- Reactor tripped from 100% power.

Which ONE of the following describes the MINIMUM design basis requirements for the EFDW system configuration that will ensure a plant COOLDOWN at 100 F/hour? (Assume the flow rate provided below is the maximum flow rate)

- A. TDEFDW pump at 400 gpm.
- B. TDEFDW pump with one 100% flow path.
- C. One MDEFDW pump with one 100% flow paths.
- D. One MDEFDW pump at 200 gpm split between both OTSG's.

QVALUE 1.0

QUESTION 23

S100

Unit 2 Plant Conditions:

- Unit 2 is at 100% power.
- RBCU 2B has been out of service for 24 hours.
- 2BS-2 (RBS B spray valve) and 2BS-4 (RBS pump B suction valve) have tripped open 4 hours ago and cannot be closed.
- RBCU 2A tripped due to breaker failure 4 hours ago.

Which ONE of the following describes the Technical Specification action that must be directed by the CR SRO?

- A. Continue plant operation, the RBS train may be out of service for an additional 20 hours.
- B. Continue plant operation, the RBS train may be out of service for an additional 6 days 20 hours.
- C. Place the reactor in the hot shutdown condition within the next 8 hours.
- D. Place the reactor in a condition with RCS pressure below 350 psig and RCS temperature below 250°F within the next 24 hours.

QVALUE 1.0

QUESTION 24

S117

Unit 1 Plant Conditions:

- Unit startup following a reactor trip is in progress.
- Plant is at 50% power.
- Chemistry samples of secondary OTSGs:
  - SG 1A 1.48 uci/cc
  - SG 1B 0.75 uci/cc
- 1RIA-54 (Turbine Building Sump Monitor) pegs downscale during a sump discharge.

Which ONE of the following describes the required actions that must be directed by the CR SRO?

- A. Continue plant operation, and suspend Unit 1 Turbine Building Sump discharges until sump grab samples are analyzed for gross radioactivity.
- B. Continue plant operation, and suspend Unit 1 Turbine Building Sump discharges until two independent sump samples are analyzed and two independent checks of the release rate calculations and discharge valve lineups are conducted.
- C. Shutdown to Hot Shutdown within the next 12 hours and be in Cold Shutdown within the following 24 hours, and suspend Unit 1 and 2 Turbine Building Sump discharges until sump grab samples are analyzed for gross radioactivity.
- D. Shutdown and be in Cold Shutdown within 24 hours, and suspend Unit 1 and 2 Turbine Building Sump discharges until two independent sump samples are analyzed and two independent checks of the release rate calculations and discharge valve lineups are conducted.

QVALUE 1.0

QUESTION 25

S120

Unit 2 Initial Plant Conditions:

- Unit 2 is operating at 75% power.
- SG 2A SGT<sub>L</sub> has been calculated to be 1.1 gpd.

Current Plant Conditions.

- Reactor trip has occurred.
- Both SGs have been isolated.
- Ten (10) minutes after SGs were isolated:
  - SG 2A pressure has decreased to 350 psig
  - SG 2B pressure has decreased to 50 psig
- FDW is available.

After both SGs have decreased to 15 psig and RCS pressure and temperature begin increasing, which ONE of the following describes the action that the CR SRO will direct to mitigate the event?

**Restore FDW through... / to isolated OTSG...**

- A. ...Main FDW nozzles / ...2A
- B. ...Main FDW nozzles / ...2B
- C. ....Auxiliary FDW ring / ...2A
- D. ...Auxiliary FDW ring / ...2B

QVALUE 1.0

QUESTION 26 B1

Unit 2 Plant Conditions:

- Reactor power is 80%.
- RCS Pressure = 2117 psig steady
- PZR Heater Banks 1 and 2 ON
- SG tube leak (SGTL) event in progress on 2B SG.
- HPI pumps 2A and 2B are running.
- HPI pump 2C will not start.
- PZR level is 215 inches and decreasing at 1 inch per minute.
- 2HP-5 (Letdown Isolation Valve) is open.
- 2HP-120 (RC Volume Control) is fully open.
- 2A Injection flowrate indicates 160 gpm.
- 2HP-26 (2A HP Injection) red and green valve position indication lights OFF.

Which ONE of the following is the next operator actions that should be taken?

- A. Place the 2HP-26 switch to open and increase injection flow.
- B. Manually trip the reactor to prevent the loss of subcooling margin.
- C. Manually trip the reactor in anticipation of the imminent low pressure reactor trip.
- D. Close 2HP-5 to prevent a reactor trip and reduce the probability of lifting the MSRVs.

QVALUE 1.0

QUESTION 27

B7

Unit 1 Plant Conditions:

- A valid reactor trip signal has been received.
- Main FDW pump 1A is operating.
- Power Range NI indications are fluctuating as follows:
  - NI-5: 4 to 7%
  - NI-6: 3 to 5%
  - NI-7: 3.5 to 5%
  - NI-8: 5.5 to 7%
- RCS pressure is 1900 psig.
- CETCs indicate 625°F.

Which ONE of the following describes the immediate operator action to respond to these conditions?

- A. Open the CRD normal or alternate 600 volt supply breakers.
- B. Open 1HP-24 (BWST suction), 1HP-25 (BWST suction), 1HP-26 (HP A Injection), and commence HP injection.
- C. Trip the main turbine and manually drive any control rods not fully inserted to its "IN LIMIT."
- D. Trip the RCPs and send operators to the Cable Room to deenergize the CRD system by opening the AC and DC supply breakers.



QVALUE 1.0

QUESTION 28

B8

With Unit 1 in HPI Forced Cooling, both MDEFDWP's have been returned to service and EFDW flow has been verified. The following plant conditions exist:

- RCS pressure = 1700 psig
- PZR temperature = 568°F
- Both Loop SCM's = 4°F
- CETC's = 584°F
- All RCPs secured
- PZR at 400 inches
- CT-1 has locked-out
- Keowee is supplying 4160 volt loads via CT-4

Which ONE of the following describes the intent of the INITIAL actions the operator would take in regard to establishing FDW flow during the recovery from HPI Forced Cooling?

**Initiate EFDW flow to the unaffected S/G(s) to...**

- A. establish 200 gpm per S/G and raise S/G levels to 240 inches XSUR.
- B. establish 200 gpm per S/G and maintain turbine bypass valve pressure setpoint at 1010 psig.
- C. match decay heat by raising S/G levels to 50% Operating Range.
- D. match decay heat by steaming S/G to maintain RCS pressure and temperature stable or slightly decreasing.

QVALUE 1.0

QUESTION 29

B9

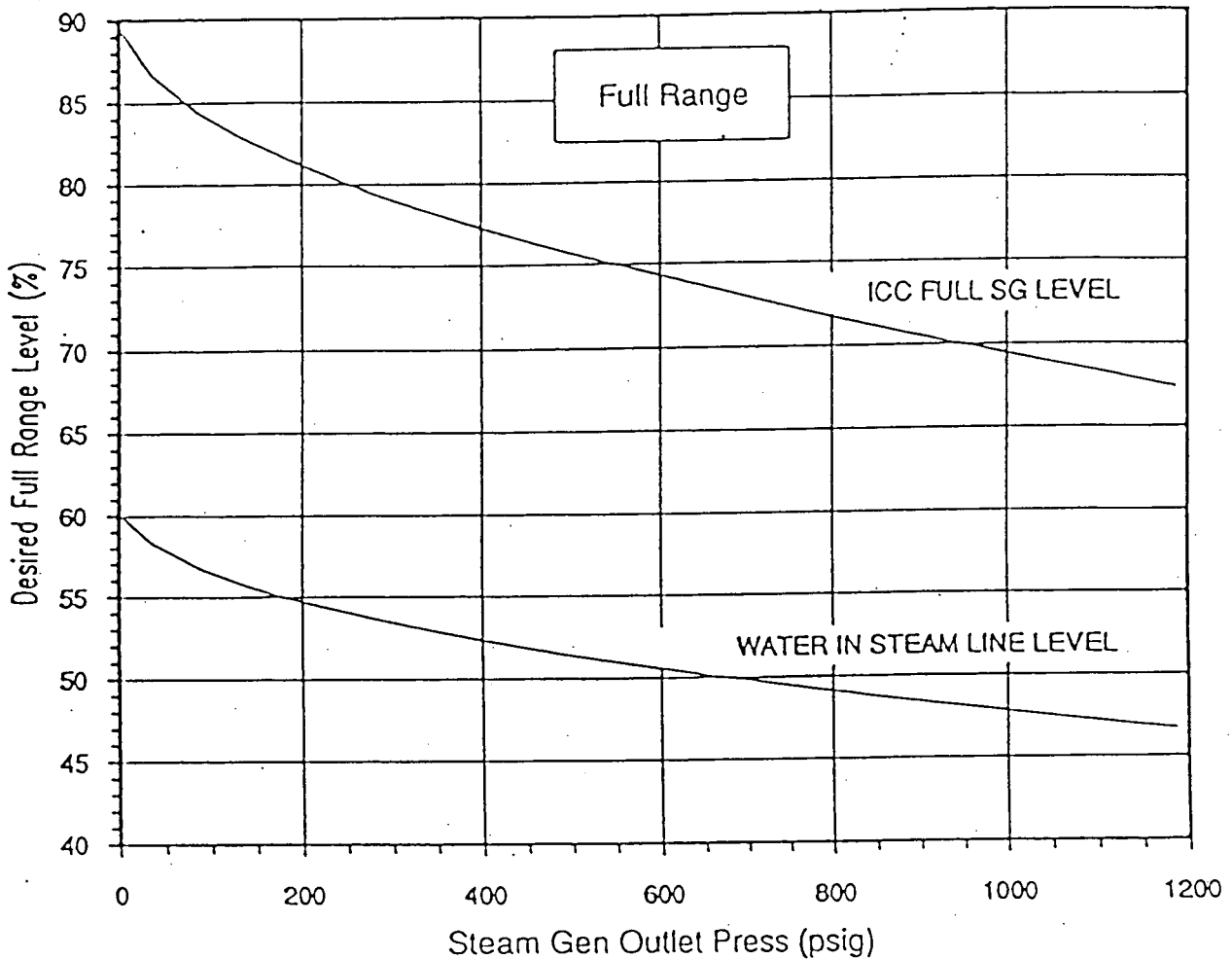
Unit 2 Plant Conditions:

- Section 504, SG Tube Leak is in progress.
- 2A SG leak rate is 20 gpm.
- 2A SG has been isolated.
- Reactor has been tripped for 1 hour from 100% power.
- 2A and 2B SG Outlet pressure = 800 psig

Which ONE of the following describes the FIRST method the operator will use to control the affected SG level and what is the required level that will be maintained?

(See Curve ATTACHMENT)

- A. Line up a hot blowdown path to the condenser to drain the SG and maintain level between 25" SUR to 48% Full Range.
- B. Line up a hot blowdown path to the condenser to drain the SG and maintain level between 25" SUR to 51% Full Range.
- C. Steam the SG to lower and maintain level between 25" SUR to 48% Full Range.
- D. Steam the SG to lower level and maintain between 25" SUR to 51% Full Range.

EMERGENCY OPERATING PROCEDURE  
EP/3/A/1800/01ENCLOSURE 7.3B  
Full Range SG Level Temperature Compensation

DIRECTIONS: To Temperature Compensate Full Range Level:

- 1) Read STEAM GEN OUTLET PRESS for desired SG from Control Room indication.
- 2) Intersect this Pressure line with the Full Range Level Curve.
- 3) Read DESIRED FULL RANGE LEVEL at intersection.
- 4) REFER TO Encl 7.5 (Level Corrections for High Reactor Building Temperature) to correct the DESIRED FULL RANGE LEVEL as necessary.

QVALUE 1.0

QUESTION 30

B10

Unit 1 Plant Conditions:

- Reactor Building pressure is 3.7 psig.
- ICCM Train B has failed.
- ICCM Train A is operating.
- The SCM program is in MANUAL and selected to OAC.
- All PR NIs indicate 7%.

The SCM windows (indicators) will display SCM calculations based ONLY on \_\_\_\_\_.

- A. RC loop A and B WR RCS pressure; RC hot leg A and B WR temperature; and the average of the 47 qualified and non-qualified CETCs
- B. RC loop A and B WR RCS pressure; RC hot leg A & B WR temperature; and the average of the 5 highest qualified CETCs
- C. ICCM RCS pressure and the average of the 5 highest CETCs for ICCM Train A and B
- D. ICCM RCS pressure and the average of the 47 CETCs not being used by the SSF for train A.

QVALUE 1.0

QUESTION 31

B11

Unit 3 Initial Plant Conditions:

- Reactor startup and power increase in progress.
- Reactor power is 50%.

Unit 3 Current Plant Conditions:

- Reactor has tripped.
- Startup FDW control valves (3FDW-35 and 44) failed closed.
- Main FDW block valves (3FDW-31 and 40) failed closed.
- 3FDW-315 (SG EFDW Control Valve to 3A SG) failed closed.
- Main FDW pump 3A operating (i.e., did not trip).

Which ONE of the following provides the levels at which SG 3A and 3B will stabilize? (Assume no operator actions.)

	<u>SG A XSUR Level</u>	<u>SG B XSUR Level</u>
A.	30 inches	25 inches
B.	25 inches	20 inches
C.	14 inches	20 inches
D.	14 inches	30 inches

QVALUE 1.0  
QUESTION 32

B12

Unit 3 Plant Conditions:

- Reactor has tripped from 90% power on RPS Anticipatory Trip.
- EOP immediate manual actions have been performed.
- Main Steam Stop Valves (MSSVs) are OPEN
- Main Steam Control Valves (MSCVs) are CLOSED
- Both Main FDWPs are operating.
- MSRVs are open; SG outlet press ~ 1030 psig.

Which ONE of the following is the required operator action?

**PLACE the ...**

- A. EHC pumps control switches to the OFF position.
- B. EHC pumps control switches to the PULL-TO-LOCK position.
- C. ICS Turbine station to HAND and lower ICS turbine demand to 0%.
- D. ICS Turbine Bypass Valves to HAND and lower setpoint to reseal MSRVs.

QVALUE 1.0

QUESTION 33

B14

Unit 3 Plant Conditions:

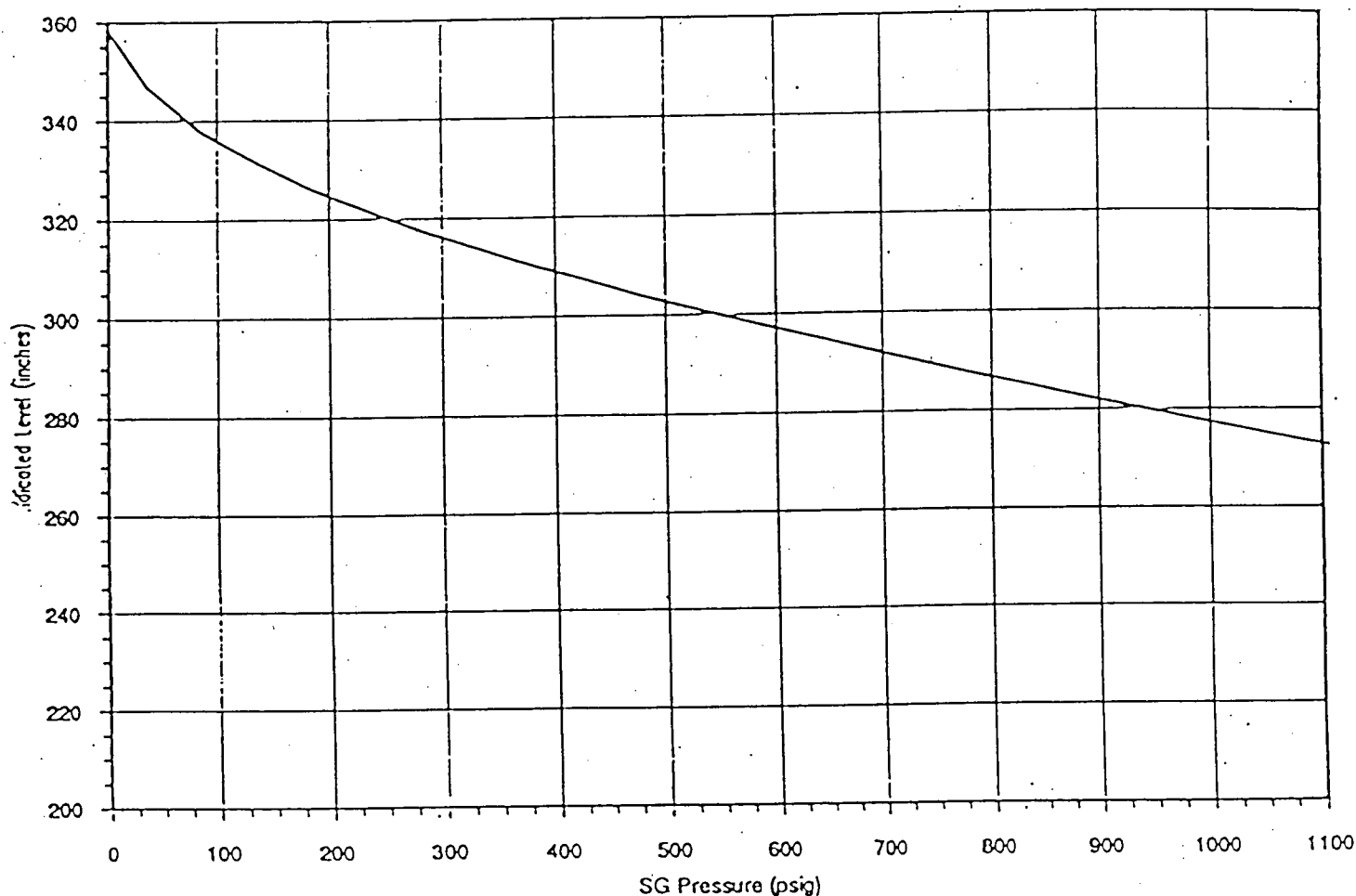
- CP-602, SG Cooldown with Saturated RCS is in progress.
- No HPI available.
- ICCM train "A" CETC's indicate 600°F.
- ICCM train "B" CETC's indicate 590°F.
- RCS pressure is 1540 psig and slowly decreasing.
- Reactor Building temperature is 95°F.
- Reactor Building pressure is 0 psig.
- EFDW is available to both SGs.

Which ONE of the following provides a set of SG conditions that satisfy the requirements for performing a rapid cooldown? (See ATTACHMENT)

	<u>SG A XSUR</u>	<u>SG B XSUR</u>	<u>SG A and B Pressures</u>
A.	300 inches	295 inches	725 psig
B.	280 inches	290 inches	725 psig
C.	290 inches	300 inches	625 psig
D.	295 inches	280 inches	625 psig

EMERGENCY OPERATING PROCEDURE  
EP/3/A/1800/01

ENCLOSURE 7.3A  
Extended Startup Range Loss of Subcooled  
Margin Setpoint



DIRECTIONS: To Determine the Loss of Subcooled Margin Setpoint:

- 1) Read STEAM GEN OUTLET PRESS for the desired SG from Control Room indication.
- 2) Intersect this Pressure line with the Loss of Subcooled Margin Setpoint curve.
- 3) Read DESIRED XSUR LEVEL at intersection.
- 4) REFER TO Encl 7.5 (Level Corrections for High Reactor Building Temperature) to correct the DESIRED XSUR LEVEL as necessary.



QVALUE 1.0

QUESTION 34

B15

Unit 1 Initial Plant Condition:

- MS Line B rupture at 100% power

Current Plant Conditions:

- Plant has been stabilized with 1B OTSG isolated.
- RCS "A" Loop Tc is 495°F and steady.
- RCS pressure is 1300 psig and steady.
- All RCPs are secured.
- Reactor Building pressure is 4.1 psig.

Which ONE of the following describes the action that must be taken by the operating crew?

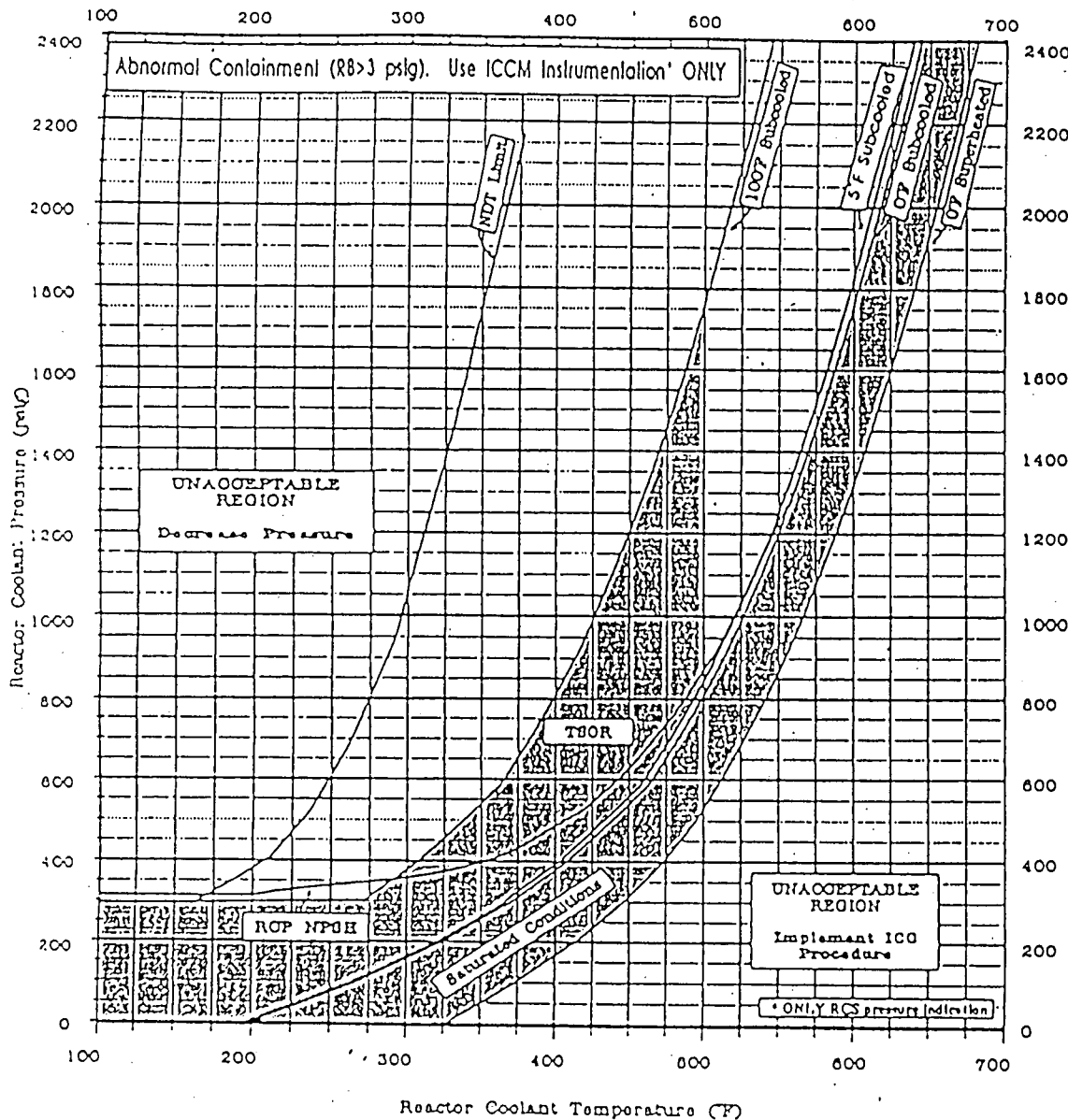
Operation in TSOR is ...

(SEE ATTACHMENT)

- A. ...required; cooldown RCS as necessary to establish approximately 5°F SCM.
- B. ...required; prevent RCS repressurization and heatup.
- C. ...NOT required; cooldown RCS as necessary to establish approximately 5°F SCM.
- D. ...NOT required; prevent RCS repressurization and heatup.

## ENCLOSURE 7.1B

## Abnormal Containment Cooldown Limits



**CAUTION** All subcooling margins should be maintained  $\geq 5^\circ\text{F}$  while depressurizing onto TSOR.

1.0 Maintain the RCS within the TSOR when either of the following conditions exist:

1.1 WHEN RCPs off

AND RCS temp ( $T_c$ )  $< 300^\circ\text{F}$ .

AND HPI operation in injection mode (1HP-26 or 1HP-27 used).

THEN depressurize the RCS to maintain core subcooling margin  $\geq 5^\circ\text{F}$ , if possible.

1.2 WHEN RCPs on.

AND Cooldown rate exceeds  $50^\circ\text{F}/\text{one-half Hr.}$

AND  $100^\circ\text{F}$  temperature change in  $T_c$  occurs.

THEN depressurize the RCS to maintain  $T_c$  in the TSOR.

**NOTE** 2.0 The TSOR 1 hour hold is not applicable for SBLOCAs or SG tube ruptures.

2.0 IF operation in the TSOR is required.

THEN stabilize RCS conditions in the TSOR.

AND maintain for 1 hour:

• Prevent heatup or repressurization.

3.0 IF depressurization is required.

THEN methods for depressurization are:

3.1 Use normal PZR spray (RCPs on).

3.2 Turn PZR heaters off and lower level.

3.3 If  $\Delta T < 410^\circ\text{F}$ , Aux. PZR Spray.

3.4 Open 1RC-66 (PORV).

3.5 If  $\Delta T > 410^\circ\text{F}$ , Aux PZR spray (Emergency Coordinator authorization to violate  $410^\circ\text{F } \Delta T$ ).

Both 34

QVALUE 1.0

QUESTION 35

B16

Unit 3 Initial Plant Conditions:

- At 0811 the Reactor tripped on "RCS Low Pressure"
- At 0812 the "B" Loop SCM indicated 0°F.

Unit 3 Current Plant Conditions:

- Present time = 0815
- CETC's = 584°F
- RCS pressure = 1370 psig
- Reactor power level = 0%
- RCP's 3A1 and 3B2 are operating; motor ammeter fluctuating from 0.3 to 0.7 KA.

Which ONE of the following is the appropriate operator action?

- A. Trip operating RCPs and secure seal injection, CC, and LPSW to tripped RCPs.
- B. Trip one operating RCP and secure seal injection, CC, and LPSW to tripped RCPs.
- C. Leave operating RCPs running and maintain seal injection, CC, and LPSW to running RCPs.
- D. Start all available RCPs, and maintain seal injection, CC, and LPSW to running RCPs.

QVALUE 1.0

QUESTION 36

B18

Unit 1 Plant Conditions following a trip from 100%:

- EOP in progress.
- Reactor Building (RB) pressure is 2.8 psig and steady.
- RCS pressure is 250 psig and decreasing at 30 psig/minute.
- ES is injecting and PZR level is 50 inches and increasing.
- BWST level is 6 feet.
- Emergency Sump level is 1.8 feet and steady.
- 1A and 1B CFT level is 2.5 feet and decreasing slowly

Which ONE of the following is the adverse condition that the operating crew must consider when determining the mitigating actions that must be taken?

- A. An unmonitored release of radioactive water/gas from the Reactor Building may be occurring.
- B. Reactor Building Emergency Sump (RBES) level is too low for instrumentation to properly indicate level.
- C. LPIPs should be secured to allow RC pressure to decrease until both CFTs have completely dumped.
- D. Insufficient Reactor Building Emergency Sump (RBES) level is available for initiation of caustic addition.

QVALUE 1.0

QUESTION 37

B20

Unit 2 Plant Conditions:

- CP-601, Cooldown Following Large Break LOCA, is in progress
- 2A and 2B LPIP operating.
- 2LP-28 (BWST Outlet) locked OPEN
- Swap to the RBES is in progress:
  - 2LP-21 (BWST Suction to LPIP) failed OPEN.
  - 2LP-19 (RBES Suction to LPIP) failed CLOSED.
  - 2RIA-35 (LPSW Discharge) alarm.
  - RIA-31 (6-Point LPI Cooler Discharge), Point #4 2B LPI Cooler, HIGH alarm actuated.

Which ONE of the following describes the required operator actions?

The operator will OPEN 2LP-20 (RBES Suction to LPIP) and...

- A. ...close 2LP-28 (BWST Outlet), adjust 2A LPSW to 5500 gpm.
- B. ...close 2LP-28 (BWST Outlet), adjust 2A and 2B LPI header flow to 1500 gpm per header.
- C. ...start 2C LPIP, isolate LPI and LPSW to 2B LPI Cooler, close 2LP-22 (BWST Suction to LPIP).
- D. ...close 2LP-22 (BWST Suction to LPIP), start 2C LPIP and align it to the 2A LPI Header then adjust 2A LPI header flow to 5500 gpm.

QVALUE 1.0

QUESTION 38

B21

Unit 3 Plant Conditions:

- Reactor trip has occurred on Unit 3 at 0330 / 12-7-98 from 50% power.
- At 2130 / 12-7-98, the control room is recovering from HPI cooling.
- EFDW has become available and is being restored to SG 1A and 1B.
- RCP 1B2 is operating.

Which ONE of the following is the feed flow rate that must be established to EACH INDIVIDUAL SG to match reactor decay heat?

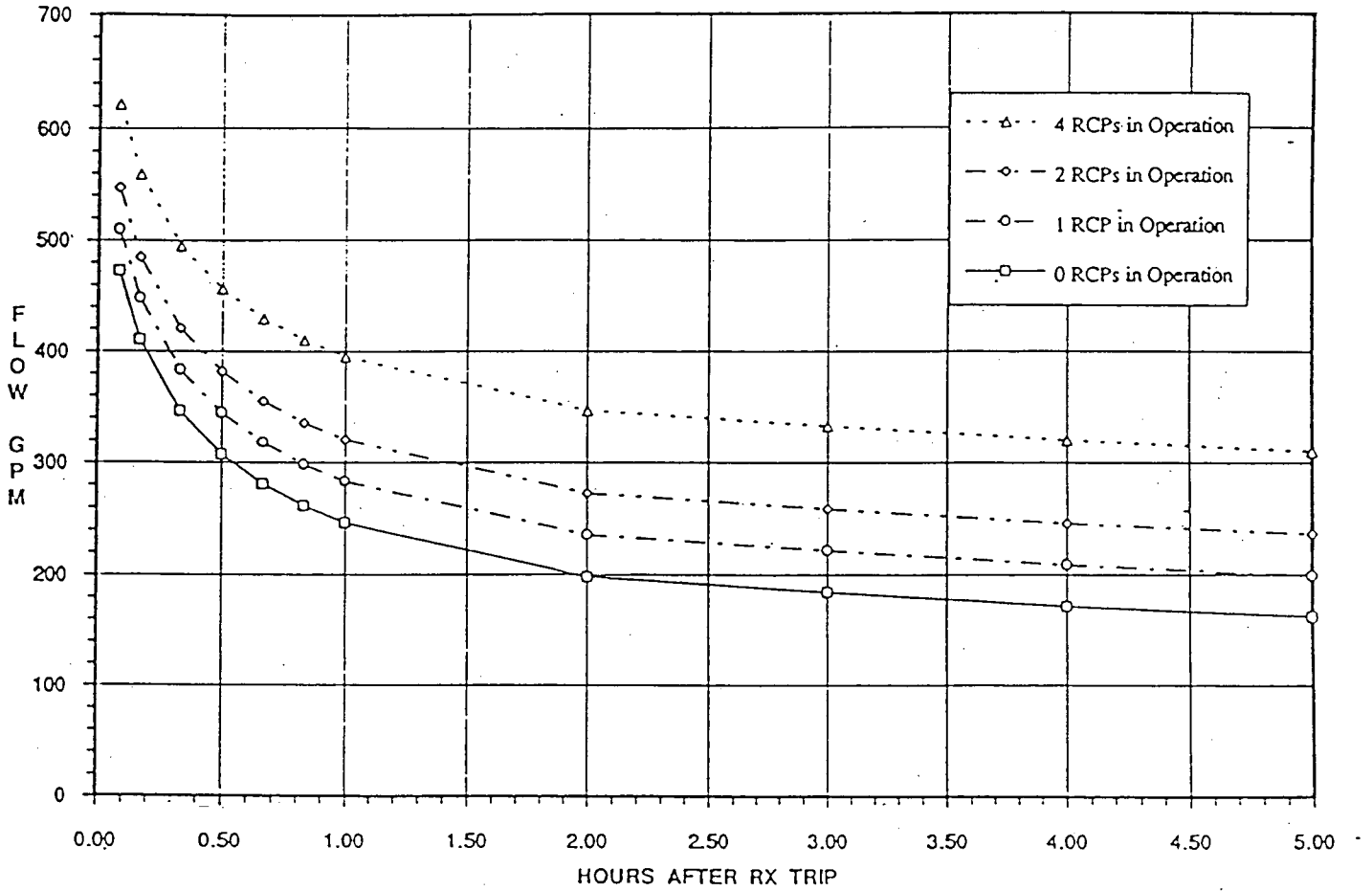
(SEE ATTACHMENT)

- A. 40 gpm
- B. 80 gpm
- C. 160 gpm
- D. 190 gpm

Both 38

EMERGENCY OPERATING PROCEDURE  
EP/1/A/1800/01

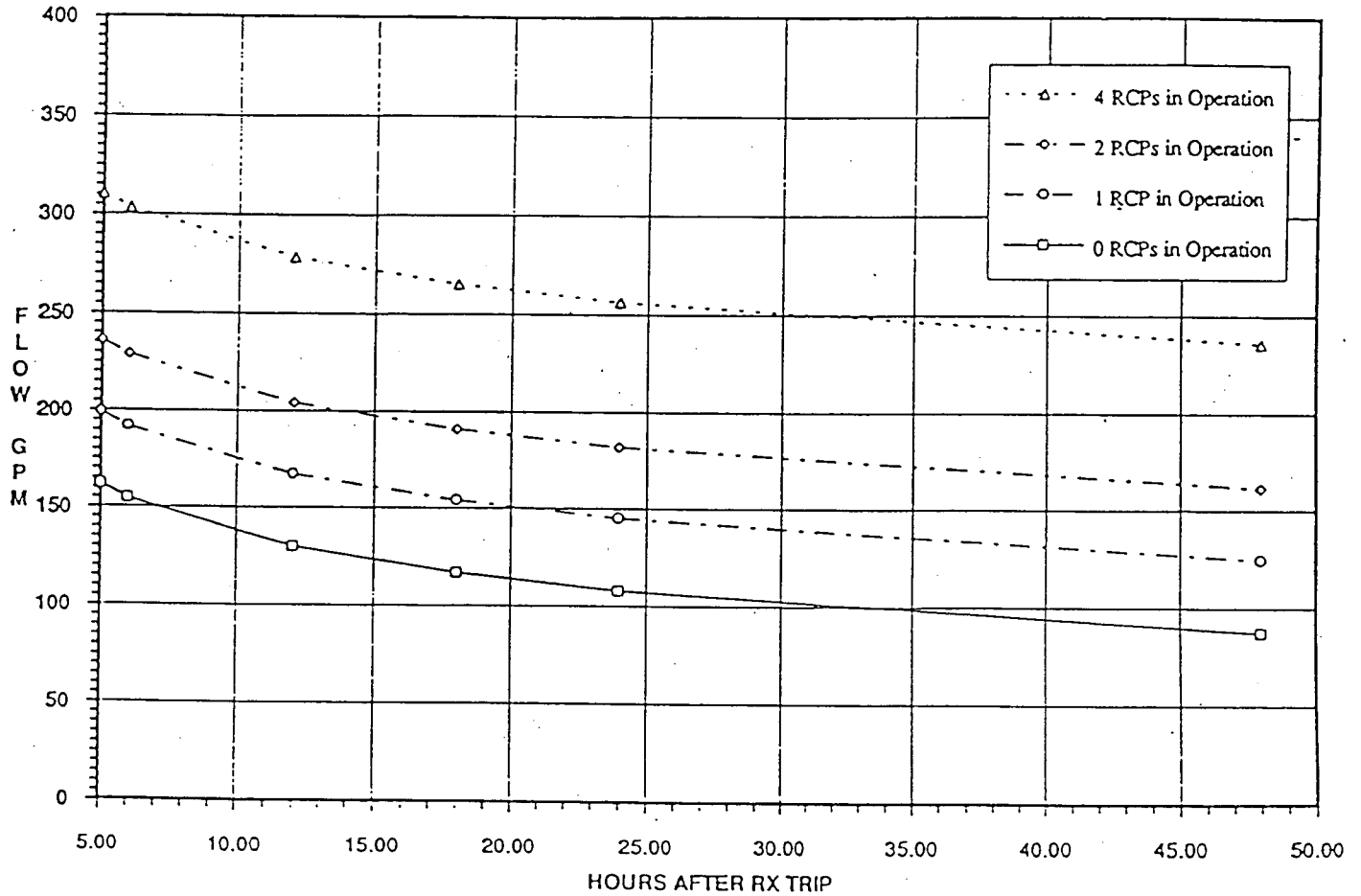
ENCLOSURE 7.6  
Total Feedwater Flow Required To Match NSSS Heat



Both 30

EMERGENCY OPERATING PROCEDURE  
EP/1/A/1800/01

ENCLOSURE 7.6  
Total Feedwater Flow Required To Match NSSS Heat





QVALUE 1.0

QUESTION 39

B22

During alignment of the SSF DC electrical system, the operator is cautioned NOT to open the SSF inverter DC input power breaker (CB-1) until the inverter is swapped to AC line.

Which ONE of the following is the expected adverse consequence if the operator fails to adhere to this precaution?

- A. KSF inverter power fuses may blow.
- B. SSF 600 volt load center XSF will be lost.
- C. Voltage spikes may damage loads on the bus.
- D. Automatic transfer of ES valves control power to SSF control room will occur.

QVALUE 1.0

QUESTION 40

B23

Unit 3 Plant Conditions:

- Section 507, Inadequate Core Cooling is in progress.
- RCS pressure is 183 psig.
- All HPIPs are operating.
- HPI header 3A flow is 600 gpm.
- HPI header 3B flow is 450 gpm.
- LPI header 3A flow is 1100 gpm.
- LPI header 3B flow is 3800 gpm.
- RB pressure is 22 psig
- RBES level is 2.5 feet and increasing.
- SG 3A and 3B pressures are 650 psig decreasing.
- SG 3A and 3B levels at 128 inches XSUR and increasing

Which ONE of the following plant conditions is indicated?

A LOCA and ...

- A. steam line rupture, HPIP 3B and LPIP 3B are in runout conditions.
- B. steam line rupture, HPI flow rates are less than the runout limits and an LPIP header 3B leak is indicated.
- C. the HPIP 3A and LPIP 3B are in runout conditions
- D. the HPI flow rates are less than runout limits and an LPI header 3B leak is indicated.

QVALUE 1.0

QUESTION 41

B24

Plant Conditions:

- Station Blackout is in progress.
- SSF D/G cannot be started due to fuel line rupture.
- SSF has been manned.
- No loads can be removed from SSF battery system.

Which ONE of the following is the TOTAL amount of time by design that BOTH the 125V DC DCSF and DCSFS batteries could provide DC power to the SSF? :

- A. One hour
- B. Two hours
- C. Four hours
- D. Eight hours

QVALUE 1.0

QUESTION 42

B25

Plant Conditions:

- Unit 1 has experienced a total loss of AC power.
- The SSF has been manned and the RCS is being maintained at hot shutdown conditions.
- RCS temperature and pressure are stable at 555°F and 2155 psig.
- The PZR level is 200 inches and continuing to increase.

Which ONE of the following is the method for stabilizing PZR level at its present indication?

- A. Open 1HP-20 (RCP Seal Return) to establish seal leakoff flow to reduce RCS inventory.
- B. Throttle open SSF-1HP-426 (RC Letdown to SFP) to establish letdown to reduce RCS inventory.
- C. Throttle closed SSF-1HP-398 (RCMU Pump Discharge Valve) to reduce makeup flow rate
- D. Throttle open 1HP-405 (RCMU Test Line Valve) to reduce makeup flow rate.

QVALUE 1.0

QUESTION 43

B29

Unit 1 Conditions:

- LDST makeup is in progress from 1A BHUT.
- A Reactor trip occurs from 100% power.

3 minutes following the reactor trip:

- Instrument air (IA) header pressure instantaneously decreases to 30 psig and continues to decrease.

Which ONE of the following describes the expected position of 1HP-15 (LDST Makeup Control) and 1FDW-35 and 44 (Startup FDW Control)? (Assume NO operator actions)

	<u>1HP-15</u>	<u>1FDW-35 and -44</u>
A.	Closed	Closed
B.	Closed	Open
C.	Open	Open
D.	Open	Closed

QVALUE 1.0

QUESTION 44

B30

The following conditions exist:

- Keowee Hydro Unit (KHU) 1 is generating to the grid.
- KHU 2 is in Standby aligned to the Underground Power Path.
- ES 1 and 2 occur on Oconee Unit 2.
- A Switchyard Isolation Signal occurs and due to a fault, PCB-8 fails CLOSED.

Which ONE of the following describes KHU's 1 and 2 emergency power lineup, following these events?

KHU-1... / KHU-2....

- A. ...continues operating at rated speed and supplies the Yellow Bus via the Overhead Power Path and PCB-9. / ...emergency starts and supplies both Standby Buses via the Underground Power Path and CT-4.
- B. ...trips due to overspeed, emergency starts, operates at rated speed-no load / ...emergency starts and supplies the Standby Buses via the Underground Power Path and CT-4.
- C. ...trips and emergency lockout on overspeed / ...emergency starts and supplies the Yellow Bus via the Overhead Power Path and PCB-9.
- D. ...trips due to the fault on PCB-8 / ...emergency starts and supplies only Standby Bus #2 via the Underground Power Path and CT-4.

QVALUE 1.0

QUESTION 45

B31

Plant Conditions:

- Keowee Unit 1 is generating to the grid at 30 MWe.
- Keowee Unit 2 is aligned to the Underground.
  
- SL<sub>1</sub> and SL<sub>2</sub> (CT-5 STBY BUS 1&2 to MFB 1&2 FDR) CLOSED.
- S1<sub>1</sub> and S2<sub>1</sub> (Unit 1 - STBY Bus 1&2 to MFB 1&2) are in AUTOMATIC and CLOSED
- S1<sub>2</sub> and S2<sub>2</sub> (Unit 2 - STBY Bus 1&2 to MFB 1&2) are in AUTOMATIC and OPEN
- S1<sub>3</sub> and S2<sub>3</sub> (Unit 3 - STBY Bus 1&2 to MFB 1&2) are in AUTOMATIC and OPEN
  
- Transformer lockout occurs on 2T, (Unit 2 Aux. Transformer)
- Transformer lockout occurs on CT-2, (Unit 2 Startup Transformer)

Which ONE of the following occurs when power is regained to Unit 2 MFBs? (Assume NO operator action.)

- A. 2X4 will immediately energize.
- B. 2X5 and 2X6 will immediately energize.
- C. 2X4 will load shed and automatically reenergize after 30 seconds.
- D. 2X5 and 2X6 will load shed and automatically reenergize after 30 seconds.

QVALUE 1.0

QUESTION 46

B32

Unit 2 Plant Conditions:

- Unit 2 is being shutdown from 100% power using Emergency Boration in accordance with EOP Section 506, "Unanticipated Nuclear Power Production."
- Emergency boration has been in progress for 20 minutes.
- Flux levels on all NIs are decreasing.

Emergency Boration can be secured per the EOP when: (Choose ONE)

Less than 1% on the \_\_\_\_\_ and core subcooling margin is \_\_\_\_\_.

- A. Power Range NI's / 4°F.
- B. Power Range NI's / 9°F.
- C. Wide Range NI's / 4°F.
- D. Wide Range NI's / 9°F.



QVALUE 1.0

QUESTION 47

B34

Unit 1 Plant Conditions:

- CP-605, Subcooled Cooldown is being implemented.
- Vessel head level is 155 inches and increasing.
- Hot leg level A is 596 inches and steady.
- Loop B SCM = 90°F.
- All PZR heaters are on.
- PZR level is 210 inches and decreasing.
- HPI injection rate equals letdown flow rate with 1HP-120 (RC volume) in Manual.

Which ONE of the following describes the condition of voids in the reactor coolant system?

**A void exists ...**

- A. ...in the vessel head and both hot legs; the voids are collapsing in both the head and the hot legs.
- B. ...in the vessel head and both hot legs; excessive RCS leakage is preventing the collapse of the voids.
- C. ...only in the reactor vessel; the void in the vessel head is collapsing.
- D. ...only in the reactor vessel; excessive RCS leakage is preventing the collapse of the voids.

QVALUE 1.0

QUESTION 48

B35

Unit 3 Plant Conditions at the SSF:

- Plant has been placed in Hot Shutdown from the SSF, following a trip from 100% power.
- The plant has run for 360 days
- RCS pressure is 2150 psig.
- PZR level is 110 inches slowly increasing.
- All RCPs are OFF.
- $T_c$  is 535°F and slowly decreasing.
- 3A OTSG level is 180".
- 3B OTSG level is 180".

Which ONE of the following RCS conditions positively indicates that natural circulation is occurring?

	$T_h$	<u>Average CETCs</u>
A.	565°F, slowly decreasing	580°F, constant
B.	565°F, slowly decreasing	575°F, slowly decreasing
C.	580°F, slowly decreasing	590°F, constant
D.	580°F, slowly decreasing	575°F, slowly increasing

QVALUE 1.0

QUESTION 49

B37

Unit 1 Plant Conditions:

- AP/1/A/1700/21, High Activity in RC System is being implemented.
- Reactor Engineering has calculated that 0.75% of the fuel has failed.
- The reactor is being shutdown by reducing power at 3% FP/hour.
- A small SG 1A tube leak exists.

AP/1700/21 directs the operator to reduce power slowly instead of immediately tripping the reactor because a reactor trip would cause \_\_\_\_\_.

- A. an inaccurate calculation of the SG tube leak rate.
- B. the iodine activity in the reactor coolant to rapidly increase during fission product buildup.
- C. Dose Equivalent Iodine (DEI) activity to be masked by crud burst radioactive particulates.
- D. a required delay of more than 8 hours before initiating sampling activities for RCS Dose Equivalent Iodine (DEI) activity.

QVALUE 1.0

QUESTION 50

B38

Plant Conditions:

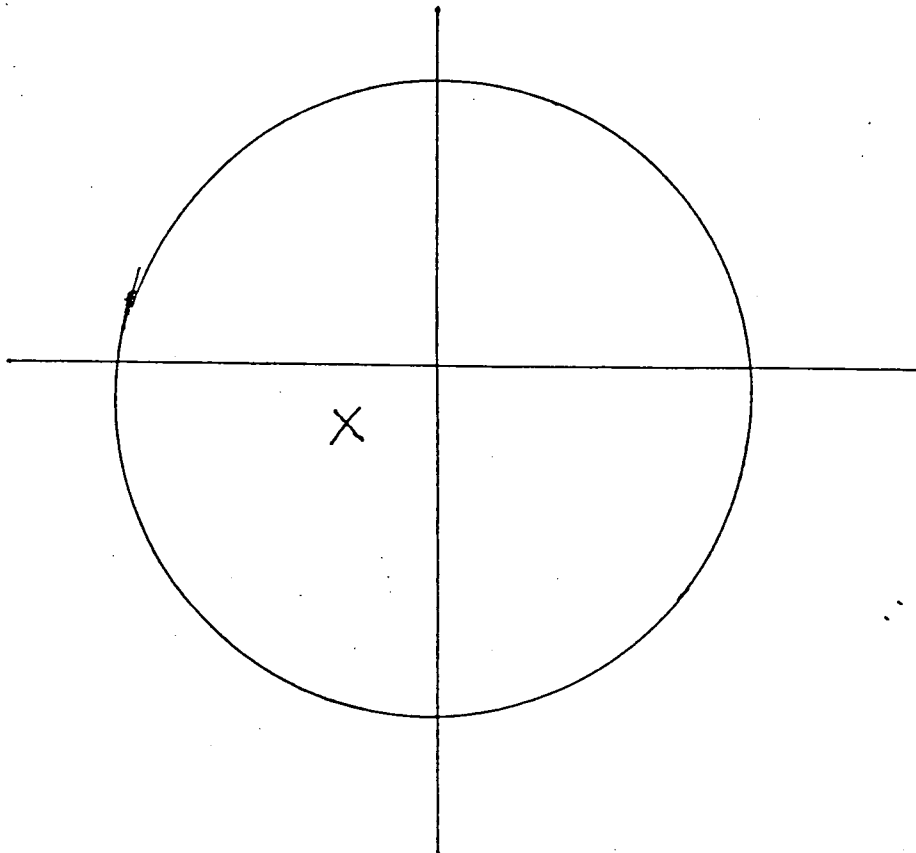
- Unit 2 at 70%
- ICS Reactor and Diamond is in MANUAL
- ALL other ICS stations are in AUTOMATIC
- Group 5 Rod 6 is dropped fully into the core

Which ONE of the following indicates the operators main concern with core power distribution?

**ASSUME NO OPERATOR ACTION.**

**REFER TO ATTACHEMENT for location of dropped rod.**

- A. Imbalance becomes more negative; Tave decreases and remains low.
- B. Imbalance becomes more positive; Tave decreases and returns to setpoint .
- C. Quadrant power tilt becomes more negative; Tave decreases and remains low.
- D. Quadrant power tilt becomes more positive; Tave decreases and returns to setpoint.



QVALUE 1.0

QUESTION 51

B39

Unit 2 Plant Conditions:

- Reactor power is 100%.
- SASS is in MANUAL
- PZR Level #2 selected
- An electrical "SHORT" of the PZR Temperature RTD "A" has just occurred.
- An electrical "OPEN" of the PZR Temperature RTD "B" has just occurred.

Unit 2 Control Room indications for PZR Level #1 and 3 will \_\_\_\_ / \_\_\_\_ , and PZR Saturation Pressure will \_\_\_\_\_.

- A. decrease / increase / increase
- B. increase / decrease / decrease
- C. increase / decrease / increase
- D. decrease / increase / decrease

QVALUE 1.0

QUESTION 52

B40

Unit 3 conditions:

- 25% turbine load
- 3MS-112 and 173, Second Stage Reheat (SSRH) valves are in AUTO.
- 3MS-77, 78, 80, & 81 (SSRH Steam Supply) valves are in AUTO.

Which ONE of the following describes the response of the SSRH valves for a loss of power to the SSRH Moore controllers?

- A. 3MS-77, 78, 80, & 81 (SSRH Steam Supply) valves will open and remain open after power is regained to the Moore controllers.
- B. 3MS-77, 78, 80, & 81 (SSRH Steam Supply) valves will close and remain closed if power is restored to the Moore controllers.
- C. 3MS-112/173 (SSRH Steam Supply) control valves will close and remain closed after power is regained to the Moore controllers.
- D. 3MS-112/173 (SSRH Steam Supply) control valves will fail "as-is" until power is restored to the Moore controllers.

QVALUE 1.0

QUESTION 53

B41

Which ONE of the following transient conditions will prevent the Turbine Master from automatically transferring to "HAND" on Unit 3?

- A. Power load unbalance at 56% reactor power.
- B. Loss of both Stator Coolant Pump at 789 Mwe.
- C. Loss of 2 operating RCPs at 56% reactor power.
- D. Dropped Reg. rod with Diamond in automatic at 798 MWe.

QVALUE 1.0

QUESTION 54

B42

Plant conditions:

- 1A GWD tank is being released from Unit 1 at 2/3 station release limit.
- Unit 2, PROCESS RADIATION MONITOR statalarm is received.
- 2RIA-45 (Norm Vent Gas) ALERT and HIGH alarms are indicated.
- (1)(2)(3)RIA-45 (Norm Vent Gas) have been properly set on each unit per PT/0/A/230/01, Radiation Monitor Check.

Which ONE of the following describes the action to be taken for this condition?

- A. Verify that 2RIA-45 (Norm Vent Gas) has automatically terminated the release.
- B. Manually terminate the 1A GWD tank release and investigate the cause of the high alarm on 2RIA-45 (Norm Vent Gas).
- C. Double the alarm setpoints for 2RIA-45 (Norm Vent Gas) and reduce 1&3 RIA-45 (Norm Vent Gas) setpoints by half and continue the release.
- D. Reduce the 1A GWD tank release flow rate by half and continue the release while obtaining revised release setpoints for 2RIA-45 (Norm Vent Gas).



QVALUE 1.0

QUESTION 55

B45

Unit 2 Plant Conditions:

- Reactor power is 16%.
- SG 2A and 2B levels are each at 24 inches and steady.
- ICS is in automatic.

Which ONE of the following describes the response of ICS if Tave is 578°F and decreasing?

- A. Reduce feed flow rate to each OTSG and withdraw control rods.
- B. Reduce feed flow rate to each OTSG and maintain current position of control rods.
- C. Maintain current feed flow rate to each OTSG and withdraw control rods.
- D. Maintain current feed flow rate to each OTSG and maintain current position of control rods.

QVALUE 1.0

QUESTION 56

B46

Unit 2 Plant Conditions:

- Reactor has tripped.
- 2KVIA AC vital power panelboard supply breaker trips
- RCS pressure is 900 psig, decreasing slowly.
- RB pressure is 3.4 psig, increasing slowly.

Which ONE of the following describes the Engineered Safeguards Channels that are expected to actuate?

**ANALOG CHANNELS... / DIGITAL CHANNELS...**

- A. ...B and C / ...1 and 2
- B. ...B and C / ...5 and 6
- C. ...A, B, and C / ...2, 4, 6
- D. ...A, B, and C / ...1, 3, 5

QVALUE 1.0

QUESTION 57

B47

Select the choice that completes the following statement for the Unit 2 Control Rod Drive System.

The control rod relative position indication (RPI) circuit provides a signal to the ...

- A. ...ICS dropped runback circuit
- B. ...Control rod sequence monitor
- C. ...Asymmetric rod alarm circuit
- D. ...Group average position indication

QVALUE 1.0

QUESTION 58

B49

During a Unit 1 reactor startup following a reactor trip (BOL), the following conditions occur:

The OATC and SRO in the Control Room are monitoring the approach to the ECP of 55% on Group 6, when, the operator notices the following withdrawn Rod positions:

Group 1-4	@	100%
Group 5	@	95%
Group 6	@	5%
Group 7	@	0%
Group 8	@	32%

Which ONE of the following describes the IMMEDIATE corrective operator action required to meet Technical Specifications for Control Rod Group and Power Distribution?

- A. Insert group 5 rods to 80%.
- B. Insert group 5 rods to 70%.
- C. Withdraw group 6 rods to 10%.
- D. Withdraw group 6 rods to 30%.

QVALUE 1.0

QUESTION 60

B53

Unit 1 Plant Conditions:

- A LOCA has occurred.
- RB Pressure is 9 psig and slowly approaching 10 psig.
- All ESF systems have actuated as expected.

Which ONE of the following statements describes the proper operation of the RB Spray system as RB pressure continues to increase?

- A. RB spray may be defeated if all RBCUs are operating in slow speed to minimize RB equipment degradation from acidic spray
- B. RB spray is manually initiated and remains in operation to prevent exceeding RB design pressure of 10 psig and Hydrogen concentration < 3%.
- C. Verify proper actuation of RB spray and operate spray flow to reduce containment pressure to less than 3 psig, then spray may be secured.
- D. Verify proper actuation of RB spray and operate spray flow to reduce containment pressure to less than 10 psig, then spray may be secured if all RBCUs are operating in high speed.

QVALUE 1.0

QUESTION 61

B54

Unit 2 Plant Conditions:

- A normal plant startup is in progress.
- RCS WR Pressure at 885 psig and slowly decreasing.
- PZR Saturation Pressure at 885 psig and slowly decreasing.
- PZR Level at 120" (inches) and slowly decreasing.
- Quench Tank Pressure is 45 psig and slowly increasing.

Which ONE of the following is the expected PORV tailpipe temperature if the PZR PORV is leaking by?  
(Assume PZR steam quality is 100%.)

- A. 532°F
- B. 360°F
- C. 325°F
- D. 300°F

QVALUE 1.0

QUESTION 62

B56

Unit 2 Plant Conditions:

- Reactor has tripped.
- OTSG A tube leakage (SGTL) is 0.12 gpm.
- RCS DEI activity is 2.0 uc/ml.
- OTSG 2A pressure 997 psig increasing slowly.
- OTSG 2B pressure 900 psig decreasing slowly.
- RCS temperature 534°F and decreasing slowly
- Radiation Protection (RP) technicians report radioactive releases have been detected at the site boundary.

Which ONE of the following describes probable pathways for the release of fission products directly to the environment that may be ISOLATED by the operator's OMP 2-1 items committed to memory?

- A. LDST relief and Auxiliary Steam relief valve open.
- B. Condenser air ejector discharge and letdown line relief seat leakage.
- C. Main Steam relief valve stuck open and Main FDW source to the SGs.
- D. Condensate Storage Tank overflow and Emergency FDW source to the SGs.

QVALUE 1.0

QUESTION 63

B57

As the operator on the Spent Fuel Handling Bridge, you are making a tour in the Unit 1 and 2 Spent Fuel Pool (SFP) and notice, the red beacon light on the north wall is operating.

Which ONE of the following describes the reason the light is operating?

- A. RIA-6 indicating High Radiation in the SFP area.
- B. The SFP Bridge, Trolley, or Grapple is in motion.
- C. The 100-Ton Crane is positioned over the SFP racks.
- D. The new fuel elevator is positioned to an intermediate position.



QVALUE 1.0

QUESTION 64

B58

During resin sluice operations, a worker will receive a Total Effective Dose Equivalent (TEDE) of 1.9 rem for the current year.

Which ONE of the following describes the MINIMUM approval needed to receive this dose?

- A. Section Manager
- B. Radiation Protection Manager
- C. Radiation Protection Manager AND Station Manager.
- D. Section Manager AND Radiation Protection Manager AND Station Manager.

QVALUE 1.0

QUESTION 65

B59

Unit 2 Plant Conditions:

- NI Power is 33.5% decreasing slowly.
- Turbine has tripped.
- RCS Pressure is 2335 psig increasing slowly.
- RCS Th temperature is 610°F
- Group 7 Control Rods are withdrawn 80%.
- 2A SG level is 25% OR and steady.
- 2B SG level is 17 inches SU Range and steady.
- 2 out of 4 RPS RB Pressure inputs fail to 3 psi.
- Actual RB pressure = 0 psig

Which ONE of the following describes the action necessary to protect the plant and the reason for this action?

**Manually...**

- A. ...trip the reactor to assure RCS integrity.
- B. ...trip the reactor to assure Reactor Building integrity.
- C. ...increase Main FDW flow and initiate full PZR spray to assure RCS integrity.
- D. ...insert control rods to reduce RCS temperature to assure RCS integrity.

QVALUE 1.0

QUESTION 66

B60

Which ONE of the following describes one of the responsibilities that must be performed by the oncoming Unit 1 reactor operator?

- A. Complete the shift turnover checklist within one hour after assuming the shift.
- B. Initiate shift turnover sheet and shift turnover checklist within one hour after assuming the shift.
- C. Make a complete tour of the control room with the aid of the turnover checklist before assuming the shift.
- D. Review turnover sheet for any equipment out of service that places the unit in an LCO action statement before assuming the shift.

QVALUE 1.0

QUESTION 67

B61

In accordance with requirements for using valve wrenches, the Nuclear Shift Supervisor...

- A. ...may authorize using a valve wrench for opening a diaphragm valve.
- B. ...must be notified if a valve wrench is used on a motor operated valve.
- C. ...must determine that double isolation for the component is not an option prior to the use of a valve wrench.
- D. ...may authorize using a valve wrench on a reach rod device, provided the valve wrench fits the valve handwheel properly.

QVALUE 1.0

QUESTION 68

B63

Given the following Unit 1 plant conditions:

- Unit 1 reactor power is 70%.
- 3 RCP operation for 48 days.
- Control rod Group 5 Rod 8 has been determined to be inoperable due a failed stator, but the rod will TRIP.
- Control rod Group 5 Rod 8 is positioned 10 inches from the group average position.

Which ONE of the following describes the required action?

REFER TO ATTACHMENT

- A. Calculate SDM within 2 hours.
- B. Reduce power to 44% within 2 hours.
- C. Place reactor in Hot Standby condition within 12 hours.
- D. Position Group 5 rods to the same position as the affected rod within 12 hours.

Both 60

### 3.5.2 Control Rod Group and Power Distribution Limits

#### Applicability

This specification applies to power distribution and operation of control rods during power operation.

#### Objective

To assure an acceptable core power distribution during power operation, to set a limit on potential reactivity insertion from a hypothetical control rod ejection, and to assure core subcriticality after a reactor trip.

#### Specification

##### 3.5.2.1 Shutdown Margin

- a. The available shutdown margin shall be greater than 1%  $\Delta k/k$  with the highest worth control rod fully withdrawn.
- b. If the shutdown margin is less than 1%  $\Delta k/k$ , then within 1 hour initiate and continue boration until the required shutdown margin is restored. The requirements of Specification 3.5.2.5.c shall be met.

##### 3.5.2.2 Movable Control Assemblies

- a. All control (safety and regulating) rods shall be operable and positioned within nine (9) inches of their group average height.
- b. A control rod shall be declared inoperable if any of the following conditions exist for that rod:
  1. The control rod cannot be moved due to excessive friction or mechanical interference, or cannot perform its intended trip function.
  2. The control rod cannot be located by either absolute or relative position indication or by in or out limit lights.
  3. The control rod is misaligned with its group average by more than nine (9) inches.
  4. The control rod does not meet the exercise requirements of Specification 4.1.
  5. The control rod does not meet the rod trip insertion times of Specification 4.7.1.
  6. The control rod does not meet the rod program verification of Specification 4.7.2.

- c. If a control rod is declared inoperable by being immovable due to excessive friction or mechanical interference or known to be untrippable then:
1. Within 1 hour verify that the shutdown margin requirement of Specification 3.5.2.1 is satisfied and,
  2. Within 12 hours place the reactor in the hot standby condition.
- d. If a control rod is declared inoperable due to causes other than addressed in 3.5.2.2.c above then:
1. Within 1 hour either restore the rod to operable status or,
  2. Continue power operation with the control rod declared inoperable and
    - a. Within 1 hour verify the shutdown margin requirement of Specification 3.5.2.1 with an additional allowance for the withdrawn worth of the inoperable rod and,
    - b. Either reactor thermal power shall be reduced to less than 60% of the allowable power for the reactor coolant pump combination within 1 hour and the Nuclear Overpower Trip Setpoints, based on flux and flux/flow/imbalance, shall be reduced within the next 4 hours to 65.5% of thermal power value allowable for the reactor coolant pump combination or,
    - c. Position the remaining rods in the affected group such that the inoperable rod is maintained within allowable group average limits of Specification 3.5.2.2.a and within acceptable operating rod position withdrawal/insertion limits for regulating rod position provided in the CORE OPERATING LIMITS REPORT.
- e. If more than one control rod is inoperable or misaligned, the reactor shall be shut down to the hot standby condition within 12 hours.

3.5.2.3 The worths of single inserted control rods during criticality are limited by the restrictions of Specification 3.1.3.5 and the control rod position limits provided in the CORE OPERATING LIMITS REPORT.

## Quadrant Power Tilt

- a. Except for physics tests, the maximum positive quadrant power tilt shall not exceed the Steady State Limit provided in the Core Operating Limits Report during power operation above 15% full power.
- b. If the maximum positive quadrant power tilt exceeds the Steady State Limit but is less than or equal to the Transient Limit provided in the Core Operating Limits Report, then:
  1. Either the quadrant power tilt shall be reduced within 2 hours to within its Steady State Limit or,
  2. The reactor thermal power shall be reduced below 100% full power by 2% thermal power for each 1% of quadrant power tilt in excess of the Steady State Limit, and the Nuclear Overpower Trip Setpoints, based on flux and flux/flow imbalance, shall be reduced within 4 hours by 2% thermal power for each 1% tilt in excess of the Steady State Limit. If less than four reactor coolant pumps are in operation, the allowable thermal power for the reactor coolant pump combination shall be reduced by 2% for each 1% excess tilt.
- c. Quadrant power tilt shall be reduced within 24 hours to within its Steady State Limit or,
  1. The reactor thermal power shall be reduced within the next 2 hours to less than 60% of the allowable power for the reactor coolant pump combination and the Nuclear Overpower Trip Setpoints, based on flux and flux/flow imbalance, shall be reduced within the next 4 hours to 65.5% of the thermal power value allowable for the reactor coolant pump combination.
- d. If the quadrant power tilt exceeds the Transient Limit but is less than the Maximum Limit provided in the Core Operating Limits Report and if there is a simultaneous indication of a misaligned control rod then:
  1. Reactor thermal power shall be reduced within 30 minutes at least 2% for each 1% of the quadrant power tilt in excess of the Steady State Limit.
  2. Either quadrant power tilt shall be reduced within 2 hours to within its Transient Limit or,



3. The reactor thermal power shall be reduced within the next 2 hours to less than 60% of the allowable power for the reactor coolant pump combination and the Nuclear Overpower Trip Setpoints, based on flux and flux/flow imbalance, shall be reduced within the next 4 hours to 65.5% of the thermal power value allowable for the reactor coolant pump combination.
- e. If the quadrant power tilt exceeds the Transient Limit but is less than the Maximum Limit provided in the Core Operating Limits Report, due to causes other than simultaneous indication of a misaligned control rod then:
    1. Reactor thermal power shall be reduced within 2 hours to less than 60% of the allowable power for the reactor coolant pump combination and the Nuclear Overpower Trip Setpoints, based on flux and flux/flow imbalance, shall be reduced within the next 2 hours to 65.5% of the thermal power value allowable for the reactor coolant pump combination.
  - f. If the maximum positive quadrant power tilt exceeds the Maximum Limit provided in the Core Operating Limits Report, the reactor shall be shut down within 4 hours. Subsequent reactor operation is permitted for the purpose of measurement, testing, and corrective action provided the thermal power and the Nuclear Overpower Trip Setpoints allowable for the reactor coolant pump combination are restricted by a reduction of 2% of thermal power for each 1% tilt for the maximum tilt observed prior to shutdown.
  - g. Quadrant power tilt shall be monitored on a minimum frequency of once every 2 hours during power operation above 15% full power.

#### 3.5.2.5 Control Rod Positions

- a. Technical Specification 3.1.3.5 does not prohibit the exercising of individual safety rods as required by Table 4.1-2 or apply to inoperable safety rod limits in Technical Specification 3.5.2.2.
- b. Except for physics tests, operating rod group overlap shall be  $25\% \pm 5\%$  between two sequential groups. If this limit is exceeded, corrective measures shall be taken immediately to achieve an acceptable overlap. Acceptable overlap shall be attained within two hours or the reactor shall be placed in a hot shutdown condition within an additional 12 hours.

- c. Position limits are specified for regulating and axial power shaping control rods. Except for physics tests or exercising control rods, the regulating control rod insertion/withdrawal limits shall be maintained within acceptable operating limits for regulating rod position provided in the CORE OPERATING LIMITS REPORT for the particular number of operating reactor coolant pumps (4,3).

If the control rod position limits are exceeded, corrective measures shall be taken immediately to achieve an acceptable control rod position. An acceptable control rod position shall then be attained within two hours. The minimum shutdown margin required by Specification 3.5.2.1 shall be maintained at all times.

- 3.5.2.6 Reactor power imbalance shall be monitored on a frequency not to exceed two hours during power operation above 40 percent rated power. Except for physics tests, imbalance shall be maintained within the acceptable operating limits for reactor power imbalance provided in the CORE OPERATING LIMITS REPORT.

If the imbalance is not within the acceptable envelope, corrective measures shall be taken to achieve an acceptable imbalance. If an acceptable imbalance is not achieved within two hours, reactor power shall be reduced until imbalance limits are met.

- 3.5.2.7 The control rod drive patch panels shall be locked at all times with limited access to be authorized by the manager or his designated alternate.

OCONEE NUCLEAR STATION

TECHNICAL SPECIFICATIONS INTERPRETATION

Technical Specification Affected: 3.5.2 Control Rod Group and  
Distribution Limits

Details

- 1) This interpretation defines what the allowable power level is for a particular reactor coolant pump combination.

<u>RCP Combination</u>	<u>Allowable Power Level</u>
4	100%
3	75%

Example 1) For a 3 pump combination, the thermal power shall be reduced to less than 60% of 75% full power (less than 45% of full power), when a control rod is declared inoperable and Tech. Spec. 3.5.2.2.d.2.b. applies.

Example 2) For a 4 pump combination, the thermal power shall be reduced to less than 60% of full power when quadrant power tilt exceeds the Transient Limit and Tech. Spec. 3.5.2.4.e.1. applies.

- 2) The actions required under Technical Specifications 3.5.2.4 must be completed when the limit specified in Table 3.5-1 is exceeded regardless of operating conditions which caused the limit to be exceeded.

Bases

- 1) These levels assure that the margin between power level and RPS Flux/Flow trip setpoint is conservatively preserved for each RC Pump combination.
- 2) The names for the different tilt limits are arbitrary in nature and have no connection with changes in operational conditions. See Memorandum For File, R. T. Bond, September 1, 1978 as Reference Information.

Approval: H. B. Barron  
H. B. Barron, Manager

Approval Date: 7-10-90

Expiration Date: None

# OCONEE NUCLEAR STATION

## TECHNICAL SPECIFICATIONS INTERPRETATION

Technical Specifications Affected: (completion times for required actions)  
 3.5.2.2 Movable Control Assemblies  
 3.5.2.4 Quadrant Power Tilt  
 3.5.2.6 Reactor Power Imbalance

### Details

The table below lists times required to complete required actions for selected specifications. Other specifications in 3.5.2, for which completion times are clear, are not listed. For each case below, time keeping begins when the restricted condition is discovered or declared. Except where noted, the time listed is the total time to complete the action. Some actions are not required to be completed, depending upon successful completion of other actions. Refer to the actual specifications for details.

SPECIFICATION	REQUIRED ACTION	COMPLETION TIME
3.5.2.2.c	Immovable Rod	
3.5.2.2.c.1	verify s/d margin	1 hour
2	go to hot standby	12 hours
3.5.2.2.d	Inoperable Rod - Not Immovable	
d.1	restore rod to operable	1 hour
d.2.a	verify shutdown margin	1 hour
d.2.b	reduce power to < 60% allowed for # RCPs	2 hours
	reduce trip setpoints to ≤ 65.5% allowed	6 hours
d.2.c	reposition remaining rods	1 hour
3.5.2.4.b&c	Tilt Above Steady State Limit	
3.5.2.4.b.1	reduce tilt to ≤ SS limit	2 hours
b.2	*reduce power 2% for each 1% tilt > SS limit	6 hours
	*reduce trip setpoints, 2% for each 1% . . .	6 hours
c	reduce tilt to ≤ SS limit	24 hours
c.1	reduce power to < 60% allowed for # RCPs	26 hours
	reduce trip setpoints to ≤ 65.5% allowed	30 hours
3.5.2.4.d	Tilt Above Transient Limit due to Misaligned Rod	
d.1	*reduce power 2% for each 1% tilt > SS limit	30 minutes
d.2	reduce tilt to ≤ transient limit	2 hours
d.3	reduce power to < 60% allowed for # RCPs	4 hours
	reduce trip setpoints to ≤ 65.5% allowed	8 hours
3.5.2.4.e	Tilt Above Transient Limit w/o Misaligned Rod	
e.1	reduce power to < 60% allowed for # RCPs	2 hours
	reduce flux/flow/imb trip	4 hours
3.5.2.6	Reactor Power Imbalance Above Operating Limit	
3.5.2.6	reduce imbalance to ≤ limit	2 hours
	** <u>BEGIN</u> reducing power	2 hours

\*See the Bases for discussion of policy when tilt continues to change.

\*\*The Bases describe the rate of power decrease to be used.

## Bases

The tabulated completion times are based upon review of the affected specifications and their supporting documentation. The table provides guidance to ensure that required actions are taken in a consistent manner that also ensures safe operation.

Completion times for separate activities are generally considered to be in series (additive), rather than in parallel, except where specified otherwise. Exceptions to this are the inoperable rod requirement in 3.5.2.2.d.2.a, to verify shutdown margin, and the alternate requirement in 3.5.2.2.d.c to align a misaligned rod, both of which are considered to be required within 1 hour. When tilt is above the steady state limit, the intent of both 3.5.2.4.b&c is considered to be that actions to reduce tilt are allowed for a specified time (2 hrs & 24 hrs), followed by additional actions (in series) if tilt could not be restored.

Conditions can arise under 3.5.2.4.b.2, 3.5.2.4.d.1, and 3.5.2.6 for which the specifications do not provide adequate guidance. The next two paragraphs describe Duke's policy regarding these situations:

For required actions under 3.5.2.4.b.2 and 3.5.2.4.d.1, in which the amount of power and/or trip setpoints reduction is twice the amount that tilt exceeds the steady state limit, a conflict can occur when tilt continues to change while the actions are being performed. If the tilt has decreased, the amount of the power/setpoints reduction may be adjusted as appropriate for the currently existing tilt. If the tilt has increased since the required actions were initiated, the amount of power/setpoint reduction is not required to be reevaluated until after the action(s) are completed, unless tilt has increased to the extent that a new specification is entered. Once the initial required action(s) are complete, if the tilt has increased such that further reduction in power/setpoints is required, these further reductions shall be completed within 4 hours for 3.5.2.4.b.2, or within 30 minutes for 3.5.2.4.d.1.

Specification 3.5.2.6 does not provide a completion time for reducing power such that imbalance is brought within the operating limits. The requirement is considered to be met by decreasing power at a reasonable, controlled rate until imbalance limits are met. A reasonable shutdown rate is comparable to a rate which would be used in a normal plant shutdown; the exact shutdown rate is to be determined based on plant conditions.

NOTE: Planning is necessary when reduction of flux and the flux/flow/imbalance trip setpoints may be required, and early initiation of setpoint changes should be considered. This will prevent time pressure during performance of sensitive RPS work.

Approval:

H.B. Barron  
H.B. Barron, Station Manager

Approval Date:

7-19-71

Expiration:

none

QVALUE 1.0

QUESTION 69

B67

Which ONE of the following sets of Reactor Protective System Trip setpoints are used in Shutdown Bypass for Unit 1?

	<u>Nuclear Flux Overpower</u>	<u>Imbalance</u>	<u>High RCS Pressure</u>
A.	5% Rated Power	Bypassed	1720 psig
B.	5% Rated Power	Bypassed	1800 psig
C.	2% Rated Power	Per COLR	1720 psig
D.	2% Rated Power	Per COLR	1800 psig

QVALUE 1.0

QUESTION 70

B72

Given the following isotopic information:

- 10CFR20 Appendix B Derived Air Concentration (DAC) for the following isotopes are:

1. Ag-110m =  $4\text{E-}8 \mu\text{Ci/ml}$
2. Co-58 =  $3\text{E-}7 \mu\text{Ci/ml}$
3. Cs-137 =  $6\text{E-}8 \mu\text{Ci/ml}$
4. Mg-56 =  $6\text{E-}6 \mu\text{Ci/ml}$

Which ONE of the following requires the work area posted as an AIRBORNE RADIOACTIVITY AREA:

- A. Mg-56 =  $7.2\text{E-}7 \mu\text{Ci/ml}$ .
- B. Co-58 =  $6.6\text{E-}8 \mu\text{Ci/ml}$ .
- C. Ag-110m =  $1.2\text{E-}8 \mu\text{Ci/ml}$ .
- D. Cs-137 =  $9.0\text{E-}9 \mu\text{Ci/ml}$ .

QVALUE 1.0

QUESTION 71

B83

Unit 2 Plant Conditions:

- A reactor startup is being conducted.
- Withdrawing Bank 6 to the ECP of 43%
- Group 6 Control Rods are withdrawn to 30% and increasing
- RCS temperature = 535°F
- EFPD = 348

Which ONE of the following describes the plant response if the 2A TBVs fail open?

- A. NI 1,2,3,4 indications increase, High Startup Rate Inhibit will prevent outward rod motion and power increase.
- B. High Startup Rate Inhibit is bypassed and reactor power increases requiring a manual reactor trip.
- C. NI 1,2,3,4 indications decrease due to less leakage and High Startup Rate Inhibit will prevent outward rod motion and prevents criticality.
- D. High Startup Rate Inhibit prevents outward rod motion and reactor power is limited by moderator and fuel coefficients.



QVALUE 1.0

QUESTION 72

B84

Unit 3 Plant Conditions:

- 67% power
- PT/3/A/600/01 surveillance for PI alignment checks are in progress for Group 7 rods:

Absolute Rod Position (API)

Group 7 Rod 5 API position indication	79%
Other Group 7 rods API position indication	81% to 82%
Group 7 AVERAGE indicates	81%

Relative Rod Position (RPI)

Group 7 Rod 5 RPI position indication	85%
Other group 7 rods RPI position indication	80 to 84%

Which ONE of the following explains the condition of control rod Group 7 Rod 5?

- A. Misaligned, because rod 7-5 RPI exceeds the allowable tolerance for rod position indication as compared to its API position.
- B. Misaligned, because the rod 7-5 RPI exceeds the allowable tolerance for rod position indication as compared to the group (RPI) AVERAGE position.
- C. Not misaligned, but rod 7-5 RPI exceeds the allowable tolerance for rod position indication as compared to its API position.
- D. Not misaligned, but rod 7-5 RPI exceeds the allowable tolerance for rod position indication as compared to the group (RPI) AVERAGE position.

QVALUE 1.0

QUESTION 73

B85

Plant condition:

- Unit 3 is operating at 90%
- A DUMMY bistable is installed in "B" RPS.

Which ONE of the following describes the condition of "B" RPS Channel?

**The installed DUMMY bistable will...**

- A. ...prevent the RPS Channel from automatically tripping.
- ☒ B. ...bypass one of the normal RPS Channel trip parameters.
- C. ...prevent the RPS Channel from being manually tripped.
- D. ...bypass all of the trip functions for the affected RPS Channel.

QVALUE 1.0

QUESTION 74

B86

Unit 2 Plant Conditions:

- 100% power
- RCS pressure is 2358 psig and increasing rapidly.

Which ONE of the following lists the RCS safety limit for which the high pressure trip setpoint has failed to provide protection?

- A. 2355 psig
- B. 2450 psig
- C. 2750 psig
- D. 3125 psig

Initial Unit 2 Plant Conditions:

- Plant operating at 97% power.
- ICS is in the integrated operating mode with normal parameters selected.
- A RC Loop flow 103%.
- B RC Loop flow 95%.
- 2B2 Narrow Range Tc failed low.

A transient has occurred; the following plant conditions exist:

- RCP 2A1 has just tripped.
- RCS Loop A flow indicates 55%.
- RCS Loop B flow indicates 95%.

Which ONE of the following Tave inputs will be selected for the ICS Tave controller?

- A. Unit Tave is automatically selected.
- B. Loop B Tave is automatically selected.
- C. Loop A Tave is automatically selected and the operator has no control of Tave selection.
- D. Loop A Tave remains selected and the operator must manually select Loop B Tave.

QVALUE 1.0

QUESTION 76

B88

Unit 2 Plant conditions from 65%:

- A small break LOCA on RCS loop B has just occurred.
- HPI header 2A flow rate is 750 gpm with 2HP-26 (2A HP Injection) CLOSED.
- HPI header 2B flow rate is 450 gpm and 2HP-27 (2B HP Injection) has been throttled to 75% open.
- RIA-32 (Aux. Gas) HIGH alarm has actuated
- HAWT level rapidly increasing

Which ONE of the following describes the operator action required and the MAXIMUM time to perform this action to ensure adequate core cooling?

OPEN 2HP- ...

- A. ...409 (2HP-27 Bypass) within the next 10 minutes.
- B. ...410 (2HP-26 Bypass) within the next 10 minutes.
- C. ...409 (2HP-27 Bypass) within the next 15 minutes.
- D. ...410 (2HP-26 Bypass) within the next 15 minutes.

QVALUE 1.0

QUESTION 77

B89

Unit 2 Plant Conditions:

- 100% power.
- RCP indications for 2B2 RCP:
  - Lower seal cavity pressure indicates 1200 psig
  - Upper Seal cavity pressure indicates 900 psig
  - Seal Return flow high statalarm is actuated.

Which ONE of the following describes the RCP seal(s) that are failing?

- A. Lower (#1) seal
- B. Middle (#2) seal
- C. Lower (#1) seal and upper (#3) seal
- D. Middle (#2) seal and upper (#3) seal

QVALUE 1.0

QUESTION 78

B90

Which ONE of the following signals will automatically start the standby Condensate Booster Pump?

(Assume plant is operating at 85% power)

- A. FDWP suction pressure 358 psig and decreasing.
- B. FDW header discharge pressure 769 psig and decreasing.
- C. Differential pressure across the powdex system 41 psig and increasing.
- D. CBP suction pressure 55 psig for 30 seconds and AOP pressure > 6 psig.

QVALUE 1.0

QUESTION 79

B91

Unit 2 Plant Conditions:

- Reactor has tripped.
- Incoming breaker to Bus 2TE trips.
- Loss of all Main FDW pumps.
- Both OTSG outlet pressures = 400 psig.

Which ONE of the following describes the source(s) of feed to OSTG?

- A. MDEFDWP "2A"
- B. MDEFDWP "2B"
- C. HWP "2A" and CBP "2C"
- D. HWP "2C" and CBP "2B"



QVALUE 1.0

QUESTION 80

B92

Unit 1 Plant Conditions:

- 100% power
- PT/0/A/230/01, Radiation Monitor Check in progress

During the performance of RIA-1 (1&2 Control Room) area radiation monitor source check, which ONE of the following is a positive indication that the monitor channel is OPERABLE?

**The area radiation monitor indication (value)...**

- A. turns to red on the display for the view node of the control room screen.
- B. turns to yellow on the display for the view node of the control room screen.
- C. increases but the High & Alert alarms do not alarm when the check source is fully exposed.
- D. does not change and the High & Alert alarms do not alarm when the check source is fully exposed.

QVALUE 1.0

QUESTION 81

B95

Unit 2 Plant Conditions:

- Unit 2 is shutdown and a heatup is in progress.
- RCS pressure is 445 psig and increasing.
- PORV setpoint selector switch is in LOW.
- Quench tank pressure is 3.5 psig.
- Quench tank level is 84 inches and increasing.
- Quench tank temperature is 100° F and slowly increasing.
- RC-66 (PORV) tailpipe temperature 211°F and increasing slowly.
- RC-67 (Safety) tailpipe temperature 235°F and increasing.
- RC-68 (Safety) tailpipe temperature 213°F and increasing slowly..

Which ONE of the following would result in these plant conditions?

- A. The PORV has lifted as required and is not reseated.
- B. The PORV is chattering at the low pressure lift setpoint.
- C. One of the PZR code safety valves is not properly seated.
- D. Both of the PZR code safety valves are chattering.

QVALUE 1.0

QUESTION 82

B96

Unit 3 RBCU conditions:

- RBCU 3A is operating in HIGH.
- RBCU 3B is operating in HIGH.
- RBCU 3C is operating in HIGH.
- RBCU 3B damper is open (vertical).

Current plant conditions:

- A grid electrical transient has just occurred.
- RBCU 3C tripped
- RBCU 3B damper remains open (vertical).

If Unit 3 RBCUs respond as expected, operator action will be required because

---

- A. Unit 3 can be operated in this configuration with no time limit.
- B. Running RBCUs will experience high vibration requiring shifting to low speed.
- C. 3B RBCU damper position will cause abnormally high temperature pockets in the A SG RB compartment.
- D. 3B RBCU damper position will cause abnormally high temperature pockets in the B SG RB compartment.

QVALUE 1.0

QUESTION 83

B101

Unit 3 Plant Conditions:

- LT-5 A/B (RV Level) indicates 84 inches
- LPI is operating in the purification mode.
- Reactor vessel level must be lowered 4 inches during maintenance.

Which ONE of the following is the LPI flow path that is used to lower reactor vessel level?

- A. LDST bypass valve to BHUT
- B. Loop cold leg drains to the BHUT
- C. Bleed Transfer Pump to the BWST
- D. Component Drain Pump to the BWST

QVALUE 1.0

QUESTION 84

B103

Unit 2 Plant Conditions:

- RCS temperature is 100° F.
- RCS pressure is 29 psig.
- RB equipment hatch is open.

Which ONE of the following describes a RB purge lineup that would PREVENT a radioactive release?

- A. Main purge fan is operating at full flow and < GWR limitations.
- B. Mini purge fan is operating at full flow and < GWR limitations.
- C. Main purge fan operating at a reduced flow rate of 9,000 cfm.
- D. Mini purge fan operating at a reduced flow rate of 9,000 cfm.

QVALUE 1.0  
QUESTION 85

B104

Plant conditions:

- 2MS-104 and -105 (2B OTSG Main Steam Stop Valves) have just failed shut.
- Reactor has tripped from 100% power.
- SG 2B pressure is 1025 psig and decreasing.

Which ONE of the following explains the response of OTSG 2B Main Steam Relief Valves (MSRVs) to the closure of the Main Steam Stop Valves, including maximum expected blowdown?

- A. MSRV (Main Steam Relief Valve) is stuck open, all MSRVs should reclose by 1060 psig
- B. MSRV is stuck open, all MSRVs should reclose by 1039 psig
- C. Normal response, all MSRVs should reclose by 1010 psig
- D. Normal response, all MSRVs should reclose by 977 psig

QVALUE 1.0.

QUESTION 86

B105

Unit 2 Plant Conditions:

- A LOCA is in progress.
- 2SA-8, B10 (Process Radiation Monitor) statalarm actuated
- RIA-39 (Control Room radiation gas monitor) high alarm is received

Which ONE of the following describes the appropriate operator actions?

Manually start \_\_\_\_\_ outside air booster fan(s) AND verify control room manometer pressure indicates \_\_\_\_\_

- A. both / + .15 inches of water.
- B. both / - .15 inches of water.
- C. one / - 1.5 inches of water.
- D. one / + 1.5 inches of water.

QVALUE 1.0

QUESTION 87

B106

Plant Conditions:

- Unit 2 is operating at 75% power.
- IA header pressure is 85 psig and decreasing rapidly.
- IA compressor B is operating (Worthington).
- IA compressor A is out of service (Worthington).
- AIA compressor for Unit 2 cannot be started.
- AIA pressure at 90 psig for Unit 1 and 3.

Which ONE of the following describes the expected response of Auxiliary Instrument Air (AIA) and the Unit 2 CRDM cooling (CC) system?

AIA ...

- A. ...provides air pressure to hold 2CC-8 (CRDM cooling valve) open, supply cooling water to the CRDMs.
- B. ...pressure not adequate, and 2CC-8 will close at 80 psig but the operator can manually open it locally to supply cooling water to CRDMs.
- C. ...pressure not adequate, and 2CC-8 will close at 80 psig preventing the restoration of cooling water before CRDMs temperatures require a manual reactor trip.
- D. ...compressor will recover IA pressure to 2CC-8 but the operator must open 2CC-8 and restart 2CC pumps from the control room to provide cooling water to the CRDMs.



QVALUE 1.0

QUESTION 88

B107

Plant conditions:

- The air supply to the Elevated Water Storage Tank (EWST) level indicator is accidentally pinched closed UPSTREAM of the sensor during maintenance activities.

Which ONE of the following describes the expected response of the EWST level indication and the response of the operator? (Assume the HPSW pump automatic controls are functioning properly.)

- A. High EWST level is indicated and the operator should verify both HPSW pumps are OFF.
- B. High EWST level is indicated, and the operator should start HPSW pumps as necessary to maintain EWST level.
- C. Low EWST level is indicated, and the operator must stop HPSW pumps as necessary to prevent the EWST from overflowing.
- D. Low EWST level is indicated, and the operator should start HPSW pumps as necessary to maintain EWST level.

QVALUE 1.0

QUESTION 89

B108

Which ONE of the following describes a design basis function of the HPSW pumps and the elevated water storage tank?

- A. Full backup for the LPSW system upon a loss of all LPSW pumps during a station blackout.
- B. Full backup for sealing water flow to the CCW pumps during a station blackout.
- C. Automatic backup cooling water to the primary instrument air compressor upon loss of all LPSW during a LOOP.
- D. Automatic backup cooling water to the MDEFDW pumps during loss of LPSW.

QVALUE 1.0

QUESTION 90

B109

Unit 1 Plant conditions:

- Preparations for reactor startup are in progress.
- RCS temperature is 190 deg. F.
- RCS has been filled and vented.
- A nitrogen bubble has been established in the PZR.
- Quench tank level is 80 inches and steady.
- Quench tank temperature is 82 deg. F and steady.
- Quench tank pressure is 4.5 psig.
- PZR vent valve (1GWD-17) is throttled 50% open.
- Quench tank vent path aligned and vent valve (1GWD-13) is closed.
- Lineup to draw a steam bubble in the PZR has just been completed.

Which ONE of the following indicates that a saturated steam bubble without non-condensable gasses is being established in the PZR?

- A. RCS pressure starts to increase, and 1GWD-17 is fully open.
- B. PZR Aux spray is open (flow steady), and RCS pressure is 46 psig and increasing.
- C. Quench tank pressure 6 psig and increasing, while venting through its vent path.
- D. After cycling 1GWD-13 open then closed, quench tank pressure is at 1 psig and steady.

QVALUE 1.0

QUESTION 91

B110

Plant Conditions:

- Unit 3 shutdown and cooldown is in progress.
- RCS pressure is 375 psig and decreasing.

As RCS pressure decreases, which ONE of the following is the LPI mode of decay heat removal that FIRST becomes available and the RCS pressure at which this mode may be started?

- A. 350 psig and decreasing; high pressure mode
- B. 320 psig and decreasing; high pressure mode
- C. 290 psig and decreasing; normal decay heat removal mode
- D. 125 psig and decreasing; normal decay heat removal mode

QVALUE 1.0

QUESTION 92

B113

Unit 3 Plant Conditions:

- Unit 3 has been operating at 100% power for 15 days.
- 3RIA-40 (Air Ejector Off Gas) count rate has doubled over the past 4 hours.
- 3RIA-32 (Penetration Room Point) has alarmed high.
- Penetration Room Ventilation fans are off.
- Penetration Room Ventilation fan discharge damper is closed.
- 3A GWD tank release is in progress (1/3 station limit).
- GWR Flow Discharge Controller is 100% open.
- Release flow rate and RIA-37 and 38 within release limits.

Which ONE of the following conditions is indicated by radiation process monitors 3RIA-40 AND 3RIA-32?

3RIA-40 indicates that... / 3RIA-32 indicates that...

- A. ...a SG tube leak has developed / ...radioactive gasses are leaking into the Penetration Room.
- B. ...a SG tube leak has developed / ...an abnormal radiation condition exists in the vent stack.
- C. ...the GWD release is increasing vent stack radiation / ...radioactive gasses are leaking into the Penetration Room.
- D. ...the GWD release is increasing vent stack radiation / ...an abnormal radiation condition exists in the vent stack.

QVALUE 1.0

QUESTION 93

B114

Unit 1 Plant Conditions:

- The CRO is transferring Group 6 control rods from the NORMAL to AUXILIARY power supply
- The CRO has performed all actions in accordance with OP/0/A/1105/009, CRD System.

The following indications/actions have occurred:

- JOG speed switch selected
- SEQUENCE OVERRIDE light - ON
- AUXILIARY light - ON
- CLAMP light - ON
- MANUAL TRANSFER pushbutton depressed
- TRANSFER CONFIRM light - OFF.
- Group 6 CONTROL ON light - OFF.

Which ONE of the following describes the response of the group 6 control rods if the operator places the rod movement switch ("joy stick") to the drive "IN" position and then releases it after 3 seconds?

- A. Will drive in continuously.
- B. Will drive in then stop.
- C. Will not move.
- D. Will drop.

QVALUE 1.0

QUESTION 94

B115

Initial Plant Conditions:

- Stations are in AUTOMATIC.
- Unit 3 is at 80% power.

Current Plant Conditions occur concurrently:

- Statalarm FWP 3B tripped.
- Total RC flow is 74%.
- RCP 3A1 ammeter reads 0.55 KA
- RCP 3A2 ammeter reads 0.10 KA
- RCP 3B1 ammeter reads 0.52 KA
- RCP 3B2 ammeter reads 0.51 KA

Which ONE of the following describes the response of Unit 3?

(Assume reactor trip does not occur).

Reactor power decreases to \_\_\_\_\_ / at \_\_\_\_\_ / ...

- A. 74% / 20%/min. / then decreases to 65% at 25%/min.
- B. 65% / 20%/min. / and stabilizes.
- C. 74% / 25%/min / then decreases to 65% at 20%/min.
- D. 65% / 25%/min. / and stabilizes.

QVALUE 1.0

QUESTION 95

B118

Initial Plant Conditions:

- Unit 3 is operating at 98% power.
- All ICS stations are in AUTOMATIC.

Current Plant Conditions:

- Unit 3 condenser vacuum has degraded slowly from 28.5 to 26.5 inches Hg.

Which ONE of the following describes the response of the plant?

Reactor power ...

- A. remains the same, and FDW flow and main steam flow remain the same.
- B. remains the same, and FDW flow and main steam flow decrease and stabilize.
- C. decreases slightly and stabilizes, as FDW and main steam flow remains the same and FDW temperature increases and stabilizes.
- D. decreases slightly and stabilizes, as FDW and main steam flow decreases and FDW temperature increases and stabilizes.



QVALUE 1.0

QUESTION 96

B119

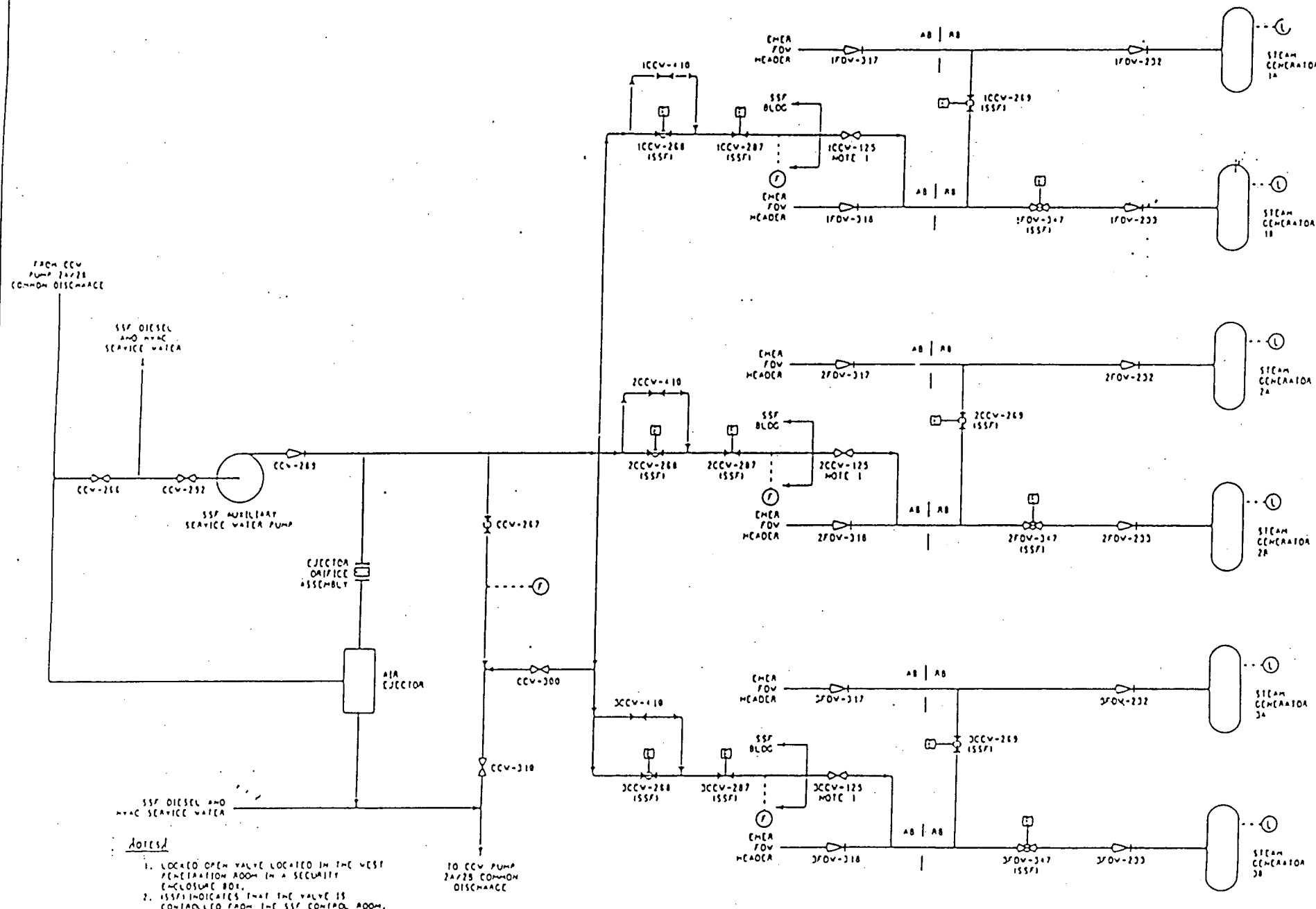
Unit 3 Plant Conditions:

- Unit 3 has tripped.
- Unit 3 control room has been evacuated.
- SSF has been manned.
- OTSG A and B are being fed using SSF Auxiliary Service Water (ASW).
- SSF 3CCW-268 (SSF ASWP to SG Supply) is fully closed.
- SSF 3CCW-410 (SSF ASWP to SG Supply Bypass) has been throttled fully open.
- CETCs are increasing slowly
- OTSG 3A and 3B levels are 55 inches and slowly decreasing.

Which ONE of the following describes the proper operator action required to control plant decay heat removal per AP/1700/25, SSF Emergency Operating Procedure, Enclosure 6.7, CCW-268 and 410 Operating Guidelines?

SEE ATTACHMENT

- A. Throttle 3CCW-287 (SSF ASWP to SG Supply Block) open .
- B. Cycle 3CCW-268 (SSF ASWP to SG Supply) open and closed.
- C. Open 3CCW-268 (SSF ASWP to SG Supply) and close 3CCW-410 (SSF ASWP to SG Supply Bypass).
- D. Cycle 3CCW-268 (SSF ASWP to SG Supply) and 3CCW-410 (SSF ASWP to SG Supply Bypass) open and closed.



ERN:0X00118J

<p>LEGEND</p> <p>SWITCH VALVE</p> <p>FLOW CONTROL VALVE</p> <p>CHECK VALVE (ALL TYPES)</p> <p>RELIEF VALVE</p>	<p>—○— NORMALLY OPEN</p> <p>—●— NORMALLY CLOSED</p> <p>—○— NORMALLY INITIATED</p> <p>① FLOW LEVEL</p> <p>② PRESSURE</p> <p>③ TEMPERATURE</p>	<p>□ E-ELECTRIC</p> <p>□ P-PISTON</p> <p>□ S-PNEUMATIC</p> <p>□ S-SOLENOID</p> <p>□ DIAPHRAGM PNEUMATIC</p> <p>RES-RECEIVES ENGINEERED SAFEGUARD SIGNAL</p>
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THIS DRAWING IS A SUMMARY FLOW DIAGRAM FOR THE SSP SYSTEM  
 DFD-1210-1, 1, 2, 3, 3.1 CPV HEADERS TO S/G'S  
 DFD-123A-2, 5 SSP AUX. SERVICE WATER PUMP

NO.	REVISIONS	DATE	BY	CHKD.	APP'D.
1	AS SHOWN	11/1/71	W. J. HARRIS	W. J. HARRIS	W. J. HARRIS
2	REVISED	11/1/71	W. J. HARRIS	W. J. HARRIS	W. J. HARRIS
3	REVISED	11/1/71	W. J. HARRIS	W. J. HARRIS	W. J. HARRIS
4	REVISED	11/1/71	W. J. HARRIS	W. J. HARRIS	W. J. HARRIS
5	REVISED	11/1/71	W. J. HARRIS	W. J. HARRIS	W. J. HARRIS
6	REVISED	11/1/71	W. J. HARRIS	W. J. HARRIS	W. J. HARRIS
7	REVISED	11/1/71	W. J. HARRIS	W. J. HARRIS	W. J. HARRIS
8	REVISED	11/1/71	W. J. HARRIS	W. J. HARRIS	W. J. HARRIS
9	REVISED	11/1/71	W. J. HARRIS	W. J. HARRIS	W. J. HARRIS
10	REVISED	11/1/71	W. J. HARRIS	W. J. HARRIS	W. J. HARRIS

THIS DRAWING SHOWS ALL UNITS

OCONEE NUCLEAR STATION

SUMMARY FLOW DIAGRAM OF  
 STANDBY SHUTDOWN FACILITY  
 (AUX. SERVICE WATER PORTION)

DC D 05FO-1210-2

DATA 74

QVALUE 1.0

QUESTION 97

B121

Unit 1 Initial Plant conditions:

- Unit 1 is at 45% power and ramping to full power.
- S/G Master Red lamp is OFF and White lamp is ON.
- All other ICS Stations are in AUTOMATIC.

Current Plant Conditions:

- All Load Control Panel indications go blank.
- S/G Master Bailey Hand lamp goes OFF and Automatic lamp remains OFF.
- ICS AUTO POWER FAILURE statalarm is lit.
- EL ICS INVERTER SYSTEM TROUBLE statalarm is lit.

Which ONE of the following describes the initial response of the MFDW flow control valves and the Feedwater Pump Turbines (FWPT)? (Assume no operator action is taken.)

Main FDW flow control valves will \_\_\_\_ AND / FWPT speed will \_\_\_\_.

- A. open / increase.
- B. open / remain the same.
- C. remain in their last position / increase.
- D. remain in their last position / remain the same.

QVALUE 1.0

QUESTION 98

B122

Unit 3 Plant Conditions:

- Unit 3 has been shutdown to Hot Shutdown to inspect for unidentified primary leakage.
- Statalarm PROCESS MONITOR RADIATION HIGH has just been received.
- 3RIA-45 (Unit 3 Normal Vent Gas Radiation Monitor) indicates  $8.2 \times 10^5$  cpm in yellow and increasing slowly on the Sorrento Screen.
- 3RIA-46 (Unit 3 High Vent Gas Radiation Monitor) indicates 0 cpm
- 3RIA-49 (Unit 3 Normal Gas Radiation Monitor) indicates 0 cpm.
- 3RIA49A (Unit 3 High Gas Radiation Monitor) indicates 0 cpm.
- RB mini purge is operating.
- RBES is being pumped to radwaste.

Which ONE of the following describes the status of the plant?

- A. RB sump has failed to isolate and LWD-2 (RB normal sump isolation) must be manually isolated immediately.
- B. RB purge has failed to isolate and PR-2, 3, 4, and 5 (purge isolations) must be manually isolated immediately.
- C. RIA-49/49A are indicating as expected at the point of switchover and the RB sump automatic isolation trip setpoint has not been reached.
- D. RIA-45/46 are indicating as expected prior to the point of switchover and the RB purge automatic isolation trip setpoint has not been reached.

QVALUE 1.0

QUESTION 99

B124

Initial Plant Conditions:

- Unit 1 shutdown for outage with welding in progress in 1UB2.
- Unit 2 at 100% power.
- Unit 3 at 90% power.

Current Plant Conditions:

- Fire in 1UB2 resulted in heavy smoke in control room.
- Unit 2 Statalarm received:
  - ICS AUTO POWER FAILURE
  - ICS INVERTER SYSTEM TROUBLE
- The Unit 1 and Unit 2 Control Rooms have been evacuated.
- Unit 2 CRD breakers have been opened and the reactor has tripped.
- An operator has been stationed at the Unit 2 Auxiliary Shutdown Panel (ASP) in the Turbine Building.

Which ONE of the following describes the operator action that will provide control of turbine bypass valves (TBVs) using the TBV Loop A and B controllers from the ASP?

- A. Adjust POS demand to zero, select HAND mode, then manually adjust the TBV position using the "Hand" knob.
- B. Match POS demand with MEAS VAR, select AUTOMATIC mode, then manually adjust the TBV pressure setpoint using the "Hand" knob.
- C. Adjust POS demand to zero, select HAND mode, place TBV Power Transfer switch to KU EMERG, then manually adjust the TBV position using the "Hand" knob.
- D. Match POS demand with MEAS VAR, select AUTOMATIC mode, place TBV Power Transfer switch to KU EMERG, then manually adjust the TBV position using the "Hand" knob.

QVALUE 1.0

QUESTION 100

B125

Unit 1 Plant Conditions:

- Power Range (PR) NI's indicate approximately 1%.
- Source Range (SR) NI-1, 2, 3, and 4 indicate full scale.
- Wide Range (WR) NI-1, 2, and 4 indicate 1% to 2%.
- WR NI-3 indicates failed low.

Which ONE of the following describes the expected indications and operation for the safety related nuclear instrument recorder on VB-1?

Recorder will indicate...

- A. lower, and the operator may select NI-1, 2, or 4 for indication.
- B. lower, and the operator will not be able to select an alternate indication.
- C. 1% to 2%, and the operator will not be able to select an alternate indication.
- D. 1% to 2%, and the operator may select between NI-1, 2, or 4 for indication.

SRO and RO Answer Key - 1-25

SRO #

S2 1 D  
S4 2 A  
S6 3 C  
S17 4 A  
S19 5 D  
S27 6 D  
S28 7 D  
S51 8 D  
S52 9 B  
S55 10 D  
S64 11 C  
S65 12 A  
S66 13 B  
S70 14 B  
S71 15 B  
S74 16 B  
S75 17 B  
S76 18 B  
S79 19 B  
S80 20 A  
S81 21 B  
S97 22 C  
S100 23 C  
S117 24 C  
S120 25 C

RO

R3 1 B  
R5 2 C  
R13 3 B  
R26 4 B  
R33 5 D  
R43 6 A  
R44 7 C  
R48 8 B  
R62 9 B  
R68 10 B  
R69 11 B  
R73 12 C  
R77 13 A  
R78 14 C  
R82 15 D  
R93 16 A  
R94 17 B  
R98 18 B  
R99 19 B  
R102 20 A  
R111 21 A  
R112 22 C  
R116 23 B  
R123 24 C  
R126 25 B

ANSWER KEY - BOTH 26 - 100

B1	26	D	B91	79	A
B7	27	B	B92	80	D
B8	28	D	B95	81	C
B9	29	C	B96	82	D
B10	30	A	B101	83	A
B11	31	D	B103	84	A
B12	32	B	B104	85	D
B14	33	A	B105	86	A
B15	34	B	B106	87	A
B16	35	C	B107	88	D
B18	36	A	B108	89	B
B20	37	A	B109	90	D
B21	38	A	B110	91	C
B22	39	A	B113	92	B
B23	40	D	B114	93	D
B24	41	B	B115	94	D
B25	42	B	B118	95	A
B29	43	A	B119	96	B
B30	44	B	B121	97	D
B31	45	D	B122	98	D
B32	46	D	B124	99	A
B34	47	C	B125	100	B
B35	48	B			
B37	49	B			
B38	50	D			
B39	51	D			
B40	52	C			
B41	53	D			
B42	54	B			
B45	55	D			
B46	56	C			
B47	57	B			
B49	58	A			
B50	59	A			
B53	60	C			
B55	61	C			
B56	62	C			
B57	63	D			
B58	64	A			
B59	65	A			
B60	66	D			
B61	67	C			
B63	68	B			
B67	69	A			
B72	70	C			
B83	71	D			
B84	72	C			
B85	73	B			
B86	74	C			
B87	75	B			
B88	76	B			
B89	77	B			
B90	78	A			