



4/6/93

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report No.: 50-269/93-301

Licensee: Duke Power Company
422 South Church Steert
Charlotte, NC 28242

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

License No.: DPR-38, DPR-47, and DPR-55

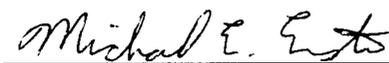
Facility Name: Oconee Nuclear Station

Examination Conducted: July 12 - 22, 1993

Chief Examiner: 
George T. Hopper

8/3/93
Date Signed

Examiners: D. Lane, Sonalysts
R. Miller, Sonalysts

Approved By: 
for Lawrence L. Lawyer, Chief
Operator Licensing Section 1
Operations Branch
Division of Reactor Safety

8/4/93
Date Signed

SUMMARY

Scope:

NRC examiners conducted regular, announced operator licensing requalification examinations and associated inspection activities during the period July 12 - 22, 1993. Examiners administered examinations under the guidelines of the Examiner Standards (ES), NUREG-1021, Revision 7. Fourteen Senior Reactor Operators (SROs) and six Reactor Operators (ROs) received written and operating examinations. For the simulator portion of the examination, operators comprised five crews. Three ROs had previously passed an NRC administered requalification exam and only participated in the simulator portion of the operating test.

Inspection activities included a review of selected Keowee Commitment Items contained in a letter to the NRC dated April 29, 1993. These items were examined to determine if they had been completed by the required due date.

Results:

Operator Pass/Fail:

	SRO	RO	Total	Percent	Crews	Percent
Pass	14	6	20	100%	5	100%
Fail	0	0	0	0%	0	0%

Examiners judged the Oconee Nuclear Station requalification program was satisfactory based on the results of the examinations.

Examiners identified generic weaknesses regarding operator performance (paragraphs 2.d.(1)-(5)).

Examiners identified a weakness regarding the definition of what constitutes a fire and when the fire brigade should be called out (paragraph 2.f.(1)).

Examiners identified a weakness in procedure CP-601 (Cooldown Following a Large LOCA) (paragraph 2.f.(2)).

Examiners identified a strength regarding the improvement in examination quality (paragraph 2.c).

Examiners identified a strength regarding improved operator performance (paragraph 2.a).

Examiners identified an inspector follow-up item regarding the lack of a minimum water level requirement for the Spent Fuel Pool (paragraph 2.f.(4)).

No violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *C. Breazeale, Regulatory Compliance
- *D. Covar, Nuclear Instructor
- *J. Davis, Safety Assurance Manager
- *J. Hampton, Vice President, Oconee Nuclear Station
- *E. Kyle, Operations Representative
- W. McIntyre, Instructor
- *G. Ridgeway, Shift Operations Manager
- *G. Rothenberger, Superintendent of Operations
- *P. Stovall, Director of Operator Training
- A. Whitener, Nuclear Instructor
- *L. Wilkie, Training Manager

Other licensee employees contacted included instructors, engineers, technicians, operators, and office personnel.

NRC Personnel

- *P. Harmon, Senior Resident Inspector
- *L. Lawyer, Chief, Operator Licensing Section 1, Region II

*Attended exit interview

2. Discussion

a. Examination Results and Program Evaluation

A requalification examination was administered under the guidelines of NUREG-1021, Revision 7. Fourteen of fourteen Senior Reactor Operators (SROs) and six of six Reactor Operators (ROs) passed the examination. Five of five crews evaluated passed the simulator portion of the examination. A significant improvement in examination quality and operator performance was noted. Based on the examination results, the Oconee Requalification Program meets the criteria established in NUREG-1021, ES-601.D.2, Revision 7, and has been determined to be satisfactory.

b. Reference Material

The examination team reviewed the reference material supplied by the licensee and found that it was adequate to support the examination. The reference material met or exceeded the requirements of form ES-601-2 Sections I and II.

c. Proposed Examination

The examination team conducted a thorough review of the facility's proposed written, walk-through, and dynamic simulator examinations, looking for weaknesses that had been identified in the previous year's requalification examination (Report No. 50-269/92-302). The improvements made in examination quality were significant and indicated that a strong and successful corrective action program had been implemented over the past year.

(1) Written Examination

The written examination met all the guidelines of ES-602. The examinations tested a diverse range of topics that were covered in direct proportion to the relative amount of time that was spent on the subject matter during the requalification cycle. Several questions addressed shutdown and low power topics as recommended in NUREG-1021 Rev 7. The Part "A" and "B" examinations contained questions that required application, analysis, synthesis and evaluation. The Training Department took great care in ensuring that the questions were properly formatted, and that the examinations were free of memory level or direct look-up questions.

The two Part "A" (RO and SRO) examinations submitted by the licensee consisted of 16 questions. Fourteen questions were common to both examinations. All questions were reviewed and the test was time validated prior to the preparation week. The NRC modified two questions to enhance the distractors. Each Part "B" examination consisted of 20 questions, 18 of which were common to both examinations. All questions were reviewed and the test was time validated prior to the preparation week. The NRC modified three questions to enhance the distractors. One question required a complete rewrite to change the format of the question into one that was more appropriate for a multiple choice question. Seven other questions required minor editorial changes to improve the format or clarify the question. None of the questions required complete replacement.

(2) Simulator Scenarios

The dynamic simulator examinations were reviewed by the NRC examination team and found to be satisfactory. The licensee prepared two scenarios for each examination week. The scenarios were challenging and contained sufficient complexity to exercise the EOPs in depth. Crew critical tasks were important and safety significant. The NRC made several critical task modifications to the scenarios. All of the finalized scenarios met the requirements of the Scenario Review Checklist (ES-604-1). The facility examination team reviewed the scenarios again prior to the examination and recommended additional enhancements to a few critical tasks. These changes were approved by the NRC.

(3) Job Performance Measures (JPMs)

The proposed JPMs were satisfactory. Nine of the 24 JPMs proposed for the examination utilized alternate paths. Five were time critical. The NRC substituted one JPM and had the facility JPM coordinator develop a JPM to test the operators' ability to perform a manual start of one of the Keowee Units. Critical steps were properly identified and required only minor modifications.

d. Operator Performance

The overall performance of the operators was very good. The NRC team considered this exam to be safety significant and discriminating. All operators passed. The examination team noted several generic weaknesses during exam administration which are enumerated below.

- (1) Operators (3/3 crews) were slow to diagnose the failure of the ICS to runback. The root cause of this was their failure to note that the Unit Load Demand (ULD) did not change in a situation which called for an automatic runback.
- (2) Operators did not refer to Enclosure 7.5 (Level Corrections for High Reactor Building Temperature) as required by ES-505 (ES Actuation).
- (3) Four Senior Reactor operators on two crews did not refer to Technical Specification 3.3.7 upon loss of a second LPSW Pump.
- (4) Command and Control procedures were not always implemented under the current guidelines of Operations Management Procedure 2-1 during normal operations. The Unit Supervisors (US) bypassed the Control Room SRO (CSRO) on several occasions and established a direct line of communication/direction with the operators.
- (5) Two of six SROs were unable to correctly perform dose rate calculations.

e. Examination Administration

The licensee's administration of the examination was well planned and coordinated. The examination was conducted over a six-day period from Wednesday through the following Wednesday, excluding the weekend. This allowed for great savings in time for both the licensee and the NRC. Less examination material had to be developed due to the efficient utilization of examiners. Scheduling and sequestering of the operators was well planned and executed. The licensee took great care to minimize the stress levels of the operators.

The previous year's requalification examination report (50-269/92-302) noted evaluator weaknesses which included overlooking or missing significant performance deficiencies during the dynamic simulator examination and improper cueing in the performance of JPMs. The NRC

examination team conducted a thorough review of the evaluator's performance during this examination. The team concluded that the facility evaluators conducted themselves in a professional manner and exhibited the good evaluation techniques of ES-603 Attachment 3 (Walk-Through Evaluation Guidelines). No discrepancies were noted.

f. Procedures

During the course of the examination, several procedural problems were encountered by the examination team.

(1) Oconee Nuclear Site Directive 3.2.8 (Fire Brigade Organization and Training)

Section 4.6.1 describes the control room operators responsibilities upon report of a fire. The procedure does not specify what constitutes a fire, i.e., when must the fire brigade be called out. One crew during the simulator examination did not announce or call out the fire brigade when they received a telephone report of smoke coming out of bus 1TA.

(2) CP-601 (Cooldown Following a Large LOCA)

Step 13.1.3 directed that HPI pumps be secured if RCS conditions are stable. The pumps might not be secured here based on the SRO's decision. When conditions require the realignment of LPI suction to the Reactor Building Emergency Sump, step 14.7 directed the closure of LP-28 if an attempt to close either LP-21 or LP-22 fails (BWST suction valves). Closing LP-28 secured suction to the HPI pumps and would result in their rapid failure if operating. During the performance of a JPM, the examiners observed two operators who directed that the valves be closed while all three HPI pumps were operating. The procedure did not caution the operators to ensure HPI pumps were not operating prior to closing LP-28.

(3) Alarm Response Procedure 1SA-2/C-1 (Letdown Temperature High)

Step 3.4.2 did not give specific guidance on how to properly bypass purification and deborating demineralizers.

(4) OP/1/A/1104/06 (Spent Fuel Cooling System)

The procedure did not specify any minimum water level to be maintained over the top of irradiated fuel assemblies in the spent fuel pool. In addition, the Oconee Technical Specifications do not address spent fuel pool water level. The basis for the maintenance of a minimum water level (usually 23 feet) ensures a sufficient water depth is available to remove 99 percent of the assumed 10 percent iodine gas activity released from the rupture of an irradiated fuel assembly. Operators did not have guidance on the maintenance of a minimum water level and could allow water level to decrease to the physical limitation of

the suction piping which extends four feet below the normal water level. NRC examiners identified this item for follow up as Inspector Follow-up Item (IFI) 50-269/93-301-01.

g. Material Condition of Plant

During the plant walk-through examinations examiners noticed unauthorized markings on panels CP-1 and CP-2 in the Safe Shutdown Facility. These markings consisted of pen marks on gauges and lights to indicate normal ranges or conditions. The licensee took prompt corrective action to remove these markings from the panels.

3. Keowee Commitment Inspection Findings

The chief examiner conducted a review of selected commitments which were established in a letter dated April 29, 1993. These licensee commitments resulted from the Loss of Offsite Power incident which occurred in October 1992. The inspection consisted of a review of three items listed under "Keowee Emergency Response Training" and one under the "Keowee Operator Training Upgrade Plan," and included interviews with personnel and an examination of training records.

a. Job Performance Measures Developed to Verify All Possible Failure Scenarios

The inspector interviewed the training department individual responsible for implementing the programs to satisfy the Keowee commitments (Keowee Instructor). During this interview the inspector raised concern over the phrase "all possible failure scenarios." This seemed global in perspective and was not specific. The Keowee Instructor explained that the intent was to develop JPMs that covered failures of the electrical bus tie breakers. The inspector reviewed the five JPMs that were developed and verified that this commitment had been completed.

b. All Keowee Personnel Trained and Qualified to All Five JPMs

The inspector reviewed the JPM training records for the five Keowee operators. These records indicated that all five of the Keowee operators had completed the JPMs with no problems and had been signed as qualified. However, the satisfactory block had not been circled on any records. The licensee corrected the training records. The inspector determined that this commitment had been satisfied.

c. Oconee Licensed Operators Given Walk-through training On These JPMs

The inspector reviewed the attendance records for the licensed operator training on these JPMs. The inspector balanced these records against a listing of all Oconee licensed operators in the NRC data base. The inspector determined that all but one operator had received the training. This operator no longer holds a license and is assigned

to the Training Department. In addition, the individuals in the license class at that time had not attended the training. The inspector informed the licensee that in a Systems Approach to Training (SAT) based program, current important issues are required to be incorporated into the training program in a timely manner. The license class did not receive the training prior to their examination in January of 1993. Nevertheless, the inspector determined that the licensee's actions in response to this commitment were adequate and satisfied the commitment.

d. Job and Task Analysis (assessment of required knowledge level)

The inspector interviewed the Keowee Instructor to determine the current status of the Job and Task Analysis (JTA) development. The Job Analysis had been completed. The Task Analysis, however, would not be completed until August 1993. This commitment had originally been scheduled for completion in June 1993. A review of the completed task analysis indicated that sufficient progress had been made and that the original commitment date was too optimistic. The licensee discussed this problem with the Branch Chief of the Division of Reactor Projects per phone conversation on July 7, 1993, in which a revised due date of August 1993 was agreed upon. This change will be reflected in the Keowee commitment quarterly update letter.

e. Refresher Training for Oconee Operators to Perform a Remote Startup and Operation of Keowee From the Oconee Control Room

The examiners tested seven operators on a remote startup of a Keowee Unit from the control room during this requalification examination. All seven passed the JPM with no discrepancies noted. This was done as a spot check of this commitment since it is not due for completion until August 1993.

4. Simulator Fidelity Review

However, the inspectors reviewed the licensee's response to all simulator performance and human factors discrepancies that had been identified by the NRC in "Simulation Facility Reports" dated October 18, 1988, through January 28, 1993. Thirty-six individual discrepancies had been identified. Thirty-two of these had been promptly corrected. The remaining four, identified below, have not been corrected because of cost benefit considerations. None of the four would prevent simulator recertification in accordance with nuclear power plant simulators for use in operator training, ANSI/ANS-3.5-1985.

The remaining discrepancies are:

- a. Due to insufficient capability to initiate Local Operator Actions (LOAs) there are several procedures, both abnormal and emergency, with LOAs that cannot be accomplished. An example is the loss of Low Pressure Service Water (LPSW) procedure which requires cross-

connecting LPSW with either High Pressure Service Water (HPSW) or another unit's LPSW. These actions cannot be accomplished.

- b. The capability to stick more than one rod at a time or to stick any rod other than the designated highest worth rod does not exist.
- c. It is not possible to simulate failed open turbine control valves following a turbine trip.
- d. The subcooling monitor cannot be failed. It has to be covered with tape during examinations to simulate an out of service monitor.

5. Exit Interview

At the conclusion of the site visit, the examiners met with representatives of the plant staff listed in paragraph 1 to discuss the results of the examinations. The licensee did not identify as proprietary any material provided to, or reviewed by the examiners. The examiners further discussed in detail the inspection findings listed below. Dissenting comments were not received from the licensee.

<u>Item Number</u>	<u>Description and Reference</u>
50-269-93-301-01	Inspector Follow-up Item regarding the lack of a minimum water level requirement for the spent fuel pool, paragraph 2.f.(4).

ENCLOSURE 2

SIMULATOR FACILITY REPORT

Facility Licensee: Duke Power Company

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

Operating Tests Administered On: July 14-21, 1993

This form is to be used only to report observations. These observations, in and of themselves, do not constitute audit or inspection findings and are not, without further verification and review, indicative of 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 which may be used in future evaluations. No licensee action is required solely in response to these observations.

During the conduct of the simulator portion of the operating test no simulator fidelity problems were observed.

TRQ 1993 - WRITTEN EXAM

TEST NO: PART-A

NAME _____ EXAM 7/19/93
SSN _____ GRADE _____
GRADED BY _____ DATE _____
REVIEWED BY Paul M. Howell DATE 7/19/93

INSTRUCTIONS FOR TAKING EXAMINATION:

1. Insure your NAME, SSN, DATE and TEST NUMBER are on this COVER PAGE and the SCANTRON FORM. Sign the declaration statement prior to turning your exam in.
2. All non-exam material must be removed from the table tops. (Calculators and reference materials for the examination will be allowed as necessary).
3. Use #2 pencil ONLY and paper provided.
4. Answer all questions on the SCANTRON FORM. Do NOT make any marks on the reference material.
5. Rest room trips are limited to only one student leaving at a time. Avoid all contact with anyone - including staff.
6. A satisfactory score on the written exam is an overall score of at least 80%.
7. If parts of the examination are not clear with respect to their intent, ask questions of the instructor only.
8. This examination is designed to take approximately 45 minutes to complete. This exam has a one hour limit to complete.
9. When you have finished your exam turn in your completed examination, then leave the examination area and remain in the conference room in the back of the simulator. Do not discuss the exam with other operators until all exams are complete.

*My signature on this form is my declaration that the responses given on this examination are entirely my own. It further declares that I am aware that I am subject to termination from the training program immediately, and in addition, will be subject to further disciplinary action up to and including discharge from the Company for cheating and/or compromising this examination.

*

(Trainee Signature)

1. Based on present plant conditions, which ONE of the following accurately predicts plant response over the next fifteen (15) minutes? (.25)

- A. Automatic actuation of ES Channels 1-6
- B. Automatic actuation of ES Channels 1,3 and 5
- C. Load Centers 1X1-1X7 will load shed
- D. Load Centers 1X5 and 1X6 will not load shed

2. RO ONLY

If a LOCA occurs resulting in an RCS pressure decrease to 100 psig, which ONE of the following would be the correct operator action? (.25)

Align and start the "1A" LPI pump to the "A" LPI header and...

- A. align and start the "1C" LPIP to the "B" LPI header.
- B. reset the load shed signal, and align and start the "1C" LPI pump to the "B" LPI header.
- C. align and start the "1C" LPI pump to supply both LPI headers.
- D. reset the load shed signal and align and start the "1C" LPIP to supply both LPI headers.

3. Based on present plant conditions, which ONE of the following accurately predicts the plant response over the next two (2) minutes, if recovery from HPI Cooling is performed and S/G heat transfer is reestablished at a total EFDW flowrate of 400 gpm? (.25)

The operator would see a substantial decrease in...

- A. Pzr level
- B. S/G pressure
- C. RCS pressure
- D. CETC's

4. If CT-5 is de-energized, which ONE of the following will likely occur within the next sixty (60) seconds? (.25)
- A. Core subcooling margin will approach 0°F.
 - B. The primary IA compressor will trip.
 - C. The OAC will become unavailable.
 - D. Retransfer to the startup source.
5. Based on present plant conditions the SSF...(.25)
- A. should be manned at this time, but not activated until required.
 - B. should not be manned and activated at this time.
 - C. should be manned and the ASW pump activated to supply Unit 1's S/Gs.
 - D. should be manned and the RC Makeup Pump activated to supply Unit 1 RCP seals.
6. Assuming NO Keowee operator actions have been taken, which ONE of the following is correct? (.25)
- A. Both Keowee units have no AC auxiliary power.
 - B. Both Keowee units have AC auxiliary power.
 - C. Keowee Unit 1 has no AC auxiliary power.
 - D. Keowee Unit 2 has no AC auxiliary power.

7. Based on present plant conditions, of the four (4) possible auto start signals, which ONE of the following accurately predicts the total number present for the "1A" MDEFDWP, assuming it was operable, and the control switch was in the "Auto 2" position? (.25)
- A. 1
 - B. 2
 - C. 3
 - D. 4
8. Which ONE of the following correctly describes the status of the EFWPT at the present time? The EFWPT is... (.25)
- A. secured per applicable procedures.
 - B. running as required.
 - C. tripped with 1MS94 shut and 1MS93 open.
 - D. operable from the control room but not running.
9. SRO Only
- For this event, determine the Emergency Plan Classification. (.25)
- A. Unusual Event
 - B. Alert
 - C. Site Area Emergency
 - D. General Emergency

10. Determine the amount of emergency feedwater that would be needed to match decay heat in gpm at the present time. (.25)
- A. 400 gpm
 - B. 350 gpm
 - C. 300 gpm
 - D. 250 gpm
11. With the present plant conditions, which ONE of the following statements correctly explains why only "1A" and "1C" HPI pumps are operating? To prevent... (.25)
- A. opening the PZR Code relief valves.
 - B. exceeding HPI pump flow limits.
 - C. loss of suction to the HPI pumps.
 - D. overcooling the RCS.

The remaining questions are
generic.

12. SRO ONLY

The "Red" Reactor Trip Indicating light located on each RPS channel's Reactor Trip module is an indication of the status of the... (.25)

- A. bistables in that RPS channel.
- B. contact buffers in that RPS channel.
- C. RPS channel associated with that Rx Trip module.
- D. CRD breaker controlled from that Reactor Trip module.

13. RO ONLY

Which ONE of the following Main Turbine trip signals is used by the RPS to generate a "Main Turbine Tripped to Reactor Trip" signal? (.25)

- A. Turbine Bearing Oil pressure < 8 psig.
- B. Turbine Shaft Pump discharge pressure < 105 psig.
- C. EHC discharge header pressure < 1100 psig.
- D. EHC ETS oil pressure < 800 psig.

14. The CRD TRIP CONFIRM signal is sent to: (.25)

- A. Shift Turbine Bypass Valve setpoint.
- B. MT/Reactor Trip Bypass bistable.
- C. ICCM Subcooling Margin program.
- D. FDWPT/Reactor Trip Bypass bistable.

15. The following conditions exist on Unit 1:

- Powdex in operation; 1C-14/15 closed
- Rx power 45%
- "1A" MFDWP running
- "1B" MFDWP secured
- 1C-14/15 Enable/Disable switch in Disable position

Given these conditions which ONE of the following will NOT cause 1C-14&15 to trip open? (.25)

- A. Total powdex differential pressure of 40 psid.
- B. Controller process bar graph reading of 80%.
- C. Controller digital window selected to P and reading 40.
- D. Feedwater pump suction pressure of 350 psig.

16. Unit 2 is experiencing a problem with Instrument Air. The following conditions exist:

- Instrument Air System pressure has decreased to 90 psig from 100 psig.
- The primary instrument air compressor is off.
- The two backup instrument air compressors that were in Standby 1 are running.
- The backup instrument air compressor that was in Standby 2 is running.
- All compressors have power.

The 3 and 5 NLO is sent to check on Unit 2's Auxiliary Instrument Air Compressor. Which ONE of the following is the correct status for the system for these conditions? The AIA compressor is in... (.25)

- A. auto and is cycling on at 88 psig, and cycling off at 105 psig to maintain pressure.
- B. auto and is off. The instrument air system is maintaining AIA pressure.
- C. hand and is loading at 95 psig, and unloading at 105 psig to maintain pressure.
- D. hand and is off. AIA receiver pressure is reading 105 psig.

17. Under compensation of an intermediate range detector will cause:
(.25)
- A. indicated neutron power to be lower than actual.
 - B. indicated startup rate to be greater than actual.
 - C. overlap between the source range and intermediate range to increase.
 - D. overlap between the source range and intermediate range to decrease.
18. During a Unit 1 startup, computer alarm D2673 (CCW Emerg. Disch. Lvl. Low) actuates. Which ONE of the following describes the proper method to clear this alarm? (.25)
- A. Open 1CCW-1 through 1CCW-6 and CCW-8 until the line is primed, then close CCW-8 prior to closing 1CCW-1 through 1CCW-6.
 - B. Open 1CCW-1 through 1CCW-6, 2CCW-7, 3CCW-93 and CCW-8 until the line is primed, then close CCW-8 prior to closing the other valves.
 - C. Open CCW-8 and CCW-8 breaker and 1CCW-1 through 1CCW-6 until the line is primed, then close 1CCW-1 through 1CCW-6 prior to closing CCW-8 and the CCW-8 breaker.
 - D. Open CCW-8 breaker with CCW-8 closed, then open 1CCW-1 through 1CCW-6 until the line is primed; then close 1CCW-1 through 1CCW-6 and CCW-8 breaker.

5.0 STUDENT INFORMATION SHEET

5.1 INITIAL CONDITIONS

- While operating at 100% power, ONS Unit #1 has experienced a loss of all 4160v and 6900v AC power.
- The Keowee Units have experienced emergency lockouts.
- Power to 1DIA panelboard has been lost.
- The main feedwater pump turbines have tripped on low suction pressure due to a loss of all HWPs and CBPs.
- Oconee Unit 2 is currently at 15% power with auxiliaries being supplied from 2T. Oconee Unit 3 is at 100% steady state conditions.

5.2 EQUIPMENT STATUS PRIOR TO TRANSIENT

- A. '1A' & '1B' MDEFWPs have been out of service for one (1) hour for unplanned safety related maintenance. The control switches are "OFF" and the cooling water isolated to the pumps.
- B. An R&R has been filled out identifying the MDEFWPs as being OOS. A Tech. Spec. LCO in effect because MDEFWPs are OOS.
- C. Keowee Unit #1 aligned to the overhead and Keowee Unit #2 aligned to underground.
- D. An R&R has been filled out identifying "1B" LPIP as being OOS due to an oil leak.

5.3 OPERATOR ACTIONS TAKEN

- A. Immediate Manual and Subsequent actions of EOP have been performed.
- B. At step 5.14 in the Subsequent actions of the EOP, a transfer was made to Section 502, Loss of Heat Transfer.
- C. Section 502 has been performed through step 8.0.
- D. Steps up to 5.5 of AP/1700/19 are completed or in progress.
- E. Steps up to 1.0 of Section 503 of AP/1700/11 are complete.

5.4 ELAPSED TIME FOR EVENT

- A. Fourteen (14) minutes

PART-A93 TEST KEY

Answer	Bank #	QT	Fig	Diff	Disc	Category 1	Categor
1. D	PART-A 494	MC	0			AP/1700/11	003
2. A	PART-A 393	MC	0			AP/1700/07	003
3. C	PART-A 492	MC	0			EOP 502	003
4. A	PART-A 487	MC	0			AP/1700/11	003
5. A	PART-A 493	MC	0			AP/1700/25	003
6. C	PART-A 488	MC	0			OP/1106/19	003
7. C	PART-A 496	MC	0			MODS	003
8. C	PART-A 114	MC	0			SAE-R11	003
9. B	PART-A 73	MC	0				003
10. B	PART-A 327	MC	0			EP/1800/01-7.6	003
11. A	PART-A 117	MC	0			EOP 502	003
12. D	PART-A 414	MC	0			RPS	000
13. D	PART-A 446	MC	0			RPS	000
14. A	PART-A 259	MC	0			CRI	000
15. D	PART-A 2	MC	0				000
16. B	PART-A 490	MC	0			MODS	000
17. C	PART-A 321	MC	0			NI	000
18. D	PART-A 369	MC	0			CCW	000

PART-A93 FEEDBACK REPORT

1. D
 - A. Incorrect - DIA is de-energized.
 - B. Incorrect - Odd channels have lost power.
 - C. Incorrect - ES 1&2 - CT-5 - 1X5 & 6 not load shed.
 - D. Correct - Powered from CT-5, 1X5 and 1X6 don't load shed with ES 1&2 signals.

2. A
 - A. correct
 - B. Reset NOT required; "A" LPI manual start required.
 - C. Manual start "A" LPI
 - D. Reset NOT required; manual start "1A" LPI.

3. C
 - A. Incorrect - Pzr level is significantly above upper level tap.
 - B. Incorrect - RCS temperature > S/G saturation temperature.
 - C. Correct
 - D. Incorrect - Feedrate insufficient to create 18°F per minute cooldown

4. A
 - A. Correct - RC-66 is open.
 - B. Incorrect - power still available to B3T.
 - C. Incorrect - OAC powered from KOAC inverter.
 - D. Incorrect - startup source not available.

5. A
 - A. true
 - B. not true
 - C. ASW not required
 - D. RC makeup pump not required

6. C
Only unit 2 has auxiliary power supplied from ONS Unit 1 4160 volt switchgear.

7. C
Three signals: 1) MFDWP discharge pressure < 800 psig
2) S/G dryout protection
3) AMSAC

8. C

9. B
4.1.5. - HPI Forced Cooling.

10. B
11. A
12. D
13. D
14. A
15. D
- A. Incorrect - Powdex delta P trip is independent of the switch.
- B. Incorrect - Process bar graph reads 0-100%; scale is 0 to 50 psig, therefore, 80% on bar is 40 psid.
- C. Incorrect - This would be reading powdex delta P when selected to P (process)
- D. Correct - Even though FDWP suction pressure below 360 psig will trip C-14&15, the switch must be enabled.
16. B Ref: AP/2/A/1700/22 and OP/2/A/1106/28
- A. Incorrect - IA pressure too high for auto start and only cycles on and off at 88 and 105 when unloader doesn't work.
- B. Correct - AP/2/A/1700/22 tells when compressor starts, and operator knowledge tells that IA supplies A1A until compressor starts.
- C. Incorrect - Compressor not normally in hand continuously; would not see auto start in hand. Does, however, load at 95 and unload at 105 to maintain 100 psig. OP/2/A/1106/28
- D. Incorrect - Would be in this on a manual start that allowed it to pressurize and stop.
17. C
18. D

PROGRAM: Operator Training - Simulator
MODULE: Periodic Training - Requalification
TOPIC: Annual Written Requalification Examination -
Section A

EXERCISE: Switchyard Isolation - Loss of All Feedwater Resulting in
HPI Forced Cooling

OVERVIEW:

This exercise guide will be used to establish a static simulator condition for the purpose of administering a "Section A" open reference written examination as part of the annual requalification examination process for licensed operators.

While operating at 100% power, the plant will experience a loss of all 4160v and 6900v AC power. Power to 1DIA panelboard has been lost. In addition to this, the Keowee Units will experience an emergency lockout and fail to start. The main feedwater pump turbines will trip on low suction pressure due to a loss of all HWPs and CBPs. At 2300 psig RCS pressure, HPI Forced Cooling will be established.

PREREQUISITE KNOWLEDGE LEVEL:

Trainees will be licensed Reactor Operators and Senior Reactor Operators.

REFERENCES:

1. ES-601 - Administration of NRC Requalification Program Evaluations (Rev 7)

1.0 INITIAL CONDITIONS

100% F.P. Steady State

EOL

2.0 SIMULATOR BRIEFING:

N/A

3.0 EXERCISE PRESENTATION

- 3.1 Operating Team to be examined is not present in the simulator area.
- 3.2 Recall SNAP 1 from SRE-3 floppy disc and then go to Section 4.0, Pre-Exam Review
- 3.3 Simulator Snap Setup:
 - A. RECALL 100% IC
 - B. Ensure charts are inking and perform diagnostic check of charts and meters.
 - C. Perform lamp check and annunciator check.
 - D. Advance and mark all charts.
 1. Date and SRE number.
 - E. Advance and date typer paper.
 - F. Ensure SPDS, OAC and PTID's are functioning properly.
 1. Place the PTID's in TRACE ON.
 - G. Place R&R stickers on 'A' & 'B' MDEFWPs switches.
 - H. Place R&R sticker on the '1B' LPI pump control.
- 3.4 Perform the following:
 - A. Place the simulator in RUN for five minutes before proceeding.
 - B. Take the "B" LPI pump breaker out of service by:
Updater File R,118 (Z,19,F); EXECUTE

C. Simulate the EFWPT AOP Tripping by:

1. ALARM OVERRIDE 1SA-8 S,50 - "EFWPT AOP OVERLOAD" Lamp "ON"
2. Panel Override P9408RR,0 "EFWPT BOP" ON "RED Lamp "OFF"
3. ACTIVATE Overrides.

D. Insert and activate malfunctions:

1. MSS330 (TDEFWP fails to start)
2. MSS260 (MDEFWP 'A' fails to start)
3. MSS270 (MDEFWP 'B' fails to start)
4. MEL042 (1DIA Inverter Trip)
5. MEL090 (Switchyard Isolation)

E. Instructor staff perform the following:

1. Immediate Manual and Subsequent Actions of EOP.
2. At step 5.5 refer to AP/1/A/1700/11, Loss of Power.
3. At step 5.8 refer to AP/1/A/1700/19, Loss of Main Feedwater.
4. At step 5.16 in the Subsequent actions of the EOP, transfer to Section 502, Loss of Heat Transfer.
5. When the RCS Pressure reaches 2300 psig, manually initiate HPI cooling as per Section 502.
6. Maximize RB cooling by verifying that '1A' and '1C' RB Cooling Units are in 'High' and '1B' RBCU is off.
7. Verify all RB Aux Fans are running, verify 1LPSW-18, 21, 24 and 565 are open and 1LPSW-566 is closed.

F. Allow Simulator to run until reactor building pressure increases to approximately 2.3 psig.

G. Freeze and SNAP the frozen simulator on floppy

H. Complete Section 4.0, Pre-Exam Review.

4.0 PRE-EXAM REVIEW

- 4.1 Remove the "B" LPI pump breaker control power by:
- Updater File R,118 (Z,19,F); EXECUTE and place and OOS sticker on "1B" LPIP switch.
- 4.2 Override the Keowee Aux. Transformer 1X and 2X volt meters to zero.
- A. Enter Override P6B03G1,0.
 - B. Enter Override P6B24G1,0
 - C. Activate Override Timer.
- 4.3 Activate Alarm 2SA-17 (D2) "Unit #1 600V Normal Supply Trouble".
- A. Enter Alarms Override (28) S,38
 - B. Activate Override Timer
- 4.4 Go to run long enough for charts to go to their required positions.
- 4.5 Verify the validity of the Exam Key to the FROZEN simulator status.
- A. Discuss any discrepancies and solution with NRC representative.
 - B. Document necessary comments on Section 5.0, Student Information Sheet.
- 4.6 Recall the operating team that is to be examined.
- A. Handout and review Section 5.0, Student Information Sheet.
 - B. Review Exam Cover Sheet with the students.
 - C. Begin one (1) hour exam.

5.0 STUDENT INFORMATION SHEET

5.1 INITIAL CONDITIONS

- While operating at 100% power, ONS Unit #1 has experienced a loss of all 4160v and 6900v AC power.
- The Keowee Units have experienced emergency lockouts.
- Power to 1DIA panelboard has been lost.
- The main feedwater pump turbines have tripped on low suction pressure due to a loss of all HWPs and CBPs.
- Oconee Unit 2 is currently at 15% power with auxiliaries being supplied from 2T. Oconee Unit 3 is at 100% steady state conditions.

5.2 EQUIPMENT STATUS PRIOR TO TRANSIENT

- A. '1A' & '1B' MDEFWPs have been out of service for one (1) hour for unplanned safety related maintenance. The control switches are "OFF" and the cooling water isolated to the pumps.
- B. An R&R has been filled out identifying the MDEFWPs as being OOS. A Tech. Spec. LCO in effect because MDEFWPs are OOS.
- C. Keowee Unit #1 aligned to the overhead and Keowee Unit #2 aligned to underground.
- D. An R&R has been filled out identifying "1B" LPIP as being OOS due to an oil leak.

5.3 OPERATOR ACTIONS TAKEN

- A. Immediate Manual and Subsequent actions of EOP have been performed.
- B. At step 5.14 in the Subsequent actions of the EOP, a transfer was made to Section 502, Loss of Heat Transfer.
- C. Section 502 has been performed through step 8.0.
- D. Steps up to 5.5 of AP/1700/19 are completed or in progress.
- E. Steps up to 1.0 of Section 503 of AP/1700/11 are complete.

5.4 ELAPSED TIME FOR EVENT

- A. Fourteen (14) minutes

PTRQ 1993 - WRITTEN EXAM

TEST NO: PART-B

NAME _____ EXAM 7/19/93
SSN _____ GRADE _____
GRADED BY _____ DATE _____
REVIEWED BY Paul m Strass DATE 7/16/93

INSTRUCTIONS FOR TAKING EXAMINATION:

1. Insure your NAME, SSN, DATE and TEST NUMBER are on this COVER PAGE and the SCANTRON FORM. Sign the declaration statement prior to turning your exam in.
2. All non-exam material must be removed from the table tops. (Calculators and reference materials for the examination will be allowed as necessary).
3. Use #2 pencil ONLY and paper provided.
4. Answer all questions on the SCANTRON FORM. Do NOT make any marks on the reference material.
5. Rest room trips are limited to only one student leaving at a time. Avoid all contact with anyone - including staff.
6. A satisfactory score on the written exam is an overall score of at least 80%.
7. If parts of the examination are not clear with respect to their intent, ask questions of the instructor only.
8. This examination is designed to take approximately 90 minutes to complete. This exam has a two hour limit to complete.
9. When you have finished your exam turn in your completed examination, then leave the examination area and go to the room designated prior to the exam. Do not discuss the exam with other operators until all exams are complete.

*My signature on this form is my declaration that the responses given on this examination are entirely my own. It further declares that I am aware that I am subject to termination from the training program immediately, and in addition, will be subject to further disciplinary action up to and including discharge from the Company for cheating and/or compromising this examination.

* _____
(Trainee Signature)

1. While predicting "Critical Rod Position" during a Unit 1 startup, the following conditions exist:

- Extended steady state power level prior to shutdown was 60%
- Reactor has been shutdown for 72 hours
- Effective Full Power Days = 280

Based on these conditions, the reactivity effect due to Samarium would be... (.25)

- A. -.135
- B. -.150
- C. -.156
- D. -.179

2. Unit 1 is critical at 5% power steady state conditions with the following conditions:

- DEI = .18 μ Ci/ml
- < 1% failed fuel
- RCS O2 concentration = .005 ppm
- CBAST is at 94" and 10,500 ppm Boron
- BAMT is "full" and 12,400 ppm Boron
- BWST is at 47.5' and 2,300 ppm Boron
- RCS Pressure is stable at 2155 psig
- HPI letdown flow = 70 gpm
- LDST level = 70 inches
- LDST pressure = 20 psig
- RCS Boron = 870 ppm
- PZR Boron = 955 ppm

Which ONE of the following is required? (.25)

- A. Increase letdown flow.
- B. Increase LDST H2 pressure.
- C. Initiate pressurizer spray.
- D. Initiate makeup to CBAST.

3. Immediately following a reactor trip:

- The Turbine Bypass Valves are manually throttled to reseal a stuck-open Main Steam Relief Valve.
- Main steam pressure has been decreased to 920 psi and is now stable.
- All Main Steam Relief Valves are closed.

Which ONE of the following correctly describes the Shutdown Margin requirements at this time? (.25)

- A. The Shutdown Margin must be calculated following any significant steam generator pressure reduction.
- B. No Shutdown Margin calculation is required as long as main steam pressure remains stable and all automatic actions have occurred.
- C. The Shutdown Margin must be calculated due to the expected reactivity effect from Xenon.
- D. No Shutdown Margin calculation is required as long as RC temperature remains above the minimum allowed for criticality.

4. The diesel generator is running in the emergency start mode.

- Voltage = 4160 volts
- Frequency = 60 Hz
- Unit #2 MFB #2 is energized at 4160 volts
- Diesel generator speed is 900 rpm

Which ONE of the following actions must be taken to parallel the generator to the Unit #2 MFB from the SSF Control Room? (.25)

- A. Secure the diesel generator, then perform an idle start.
- B. Secure the diesel generator, then perform a normal start.
- C. Depress the "emergency control function override" pushbutton.
- D. Depress the "reset-diesel generator emergency start" pushbutton.

5. Three (3) fire detectors in the Unit 3 Cable Room are non-functional per the "Fire Impairment Sheet". The Fire Penetration Barriers for Unit 3 Cable Room have been classified as "technically inoperable". Which ONE of the following is correct? (.25)
- A. A fire watch patrol must be established to inspect the Unit 3 Cable Room at least once per hour.
 - B. A continuous fire watch for Unit 3 Cable Room must be established within the hour.
 - C. The inoperable instrumentation must be returned to service within 14 days.
 - D. At least one of the inoperable fire detectors shall be returned to service within one hour.
6. Unit #1 is in the process of draining down the RCS to repair a SG tube leak on the "A" SG. The following conditions exist:
- The OAC is OOS for maintenance
 - LT-5 indicates 79 inches
 - BWST level is 47 ft. and boron concentration is 2275 ppm
 - 1LP-28 is locked open
 - 1LP-21 is red tagged shut for maintenance; the work is in progress
 - ICCM Train A tagged out to I&E (OOS)
 - LPI is in normal DHR with "1C" LPI pump running
 - The "1A" LPI pump is isolated and tagged to repair the motor

Choose ONE of the following to complete this statement.

Drain down for SG tube leak repair CANNOT be performed until...(.25)

- A. ICCM Train "A" is returned to service.
- B. the unit supervisor receives the tag stubs for 1LP-21.
- C. BWST boron concentration is acceptable.
- D. eddy current cables removed and RB emergency hatch is closed.

7. RO ONLY

Unit 1 has been operating for several months with a very small SG tube leak, calculated to be about .007 gpm. 1RIA-40 has been reading 130,000 cpm, when suddenly RIA-40 count rate increases off-scale. Samples indicate:

CSAE off-gas: Xe-133 eq = $9.02E-3$ μ ci/ml
Total Gas = $1.47E-2$ μ ci/ml

RCS: Xe-133 eq = 2.92 μ ci/ml
Total Gas = 4.76 μ ci/ml

CSAE off-gas flow is measured at 6.5 scfm.

Calculate the leak size and determine the action required to be taken concerning continued unit operation.

- A. .057 gpm; unit operation may continue since leakage is less than .35 gpm.
- B. .150 gpm; unit operation may continue since leakage is less than .35 gpm.
- C. .57 gpm; unit must be shutdown since leakage is more than .35 gpm.
- D. 1.50 gpm; unit must be shutdown since leakage is more than .35 gpm.

8. The following conditions exist on Unit 1:

- 100% power steady state conditions
- ES Analog Channel "A" tripped to replace the Reactor Building pressure trip bistable - estimated time of work completion is six hours
- Analog computer point A1417 (ES Channel "B" WR pressure) comes in alarm and reads 2265 psig
- Area Dispatcher requests maximum unit MWe output for load considerations
- A check of the OAC analog points shows:
 - A1416 (ES Channel "A" WR pressure) - 2150 psig
 - A1418 (ES Channel "C" WR pressure) - 2156 psig

Which ONE of the following is the correct response for these conditions in accordance with management procedures? (.25)

- A. Immediately begin shutdown to Hot Shutdown at the maximum controllable rate. Twelve (12) hour LCO in effect.
- B. Within twelve (12) hours, the component(s) must be repaired or the unit shutdown must commence.
- C. Immediately begin shutdown at a rate that will place the unit in Hot Shutdown within twelve (12) hours.
- D. Within twelve (12) hours, component(s) must be repaired or the unit must be in Hot Shutdown.

9. During a normal startup, when swapping the unit auxiliary power supply from the startup transformer to the auxiliary transformer, transfer of power to the second main feeder bus should be performed without delay to prevent... (.25)

- A. excessive current between the main feeder buses.
- B. undervoltage conditions between the main feeder buses.
- C. blowing motor control center fuses.
- D. motor damage from non-synchronized sources.

10. SRO ONLY

The following conditions exist on Unit #1:

- Refueling shutdown is in progress
- Core is defueled
- Reactor vessel is drained for "Incore Instrumentation" work.
- 1C LPIP is running in normal DHR mode.
- DHR Cooler Outlet temperature is 97°F.
- CT-1 is supplying unit auxiliaries.
- Main Feeder Bus #2 is isolated (red tagged) for relay inspection.
- CT-5 out of service, due to 100 KV line work.
- Maintenance brings an approved Work Request to the control room to isolate (red tag) the Main Transformer (1T) for bus bar inspection and refurbishing.

Can this work be performed? (Choose ONE). (.25)

- A. No. Main Feeder Bus #2 and the Main Transformer cannot be removed from service under the present plant conditions.
- B. No. CT-5 and the Main Transformer cannot be removed from service under the present plant conditions.
- C. Yes, provided CT-2 is available as an emergency power source.
- D. Yes, provided the Keowee underground power path is operable.

11. Chest warming of the ONS Unit 1 Main Turbine has just been initiated. The following conditions are observed:

- Main steam temperature indicates 538°F
- First stage inner metal temperature indicates 180°F
- Main steam pressure indicates 900 psig
- Control valve above seat inner surface temperature indicates 280°F

What is the maximum, allowable delta T across the chest, based on these conditions? (.25)

- A. 81
- B. 98
- C. 105
- D. 117

12. Unit 1 is in the process of filling the RCS, following a S/G tube leak repair, using "A" BTP and "A" BHUT. The following conditions existed prior to the fill:

- NI 1&2 - 50 cps
- LT-5 - 30"
- Minimum required boron for 1% SDM - 1090 ppm
- RCS boron - 1208 ppm
- "A" BHUT - 1,670 ppm

Present plant conditions are:

- NI 1&2 - 90 cps
- LT-5 - 90"

The SS reports that he found 1DW-88 open, and he has closed it.

Which ONE of the following describes the correct operator response? (.25)

- A. The minimum required SDM is met; continue with the fill and increase sampling frequency.
- B. The minimum required SDM is met; continue with the fill and initiate makeup to LDST from BAMT.
- C. Stop the fill, evacuate the RB, initiate makeup from CBAST, verify SDM, and then continue with the fill.
- D. Stop the fill, verify the valve alignment and the SDM requirements, and then continue with the fill.

13. A station fire has caused Units 1 & 2 to activate the SSF. HPI and EFDW systems are lost on both units. Given the following, calculate the time remaining before the Unit 1 & 2 RC Makeup Pumps suction level has been reduced to one (1) foot above the top of SF Racks. (.25)

- SF Pool temperature normal
- Each RC Makeup Pumps Flow Rate = 26 gpm
- SFP level = 12 feet above Fuel Transfer Tubes
- SSF 1HP-426 & 2HP-426 (RC Letdown to SF Pool) is closed

- A. 8 hours 22 minutes
- B. 12 hours 34 minutes
- C. 25 hours 8 minutes
- D. 50 hours 20 minutes

14. Unit 1 is shutting down for refueling, and the following conditions exist:

- RCS Pressure = 400 psig
- Tc = 315°F
- PZR level = 250"
- 1HP-26 handwheel tagged closed and breaker tagged open
- 1HP-409 and 1HP-410 switches tagged closed
- 1C HPI pump breaker tagged open
- PORV is operable and selected to the Low Range setpoint
- Both CFT's are at 13' and 325 psig
- The travel stop on 1HP-120 is operable

Based on these conditions, LTOP requirements can be met at this time by: (Choose ONE) (.25)

- A. opening 1RC-159 and 1RC-160 (Reactor Vessel Head Vents).
- B. closing 1CF-1 and 1CF-2, and tagging their breakers open.
- C. adjusting RC pressure and PZR level within limits.
- D. ensuring the OAC and associated LTOP alarms are operable.

15. Unit is operating at 100% power. Chemistry notifies the control room that an RCS sample taken on Tuesday at (2300) indicates a chloride concentration of .18 ppm. Using the 2300 as the starting point, determine the day and time required to be at cold shutdown. (All actions to reduce chlorides are unsuccessful.) (.25)

- A. Thursday at 2300
- B. Friday at 1100
- C. Friday at 2300
- D. Saturday at 1100

16. RO ONLY

A transient on Unit 1 results in the following conditions:

- RCS pressure = 1300 psig
- OTSG pressure A = 100 psig
- OTSG pressure B = 850 psig
- Rx Bldg pressure = 3.5 psig
- Rx Bldg dome temp = 200°F
- Rx Bldg emergency sump = 3 ft.
- Core SCM = 0°F

For these conditions, which ONE of the following is the correct Loss of Subcooling Margin setpoint? (.25)

- A. A = 335" B = 285"
- B. A = 335" B = 298"
- C. A = 348" B = 298"
- D. A = 348" B = 309"

17. Units #1 & #2 are at 100% power and Unit #3 at 78% power. The following indications are observed on Unit #2 while performing SSF Control Room Instrumentation Surveillance checks:

SSF SG 2A level = 152" CR SG 2A level = 152"
SSF SG 2B level = 147" CR SG 2B level = 152"

Incore Thermocouple Temperatures are:
608°F - 608°F - 604°F - 612°F - 600°F

Which ONE of the following is correct concerning surveillance checks? (.25)

- A. The S/G levels indicate within 10%. The Incore Thermocouples are within 10% of their average temperature; surveillance checks are satisfactory.
- B. The S/G levels indicate as expected for 100% power. The Incore Thermocouples do not differ by more than 40°F; surveillance checks are satisfactory.
- C. The S/G levels indicate as expected for 100% power. The Incore Thermocouples are not within 4°F; surveillance checks are not satisfactory.
- D. The S/G levels are within 10 inches, but the Incore Thermocouples indicate that two of them are more than 4°F below the highest; surveillance check is not satisfactory.

18. Plant conditions on Unit 1 are as follows:

- The reactor has been shutdown for 22 days, following a 200-day run at full power, to repair a S/G Tube Leak.
- The reactor is in cold shutdown on decay heat removal.
- Both loops of LPI decay heat removal have just become inoperable.
- No other means of decay heat removal has been initiated.
- LT-5 indicates 32".

Which ONE of the following is the amount of time until Core Uncovery is expected to occur? (.25)

- A. 5.0 hours
- B. 6.2 hours
- C. 7.2 hours
- D. 8.5 hours

19. After a unit trip from 100% full power on Unit 1, the following indications are observed:

- All HPI pumps are on
- "A" HPI header flow is 600 gpm
- "B" HPI header flow is 475 gpm
- RCS pressure at 400 psi and slowly decreasing
- ES channels 1 through 6 actuated
- "A" CFT level is 7 feet
- "B" CFT level is "0" feet
- "A" LPI header flow is 1000 gpm
- "B" LPI header flow is "0" gpm
- "1A" and "1B" LPIPs are on

Concerning the LPI System, which ONE of the following is the correct operator action? (.25)

- A. Open 1RC-66 (PORV) and hot leg and reactor vessel head vents.
- B. Open 1LP-18 (LP 1B Line to Rx Bldg. Isolation).
- C. Close 1LP-18 (LP 1B Line to Rx Bldg. Isolation) and 1CF-1 (1A CFT Outlet).
- D. Close 1LP-17 (LP 1A Line to Rx Bldg. Isolation) and 1CF-2 (1B CFT Outlet).

20. The following conditions exist on Unit 1:

- RCS pressure is 10 psig
- Reactor building pressure is 8 psig and decreasing
- OTSG levels are 42% "A" S/G and 45% "B" S/G on the Full Range
- A & B OTSG outlet pressure is 400 psig.
- Reactor building dome temperature is 250°F
- CETC's are 125°F
- LPI flow in the "A" header is 3005 gpm.
- LPI flow in the "B" header is 2997 gpm.
- LPSW flow to the "A" LPI cooler is 3000 gpm.
LPSW flow to the "B" LPI cooler is 5200 gpm.
- Reactor Building Spray flow is \approx 1000 gpm/header
- LPI is in recirc on the Rx building emergency sump
- PRV flow is 600 cfm on the "A" header;
1010 cfm on the "B" header

For these conditions, which ONE of the following operator actions is correct? (.25)

- A. Increase reactor building spray flow to approximately 1500 gpm/header.
- B. Press the reset button for 1LPSW-252, and reduce LPSW flow to the "B" LPI cooler, to 3000 gpm.
- C. Slowly open TBV's; conditions indicate that water may be in the "B" MS line.
- D. Open 1PR-20 (PR fan suction tie), and balance flows in each filter train.

21. SRO ONLY

At 0300 hours a Main Steam line rupture (outside containment) occurred on Oconee Unit 1. The isolation of the affected OTSG is complete and at 0315, the following indications are observed:

- RC pressure is stable at 1425 psig
- Lowest indicated Tc during the event was 445°F
- RC temperature is now stable at 460°F
- Core and Loop Subcooling margins have not decreased below 5°F during the transient
- 1A1 and 1B2 RCP's are running
- LDST temperature is 85°F
- 1RC-1 has failed closed
- ES channels 1 & 2 actuated and have been selected to manual as required
- Pressurizer level = 150"

Which ONE of the following would be the proper action to take at this time? (.25)

- A. Initiate normal cooldown using Pzr Aux. Spray as a means of depressurization.
- B. Initiate normal cooldown using 1RC-66 as a means of depressurization.
- C. Adjust RC pressure and temperature to 1425 psig and 475°F, and hold for one (1) hour.
- D. Adjust RC pressure and temperature to 1100 psig and 460°F, and hold for one (1) hour.

22. Following an extended loss of Main Feedwater (all HWP's have become inoperable), the TDEFWP has been supplying SGs from the hotwell when it suddenly trips and cannot be restarted. The EFDW cross-ties from the other two units are unavailable. The following conditions exist:

- Hotwell level at 65 inches
- RCS temperature at 545°F
- RCS pressure at 2155 psig;
- Condenser Vacuum at 27.5 inches Hg vacuum
- Pressurizer level at 100 inches
- UST level at one (1) foot

Which ONE of the following actions should be taken by the control room operators to reestablish emergency feedwater? (.25)

- A. Break Condenser Vacuum and align MDEFWP's to the Hotwell and close the suction from UST and start the MDEFWPs.
- B. Align the MDEFWP's to the Hotwell then start both pumps and limit the discharge flow to 500 GPM.
- C. Use the CST pumps to increase the UST level to > 2 feet then restart both MDEFWP's.
- D. Reduce the Hotwell level to < 60 inches then start both MDEFWP's and maintain total emergency feedwater flow at 200GPM.

PART-B93 TEST KEY

Answer	Bank #	QT	Fig	Diff	Disc	Category 1	Categor
1. A	PART-B 92	MC	0			PT/1103/15	RT
2. B	PART-B 311	MC	0			OP/1103/05	
3. B	PART-B 323	MC	0			EOP E20	ADM/SRG
4. D	PART-B 25	MC	0			OP/1600/10	
5. A	PART-B 4	MC	0			SLC 16.9.5/6	ADM/SRG
6. A	PART-B 185	MC	0			OP/1103/11	
7. B	PART-B 22	MC	0			OP/1106/31	
8. D	PART-B 26	MC	0			PT/600/01	
9. A	PART-B 386	MC	0			OP/1107/02	
10. D	PART-B 134	MC	0			OP/1102/11	
11. C	PART-B 415	MC	0			OP/1106/01	STG
12. C	PART-B 143	MC	0			OP/1103/02	
13. B	PART-B 12	MC	0			AP/25/OP/1108/1	ADM/SRG
14. D	PART-B 455	MC	0			OP/1104/49	CP/017
15. D	PART-B 21	MC	0			TS 3.1.5	
16. C	PART-B 57	MC	0			EOP 602	
17. B	PART-B 60	MC	0			PT/600/20	
18. B	PART-B 427	MC	0			AP/1700/07	
19. D	PART-B 47	MC	0			EOP 601	
20. B	PART-B 462	MC	0				ADM/OEP
21. D	PART-B 193	MC	0			EOP 503	ADM/SRG
22. A	PART-B 284	MC	0			AP/1700/19	

PART-B93 FEEDBACK REPORT

1. A
A. Correct
B. Incorrect peak Sm used (-.42)
C. Incorrect prev. Pwr. level used (80%)
D. Incorrect prev. power level used (interpolate between 60% and 80%)
2. B
3. B
4. D
Encl. 4.8
5. A
6. A
7. B
A. factor of 10 error used 29.2
B. correct
C. RIA 40 calc.
D. Kel33 calc with factor 10 error
8. D
Requires TS table 3.5.1 to answer question.
9. A
10. D Ref: OP/1/A/1103/11 and OP/1/A/1102/11
D is correct based on encl. 3.8 of OP/1/A/1103/11 and Limit and Precautions of OP/1/A/1102/11. (LP 2.2.1 & 2.2.2 & 2.2.3 & 2.2.4)
11. C
A = use MS temp on bottom axis
B = use MS minus FS inner metal temp
C = correct
D = use FS inner metal temp on bottom axis
12. C
AP/1700/03
OP/1104/21
13. B
.1 ft = 1,308 gallons per OP/1108/01 Encl. 24
2 RC Makeup pumps taking suction off of 1&2 SFP @ 52 gpm
Minimum allowable level = 9 ft above FT Tubes (1 foot above the racks)

A = 3 pumps 3 ft
B = 2 pumps 3 ft
C = 1 pump 3 ft
D = 2 pumps 12 ft

14. D

15. D

16. C

17. B

18. B

- A. Using LT-5 14" curve
- B. correct
- C. Using LT-5 50" curve
- D. using after refueling curve at 32"

19. D

20. B

- A. Incorrect - suction for RBS is now the RBE sump and not BWST. Flow must be 1000 gpm, CP-602.
- B. Correct - knowledge (Mod training) OEP enabling 3.
- C. Incorrect - level as calculated, using EOP enclosure. 7.3B is too low (with temp. correction), to perform this guidance from CP-602.
- D. Incorrect - this guidance given in CP-601 when a PRV fan does not start.

21. D

- A. Hold in TSOR is required.
- B. Hold in TSOR is required.
- C. Heatup from 460°F to 475°F is not desired.
- D. Correct answer.

22. A