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

ENCLOSURE 1

EXAMINATION REPORT - 50-269/92-302

Facility License: Duke Power Company

Facility Name: Oconee Nuclear Station

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

Examinations were administered at the Oconee Nuclear Station site near Seneca, South Carolina.

Chief Examiner: M H Bartley for Richard S. Baldwin — 9/9/92 Date Signed

Approved By: Lawrence L. Lawyer — 9/9/92 Date Signed
Lawrence L. Lawyer, Chief
Operator Licensing 1
Division of Reactor Safety

SUMMARY

Scope: Requalification written examinations and operating tests were administered to 10 Reactor Operators (RO) and 14 Senior Reactor Operators (SRO) during the weeks of July 20 and July 27, 1992.

Results: Nine ROs and thirteen SROs passed these examinations. All others failed.

Based upon the above results, the Oconee Requalification Program has been determined to be satisfactory.

A strength was noted in the construction and maintenance of Job Performance Measures (JPM) (paragraph 4.c.(3)).

Weaknesses were noted in the areas of written examination construction (paragraph 4.b.(2), 4.b.(3), 4.c.(1)), communications during Emergency Operating Procedure (EOP) implementation (paragraph 4.e), and evaluator performance (paragraph 4.f). A conflict between procedures (paragraph 4.g.(1)) was identified as an Inspector Follow-up Item (IFI).

(a) Many instances were noted in which the ROs failed to repeat back orders and the SROs failed to acknowledge plant and equipment status reports from the ROs.

(b) A significant problem was the interface and command relationship between the US, CRSRO, and the ROs. Typically, during the implementation of the EOPs, all four operators talked simultaneously. The CRSRO gave orders to one RO while the US gave orders to the other RO or the US and CRSRO gave orders to the same operator. This led to confusion due to the noise level in the control room and the ROs being unsure of who was in charge. In addition, the US and the CRSRO gave the same order at different times because of lack of coordination. This delayed operator actions because they had to listen to and repeat back the same order twice.

(2) The SROs also demonstrated weaknesses in the implementation of the EOPs.

(a) The examiners identified inconsistencies between procedure reading in week 1 and week 2 of the examinations. During week 1, the CRSRO read all the cautions and steps verbatim and expected verbatim repeat backs from the operators. During week 2, the CRSROs paraphrased cautions or referred to a placard posted on the control board and accepted an "I understand" acknowledgement from the ROs. Also during week 1, the CRSROs repeated steps that had already been accomplished in previous EOP sections and verified those steps valve by valve. As an example, HPI-PORV forced cooling had already been initiated and the CRSRO transitioned to a section of the EOPs that required initiation of HPI-PORV forced cooling, the CRSRO then went through the step again valve by valve. However, during the second week under the same conditions, the CRSRO just said "Has HPI-PORV cooling been initiated?", the RO said "Yes, HPI-PORV cooling has been initiated," and the CRSRO continued to the next step.

(b) The SROs forced EOP transitions to go to the EOP section that addressed the problem they **diagnosed**. This is contrary to the purpose of symptom-based EOPs and in one case caused the delay of a rapid cooldown due to a SBLOCA being incorrectly diagnosed as a Steam Generator tube rupture. This scenario consisted of faulting Once Through Steam Generator (OTSG) "B" and,

once the Reactor Coolant System was stabilized from the faulted OTSG, initiating a SBLOCA in containment. The crew was in Section 503, Excessive Heat Transfer, when the SBLOCA was initiated. The US diagnosed it as a tube rupture in the faulted OTSG and told the CRSRO that they needed to get to Section 504, SG Tube Leak. The CRSRO decided to leave Section 503 without completing it and return to the beginning of the "Subsequent Actions" section as allowed by Operations Management Procedure 1-18, Communication and EOP Implementation Standard. At step 5.17 in the "Subsequent Actions", which states:

"IF heat transfer is or has been excessive:
THEN GO TO Section 503, Excessive Heat Transfer"

the CRSRO said "We've already done that" and proceeded to step 5.18 which transfers the reader to Section 504, SG Tube Leak. At this point the CRSRO transitioned, with the Unit Supervisor's concurrence, to Section 504 even though he did not have the indications listed in step 5.18 for a steam generator tube leak. The correct action was to stay in Section 503 until it transitioned the CRSRO to CP-602, Cooldown with Saturated RCS. This improper use of the EOPs delayed the initiation of a rapid cooldown by 12 minutes allowing a significant loss of Reactor Coolant System inventory prior to reaching Core Flood Tank injection pressure.

(c) The Unit Supervisors were directing EOP actions from memory as much as ten minutes in advance of the procedure steps. There are several problems associated with this practice. First, the US is giving orders based on his diagnosis of the problem vice using the symptom-based approach of the EOPs. If the US or CRSRO misdiagnosed the problem, they could direct improper actions to be taken and impede or complicate the plant recovery. Secondly, this practice complicates crew communications as discussed in paragraph 4.b.(1)(b) and delays the operators in their completion of tasks.

Plant management has committed to resolve this problem.

(3) The crews demonstrated weaknesses in their understanding of the affect of the delta T cold controller on the Integrated Control System and in the diagnosis of a Feedwater delta P instrument failure. The incorrect diagnosis of the Feedwater delta P instrument failure by two of three crews resulted in reactor trips.

f. Facility Evaluators

Evaluator weaknesses were noted during the performance of the dynamic simulator examinations and JPMs.

(1) Evaluator weaknesses during the JPMs included poor and improper cuing, poor follow-up questioning techniques, allowing an operator to use unauthorized reference materials, and giving the operators partial procedures which cued them when the task was complete. During one JPM, when the operator incorrectly performed a step, the evaluator cued the operator to "do that step again" resulting in the operator passing the JPM when the operator originally failed a critical step.

(2) During the dynamic simulator examinations, the evaluators were inconsistent in the use of the competency rating factors. Also, they identified minor problems but sometimes overlooked or missed significant problems.

(a) An example of inconsistency in the use of rating factors occurred when a crew misdiagnosed an event. The crew misdiagnosed a SBLOCA as a tube leak and incorrectly forced a transition of the EOPs to Section 504, SG Tube Leak. The facility evaluators rated the crew a "two" under "diagnosis of events." The NRC examiners rated the crew as a "one" under "implementation of procedures" due to the crew using an event-based approach to implement symptom-based procedures.

(b) An example of a significant problem being missed occurred when the evaluators failed to identify an ISCT failure. A crew allowed Main Steam Header pressure to stay at or above the Main Steam Relief Valve (MSRV) setpoint for ten minutes with a known tube rupture in progress in that steam generator. The NRC examiners failed the crew, an RO, and the Unit Supervisor for failure of an Individual Simulator Critical Task which stated:

"Following Reactor trip adjust TBV's on OTSG "B" to keep MS press < MS relief setpoint."

The facility evaluators did not initially fail anyone until the NRC examiners started questioning the lifting of the MSRVs and the inadequate control of "B" Main Steam Header Pressure. The final facility examiner ratings were to only fail the RO. The NRC examiners gave the crew ratings of "one" in "diagnosis

of plant conditions", "understanding of how actions affected system/plant", "manipulation of controls", and "taking manual control of automatic functions." The facility evaluators gave the crew ratings of "one" in the areas of "diagnosis of plant conditions" and "manipulation of controls."

g. Procedure Weaknesses

The examiners identified two procedure weaknesses during the examination weeks which plant management has committed to resolve.

(1) Operations Management Procedure 2-1, Duties and Responsibilities of On-Shift Operations Personnel, step 1.3.8 required that if inadequate core cooling conditions existed then immediate transition to Section 507, Inadequate Core Cooling, was necessary. This is in direct conflict with the note preceding step 1.0 of CP-601, Cooldown Following Large LOCA. This is identified as IFI 50-269/92-302-01.

(2) PT/1/A/600/01, Periodic Instrument Surveillance, describes how to trip an RPS channel for an out of tolerance instrument but does not state the final position of the Test-Operate switch. Some operators returned the switch to OPERATE while others left it in TEST-OPERATE.

h. Simulator Fidelity

The team did not review the degree to which the simulator meets the operational requirements of ANSI/ANS-3.5. The following problems were noted during the dynamic simulator examinations.

(1) The Reactor Building pressure is not modelled correctly. It is a straight line interpolation and does not exceed 47 psig. This affected one set of scenarios and prevented the examiners from determining if the crews' approach to combat the casualty would have resulted in exceeding the Reactor Building design pressure of 60 psig.

(2) The ICCM monitors received frequent data link failures.

(3) The ICCM monitors continued to update after the simulator was placed in freeze. This detracted from the effectiveness of the Part A static simulator examination.

i. Material Condition of the Plant

The examiners noted several problems in the plant during the administration of the walk-through examinations. During the exit interview, plant management committed to correct these problems.

(1) There were eight to twelve terminal nuts lying in the bottom of 2MTC3 (RCP interlock cabinet). Loose materials in electrical cabinets were also pointed out to the facility personnel during the January 1992 initial examinations.

(2) There were numerous lights burned out in the Turbine Building, Aux Building, and Safe Shutdown Facility.

(3) Problems were also noted with fire extinguisher safety checks (exceeding periodicity and illegible tags) and, in one case, a fire extinguisher in a Unit 2 equipment room was not secured in its mounting bracket.

5. Exit Meeting

At the conclusion of the site visit, the examiners met with representatives of the plant staff to discuss the results of the examinations and inspection findings. The licensee did not identify as proprietary any material provided to or reviewed by the examiners.

Item Number	Description/Reference
50-269, 270, 287/92-302-01	IFI - Conflict between OMP 2-1 and CP-601 on when to enter Section 507, "Inadequate Core Cooling", paragraph 4.g.(1).

ENCLOSURE 2

SIMULATOR FIDELITY REPORT

Facility Licensee: Duke Power Company

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

Operating Tests Administered On: July 20, 21, 28, and 29, 1992

This form is used only to report observations. These observations do not constitute, in and of themselves, 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, the following items were observed:

ITEM	DESCRIPTION
Reactor Building Pressure	The pressure model is a straight line interpolation and will not go above 47 psig (RB design pressure is 60 psig).
ICCM Monitors	Received frequent Data Link failures Continues to update when simulator is in freeze

Enclosure 3

PTRQ 1992- WRITTEN EXAM

PART-A

TEST NO: SRE-21

NAME _____ DATE 07/30/92

SSN _____ GRADE _____

GRADED BY _____ DATE _____

REVIEWED BY [signature] DATE 7-30-92

INSTRUCTIONS FOR TAKING EXAMINATION:

1. Insure your NAME, SSN and TEST NUMBER are on this cover sheet 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 form provided. 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 and have turned in your completed examination, leave the examination area.

*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. During this event, if you were to view the P/T trace one (1) hour from the present time, predict the proper response during this time period. Assume any required operator actions have been performed. RCS Pressure decreasing and temperature:(.25)

   A. decreasing to maintain close to 50° subcooling.

   B. decreasing to maintain close to 20° subcooled.

   C. decreasing to maintain close to 15° subcooled.

   D. decreasing to maintain close to 0° subcooled.

2. Which OTSG should be isolated, and at what point during this event should it be isolated? (.25)

   A. 1A; when RC temperature is less than 532°F.

   B. 1B; when RC temperature is less than 532°F.

   C. 1A; when SG pressure is less than 970 psig.

   D. 1B; when SG pressure is less than 970 psig.

3. If during this scenario, RC Pumps are lost and are unavailable, and a natural circulation cooldown must be initiated, then: (.25)

   A. the "A" OTSG would not be steamed for any reason.

   B. both OTSG's would be steamed to accomplish the cooldown.

   C. no cooldown limit applies due to the difficulty involved with one OTSG natural circulation cooldown.

   D. the "B" OTSG would be used <u>only</u> if unable to control the cooldown rate.

4. SRO ONLY

Determine the correct Emergency Plan Classification for this event. (.25)

A. Unusual Event

B. Alert

C. Site Area Emergency

D. General Emergency

5. Over the next thirty (30) minutes, which two (2) parameters will be causing a change in shutdown margin? (.25)

A. RCS temperature increases; boron increases.

B. RCS temperature decreases; boron decreases.

C. RCS temperature decreases; Xenon increases.

D. RCS temperature increases; Xenon increases.

6. Determine if operation in the TSOR is required, and select the explanation why. (.25)

A. Yes. RCP's on; RC temperature > 500°F; HPI is in the injection mode.

B. Yes. RCS temperature has decreased >20°F in 5 minutes.

C. No. ES 1 and/or 2 has not actuated.

D. No. RCP on; RC temperature > 500°F; HPI is in the injection mode.

7. Utilizing existing control room indications, is the TDEFWP operable? State a minimum of three indications you used to make this determination. (.25)

   A. No. MS-93 indicates open; TDEFDWP discharge pressure; "Zero" flow into the "A" OTSG.

   B. Yes. MS-93 indicates open; TDEFDWP discharge pressure; TDEFW pump tripped statalarm not on.

   C. No. MS-93 indicates open; TDEFDWP Discharge Pressure; "A" OTSG low level.

   D. Yes. MS-93 indicates open; TDEFDWP bearing oil pump off; 1LPSW-137 open.

8. Assuming that EFW is lost, which ONE of the following should the operator perform to establish a heat sink? (.25)

   A. Depressurize the OTSG's to feed with the CBP's.

   B. Depressurize the RCS to utilize LPI.

   C. Go to forced HPI cooling.

   D. Reset a MFDWPT and feed both SG's.

9. Which ONE of the following statements correctly describes the ICS response to the existing plant situation? (.25)

   A. "A" TBV is indicating open but has failed shut due to MT Header Pressure signal.

   B. "A" TBV has failed open due to ICS Turbine Master setpoint signal failing high.

   C. "A" TBV has failed to control the "A" OTSG Pressure at the expected post trip pressure.

   D. "A" TBV is indicating open but has failed shut due to OTSG outlet pressure signal.

10. Which ONE of the following statements is correct, relating to the existence of primary to secondary heat transfer at this time? (.25)

    A. Most of the primary to secondary heat transfer is taking place in the "B" OTSG.

    B. Most of the primary to secondary heat transfer is taking place in the "A" OTSG.

    C. Both the "A" and "B" steam generators are transferring heat.

    D. Primary to secondary heat transfer does not exist.

11. Which ONE of the following is the fastest method for feeding the OTSG's for the existing plant condition? (.25)

    A. Align TDEFWP to the "A" S/U control valve to feed "A" SG and throttle 1FDW-316 as necessary to feed "B" SG.

    B. Align TDEFWP to the "B" S/U control valve to feed "B" SG and throttle 1FDW-315 as necessary to feed "A" SG.

    C. Align "A" MDEFWP to the "A" S/U control valve to feed "A" SG and throttle 1FDW-316 as necessary to feed "B" SG.

    D. Align TDEFWP to "A" and "B" S/U control valves to feed "A" and "B" SG's respectively.

12. Assuming no further operator actions, which ONE of the following statements correctly predicts the change in SG heat transfer conditions over the next fifteen (15) minutes? (.25)

    A. Turbine bypass valves will control main steam pressure, preventing excessive heat transfer.

    B. Main steam line reliefs will control turbine header pressure, preventing excessive heat transfer.

    C. OTSG's will be overfed by Emergency Feedwater, causing excessive heat transfer.

    D. Overfeed condition will exist resulting in excessive heat transfer.

13. SRO ONLY

Later in this event, after the affected S/G is isolated, the EOP directs the operator to steam the affected SG to prevent exceeding 285 inches XSUR. Why? (.25)

A. 285 inches is above the location within the SG where most leaks have occurred in the past.

B. To prevent feedwater in-leakage.

C. To prevent contaminated water in steam lines.

D. 285 inches is the upper Tech. Spec. limit.

14. ---

| REMAINING QUESTIONS ARE GENERIC! |

RO ONLY

At power, one of the first symptoms that condenser vacuum is decreasing is: (.25)

A. the "Low Condenser Vacuum" statalarm.

B. increasing NI power.

C. the Main Feedwater Pumps trip.

D. generated megawatts increase.

15. RO ONLY

Choose the correct statement concerning EFW control if power is lost for one (1) hour. (.25)

A. 1FDW-315 and 316 air accumulators have enough capacity to ensure proper operation from the EFW control panel.

B. 1FDW-315 and 316 nitrogen backup will ensure proper operation from EFW control panel in either Auto or Manual.

C. 1FDW-315 and 316 nitrogen backup will ensure proper operation from EFW control panel in Manual only.

D. 1FDW-315 and 316 will have to be manually operated from the Penetration Rooms.

16. The MDEFDWP's will start on low OTSG level if, after thirty (30) seconds, the level is still 21 inches or less: (.25)

    A. and the pump control switch is in the Auto 1 or Auto 2 position.

    B. only when the pump control switch is in the Auto 1 position.

    C. only when the pump control switch is in the Auto 2 position.

    D. only when the pump control switch is in the Run position.

17. Which ONE of the following describes the ICCM Subcooling Margin Monitor indication when superheated conditions are reached? (.25)

    A. Orange background with black number(s).

    B. Orange background with white number(s).

    C. Black background with white number(s).

    D. Black background with orange number(s).

18. Unit 1 RCP Seal Return Valves (1HP-226, 228, 230 & 232) are interlocked to close under which of the following conditions? (.25)

    A. Total Seal Supply flow < 8 gpm.

    B. Individual Seal Supply flow < 3 gpm.

    C. CC flow and Seal Supply flow = '0'gpm with > 400 psi RCS pressure.

    D. Seal Supply flow = '0'gpm, RCP's off with < 400 psi RCS pressure.

19. If the CRD's are in MANUAL, they cannot be returned to AUTO unless: (.25)

A. neutron error is within ± 0.5%.

B. all Safety Groups are at "Out-Limit".

C. all control rods are on their own Group Power Supply.

D. an "Out-Inhibit" is <u>not</u> in effect and neutron error is less than 2%.

20. How will load centers X5 and X6 respond to a load shed signal? (.25)

A. will load shed if powered from CT-1.

B. will load shed if powered from CT-5.

C. will load shed if ES 1 & 2 actuate.

D. will not load shed.

SRE-21 FEEDBACK REPORT

1. D
2. B
3. B
4. B
5. C
6. D
7. B
8. A
9. C
10. A
    No water in "A" OTSG at this time.
11. C
12. D
13. C
14. B
15. B
16. A
17. A
18. C
19. B
20. B

SRE-21 TEST KEY

	Answer	Bank #	QT	Category 1
1.	D	PART-A 384	MC	R55
2.	B	PART-A 389	MC	R55
3.	B	PART-A 26	MC	EOP 504
4.	B	PART-A 374	MC	R55
5.	C	PART-A 76	MC	PT/1103/15
6.	D	PART-A 78	MC	EOP 503
7.	B	PART-A 79	MC	AP/1700/19
8.	A	PART-A 88	MC	AP/1700/19
9.	C	PART-A 89	MC	SAE-R25
10.	A	PART-A 91	MC	EOP E20
11.	C	PART-A 92	MC	AP/1700/19
12.	D	PART-A 93	MC	SAE-R25
13.	C	PART-A 388	MC	R55
14.	B	PART-A 29	MC	R15
15.	B	PART-A 131	MC	EF
16.	A	PART-A 475	MC	EFW
17.	A	PART-A 253	MC	RCI
18.	C	PART-A 256	MC	HPI
19.	B	PART-A 273	MC	CRI
20.	B	PART-A 248	MC	PSL

PTRQ 1992- WRITTEN EXAM

PART-A

TEST NO: SRE-09

NAME _____ DATE 07/23/92

SSN _____ GRADE _____

GRADED BY _____ DATE _____

REVIEWED BY Paul M Stovall DATE 7/22/92

INSTRUCTIONS FOR TAKING EXAMINATION:

1. Insure your NAME, SSN and TEST NUMBER are on this cover sheet 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 form provided. 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 and have turned in your completed examination, leave the examination area.

*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)

ES-602-2

WRITTEN EXAMINATION COVER SHEET

U.S. NUCLEAR REGULATORY COMMISSION
(SENIOR) REACTOR OPERATOR REQUALIFICATION EXAMINATION

FACILITY: _____

REACTOR TYPE: _____

DATE ADMINISTERED: _____

OPERATOR: _____

SECTION	OPERATOR'S SCORE	CATEGORY VALUE	% OF CATEGORY VALUE
A Plant and Control Systems	_____	_____	_____
B Administrative Controls/ Procedural Limits	_____	_____	_____
TOTALS	_____	_____	_____ Final Grade

5.0 STUDENT INFORMATION SHEET

5.1 INITIAL CONDITIONS

A. While operating at 100% steady state power , the mechanical maintenance group requested that the "1A" LPI Pump be "red tagged" out of service for repair. Unit 2 is shutdown for repairs to transformer CT-2, which is out of service. CT-1 is supplying Unit 2 Auxiliaries as well as acting as a backup to Unit 1. A double end break LOCA on the "B" hot leg occurred. Engineered Safeguards actuated but LPSW will not align to the "1A" LPI Cooler due to a failure of LPSW-4 to open.

5.2 EQUIPMENT STATUS PRIOR TO TRANSIENT

A. "1A" LPI Pump breaker is tagged out for maintenance to be performed on the pump.

B. A Tech Spec LCO has been in effect for one (1) hour due to the "1A" LPI pump being out of service.

C. Unit 2 is shutdown for repairs to transformer CT-2, which is out of service.

D. CT-1 is supplying Unit 2 auxiliaries as well as backing up Unit 1.

E. A Tech Spec LCO has been in effect for two (2) hours due to CT-1 being aligned to supply Units 1 & 2.

F. R & Rs have been filled out related to the out of normal conditions associated with the LPI system and the startup transformers.

5.3 OPERATOR ACTIONS TAKEN

A. Immediate Manual Actions of the EOP

B. 1B HPIP has been secured

5.4 ELAPSED TIME FOR EVENT

A. Three (3) minutes

1. At the present time, LPSW to the LPI coolers: (.25)

   A. is required to remove decay heat.

   B. is not required to remove decay heat.

   C. is not adequate to remove decay heat.

   D. should be throttled to 5500gpm.

2. Which ONE of the following correctly describes the present plant situation? (.25)

   A. Inadequate Core Cooling exists.

   B. Containment Integrity exists.

   C. The Secondary side of the plant has caused excessive heat transfer.

   D. Two (2) RCP's should not be secured at this time.

3. SRO ONLY

   For this event, determine the Emergency Plan Classification. (.25)

   A. Unusual Event

   B. Alert

   C. Site Area Emergency

   D. General Emergency

4. SRO ONLY

   In regard to LPI during this event: (.25)

   A. LPI/HPI should be aligned in the piggyback mode.

   B. LPI injection is adequate to remove decay heat.

   C. Design Basis requirements are not met.

   D. The LPI system is not removing decay heat.

5. Based on present plant conditions, which ONE of the following Unit 1 loads should be shutdown? (.25)

   A. 1C HPI pump.

   B. 1A HPI pump.

   C. 1B RBS Pump.

   D. A LPSW Pump.

6. For the existing scenario, which ONE of the following set of conditions will allow the operator to secure the HPI pumps? (.25)

   A. When Core Subcooling Margin becomes >20°F subcooled.

   B. When each LPI header flow is 3000 gpm.

   C. When each LPI header flow is 1000 gpm and RCS conditions are stable.

   D. Present plant conditions allow for securing HPI pumps at this time.

7. Valves 1CF-1 (1A CFT Outlet) and 1CF-2 (1B CFT Outlet) should be: (.25)

   A. closed at this time.

   B. left open at this time.

   C. closed when core SCM returns to >20°F.

   D. closed when CFT pressure reaches 0 psi.

8. Which ONE of the following statements is correct concerning RCP's during this scenario? (.25)

   A. Secure to prevent phase separation if the pumps are lost with the system at greater than 70% void fraction.

   B. Secure to protect the RC Pumps from damage.

   C. Since core SCM has been 0°F for >2 minutes, the RCPs should remain running to pump a steam/water mixture through the core.

   D. Since core SCM has been 0°F for >2 minutes, the RC Pumps should remain running to ensure proper core heat transfer.

9. Based on present plant conditions, what operator action must be taken to determine Reactor Building Hydrogen concentration from the Control Room? (.25)

   A. Place the RB Hydrogen Purge in service.

   B. Place the RB Hydrogen Analyzers in service.

   C. Open valves 1PR-81 and 1PR-84 (Train "A" RB Hydrogen Analyzer Isolations).

   D. No action required; Hydrogen concentration is zero (0) as indicated.

10. Based on present plant conditions, if PCB-17, PCB-18 and ACB-4 trip, which ONE of the following will be the source of power? (.25)

   A. Keowee #1 when ACB-3 automatically closes.

   B. Keowee #2 through the overhead power path.

   C. CT-3 through the emergency cross-connects.

   D. Central switchyard when SL-1 and SL-2 are closed.

11. Which ONE of the following choices list the RIA's that are currently providing accurate information? (.25)

   A. 1RIA-4, 1RIA-48, 1RIA-49

   B. 1RIA-47, 1RIA-49, 1RIA-57

   C. 1RIA-47, 1RIA-48, 1RIA-56

   D. 1RIA-4, 1RIA-57, 1RIA-58

12. Which ONE of the following best describes the cooling medium for the reactor core? (.25)

   A. Forced circulation cooling.

   B. Two-phase cooling.

   C. HPI/LPI cooling.

   D. No cooling presently taking place.

13. Which ONE of the following reactions can the operator minimize, when reactor building pressure is 3 psig? (.25)

    A. zirc - water reaction.

    B. Radiolysis reaction.

    C. stainless steel - boric acid reaction.

    D. zinc - boric acid reaction.

14. What operator actions should be taken in regards to LPI flow? (.25)

    A. Secure the 1B LPIP, valve-in the 1C LPIP and establish 1500gpm flow in both LPI headers.

    B. Flow should be split evenly to 3000 gpm per header.

    C. Flow should be split evenly to 1500 gpm per header.

    D. Valve-in the 1C LPIP and establish flow in both LPI headers at 3000 gpm.

15. If a load shed signal <u>had</u> been activated at the start of this event which ONE of the following apply at this time? 1C LPIP ... (.25)

    A. may be started.

    B. may not be started.

    C. cannot be started until 1B LPIP is secured.

    D. cannot be started until the load shed signal is reset.

16. 1LP-1 (LPI Return Block from RCS) is interlocked so that it will <u>not</u> open unless: (.25)

    A. RCS pressure is < 400 psi.

    B. RCS temperature is <246°F.

    C. 1LP-2 (LPI Return Block) is open.

    D. 1LP-2 (LPI Return Block) is closed.

17. Which ONE of the following is the reason that the APSR's are maintained latched in their withdrawn position on a reactor trip? (.25)

A. Provides a manual means of reactivity control.

B. Provides additional SDM in case of an inadventant restart.

C. Limits excessive flux tilting.

D. Prevents the addition of positive reactivity.

18. When the PORV Select switch is in LOW: (.25)

A. the controlling signal is from the ES Channel A pressure instrument.

B. the controlling signal is from the SSF RCS Loop B pressure instrument.

C. the controlling signal is from the SSF Pressurizer pressure instrument.

D. the controlling signal is from the RCS Low Range Cooldown pressure instrument.

19. RO ONLY

During a unit shutdown on unit one you are directed by procedure to align the LPI system for switchover mode of operation. The switchover mode of decay heat removal is used on Units 1 and 2: (.25)

A. because the LPI coolers are not designed to accept the combined RCS pressure and LPI pump discharge pressure.

B. because the LPI coolers are not designed to accept the combined RCS pressure and RCP discharge pressure.

C. but is not necessary on Unit 3, because an orifice in the decay heat drop line reduces the flowrate to the LPI coolers.

D. but is not necessary on Unit 3, because the Unit 3 Coolers can be bypassed when necessary.

20. The TDEFWP has automatically started and is supplying the OTSGs. Which ONE of the following describes the response of 1FDW-315 and 1FDW-316 (SG EFDW Control Valves) controllers when the initiation signal CLEARS.? (.25)

    A. Continues to operate in AUTO until the MANUAL pushbutton is depressed.

    B. Continues to operate in AUTO until the initiation signal is reset.

    C. Shifts to MANUAL as soon as the initiation signal clears.

    D. Shifts to MANUAL when the TDEFWP control switch is placed to RUN.

21. A complete loss of DC power to the TDEFWP has occurred. Which ONE of the following describes the starting of the TDEFWP if an AUTOMATIC initiation signal is received? (.25)

    A. Will automatically start because the steam supply valve, MS-93, will be opened when its pilot solenoid de-energizes.

    B. Can be manually started by placing the Control Room control switch to RUN, due to a loss of auto initiation logic control power.

    C. Can be manually started by pulling up on the local hand-starting lever.

    D. Cannot be started since the low oil pressure start permissive for the turbine cannot be met.

22. Which ONE of the following statements correctly describes the reason for lining up the Post LOCA Boron Dilution Valves within nine hours of the existing transient? (.25)

    A. To provide a hot leg flow path which will prevent boron concentrating in the core.

    B. To provide a cold leg flow path to enhance core cooling.

    C. To prevent damage to the LPI pumps.

    D. To ensure proper operation of the internal vent valves in the core support shield.

SRE-09 TEST KEY

	Answer	Bank #	QT	Category 1
1.	B	PART-A 70	MC	SAE-R48
2.	B	PART-A 22	MC	EOP 501
3.	C	PART-A 337	MC	RP/1000/01
4.	B	PART-A 314	MC	EOP 602
5.	D	PART-A 67	MC	EOP E20
6.	C	PART-A 65	MC	EOP 601
7.	B	PART-A 72	MC	EOP 601
8.	B	PART-A 64	MC	EOP 501
9.	B	PART-A 68	MC	EOP 505
10.	D	PART-A 393	MC	
11.	D	PART-A 268	MC	AM6
12.	C	PART-A 21	MC	EOP 601
13.	D	PART-A 262	MC	HDC
14.	D	PART-A 308	MC	LPI
15.	A	PART-A 258	MC	LPI
16.	A	PART-A 249	MC	LPI
17.	D	PART-A 310	MC	RPS
18.	D	PART-A 250	MC	RCI
19.	A	PART-A 403	MC	LPI
20.	A	PART-A 396	MC	EF
21.	C	PART-A 395	MC	EF
22.	A	PART-A 81	MC	EOP 601

SRE-09 FEEDBACK REPORT

1. B
2. B
3. C
4. B
5. D
6. C
7. B
8. B
9. B
10. D
11. D
12. C
13. D
14. D
15. A
16. A
17. D
18. D
19. A
20. A
21. C
22. A

PTRQ 1992- WRITTEN EXAM

PART-A

TEST NO: SRE-11

NAME _____ DATE 07/27/92

SSN _____ GRADE _____

GRADED BY _____ DATE _____

REVIEWED BY Paul M Stovall DATE 7/23/92

INSTRUCTIONS FOR TAKING EXAMINATION:

1. Insure your NAME, SSN and TEST NUMBER are on this cover sheet 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 form provided. 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 and have turned in your completed examination, leave the examination area.

*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 statements describes the actions that should be taken prior to placing RPS Channel "B" in Manual Bypass in order to prevent violating any limit? (.25)

   A. No actions needed; Channel "B" can be placed in Manual Bypass at any time.

   B. Channel "A" should be tripped, prior to placing Channel "B" in Manual Bypass.

   C. A dummy bistable should be inserted in the Channel "A" High Pressure trip bistable and take channel "A" out of Manual Bypass.

   D. The reactor will have to be shutdown prior to placing Channel "B" in Manual Bypass.

2. Concerning the Component Cooling system at this time: (.25)

   A. CC Pumps "1A" and "1B" have tripped, causing 1CC-8 (RB Outside Block) to shut.

   B. Quench Tank temperature will increase.

   C. 1CC-8 (RB Outside Block) has failed shut, resulting in a complete loss of CC flow.

   D. The standby CC pump should have automatically started.

3. For the present plant condition, which ONE of the following additional failures would result in seal damage to the RC pumps? (.25)

   A. Loss of 1TA and 1TB switchgear.

   B. 1HP-20 (RCP Seal Return) failing closed.

   C. 1HP-31 (RCP Seal Flow Control) failing closed.

   D. 1HP-115 (1A&1B HPIP's Discharge X-Connect) fails closed.

4. Based on present plant conditions, if the toggle switch for RCS Pressure on the SASS panel in RPS Cabinet "E" was positioned to "A", which ONE of the following statements is correct? (.25)

   A. The PORV and Spray Valve would open due to the pressure signal being failed high.

   B. The PORV and Spray Valve would only be manually operable from the Control Room.

   C. The Spray Valve would only be manually operable from ICS Cabinet #13.

   D. The PORV and Spray Valve would not be affected.

5. Which ONE of the following statements is correct concerning Subcooling Margin Monitors based on present plant conditions? (.25)

   A. All SCM Monitors are operable.

   B. The Digital Front-Board SCM Monitors are operable and all ICCM SCM Monitors are inoperable.

   C. The Digital Front-Board SCM Monitors are inoperable and all ICCM SCM Monitors are operable.

   D. The ICCM SCM Monitors are inoperable.

6. Which ONE of the following statements is correct based on present plant conditions? Demineralizer resin... (.25)

   A. has been damaged.

   B. will <u>not</u> be damaged because letdown flow is directed to "A" BHUT.

   C. will <u>not</u> be damaged because the demineralizer is bypassed.

   D. will be damaged unless letdown flow is increased to >100 gpm.

7. Which ONE of the following statements would be correct if a SBLOCA occurred and ES 1&2 actuated on low RCS pressure during the present plant condition? (.25)

   A. 1HP-5 (Letdown Isolation) will not automatically close.

   B. 1HP-409 (1HP-27 Bypass) will have to be opened to ensure HPI flow in the "A" and "B" HPI headers.

   C. Adequate HPI flow will be established in both injection headers without operator action.

   D. 1LPSW-6 and 15 (RCP Coolers Supply and Outlet) will have to be re-opened to restore LPSW flow to RCP's.

8. Which ONE of the following actions is required if Rod 2, Group 7 drops to 25%? (.25)

   A. Manually trip the reactor.

   B. Bring the unit to hot standby within twelve (12) hours.

   C. Bring the unit to hot shutdown within twelve (12) hours.

   D. Position the remaining rods in Group 7 to clear the Assymetric Fault alarm.

9. Choose the correct statement concerning RCP operation based on present plant conditions. (.25)

   A. RCP's may continue to operate, but 1B2 RCP cannot be restarted.

   B. The remaining RCP's should be secured.

   C. RCP's may continue to operate and RCP 1B2 can be restarted.

   D. Close 1HP-230 (1B2 RCP Seal Return Stop) and 1LPSW-11&12 (1B2 RCP MTR CLR In&Out).

10. Based on present plant conditions: (.25)

    A. Th is lower in the "A" Loop; the RPS channels that use the signals from "A" Loop are further away from a high Th trip.

    B. Th is lower in the "A"loop; the RPS channels that use the signals from "A" Loop will be closer to a high Th trip.

    C. RCS pressure is lower in the "A" Loop; the RPS channels that use the signals from "A" Loop will be closer to a low pressure and variable pressure/temperature trip.

    D. RCS pressure is lower in the "A" Loop; the RPS channels that use the signals from "A" Loop will be closer to a high pressure trip.

11. Based on available Control Room indications, which ONE of the following is correct? CRDs... (.25)

    A. are responding properly.

    B. should be inserting and they are not moving.

    C. should be withdrawing and they are not moving.

    D. should be withdrawing and they are inserting.

12. Based on present plant conditions, what is the maximum MWe output allowed? (.25)

    A. 400 MWe

    B. 487 MWe

    C. 531 MWe

    D. 664 MWe

13. RO ONLY

The "B" HPIP is running because: (.25)

A. It started in order to to recover Pressurizer level.

B. of Labyrinth Seal dP.

C. of Seal Supply Filter dP.

D. of Seal injection flow.

14. ■■■
■ REMAINING QUESTIONS ARE GENERIC! ■
■■■

Unit #1 is operating at 100% power with four (4) operable RPS channels. RPS Channel "A" is placed in Manual Bypass. The trip logic on Unit #1 after RPS Channel "A" is placed in Manual Bypass is: (.25)

A. Two (2) out of three (3).

B. One (1) out of three (3).

C. Two (2) out of four (4).

D. One (1) out of four (4).

15. RPS channel "A" is tripped because of a failed pressure signal. The operator is instructed to place the RPS channel in manual bypass until the bistable can be repaired. Which ONE of the following is NOT an action that should be taken by the operator to accomplish this task? (.25)

A. Insert the manual bypass key and turn to bypass channel A.

B. Reset the RCS High Pressure Trip Bistable.

C. Verify the RPS channel A Reactor Trip module lamp is dim.

D. Verify the RP Channel "A" Trip Bypass statalarm on and the RP channel "A" trip statalarm off.

16. SRO ONLY

The RPS "High RCS Pressure" trip is designed to provide protection from a... (.25)

A. loss of all FDW.

B. loss of all RCS flow.

C. rod ejection at power.

D. slow rod withdrawal accident at power.

17. Analog points that are read from the Operator Aid Computer are...(.25)

A. considered safety related when they are fed directly from safety related transmitters.

B. not considered safety related.

C. considered safety related when they are fed from either ICCM Train "A" or "B".

D. not considered safety related, except during emergency situations.

18. Core subcooling margin displayed on the ICCM monitors is calculated from loop wide range pressure and the average of: (.25)

A. all CETC's.

B. all 24 qualified CETC's for ICCM.

C. the 5 hottest CETC's for that train.

D. the 12 qualified CETC's for that train.

19. The MDEFDWP hotwell suction modification was implemented to... (.25)

A. allow the hotwell level to be drawn down to 12 inches when supplying suction to the MDEFDWP'S.

B. increase the amount of water available as suction for the MDEFDWP's.

C. allow taking a suction from the hotwell with the MDEFDWP's without breaking vacuum.

D. decrease the time required to establish the flow path from the hotwell, by eliminating all manual valve operations.

20. If "Bypass" is selected with the Shutdown Bypass key switch on one RPS Channel during full power operation: (.25)

A. the breaker associated with that RPS Channel will open.

B. that RPS Channel will trip.

C. the channel will trip and its associated breaker will open.

D. the channel becomes inoperable.

SRE11 TEST KEY

	Answer	Bank #	QT	Category 1
1.	B	PART-A 39	MC	TS 3.5.1.
2.	C	PART-A 136	MC	SAE-R13
3.	C	PART-A 139	MC	HPI
4.	D	PART-A 30	MC	PT/600/01
5.	C	PART-A 35	MC	OP/1103/20
6.	A	PART-A 36	MC	SAE-R13
7.	C	PART-A 37	MC	EOP 505
8.	A	PART-A 196	MC	AP/1700/15
9.	A	PART-A 203	MC	SF-102
10.	C	PART-A 240	MC	OP/1102/04
11.	A	PART-A 197	MC	SAE-R19
12.	A	PART-A 198	MC	TS 3.5
13.	D	PART-A 202	MC	AP/1700/14
14.	A	PART-A 434	MC	RPS
15.	B	PART-A 420	MC	RPS
16.	D	PART-A 410	MC	RPS
17.	B	PART-A 454	MC	RCI
18.	C	PART-A 284	MC	RCI
19.	B	PART-A 480	MC	EFW
20.	B	PART-A 435	MC	RPS

SRE11 FEEDBACK REPORT

1. B
2. C
3. C Ref: PNS-020 DELETED 5/91
4. D
5. C
6. A
7. C
8. A
9. A Ref: PNS-020 DELETED 5/91
10. C
11. A
12. A
13. D
14. A
15. B
16. D
17. B
18. C
19. B
20. B

PTRQ 1992 - WRITTEN EXAM

TEST NO: PART-B

NAME _____ EXAM 07/27/92

SSN _____ GRADE _____

GRADED BY _____ DATE _____

REVIEWED BY Paul M Stovall DATE 7/23/92

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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 and have turned in your completed examination, leave the examination area.

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* _____
(Trainee Signature)

PART-B2 TEST KEY

	Answer	Bank #	QT	Category 1
1.	D	PART-B 354	MC	OMP 2-6/SD3.3.1
2.	B	PART-B 245	MC	PT/600/01
3.	B	PART-B 323	MC	OP/2/1102/02
4.	C	PART-B 246	MC	OP/1104/49
5.	B	PART-B 196	MC	OP/1103/11
6.	B	PART-B 319	MC	OP/1104/02
7.	C	PART-B 107	MC	OP/1502/07
8.	B	PART-B 395	MC	AP/1700/19
9.	B	PART-B 157	MC	OP/1502/07
10.	D	PART-B 84	MC	OMP 2-7
11.	B	PART-B 265	MC	SD 4.2.3
12.	B	PART-B 8	MC	TS 3.1.5
13.	C	PART-B 414	MC	OP/1106/31
14.	D	PART-B 454	MC	LPI
15.	B	PART-B 179	MC	OP/1106/01
16.	C	PART-B 341	MC	AP/1700/25
17.	C	PART-B 377	MC	EOP E20
18.	A	PART-B 70	MC	AP/1700/13
19.	A	PART-B 282	MC	AP/1700/19
20.	C	PART-B 375	MC	AP/1700/22
21.	D	PART-B 238	MC	EOP 503
22.	D	PART-B 207	MC	EOP 602
23.	A	PART-B 288	MC	AP/1700/19
24.	B	PART-B 61	MC	EOP 506
25.	D	PART-B 80	MC	OP/1600/04
26.	B	PART-B 223	MC	OP/1102/10
27.	D	PART-B 46	MC	EOP 601
28.	C	PART-B 56	MC	EOP 504
29.	A	PART-B 191	MC	OP/1103/11
30.	B	PART-B 437	MC	RPS
31.	C	PART-B 431	MC	OP/1107/04
32.	C	PART-B 353	MC	CCW
33.	B	PART-B 432	MC	AP/1700/23
34.	C	PART-B 346	MC	AP/1700/03
35.	B	PART-B 195	MC	OP/1103/02
36.	B	PART-B 120	MC	SLC 16.11-3
37.	D	PART-B 336	MC	OP/1102/04
38.	B	PART-B 367	MC	AP/1700/25
39.	A	PART-B 427	MC	AP/1700/07

1. An NLO has the need to enter a "High Radiation Area". The general area is 200 mrem/hr. The NLO should: (.25)

   A. wear an operable alarming dosimeter.

   B. wear an operable alarming dosimeter and pocket dosimeter.

   C. contact RP to determine the need for High Range Dosimeter and permission to enter the area.

   D. wear an operable alarming dosimeter, pocket dosimeter and a TLD.

2. Unit 1 is operating at 98% power when I & E informs the Control Room that the "High Pressure" bistable for RPS channel "A" is inoperable. Channel "B" contains a dummy bistable.

   Which one of the following describes how to trip channel "A" and the unit's operating status following this action? (.25)

   A. Trip any appropriate bistable. Immediate unit shutdown is not required. One channel tripped and one channel in bypass for testing is allowed for up to four hours.

   B. Place an instrument channel in TEST-OPERATE. Immediate unit shutdown is not required. One channel tripped and one channel in bypass for testing is allowed for up to four hours.

   C. Place an instrument channel in TEST-OPERATE. Immediate unit shutdown is required because the minimum operable channels is not met.

   D. Trip the associated RPS breaker. Immediate unit shutdown is not required because a tripped channel is considered operable.

3. Immediately following a reactor trip, the Turbine Bypass Valves are manually throttled to lower main steam pressure to reseat a stuck-open Main Steam Relief Valve. Main steam pressure has to be lowered to 920 psi to reseat the relief valve. Is a Shutdown Margin Calculation required? Explain your answer. (.25)

   A. Yes. Shutdown Margin has to be calculated following any abnormal steam generator pressure reduction.

   B. No. As long as all rods are fully inserted.

   C. Yes. Shutdown Margin must be calculated due to the anticipated negative Xenon reactivity addition.

   D. No. Unless the Moderator Temperature Coefficient was positive, in which case the Shutdown Margin should be verified.

4. A plant startup is in progress on Unit 1. The present plant conditions are:

   - RC temperature = 242°F
   - RC pressure = 320 psig
   - Heatup rate = .65°F/min
   - Pressurizer level = 280 inches
   - 1A1 RCP is operating

   Why is this not an acceptable operating status? And determine the proper course of action to obtain an acceptable operating condition. (.25)

   A. Pressurizer level is limited to ≤ 220 inches at this pressure and temperature. Stop the heatup and establish an acceptable RCS pressure and PZR level within four hours.

   B. NPSH is not established for RCP operation. Immediately stop the RCP and establish the minimum required NPSH.

   C. Pressurizer level is limited to ≤ 260 inches at this pressure and temperature. Stop the heatup and establish an acceptable RCS pressure and PZR level within one hour.

   D. The heatup rate is not acceptable. The rate should be reduced to .45°F/min. to prevent exceeding the maximum heatup rate allowed.

5. After the RCS has been drained to the desired level, you inform Health Physics, per Operations procedure, to make new RB surveys. The HP Technician tells you that new surveys are not necessary since the RB general environment radiation levels will decrease due to removing the radioactive reactor coolant. Do you agree or disagree with the HP Technician? (.25)

   A. Agree. All levels decrease.

   B. Disagree. Radiation levels could increase in certain areas of the Reactor Building.

   C. Agree. Draining system makes no difference.

   D. Disagree. All levels increase.

6. The "A" HPI pump is being run for testing after maintenance. The pump has been running for thirty-five (35) minutes total time, and twenty (20) minutes with the discharge valve throttled. The motor amps, motor bearing temperatures and recirculation flow temperatures have just started a slow increase from previously being stable, which you consider to be abnormal. What action should be taken to correct the temperature rises? Immediately throttle the... (.25)

   A. suction valve closed as required to return parameters to previous levels. If throttling does not restore parameters, stop the pump.

   B. discharge valve closed as required to return parameters to previous levels. If throttling does not restore parameters, stop the pump.

   C. discharge valve open as required to return parameters to previous levels. If throttling does not restore parameters, stop the pump.

   D. suction valve open as required to return parameters to previous levels. If throttling does not restore parameters, stop the pump.

7. SRO ONLY

During fuel handling operations, the Reactor Operator lowers a fuel assembly into the core and reports to the Control Room a hoist tape reading 1½ inches higher than the referenced tape reading. Based on this tape reading, you direct the Bridge Operator to: (.25)

A. disengage from the fuel assembly and report to the next core position.

B. raise the fuel assembly approximately one foot; shake the mast cable, while lowering the fuel assembly.

C. raise the fuel assembly, then re-try lowering it into position.

D. disengage from the fuel assembly, re-index the bridge, regrapple the fuel assembly, and re-try inserting it into position.

8. A switchyard isolation has occurred, and CT-1 experienced a transformer lockout. You notice that the EFW system has actuated, and that XSUR levels are 35" and increasing. You should: (.25)

A. take manual control of FDW-315 and 316, and reduce XSUR levels to 30" to prevent overcooling.

B. allow EFW to continue to feed up to 240" XSUR.

C. take manual control of FDW-316 and 316, and reduce OTSG levels to 25" SUR to stop overfeed.

D. allow MFW to feed to 50% Operating Range.

9. An NLO, working in Unit 1 reactor building during a refueling shutdown, is asked by I&E to move the main fuel bridge which they are working on. Is the NLO allowed to operate the main fuel bridge? (.25)

A. No, required to be a qualified bridge operator holding an RO or SRO license.

B. Yes, if he is a qualified bridge operator.

C. No, only licensed RO's can operate the bridge.

D. Yes, provided he is not moving fuel.

10. If the incore chart recorder for Unit 1 in the SSF Control Room becomes inoperable, with Unit 1 at 100% power and Units 2 & 3 at cold shutdown, what action is required? (.25)

    A. The recorder must be repaired within 7 days or Unit 1 must be brought to Hot Standby.

    B. The recorder must be repaired within 7 days or Unit 1 must be brought to Hot Shutdown.

    C. No immediate action is required, but a letter must be sent to the NRC within thirty (30) days.

    D. No immediate action is required.

11. An inoperable fire barrier in the Unit 2 Equipment Room requires a fire watch until the barrier is repaired. The fire detection instrumentation in the area IS operable. If the last fire watch tour in the area was made at 0815, the latest the next tour may be performed, without exceeding the maximum allowable time between tours is: (.25)

    A. 0915

    B. 0930

    C. 0945

    D. 1015

12. Chemistry notifies the control room reactor operator of the following sample results on Unit 1, during a unit startup:

- RCS O_2 - .15ppm
- RCS CL^- - .10ppm
- RCS FL^- - .05ppm

The present RCS temperature and pressure is:

- 190°F
- 300 psig

The present time is 0800. What is the maximum RCS temperature you could reach at 0900? (.25)

A. 200°F

B. 235°F

C. 250°F

D. 280°F

13. RO ONLY

Determine the magnitude of a Steam Generator tube leak on Unit 1, given the following conditions: (.25)

- 1.15 X 10^6 cpm on 1RAI40
- CSAE off-gas flow 5 scfm
- RCS activity .75 µci/ml (Xe 133 + 135)

A. 0.016 gpm

B. 0.16 gpm

C. 1.6 gpm

D. 16.0 gpm

14. RO ONLY

A Load Shed has occurred concurrent with a LOCA, and the "B" LPI pump failed to start. To start the "C" LPI pump, the operator must: (.25)

A. reset the Load Shed by depressing both reset buttons simultaneously, then start the pump.

B. take manual control of the Load Shed circuit on ES channels 1&2, and start the pump.

C. depress both MFB Monitor Panel reset buttons simultaneously, then start the pump.

D. wait about five (5) seconds after the Load Shed, and start the pump.

15. RO ONLY

The unit is operating at 100% with 880 MWE/200 MVAR loaded on the main turbine generator. The Charlotte dispatcher has just requested that the unit load be decreased to 600 megawatts, due to the light holiday system load. Concerning generator operation, what, if any, is MVAR limit during transient? (.25)

A. 200 MVAR's

B. 150 MVAR's

C. 50 MVAR's

D. 30 MVAR's

16. RO ONLY

A fire on Unit 2 has caused a total loss of HPI. During your mitigation of this transient, valve SSF-2SF-82 (RC Makeup Suction Valve) does not open. What action will you take? (.25)

A. Override the RC Makeup Pump start switch.

B. Send an NLO to manually open the valve.

C. Trip the RC makeup pump.

D. Throttle the discharge valve to approximately 8 GPM.

17. The EOP Subsequent Actions maintains pressurizer level constant at approximately 100 inches. Which is NOT a reason for this action? (.25)

A. Ensure pressurizer heaters are available.

B. Limit RCS pressure increase during the refill.

C. Ensure adequate steam space volume for shutdown transients such as inadvertent ES actuation.

D. Limit the amount of pressurizer subcooling that occurs during refill.

18. Unit 1 was operating at 100% power when a tremor is felt by everyone in the control room. The following statalarms are received:

- "Seismic Trigger"
- "CCW Lake Level Low"
- "V Cond Vacuum Low"

The reactor and main turbine trip immediately after these alarms are received. What actions will you take to maintain an adequate supply of cooling water to the TDEFWP and HPI motors? (.25)

A. The Jockey Pump is cycled on and off.

B. Cycle one of the HPSW pumps on and off.

C. Maintenance will use a portable submersible pump.

D. Pumper trucks from nearby fire departments will be utilized to supply water.

19. Following a loss of Main Feedwater, EFW Flow is being controlled manually with 1FDW-315 and 316 from the control room. The TDEFWP is operating. The pneumatic lines to the valve actuators on 1FDW-315 and 1FDW-316 have been sheared.

The following conditions are noted:

- RCS temperature decreasing rapidly.
- RCS pressure decreasing rapidly.
- SG filling rapidly.
- MDEFWP's are out service.

What actions, if any, are required to mitigate this condition? (.25)

A. Establish EFDW flow through the SU Control Valves.

B. Dispatch an NLO to throttle EFW flow manually at the pump discharge.

C. Trip all EFWPs and feed the SGs with the CBPs.

D. Verify auxiliary steam is lined up to the TDEFWP, then throttle steam to the pump.

20. RO ONLY

The reactor operator sends an NLO to open valve CC-8, following a loss of IA. The NCO & NLO must understand that: (.25)

A. a special jacking pin is required from the tool room.

B. a "white tag" must be attached to the valve.

C. the NLO must remain with this valve until closed.

D. the air regulator must be isolated and air pressure bled off before opening the valve.

21. A steam line break outside of containment has caused a reactor trip from rated power due to the cooldown and depressurization. Evaluate the following data and determine if operation in the TSOR is required. (.25)

- Tc = 495°F
- 2 RCP's are operating.
- 1HP-26 is throttled open to recover the pressurizer level.
- "A" and "B" HPI Pumps are operating.

A. No. The HPI System is not in the injection mode.

B. Yes. RCS temperature (Tc) is less than 500°F.

C. Yes. The HPI System is operating in the injection mode with two HPI pumps.

D. No. The RCP's are operating, therefore, not required because a 100°F change in Tc has not occurred.

22. SRO ONLY

A SBLOCA that saturates the RCS has occurred on Unit 1. The BWST depletes prior to RCS pressure decreasing below the shutoff head of the LPI pumps. Describe the procedural guidance (major steps) provided to continue the plant cooldown from this point. (.25)

A. Open PORV and RCS high point vents and blowdown to LPI; establish greater than 1000 gpm, LPI flow, per header.

B. Transfer suction to SFP; maintain 100°F/hour cooldown rate to LPI.

C. Initiate a rapid RCS Cooldown to LPI using both SGs.

D. At 10 feet in BWST, align LPI to discharge to HPI; at 6 feet in BWST, align LPI suction to RB emergency sump and isolate BWST.

23. Following a total loss of feedwater, the Steam Generators have been fed by the units' Condensate Booster Pumps. The NLO has just called to say that EFDW has been lined up from another unit and is ready for use. The following conditions exist at the present time:

- RCS pressure - 2155 psig
- RCS temperature - 532°F
- SG pressure - 500 psig
- Incore thermocouples - 530°F to 540°F

What should steam generator pressure be controlled at when EFDW is restored? (.25)

A. Saturation pressure for 532°F

B. Maintain present SG pressure, 500 psig.

C. 1010 psig

D. Determined by the discharge pressure of the EFWP

24. Following a loss of Main Feedwater (both MFWP's trip) from rated power, the reactor will not trip. The reactor operator sees also that all main turbine stop valves are open and the generator breakers are closed. The operator should: (.25)

A. allow the turbine to continue operating to help remove heat from the primary, while inserting control rods.

B. begin inserting control rods and trip both EHC pumps to trip the turbine-generator.

C. open the generator exciter field breaker to keep from motoring the generator, and begin emergency boration.

D. Reset a MFW pump or verify EFW has actuated and feed both SG's to 50% operating range.

25. A Nuclear Operator Technician finds an alarm bell sounding at the SSF CO_2 tank with the tank pressure reading 330 psig. What would be a likely cause for the elevated tank pressure, and at what point will the alarm bell be silenced? (.25)

A. The air temperature in the HVAC room has increased. The alarm bell should silence at approximately 325 psig decreasing.

B. The tank was probably overfilled by the CO_2 supplier. The alarm bell should silence at approximately 300 psig decreasing.

C. The tank's manual relief valve has failed to lift. The alarm bell should silence at approximately 320 psig.

D. The refrigeration unit has malfunctioned. The alarm bell should silence at approximately 325 psig decreasing.

26. RO ONLY

During a unit shutdown:

- What is the maximum allowable cool down rate?
- How do you control the cooldown to 532°F? (.25)

A. 45°F per hour by controlling the reactor shutdown rate.

B. 45°F in any one-half hour period by controlling the reactor shutdown rate.

C. 45°F per hour by controlling the reactor shutdown rate and adjusting the turbine by-pass valves.

D. 45°F per one-half hour period, controlling the cooldown rate by adjusting the turbine by-pass valve positions.

27. SRO ONLY

A transient on Unit 1, initiated five minutes ago, has resulted in a reactor trip and the following indications:

- RCS pressure is 46 psig.
- RCS Loop Subcooling Monitors indicate 0°F with a black background.
- RCS Core Subcooling Monitors indicate 6°F with a red background.

Should a transfer to the ICC section of the EOP be made at this time? (.25)

A. Should not be made since EFDW has not reached the XSUR loss of SCM level yet.

B. Should be made because the core indicates superheated conditions.

C. Should be made because the only means of additional core cooling is addressed in ICC.

D. Should not be made since superheated conditions may exist until the core is reflooded.

28. SRO ONLY

Following isolation of a SG with a tube leak that does not involve HPI cooling, if subcooling margin is lost: (.25)

A. the SG should be unisolated and used to reestablish subcooling margin.

B. this is an indication of multiple tube failures, and a transfer back to Subsequent Actions should be made to reassess the isolation.

C. this is an indication that a SBLOCA may have also occurred, and a transfer to the SG Cooldown With Saturated RCS section of the EOP should be made.

D. this is to be expected, since subcooling margin is maintained as low as possible to reduce primary to secondary leakage.

29. SRO ONLY

What is the purpose behind the "Requirements for reducing Reactor Vessel level less than 50 inches on LT-5," in the Unit 1 procedure "Drain and Nitrogen Purging of the RCS", Enclosure 3.7? (.25)

A. The requirements ensure faster recovery of LPI decay heat removal and limits the possibility of loss of LPI DHR during drained down conditions.

B. These requirements ensure that at least two independent and diverse means of decay heat removal are always available.

C. These requirements ensure that adequate inventory is available for repressurizing and using steam generators for decay heat removal.

D. These requirements ensure that adequate inventory is available for repressurizing and starting RCP's in the event 4160 volt power is lost.

30. SRO ONLY

The basis for having the "Both FWP's Tripped to Reactor Trip Anticipatory Trip" is to: (.25)

A. back-up the High Pressure Trip.

B. prevent challenging the PORV.

C. back-up the High Temperature Trip.

D. maintain DNBR > 1.3.

31. Unit 1 is operating at rated power. 1DIC inverter has been swapped to AC line (KRA), and the inverter has been shutdown for I&E to perform maintenance on the inverter. I&E requests that the inverter output circuit breaker be opened. The opening of the inverter output circuit breaker: (.25)

A. should have already been performed when the inverter was shutdown by procedure.

B. is not allowed above 250°F or 350 psig RCS temperature or pressure.

C. will de-energize 1KVIC panelboard.

D. will de-energize 1DIC panelboard.

32. Following a station loss of electrical power that lasted until Keowee Unit 1 re-energized the main feeder buses through CT-4, the Emergency CCW system actuated. To secure the Emergency CCW system without causing a loss of prime: (.25)

A. throttle closed 1CCW-1 through 6, then close CCW-8.

B. close 1CCW-1 through 6, 2CCW-7 and 3CCW-93; then close CCW-8.

C. throttle closed 1CCW-1 through 6, 2CCW-7 and 3CCW-93; then close CCW-8; then close the other valves fully.

D. close CCW-8 then close 1CCW-1 through 6, 2CCW-7 and 3CCW-93.

33. Unit 1 is operating at 75% power when the reactor trips and all ICS manual and automatic control indications deenergize. Which of the following actions must be taken to restore power to the Integrated Control System? (.25)

A. Verify the breaker for Auto Power in the back of ICS Cabinet #4 "ON"; verify breaker #25 (ICS Auto Power) in 1KI Power Panelboard "ON."

B. At the Static Inverter Bypass Switch Cabinet for 1KI inverter, open switches #1 and #3, close switch #2.

C. At 1KI inverter, move the Manual Bypass Switch (S1) from the "Normal Operation" position to the "Alternate Source to Load" position.

D. Verify the breaker for Hand Power in the back of ICS Cabinet #4 "ON"; verify breaker #1 (ICS Manual Power) in 1KI Power Panelboard "ON."

34. Unit 1 is at 70% power with three RCPs operating. An inadvertent deboration of the RCS occurs. The result is reactor power at 70% power and control rod group seven position at 10% withdrawn. What action is required? (.25)

A. Contact the reactor engineer prior to any rod motion.

B. Immediately begin inserting rods to shut down the reactor.

C. Borate the control rods back to allowable limits.

D. Begin withdrawing rods back within the insertion limits to provide proper SDM.

35. As you enter the Control Room, the NCO tells you that CRD-9 has just been vented. When you question how long the RCS CRD venting has been in progress, you are told, "approximately ten (10) minutes". You are concerned since CRD-9....? (.25)

    A. is one of the first to be vented that venting CRDM's will take an inordinate length of time to complete.

    B. is one of the last to be vented that venting CRDM's is not being performed in sequence.

    C. has permanent venting installed and should not be tampered with.

    D. has no vent, therefore, the NCO and reactor building NLOs are not communicating.

36. A containment purge, using the main purge fan, is in progress on Unit 1 at cold shutdown. The reactor operator notices that the Containment Purge Effluent Flow Rate Monitor is indicating zero. Investigation by I&E determines that the monitor is inoperable. Determine the appropriate action concerning the purge release. The effluent release.... (.25)

    A. may continue since HP has already determined containment activity.

    B. may continue, provided the flow rate is estimated at least once per four (4) hours.

    C. must be stopped immediately.

    D. may continue, provided the flow rate is monitored continuously and estimated at least once per hour.

37. The unit has been shutdown for the last ten (10) days while repairing 1A2 RCP seal package. When the seal first indicated a problem, reactor power was reduced to 75% from the 100% power level it had been operating at for two weeks and the unit was operated for another three (3) days at 75% power. At that time the unit was brought to cold shutdown. Now the unit is ready to restart. Which of the following is the conditioned power level? (.25)

A. 50%

B. 75%

C. 90%

D. 100%

38. What is the bases for waiting two (2) hours before diverting SSF diesel generator service water discharge flow to the yard drains? (.25)

A. preventing D/G high temperature trip.

B. maximizing available CCW inventory.

C. maintaining emergency CCW gravity flow.

D. maintaining SSF HVAC operability.

39. Plant conditions on Unit 1 are as follows:

- The reactor has been shutdown for 22 days, for Turbine Generator repair, following a 200-day run at full power.
- The reactor has been in cold shutdown on decay heat removal for 20 days.
- 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 Uncover is expected to occur? (.25)

A. 5.0 hours

B. 6.2 hours

C. 7.2 hours

D. 8.5 hours