March 24, 1999

Mr. John P. Cowan, Vice President
Nuclear Operations
Florida Power Corporation
ATTN: Manager Nuclear Licensing (SA2A)
Crystal River Energy Complex
15760 West Power Line Street
Crystal River, FL 34428-6708

SUBJECT: NRC EXAMINATION REPORT NO. 50-302/99-301

Dear Mr. Cowan:

During the period February 8 through February 25, 1999, the Nuclear Regulatory Commission (NRC) administered operating examinations to employees of your company who had applied for licenses to operate the Crystal River Nuclear Plant. At the conclusion of the examination, the examiners discussed the examination questions and preliminary findings with those members of your staff identified in the enclosed report. The written examination was administered by your staff on February 15, 1999.

Of the five SRO applicants and six RO applicants who received the written examinations and operating tests, eight candidates passed the examination, representing a 73 percent pass rate. Operating procedural discrepancies were noted during the examination which impacted candidates' performance.

A Simulation Facility Report is included in this report as Enclosure 2. Post-examination comments are included as Enclosure 3. The NRC's response to the comments is included as Enclosure 4. A copy of the written examination questions and answer key as noted in Enclosure 5, was retained by your facility following administration.

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

Sincerely,

(Original signed by H. O. Christensen)

Harold O. Christensen, Chief
Operator Licensing and Human
Performance Branch
Division of Reactor Safety

Docket No. 50-302
License No. DPR-72

Enclosures:
1. Report Details
2. Simulation Facility Report
3. Licensee Post-Examination Comments
4. NRC Response to the Post-Examination Comments
5. Written Examination and Answer Key (SRO)
   (Document Control Desk Only)

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DATE	3/ 24/99	3/ 22/99	3/24/99	3/ 24/99	3/24 /99	3/ /99	3/ /99
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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.:	50-302
License Nos.:	DPR-72
Report Nos.:	50-302/99-301
Licensee:	Florida Power Corporation
Facility:	Crystal River Unit 3
Location:	15760 West Power Line Street Crystal River, FL 34428-6708
Dates:	February 8 - 11, 1999 and February 22 - 25, 1999 Written Examination - February 15, 1999
Examiners:	G. Hopper, Chief License Examiner J. Bartley, Resident Inspector Farley L. Mellen, License Examiner
Approved by	H. Christensen, Chief Operator Licensing and Human Performance Branch Division of Reactor Safety

Enclosure 1

EXECUTIVE SUMMARY
NRC Examination Report No. 50-302/99-301

During the period February 8 through 25, 1999, NRC examiners conducted an announced operator licensing initial examination in accordance with the guidance of Examiner Standards, NUREG-1021, Interim Revision 8. This examination implemented the operator licensing requirements of 10 CFR §55.41, §55.43, and §55.45.

Five senior reactor operator candidates and six reactor operator candidates received written examinations and operating tests. The NRC administered the operating tests during the weeks of February 8 and February 22, 1999. The licensee administered the written examination on February 15, 1999.

Operations

- The examiners found that the as-submitted written examination and operating tests met the requirements of NUREG-1021. The approved written examination questions were noted to be adequate test items for measuring candidate understanding of systems and administrative knowledge. (Section O5.1)

- The examiners concluded that RO candidate performance on the written examination was satisfactory with an average score was 85. SRO candidate performance was not as successful with an average score of 82. Overall performance on the operating test was satisfactory with isolated weaknesses noted in the area of EOP implementation. (Section 05.1)

- The examiners noted several procedural discrepancies which impacted candidate performance. Applicants were required to interpret procedural steps and work around procedural problems. These procedure problems are similar to those noted in examination report 50-302/98-301. (Section 05.1)

- Candidate Pass/Fail

	SRO	RO	Total	Percent
Pass	3	5	8	73%
Fail	2	1	3	27%

Report Details

Summary of Plant Status

During the period of the examinations, Unit 3 was at 100 percent power.

I. Operations

O5 Operator Training and Qualifications

O5.1 Initial Operator Licensing Examinations

a. Examination Scope

NRC examiners conducted regular, announced operator licensing initial examinations during the period February 8 through 25, 1999. The examiners administered examinations developed by members of the Crystal River training staff under the requirements of an NRC security agreement, in accordance with the guidelines of the Examiner Standards (ES), NUREG-1021, Interim Revision 8. Five SRO and six RO license applicants received written examinations and operating tests.

b. Observations and Findings

The examiners found that the level of difficulty of the licensee's initial examination submittal was adequate. However, the technical accuracy of the examination was in need of some improvement. The licensee addressed the deficiencies. The operating tests were validated during the week of January 25, 1999. The written examinations were finalized and approved the week of February 1, 1999.

The facility examination developers submitted 125 multiple choice questions for NRC examiner review. The examiners had comments where substance was a problem in the question; comments were to assure clarity in the question stem, ensure there was only one correct answer or to enhance the quality of the incorrect choices. These comments were appropriately addressed by the licensee. There were nine post examination comments on the written examination. Seven of the comments that were accepted resulted from an inadequate technical review. The licensee's examination review and validation process should have identified the questions with multiple correct answers or no correct answers prior to administration of the written examination.

The facility examination developers submitted three simulator scenarios and one spare for NRC review. The examiners found the simulator tests followed the guidelines of NUREG-1021. The malfunctions were logically sequenced to lead to the major plant transient and served as a valid measurement tool of the candidate's abilities. Minor changes were made to enhance the test items of each scenario.

The walkthrough examinations sets submitted by the facility examination developers contained job performance measures (JPMs) that generally met the guidelines of the ES and were of the appropriate level of difficulty. Minor JPM content additions were made to improve their usability by the examiners. The JPM follow-up questions were adequate; they represented an acceptable level of difficulty. The answer key for several of the followup questions had incorrect or only partially correct answers. These were corrected during the preparation week.

Examination Results and Conclusions

Eight of eleven candidates passed the examination. One RO candidate and two SRO candidates failed the written examination and all candidates passed the simulator/JPM portion of the operating test. The examiners determined that several candidates exhibited performance deficiencies on the administrative portion of the operating test. The specific weakness identified was in Radiation Control (Administrative Topic A.3). Five candidates failed to correctly calculate a stay time for a job. This time included the integrated transit time to and from the jobsite. In addition, three candidates were not able to correctly determine the required radiological posting for an area.

The examiners noted some generic candidate performance and procedural weaknesses during the simulator or plant walkthrough examinations. These are as follows:

1) Procedure and Performance Problems:

One of the prescripted followup questions following the JPM, " Depressurize RCS using Aux Spray," required the candidates to determine which portion of the Low Temperature Overpressure Protection (LTOP) system Technical Specification applied. The data in the question included a PZR level >135 inches and an inoperable PORV. Most of the candidates selected TS 3.4.11 Actions E and G. The correct answer was TS 3.4.11 Action I. The cause of this appears to be a poorly constructed TS table. Action H ends about halfway down page 3.4.21B. Action I is approximately 1/4 of a page long and is on the following page. Most of the candidates that failed this question did not notice that the table continued on the following page.

During the performance of a JPM for the Start an ECST release, the candidates were asked to use Enclosure 4 of OP-407A to determine the volume of the tank to be released. Five candidates did not understand the structure of the enclosure and determined the incorrect tank volume.

During the performance a JPM that required the recovery of a misaligned rod, candidate's encountered step 4.7.3.2 of OP-502. This procedural step had several problems. The first step detail read as follows:

-------<u>IF</u> power increases to greater than or equal to 60% RTP
<u>IF</u> Flux Imbalance/Quadrant Power Tilt approaches Limits
<u>Then</u> stop rod withdrawal and continue to the next step

There was no conjunction between the first two <u>IF</u> statements. Operators were unsure if only one of the substeps was necessary or if both were necessary to satisfy the <u>THEN</u> conditional statement.

The second step detail read as follows:

------<u>IF</u> power remains constant
<u>AND</u> limits for Flux Imbalance/Quadrant Power Tilt are <u>NOT</u> affected
<u>THEN</u> GO TO Step 4.7.37

This step followed the withdrawal of a control rod. Assuming fuel was present in the reactor core, it was not possible for the power to remain constant during the withdrawal of a control rod. This step transitioned operators past a step for comparison of API and RPI. Candidates were unsure of the actions necessary to satisfy the conditional logic for this step or were forced to circumvent the step because they knew the intent of the step.

This JPM also contained a question that dealt with two asymmetric rods. AI-505, Conduct of Operations During Abnormal and Emergency Events, Enclosure 1, Licensed Operator and STA Memory Items, section 2.2 required the operator to initiate a manual reactor trip if there are two or more asymmetric control rods. TS 3.1.4 ACTION C stated if more than one trippable CONTROL ROD is inoperable, or not within 6.5% of it's group average height or both, verify SDM within 1 hour OR initiate boration within 1 hour and be in mode 3 within 6 hours. Over 50 percent of the candidates failed to recognize this condition represented a procedurally required immediate manual reactor trip.

During the performance of JPM 12S, Lower Water Level in a RCDT, candidates were asked to perform a faulted JPM. The JPM required the candidates to stop a procedure and back out of the procedure, then proceed down an alternate release path. Several candidates were not familiar with the process of backing out of a procedure.

During the performance of JPM 3S candidates were expected to use AH-32-FIR. Several candidates did not know that the instrument was located on the Main Control Board.

2) Candidate Simulator Performance

During an Anticipated Transient without Scram event, seven of eight Candidates did not wait the required time to re-energize the busses that powered the CRD breakers. Eight of eight candidates did not perform the steps in the prescribed order. AI-505 stated that the steps should be performed in about 3 seconds. The engineering analysis required that there be a minimum of 3 seconds before the busses are re-energized. This time is required to ensure that the loads have shed from the busses before it is re-energized. The licensee initiated a precursor card to revise AI-505 and EOP-02.

During a loss of main and emergency feedwater event, one crew did not attempt to start FWP-7 when it was available. The crew went to HPI PORV cooling, when adequate heat transfer was still present due to steam generator level.

One crew had difficulty transitioning from EOP-6 to EOP-5. The crew went from EOP-6 to EOP-2, then back to EOP-6. The negative effects of this transition was that the crew did not isolate a steam generator that was required to be isolated by procedure.

The facility licensee submitted nine post-examination comments. These were submitted to the NRC by letter dated February 19, 1999 (FPC TRA-990009). The text of the comments is an attachment to this report. The licensee conducted a post-examination grading item analysis of both written examinations. This analysis identified 6 questions where there was a grade of less than 50 percent for the SRO candidates. Three of theses questions were modified or deleted. The remaining questions were reviewed. The licensee concluded the low success rate was due to the difficulty of the question and was not due to any generic weakness. The analysis identified 2 questions where there was a grade of less than 50 percent for the RO candidates. Both of these questions were modified or deleted.

c. Conclusions

The Examiners concluded that RO candidate performance on the written examination was satisfactory. The average score was 85. SRO candidate performance was not as successful with an average score of 82. Overall performance on the operating test was satisfactory with isolated weaknesses noted in the area of EOP implementation.

The examiners also noted several procedural discrepancies which impacted candidate performance. Applicants were required to interpret procedural steps and work around procedural problems. These procedure problems were similar to those noted in examination report 50-302/98-301.

V. Management Meetings

X1. Exit Meeting Summary

An exit interview was conducted on February 25, 1999 to reiterate the purpose of the site visit and to discuss the findings. The licensee had no comments and the examiner received no dissenting comments. No proprietary information was received.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

*C. Pardee, Director Plant Operations
*W. Young, Nuclear Operation Instructor
A. Kennedy, Nuclear Operation Instructor
M. Gallian, Nuclear Operation Instructor
*T. Taylor, Director Training
*G. Halnon, Director Quality Programs
D. Smith, Simulator Operator
*K. McCall, Training Manager
*L. McDougal, Manager Compliance
*R. Davis, Operations Assistant Director
*J. Terry, Operations Engineering Manager

NRC

*S. Sanchez, Resident Inspector

*Attended Exit Interview

INSPECTION PROCEDURES USED

NUREG-1021, Interim Rev. 8: Operator Licensing Examination Standards for Power Reactors

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

Discussed

None

LIST OF ACRONYMS USED

API	Actual Position Indication
CFR	Code of Federal Regulations
CRA	Control Rod Assembly
CRD	Control Rod Drive
CRG	Control Rod Group
ECST	Evaporator Condensate Storage Tank
EOP	Emergency Operating Procedure
ES	Examiner's Standard
JPM	Job Performance Measure
HPI	High Pressure Injection
KA	Knowledge and Ability
LCO	Limited Condition Of Operation
LPI	Low Pressure Injection
LTOP	Low Temperature Overpressure Protection
NI	Nuclear Instrument
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
OTSG	Once Through Steam Generator
PORV	Power Operated Relief Valve
PZR	Pressurizer
RCS	Reactor Coolant System
RCP	Reactor Coolant Pump
RO	Reactor Operator
RPI	Rod Position Indication
RTP	Reactor Thermal Power
SRO	Senior Reactor Operator
SDM	Shutdown Margin
STA	Shift Technical Advisor
TS	Technical Specification

SIMULATION FACILITY REPORT

Facility Licensee: Crystal River 3

Facility Docket Nos.: 50-302

Operating Tests Administered on: February 8 though February 25, 1999

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

While conducting the simulator portion of the operating tests, the following items were observed:

ITEM	DESCRIPTION
Feedwater Flow Modeling	One minor instance of a Feedwater flow modeling was identified during the administration of one JPM. This was quickly resolved.

POST-EXAMINATION COMMENTS

1. SRO/RO Exam SRO Question #11 RO Question #2

There were two parts to this question. The first part required the student to comprehend the plant conditions and recognize that the "VERIFY FWV-29 ON AUTO" alarm is an expected alarm during a power increase. The second part required the student to recall the percentage of valve movement required to clear the alarm. This is not information which the operator is required to know since FWV-29 is not a throttle valve, and therefore, the exact percentage of valve movement is not significant to plant operation in that the valve will go full travel when a command is received. This information is available to the operator in the control room from the AR however that reference was not provided to the student during the exam.

Recommendation: Accept choices "C" and "D" as correct answers.

2. SRO Exam Only SRO Question #20

The stem condition used to rule out Distractor "A" is as follows: "There are no reactor building leak annunciators in alarm." Additional research determined that the setpoint for this alarm requires the leak to have a value of > 50 gpm. The other stem conditions, which distinctly identify an SW leak in progress, do not contain sufficient information for the student to determine the magnitude of the leak. Unless the student assumes a leak size of > 50 gpm then Distractor "A" is also correct.

Recommendation: Accept choices "A" and "B" as correct answers.

3. SRO/RO Exam SRO Question #22 RO Question #35

This question was originally written to test knowledge of an interlock which is only applicable to the "A" ES train. During exam review prior to administration, the question was modified to address the "B" ES train. It was not recognized at that time that this change made distractor "D" correct in that DHP-1B, which is not affected by that interlock, would be running and therefore need to be secured along with the equipment in distractor "A"

Recommendation: Accept choices "A" and "D" as correct answers.

4. SRO/RO Exam SRO Question #38 RO Question #49

This question required the student to assess abnormal indications during fuel movement. The primary indications given were : (1) increased counts (doubled) on neutron detectors, (2) increased readings on rad monitors, and (3) bubbles in the area of the assembly being inserted. Two of the distractors were (1) fuel element damage and (2) a local criticality. Two of the conditions would be expected for either distractor: increased rad monitor reading and bubbles (either gas from the fuel assembly or steam). The third condition really doesn't fit either case. Inserting a fuel assembly into the core rarely if ever causes a doubling in count rate. In fact, our procedures require investigation and increased monitoring should this occur. On the other hand, if any criticality were to occur, counts should more than double. These options were discussed with the reactor engineer who stated that of the two choices he would have to pick fuel element damage. However, he added that the neutron count rate tended to make him doubt that choice and that he would not be able to rule out the possibility of a criticality since he had never seen counts double as a result of inserting a single assembly. In view of this, it is felt the this question placed the student in the position of making a "best guess" between two close but not entirely correct choices.

Recommendation: Either accept choices "A" and "B" as correct *or* delete the question.

5. SRO/RO Exam SRO Question #57 RO Question #33

This question required the student to determine if the PORV has cycled ***and*** to determine if the PORV has closed after the test. All of the distractors contained sufficient information to determine whether or not the PORV had opened. However the pressure and temperature values given in the distractors did not indicate a direction, i.e. increasing, decreasing or stable, which the student would need to specifically determine if the PORV had closed.

Recommendation: Delete this question.

After discussions with Mr. Hopper and Mr. Mellen on 2-22-99 it was determined that due to some of the students familiarity with SP-379 that Distractor C could also be a correct answer. From discussions with students who were familiar with this evolution they considered resetting the alarm to be integral with cycling the valve as this was the next step in the procedure section. Based on this information Distractor A or C should be considered as correct answers.

6. SRO/RO Exam SRO Question #70 RO Question #28

This question requires the student to analyze plant conditions and determine the electrical lockouts which would be required to be reset in order to load *both* EDGs on the ES buses. For the stem conditions given the 86DG lockout is the only possible choice for the "A" EDG.

With regard to "B" EDG, the "B" 4160V undervoltage lockout will be actuated, however this lockout will only prevent the offsite feeder breakers from re-energizing the bus. It will not prevent the "B" EDG breaker from re-closing and loading on the bus. There is no correct answer for this question.

Recommendation: Delete this question.

7. SRO/RO Exam SRO Question #80 RO Question #67

This question gave the student a set of plant conditions with a steady increase in RCS temperature. The student was required to select a possible explanation from the choices given. The correct answer per the key required the student to recognize that an increase in RWP-3A discharge pressure could result from fouling of the heat exchangers and therefore result in an increase in RCS temperature. Upon further review it was recognized that the increased discharge pressure could also be attributed to tide level which would not affect flow and therefore not affect RCS temperature. In addition, it was noted that response B could explain the temperature increase. This response was intended to be incorrect from the perspective that an increased delta temperature on the shell (cooling water) side of the heat exchanger would indicate increased heat transfer and therefore a reduction in RCS temperature. Upon review it was realized that a reduction in cooling water flow would also result in a larger shell side delta temperature, and also an increase in RCS temperature since more heat is removed per lbm of cooling water but with fewer total lbm the result is overall less heat removal from the RCS. *Distractor B was modified ~ 3 days prior to the date of the exam due to comments from two operators that were involved with the final time validation of the exam.*

Recommendation: Accept choices "A" and "B" as correct answers.

8. SRO/RO Exam SRO Question #49 RO Question #81

The reference material provided was inadequate to correctly answer this question. The students were supplied with a copy of Technical Specifications with only the LCO actions included. Additional information required to determine the operability of these components was located in the TS Bases, which were not provided.

Recommendation: Delete this question.

9. RO Exam Only RO Question #52

This question is based on a Limit and Precaution located in a fuel handling procedure. Limit and Precaution 3.2.14.5 supports Distractor "B" as the correct answer required by the key. Upon further review another Limit and Precaution, 3.2.14, located in the same procedure requires personnel to evacuate, even if there is a fuel assembly in the bridge mast, if the sounding of a radiation monitor alarm is present. This Limit and Precaution supports Distractor "A".

Recommendation: Accept choices "A" and "B" as correct answers.

NRC RESOLUTION OF FACILITY COMMENTS

1. SRO/RO Exam SRO Question #11 RO Question #2:

Recommendation partially accepted. Distractor C is incorrect because the alarm associated with FWV-29 is an alarm that is normal during a power increase. It is only in alarm during the initial pulse of the valve and clears after the valve is > 15% open. Distractor C cannot be accepted because it contains information which is not correct. (I.e. the alarm will stay in until FWV-29 is fully opened). However, upon further review it was determined that another K/A (059K6.03) associated with this question has a relative importance factor (1.9/2.1). This question lacks operational validity and was deleted from this examination.

2. SRO Exam Only SRO Question #20:

Recommendation accepted. Distractor A was also a correct answer. Information supplied to the NRC examination reviewers was incomplete. The reason for excluding Distractor A given was invalid. The answer key was changed to accept choices (a) and (b).

3. SRO/RO Exam SRO Question #22 RO Question #35:

Recommendation accepted. The review supplied by the licensee implied that this question was modified in the review process, from an "A" train failure to a "B" train failure. The question that was originally submitted was for the failure of the "B" train. The ROT-4-13 Table II Block 6 which was submitted for the examiners review stated that BSP-3B was armed and did not provide the status of BSP-1B. There is no BSP-3B installed at Crystal River. The logic diagrams associated with this question were reviewed. Based on this review the answer key was changed to accept choices (a) and (d).

4. SRO/RO Exam SRO Question #38 RO Question #49:

Recommendation not accepted. The question is not technically accurate. There are no completely correct answers. This question was deleted from this examination.

5. SRO/RO Exam SRO Question #57 RO Question #33:

Recommendation accepted. Based upon work practice instructions that were not supplied to the NRC examination reviewers Distractor C was considered an acceptable answer. The answer key was changed to accept choices (a) and (c).

6. SRO/RO Exam SRO Question #70 RO Question #28:

Recommendation accepted. Based upon the information supplied to the NRC examination reviewers the NRC examiners concluded there were no correct answers. During the exam comment discussions the NRC examination reviewers were assured that choice (a) was correct. The licensee's post examination review determined that there were no correct answers. This question was deleted.

7. SRO/RO Exam SRO Question #80 RO Question #67:

Recommendation accepted. Late in the review process the licensee requested a change to the written examination to remove a difficult distractor. The licensee replaced this distractor with one that in their post examination review, they found to be correct. The answer key was changed to accept choices (a) and (b).

8. SRO/RO Exam SRO Question #49 RO Question #81:

Recommendation not accepted. Choice (a) can be eliminated because the inverter is not operable until it is supplying the vital bus. Choice (b) and (d) can be eliminated because the vital buses are operable because they are aligned to their alternate power supply. ROT 4.91 learning objective B5 stated: given various plant conditions apply the following technical specifications: a 3.8.7, b 3.8.8, c.3.8.9, and d. 3.8.10,. The lesson plan further stated: Operability requirements for the inverters, operating and shutdown, are addressed in LCOs 3.8.7 and 3.8.8. The information necessary to answer this question was covered in this training. The logical synthesis of this information was required to answer this question. No additional information was necessary.

9. RO Exam Only RO Question #52:

Recommendation accepted. Information supplied to the NRC examination reviewers was incomplete. Choices (a) and (b) are both correct. The answer key was changed to accept choices (a) and (b).

MASTER

Master 99-301

CRYSTAL RIVER UNIT 3

1999

RO

WRITTEN EXAMINATION

Wednesday, March 31, 1999 @ 08:49 AM

Answer Key

Test Name: NRCNRO.TST
Test Date: Wednesday, January 27, 1999

		Question ID		Type	Pts	0	1	2	3	4	5	6	7	8	9
1:	1	ROT-5-01	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	~~2~~	~~ROT-4-14~~ Deleted	007	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	3	ROT-4-14	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	4	ROT-4-91	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	5	ROT-4-09	004	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	6	ROT-5-01	003	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	7	ROT-4-15	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	8	ROT-4-25	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	9	ROT-5-31	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	10	ROT-4-87	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	11	ROT-5-94	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	12	ROT-4-14	004	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	13	ROT-4-14	005	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	14	ROT-4-13	003	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	15	ROT-4-09	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	16	ROT-5-91	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	17	ROT-4-56	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	18	ROT-5-01	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	19	ROT-5-91	003	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	20	ROT-4-56	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	21	ROT-4-06	005	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	22	ROT-4-06	004	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	23	ROT-5-14	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	24	ROT-4-62	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	25	ROT-4-15	004	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	26	ROT-4-28	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	27	ROT-5-68	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	~~28~~	~~ROT-4-90~~ Deleted	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	29	ROT-4-12	003	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	30	ROT-4-13	004	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	31	ROT-5-60	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	32	ROT-4-06	003	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	33	ROT-4-60	004	MC-SR	1 C	A	B	C	D	A	B	C	D	A	B
1:	34	ROT-5-97	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	35	ROT-4-55	001	MC-SR	1 D	A	B	C	D	A	B	C	D	A	B
1:	36	ROT-5-90	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	37	ROT-5-61	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	38	ROT-4-59	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	39	ROT-4-62	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	40	ROT-4-09	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	41	ROT-4-89	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	42	ROT-4-25	004	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	43	ROT-4-06	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	44	ROT-4-52	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	45	ROT-4-12	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	46	ROT-4-68	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	47	ROT-4-09	005	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	48	ROT-5-96	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	~~49~~	~~ROT-4-26~~ Deleted	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	50	ROT-5-72	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C

Wednesday, March 31, 1999 @ 08:49 AM

Answer Key

Test Name: NRCNRO.TST
Test Date: Wednesday, January 27, 1999

		Question ID		Type	Pts	Answer(s) 0	1	2	3	4	5	6	7	8	9
1:	51	ROT-5-85	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	52	ROT-4-26	001	MC-SR	1 a&	B	C	D	A	B	C	D	A	B	C
1:	53	ROT-4-81	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	54	ROT-4-60	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	55	ROT-4-14	003	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	56	ROT-2-20	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	57	ROT-4-09	003	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	58	ROT-4-13	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	59	ROT-4-15	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	60	ROT-4-13	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	61	ROT-5-116	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	62	ROT-4-15	003	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	63	ROT-3-03	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	64	ROT-5-91	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	65	ROT-5-14	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	66	ROT-5-72	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	67	ROT-4-57	001	MC-SR	1 B&	A	B	C	D	A	B	C	D	A	B
1:	68	ROT-4-51	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	69	ROT-4-91	003	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	70	ROT-5-96	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	71	ROT-4-52	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	72	ROT-5-84	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	73	ROT-5-69	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	74	ROT-5-99	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	75	ROT-4-77	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	76	ROT-4-25	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	77	ROT-4-75	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	78	ROT-3-18	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	79	ROT-4-10	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	80	ROT-4-28	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	81	ROT-4-91	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	82	ROT-4-10	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	83	ROT-2-16	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	84	ROT-4-14	008	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	85	ROT-4-60	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	86	ROT-4-14	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	87	ROT-5-100	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	88	ROT-5-116	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	89	ROT-4-90	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	90	ROT-5-95	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	91	ROT-4-12	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	92	ROT-4-60	003	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	93	ROT-4-06	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	94	ROT-4-25	003	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	95	ROT-5-68	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	96	ROT-4-28	004	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	97	ROT-5-98	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	98	ROT-4-14	006	MC-SR	1	A	A	A	A	A	A	A	A	A	A
1:	99	ROT-4-28	003	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	100	ROT-4-69	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D

U.S. Nuclear Regulatory Commission
Site-Specific
Written Examination

Applicant Information

Name:	Region: II
Date: 2/15/99	Facility/Unit: FPC/CR-3
License Level: RO / SRO	Reactor Type: BW
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. The passing grade requires a final grade of at least 80.00 percent. Examination papers will be collected five hours, or as determined by the NRC Chief Examiner, after the examination starts.

Applicant Certification

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

____
Applicant's Signature

Results

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

Name: ______________________________

1. The following plant conditions exist:

   - A reactor trip has occurred.
   - All rods have *not* fully inserted into the core.
   - NI-3 and NI-4 indicate 5×10^{-7} amps and steady.
   - T_{ave} is 552° F.

   What Mode is the plant in for these conditions?

   A. Mode 1

   B. Mode 2

   C. Mode 3

   D. Mode 4

2. A power increase is in progress from 50% power. The "VERIFY FWV-29 ON AUTO" alarm has just annunciated.

Which of the following describes this plant condition?

A. This is *not* an expected alarm during a normal power increase. The Auto/Man toggle switch for FWV-29 must still be selected to the Manual position.

B. This is *not* an expected alarm during a normal power increase. FWV-29 should automatically open under these conditions.

C. This is an expected alarm during a normal power increase. This alarm will stay in until FWV-29 is fully open.

D. This is an expected alarm during a normal power increase. This alarm will stay in until FWV-29 is > 15% open.

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3. The following plant conditions exist:

- NI-5 indicates 73% reactor power.
- NI-6 indicates 75% reactor power.
- NI-7 indicates 76% reactor power.
- NI-8 indicates 74% reactor power.
- NI-5/6 selected for control.

Which of the following describes the expected plant response if NI-6 failed low?

A. The neutron power signal from RPS to ICS would be 76% power; SASS would transfer and select NI-7/8 for control; CRD system would initially insert control rods.

B. The neutron power signal from RPS to ICS would be 76% power; SASS would not transfer; CRD system would initially withdraw control rods.

C. The neutron power signal from RPS to ICS would be 73% power; SASS would transfer and select NI-7/8 for control; CRD system would initially insert control rods.

D. The neutron power signal from RPS to ICS would be 73% power; SASS would not transfer; CRD system would initially withdraw control rods.

4. With the plant at 100% power a catastrophic failure of VBIT-1C rendered itself inoperable and caused both of the VBXSs that it feeds to fail as is and not transfer to their alternate power supply.

Which of the following describes the EOP/AP action(s) that should be taken?

A. AP-581, Loss of NNI-X, should be entered.

B. AP-582, Loss of NNI-Y, should be entered.

C. AP-430, Loss of Control Room Alarms, should be entered.

D. Trip both MFW pumps and the reactor due to the loss of ICS power. EOP-2, Vital System Status Verification, and Rule 3, EFW Control, should be entered.

5. The following plant conditions exist:

- The plant is at 100% power.
- The turbine is selected to the "A" steam header pressure transmitter for control.

Which statement below describes the expected ICS/SASS response to a low failure of the selected "A" turbine header pressure transmitter coincident with a *reactor trip*?

A. SASS will transfer the "A" header input to the turbine and bypass valves to the unaffected transmitter.

B. SASS will transfer the "A" header input to the turbine to the unaffected transmitter. The bypass valves will be demanded closed.

C. SASS will transfer the header input to the turbine and bypass valves to the "B" steam header pressure transmitter.

D. SASS will transfer the header input to the turbine to the "B" steam header pressure transmitter. The bypass valves will be demanded closed.

6. The plant is at 100% full power when the letdown radiation monitor, RM-L1, fails high. Chemistry is notified and, after sampling, returns with the following data:

   - Dose equivalent I-131 is 0.02 μCi/gm.
   - Reactor coolant gross specific activity is 150/E-bar μCi/gm.

   What technical specification action, if any, should be taken?

   A. Be in Mode 3 with Tave < 500° F in six hours.

   B. Verify dose equivalent I-131 within acceptable region and restore within 48 hours.

   C. Verify gross specific activity within acceptable region and restore within 48 hours.

   D. No technical specification action applies for these conditions.

7. The following plant conditions exist:

- A plant startup is in progress.
- A main steam line rupture downstream of MSV-55, MS supply to EFP-2, has occurred.
- "A" OTSG pressure is 540 psig.
- "B" OTSG pressure is 780 psig.

Based on the conditions above which of the following describes current plant configuration?

A. MSIVs on the "A" OTSG are open; MSIVs on the "B" OTSG are open; MFW is controlling the "A" OTSG at Low Level Limits.

B. MSIVs on the "A" OTSG are closed; MSIVs on the "B" OTSG are open; EFW is controlling the "A" OTSG at Low Level Limits.

C. MSIVs on the "A" OTSG are open; MSIVs on the "B" OTSG are open; MFW is controlling the "B" OTSG at Low Level Limits.

D. MSIVs on the "A" OTSG are closed; MSIVs on the "B" OTSG are open; EFW is controlling the "B" OTSG at Low Level Limits.

8. A small leak has just occurred in the Waste Gas Decay Tank area. Which of the following describes the *first* radiation monitor that should detect this leak and the automatic actuations that should occur?

A. RM-A4; trips AHF-10

B. RM-A3; trips AHF-11A/B and closes AHD-29 & 36.

C. RM-A3; trips AHF-11A/B, closes WDV-393, 394, & 395 (recycle isolation valves) and closes WDV-439 (common waste gas isolation).

D. RM-A11; closes WDV-393, 394, & 395 (recycle isolation valves) and closes WDV-439 (common waste gas isolation).

9. Step 3.34 of AP-990, Shutdown from Outside the Control Room, requires the performance of Enclosure 2, RSD Panel Log Readings. Natural Circulation is in progress with EFIC controlling OTSG level. The following data is recorded:

- OTSG 'A' Operate Level	91%
- OTSG 'B' Operate Level	92%
- T_{cold}	545°
- T_{hot}	572°
- $T_{incores}$	590°
- RCS Wide Range Pressure	1600 psig

Based on the above readings which of the following describes the condition of the RCS and EFIC level control?

A. Adequate Subcooling Margin does not exist. EFIC is controlling at the required level.

B. Adequate Subcooling Margin does not exist. EFIC should be controlling level at the Natural Circulation setpoint due to RCPs being secured.

C. Adequate Subcooling Margin does exist. EFIC is controlling at the required level.

D. Adequate Subcooling Margin does exist. EFIC should be controlling level at the Natural Circulation setpoint due to RCPs being secured.

10. Which of the following conditions best describes the configuration of selected Control Complex Ventilation system components after a RMA-5 Gas Actuation has occurred?

A. AHD-2C & 2E will be open.

B. The CC Normal Duty Supply Fans (AHF-17A/B) will trip.

C. The CC Ventilation system will be in the recirculation mode with a Normal Duty Supply fan (AHF-17A/B) running.

D. The selected Control Access Area Exhaust Fan (AHF-20A/B) will be running in fast speed.

11. A step in EOP-05, Excessive Heat Transfer, states:

> IF at any time ES systems have,
> OR should have actuated,
> THEN ensure ES equipment is properly aligned.

If reactor coolant pressure is 1450 psig and RB pressure is 4.5 psig which of the following indications and associated operator responses is in compliance with this step?

A. The decay heat inlet valve to the reactor coolant system, DHV-5, has a green ES status light and the control board operator rotates the valve's switch to open it.

B. The "B" Building Spray Pump, BSP-1B, has an amber ES status light and the control board operator rotates the pump's control handle to start it.

C. High pressure injection valve, MUV-23, has a green ES status light and the control board operator rotates the valve's switch to open it.

D. The "A" Decay Heat Closed Cycle Cooling Pump, DCP-1A, has an amber ES status light and the control board operator rotates the pump's control handle to start it.

12. The following plant conditions exist:

- Plant is at 30% power.
- A spurious turbine trip occurs.
- 'A' OTSG TBVs fail closed.

Which of the following describes expected plant parameters 10 minutes after the event? (assume no operator intervention)

A.	'A' OTSG pressure	1025 psig
	'B' OTSG pressure	885 psig
B.	'A' OTSG pressure	1025 psig
	'B' OTSG pressure	1010 psig
C.	'A' OTSG pressure	1010 psig
	'B' OTSG pressure	1010 psig
D.	'A' OTSG pressure	1010 psig
	'B' OTSG pressure	935 psig

13. Which of the following describes the direct signal that decreases condensate flow demand on a loss of one MFW pump at 80% power?

A. A signal from the deaerator high level interlock.

B. A runback signal from the ULD sub-section of the ICS.

C. A signal that compares existing CD flow with FW flow and hotwell level.

D. A signal that compares existing CD flow with FW flow and deaerator level.

14. The following plant conditions exist:

- A controlled plant shutdown is in progress.
- RCS pressure is 250 psig.
- RCS temperature is 200° F.
- An RCS leak occurs and you elect to manually actuate LPI.

Based on the above conditions what would be the expected status of DHP-1A & 1B?

A. Neither DHP will start.

B. Both DHPs will start immediately.

C. Both DHPs will start 15 seconds following the manual actuation in their normal block loading sequence.

D. The "B" DHP will start 15 seconds following the manual actuation in its normal block loading sequence. The "A" DHP will not start until five seconds later if EFP-1 is running.

15. The following plant conditions exist:

- Plant is at 100% power.
- The turbine is aligned to the 'A' OTSG for header pressure control.
- The selected steam header pressure transmitter fails rapidly to mid-scale.

Which of the following describes the expected plant response?

A. SASS will automatically transfer to the alternate transmitter. The TBVs from the "A" OTSG will close.

B. SASS will *not* automatically transfer. The TBVs from the 'A' OTSG will open.

C. A SASS mismatch alarm will annunciate but a SASS transfer will not occur. The turbine governor valves will close.

D. SASS will *not* automatically transfer. The turbine governor valves will open.

16. EOP-06, Steam Generator Tube Rupture, has the following step:

> IF condenser is available,
> THEN notify SPO to
> CONCURRENTLY PERFORM
> EOP-14, Enclosure 6, OTSG
> Blowdown Lineup

What is the basis for performing this step?

A. Provides a means of OTSG pressure control if steaming is not permitted.

B. Provides an additional means of OTSG pressure control if steaming is permitted.

C. Provides a path for OTSG inventory control if steaming is not permitted or is inadequate to keep up with the leak rate.

D. Provides a path for OTSG inventory control if steaming is permitted and is adequate to keep up with the leak rate.

17. The plant was operating at 100% power when a steam leak on the "A" steam generator occurred in the reactor building (RB). The following conditions exist:

- Reactor building pressure is 5 psig.
- Reactor coolant temperature (T_c) 490°F.
- RCS pressure 1400 psig and increasing.
- Pressurizer level is 10 inches.
- "A" steam generator is isolated.
- "B" steam generator is being fed from emergency feedwater and steamed through the atmospheric dump valve.

In this situation the nuclear services closed cycle cooling (SW) system is providing cooling water to:

A. Reactor coolant pumps and reactor building main fan assemblies.

B. Reactor coolant pumps and control rod drive mechanisms.

C. Reactor coolant drain tank and reactor building main fan assemblies.

D. Reactor coolant pumps only.

18. At 1600 the incore neutron flux detection system is declared inoperable. Power Range NIs indicate the following:

NI-5 = 85.0%	NI-7 = 95.0%
NI-6 = 89.5%	NI-8 = 93.5%

Which of the following is the calculated limiting Quadrant Power Tilt from the above NI readings?

A. + 6.3%

B. - 1.4%

C. + 4.7%

D. - 4.7%

19. With LPI established at > 1400 gpm in both lines a step in EOP-3, Inadequate Subcooling Margin, instructs the PPO to unlock and close the CFT isolation valve breakers. Where are these breakers located and what is the purpose for this action?

A. ES MCC 3A & 3B; to allow the control room operators to verify the valves are open to provide an additional source of makeup to the RCS.

B. ES MCC 3A & 3B; to allow the control room operators to close the valves to prevent nitrogen injection into the RCS after the tanks are emptied.

C. ES MCC 3AB; to allow the control room operators to verify the valves are open to provide an additional source of makeup to the RCS.

D. ES MCC 3AB; to allow the control room operators to close the valves to prevent nitrogen injection into the RCS after the tanks are emptied.

20. The following plant conditions exist:

- SWP-1C is in operation.
- An accident in the seawater room results in completely shearing off the SW surge tank suction line.

Which of the following describes the response of the SWPs?

A. SWP-1B auto starts and SWP-1C trips.

B. SWP-1B auto starts first; then SWP-1A auto starts and SWP-1C trips.

C. SWP-1A auto starts first; then SWP-1B auto starts and SWP-1C trips.

D. Both SWP-1A and SWP-1B auto start and SWP-1C continues to run.

21. A step in SP-354A, Monthly Test of EDG-1A, requires the PPO to ensure that the Speed Droop is set to '60' and the Unit-Parallel switch to 'Parallel'. Where would you direct the PPO to go to perform these functions and why are they necessary?

A. Both switches are located in the EDG-1A control panel; Speed droop setting is to allow sharing of real load; Parallel setting is to allow sharing of reactive load.

B. Speed droop switch is located on the engine governor and the Unit-Parallel switch is located in the EDG-1A control panel; Speed droop setting is to allow sharing of real load; Parallel setting is to allow sharing of reactive load.

C. Both switches are located in the EDG-1A control panel; Speed droop setting is to allow sharing of reactive load; Parallel setting is to allow sharing of real load.

D. Speed droop switch is located on the engine governor and the Unit-Parallel switch is located in the EDG-1A control panel; Speed droop setting is to allow sharing of reactive load; Parallel setting is to allow sharing of real load.

22. DPDP-1A is de-energized due to an internal fault on the bus coincident with a Loss of Offsite Power.

Based on these conditions which of the following describes the status of EDG-1A and the EFIC system?

A. EDG-1A will start and load on the bus; the 'A' and 'C' EFIC cabinet will lose power.

B. EDG-1A will start and come up to speed but will *not* energize the bus; the 'A' and 'C' EFIC cabinet will *not* lose power.

C. EDG-1A will start and load on the bus; the 'A' train EFIC control valves will fail full open.

D. EDG-1A will start and come up to speed but will *not* energize the bus; the 'B' train EFIC block valves will fail as is.

23. What is the policy for CR-3 Nuclear Operations for bypassing automatic safety system actuations? (10 CFR 50.54 X/Y has not been invoked)

A. Reactor Operators have the authority to immediately bypass inadvertent Safety System Actuations. Informing the Procedure Director is not required.

B. Reactor Operators have the authority to bypass automatic Safety System Actuations as required but must immediately inform the Procedure Director afterwards.

C. Reactor Operators must obtain approval from the Procedure Director prior to bypassing automatic Safety System Actuations for which there is no procedural guidance.

D. Reactor Operators must obtain concurrance from the Procedure Director prior to bypassing automatic Safety System Actuations as directed by approved plant procedures.

24. The following plant conditions exist:

- A large break LOCA is in progress.
- HPI, LPI, RBIC and BS have actuated.
- HPI, LPI and RBIC were bypassed following actuation.
- RB pressure is currently 15 psig.
- BSV-3 failed to automatically control and was taken to manual and closed.
- The HPI seal-in permit was reset and the "A" BS pump was secured.

Which of the following methods of BS flow control are available when BSV-3 is repaired and returned to service?

A. Manual only.

B. Remote/Auto only.

C. Local/Auto only.

D. Local/Auto and Manual.

25. During normal full power operation a circuit failure occurs which results in the "SV1/SV2 Test" white indicating light for MSV-411 to illuminate. Using this indication only which of the following choices best describes the status of the MSIV air supply system?

A. SV1 and/or SV2 have de-energized, MSIV-411 should close.

B. SV1 and/or SV2 have energized, MSIV-411 should close.

C. SV1 and/or SV2 have de-energized, MSIV-411 should not reposition.

D. SV1 and/or SV2 have energized, MSIV-411 should not reposition.

26. The following plant conditions exist:

- OP-209, Plant Cooldown, is in progress.
- RCS pressure is 450 psig.
- RCS temperature is 300° F.
- A failure occurs which results in de-energizing the CRD system.

Which of the following describes the impact, if any, of this failure on the CRD system?

A. Possible damage could have occurred to the stator assembly.

B. Possible damage could have occurred to the lead screw.

C. Possible damage could have occurred to the radial thrust bearing.

D. The control rods will insert at a slower rate than at normal system pressure and temperature.

27. The following plant conditions exist:

- Plant is at 70% power during three RCP operation.
- MFW Booster pump 1A suction valve receives a false signal and strokes 10% in the closed direction and then stops.

Which of the following describes the required operator actions for this condition?

A. Reduce power to 45%.

B. Manually trip one MFWP and reduce power to 45%.

C. Reduce power to 55% and manually trip MFW Booster pump 1A.

D. There will be sufficient flow through the valve since it is still 90% open. Troubleshooting efforts should be initiated immediately.

28. The following plant conditions exist:

- A LOOP has occurred.
- 'A' EDG did not start due to an electrical lockout.
- 'B' EDG initially started and loaded on the bus and then the output breaker tripped open for no apparent reason. The EDG engine remained at 900 rpm.

Which of the following describes the electrical lockouts, at a minimum, which must be reset if both EDGs are to be loaded on the ES buses?

A. 'A' EDG - 86DG, generator differential current lockout
'B' EDG - 4160V undervoltage lockout

B. 'A' EDG - 4160V undervoltage lockout
'B' EDG - 4160V undervoltage lockout

C. 'A' EDG - 4160V undervoltage lockout
'B' EDG - 86DG, generator differential current lockout

D. 'A' EDG - 86DG, generator differential current lockout
'B' EDG - 86DG, generator differential current lockout

29. The following plant conditions exist:

PARAMETER	DATA
Rx power	90%
Linear amp power range	top 45 bottom 45
RCS T_{hot}	601
RCS pressure	1955
RCS flow	1.47×10^8 lbm/hr
RB pressure	+0.5 psig
RCP monitor	A 8,300 kw B 7,100 kw C 9,500 kw D 8,000 kw
Turbine control oil	99 psig
MFW control oil	114 psig

Based on the above data which of the following parameter changes will require immediate entry into EOP-2, Vital System Status Verification? (consider each option independently)

A. Linear amp power range top 30 bottom 60

B. RCS pressure 1900 psig

C. RCP monitor B 2152 kw

D. Turbine control oil 50 psig

30. The following plant conditions exist:

- A LOOP has occurred.
- A steam leak in containment is in progress.
- RB pressure is 12 psig.
- RCS pressure is 600 psig.

Based on the above conditions which of the following describes the status of EFP-1, DHP-1A, DHV-5 and BSV-3? (assume all loads have sequenced on as designed)

A.	EFP-1	Running
	DHP-1A	Running
	DHV-5	Open
	BSV-3	Open
B.	EFP-1	Running
	DHP-1A	Off
	DHV-5	Open
	BSV-3	Open
C.	EFP-1	Off
	DHP-1A	Off
	DHV-5	Open
	BSV-3	Closed
D.	EFP-1	Off
	DHP-1A	Running
	DHV-5	Closed
	BSV-3	Open

31. The following plant conditions exist:

- Plant is in Mode 5.
- A Reactor Building purge is in progress.

If RM-A1 trips which of the following describes the automatic action(s) that will occur and the manual action(s) which should be taken?

A. AHV-1A, 1B, 1C, and 1D will automatically close; AHF-6A/6B should be manually shutdown.

B. AHV-1A, 1B, 1C, and 1D will automatically close; AHF-6A/6B & AHF-7A/7B should be manually shutdown.

C. AHF-6A/6B & AHF-7A/7B will automatically stop; AHV-1A, 1B, 1C, and 1D should be manually closed.

D. AHF-6A/6B will automatically stop; AHV-1A, 1B, 1C, and 1D should be manually closed and AHF-7A/7B should be manually stopped.

32. EOP-8, LOCA Cooldown, is in progress. HPI and LPI actuated as designed and recovery efforts are in progress. The NSS directs you to shutdown the EDGs. Which of the following methods should be used to shutdown an EDG in this situation?

A. Place the Normal/At Engine switch to At Engine and direct the primary plant operator to depress the reset pushbuttons in the EDG engine room.

B. Bypass or reset the ES actuation and direct the primary plant operator to depress the Emergency Stop pushbutton in the EDG control room.

C. Bypass or reset the ES actuation and depress the Stop pushbutton on the main control board.

D. Use the speed changer to decrease EDG load to approximately 100 kW and then depress the stop pushbutton on the main control board.

33. SP-379, PORV Exercise Test, is in progress with the following initial plant conditions:

- RCDT pressure is 2 psig.
- RCDT temperature is 90° F.
- RCDT level is 100".
- Tailpipe temperature is 100° F.
- RCS pressure is 700 psig.
- PZR level is 90".

Immediately after the PORV is cycled which of the following sets of conditions indicate that the stroke test was successful and the PORV is closed?

A. 'PORV Safety Valve Open' alarm is annunciated.
Tailpipe temperature is 320° F.
RCS pressure is 650 psig.

B. 'PORV Safety Valve Open' alarm is annunciated.
Tailpipe temperature is 220° F.
RCS pressure is 650 psig.

C. 'PORV Safety Valve Open' alarm is out.
Tailpipe temperature is 320° F.
RCDT temperature is 93° F.

D. 'PORV Safety Valve Open' alarm is out.
Tailpipe temperature is 220° F.
RCDT level is 103".

34. EOP-3, Inadequate Subcooling Margin, is in progress. Which of the following sets of conditions would require transition into EOP-7, Inadequate Core Cooling?

A. RCS pressure; 1965 psig
T_{hot}; 660° F
T_{incore}; 650° F
T_{cold}; 630° F

B. RCS pressure; 1875 psig
T_{hot}; 660° F
T_{incore}; 650° F
T_{cold}; 630° F

C. RCS pressure; 1705 psig
T_{hot}; 640° F
T_{incore}; 630° F
T_{cold}; 625° F

D. RCS pressure; 900 psig
T_{hot}; 550° F
T_{incore}; 552° F
T_{cold}; 540° F

35. The following plant conditions exist:

- A Loss of Offsite Power has occurred.
- RB pressure is 32 psig.
- RCS pressure 900 psig.
- Adequate subcooling margin does exist.
- A 480V overcurrent lockout has occurred on the 'B' bus.

Which of the following describes equipment that must be secured because of these conditions?

A. BSP-1B and MUP-1C.

B. RWP-2B and RWP-3B.

C. BSP-1B, MUP-1B and RWP-3B.

D. DHP-1B, MUP-1C, BSP-1B and RWP-3B.

36. Technical Specification 3.4.1, RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) limits, requires verification of RCS total flow every 12 hours. Which of the following describes the procedure and location where RCS total flow is read to meet this surveillance?

A. SP-225, Reactor Coolant Flow Measurement at Hot Full Power; Main Control Board ICS section.

B. SP-225, Reactor Coolant Flow Measurement at Hot Full Power; Main Control Board PSA section.

C. SP-300, Operating Daily Surveillance Log; Main Control Board ICS section.

D. SP-300, Operating Daily Surveillance Log; Main Control Board PSA section.

37. The following plant conditions exist:

- The plant is at 32% power.
- MUP-1B, SWP-1A, and RWP-2A are running.
- A failure in the 230KV switchyard caused the OPT feed from the switchyard to trip open but its normal feeder breaker to the ES bus did not open.

What is the appropriate operator response to this situation?

A. Trip the reactor and secure SW cooled components.

B. Ensure MUP-1B, SWP-1A and RWP-2A are still in operation.

C. Ensure SWP-1B and RWP-2B start; transfer MUP-1A to DC then start DCP-1A, RWP-3A; start MUP-1A.

D. Ensure SWP-1B and RWP-2B start; start DCP-1B, RWP-3B; align the makeup system to start MUP-1C; start MUP-1C.

38. You are about to start a release from ECST-A when you notice that there is a work request written on flow recorder WD-101-FR because of erratic indication. The SSOD gives his permission to perform the release with the recorder inoperable provided release rate data is taken every 15 minutes. At the start of the release ECST-A level is at 95%. The level is at 84% 15 minutes later. Which of the following was the release rate during this 15 minute period?

A. $\approx$ 25 gpm

B. $\approx$ 47 gpm

C. $\approx$ 62 gpm

D. $\approx$ 78 gpm

39. The ES Actuation System has failed to properly operate following a large break LOCA.

The following plant conditions exist:

- RCS pressure is 300 psig.
- Reactor Building pressure indicates 30 psig.
- No ES actuations have occurred.
- Health Physics reports detection of a severe containment release directly to the environment through a crack surrounding a penetration.

Which of the following actions would be the preferred method to reduce the radiation leakage to the environment?

A. Align both LPI/HPI suction from the RB sump and initiate flow.

B. Align RB purge using both supply and exhaust fans and initiate flow.

C. Start two RB fans in slow speed and initiate cooling.

D. Start two RB spray pumps and initiate cooling.

40. The following plant conditions exist:

- RCS temperature is 530° F.
- SASS alarm is annunciated.
- Approximately two minutes later two PZR level alarms annunciate (pressurizer level < 40" *and* level > 240").

Which of the following describes the probable cause for these indications?

A. RC-1-LT1 is failing high.

B. RC-1-LT1 is failing low.

C. RC-1-LT3 is failing high.

D. RC-1-LT3 is failing low.

41. With the plant operating at 65% power a 'Sudden Pressure' relay actuates on the Startup Transformer.

Based on the above which of the following electrical line-ups could be used to supply power to the 'A' Train PZR heaters?

A. MTDG-1; 4160V Rx Aux Bus 3; 480V Rx Aux Bus 3A.

B. EDG-1A; ES 4160V Bus 3A; ES 480V Bus 3A; 480V Rx Aux Bus 3A.

C. BEST; ES 4160V Bus 3A; ES 480V Bus 3A; 480V Rx Aux Bus 3A.

D. EDG-1B; ES 4160V Bus 3B; 480V Plant Aux Bus; 480V Rx Aux Bus 3A.

42. The following plant conditions exist:

- RCS temperature is 220° F.
- RM-A6 has been declared inoperable due to a blocked sample line in the ductwork of AHF-3B.

Which of the following action(s), if any, could be taken to ensure compliance with Technical Specifications?

A. No actions are required.

B. Start AHF-3A within 6 hours and repair the sample line within 30 days.

C. Start the back-up sample pump on RM-A6 and perform SP-317 every 24 hours.

D. Perform SP-317 every 24 hours and repair the sample line within 30 days.

43. Reactor Building pressure is 4.8 psig. Which of the following describes the status of the EDGs and the effect of protective relay actuation on the output breaker?

A. The EDGs are running with their 'Ready' lights illuminated. Actuation of the generator differential current relay will shut down the engine and trip or prevent closure of the output breaker.

B. The EDGs are running with their 'Ready' lights illuminated. Actuation of the exciter field short relay will shut down the engine and trip or prevent closure of the output breaker.

C. The EDGs are running with their 'Run' lights illuminated. Actuation of the generator differential current relay will shut down the engine and trip or prevent closure of the output breaker.

D. The EDGs are running with their 'Run' lights illuminated. Actuation of the exciter field short relay will shut down the engine and trip or prevent closure of the output breaker.

44. The following plant conditions exist:

- RCS pressure has decreased to 1450 psig.
- Reactor building pressure is 1 psig.

Which of the following describes the Makeup Tank level response and cause for the change?

A. Increases because of RCP Controlled Bleed Off return flow.

B. Decreases because of high pressure injection flow into the reactor core.

C. Increases because of Makeup pump recirc return flow.

D. Decreases because letdown flow is isolated.

45. The following plant conditions exist:

- The plant is at 50% reactor power.
- The ICS power supply monitor fails resulting in a loss of + 24 volt power.

What is the plant's response to this situation?

A. ATWS removes power from the safety rods and initiates EFIC.

B. AMSAC trips the main turbine and initiates EFIC.

C. DSS removes power from the regulating control rods.

D. RPS trips the reactor due to the loss of both MFW pumps.

46. Which of the following conditions will cause an automatic trip of both Main Feedwater pumps (FWP-2A & 2B) with the plant at 80% power?

A. Deaerator level of two foot.

B. Both suction valves are 75% open.

C. Lube oil pressure of ≤ 5 psig on one pressure switch.

D. 'A' OTSG pressure < 600 psig.

47. Which of the following describes how PZR level is controlled on a loss of NNI-X power?

A. A backup power supply will allow manual operation of MUV-31 following a loss of all NNI-X DC power.

B. A backup power supply will allow automatic operation of MUV-31 following a loss of all NNI-X AC power.

C. A loss of NNI-X AC or DC power will cause MUV-31 to fail closed. MUV-24 will be used for PZR level control.

D. A loss of NNI-X AC or DC power will cause the valve controller to swap to NNI-Y for control power.

48. The plant has experienced a reactor trip. While completing the follow-up actions of EOP-2, Vital Safety System Verification, you observe that control rod 1 in group 1 and control rod 3 in group 6 do not have their in-limit or 0% lights energized. API shows both control rods at about 20% withdrawn. Which of the following should be performed?

A. Open breakers 3305 and 3312.

B. Start boration using a boric acid storage tank and associated pump.

C. Start boration from a reactor coolant bleed tank with a concentration greater than reactor coolant.

D. Depress "HPI Manual Actuation" on Train A and B.

49. While placing a fuel assembly into the core the following is observed:

- Count rate doubles on the source range instruments.
- RM-G16, Radiation Monitor for the RB Fuel Handling Bridge, is in alarm.
- Bubbles are emerging from the core.

Which of the following could have caused the above conditions?

A. A fuel assembly has been damaged.

B. Inadvertant local criticality has occurred.

C. The instrument air line to the grapple mechanism has broken.

D. The standby decay heat removal train was placed in service.

Deleted

50. Twenty minutes prior to completion of defueling activities the Spent Fuel (SF) pool level was 158 feet. Defueling has now been completed and the following plant conditions exist:

- Spent Fuel (SF) pool level is 156 feet and decreasing.
- The SF pool low level annunciator is in alarm.
- The transfer tube valves are open.
- The auxiliary building sump level is increasing.
- All other building sumps are stable.
- SFP-1B is operating; SFP-1A is secured.
- Reactor building pressure is 1 psig.

Which of the following could stop the decrease in Spent Fuel pool level?

A. Close the transfer tube valves.

B. Secure SFP-1B.

C. Transfer SF heat exchangers.

D. Secure the reactor building purge.

51. The following plant conditions exist:

- A large steam line break on the "B" OTSG has occurred.
- The "B" steam generator has been isolated.
- Reactor coolant pressure is 1300 psig.
- Reactor coolant temperature is 532°F.

Based on the above conditions what is the function of HPI and when can it be throttled?

A. HPI is required for core cooling and can be throttled when low pressure injection through DHV-5 or 6 has been established for 20 minutes.

B. HPI is required for core cooling and can be throttled when heat removal through the "A" OTSG is established.

C. HPI is required to compensate for RCS contraction and can be throttled when the pressurizer level exceeds 40 inches.

D. HPI is required to compensate for RCS contraction and can be throttled when adequate subcooling margin is recovered.

52. During refueling operations the following radiation monitors come into alarm:

- RM-G17, Reactor Building Personnel Hatch.
- RM-G18, Reactor Building Incore Instrument Area.

Which of the following actions are required?

A. Secure refueling operations.

B. Secure the RB purge if in operation.

C. Perform the actions required in the ODCM.

D. Perform the actions required in Technical Specifications.

53. The following sequence of events have occurred:

- Instrument Air (IA) pressure drops to 70 psig.
- The air leak is then isolated.
- Air pressure recovers to 115 psig.

Which of the following describes the response of IAV-30 and required operator action(s), if any, to this sequence of events?

A. IAV-30 will close and automatically open when IA pressure increases above 80 psig.

B. IAV-30 will open and automatically close when IA pressure increases above 80 psig.

C. IAV-30 will close and must be manually reset and opened when IA pressure increases above 80 psig.

D. IAV-30 will open and must be manually reset and closed when IA pressure increases above 80 psig.

54. The following conditions are observed for the "A" Reactor Coolant Pump (RCP-1A).

- First seal cavity pressure is 2150 psig.
- Second seal cavity pressure is 1100 psig.
- Third seal cavity pressure is 1055 psig.
- Controlled bleed off flow has increased.
- Seal leakage flow has not changed.

Which of the following conditions would cause the above indications?

A. Seal number 1 has failed.

B. Seal number 2 has failed.

C. Seal number 3 has failed.

D. Restriction bushing has failed.

55. During operation at 60% power replacement of the signal generator which is supplying the RCS flow signal for the "A" RCP is required. Which of the following describes the control station(s) which must be taken to manual to prevent changing feedwater flow in either train during this evolution?

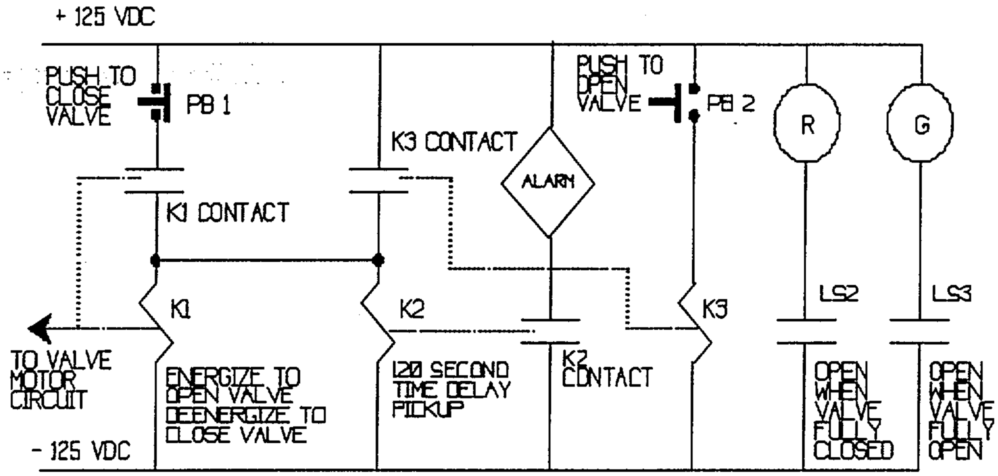
A. Load Ratio Hand/Auto station.

B. "A" Feedwater Master Hand/Auto station.

C. Both Feedwater Master Hand/Auto stations.

D. Both Low Load Control Valve Hand/Auto stations.

56. In the valve control circuit shown below the valve being controlled is initially closed.



Which of the following describes when the motor-operated valve will begin to stroke open? (Note: contacts are shown in standard "de-energized" condition.)

A. Immediately after PB2 is depressed.

B. At the same time the alarm actuates.

C. 120 seconds after PB2 is depressed.

D. Immediately after PB1 is depressed if contact #1 is closed.

57. The following plant conditions exist:

- Plant is at 100% power.
- RC-1-LT1 is selected for PZR level control.
- RC-1-LIR-1 and LIR-3 indicate 215" and steady.

The control room operator observes RC-1-LIR-1 decrease to 155" at ≈ 15" per minute. RC-1-LIR-3 is steady and normal makeup flow is unchanged.

Based on the above which of the following is the probable cause of these indications and the proper operator response?

A. RC-1-LT1 has failed. Swap to the alternate source per OP-501, Reactor Non-Nuclear Instrumentation, and return the transmitter to operable status within 30 days.

B. RC-1-LT1 has failed. SASS will automatically transfer to the alternate source. Initiate repair efforts and return the transmitter to operable status within 72 hours.

C. Temperature input to RC-1-LIR-1 has failed. Swap to the alternate source per OP-501, Reactor Non-Nuclear Instrumentation, and return the transmitter to operable status within 30 days.

D. Temperature input to RC-1-LIR-1 has failed. SASS will automatically transfer to the alternate source. Initiate repair efforts and return the transmitter to operable status within 72 hours.

58. With the plant at 100% power a spurious 'B' Train ES HPI actuation occurs. Which of the following describes an action which must be taken to restore normal plant operation?

A. Secure MUP-1B.

B. Secure MUP-1C.

C. Secure EFP-1.

D. Secure EFP-2.

59. The following plant conditions exist:

- The plant is at 100% power.
- A 'Sudden Pressure' lockout relay has actuated on the BEST transformer.

Which of the following describes the EFW and/or AFW automatic start signal(s), if any, for this condition?

A. No automatic start signal will be actuated for EFW or AFW.

B. Both EFPs will start due to the loss of all RCPs and both MFWPs .

C. FWP-7 and EFP-1 will start due to the loss of control power to MTDG-1 and the loss of all RCPs.

D. Both EFPs will start due to the loss of both MFWPs and the DSS signal generated due to the loss of FW flow.

60. Following an event in which RB pressure reached a maximum of 7 psig the SSOD directs you to restore SW cooling to the Letdown Coolers. Which of the following describes the *minimum* actions that must be taken to perform this task?

A. Bypass/Reset the 'A' RBIC actuation, select the 'B' ES reset switch on the MCB to 'Reset' and select the valves to open from the MCB.

B. Bypass/Reset the 'B' RBIC actuation, direct the PPO to depress the local 'Open' pushbuttons in the Triangle Room and then select the valves to open from the MCB.

C. Bypass/Reset the 'A' and 'B' RBIC actuation, select the 'B' ES reset switch on the MCB to 'Reset' and direct the PPO to depress the local 'Open' pushbuttons in the Triangle Room.

D. Bypass/Reset the 'A' and 'B' RBIC actuation, direct the PPO to depress the local 'Open' pushbuttons in the Triangle Room and select MCB switches to open.

61. Per EOP-13, Rule 3, if EFW control is in manual during an Inadequate Subcooling Margin condition, flow to the OTSGs should be directed through a single line to each available steam generator. Which of the following is the basis for using only a single line to feed the OTSG(s)?

A. Use of a single line results in higher flowrates which place the flow instrumentation in a region of smaller errors.

B. Use of a single line places the control valves in a position where they have more precise flow control.

C. Use of a single line provides fewer parameters for the operator to monitor, thus simplifying manual control.

D. Accident analysis single failure criteria assumes a single line is available. Manual EFW flow control is proceduralized to ensure operation within analyzed accident criteria.

62. Which of the following describes the basis for varying the rate of OTSG level increase in proportion to OTSG pressure when EFW is actuated?

A. To maintain steam pressure above 600 psig.

B. To assist the EFW overfill logic in controlling OTSG level.

C. To prevent excessive thermal shocking of the OTSG tube sheets.

D. To minimize RCS cooldown.

63. Following a large break loss of coolant accident reactor coolant system pressure is 435 psig. Steam generator pressure is 140 psig. What should the hot and cold leg temperatures be if boiler-condenser heat transfer has been established?

A. T_h is 468° F; T_c is 428° F.

B. T_h is 456° F; T_c is 428° F.

C. T_h is 456° F; T_c is 360° F.

D. T_h is 448° F; T_c is 360° F.

64. The following plant conditions exist:

- RCS pressure is 180 psig.
- RCS temperature is 175° F.
- Instrument air pressure is 85 psig and decreasing.

Which of the following describes the expected plant response and required operator actions for these conditions?

A. DHHE DC control valves will fail to the NO cooling position on loss of air. Manual control is necessary to limit the the RCS heatup rate to $\leq$ 10° F in any 1 hour period.

B. DHHE DC control valves will fail to the full cooling position on loss of air. Manual control is necessary to limit the the RCS cooldown rate to $\leq$ 10° F in any 1 hour period.

C. DHHE DC control valves will fail to the NO cooling position on loss of air. Manual control is necessary to limit the the RCS heatup rate to $\leq$ 25° F in any 1/2 hour period.

D. DHHE DC control valves will fail to the full cooling position on loss of air. Manual control is necessary to limit the the RCS cooldown rate to $\leq$ 25° F in any 1/2 hour period.

65. The following plant conditions exist:

- A controlled plant shutdown is in progress due to a shaft failure of RWP-2A.
- The reactor is critical with RCS temperature at 545° F.
- PZR level is 95".
- The SPO reports that CWTS-2 is completely clogged with debris and will not start and the flume water level is almost empty.

Based on these conditions which of the following actions, and applicable reasons for these actions, should be performed?

A. Since RWP-1 and RWP-2B are not affected by this flume water level decrease continue with the plant shutdown per applicable OPs and inform maintenance personnel of the problem.

B. Trip the reactor and initiate EFIC due to the loss of CW cooling to the condenser.

C. Trip the reactor due to low PZR level.

D. Trip the reactor due to the loss of SW RW flow.

66. The following plant conditions exist:

- Plant is in Mode 6 with refueling activities in progress.
- An RCS leak results in a decrease in refueling canal level.
- AP-1080, Refueling Canal Level Lowering, is entered.

A step in AP-1080 states:

> IF irradiated fuel is suspended form Main Fuel Handling Bridge,
> THEN notify bridge operator to place fuel in Rx vessel.
>
> IF irradiated fuel can NOT be placed in the Rx vessel,
> THEN notify bridge operator to place the fuel in an available upender and lower.

The primary concern addressed by this step is to:

A. Place the bridge in a condition where the operator can leave.

B. Place the bridge in the location where it will receive the least radiation exposure.

C. Place the fuel assembly in a location where it can be transferred to the spent fuel pool and the gates closed

D. Place the fuel assembly in a location where uncovery is least likely and shielding is maximized.

67. The plant is in Mode 5 with the 'A' DH train in service under steady state conditions. The control room operators observe a steady increase in RCS temperature. Which of the following describes a possible reason for this increase?

A. An increase in RWP-3A discharge pressure.

B. An increase in the ΔT across the shell side of DCHE-1A.

C. RWV-150 has failed open and is raising the temperature in the raw water pit.

D. The temperature feedback loop for the DC control valves is malfunctioning and decreasing the DC flow through the DHHE.

68. The "A" Saturation Monitor has been selected to "Incore" for its temperature input. Incore temperature input is 600° F and RCS pressure is 500 psia. Which of the following statements describes the temperature input signal and the status of core cooling which should be indicated by this Saturation Monitor?

A. The average of the 6 selected incore thermocouples indicate that subcooling margin has been lost but the core is being adequately cooled.

B. The highest of the 6 selected incore thermocouples indicate that subcooling margin has been lost but the core is being adequately cooled.

C. The average of the 6 selected incore thermocouples indicate that an inadequate core cooling event is in progress.

D. The highest of the 6 selected incore thermocouples indicate that an inadequate core cooling event is in progress.

69. Due to a switching error both the 'B' and 'D' battery charger's output breakers have been opened. What is the expected status light indication on the 'B' vital bus inverter for this condition?

A.

Normal Source Available	ON
Battery Source Available	ON
Normal Source Supplying Load	ON
Battery Supplying Load	OFF
In Sync	ON

B.

Normal Source Available	ON
Battery Source Available	OFF
Normal Source Supplying Load	ON
Battery Supplying Load	OFF
In Sync	OFF

C.

Normal Source Available	OFF
Battery Source Available	ON
Normal Source Supplying Load	OFF
Battery Supplying Load	ON
In Sync	ON

D.

Normal Source Available	ON
Battery Source Available	OFF
Normal Source Supplying Load	ON
Battery Supplying Load	OFF
In Sync	ON

70. The following plant conditions exist:

- The plant is in Mode 3 with Group 1 control rods withdrawn.
- A Loss of Offsite Power occurs.
- EDG-1A fails to start.
- EFP-2 will not start.
- RCS temperatures are increasing.

Which of the following is the appropriate EOP entry and transition sequence for the given conditions?

A. Immediately enter EOP-02, Vital Systems Status Verification, and transition to EOP-04, Inadequate Heat Transfer, as directed by EOP-02 follow-up steps.

B. Immediately enter EOP-09, Natural Circulation Cooldown, and transition to EOP-10, Post Trip Stabilization, as directed by EOP-09 follow-up steps.

C. Immediately enter EOP-02, Vital Systems Status Verification, and transition to EOP-04, Inadequate Heat Transfer, when EOP-04 symptoms become apparent.

D. Immediately enter EOP-04, Inadequate Heat Transfer, based on EOP symptoms, and transition to EOP-08, LOCA Cooldown, as directed by EOP-04 follow-up steps.

71. The Make-up Tank (MUT) low pressure alarm has just actuated with the level at 80 inches. Which of the following is the amount that the pressure should be increased from its current value to operate in the preferred region without receiving further MUT alarms?

A. 12 psig.

B. 14 psig.

C. 16 psig.

D. 18 psig.

72. Instrument air pressure has decreased to 76 psig and makeup flow decreases to 15 gpm. Which of the following describes the *next* operator action required?

A. Restore letdown flow using MUV-50, bypass around MUV-51, to normal value and adjust MUT level as required.

B. Trip the reactor and concurrently perform EOP-2.

C. Bypass instrument air dryers then trip the reactor and concurrently perform EOP-2.

D. Manually control MUV-24 to maintain PZR level at > 80 inches.

73. The following plant conditions exist:

- A fire has been reported in the CC HVAC room.
- Smoke and fumes are observed filling the control room.
- Normal plant control has *not* been affected.

Which of the following describes the actions which should be taken?

A. Enter AP-880, Fire Protection, and AP-990, Shutdown from Outside Control Room.

B. Enter AP-880, Fire Protection. Since normal plant control has not been affected entry into AP-990, Shutdown from Outside Control Room, is not required.

C. Enter AP-990, Shutdown from Outside Control Room. Since the fire is in the CC HVAC room entry into AP-880, Fire Protection, is not required.

D. Enter AP-990, Shutdown from Outside Control Room, don air packs and concurrently perform AP-510, Rapid Power Reduction.

74. The following plant conditions exist:

- The plant is in Mode 5.
- The operating decay heat pump, DHP-1A, trips on overload.
- The standby decay heat pump, DHP-1B, is started, cavitates and trips.
- Reactor coolant level is 131'.
- Reactor coolant temperature is 93° F.
- Upper hand holds on the steam generator are removed.

Based on these conditions which of the following methods should be used to restore core heat removal?

A. Establish decay heat removal with DHP-1A.

B. Establish high pressure injection.

C. Establish fuel transfer canal fill.

D. Establish decay heat removal using spent fuel cooling.

75. SCP-1A has been in operation for two hours when the open limit switch on its discharge valve malfunctions, indicating the valve is not full open. Which of the following describes the plant response to this failure?

A. SCP-1A will trip, its discharge *and* suction valves will close and SCP-1B will auto start 10 seconds later.

B. SCP-1A will remain in operation. No auto start signal will be generated for SCP-1B.

C. SCP-1A will trip, its discharge valve will close and SCP-1B will auto start 10 seconds later.

D. SCP-1A will remain in operation because its discharge valve full open indication is only required for pump start.

76. The following plant conditions exist:

- The plant is in Mode 6 with refueling operations in progress.
- The 'A' DH Train is in service.
- A malfunction occurs in the Radiation Monitoring Panel which renders RM-L1, RM-L6 & RM-L7 inoperable.
- Control room operators notice a slow decreasing trend in refueling canal water level.

Which of the following combination of indications could be used to determine the reason for the decrease in refueling canal water level?

A. If the leak is into the SW system; RM-L3 would increase and SW surge tank level would increase.

B. If the leak is into the DC system; RM-L5 would increase and DC surge tank level would increase.

C. If the leak is into the SF system; RM-L5 would increase and DC surge tank level would remain constant.

D. If the leak is into the DC system; RM-L3 would increase and DC surge tank level would increase.

77. The following plant conditions exist:

- The plant is at 47% power.
- 'A' CWP is out of service for bearing replacement.

Which of the following describes the expected plant response and/or operator actions required if the 'B' CWP were to trip?

A. With the plant at 47% power the remaining two CWPs are sufficient. No additional operator actions are required.

B. The operator should immediately trip the turbine and enter EOP-2, Vital System Status Verification.

C. The operator should enter AP-510, Rapid Power Reduction, reduce power to < 45% then enter AP-660, Turbine Trip, and trip the turbine.

D. The operator should immediately trip the turbine, enter EOP-2, Vital System Status Verification and ensure the ADVs for the 'A' OTSG are controlling due to the "Loss of CWP" interlock closing the 'A' OTSG turbine bypass valves.

78. The following plant conditions exist:

- Reactor coolant average temperature is 579° F.
- Reactor coolant pressure is 2100 psig and decreasing at 100 psig/min.
- Pressurizer temperature is 643° F and decreasing at 6° F/min.
- Makeup flow 8-10 gpm higher than normal.
- The Reactor Coolant Drain Tank level is stable.
- PZR level is stable.
- Reactor power is 40%.

Which of the following is the most probable cause for the above indications?

A. RCS pressure transmitter tubing rupture.

B. Stuck open PORV.

C. Code safety valve flange leak.

D. MUV-567, letdown isolation valve, bonnet leak.

79. The plant is operating at 100% power with a 0% imbalance. Which of the following describes the RPS response if the lower chamber of NI-7 fails?

A. Assuming a failure of the instrument high the associated RPS channel would trip due to a large positive imbalance.

B. Assuming a failure of the instrument low the associated RPS channel would trip due to a large positive imbalance.

C. Assuming a failure of the instrument high the associated RPS channel would trip due to a large negative imbalance.

D. Assuming a failure of the instrument low the associated RPS channel would trip due to a large negative imbalance.

80. AP-545, Plant Runback, requires the operator to reduce power to < 60% rated thermal power in the event of an asymmetric fault. What is the reason for this step?

A. To minimize local fuel temperature gradients.

B. To maintain axial power imbalance within limits.

C. To ensure LHR (kw/ft) limitations are not exceeded.

D. To ensure regulating rod insertion limits are not exceeded.

81. The following plant conditions exist:

- The plant is in Mode 1.
- A failure in the 'A' inverter has caused its transfer switches to automatically swap to the alternate power supplies.
- Operations manually bypasses the inverter and transfer switches to assist troubleshooting activities.
- Electricians replace a circuit board and report that the inverter is functioning properly and ready to supply the vital buses.

Prior to re-alignment of the inverter and transfer switches which of the following describes the operability condition for this equipment?

A. The vital buses and inverter are *operable.*

B. The vital buses and inverter are *inoperable.*

C. The vital buses are *operable* but the inverter is *inoperable* until the transfer switches are placed back in service.

D. The inverter is *operable* but the vital buses are *inoperable* until the transfer switches are placed back in service.

82. The initial power escalation following a refueling outage is being performed. The reactor power level is stabilized to perform testing. The following indications are available to the operator at the control board:

NI-5	28.0%
NI-6	26.0%
NI-7	28.0%
NI-8	29.0%

T_h Loop A	588.5° F
T_h Loop B	588.0° F
T_c Loop A	569.5° F
T_c Loop B	570.0° F
RCS Tave	579.0° F

Which of the following is an accurate estimate of the thermal power level of the reactor at this point?

A. 549 MWt

B. 661 MWt

C. 738 MWt

D. 1040 MWt

83. OP-203, Plant Startup, is in progress. Which of the following describes the frequency and voltage conditions procedurally required for generator output breaker closure?

A. Synchroscope rotating slowly in the clockwise direction. Incoming voltage slightly higher than running voltage.

B. Synchroscope rotating slowly in the counter-clockwise direction. Incoming voltage slightly lower than running voltage.

C. Synchroscope rotating slowly in the clockwise direction. Incoming voltage equal to running voltage.

D. Synchroscope rotating slowly in the counter-clockwise direction. Incoming voltage equal to running voltage.

84. The following plant conditions exist:

- Plant is operating ≈ 20% power.
- SUCV position ≈ 95% open.
- LLCV position ≈ 5% open.

I & C technicians have requested that the 'B' train SUCV and LLCV hand/auto stations be taken to hand in order to record some data on the proportional/integral module supplying the input to these stations. Permission is received and these stations are placed in manual. After the technicians are finished, with no problems noted, preparations are made to return these stations to automatic.

Which of the following describes the appropriate actions to return these stations to automatic?

A. Place the SUCV in auto first, then place the LLCV in auto.

B. Place the LLCV in auto first, then place the SUCV in auto.

C. Open the SUCV to 100% to allow the LLCV full control. Place the LLCV in auto first and then the SUCV.

D. Close the LLCV to allow the SUCV full control. Place the SUCV in auto first and then the LLCV.

85. The following plant conditions exist:

- The plant is at 100% power.
- Seal injection flow has been lost.
- RCP-1B vibrations are in the "action" range on one monitor and in the "alert" range on another monitor.
- Cooling water leaving RCP-1B is 190° F.
- Thrust bearing temperatures for RCP-1B are 190° F.

Which of the following actions are required to be taken for the above conditions?

A. Trip RCP-1B after reducing power to 95%.

B. Notify Engineering and continue to monitor the pump.

C. Start both lift oil pumps for RCP-1B and notify engineering.

D. Trip RCP-1B immediately.

86. The following plant conditions exist:

- The reactor is at 40% power.
- The controlling T_{ave} signal slowly fails low.
- The control rods commence a continuous rod withdrawal.
- The operator quickly places the Diamond and Rx Demand hand/auto station to manual.
- Feedwater flow is observed to be decreasing.

Which of the following describes the reason for the feedwater reduction?

A. The ICS is in Track causing feedwater demand to be reduced.

B. The 'Reactor Limited by Feedwater' cross-limit is driving feedwater demand down.

C. Feedwater is attempting to correct T_{ave}.

D. The 'Feedwater Limited by Reactor' cross-limit is driving feedwater demand down.

87. A step in EOP-12, Station Blackout, directs the operator to actuate MS line isolation on both OTSGs.

Which of the following is the reason for this step?

A. To help control cooldown by minimizing the length of steam line available for steam control problems.

B. To prevent OTSG dry out due to the loss of main feedwater.

C. To maintain greater than 100 psig in the OTSGs due to the impact of the loss of power on turbine bypass valves.

D. To ensure OTSGs are isolated due to the impact of the loss of power on the MS line isolation logic.

88. The following plant conditions exist:

- During a plant heatup a Loss of Offsite Power occurred.
- EOP-02, Vital System Status Verification, immediate actions have been completed.
- Due to EFIC control problems EOP-4, Inadequate Heat Transfer, was entered and HPI/PORV cooling was established.

Ten minutes into the event the following plant conditions exist:

- AFW is established and feeding both OTSGs.
- HPI/PORV cooling has been secured.
- Subcooling margin is now 70° F and increasing (based on T_{incore}).
- PZR level is off scale high.
- T_{incore} is decreasing at 20° F per 1/2 hour.
- RCS pressure and temperature is above and to the left of the Nat Circ curve.

Which of the following describes the actions that should be taken in this situation and why is it being done?

A. HPI must be throttled because cooldown limits have been exceeded.

B. HPI must be throttled to restore PZR level since adequate subcooling margin exists.

C. HPI must be throttled when T_{cold} reaches 380° F to ensure NDT limits are not exceeded.

D. HPI must be throttled to minimize SCM because PTS guidelines are applicable.

89. With the plant at 100% power which of the following power sources could feed the 'B' ES 4160V bus?

A. Unit 3 Startup transformer, Offsite Power transformer, Backup ES transformer or the Unit Auxiliary transformer.

B. Offsite Power transformer, Backup ES transformer, EDG-1B or the Unit Auxiliary transformer.

C. Unit 3 Startup transformer, Offsite Power transformer, Backup ES transformer or EDG-1B

D. Offsite Power transformer, Backup ES transformer, MTDG-1 or EDG-1B.

90. The following plant conditions exist:

- EOP-8, LOCA Cooldown, performance is in progress.
- RCS pressure is 1600 psig.
- RCS temperature is 450° F.
- RB pressure is 4.2 psig.

Which of the following describes the status of the RB main fans (AHF-1A, 1B and 1C)?

A. Both ES selected RB main fans are in slow speed and being cooled by Nuclear Services Closed Cycle Cooling.

B. Both ES selected RB main fans are in slow speed and being cooled by Industrial Cooling.

C. One ES selected RB main fan is in slow speed and being cooled by Nuclear Services Closed Cycle Cooling.

D. One ES selected RB main fan is in slow speed and being cooled by Industrial Cooling.

91. The following sequence of events are in progress:

- Unit is at 100% power with the "A" RPS channel in bypass for testing.
- A feedwater flow problem causes RCS pressure to exceed the RPS high pressure trip setpoint.
- RPS channels "B" and "D" actuate as designed.
- RPS channel "C" does not actuate due to a failed RCS pressure bistable.

Which of the following describes the expected response of the RPS/CRD system?

A. No CRD breakers will open.

B. All CRD breakers will open.

C. The "B" & "D" breakers and the "F" electronic trip will open. This will not result in a reactor trip because the "A" and "C" CRD breakers and the "E" electronic trip do not open.

D. The "B" & "D" breakers and the "F" electronic trip will open. This will result in a reactor trip even though the "A" and "C" CRD breakers and "E" electronic trip do not open.

92. The following plant conditions exist:

- Plant is at 28% power.
- Preparations are in progress to re-start RCP-1A due to a spurious trip.

Which of the following will electrically prevent RCP-1A from being started? (consider only the effect on RCP interlocks for each failure)

A. Selected wide range T_{cold} signal input failed low.

B. Selected narrow range T_{cold} signal input failed low.

C. Common controlled bleed-off valve, MUV-253, closed.

D. Selected reactor power signal input failed low.

93. SP-354A, Monthly Functional Test of the Emergency Diesel Generator, is in progress with the EDG output breaker closed and an electrical load of three megawatts. A grid disturbance occurs and grid frequency decreases.

Which of the following describes the effect this will have on the operating EDG?

A. The EDG output breaker will automatically open due to a Volts/Hertz lockout relay actuation.

B. The EDG output breaker will automatically open due to a reverse power relay actuation.

C. There should be minimal effect to the EDG due to the Unit/Parallel switch being selected to Parallel.

D. There should be minimal effect to the EDG due to the Speed Droop being set at 60.

94. During a waste gas release, with a normal "B" side ventilation lineup, RM-A2, Auxiliary Building Purge Exhaust Radiation Monitor, goes into high alarm. Which of the following groups of fans trip?

A. AHF-10, Fuel Handling Area Fan.
AHF-11B, Auxiliary Building Supply Fan.
AHF-9B, Penetration Cooling Fan.
AHF-14A and 14C, Auxiliary Building Exhaust Fans.
AHF-30, Chem Lab Supply Fan.

B. AHF-10, Fuel Handling Area Fan.
AHF-14B and AHF-14D, Auxiliary Building Exhaust Fans.
AHF-9B, Penetration Cooling Fan.
AHF-34A, Hot Machine Shop Welding Hood Exhaust Fan.
AHF-30, Chem Lab Supply Fan.

C. AHF-10, Fuel Handling Area Fan.
AHF-11B, Auxiliary Building Supply Fan.
AHF-9B, Penetration Cooling Fan.
AHF-44B, Chemistry Hood Exhaust Fan.
AHF-30, Chem Lab Supply Fan.

D. AHF-10, Fuel Handling Area Fan.
AHF-11B, Auxiliary Building Supply Fan.
AHF-9B, Penetration Cooling Fan.
AHF-34A, Hot Machine Shop Welding Hood Exhaust Fan.
AHF-30, Chem Lab Supply Fan.

95. Which of the following sets of conditions would require a plant runback to 55%?

A. "A" Main Feedwater pump lube oil pressure of 10 psig and a deaerator level of two feet.

B. "B" Main Feedwater pump lube oil pressure of 0 psig and a deaerator level of two feet.

C. "A" Feedwater Booster pump lube oil pressure of 0 psig and a deaerator level of six feet.

D. "B" Feedwater Booster pump lube oil pressure of 10 psig and a deaerator level of six feet.

96. The following plant conditions exist:

- A power increase is in progress.
- Group 7 rods are at 45% withdrawn when rod 7-4 sticks in place.
- PI panel indication is selected to RPI.

As the power increase continues which of the following indications could be used to determine that rod 7-4 is no longer moving?

A. Individual control rod position indication on PI panel.

B. Individual control rod position indication on plant computer.

C. Group average indication on MCB or plant computer.

D. Individual control rod amber fault light illuminates.

97. EOP-09, Natural Circulation Cooldown, contains a table which provides limits on natural circulation cooldown rates.

For RCS pressure maintained above the Natural Circulation curve of Figure 1 & 2 in the EOP, the cooldown rate limit is $\leq 25°$ F per 1/2 hour.

Which of the following describes the basis for this limit?

A. To limit thermal stress on the OTSG tubesheet.

B. To limit voiding in the reactor vessel head region.

C. To maintain a stable or lowering core ΔT.

D. To conserve EFT-2 inventory.

98. The following plant conditions exist at 100% power:

'A' OTSG Level	80%	'B' OTSG Level	80%
'A' MFW Flow	5.4 E6 lbm/hr	'B' MFW Flow	5.4 E6 lbm/hr

Core ΔT 44° F

A problem develops with RCP-1C and the decision is made to run the plant back and secure the pump. At 80% power RCP-1C trips and an ICS runback occurs to 75% power. Which of the following describes the approximate expected plant parameters, as compared to the above values, after the plant stabilizes at 75% power?

A.

'A' OTSG Level	unchanged
'B' OTSG Level	50% of original
'A' MFW Flow	unchanged
'B' MFW Flow	50% of original
Core ΔT	44° F

B.

'A' OTSG Level	unchanged
'B' OTSG Level	50% of original
'A' MFW Flow	unchanged
'B' MFW Flow	50% of original
Core ΔT	33° F

C.

'A' OTSG Level	75% of original
'B' OTSG Level	50% of original
'A' MFW Flow	75% of original
'B' MFW Flow	50% of original
Core ΔT	44° F

D.

'A' OTSG Level	75% of original
'B' OTSG Level	50% of original
'A' MFW Flow	75% of original
'B' MFW Flow	50% of original
Core ΔT	33° F

99. The following plant conditions exist at 200 EFPD:

- Group 7 rods begin to move in continuously.
- Rod motion stops when group 7 reaches its in-limit.
- Proper rod sequencing was observed.
- Reactor power has decreased from 100% to 70%.
- Group 8 is at 30% withdrawn.

What core operating limit has been exceeded?

A. Quadrant power tilt limit.

B. Regulating rod insertion limits.

C. Axial power imbalance limit.

D. Axial power shaping rod insertion limits.

100. The plant is operating at 60% RTP when the control board operator notices a slow degradation of condenser vacuum. Ten minutes later the following conditions exist:

- OP-607, Condenser Vacuum Systems, Section 4.5, Loss of Vacuum, has been entered.
- Condenser vacuum is 4" Hg absolute.
- Condenser ΔT is 3° F.
- "A" Air Removal Pump, ARP-1A, has tripped.
- "B" Air Removal Pump, ARP-1B, has failed to auto-start.

Which of the following describes required operator action(s), if any, and the status of condenser vacuum?

A. The main turbine should be manually tripped; procedural limits have been exceeded. Condenser vacuum will continue to degrade following the turbine trip.

B. The main turbine should be manually tripped; procedural limits have been exceeded. Condenser vacuum will stabilize following the turbine trip.

C. The main turbine is within procedural limits; condenser vacuum will continue to degrade.

D. The main turbine is within procedural limits; condenser vacuum will stabilize at a slightly lower value.

MASTER

Master
99-301

CRYSTAL RIVER UNIT 3

1999

SRO

WRITTEN EXAMINATION

Wednesday, March 31, 1999 @ 08:48 AM

Answer Key

Test Name: NRCNSRO.TST
Test Date: Wednesday, January 27, 1999

		Question ID		Type	Pts	0	1	2	3	4	5	6	7	8	9
1:	1	ROT-5-01	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	2	ROT-5-43	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	3	ROT-4-75	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	4	ROT-4-12	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	5	ROT-5-96	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	6	ROT-4-91	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	7	ROT-5-90	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	8	ROT-4-06	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	9	ROT-5-85	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	10	ROT-5-84	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	~~11~~	~~ROT-4-14~~ Deleted	003	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	12	ROT-5-85	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	13	ROT-4-09	003	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	14	ROT-5-116	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	15	ROT-5-31	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	16	ROT-4-28	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	17	ROT-4-25	004	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	18	ROT-3-18	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	19	ROT-4-54	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	20	ROT-5-61	001	MC-SR	1 a &	B	C	D	A	B	C	D	A	B	C
1:	21	ROT-4-69	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	22	ROT-4-55	001	MC-SR	1 d &	A	B	C	D	A	B	C	D	A	B
1:	23	ROT-4-09	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	24	ROT-5-116	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	25	ROT-4-60	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	26	ROT-4-56	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	27	ROT-5-98	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	28	ROT-4-89	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	29	ROT-4-14	002	MC-SR	1	A	A	A	A	A	A	A	A	A	A
1:	30	ROT-4-25	003	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	31	ROT-5-104	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	32	ROT-5-96	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	33	ROT-4-06	003	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	34	ROT-4-09	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	35	ROT-5-01	003	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	36	ROT-5-94	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	37	ROT-4-52	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	~~38~~	~~ROT-4-26~~ Deleted	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	39	ROT-5-14	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	40	ROT-5-01	010	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	41	ROT-4-87	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	42	ROT-4-14	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	43	ROT-5-01	004	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	44	ROT-5-69	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	45	ROT-5-34	003	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	46	ROT-5-01	008	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	47	ROT-4-13	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	48	ROT-4-13	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	49	ROT-4-91	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	50	ROT-5-91	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A

Wednesday, March 31, 1999 @ 08:48 AM

Answer Key

Test Name: NRCNSRO.TST
Test Date: Wednesday, January 27, 1999

		Question ID		Type	Pts	0	1	2	3	4	5	6	7	8	9
1:	51	ROT-5-114	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	52	ROT-5-61	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	53	ROT-5-38	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	54	ROT-4-06	004	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	55	ROT-4-12	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	56	ROT-2-20	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	57	ROT-4-60	004	MC-SR	ATH 1 C ?	A	B	C	D	A	B	C	D	A	B
1:	58	ROT-4-91	003	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	59	ROT-5-14	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	60	ROT-5-01	011	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	61	ROT-5-91	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	62	ROT-4-26	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	63	ROT-4-14	004	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	64	ROT-5-97	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	65	ROT-4-15	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	66	ROT-5-107	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	67	ROT-4-60	003	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	68	ROT-4-90	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	69	ROT-4-77	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	~~70~~	~~ROT-4-90~~ Deleted ATH	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	71	ROT-4-12	003	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	72	ROT-5-01	006	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	73	ROT-5-31	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	74	ROT-5-68	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	75	ROT-5-01	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	76	ROT-4-59	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	77	ROT-5-100	001	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	78	ROT-4-25	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	79	ROT-5-61	003	MC-SR	ATA	D	A	B	C	D	A	B	C	D	A
1:	80	ROT-4-57	001	MC-SR	1 B ?	A	B	C	D	A	B	C	D	A	B
1:	81	ROT-4-25	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	82	ROT-4-60	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	83	ROT-4-69	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	84	ROT-5-01	009	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	85	ROT-5-99	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	86	ROT-5-72	001	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	87	ROT-5-68	002	MC-SR	1	A	B	C	D	A	B	C	D	A	B
1:	88	ROT-4-06	002	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	89	ROT-5-72	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	90	ROT-5-01	005	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	91	ROT-4-15	002	MC-SR	1	B	C	D	A	B	C	D	A	B	C
1:	92	ROT-4-51	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	93	ROT-3-03	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	94	ROT-2-16	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	95	ROT-5-34	005	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	96	ROT-4-62	001	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	97	ROT-4-81	001	MC-SR	1	C	D	A	B	C	D	A	B	C	D
1:	98	ROT-5-01	007	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	99	ROT-5-116	003	MC-SR	1	D	A	B	C	D	A	B	C	D	A
1:	100	ROT-4-28	002	MC-SR	1	D	A	B	C	D	A	B	C	D	A

U.S. Nuclear Regulatory Commission
Site-Specific
Written Examination

Applicant Information

Name:	Region: II
Date: 2/15/99	Facility/Unit: FPC/CR-3
License Level: RO / SRO	Reactor Type: BW
Start Time:	Finish Time:

Instructions

Use the answer sheets provided to document your answers. Staple this cover sheet on top of the answer sheets. The passing grade requires a final grade of at least 80.00 percent. Examination papers will be collected five hours, or as determined by the NRC Chief Examiner, after the examination starts.

Applicant Certification

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

____
Applicant's Signature

Results

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

Name: ______________________________

1. The plant was operating at 100% power when control rod 7-2 drops fully into the core. AP-545, Plant Runback, was entered and the plant is stabilized at 58% power. A QPT calculation is required per AP-545. Power Range NIs indicate as follows:

   - NI-5 58% power
   - NI-6 57% power
   - NI-7 58% power
   - NI-8 42% power

   Which of the following actions would be acceptable for these conditions?

   A. Enter TS 3.2.4 and comply with Condition A.

   B. Enter TS 3.2.4 and comply with Condition B.

   C. Enter TS 3.2.4 and comply with Condition D.

   D. Enter TS 3.2.4 and comply with Condition F.

2. Which of the following radiation exposures would require immediate notification to the Nuclear Regulatory Commission (NRC)?

A. 18 Rem CEDE.

B. 23 Rem TEDE.

C. 82 Rem LDE.

D. 210 Rem SDE-WB.

3. The following plant conditions exist:

- The plant is at 47% power.
- 'A' CWP is out of service for bearing replacement.

Which of the following describes the expected plant response and/or operator actions required if the 'B' CWP were to trip?

A. With the plant at 47% power the remaining two CWPs are sufficient. No additional operator actions are required.

B. The operator should immediately trip the turbine and enter EOP-2, Vital System Status Verification.

C. The operator should enter AP-510, Rapid Power Reduction, reduce power to < 45% then enter AP-660, Turbine Trip, and trip the turbine.

D. The operator should immediately trip the turbine, enter EOP-2, Vital System Status Verification and ensure the ADVs for the 'A' OTSG are controlling due to the "Loss of CWP" interlock closing the 'A' OTSG turbine bypass valves.

4. The following plant conditions exist:

- The plant is at 50% reactor power.
- The ICS power supply monitor fails resulting in a loss of + 24 volt power.

What is the plant's response to this situation?

A. ATWS removes power from the safety rods and initiates EFIC.

B. AMSAC trips the main turbine and initiates EFIC.

C. DSS removes power from the regulating control rods.

D. RPS trips the reactor due to the loss of both MFW pumps.

5. The following plant conditions exist:

- The plant is in Mode 3 with Group 1 control rods withdrawn.
- A Loss of Offsite Power occurs.
- EDG-1A fails to start.
- EFP-2 will not start.
- RCS temperatures are increasing.

Which of the following is the appropriate EOP entry and transition sequence for the given conditions?

A. Immediately enter EOP-02, Vital Systems Status Verification, and transition to EOP-04, Inadequate Heat Transfer, as directed by EOP-02 follow-up steps.

B. Immediately enter EOP-09, Natural Circulation Cooldown, and transition to EOP-10, Post Trip Stabilization, as directed by EOP-09 follow-up steps.

C. Immediately enter EOP-02, Vital Systems Status Verification, and transition to EOP-04, Inadequate Heat Transfer, when EOP-04 symptoms become apparent.

D. Immediately enter EOP-04, Inadequate Heat Transfer, based on EOP symptoms, and transition to EOP-08, LOCA Cooldown, as directed by EOP-04 follow-up steps.

6. With the plant at 100% power a catastrophic failure of VBIT-1C rendered itself inoperable and caused both of the VBXSs that it feeds to fail as is and not transfer to their alternate power supply.

Which of the following describes the EOP/AP action(s) that should be taken?

A. AP-581, Loss of NNI-X, should be entered.

B. AP-582, Loss of NNI-Y, should be entered.

C. AP-430, Loss of Control Room Alarms, should be entered.

D. Trip both MFW pumps and the reactor due to the loss of ICS power. EOP-2, Vital System Status Verification, and Rule 3, EFW Control, should be entered.

7. Technical Specification 3.4.1, RCS Pressure, Temperature, and Flow Departure from Nucleate Boiling (DNB) limits, requires verification of RCS total flow every 12 hours. Which of the following describes the procedure and location where RCS total flow is read to meet this surveillance?

A. SP-225, Reactor Coolant Flow Measurement at Hot Full Power; Main Control Board ICS section.

B. SP-225, Reactor Coolant Flow Measurement at Hot Full Power; Main Control Board PSA section.

C. SP-300, Operating Daily Surveillance Log; Main Control Board ICS section.

D. SP-300, Operating Daily Surveillance Log; Main Control Board PSA section.

8. Reactor Building pressure is 4.8 psig. Which of the following describes the status of the EDGs and the effect of protective relay actuation on the output breaker?

A. The EDGs are running with their 'Ready' lights illuminated. Actuation of the generator differential current relay will shut down the engine and trip or prevent closure of the output breaker.

B. The EDGs are running with their 'Ready' lights illuminated. Actuation of the exciter field short relay will shut down the engine and trip or prevent closure of the output breaker.

C. The EDGs are running with their 'Run' lights illuminated. Actuation of the generator differential current relay will shut down the engine and trip or prevent closure of the output breaker.

D. The EDGs are running with their 'Run' lights illuminated. Actuation of the exciter field short relay will shut down the engine and trip or prevent closure of the output breaker.

9. The following plant conditions exist:

- Plant is in Mode 3.
- RCS pressure is 1920 psig.
- T_{incore} is 606° F.
- HPI flows

	Wide Range	Narrow Range
A1	220 gpm	180 gpm
A2	250 gpm	200 gpm
B1	200 gpm	170 gpm
B2	190 gpm	155 gpm

Based on the conditions above which of the following action(s), if any, should be taken associated with HPI flow directing?

A. No additional actions are required.

B. Isolate MUV-30, bypass around MUV-31, due to higher than expected flow indication on line A2.

C. Bypass and/or reset ES actuations, close MUV-27 and ensure flow decreases on line A2.

D. Bypass and/or reset ES actuations, close HPI valve on line A2 and remove power from affected valve.

10. Instrument air pressure has decreased to 76 psig and makeup flow decreases to 15 gpm. Which of the following describes the *next* operator action required?

A. Restore letdown flow using MUV-50, bypass around MUV-51, to normal value and adjust MUT level as required.

B. Trip the reactor and concurrently perform EOP-2.

C. Bypass instrument air dryers then trip the reactor and concurrently perform EOP-2.

D. Manually control MUV-24 to maintain PZR level at > 80 inches.

11. A power increase is in progress from 50% power. The "VERIFY FWV-29 ON AUTO" alarm has just annunciated.

Which of the following describes this plant condition?

A. This is *not* an expected alarm during a normal power increase. The Auto/Man toggle switch for FWV-29 must still be selected to the Manual position.

B. This is *not* an expected alarm during a normal power increase. FWV-29 should automatically open under these conditions.

C. This is an expected alarm during a normal power increase. This alarm will stay in until FWV-29 is fully open.

D. This is an expected alarm during a normal power increase. This alarm will stay in until FWV-29 is > 15% open.

Deleted AH

12. The following plant conditions exist:

- A large steam line break on the "B" OTSG has occurred.
- The "B" steam generator has been isolated.
- Reactor coolant pressure is 1300 psig.
- Reactor coolant temperature is 532°F.

Based on the above conditions what is the function of HPI and when can it be throttled?

A. HPI is required for core cooling and can be throttled when low pressure injection through DHV-5 or 6 has been established for 20 minutes.

B. HPI is required for core cooling and can be throttled when heat removal through the "A" OTSG is established.

C. HPI is required to compensate for RCS contraction and can be throttled when the pressurizer level exceeds 40 inches.

D. HPI is required to compensate for RCS contraction and can be throttled when adequate subcooling margin is recovered.

13. Which of the following describes how PZR level is controlled on a loss of NNI-X power?

A. A backup power supply will allow manual operation of MUV-31 following a loss of all NNI-X DC power.

B. A backup power supply will allow automatic operation of MUV-31 following a loss of all NNI-X AC power.

C. A loss of NNI-X AC or DC power will cause MUV-31 to fail closed. MUV-24 will be used for PZR level control.

D. A loss of NNI-X AC or DC power will cause the valve controller to swap to NNI-Y for control power.

14. Per EOP-13, Rule 3, if EFW control is in manual during an Inadequate Subcooling Margin condition, flow to the OTSGs should be directed through a single line to each available steam generator. Which of the following is the basis for using only a single line to feed the OTSG(s)?

A. Use of a single line results in higher flowrates which place the flow instrumentation in a region of smaller errors.

B. Use of a single line places the control valves in a position where they have more precise flow control.

C. Use of a single line provides fewer parameters for the operator to monitor, thus simplifying manual control.

D. Accident analysis single failure criteria assumes a single line is available. Manual EFW flow control is proceduralized to ensure operation within analyzed accident criteria.

15. Step 3.34 of AP-990, Shutdown from Outside the Control Room, requires the performance of Enclosure 2, RSD Panel Log Readings. Natural Circulation is in progress with EFIC controlling OTSG level. The following data is recorded:

- OTSG 'A' Operate Level	91%
- OTSG 'B' Operate Level	92%
- T_{cold}	545°
- T_{hot}	572°
- $T_{incores}$	590°
- RCS Wide Range Pressure	1600 psig

Based on the above readings which of the following describes the condition of the RCS and EFIC level control?

A. Adequate Subcooling Margin does not exist. EFIC is controlling at the required level.

B. Adequate Subcooling Margin does not exist. EFIC should be controlling level at the Natural Circulation setpoint due to RCPs being secured.

C. Adequate Subcooling Margin does exist. EFIC is controlling at the required level.

D. Adequate Subcooling Margin does exist. EFIC should be controlling level at the Natural Circulation setpoint due to RCPs being secured.

16. The following plant conditions exist at 200 EFPD:

- Group 7 rods begin to move in continuously.
- Rod motion stops when group 7 reaches its in-limit.
- Proper rod sequencing was observed.
- Reactor power has decreased from 100% to 70%.
- Group 8 is at 30% withdrawn.

What core operating limit has been exceeded?

A. Quadrant power tilt limit.

B. Regulating rod insertion limits.

C. Axial power imbalance limit.

D. Axial power shaping rod insertion limits.

17. The following plant conditions exist:

- RCS temperature is 220° F.
- RM-A6 has been declared inoperable due to a blocked sample line in the ductwork of AHF-3B.

Which of the following action(s), if any, could be taken to ensure compliance with Technical Specifications?

A. No actions are required.

B. Start AHF-3A within 6 hours and repair the sample line within 30 days.

C. Start the back-up sample pump on RM-A6 and perform SP-317 every 24 hours.

D. Perform SP-317 every 24 hours and repair the sample line within 30 days.

18. The following plant conditions exist:

- Reactor coolant average temperature is 579°F.
- Reactor coolant pressure is 2100 psig and decreasing at 100 psig/min.
- Pressurizer temperature is 643°F and decreasing at 6°F/min.
- Makeup flow 8-10 gpm higher than normal.
- The Reactor Coolant Drain Tank level is stable.
- PZR level is stable.
- Reactor power is 40%.

Which of the following is the most probable cause for the above indications?

A. RCS pressure transmitter tubing rupture.

B. Stuck open PORV.

C. Code safety valve flange leak.

D. MUV-567, letdown isolation valve, bonnet leak.

19. The following plant conditions exist:

- Refueling operations are in progress.
- RC-132-PT, 0 to 600# pressure transmitter fails high.
- "A" DH train is in operation.

Based on these conditions which of the following action(s) should be performed?

A. Enter TS 3.3.1 and perform required actions.

B. No actions are required other than initiating the required paperwork for repair of the transmitter.

C. Secure DHP-1A due to DHV-3 receiving a close signal. Enter AP-404 and perform required actions.

-D. Secure DHP-1A due to DHV-4 receiving a close signal. Enter AP-404 and perform required actions.

20. The following plant conditions exist:

- The nuclear services surge tank is decreasing in level.
- The reactor building and auxiliary building sump levels are not increasing.
- All nuclear services heat exchangers have been rotated into operation with no change in conditions.
- RCS makeup, letdown and MUT level are steady.
- There are no reactor building system leak annunciators in alarm.

Where is the location of the SW leak?

A. The reactor coolant drain tank.

B. The industrial cooling system.

C. The primary sample cooler.

D. The inservice reactor coolant pump seal return cooler.

21. The following plant conditions exist:

- The plant is at 50% power.
- Condenser vacuum is 25 in-HgA and steady.
- Low pressure turbine exhaust temperature is 258° F.

Based on these conditions which of the following action(s) should be taken?

A. Restore vacuum to > 26.5 in-HgA within five minutes or trip the turbine.

B. Immediately reduce power to < 30% and trip the main turbine within five minutes.

C. Trip the main turbine immediately.

D. Initiate hood spray.

22. The following plant conditions exist:

- A Loss of Offsite Power has occurred.
- RB pressure is 32 psig.
- RCS pressure 900 psig.
- Adequate subcooling margin does exist.
- A 480V overcurrent lockout has occurred on the 'B' bus.

Which of the following describes equipment that must be secured because of these conditions?

A. BSP-1B and MUP-1C.

B. RWP-2B and RWP-3B.

C. BSP-1B, MUP-1B and RWP-3B.

D. DHP-1B, MUP-1C, BSP-1B and RWP-3B.

23. The following plant conditions exist:

- The plant is at 100% power.
- The turbine is selected to the "A" steam header pressure transmitter for control.

Which statement below describes the expected ICS/SASS response to a low failure of the selected "A" turbine header pressure transmitter coincident with a *reactor trip*?

A. SASS will transfer the "A" header input to the turbine and bypass valves to the unaffected transmitter.

B. SASS will transfer the "A" header input to the turbine to the unaffected transmitter. The bypass valves will be demanded closed.

C. SASS will transfer the header input to the turbine and bypass valves to the "B" steam header pressure transmitter.

D. SASS will transfer the header input to the turbine to the "B" steam header pressure transmitter. The bypass valves will be demanded closed.

24. The following plant conditions exist:

- The "A" OTSG has blown down to 6" on the EFIC Low Range instrument due to a failed open MSSV. This valve has now been reseated and gagged closed.
- Main feedwater pumps are the only available source of feedwater.
- Feedwater temperature is 160° F.

As the SSOD which of the following actions should be performed?

A. Feed the "A" OTSG via the EFW nozzles at 450 to 600 gpm.

B. Feed the "A" OTSG via the MFW nozzles at 450 to 600 gpm.

C. Feed the "A" OTSG via the EFW nozzles at $< .15 \times 10^6$ lbm/hr.

D. Feed the "A" OTSG via the MFW nozzles at $< .15 \times 10^6$ lbm/hr.

25. The following plant conditions exist:

- The plant is at 100% power.
- Seal injection flow has been lost.
- RCP-1B vibrations are in the "action" range on one monitor and in the "alert" range on another monitor.
- Cooling water leaving RCP-1B is 190° F.
- Thrust bearing temperatures for RCP-1B are 190° F.

Which of the following actions are required to be taken for the above conditions?

A. Trip RCP-1B after reducing power to 95%.

B. Notify Engineering and continue to monitor the pump.

C. Start both lift oil pumps for RCP-1B and notify engineering.

D. Trip RCP-1B immediately.

26. The plant was operating at 100% power when a steam leak on the "A" steam generator occurred in the reactor building (RB). The following conditions exist:

- Reactor building pressure is 5 psig.
- Reactor coolant temperature (T_c) 490°F.
- RCS pressure 1400 psig and increasing.
- Pressurizer level is 10 inches.
- "A" steam generator is isolated.
- "B" steam generator is being fed from emergency feedwater and steamed through the atmospheric dump valve.

In this situation the nuclear services closed cycle cooling (SW) system is providing cooling water to:

A. Reactor coolant pumps and reactor building main fan assemblies.

B. Reactor coolant pumps and control rod drive mechanisms.

C. Reactor coolant drain tank and reactor building main fan assemblies.

D. Reactor coolant pumps only.

27. EOP-09, Natural Circulation Cooldown, contains a table which provides limits on natural circulation cooldown rates.

For RCS pressure maintained above the Natural Circulation curve of Figure 1 & 2 in the EOP, the cooldown rate limit is $\leq 25°$ F per 1/2 hour.

Which of the following describes the basis for this limit?

A. To limit thermal stress on the OTSG tubesheet.

B. To limit voiding in the reactor vessel head region.

C. To maintain a stable or lowering core ΔT.

D. To conserve EFT-2 inventory.

28. With the plant operating at 65% power a 'Sudden Pressure' relay actuates on the Startup Transformer.

Based on the above which of the following electrical line-ups could be used to supply power to the 'A' Train PZR heaters?

A. MTDG-1; 4160V Rx Aux Bus 3; 480V Rx Aux Bus 3A.

B. EDG-1A; ES 4160V Bus 3A; ES 480V Bus 3A; 480V Rx Aux Bus 3A.

C. BEST; ES 4160V Bus 3A; ES 480V Bus 3A; 480V Rx Aux Bus 3A.

D. EDG-1B; ES 4160V Bus 3B; 480V Plant Aux Bus; 480V Rx Aux Bus 3A.

29. The following plant conditions exist at 100% power:

'A' OTSG Level	80%	'B' OTSG Level	80%
'A' MFW Flow	5.4 E6 lbm/hr	'B' MFW Flow	5.4 E6 lbm/hr

Core ΔT 44° F

A problem develops with RCP-1C and the decision is made to run the plant back and secure the pump. At 80% power RCP-1C trips and an ICS runback occurs to 75% power. Which of the following describes the approximate expected plant parameters, as compared to the above values, after the plant stabilizes at 75% power?

A.
'A' OTSG Level unchanged
'B' OTSG Level 50% of original
'A' MFW Flow unchanged
'B' MFW Flow 50% of original
Core ΔT 44° F

B.
'A' OTSG Level unchanged
'B' OTSG Level 50% of original
'A' MFW Flow unchanged
'B' MFW Flow 50% of original
Core ΔT 33° F

C.
'A' OTSG Level 75% of original
'B' OTSG Level 50% of original
'A' MFW Flow 75% of original
'B' MFW Flow 50% of original
Core ΔT 44° F

D.
'A' OTSG Level 75% of original
'B' OTSG Level 50% of original
'A' MFW Flow 75% of original
'B' MFW Flow 50% of original
Core ΔT 33° F

30. During a waste gas release, with a normal "B" side ventilation lineup, RM-A2, Auxiliary Building Purge Exhaust Radiation Monitor, goes into high alarm. Which of the following groups of fans trip?

A. AHF-10, Fuel Handling Area Fan.
AHF-11B, Auxiliary Building Supply Fan.
AHF-9B, Penetration Cooling Fan.
AHF-14A and 14C, Auxiliary Building Exhaust Fans.
AHF-30, Chem Lab Supply Fan.

B. AHF-10, Fuel Handling Area Fan.
AHF-14B and AHF-14D, Auxiliary Building Exhaust Fans.
AHF-9B, Penetration Cooling Fan.
AHF-34A, Hot Machine Shop Welding Hood Exhaust Fan.
AHF-30, Chem Lab Supply Fan.

C. AHF-10, Fuel Handling Area Fan.
AHF-11B, Auxiliary Building Supply Fan.
AHF-9B, Penetration Cooling Fan.
AHF-44B, Chemistry Hood Exhaust Fan.
AHF-30, Chem Lab Supply Fan.

D. AHF-10, Fuel Handling Area Fan.
AHF-11B, Auxiliary Building Supply Fan.
AHF-9B, Penetration Cooling Fan.
AHF-34A, Hot Machine Shop Welding Hood Exhaust Fan.
AHF-30, Chem Lab Supply Fan.

31. OP-210, Reactor Startup, requires pressurizer level to be maintained within the limits of OP-103A Curve 5, Pressurizer Level vs Tave whenever the reactor is critical.

Which of the following is the reason for maintaining the minimum level?

A. To maintain pressurizer level during a plant runback.

B. To prevent uncovering the pressurizer heaters following a reactor trip.

C. To maintain a steam bubble in the PZR following a turbine trip from $\leq$ 30% power.

D. To maintain a steam bubble in the pressurizer and prevent vessel head voiding after a reactor trip.

32. The plant has experienced a reactor trip. While completing the follow-up actions of EOP-2, Vital Safety System Verification, you observe that control rod 1 in group 1 and control rod 3 in group 6 do not have their in-limit or 0% lights energized. API shows both control rods at about 20% withdrawn. Which of the following should be performed?

A. Open breakers 3305 and 3312.

B. Start boration using a boric acid storage tank and associated pump.

C. Start boration from a reactor coolant bleed tank with a concentration greater than reactor coolant.

D. Depress "HPI Manual Actuation" on Train A and B.

33. DPDP-1A is de-energized due to an internal fault on the bus coincident with a Loss of Offsite Power.

Based on these conditions which of the following describes the status of EDG-1A and the EFIC system?

A. EDG-1A will start and load on the bus; the 'A' and 'C' EFIC cabinet will lose power.

B. EDG-1A will start and come up to speed but will *not* energize the bus; the 'A' and 'C' EFIC cabinet will *not* lose power.

C. EDG-1A will start and load on the bus; the 'A' train EFIC control valves will fail full open.

D. EDG-1A will start and come up to speed but will *not* energize the bus; the 'B' train EFIC block valves will fail as is.

34. The following plant conditions exist:

- Plant is at 100% power.
- RC-1-LT1 is selected for PZR level control.
- RC-1-LIR-1 and LIR-3 indicate 215" and steady.

The control room operator observes RC-1-LIR-1 decrease to 155" at ≈ 15" per minute. RC-1-LIR-3 is steady and normal makeup flow is unchanged.

Based on the above which of the following is the probable cause of these indications and the proper operator response?

A. RC-1-LT1 has failed. Swap to the alternate source per OP-501, Reactor Non-Nuclear Instrumentation, and return the transmitter to operable status within 30 days.

B. RC-1-LT1 has failed. SASS will automatically transfer to the alternate source. Initiate repair efforts and return the transmitter to operable status within 72 hours.

C. Temperature input to RC-1-LIR-1 has failed. Swap to the alternate source per OP-501, Reactor Non-Nuclear Instrumentation, and return the transmitter to operable status within 30 days.

D. Temperature input to RC-1-LIR-1 has failed. SASS will automatically transfer to the alternate source. Initiate repair efforts and return the transmitter to operable status within 72 hours.

35. The following plant conditions exist:

- The plant is in Mode 3.
- One of the two available PPOs assigned to the Auxiliary Building slips and severely sprains his ankle while performing a walkdown of the Reactor Building.
- The PPO is contaminated and is escorted to the hospital by both available Health Physics technicians.

Which of the following describes the correct response, relating to shift staffing, for this situation?

A. No action is required. Minimum staffing levels are still met.

B. If it is two hours or less until shift turnover is scheduled to occur no action is required.

C. Another PPO should be called in immediately and should arrive within two hours.

D. Another HP technician should be called in immediately and should arrive within two hours.

36. A step in EOP-05, Excessive Heat Transfer, states:

<u>IF</u> at any time ES systems have,
<u>OR</u> should have actuated,
<u>THEN</u> ensure ES equipment is properly aligned.

If reactor coolant pressure is 1450 psig and RB pressure is 4.5 psig which of the following indications and associated operator responses is in compliance with this step?

A. The decay heat inlet valve to the reactor coolant system, DHV-5, has a green ES status light and the control board operator rotates the valve's switch to open it.

B. The "B" Building Spray Pump, BSP-1B, has an amber ES status light and the control board operator rotates the pump's control handle to start it.

C. High pressure injection valve, MUV-23, has a green ES status light and the control board operator rotates the valve's switch to open it.

D. The "A" Decay Heat Closed Cycle Cooling Pump, DCP-1A, has an amber ES status light and the control board operator rotates the pump's control handle to start it.

37. The following plant conditions exist:

- RCS pressure has decreased to 1450 psig.
- Reactor building pressure is 1 psig.

Which of the following describes the Makeup Tank level response and cause for the change?

A. Increases because of RCP Controlled Bleed Off return flow.

B. Decreases because of high pressure injection flow into the reactor core.

C. Increases because of Makeup pump recirc return flow.

D. Decreases because letdown flow is isolated.

38. While placing a fuel assembly into the core the following is observed:

- Count rate doubles on the source range instruments.
- RM-G16, Radiation Monitor for the RB Fuel Handling Bridge, is in alarm.
- Bubbles are emerging from the core.

Which of the following could have caused the above conditions?

A. A fuel assembly has been damaged.

B. Inadvertant local criticality has occurred.

C. The instrument air line to the grapple mechanism has broken.

D. The standby decay heat removal train was placed in service.

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39. What is the policy for CR-3 Nuclear Operations for bypassing automatic safety system actuations? (10 CFR 50.54 X/Y has not been invoked)

A. Reactor Operators have the authority to immediately bypass inadvertent Safety System Actuations. Informing the Procedure Director is not required.

B. Reactor Operators have the authority to bypass automatic Safety System Actuations as required but must immediately inform the Procedure Director afterwards.

C. Reactor Operators must obtain approval from the Procedure Director prior to bypassing automatic Safety System Actuations for which there is no procedural guidance.

D. Reactor Operators must obtain concurrance from the Procedure Director prior to bypassing automatic Safety System Actuations as directed by approved plant procedures.

40. The plant is at 100% full power when the letdown radiation monitor, RM-L1, fails high. Chemistry is notified and, after sampling, returns with the following data:

- Dose equivalent I-131 is 0.02 μCi/gm.
- Reactor coolant gross specific activity is 150/E-bar μCi/gm.

What technical specification action, if any, should be taken?

A. Be in Mode 3 with Tave < 500° F in six hours.

B. Verify dose equivalent I-131 within acceptable region and restore within 48 hours.

C. Verify gross specific activity within acceptable region and restore within 48 hours.

D. No technical specification action applies for these conditions.

41. Which of the following conditions best describes the configuration of selected Control Complex Ventilation system components after a RMA-5 Gas Actuation has occurred?

A. AHD-2C & 2E will be open.

B. The CC Normal Duty Supply Fans (AHF-17A/B) will trip.

C. The CC Ventilation system will be in the recirculation mode with a Normal Duty Supply fan (AHF-17A/B) running.

D. The selected Control Access Area Exhaust Fan (AHF-20A/B) will be running in fast speed.

42. Which of the following describes the direct signal that decreases condensate flow demand on a loss of one MFW pump at 80% power?

A. A signal from the deaerator high level interlock.

B. A runback signal from the ULD sub-section of the ICS.

C. A signal that compares existing CD flow with FW flow and hotwell level.

D. A signal that compares existing CD flow with FW flow and deaerator level.

43. The following plant conditions exist:

- The plant is in Mode 3.
- The diesel fuel storage tank readings are as follows:

EDG "A" - 8' 2"
EDG "B" - 7' 1"

Which of the following describes the required action(s) for this situation?

A. Restore fuel oil to within limits in 48 hours.

B. Verify combined stored fuel oil level > 45,834 gallons within 1 hour.

C. Both EDGs are inoperable; restore one to operable status in 2 hours.

D. Immediately declare the "B" EDG inoperable and restore to operable status within 72 hours.

44. The following plant conditions exist:

- A fire has been reported in the CC HVAC room.
- Smoke and fumes are observed filling the control room.
- Normal plant control has *not* been affected.

Which of the following describes the actions which should be taken?

A. Enter AP-880, Fire Protection, and AP-990, Shutdown from Outside Control Room.

B. Enter AP-880, Fire Protection. Since normal plant control has not been affected entry into AP-990, Shutdown from Outside Control Room, is not required.

C. Enter AP-990, Shutdown from Outside Control Room. Since the fire is in the CC HVAC room entry into AP-880, Fire Protection, is not required.

D. Enter AP-990, Shutdown from Outside Control Room, don air packs and concurrently perform AP-510, Rapid Power Reduction.

45. A new fuel assembly was being positioned at the new fuel elevator for placement in the Spent Fuel Pool. A failure occurred with the lifting cable and the assembly fell into the SF pool and may have possibly hit another fuel assembly. As a precaution the Fuel Handling Area was evacuated. Control room operators noticed an increase in RM-A2 and local RMGs but none went above the "Warning" setpoint. Which of the following Emergency Classifications, if any, should be entered?

A. An Unusual Event should be entered.

B. An Alert should be entered.

C. A Site Area Emergency should be entered.

D. No Emergency Classification should be entered. The NSM should inform the MNPO and DNPO to determine additional actions to be taken.

46. The plant is operating in Mode 1 with 250 EFPD. The plant computer is Out-of-Service while in Mode 1. Power Range NIs are as follows:

NI-5 = 90.6%	NI-7 = 95.7%
NI-6 = 90.0%	NI-8 = 91.7%

Which of the following is the required RPS Overpower Trip setpoint for these conditions?

A. $\leq$ 92.00%

B. $\leq$ 95.88%

C. $\leq$ 96.90%

D. $\leq$ 100.78%

47. The following plant conditions exist:

- A LOOP has occurred.
- A steam leak in containment is in progress.
- RB pressure is 12 psig.
- RCS pressure is 600 psig.

Based on the above conditions which of the following describes the status of EFP-1, DHP-1A, DHV-5 and BSV-3? (assume all loads have sequenced on as designed)

A.	EFP-1	Running
	DHP-1A	Running
	DHV-5	Open
	BSV-3	Open
B.	EFP-1	Running
	DHP-1A	Off
	DHV-5	Open
	BSV-3	Open
C.	EFP-1	Off
	DHP-1A	Off
	DHV-5	Open
	BSV-3	Closed
D.	EFP-1	Off
	DHP-1A	Running
	DHV-5	Closed
	BSV-3	Open

48. The following plant conditions exist:

- A controlled plant shutdown is in progress.
- RCS pressure is 250 psig.
- RCS temperature is 200° F.
- An RCS leak occurs and you elect to manually actuate LPI.

Based on the above conditions what would be the expected status of DHP-1A & 1B?

A. Neither DHP will start.

B. Both DHPs will start immediately.

C. Both DHPs will start 15 seconds following the manual actuation in their normal block loading sequence.

D. The "B" DHP will start 15 seconds following the manual actuation in its normal block loading sequence. The "A" DHP will not start until five seconds later if EFP-1 is running.

49. The following plant conditions exist:

- The plant is in Mode 1.
- A failure in the 'A' inverter has caused its transfer switches to automatically swap to the alternate power supplies.
- Operations manually bypasses the inverter and transfer switches to assist troubleshooting activities.
- Electricians replace a circuit board and report that the inverter is functioning properly and ready to supply the vital buses.

Prior to re-alignment of the inverter and transfer switches which of the following describes the operability condition for this equipment?

A. The vital buses and inverter are *operable*.

B. The vital buses and inverter are *inoperable*.

C. The vital buses are *operable* but the inverter is *inoperable* until the transfer switches are placed back in service.

D. The inverter is *operable* but the vital buses are *inoperable* until the transfer switches are placed back in service.

50. With LPI established at > 1400 gpm in both lines a step in EOP-3, Inadequate Subcooling Margin, instructs the PPO to unlock and close the CFT isolation valve breakers. Where are these breakers located and what is the purpose for this action?

A. ES MCC 3A & 3B; to allow the control room operators to verify the valves are open to provide an additional source of makeup to the RCS.

B. ES MCC 3A & 3B; to allow the control room operators to close the valves to prevent nitrogen injection into the RCS after the tanks are emptied.

C. ES MCC 3AB; to allow the control room operators to verify the valves are open to provide an additional source of makeup to the RCS.

D. ES MCC 3AB; to allow the control room operators to close the valves to prevent nitrogen injection into the RCS after the tanks are emptied.

51. The following plant conditions exist:

- The plant is in Mode 3.
- RCS pressure is 2155 psig.
- RCS temperature is 534° F.
- MUV-31 has increased from 65% to 95% open.
- PZR level, after an initial decrease, is being maintained at setpoint.
- A Security Officer has called the control room to report water dripping from the ventilation ductwork in the Seawater Room.

Based on the above which of the following describes the EOP/AP that should be entered and probable plant conditions?

A. Entry Conditions for EOP-2, Vital System Status Verification, are met due to excessive RCS leakage.

B. Entry Conditions for EOP-5, Excessive Heat Transfer, are met. The PZR level decrease is due to the decrease in RCS temperature.

C. Entry Conditions for EOP-8, LOCA Cooldown, are met. The PZR level decrease is due to an RCS leak into the SW system.

D. Entry Conditions for AP-520, Loss of RCS Coolant or Pressure, are met. The PZR level decrease is due to an RCS leak into the SW system.

52. Which of the following meets the entry conditions of AP-330, Loss of Nuclear Services Cooling ?

A. Power is lost to the "A" Emergency SW pump while SWP-1C is out of service.

B. A piping leak in the SW system results in reduced flow to components; numerous components have high temperature alarms and the temperatures are increasing .

C. Loss of make-up capabilities to the SW surge tank coupled with normal system leakage have resulted in the tank level decreasing to 8 feet.

D. A partially plugged CRD filter has resulted in a low flow auto start of the back-up SW booster pump and a high delta-P condition on the cooling line to the CRDs.

53. During operation at 100% power a SASS monitoring channel is cycling in and out of alarm. Which of the following is the correct action which should be taken for this condition?

A. Open the associated annunciator alarm link per OI-07 and generate a work request.

B. Monitor the affected channel to determine the most valid indication and select that indicator using the control board (or cabinet) switch.

C. Monitor the affected channel to determine the most valid indication, select that indicator using the control board (or cabinet) switch and bypass the affected channel.

D. Bypass the affected channel and generate a work request to increase the "SASS MISMATCH" alarm setpoint.

54. A step in SP-354A, Monthly Test of EDG-1A, requires the PPO to ensure that the Speed Droop is set to '60' and the Unit-Parallel switch to 'Parallel'. Where would you direct the PPO to go to perform these functions and why are they necessary?

A. Both switches are located in the EDG-1A control panel; Speed droop setting is to allow sharing of real load; Parallel setting is to allow sharing of reactive load.

B. Speed droop switch is located on the engine governor and the Unit-Parallel switch is located in the EDG-1A control panel; Speed droop setting is to allow sharing of real load; Parallel setting is to allow sharing of reactive load.

C. Both switches are located in the EDG-1A control panel; Speed droop setting is to allow sharing of reactive load; Parallel setting is to allow sharing of real load.

D. Speed droop switch is located on the engine governor and the Unit-Parallel switch is located in the EDG-1A control panel; Speed droop setting is to allow sharing of reactive load; Parallel setting is to allow sharing of real load.

55. All power is lost to VBDP-5. Which of the following describes the response of the Reactor Protection System (RPS) and associated Control Rod Drive (CRD) interface?

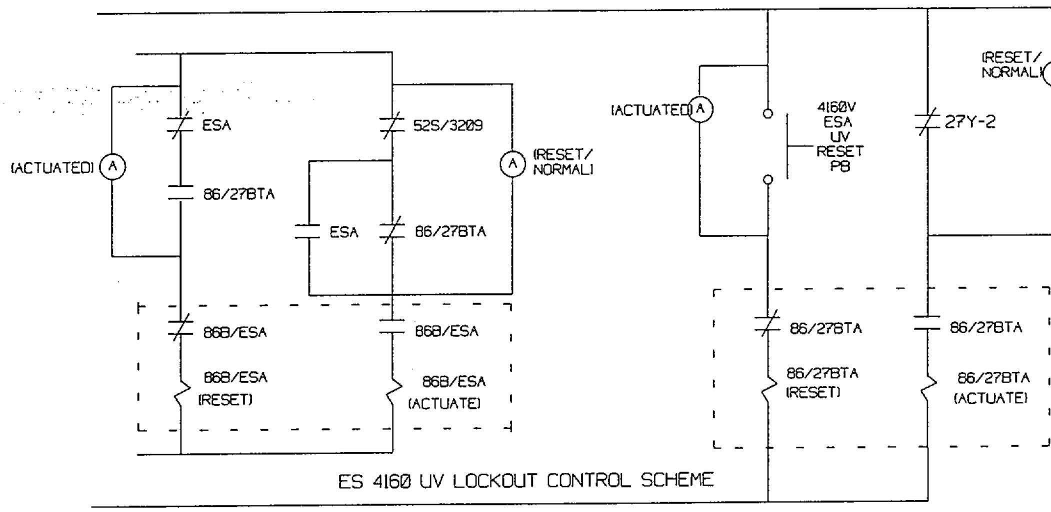
A. RPS channel "C" will trip and the "C" CRDM breakers will open.

B. RPS channel "D" will trip and the "D" CRDM breakers will open.

C. RPS channel "C" will trip and the "F" electronic trip will actuate.

D. RPS channel "D" will trip and the "E" electronic trip will actuate.

56. Using the drawing below which of the following will extinguish the "Actuated" lamps and illuminate the "Reset/Normal" lamps?



A. The undervoltage condition clears and the "Reset" pushbutton is depressed.

B. Breaker 3209 is opened and the "Reset" pushbutton is depressed.

C. The HPI actuation clears and the "Reset" pushbutton is depressed.

D. The HPI actuation clears, breaker 3209 is opened and the "Reset" pushbutton is depressed.

57. SP-379, PORV Exercise Test, is in progress with the following initial plant conditions:

- RCDT pressure is 2 psig.
- RCDT temperature is 90° F.
- RCDT level is 100".
- Tailpipe temperature is 100° F.
- RCS pressure is 700 psig.
- PZR level is 90".

Immediately after the PORV is cycled which of the following sets of conditions indicate that the stroke test was successful and the PORV is closed?

A. 'PORV Safety Valve Open' alarm is annunciated.
Tailpipe temperature is 320° F.
RCS pressure is 650 psig.

B. 'PORV Safety Valve Open' alarm is annunciated.
Tailpipe temperature is 220° F.
RCS pressure is 650 psig.

C. 'PORV Safety Valve Open' alarm is out.
Tailpipe temperature is 320° F.
RCDT temperature is 93° F.

D. 'PORV Safety Valve Open' alarm is out.
Tailpipe temperature is 220° F.
RCDT level is 103".

58. Due to a switching error both the 'B' and 'D' battery charger's output breakers have been opened. What is the expected status light indication on the 'B' vital bus inverter for this condition?

A.

Normal Source Available	ON
Battery Source Available	ON
Normal Source Supplying Load	ON
Battery Supplying Load	OFF
In Sync	ON

B.

Normal Source Available	ON
Battery Source Available	OFF
Normal Source Supplying Load	ON
Battery Supplying Load	OFF
In Sync	OFF

C.

Normal Source Available	OFF
Battery Source Available	ON
Normal Source Supplying Load	OFF
Battery Supplying Load	ON
In Sync	ON

D.

Normal Source Available	ON
Battery Source Available	OFF
Normal Source Supplying Load	ON
Battery Supplying Load	OFF
In Sync	ON

59. The following plant conditions exist:

- A controlled plant shutdown is in progress due to a shaft failure of RWP-2A.
- The reactor is critical with RCS temperature at 545° F.
- PZR level is 95".
- The SPO reports that CWTS-2 is completely clogged with debris and will not start and the flume water level is almost empty.

Based on these conditions which of the following actions, and applicable reasons for these actions, should be performed?

A. Since RWP-1 and RWP-2B are not affected by this flume water level decrease continue with the plant shutdown per applicable OPs and inform maintenance personnel of the problem.

B. Trip the reactor and initiate EFIC due to the loss of CW cooling to the condenser.

C. Trip the reactor due to low PZR level.

D. Trip the reactor due to the loss of SW RW flow.

60. The following plant conditions exist:

- Plant is in Mode 4.
- A waste gas tank release has been in progress for 1.5 hours.
- Notified by Chemistry that the RM-A2 particulate sampler is non-functional.
- RM-A8 indicates a slow increasing trend.

Which of the following actions should be be taken?

A. The release must be secured until the sampler is declared operable.

B. The release may continue until completion since RM-A2 Gas will secure the release if its high setpoint is reached.

C. The release may continue for up to one hour with no additional actions.

D. The release may continue for more than one hour as long as samples are continuously taken with auxiliary sampling equipment.

61. EOP-06, Steam Generator Tube Rupture, has the following step:

> IF condenser is available,
> THEN notify SPO to
> CONCURRENTLY PERFORM
> EOP-14, Enclosure 6, OTSG
> Blowdown Lineup

What is the basis for performing this step?

A. Provides a means of OTSG pressure control if steaming is not permitted.

B. Provides an additional means of OTSG pressure control if steaming is permitted.

C. Provides a path for OTSG inventory control if steaming is not permitted or is inadequate to keep up with the leak rate.

D. Provides a path for OTSG inventory control if steaming is permitted and is adequate to keep up with the leak rate.

62. During refueling operations the following events occur:

- The main bridge operator is placing a fuel assembly into the core.
- The "Underload Limit" light is flashing in and out.
- The fuel assembly is $\approx$ 2 feet from full insertion.
- The spotter is giving instructions to the bridge operator on the use and direction of the inching motor.

Which of the following is the Refueling Area Supervisor's responsibility in this situation?

A. Approve all further actions prior to them taking place.

B. Assume the role of the spotter and give directions.

C. Obtain permission from the Refueling Engineer in the control room to continue.

D. Initiate a "Stop Work" order for a significant fuel handling event.

63. The following plant conditions exist:

- Plant is operating ≈ 20% power.
- SUCV position ≈ 95% open.
- LLCV position ≈ 5% open.

I & C technicians have requested that the 'B' train SUCV and LLCV hand/auto stations be taken to hand in order to record some data on the proportional/integral module supplying the input to these stations. Permission is received and these stations are placed in manual. After the technicians are finished, with no problems noted, preparations are made to return these stations to automatic.

Which of the following describes the appropriate actions to return these stations to automatic?

A. Place the SUCV in auto first, then place the LLCV in auto.

B. Place the LLCV in auto first, then place the SUCV in auto.

C. Open the SUCV to 100% to allow the LLCV full control. Place the LLCV in auto first and then the SUCV.

D. Close the LLCV to allow the SUCV full control. Place the SUCV in auto first and then the LLCV.

64. EOP-3, Inadequate Subcooling Margin, is in progress. Which of the following sets of conditions would require transition into EOP-7, Inadequate Core Cooling?

A. RCS pressure; 1965 psig
T_{hot}; 660° F
T_{incore}; 650° F
T_{cold}; 630° F

B. RCS pressure; 1875 psig
T_{hot}; 660° F
T_{incore}; 650° F
T_{cold}; 630° F

C. RCS pressure; 1705 psig
T_{hot}; 640° F
T_{incore}; 630° F
T_{cold}; 625° F

D. RCS pressure; 900 psig
T_{hot}; 550° F
T_{incore}; 552° F
T_{cold}; 540° F

65. Which of the following describes the basis for varying the rate of OTSG level increase in proportion to OTSG pressure when EFW is actuated?

A. To maintain steam pressure above 600 psig.

B. To assist the EFW overfill logic in controlling OTSG level.

C. To prevent excessive thermal shock of the OTSG tube sheets.

D. To minimize RCS cooldown.

66. SP-333, Control Rod Excercises, is in progress with reactor power at 90%. While swapping to the auxiliary power supply for Group 4 a malfunction occurs and control rods 4-3 and 4-4 drop to 70% withdrawn and remain there. Which of the following action(s) should be taken?

A. Trip the reactor and enter EOP-2, Vital System Status Verification.

B. Reduce reactor power to 60% using AP-510, Rapid Power Reduction, and verify SDM limits are not exceeded.

C. Reduce reactor power to 60% using AP-545, Plant Runback, and verify SDM limits are not exceeded.

D. Reduce reactor power to 60% using OP-204, Power Operations, and verify SDM limits are not exceeded.

67. The following plant conditions exist:

- Plant is at 28% power.
- Preparations are in progress to re-start RCP-1A due to a spurious trip.

Which of the following will electrically prevent RCP-1A from being started? (consider only the effect on RCP interlocks for each failure)

A. Selected wide range T_{cold} signal input failed low.

B. Selected narrow range T_{cold} signal input failed low.

C. Common controlled bleed-off valve, MUV-253, closed.

D. Selected reactor power signal input failed low.

68. With the plant at 100% power which of the following power sources could feed the 'B' ES 4160V bus?

A. Unit 3 Startup transformer, Offsite Power transformer, Backup ES transformer or the Unit Auxiliary transformer.

B. Offsite Power transformer, Backup ES transformer, EDG-1B or the Unit Auxiliary transformer.

C. Unit 3 Startup transformer, Offsite Power transformer, Backup ES transformer or EDG-1B

D. Offsite Power transformer, Backup ES transformer, MTDG-1 or EDG-1B.

69. SCP-1A has been in operation for two hours when the open limit switch on its discharge valve malfunctions, indicating the valve is not full open. Which of the following describes the plant response to this failure?

A. SCP-1A will trip, its discharge *and* suction valves will close and SCP-1B will auto start 10 seconds later.

B. SCP-1A will remain in operation. No auto start signal will be generated for SCP-1B.

C. SCP-1A will trip, its discharge valve will close and SCP-1B will auto start 10 seconds later.

D. SCP-1A will remain in operation because its discharge valve full open indication is only required for pump start.

70. The following plant conditions exist:

- A LOOP has occurred.
- 'A' EDG did not start due to an electrical lockout.
- 'B' EDG initially started and loaded on the bus and then the output breaker tripped open for no apparent reason. The EDG engine remained at 900 rpm.

Which of the following describes the electrical lockouts, at a minimum, which must be reset if both EDGs are to be loaded on the ES buses?

A. 'A' EDG - 86DG, generator differential current lockout
'B' EDG - 4160V undervoltage lockout

B. 'A' EDG - 4160V undervoltage lockout
'B' EDG - 4160V undervoltage lockout

C. 'A' EDG - 4160V undervoltage lockout
'B' EDG - 86DG, generator differential current lockout

D. 'A' EDG - 86DG, generator differential current lockout
'B' EDG - 86DG, generator differential current lockout

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71. The following plant conditions exist:

PARAMETER	DATA
Rx power	90%
Linear amp power range	top 45 bottom 45
RCS T_{hot}	601
RCS pressure	1955
RCS flow	1.47×10^8 lbm/hr
RB pressure	+0.5 psig
RCP monitor	A 8,300 kw B 7,100 kw C 9,500 kw D 8,000 kw
Turbine control oil	99 psig
MFW control oil	114 psig

Based on the above data which of the following parameter changes will require immediate entry into EOP-2, Vital System Status Verification? (consider each option independently)

A. Linear amp power range top 30 bottom 60

B. RCS pressure 1900 psig

C. RCP monitor B 2152 kw

D. Turbine control oil 50 psig

72. The plant is in Mode 6 with Refueling Operations in progress. The Refueling Shift Supervisor has been notified that SP-346, Containment Penetrations Weekly Check During Refueling Operations, has failed due to multiple containment penetrations not in their required status. Which of the statements below describes the minimum required actions?

A. Core alterations may continue but the HP Supervisor must verify that air flow at the RB Hatch is into the RB.

B. Core alterations may continue but the Reactor Building Purge System supply fans must be secured.

C. Immediately suspend all core alterations however movement of irradiated fuel in the fuel transfer canal may continue.

D. Immediately suspend all core alterations and movement and irradiated fuel within containment.

73. The following plant conditions exist:

- The plant is in Mode 3 with RCS pressure at 2150 psig.
- AP-990, Shutdown from Outside the Control Room, has been entered and transfer to the Remote Shutdown Panel is complete.
- MUV-31 has failed.
- The NSS directs that PZR level be maintained at an indicated ≈ 100 inches.

Which of the following actions should be taken and what would be the approximate actual PZR level for these conditions?

A. Open MUV-27 and direct the PPO to open MUV-30, bypass around MUV-31; ≈ 160 inches.

B. Use an available HPI valve; ≈ 160 inches.

C. Open MUV-27 and direct the PPO to open MUV-30, bypass around MUV-31; ≈ 40 inches.

D. Use an available HPI valve; ≈ 40 inches.

74. The following *initial* plant conditions exist at 100 EFPD:

NI-5	100%	Imbalance at 0
NI-6	100%	Rod Index of 282%
NI-7	100%	
NI-8	100%	

Fifteen minutes after an event the following conditions are observed:

NI-5	40%	Imbalance at -10
NI-6	50%	Rod Index of 250%
NI-7	50%	
NI-8	50%	

Which of the following could cause these indications?

A. Dropped rod.

B. Stuck rod in the fully withdrawn position.

C. Loss of one reactor coolant pump.

D. Boration event in progress.

75. The following plant conditions exist:

- A Continuous Control Rod Motion event was in progress.
- AP-525 was entered and control rod motion was stopped.
- Initial reactor power was 30% with a Rod Index of 180.
- Final reactor power is 60% with a Rod Index of 200.

Based on the above conditions which of the following action(s), if any, should be initiated?

A. No action is required. Rod Index is acceptable for this power level.

B. Enter TS and verify F_Q and F^N DH are within limits once every two hours and restore regulating rod groups to within limits in < 24 hours.

C. Enter TS and initiate boration to restore SDM to > 1% Dk/k within 15 minutes and restore regulating rod groups to within restricted operating region in < 2 hours.

D. Enter TS and reduce thermal power to < the thermal power allowed by the regulating rod group insertion limits < 2 hours.

76. You are about to start a release from ECST-A when you notice that there is a work request written on flow recorder WD-101-FR because of erratic indication. The SSOD gives his permission to perform the release with the recorder inoperable provided release rate data is taken every 15 minutes. At the start of the release ECST-A level is at 95%. The level is at 84% 15 minutes later. Which of the following was the release rate during this 15 minute period?

A. $\approx$ 25 gpm

B. $\approx$ 47 gpm

C. $\approx$ 62 gpm

D. $\approx$ 78 gpm

77. A step in EOP-12, Station Blackout, directs the operator to actuate MS line isolation on both OTSGs.

Which of the following is the reason for this step?

A. To help control cooldown by minimizing the length of steam line available for steam control problems.

B. To prevent OTSG dry out due to the loss of main feedwater.

C. To maintain greater than 100 psig in the OTSGs due to the impact of the loss of power on turbine bypass valves.

D. To ensure OTSGs are isolated due to the impact of the loss of power on the MS line isolation logic.

78. A small leak has just occurred in the Waste Gas Decay Tank area. Which of the following describes the *first* radiation monitor that should detect this leak and the automatic actuations that should occur?

A. RM-A4; trips AHF-10

B. RM-A3; trips AHF-11A/B and closes AHD-29 & 36.

C. RM-A3; trips AHF-11A/B, closes WDV-393, 394, & 395 (recycle isolation valves) and closes WDV-439 (common waste gas isolation).

D. RM-A11; closes WDV-393, 394, & 395 (recycle isolation valves) and closes WDV-439 (common waste gas isolation).

79. The following plant conditions exist:

- The plant is at 32% power.
- MUP-1B, SWP-1A, and RWP-2A are running.
- A failure in the 230KV switchyard caused the OPT feed from the switchyard to trip open but its normal feeder breaker to the ES bus did not open.

What is the appropriate operator response to this situation?

A. Trip the reactor and secure SW cooled components.

B. Ensure MUP-1B, SWP-1A and RWP-2A are still in operation.

C. Ensure SWP-1B and RWP-2B start; transfer MUP-1A to DC then start DCP-1A, RWP-3A; start MUP-1A.

D. Ensure SWP-1B and RWP-2B start; start DCP-1B, RWP-3B; align the makeup system to start MUP-1C; start MUP-1C.

80. The plant is in Mode 5 with the 'A' DH train in service under steady state conditions. The control room operators observe a steady increase in RCS temperature. Which of the following describes a possible reason for this increase?

A. An increase in RWP-3A discharge pressure.

B. An increase in the ΔT across the shell side of DCHE-1A.

C. RWV-150 has failed open and is raising the temperature in the raw water pit.

D. The temperature feedback loop for the DC control valves is malfunctioning and decreasing the DC flow through the DHHE.

81. The following plant conditions exist:

- The plant is in Mode 6 with refueling operations in progress.
- The 'A' DH Train is in service.
- A malfunction occurs in the Radiation Monitoring Panel which renders RM-L1, RM-L6 & RM-L7 inoperable.
- Control room operators notice a slow decreasing trend in refueling canal water level.

Which of the following combination of indications could be used to determine the reason for the decrease in refueling canal water level?

A. If the leak is into the SW system; RM-L3 would increase and SW surge tank level would increase.

B. If the leak is into the DC system; RM-L5 would increase and DC surge tank level would increase.

C. If the leak is into the SF system; RM-L5 would increase and DC surge tank level would remain constant.

D. If the leak is into the DC system; RM-L3 would increase and DC surge tank level would increase.

82. The plant is operating at 100% full power with the following RCP seal data:

RCP SEAL STAGE PRESSURE (psig)

Time	2nd Stage RCP-1A	3rd Stage RCP-1A	2nd Stage RCP-1B	3rd Stage RCP-1B	2nd Stage RCP-1C	3rd Stage RCP-1C	2nd Stage RCP-1D	3rd Stage RCP-1D
0900	1300	700	1400	800	1550	900	1425	725
0910	1325	725	1375	825	1575	925	1425	775
0920	1300	700	1400	800	1550	950	1400	775
0930	1325	725	1400	800	1575	1035	1450	800
0940	1350	725	1400	800	1575	1125	1450	800
Dumpster clicks per minute at 0940.	3		2		3		2	

Based on the above data which of the following describes the proper course of action?

A. Immediately trip RCP-1C and allow the ICS to run back the plant.

B. Reduce power to < 72% per AP-510, Rapid Power Reduction, and trip RCP-1C.

C. Reduce power to < 72% per OP-204, Power Operations, and trip RCP-1C.

D. RCPs are all within expected leakage for the operating condition. Total RCS leakage should be verified by performance of SP-317.

83. The plant is operating at 60% RTP when the control board operator notices a slow degradation of condenser vacuum. Ten minutes later the following conditions exist:

- OP-607, Condenser Vacuum Systems, Section 4.5, Loss of Vacuum, has been entered.
- Condenser vacuum is 4" Hg absolute.
- Condenser ΔT is 3° F.
- "A" Air Removal Pump, ARP-1A, has tripped.
- "B" Air Removal Pump, ARP-1B, has failed to auto-start.

Which of the following describes required operator action(s), if any, and the status of condenser vacuum?

A. The main turbine should be manually tripped; procedural limits have been exceeded. Condenser vacuum will continue to degrade following the turbine trip.

B. The main turbine should be manually tripped; procedural limits have been exceeded. Condenser vacuum will stabilize following the turbine trip.

C. The main turbine is within procedural limits; condenser vacuum will continue to degrade.

D. The main turbine is within procedural limits; condenser vacuum will stabilize at a slightly lower value.

84. At 1600 the incore neutron flux detection system is declared inoperable. Power Range NIs indicate the following:

NI-5 = 85.0%	NI-7 = 95.0%
NI-6 = 89.5%	NI-8 = 93.5%

Which of the following is the calculated limiting Quadrant Power Tilt from the above NI readings?

A. + 6.3%

B. - 1.4%

C. + 4.7%

D. - 4.7%

85. The following plant conditions exist:

- The plant is in Mode 5.
- The operating decay heat pump, DHP-1A, trips on overload.
- The standby decay heat pump, DHP-1B, is started, cavitates and trips.
- Reactor coolant level is 131'.
- Reactor coolant temperature is 93° F.
- Upper hand holds on the steam generator are removed.

Based on these conditions which of the following methods should be used to restore core heat removal?

A. Establish decay heat removal with DHP-1A.

B. Establish high pressure injection.

C. Establish fuel transfer canal fill.

D. Establish decay heat removal using spent fuel cooling.

86. Twenty minutes prior to completion of defueling activities the Spent Fuel (SF) pool level was 158 feet. Defueling has now been completed and the following plant conditions exist:

- Spent Fuel (SF) pool level is 156 feet and decreasing.
- The SF pool low level annunciator is in alarm.
- The transfer tube valves are open.
- The auxiliary building sump level is increasing.
- All other building sumps are stable.
- SFP-1B is operating; SFP-1A is secured.
- Reactor building pressure is 1 psig.

Which of the following could stop the decrease in Spent Fuel pool level?

A. Close the transfer tube valves.

B. Secure SFP-1B.

C. Transfer SF heat exchangers.

D. Secure the reactor building purge.

87. The following plant conditions exist:

- Plant is at 70% power during three RCP operation.
- MFW Booster pump 1A suction valve receives a false signal and strokes 10% in the closed direction and then stops.

Which of the following describes the required operator actions for this condition?

A. Reduce power to 45%.

B. Manually trip one MFWP and reduce power to 45%.

C. Reduce power to 55% and manually trip MFW Booster pump 1A.

D. There will be sufficient flow through the valve since it is still 90% open. Troubleshooting efforts should be initiated immediately.

88. EOP-8, LOCA Cooldown, is in progress. HPI and LPI actuated as designed and recovery efforts are in progress. The NSS directs you to shutdown the EDGs. Which of the following methods should be used to shutdown an EDG in this situation?

A. Place the Normal/At Engine switch to At Engine and direct the primary plant operator to depress the reset pushbuttons in the EDG engine room.

B. Bypass or reset the ES actuation and direct the primary plant operator to depress the Emergency Stop pushbutton in the EDG control room.

C. Bypass or reset the ES actuation and depress the Stop pushbutton on the main control board.

D. Use the speed changer to decrease EDG load to approximately 100 kW and then depress the stop pushbutton on the main control board.

89. The following plant conditions exist:

- Plant is in Mode 6 with refueling activities in progress.
- An RCS leak results in a decrease in refueling canal level.
- AP-1080, Refueling Canal Level Lowering, is entered.

A step in AP-1080 states:

> IF irradiated fuel is suspended form Main Fuel Handling Bridge,
> THEN notify bridge operator to place fuel in Rx vessel.
>
> IF irradiated fuel can NOT be placed in the Rx vessel,
> THEN notify bridge operator to place the fuel in an available upender and lower.

The primary concern addressed by this step is to:

A. Place the bridge in a condition where the operator can leave.

B. Place the bridge in the location where it will receive the least radiation exposure.

C. Place the fuel assembly in a location where it can be transferred to the spent fuel pool and the gates closed

D. Place the fuel assembly in a location where uncovery is least likely and shielding is maximized.

90. During three RCP operation (RCP-1D secured) the following readings are recorded:

- RCS total flow	107×10^6 1bm/hr			
- RCS T_{hot}	"A" loop	605° F	"B" Loop	605° F
- RCS pressure	"A" loop	2055 psig	"B" Loop	2090 psig

Based on the above conditions what action(s), if any, are required to be taken?

A. No action required. All parameters are within limits with only three RCPs in operation.

B. A DNBR Safety Limit has been exceeded. Be in Mode 3 within one hour.

C. One DNB parameter is not within limits. Restore the parameter to within limits in two hours.

D. Two DNB parameters are not within limits. Restore the parameters to within limits in two hours.

91. During normal full power operation a circuit failure occurs which results in the "SV1/SV2 Test" white indicating light for MSV-411 to illuminate. Using this indication only which of the following choices best describes the status of the MSIV air supply system?

A. SV1 and/or SV2 have de-energized, MSIV-411 should close.

B. SV1 and/or SV2 have energized, MSIV-411 should close.

C. SV1 and/or SV2 have de-energized, MSIV-411 should not reposition.

D. SV1 and/or SV2 have energized, MSIV-411 should not reposition.

92. The "A" Saturation Monitor has been selected to "Incore" for its temperature input. Incore temperature input is 600° F and RCS pressure is 500 psia. Which of the following statements describes the temperature input signal and the status of core cooling which should be indicated by this Saturation Monitor?

A. The average of the 6 selected incore thermocouples indicate that subcooling margin has been lost but the core is being adequately cooled.

B. The highest of the 6 selected incore thermocouples indicate that subcooling margin has been lost but the core is being adequately cooled.

C. The average of the 6 selected incore thermocouples indicate that an inadequate core cooling event is in progress.

D. The highest of the 6 selected incore thermocouples indicate that an inadequate core cooling event is in progress.

93. Following a large break loss of coolant accident reactor coolant system pressure is 435 psig. Steam generator pressure is 140 psig. What should the hot and cold leg temperatures be if boiler-condenser heat transfer has been established?

A. T_h is 468° F; T_c is 428° F.

B. T_h is 456° F; T_c is 428° F.

C. T_h is 456° F; T_c is 360° F.

D. T_h is 448° F; T_c is 360° F.

94. Preparations are in progress for closing the main generator output breaker. Which of the following conditions will cause a sudden large and possibly damaging mechanical torque to be exerted on the generator?

A. Generator is supplying a higher voltage than the grid.

B. Generator is supplying a lower voltage than the grid.

C. Generator frequency is 61 hertz.

D. Generator voltage is out of phase with the grid.

95. Thirty (30) minutes after a large SGTR/LOCA event, coincident with a stuck open MSSV, the plant conditions are as follows:

- RCS pressure is 600 psig and slowly decreasing.
- RCS temperature (incores) is 850° F and slowly increasing.
- RM-G29 is 27,000 R/hr.
- RM-G30 is 28,000 R/hr.
- MUP-1A and MUP-1B are running.
- Both BSPs are running.

Determine the correct Protective Action Recommendations for the conditions listed above.

A. No Protective Action Recommendations are required.

B. 0-2 miles, Evacuate 360°; 2-5 miles, Evacuate downwind sectors and shelter remaining sectors; 5-10 miles, Shelter downwind sectors.

C. 0-2 miles, Evacuate 360°; 2-5 miles, Evacuate 360°; 5-10 miles, Shelter 360°.

D. 0-2 miles, Evacuate 360°; 2-5 miles, Evacuate 360°; 5-10 miles, Evacuate 360°.

96. The ES Actuation System has failed to properly operate following a large break LOCA.

The following plant conditions exist:

- RCS pressure is 300 psig.
- Reactor Building pressure indicates 30 psig.
- No ES actuations have occurred.
- Health Physics reports detection of a severe containment release directly to the environment through a crack surrounding a penetration.

Which of the following actions would be the preferred method to reduce the radiation leakage to the environment?

A. Align both LPI/HPI suction from the RB sump and initiate flow.

B. Align RB purge using both supply and exhaust fans and initiate flow.

C. Start two RB fans in slow speed and initiate cooling.

D. Start two RB spray pumps and initiate cooling.

97. The following sequence of events have occurred:

- Instrument Air (IA) pressure drops to 70 psig.
- The air leak is then isolated.
- Air pressure recovers to 115 psig.

Which of the following describes the response of IAV-30 and required operator action(s), if any, to this sequence of events?

A. IAV-30 will close and automatically open when IA pressure increases above 80 psig.

B. IAV-30 will open and automatically close when IA pressure increases above 80 psig.

C. IAV-30 will close and must be manually reset and opened when IA pressure increases above 80 psig.

D. IAV-30 will open and must be manually reset and closed when IA pressure increases above 80 psig.

98. The following plant conditions exist:

- A reactor startup is in progress.
- The reactor is critical at 8 E-10 amps on both intermediate range instruments.
- NI-2 fails low.

Based on these conditions determine if SR/IR overlap could have been verified and the TS action(s) associated with the NI failure?

A. Adequate SR/IR overlap could *not* be determined prior to this failure. Immediately decrease power to ≤ 5 E-10 amps.

B. Adequate SR/IR overlap could *not* be determined prior to this failure. Restore channel to operable status prior to increasing thermal power.

C. Adequate SR/IR overlap could be determined prior to this failure. Restore channel to operable prior to entry into Mode 1.

D. Adequate SR/IR overlap could be determined prior to this failure. Restore channel to operable status prior to increasing thermal power.

99. The following plant conditions exist:

- During a plant heatup a Loss of Offsite Power occurred.
- EOP-02, Vital System Status Verification, immediate actions have been completed.
- Due to EFIC control problems EOP-4, Inadequate Heat Transfer, was entered and HPI/PORV cooling was established.

Ten minutes into the event the following plant conditions exist:

- AFW is established and feeding both OTSGs.
- HPI/PORV cooling has been secured.
- Subcooling margin is now 70° F and increasing (based on T_{incore}).
- PZR level is off scale high.
- T_{incore} is decreasing at 20° F per 1/2 hour.
- RCS pressure and temperature is above and to the left of the Nat Circ curve.

Which of the following describes the actions that should be taken in this situation and why is it being done?

A. HPI must be throttled because cooldown limits have been exceeded.

B. HPI must be throttled to restore PZR level since adequate subcooling margin exists.

C. HPI must be throttled when T_{cold} reaches 380° F to ensure NDT limits are not exceeded.

D. HPI must be throttled to minimize SCM because PTS guidelines are applicable.

100. The following plant conditions exist:

- A power increase is in progress.
- Group 7 rods are at 45% withdrawn when rod 7-4 sticks in place.
- PI panel indication is selected to RPI.

As the power increase continues which of the following indications could be used to determine that rod 7-4 is no longer moving?

A. Individual control rod position indication on PI panel.

B. Individual control rod position indication on plant computer.

C. Group average indication on MCB or plant computer.

D. Individual control rod amber fault light illuminates.