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

ENCLOSURE 1

EXAMINATION REPORT 50-413/OL-09-02

Facility Licensee: Duke Power Company
P. O. Box 256
Clover, SC 29710

Facility Name: Catawba Nuclear Station

Facility Docket Nos.: 50-413 and 50-414

Requalification written examinations and operating tests were administered at the Catawba Nuclear Station near Clover, South Carolina.

Chief Examiner: Richard S Baldwin — 1-8-90
Richard S. Baldwin — Date Signed

Approved By: Charles A Casto — 1-9-90
Charles A. Casto, Chief — Dated Signed
Operator Licensing Section 1
Division of Reactor Safety

Summary:

Requalification examinations were conducted during the weeks of August 21, 1989, and September 4, 1989.

Written and operating examinations were administered to ten Reactor Operators (ROs) and fourteen Senior Reactor Operators (SROs). Of the ten ROs tested, ten passed the examination. Of the fourteen SROs tested, eight passed the examination. Two of the six crews failed the simulator part of the operating examination.

REPORT DETAILS

1. Facility Employees Attending Exit Meeting:

R. Casler, Superintendent of Operations
J. Cox, Training Manager
H. Barron, DPC/CNS
W. Barron, Director of Operations Training
R. Kimray, Senior Instructor
G. Spurlin, Senior Instructor

2. Examiners

*R. Baldwin, NRC, Region II
J. Arildsen, NRC, Region II
R. McWhorter, NRC, Region II
P. Doyle, NRR, Headquarters
C. Casto, NRC, Region II

*Chief Examiner

3. Exit Meeting

At the conclusion of the site visit, the examiners met with representatives of the plant staff to discuss the results of the examinations. The following items were addressed:

Examination Development

After review of the licensee proposed questions for the written examinations, the examination team had to make extensive modifications to enhance the examination and format the questions to be more objective. The questions were not time validated prior to the examination team arriving on site.

The walk-through examinations, Job Performance Measures (JPMs) required minor changes in content and format.

The proposed simulator scenarios required minor changes to include more pertinent Individual Simulator Critical Tasks (ISCT).

Examination Administration

Administration of the written examination was very efficient. This method consisted of dividing Part B of the examination into two one-hour segments and administering it concurrently with Part A in the simulator. This method allowed the entire written examination to be accomplished in one day.

During the administration of the walk-through portion of the examination, minor inconsistencies were noted between evaluators, it was felt that those will diminish as the evaluators become more accustomed to administering JPMs. As a whole the ability of the facility's evaluators were considered as good.

During the administration of the simulator examinations the facility's examiners/evaluators appeared to conduct the scenarios in a well planned, and well ordered manner.

Generic weaknesses were displayed by the operator in the areas of ability in interpreting the ECCS light panel, reading and implementation of some emergency operating procedural steps, communication skills, proper verification of automatic actions following a reactor trip or safety injection, and event classification.

ENCLOSURE 4

REQUALIFICATION PROGRAM EVALUATION

The reference material provided by the licensee was reviewed to determine if it was adequate to support the examination. Handouts and procedures to support the test items were determined to be satisfactory. A sampling plan which included topics covered in the requalification program was provided. It did not include the percentage of time spent on each task until requested to do so by the NRC.

The number of open reference questions provided was consistent with NRC requirements for this stage of program implementation. A majority of the questions were essay or short answer, and many of these questions were of a look-up nature or required only the ability to match information in the question stem to the reference material in order to answer correctly. As a result, the exam team had to modify or develop a good portion of the written exam questions used for the examination. Questions from exams administered previously at Catawba were also used. The exams that were developed required some post-exam changes. The number of changes made is of concern to the NRC since it is reflective of the facility's ability to properly prepare an examination. Since this program is in the developing stages, the changes were accepted and were not grounds for rating the Catawba requalification program unsatisfactory. It is expected that future examinations will require fewer, if any changes.

The Job Performance Measures (JPMs) written by the facility covered important tasks; all were related to the Task Analysis and NUREG-1122. The JPMs originally submitted required changes to include evaluator cues and to better define standards for steps of a task. These changes were to ensure that they would be consistently administered by all evaluators. The changes were made in a prompt manner. The follow-up questions to the JPMs were released with the JPMs. The NRC will substitute facility-generated JPMs from outside the sampling plan to the maximum allowed by the standards on the next requalification examination.

The simulator exam scenarios submitted required minor modifications to emphasize emergency plant operations and to include passive malfunctions which would provide positive indication of completion of immediate operator actions associated with Emergency Operating Procedures. The changes were made promptly. The passive malfunctions that were added would not cause plant degradation if the operator failed to note it on his immediate operator action verification. Scenarios for future exams should be written such that these items would cause plant conditions to degrade or impede recovery. The facility evaluators were attentive and did not overlook items important to the evaluation. The facility led critiques conducted at the end of each crew's scenario set were informative and highlighted both the good and bad aspects of the operators' performance.

Based on the examination results, the Catawba Nuclear Station Requalification Program is evaluated as satisfactory.

ENCLOSURE 5

SIMULATION FACILITY FIDELITY REPORT

Facility Licensee: Duke Power Company

Facility Docket Nos.: 50-413 and 50-414

Operating Tests Administered On: August 22 and September 5, 1989

This form is 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 which may be used in future evaluations. No licensee action is required in response to these observations.

During the conduct of the simulator portions of the operating tests, the following items were observed:

No discrepancies were noted.

KEY

U.S. NUCLEAR REGULATORY COMMISSION
REACTOR OPERATOR REQUALIFICATION EXAMINATION

FACILITY: CATAWBA

REACTOR TYPE: WEC PWR

DATE ADMINISTERED: 08/25/89

OPERATOR: Part A - RO-1A

SECTION	CATEGORY VALUE	OPERATOR'S SCORE	% OF CATEGORY VALUE
A Plant Proficiency	14/25 pts.		
B Limits and Controls			

Final Grade

NAME_____

DATE _____

S.S. #_____

PART A
Test # 20-1A
AUGUST 25,1989
Page of

Originated by: R.E. Kimray

Approved by: W.H. Barron
DIR. OF OPER. TRNG.

TOTAL POINTS: 15
TOTAL QUESTIONS: 15

INSTRUCTIONS:

1. Put your name on each answer sheet
2. Write your answers on the answer sheet.
3. Ask the test monitor/instructor concerning questions which are not clear to you.
4. Cheating or evidence of cheating will not be tolerated.

My signature on this form is my declaration that the responses given on the attached test or quiz are entirely my own.

It further declares that I am aware that I am subject to termination from the training program immediately, and in addition, will be subject to further disciplinary action up to and including discharge from the company for cheating and/or compromising on exams/tests.

_____
Students signature

TURNOVER SHEET

Conditions Existing at the time of the Incident:

A. Plant Conditions

- Power History 100% MOL
- Boron 464 ppm
- Tave 591°F
- Xenon 2914 pcm
- Samarium -47 pcm

B. Tech. Spec. Action Items:

- Turbine impulse Press channel II has failed Low.
- D/G 'D' Fuel oil level is below Tech. Spec. minimum.

C. Work in Progress:

- "PZR REF Level" meter is failed Low
- Power reduction in progress at ~10% per hour

D. Current Procedure:

OP/1/A/6100/03 Enclosure 4.2 Step 2.2

Manual Actions Taken During the Incident:

A. Operator Computer Alarms Acknowledged
B. Control Room Annunciators Acknowledged

Simulator and chart recorders are "Frozen", the OAC is operational.

Points: [1.0] Which of the following statements is correct concerning the present status of the steam dump load rejection controller?

A. Controller is armed and steam dumps will modulate to maintain $T_{avg} = T_{no\text{-}load}$.

B. Controller is armed and steam dumps will modulate when T_{avg} exceeds T_{ref} by $3^{\circ}F$.

C. Controller is armed but dumps will not modulate due to failure of Impulse pressure channel 2.

D. Controller will not arm due to failure of Impulse pressure channel 2.

TIME: 2 minutes

Question 3 1

K/A Catalog

Sys	Mode	No.	RO	SRO
041	020	K4.03	2.8*	3.1

Answer 3: B.

References: 1MC-1

Originator: LBL

Points: [1.0] Which of the following is NOT a supporting indication of 1LXI being deenergized?

A. Battery charger 1CCA deenergized

B. TXI feeder breaker open

C. RY jockey pump B deenergized

D. TSC power supply swapped to alternate

R
Ov

RO Only

TIME: 3 minutes

Question 7 2

K/A Catalog

Sys	Mode	No.	RO	SRO
62	000	8	3.1	3.1

Answer 7: C.

References: OP/1/B/6100/10I

Originator:

Points: [1.0] Which of the shutdown CRDM fans is (are) available? Explain your answer.

TIME: 3 minutes

[illegible]tion 15 3

[illegible]/A atalog

Sys	Mode	No.	RO	SRO
062	000	K[illegible].01	3.5	3.9

Answer 15: A, C & D fans are now available. (.5 pts)

D has power from its normal supply.(D-MXR) (.25 pts)

A & C have power from their alternate supply.(.25 pts)

(A-MXO, C-MXQ)

References: MC-1

Originator: LBL

Points: [1.0] With the current plant conditions, what is the status of the operability of the P-13 interlock? Justify your answer.

TIME: 4 minutes

Question 4

K/A Catalog

Sys	Mode	No.	RO	SRO
012	000	K4.02	3.9	4.3

Answer 4: Inoperable (.5 pts.), T.S. Requires 2 channels minimum operable. CH-2 impulse press is failed Low. (.5 pts.)

References: T.S. Table 3.3-1

Originator:

Points: [1.0] Which of the following statements is correct concerning the current S/G Lo-Lo Level Reactor trip setpoints?

A. All four channels setpoints on all four S/G's are 40%.

B. Channels 1, 2 & 3 setpoints on all four S/G's are 40%, channel 4 setpoint on all S/G's is 17%.

C. All four channels setpoints on all four S/G's are 17%.

D. Channels 1, 3 & 4 setpoints on all four S/G's are 40%, channel 2 setpoint on all S/G's is 17%.

TIME: 3 minutes

Question 9 5

K/A Catalog

Sys	Mode	No.	RO	SRO
12	000	K4.02	3.9	4.3

Answer 9: D.

References: OP/1/A/6700/01 Fig 3.12

Originator: GFW

Points: [1.0] With the conditions that existed prior to the present incident, what actions would be required if NI-185A (ND Pump 1A Containment Sump Suction) was found to be inoperable?

A. Restore 1B D/G or NI-185A to operable status within 2 hours or be in Mode 3 within next 6 hours, Mode 5 within the following 30 hours.

B. Restore 1B D/G or NI-185A to operable status within 24 hours or be in Mode 3 within next 6 hours, Mode 5 within the following 30 hours.

C. Restore 1B D/G and NI-185A to operable status within 7 days or be in Mode 3 within next 6 hours, Mode 5 within the following 30 hours.

D. Restore 1B D/G and NI-185A to operable status within 72 hours or be in Mode 3 within next 6 hours, Mode 5 within the following 30 hours.

TIME: 6 minutes

Question 5 6

K/A Catalog

Sys	Mode	No.	RO	SRO
064	Gen	11	3.4	3.9

Answer 5: A.

References: T. S. 3.8.1.1 Action C
T. S. I. 3.8.1 Dated 10-4-84

Originator: LBL

Points: [1.0] Which of the following statements most accurately describes the cause of steam flow/feed flow mismatch on B S/G.

A. B S/G CF control valve has failed closed.

B. Indicated steam flow has increased due to failure of pressure compensation circuitry.

C. Feedwater flow has been reduced to bring B S/G level to new program value.

D. Power has been lost to B S/G CF flow instrumentation.

RO Only

TIME: 2 minutes

Question ~~8~~ 7

K/A Catalog

Sys	Mode	No.	RO	SRO
59	000	A2.12	3.1	3.4

Answer 8: C.

References: AP/1/A/5500/16

Originator: GFW

RO Only

Points: [1.0] What event currently in progress is responsible for the recent increase in Tavg?

TIME: 3 minutes

Question 14 9

K/A Catalog

Sys	Mode	No.	RO	SRO
059	000	K1.05	3.1	3.2

Answer 14: Feedwater flow to B & C S/G's has been reduced

References: MC-2

Originator: LBL

Points: [1.0] The "Comparator P/R Channel Deviation" annunciator is currently in alarm. What is the existing cause for this alarm?

TIME: 2 minutes

Question 9

K/A Catalog

Sys	Mode	No.	RO	SRO
015	020	K4.02	3.2	3.5

Answer 1: P/R Channel 42 has failed Low. (due to loss of detector volt.)

References: OP/1/B/6100/10C

Originator:

Points: [1.0] Which of the following is correct concerning the Immediate Actions of AP/1/A/5500/16 Case IV, Power Range Malfunction?

A. Reactor Trip is required but has not been performed.

B. Unwarranted rod motion is occurring but the Bank Select switch has not been placed in Manual.

C. S/G Level Program Select switch has not been placed to an operable channel.

D. Automatic rod withdrawal is not possible but the Bank Select switch has not been placed in Manual.

TIME: 3 minutes

Question ~~2~~ 10

K/A Catalog

Sys	Mode	No.	RO	SRO
015	Gen	14	3.6	3.6

Answer 2: C.

References: AP/1/A/5500/16, Case IV

Originator: LBL

Points: [1.0] With the conditions that existed prior to the present event and assuming that the unit shutdown is required by the D/C inoperability, what RN alignments are required to enable Unit 2 to remain at 100% power? (choose one)

A. Close 1RN-69B (RN Hdr 1B Supply ISOL), open and tag its supply breaker.

B. Close 1RN-47A (RN Supply Hdr X-Over ISOL) and 1RN-229B (NSHX 1B Outlet ISOL), tag the switches for these valves, open and tag the breaker for 1RN-310B (RN Hdr 1B to CA Pmp Suct ISOL).

C. Close 1RN-47A (RN Supply Hdr X-Over ISOL), 1RN-229B (NSHX 1B Outlet ISOL) and 1RN-310B (RN Hdr 1B to CA Pmp Suct ISOL), open and tag the breakers for these valves.

D. Close 1RN-47A and 2RN-47A (RN Supply Hdr. X-Over ISOL), tag these valve switches, verify all NSHX Outlet isolation valves (1RN-148A, 1RN-229B, 2RN-148A, 2RN-229B) are closed.

TIME: 4 minutes

Question 6 //

K/A Catalog

Sys	Mode	No.	RO	SRO
076	000	K1.05	3.8	4.0

Answer 6: B.

References: OP/0/A/6400/06C, Encl. 4.12

Originator: LBL

Points: [1.0] What should Programed Pressurizer level be this time?

A. 25%

B. 57%

C. 60%

D. 64%

RO Only

TIME: 1 minutes

Question ~~20~~ 12

K/A Catalog

Sys	Mode	No.	RO	SRO
000	028	EA2.01	3.4	3.6
000	028	EA2.02	3.4	3.8

Answer 10: C.

References: OP/1/A/6700/01 Fig 3.13

Originator: GFW

Points: [~~1.0~~ D] Which one of the following statements is not correct concerning the current seal injection flow rate?

A. NV-309 is closing down to reduce seal injection flow to 32 gpm.

B. "NCP Seal Water Low" is in alarm due to Low seal flow to 'A' NCP.

C. High flow rate is causing seal injection filter high differential pressure alarms.

D. Unidentified leakage is exceeding Technical Specification limits.

Question deleted since answer 'd' is also correct

TIME: 3 minutes

Question ~~11~~ 17

K/A Catalog

Sys	Mode	No.	RO	SRO
003	000	A1.09	2.8	2.8
003	000	K6.02	2.7	3.1
003	000	A2.01	3.5	3.9

Answer 11: A.

References: 1MC5
OP/1/B/6100/10H

Originator: GFW

Rev: 01/08-01-89/RBP

Points: [1.0] Which one of the following statements is correct concerning the current status of 1C NC pump?

A. The #1 seal has failed, after the seal return isolation (NV-74A) is closed, operation may continue for 24 hours.

B. The #1 seal has failed, continued operation is allowable as long as leakage to the NCDT does not exceed 10 gpm.

C. The #1 seal has failed, the pump trip criteria has been met and the reactor and C NC pump should be tripped immediately.

D. The #1 seal has failed, the NC pump must be stopped within thirty minutes.

TIME: 3 minutes

Question ~~12~~ 14

K/A Catalog

Sys	Mode	No.	RO	SRO
003	000	A2.01	3.5	3.9

Answer 12: D.

References: 1MC3
OAC Graphics 025
OP/1/B/6100/10H

Originator: GFW

Points: [1.0] Considering existing plant conditions, should 1NV-101A (NC Pumps #1 Seal Byp) be opened?

A. Yes. 1C NCP #1 seal outlet temp > 200°F and seal injection flow is > 6 gpm.

B. No. 1C NCP #1 seal leakoff flow > 1 gpm and NCS pressure is > 1000 psig.

C. No. 1C NCP seal injection flow is < 6 gpm and #1 seal leakoff is open.

D. Yes. 1C NCP #1 seal outlet temp > 200°F and #1 seal leakoff is open.

TIME: 3 minutes

Question ~~13~~ 15

K/A Catalog

Sys	Mode	No.	RO	SRO
003	000	A2.01	3.5	3.9

Answer 13: B.

References: OP/1/B/6100/10H

Originator: GFW

KEY

U.S. NUCLEAR REGULATORY COMMISSION
REACTOR OPERATOR REQUALIFICATION EXAMINATION

FACILITY: CATAWBA

REACTOR TYPE: WEC PWR

DATE ADMINISTERED: 08/25/89

OPERATOR: PART A - RO-1B

SECTION	CATEGORY VALUE 15 pts.	OPERATOR'S SCORE	% OF CATEGORY VALUE
A Plant Proficiency			
B Limits and Controls			

Final Grade

NAME_____

DATE _____

S.S. #_____

PART A
Test # RO-18
AUGUST 25,1989
Page of

Originated by: R.E. Kimray

Approved by: W K Barron
DIR. OF OPER. TRNG.

TOTAL POINTS: 15
TOTAL QUESTIONS: 15

INSTRUCTIONS:

1. Put your name on each answer sheet
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_____
Students signature

TURNOVER SHEET

Conditions Existing at the time of the Incident:

A. Plant Conditions

- Power History 100% BOL
- Boron 959 ppm
- Tave 591°F
- Xenon 2939 pcm
- Samarium +54.6 pcm

B. Tech. Spec. Action Items:

None

C. Work in Progress:

None

D. Current Procedure:

OP/1/A/6100/03 Enclosure 4.1

Manual Actions Taken During the Incident:

A. Operator Computer Alarms Acknowledged
B. Control Room Annunciators Acknowledged
C. Rx Trip Breakers opened

Simulator and chart recorders are "Frozen", the OAC is operational.

Points: [1.0] Which of the following best describes the currently existing CA auto start signals? (select one)

A. SI, AMSAC, both CFPT's tripped

B. AMSAC, 1/4 S/G Lo-Lo Level, S_T.

C. SI, Essential Switchgear B/O sequencers actuated, both CFPT's tripped.

D. SI, CF Isolation, 1/4 S/G Lo-Lo Level, AMSAC

TIME: 2 minutes

Question ~~6~~ 1

K/A Catalog

Sys	Mode	No.	RO	SRO
061	000	K4.02	4.5	4.6

Answer 6: A.

References:

Originator: CWO

Points: [1.0] Why was OTΔT the cause of the Reactor Trip? Include the required logic in your answer.

TIME: 4 mintues

Question 1 2

K/A Catalog

Sys	Mode	No.	RO	SRO
000	009	EA2.25	3.9	4.1

Answer 1: The decrease in pressurizer pressure reduced the OTΔT setpoint on at least 2/4 channels to the existing ΔT.

Reference:

Originator: LBL

Points: [1.0] Based on current Engineered Safeguards and plant conditions, what action should be taken? (select one)

A. Manually initiate A Train Phase B Containment Isolation.

B. Manually initiate A Train Phase A Containment Isolation.

C. Manually initiate B Train Phase B Containment Isolation.

D. Manually initiate B Train Phase A Containment Isolation.

TIME: 2 minutes

Question 7 3

K/A Catalog

Sys	Mode	No.	RO	SRO
013	000	K1.01	4.2	4.4

Answer 7: D.

References:

Originator: CWO

Points: [1.0] With existing plant values, approximately how long will it be before the ND pumps automatically shift suction to the containment sump? (select one)

A. 170 minutes

B. 200 minutes

C. 240 minutes

D. 290 minutes

TIME: 7 minutes

Question ~~11~~ 4

K/A Catalog

Sys	Mode	No.	RO	SRO
000	025	9	3.4	3.6
000	025	12	3.3	3.5

Answer 11: C. FWST level = 95% ... ~ 375,000 gal

Swap at 36.6% ..... ~ 150,000 gal

225,000 gal to pump

(±10,000)

ECCS Flow:

NV ~ 580gpm

NI ~ 350 gpm

930 gpm (±100gpm) $\frac{225,00 \text{ gal}}{930 \text{ gpm}} = 242$ min

or

4.03 hr

References: OP/1/A/6700/01 Curve 7.12
1MC5
1MC11

Originator: GFW

Points: [1.0] Based on current plant conditions, which of the following statements most accurately describes the method by which decay heat is being removed from the Reactor Core? (select one)

A. Forced circulation to S/G's, steam dumps to condenser.

B. Natural circulation to S/G's, steam dumps to condenser.

C. Natural circulation to S/G's, S/G PORV's to atmosphere.

D. Safety Injection flow through core and out the break.

TIME: 2 minutes

Question ~~12~~ 5

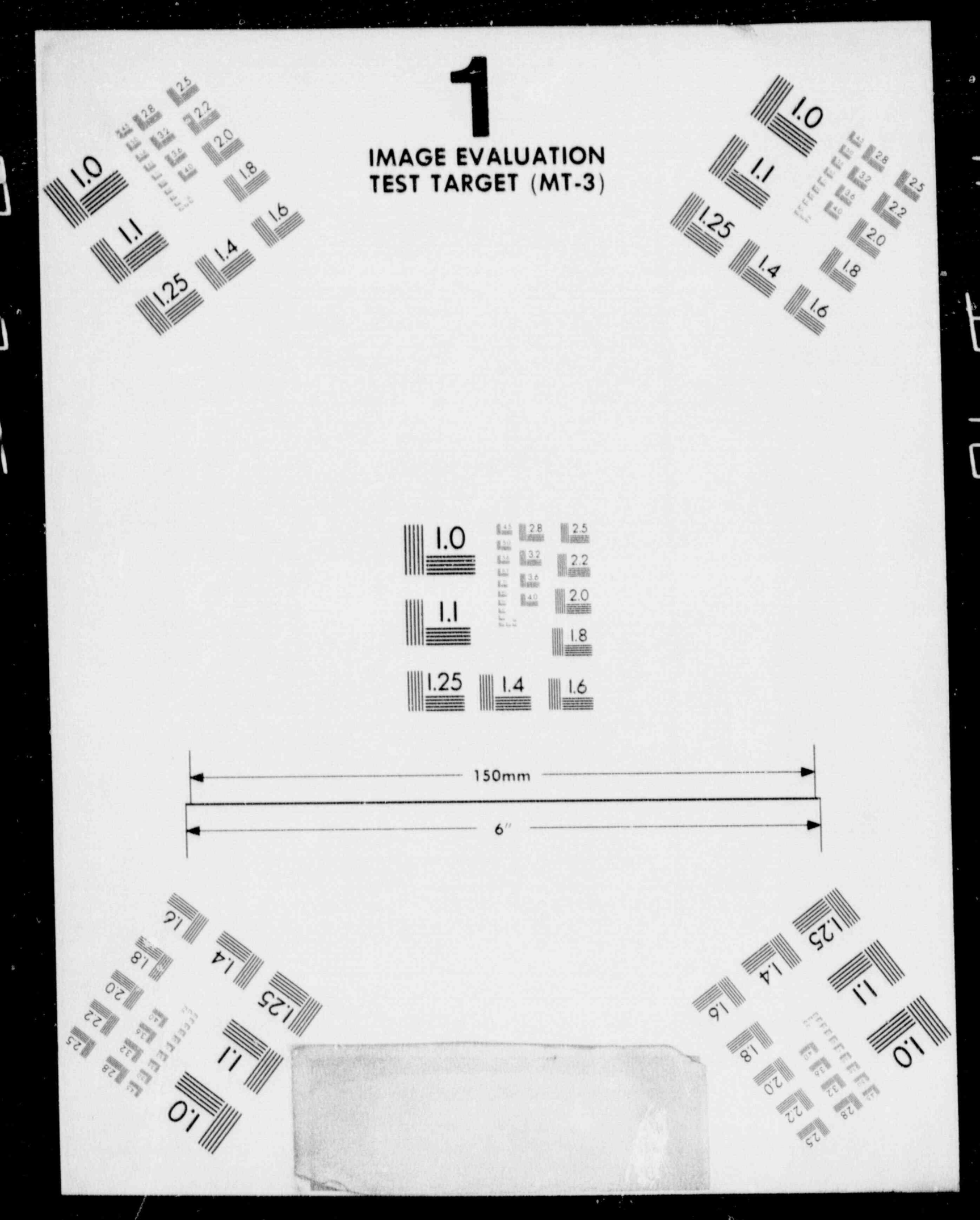
K/A Catalog

Sys	Mode	No.	RO	SRO
000	074	EA1.27	4.2	4.2

Answer 12: D. Safety Injection flow through the core and out the break.

References: 1MC10
1MC5

Originator: GFW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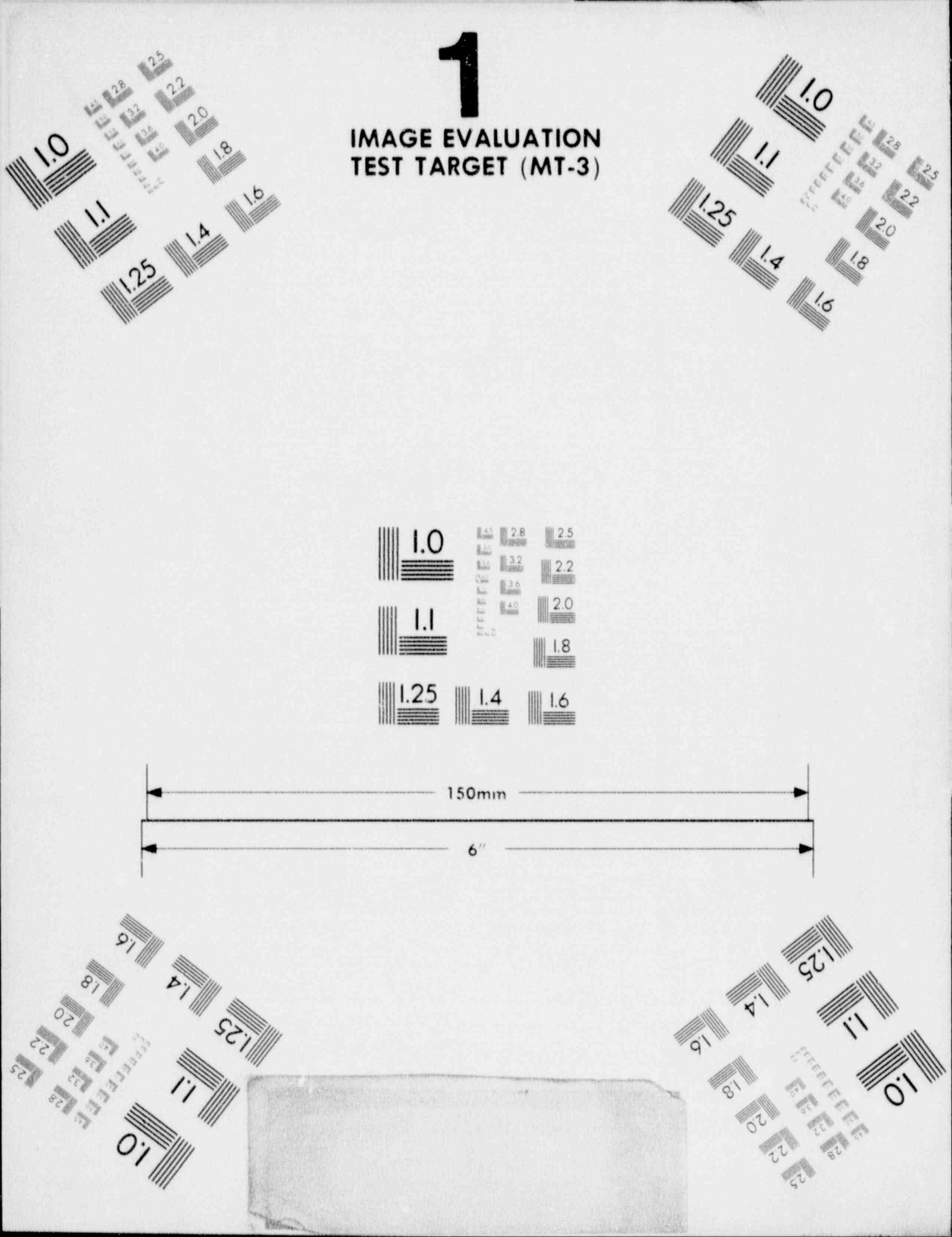
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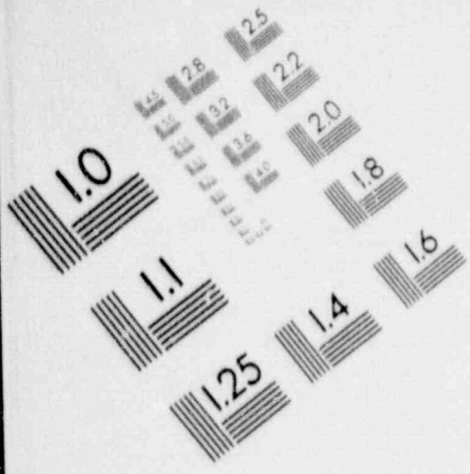
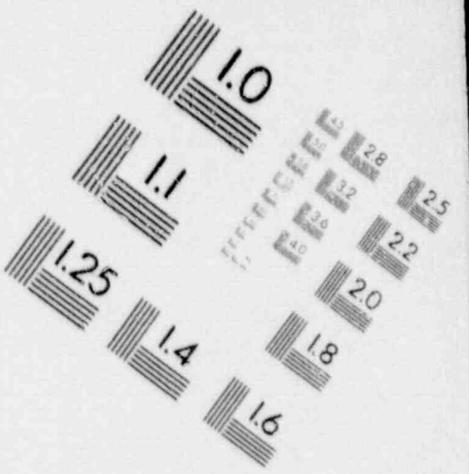
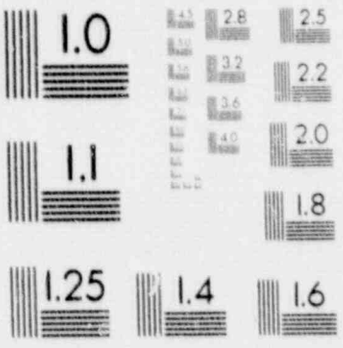
4.0
150mm
6"

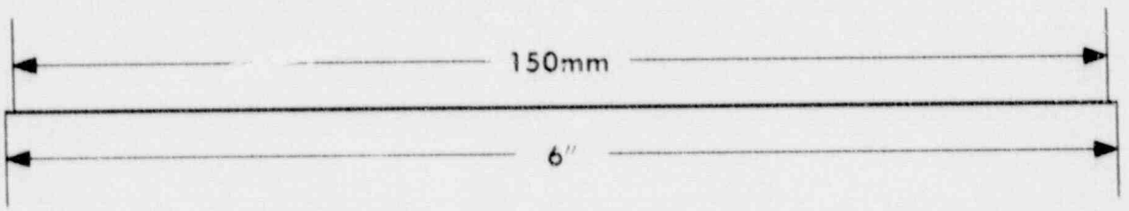
1

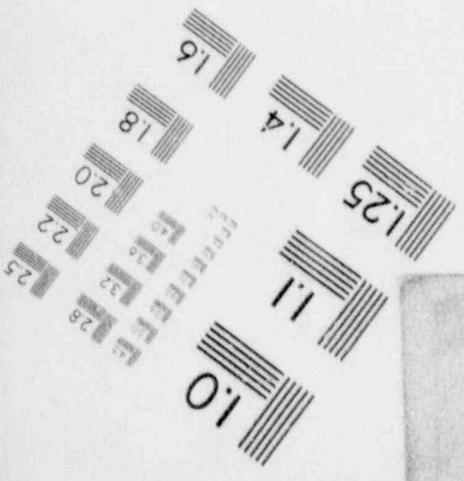
IMAGE EVALUATION TEST TARGET (MT-3)

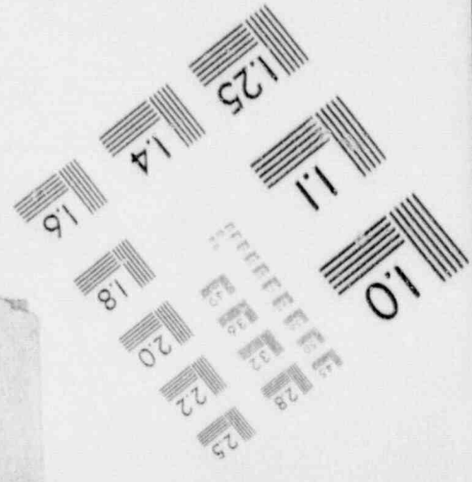


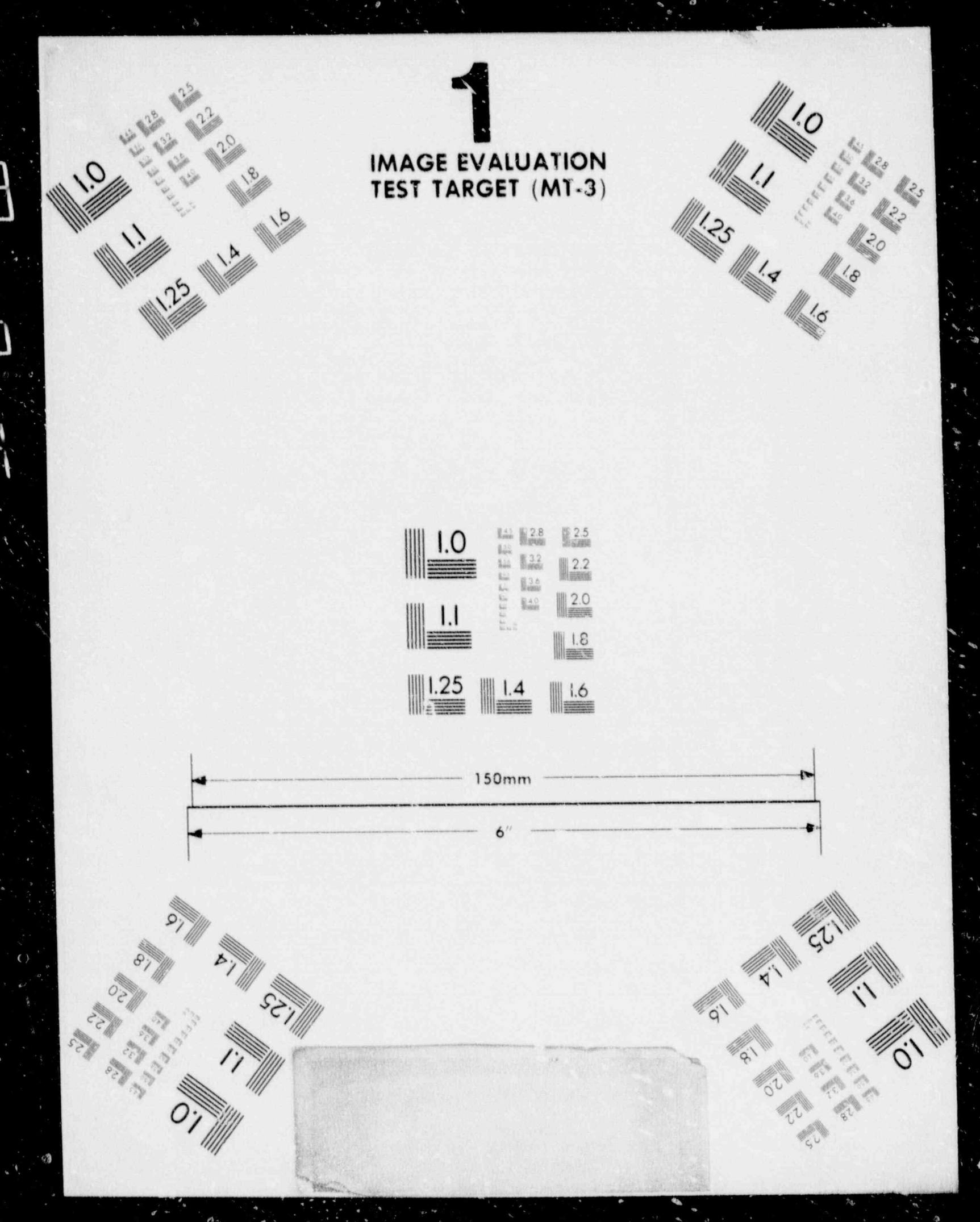








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2.5
2.8
3.2
3.6
4.0
150mm
6"

Points: [1.0] Is NC Pump status correct for present plant conditions? (select one)

A. No. The NC Pumps should not be tripped until Phase B Isolation occurs.

B. Yes. #1 seal leakoff flows are in alarm, indicating seal failures.

C. No. The NC Pumps should not have been tripped due to voiding in the Reactor vessel head.

D. Yes. Subcooling is < $0^{\circ}F$ and SI flow is indicated.

TIME: 3 minutes

Question 3 6

K/A Catalog

Sys	Mode	No.	RO	SRO
000	009	EK3.13	3.4	3.7
000	009	EK3.23	4.2	4.3
000	009	EA1.16	4.2	4.2
000	009	EA2.13	3.4	3.6

Answer 3: D. Yes, Subcooling is < 0 and S/I flow is indicated.

References:

Originator: CWO

Points: [1.0] What action will be required due to the currently indicated control rod positions? (select one)

A. Verify adequate shutdown margin

B. Enter EP/2A1

C. Emergency Borate 170 ppm

D. Be in Mode 5 within the next 30 hours

TIME: 5 minutes

Question ~~16~~ 17 RO ONLY

K/A Catalog

Sys	Mode	No.	RO	SRO
000	005	EA1.05	3.4	3.4
000	007	EA1.06	4.4	4.5

Answer 16: A.

References: MC-1
EP/1/A/5000/1C2

Originator: LBL

Points: [1.0] Should Safety Injection be terminated with the plant in its present status? (select one)

A. Yes - PZR level offscale high, repressurization is imminent.

B. No - heat sink criteria not met, subcooling criteria not met.

C. No - NC pressure criteria not met, subcooling criteria not met.

D. No - RVLIS criteria not met, NCS pressure criteria not met.

TIME: 3 minutes

Question ~~13~~ 8 RO ONLY

K/A Catalog

Sys	Mode	No.	RO	SRO
000	008	12	3.9	4.1

Answer 13: C.

References: EP/1/A/5000/1C Step 9

Originator: GFW

Points: [1.0] What two conditions have energized the pressurizer heaters? (select one)

A. PZR vapor space low temperature, PZR surge line low temperature.

B. PZR high level deviation, PZR low pressure.

C. PZR vapor space low temperature, PZR high level.

D. PZR high level deviation, PZR surge line low temperature.

TIME: 1 minutes

Question ~~15~~ 9

K/A Catalog

Sys	Mode	No.	RO	SRO
010	000	K2.01	3.0	3.4

Answer 15: B.

References: 1MC10
OP/1/B/6100/10G

Originator: GFW

Points: [1.0] What was the specific component failure that was the root cause of the Safety Injection?

TIME: 3 minutes

Question 2/10

K/A Catalog

Sys	Mode	No.	RO	SRO
000	008	EA2.20	3.4	3.6
000	009	EA2.02	3.5	3.8

Answer 2: Pzr Safety Valve 1NC-1 failed open. (1.0 pts)

References:

Originator: CWO

Points: [1.0] Which of the following most accurately explains the response of PZR level during this event? (select one)

A. Decreased due to post-trip cooldown then increased due to void formation in reactor vessel head.

B. Decreased due to LOCA then increased due to SI flow.

C. Decreased due to post-trip cooldown then increased due to heatup from lack of adequate decay heat removal.

D. Decreased due to LOCA then increased due to post-trip heatup.

TIME: 3 minutes

Question 14 ||

K/A Catalog

Sys	Mode	No.	RO	SRO
000	008	EK3.01	3.7	4.4
000	008	EA2.29	3.9	4.2

Answer 14: A. Level decreased due to post trip cooldown then increased due to void formation in Rx Vessel Head

References: PZR Level Traces
RVLIS

Originator: LBL

Points: [1.0] What plant condition was the most probable cause of the "NCP Hi-Hi Vibration" annunciator alarm?

TIME: 4 minutes

Question ~~9~~ 12

K/A Catalog

Sys	Mode	No.	RO	SRO
002	000	K5.09	3.7	4.2
003	000	A1.07	3.4	3.4

Answer 9: Pumping 2 phase mixture before the pumps were tripped (caviation, loss of subcooling)

References: 1MC5
OP/1/B/6100/10G

Originator: GFW

Points: [1.0] Should this accident progress until the "Sp" condition is reached, which of the following automatic system actions will take place?

A. KC aligns to the Containment Chillers.

B. RN aligns to the ND Heat Exchangers.

C. KC aligns to the NS Heat Exchangers.

D. KC aligns to the ND Heat Exchangers.

TIME: 1 minute

Question 17 | 3

K/A Catalog

Sys	Mode	No.	RO	SRO
000	026	EK3.02	3.6	3.9

Answer 17: D.

References: OP-CN-PSS-KC

Originator: RJK

THE FOLLOWING

QUESTIONS DO NOT

REL-ATE TO THIS

SCENARIO!

Points: [1.0] All three CA Pumps receive an auto start signal. Three (3) minutes later you notice "B" Motor Driven Pump failed to start. The "A" Motor Driven Pump and the Turbine Driven Pump are running. Explain the CA system response to this situation.

TIME: 3 minutes

Question 10/14 NOT RELATED TO SCENARIO

K/A Catalog

Sys	Mode	No.	RO	SRO
061	000	K4.05	3.1	3.4

Answer 10: "B" S/G CA flow is isolated from "A" MD Pump

References: OP-CN-CF-CA

Originator: RJK

Points: [1.0] What is the consequence of P-4 failing to Actuate? (select one)

A. Phase "A" Isolation cannot be reset.

B. Safety Injection cannot be reset.

C. SM Isolation on "Sp" cannot be reset.

D. D/G Sequencer cannot be reset.

TIME: 2 minutes

Question 8/15 **NOT SCENARIO RELATED**

K/A Catalog

Sys	Mode	No.	RO	SRO
	000	K6.04	3.3	3.6

Answer: B.

References:

Originator: RJK

KEY

U.S. NUCLEAR REGULATORY COMMISSION
REACTOR OPERATOR REQUALIFICATION EXAMINATION

FACILITY: CATAWBA

REACTOR TYPE: WEC PWR

DATE ADMINISTERED: 08/25/89

OPERATOR: Panel B-RO-1A

SECTION	CATEGORY VALUE	OPERATOR'S SCORE	% OF CATEGORY VALUE
A Plant Proficiency			
B Limits and Controls	13 pts.		

Final Grade

NAME_____

DATE _____

S.S. #_____

PART B
Test #20-1A
AUGUST 25,1989
Page of

Originated by: R.E. Kimray

Approved by: W K Barron
DIR. OF OPER. TRNG.

TOTAL POINTS: 13
TOTAL QUESTIONS: 13

INSTRUCTIONS:

1. Put your name on each answer sheet
2. Write your answers on the answer sheet.
3. Ask the test monitor/instructor concerning questions which are not clear to you.
4. Cheating or evidence of cheating will not be tolerated.

My signature on this form is my declaration that the responses given on the attached test or quiz are entirely my own.

It further declares that I am aware that I am subject to termination from the training program immediately, and in addition, will be subject to further disciplinary action up to and including discharge from the company for cheating and/or compromising on exams/tests.

_____
Students signature

(/) 1 PTS If the control rod insertion limits are exceeded during critical operation:

A. QPTR may have been outside Tech Spec limits.

B. There may be excessive boron in the reactor coolant.

C. Radial peaking factors may have been exceeded.

D. The shutdown margin may be inadequate.

ANSWER: D

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 6
SRO: 6

REFERENCES: Sequoyah (Q#B-14)
TS 3/4.1.3 Bases
KSA 192/005 K1.15 (3.4/3.9)
001/000 K4.08 (3.9/4.4)
001/000 G6 (2.9/3.8)

ORIGINATOR: DRR

TIME: 3 minutes

(2) 1 PTS The reactor was at 100% power (MOL) when an emergency boration raised NC system boron concentration from 300 ppm to 720 ppm. Assuming that the boric acid charged into the NC system was at a concentration of 7500 ppmB, how many gallons of boric acid were added?

ANSWER: To go from 300 ppm to 600 ppm requires 2459 gal. (.5 pts.)
To go from 600 ppm to 720 ppm requires 1014 gal. (.5 pts.) OR
The total required is then ~~3475~~ 3473 gal. (1.0 pts.)

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 5d
SRO: 5d

REFERENCES:
1. Unit 1 Data book Sect 5.1 pg 4-9
2. 004/000 - A4.04 (3.2/3.6)
3. CNS AUDIT EXAM 8-21-87 (1.24/5.22)

ORIGINATOR: AUDIT EXAM

TIME: 4 minutes

(3) 1 PTS Work is to be performed on CA-2 (Hotwell Suction Isolation to CA Pumps), and CA-6 must be closed. Select the requirement which must be met prior to closing CA-6 (CA CST Suction Isolation to CA Pumps).

A. CA pump running in recirc

B. CA pump running for normal feedwater requirements

C. UST level >80%

D. Station management approval

ANSWER: D

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 9
SRO: 9

REFERENCES: OP/1/A/6250/02
K/A 061000 A1.04 (3.9/3.9)

ORIGINATOR: CFK

TIME: 4 minutes

Check Christmas

August 14, 1989
CF-CA-6

(4) 1 PTS A startup is in progress on Unit 1 from Mode 4. A failure of the breaker feeding 1EID causes 1EID and 1ERPD to become de-energized. What ACTION is required due to this event?

ANSWER: Re-energize 1ERPD within 2 hours. (.33 pts.) Restore 1EID to operable within 24 hours or (.33 pts.) be in Mode 5 within the next 30 hours. (.33 pts.)

OBJECTIVES: ENPF:N/A
ISS:N/A
RO:24
SRO:24

REFERENCES: 1. CNS Tech Spec 3.8.3.1
2. K/A 062 G-5 (3.1/3.8)

ORIGINATOR: C. O'Dell

TIME: 3 minutes

need 2 more checked

May 2, 1988
EL-EP-6

(5) 1 PTS Power is being increased from 90% to 100% power when the OATC observes that rods are not moving in Automatic. Upon taking rods to manual, he discovers they will still not move. List 2 options available to achieve Tavg = Tref once the load increase is terminated.

ANSWER:
1. Adust turbine load
2. Adjust boron concentration

OBJECTIVES:
ENPF: N/A
ISS: N/A
RO: 14
SRO: 14

REFERENCES:
AP/1/A/5500/15 Retype #2
001/000/K4.08 (3.2/3.4)

ORIGINATOR: RHY

TIME: 2 minutes

RO only

Not SRO

(6) 1 PTS With unit 1 in Mode 1, you receive the "Control Rod Bank Lo Limit" annunciator. Control Rods are stepping in at 8 steps per minute. The "Control Rod Bank Lo-Lo Limit" Annunciator starts alarming. The CR SRO orders Emergency Boration to be initiated but NV-236B cannot be opened. What action should the OATC or BOP take next.

ANSWER: Open NV 252 or 253 (.5 pts) and close NV-188 or 189 (.5 pts)
OR (Swap charging pump suction from VCT to FWST) (1.0 pts)

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 14
SRO: 14

REFERENCES: Open Reference
AP/13 Case I Step D.1
000/024/EA2.01 (3.8/4.1)

ORIGINATOR: GFW

TIME: 2 minutes

(7) 1 PTS A Safety Injection occurred on Unit 1 and the following conditions exist:

A)	Main Steam Header Pressure	950 psig ↔
B)	S/G Pressures	950 psig ↔
C)	Containment Pressure	.15 psig ↔
D)	S/G Narrow Range Levels	
	1) "1B" S/G	45% ↑ rapidly
	2) All other S/G's	25% ↑ slowly
E)	Floor & Equipment Sump Level	6 inches ↔
F)	NC Loop T-Hot All	540°F ↓ slowly
G)	EMF's (Radiation Monitoring) except:	all reading normal
	1) Steamline EMF's 27	Trip 1
	2) Condenser Air Ejector (1EMF-33)	Inoperable
	3) S/G Sample (1EMF-34)	Trip II

Select the procedure path the operator will use to correctly address this accident: (Select one)

A. AP/10 (Reactor Coolant Leak), EP/01 (Reactor Trip or Safety Injection), then EP/1C (High Energy Line Break Inside Containment)

B. AP/10 (Reactor Coolant Leak), EP/01 (Reactor Trip or Safety Injection), then EP/1D (Steam Line Break Outside Containment)

C. AP/10 (Reactor Coolant Leak), EP/01 (Reactor Trip or Safety Injection), then EP/1E (Steam Generator Tube Rupture)

D. AP/10 (Reactor Coolant Leak), EP/01 (Reactor Trip or Safety Injection), then EP/1B (SI Termination Following a Spurious SI)

ANSWER: C

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 3,7
SRO: 3,7

REFERENCES: EP/1/A/5000/01
KSA 000/037 EK3.02 (3.2/3.5)
000/037 EK3.05 (3.7/4.0)
000/037 EK3.07 (4.2/4.4)
000/037 EA1.06 (3.8/3.9)
000/037 EA1.13 (3.9/4.0)
000/037 G-11 (3.9/4.1)

ORIGINATOR: DRR

TIME: 3 minutes

(8) 1 PTS A natural circulation cooldown (EP-1A1) is in progress because offsite power has been lost. The CRDM Cooling Fans cannot be loaded onto the AC Blackout Buses.

How will the inoperability of the CRDM Fans affect the cooldown and depressurization?

A. It has little affect because the amount of NC System Heat removed by running the fans is of little insignificance compared to that removed by steaming the secondary plant.

B. Transfer to EP-2F3 "Void in Reactor Vessel" will be required because cooldown and depressurization will cause formation of a steam void in the vessel head.

C. Pressure must be reduced more rapidly to avoid a possible pressurized thermal shock transient.

D. Greater minimum subcooling must be maintained, and the total upper head cooldown rate will be less.

ANSWER: D

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: 7
SRO: 7

REFERENCES: EP-1A1 P.3, P.6, P.7, P.15
K/A# 000056 EK3.02 (4.4/4.7)

ORIGINATOR:

TIME: 3 minutes

(9) 1 PTS A safety injection has occurred due to a High Energy Line Break Inside the Containment (HELBIC). Upon transition into the HELBIC procedure the following is noted:

1)	Reactor Power	0%
2)	Intermediate Range SUR	-.33 dpm
3)	Source Range SUR	-.33 dpm
4)	Reactor Coolant Subcooling	2°F
5)	All Cold Leg Temperatures Decreased	60°F in last 60 min.
6)	Containment Pressure	3.5 psig
7)	Narrow Range S/G Levels	10%
8)	Total Feedwater Flow to Intact S/G's	400 gpm
9)	Pressurizer Level	30%
10)	Pressurizer Pressure	2300 psig
11)	RVLIS UR Level	100%

Based on this information which Critical Safety Function should be given highest priority?

A. Subcriticality

B. Heat Sink

C. Reactor Coolant Integrity

D. Reactor Coolant Inventory

ANSWER: B

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 9
SRO: 9

REFERENCES: EP/1/A/5000/2C1
EP/1/A/5000/1C
KSA 000/074 EK3.02 (3.7/4.2)
000/074 G011 (4.5/4.6)

ORIGINATOR: DRR

TIME: 4 minutes

(10) 1 PTS Plant Conditions:

EP-2F3 (Void in Reactor Vessel) in progress
S/I has been terminated
Normal Charging and Letdown have been established
No NC Pumps are operating
NC Temp and Press. being maintained per Enclosure 3 of
EP-2D1 (Anticipated Pressurized Thermal Shock Condition)
EP-2D1 Has been exited
Minimum NC T_c = 300°
NC Pressure = 775 psig
Avg of 5 highest Core Exit T/C's = 494°F

What method must be used for void removal? Explain why this method is required.

ANSWER: Start one reactor coolant pump (.5 pts.). Void cannot be removed via repressurization due to pressure being maintained per EP/2D1 Enclosure 3. (.5 pts.)

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 4
SRO: 4

REFERENCES: EP/1/A/5000/2D2 Rev #4
EP/1/A/5000/2F3 Rev #4
KSA 000/074 G-12 (4.3/4.4)

ORIGINATOR: C. O'Dell

TIME: 5 minutes

RO Only

Not Used

(||) 1 PTS With a temperature decrease in all NC Cold legs having exceeded 100°F in the last 60 minutes, which of the following combinations of NC cold leg temperature and pressure will result in a red alarm on the Reactor Coolant Integrity CSF?

A. 240°F and 1000 psig

B. 240°F and 1500 psig

C. 340°F and 1800 psig

D. 340°F and 2400 psig

ANSWER: B

OBJECTIVES: ENPF:N/A
ISS:N/A
RO:3
SRO:3

REFERENCES:
1. EP/1/A/5000/02 Ret. #3
2. K/A 000/011 G-11 (4.3/4.5)
3. K/A 000/011 EA1.01 (3.7/3.8)

ORIGINATOR: C. O'Dell

TIME: 3 minutes

( )2-) 1 PTS The turbine is being prepared for loading. The reactor is critical at approximately 8% power. Annunciator IR HI VOLT FAIL alarms, and you determine that IR channel N36 has failed.

Which of the following best describes your required actions?

A. Place the N36 LEVEL TRIP switch in the BYPASS position, and continue power operation.

B. Reduce power to less than 5%, and place the N36 LEVEL TRIP switch in the BYPASS position.

C. Do not reduce power to less than 5% until the N36 LEVEL TRIP switch is placed in the BYPASS position.

D. Restore the N36 channel to operable status before increasing power above 10% of Rated Thermal Power.

ANSWER: D

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: ENB-10
SRO: ENB-10

REFERENCES: T.S. 3.3.1 Applicability
T.S. 3.3.1 Action 3
AP/16 P.8 Step 2
AP/16 P.10 Step 4
K/A# 000033 EK3.02 (3.6/3.9)
K/A# 000033 EA2.09 (3.4/3.7)

ORIGINATOR:

TIME: 3 minutes - RO

2 minutes - SRO

(13) 1 PTS When Steam Generators are pressurized and CF flow is not aligned to the Main Feed Nozzles, how is the feed nozzle containment penetration piping kept above the brittle fracture temperature?

ANSWER: By maintaining S/G reverse purge flow

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 9a
SRO: 9a

REFERENCES: 1. OP-CN-HO-CF
2. 035/000 - SG10 (3.2/3.4)
3. CNS NRC Exam 9-1-86 (4.07)

ORIGINATOR: NRC

TIME: 2 minutes

KEY

U.S. NUCLEAR REGULATORY COMMISSION
REACTOR OPERATOR REQUALIFICATION EXAMINATION

FACILITY: CATAWBA

REACTOR TYPE: WEC PWR

DATE ADMINISTERED: 08/25/89

OPERATOR: Part B-RO-1B

SECTION	CATEGORY VALUE	OPERATOR'S SCORE	% OF CATEGORY VALUE
A Plant Proficiency			
B Limits and Controls	12.5 pts.		

Final Grade

NAME_____

DATE _____

S.S. #_____

PART B
Test # 20-18
AUGUST 25,1989
Page of

Originated by: R.E. Kimray

Approved by: W R Barron
DIR. OF OPER. TRNG.

TOTAL POINTS: 12.5
TOTAL QUESTIONS: 11

INSTRUCTIONS:

1. Put your name on each answer sheet
2. Write your answers on the answer sheet.
3. Ask the test monitor/instructor concerning questions which are not clear to you.
4. Cheating or evidence of cheating will not be tolerated.

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_____
Students signature

(1) 1 PTS While performing PT/O/A/4400/01C (Fire Suppresion System Monthly Test) with the unit in Mode 2, the sprinklers in Rooms 104 and 112 are found to be isolated. Choose the statement that best describes the required action.

A. Enter Tech Spec 3.0.3 and commence Unit shutdown within 1 hour

B. Establish an hourly fire watch with backup Fire Suppresion equipment within one hour for both areas

C. Establish a continuous fire watch with backup Fire Suppresion equipment within one hour

D. Do not enter Mode 1 due to being in this action statement

ANSWER: B

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 18
SRO: 18,22

REFERENCES: KSA 086000 - SG5(3.0/3.6)
Tech. Spec. 3.7.10

ORIGINATOR: DRR

TIME: 5 minutes

RO only

SRO NOT ON

January 25, 1989
SS-RFY-1

(2) PTS When a CA Pump is taken out of service, what action is taken to prevent overpressurizing the pump suction?

ANSWER: The pump drain is opened prior to closing the recirc isolation.

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 9
SRO: 9

REFERENCES: KSA 061/000/A2.04 (3.4/3.8)
CNS RO Audit Exam 8/21/87 (2.20)

ORIGINATOR: DRR

TIME: 4 minutes

RO Only

Not RO Only

August 15, 1989
CF-CA-8

(3) 1 PTS Unit 1 is at 80% power with rods in manual due to an inoperable rod position indication system for Shutdown Bank 'E' rod D-8. While increasing turbine load to 100% power, the following alarms are received:

- RPI Urgent annunciator alarm
- Rod Bottom for H-8 in Control Bank 'D'
- General Warning for H-8 in Control Bank 'D'
- RPI Urgent alarm
- RPI Data A and B failure

The following action should be taken:

A. Apply Tech Spec 3.0.3 because two control rod position indications are inoperable.

B. Continue operation provided the non-indicating rod positions are determined once per 8 hours by the incore detector system and immediately after any non-indicating rod motion > 24 steps in one direction since the last determination.

C. Immediately trip the reactor since two control rod positions cannot be determined.

D. Verify that all digital rod position indicators for the affected bank are operable and that the most withdrawn rod and the least withdrawn rod of the bank are within a maximum of 12 steps of each other at least once per 8 hours.

ANSWER: B

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 15
SRO: 15

REFERENCES: TS 3/4.1.3 Movable Control Assemblies

KSA 014/000/G-8/3.6/4.3
KSA 014/000 A1.02/3.2/3.6

ORIGINATOR: McGuire

TIME: 3 minutes

(4) 1 PTS A plant cooldown is in progress and NC system temperature has just been reduced to less than 285°F. What operator action must be taken to ensure compliance with Tech Specs?

ANSWER: At least one NV pumps (.5 pts) and one NI pump (.5 pts) shall be made inoperable.

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 16
SRO: 16

REFERENCES: NI Lesson Plan
CNS Audit Exam (8/21/87) SRO - Q8.06
CNS Tech Spec 3.5.3 bases (pg B3/4 5-2)
KSA 006/00 K5.04 (2.9/3.1)

ORIGINATOR:

TIME: 3 minutes

(5) 1 PTS The control room operators are responding to a SGTR with pressurizer pressure control available. The ruptured steam generator has been identified and isolated with a proper NC System cooldown and depressurization completed. Prior to terminating SI, the ruptured steam generator goes water solid.

Select the statement that best describes the proper operator action.

A. Immediately go to EP/2C3 Steam Generator High Level. This heat sink challenge has the highest priority.

B. Refer to EP/2C3 but continue with the procedure in effect and terminate SI. Actions to stop primary-to-secondary leakage should retain the highest priority.

C. Immediately, take local actions to support the main steamlines, such as blocking steamlines and pinning pipe support hangers. Preventing a main steamline break has the highest priority.

D. Immediately go to EP/01 to rediagnose the event.

ANSWER: B

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: 2
SRO: 2

REFERENCES: EP-1E, EP-02, EP-2C3
K/A# 000038 EA2.16 (4.2/4.6)
K/A# 000038 SG12 (3.8/4.0)
K/A# 000038 EK3.06 (4.2/4.5)

ORIGINATOR:

TIME: 6 minutes

(6) 1.0 PTS Based on the following conditions, calculate the allowable reactor vessel venting time. Show all calculations and express units in minutes.
NC Pressure = 600 psig
Lower Containment Temp = 145°F
Containment Pressure = 3.1 psig
Containment H2 Concentration = 2.9%

ANSWER: (0.25 pt. each partial credit for A = 0354.8, B = 935, C = 2000)
.467 minutes (accept .434 to .5 minutes)

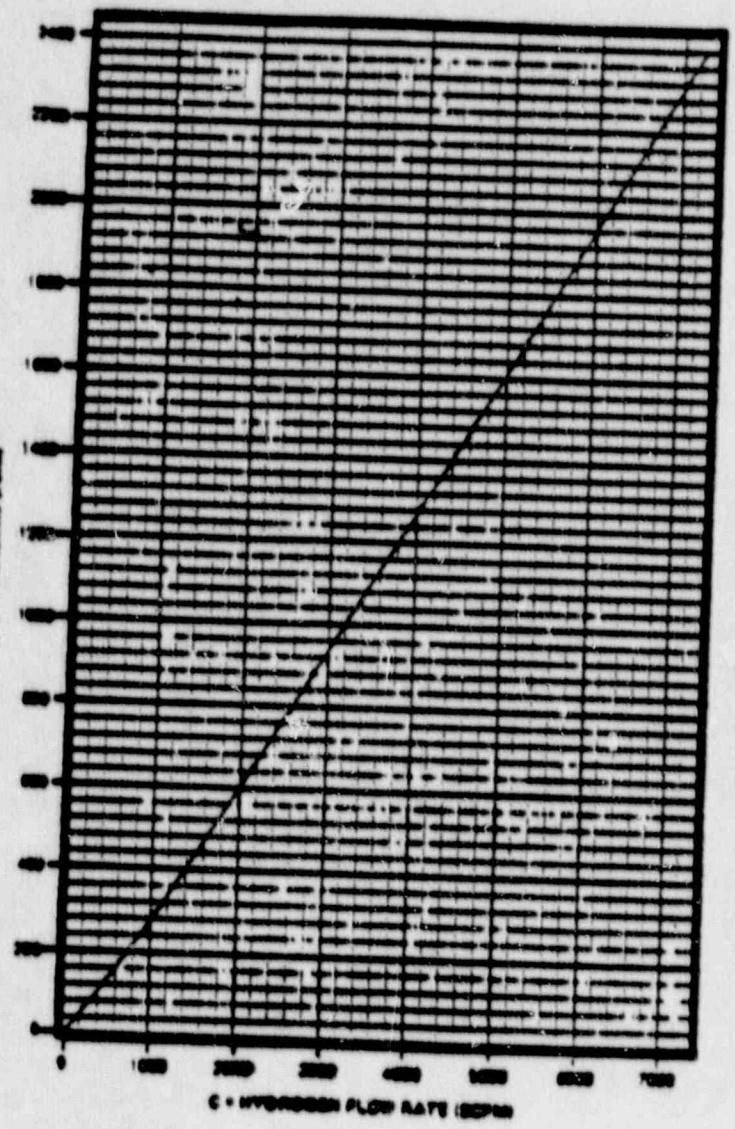
OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 4
SRO: 4

REFERENCES: EP/1/A/5000/2F3 Rev #4
KSA 000/040 (3.8/4.1)
000/074 (4.3/4.4)

ORIGINATOR: C. O'Dell

TIME: 5 minutes

Allowable Hydrogen Venting Time



CALCULATION OF MAXIMUM ALLOWABLE VENTING TIME

STEP 1: Calculate A

$$A = 9,300 \times \frac{(P + 14.7)}{14.7} \times \frac{492}{(T + 460)}$$

Where: P = Containment pressure (psig)
T = Lower containment temperature (F)

STEP 2: Calculate B

$$B = (3 - H) \times A$$

Where: H = Containment hydrogen concentration (%)

STEP 3: Determine C from the curve for the current NC system pressure.

STEP 4: Calculate T

$$T = B/C$$ = Venting time in minutes.

EXAMPLE:

Containment pressure = 3.0 psig
Lower containment temperature = 150F
Containment hydrogen concentration = 1.0%
NC system pressure = 1000 psig

$$A = 9,300 \times \frac{(3.0 + 14.7)}{14.7} \times \frac{492}{(150 + 460)} = 9,228$$

$$B = (3 - 1.0) \times 9,228 = 18,456$$

C = 3,200 (from the curve for NC system pressure = 1000 psig)

T = 18,456/3,200 = 5.8 minutes

NC pressure _____ PSIG

Allowable venting time _____ min.

(7) 1 PTS Plant conditions have resulted in entry into EP/1/A/5000/2B1 (Inadequate Core Cooling). Core Exit T/C's are 715°F, NO NC Pumps are running and all NC system vent paths are isolated.

What course of action should be taken for NC system Cooldown/Depressurization?

ANSWER: (Depressurize NC using S/G) secondary depressurization of all intact S/G's. (1.0) (Then open PZR PORV's if that doesn't work)

OBJECTIVES: ENPF:N/A
ISS:N/A
RO:4
SRO:4

REFERENCES:
1. EP/1/A/5000/2B1 Ret. #5
2. K/A 000/074 G-11 (4.5/4.6)
3. K/A 000/074 G-12 (43./4.4)

ORIGINATOR: C. O'Dell

TIME: 5 minutes

(8) 1 PTS An ATWS has occured. All attempts to trip the reactor were unsuccessful and emergency boration CANNOT be established. Reactor power is less than 1% and the Intermediate Range SUR is +.2 DPM.

Choose the statement that best describes the correct operator action(s) under these conditions?

A. Return to the procedure and step in effect.

B. Allow the RCS to heat up while continuing efforts to establish emergency boration.

C. Go to EP-2A2 required by the subcriticality status tree based on current reactor conditions.

D. Maintain RCS temperatures stable while continuing efforts to establish emergency boration.

ANSWER: B

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: 4
SRO: 4

REFERENCES: EP-2A1 P.9 Step 10
EP-02 Status Tree
K/A# 000029 EA2.01 (4.4/4.7)
K/A# 000029 3G 12 (4.1/4.2)
K/A# 000029 EK3.12 (4.4/4.7)

ORIGINATOR:

TIME: 4 minutes

RO Only

NOT RO SRO

(9) 2 PTS List three different plant radiation monitors used in the diagnostics of EP/01 to indicate a primary to secondard leak. Include all automatic actions (other than alarms) associated with each, if any.

ANSWER:

1. S/G Blowdown (EMF 34) (.2 pts.)
   a. Isol. blowdown flow, (.2 pts.)
   b. Isol. BB tank vent (.2 pts.)
   c. Isol. BB to TB sump (.2 pts.)
   d. Isol. S/G smpl flow (.2 pts.)
2. Condensate Air Ejector (EMF 33) (.5 pts.)
3. Main Steam Lines (.5 pts.)

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 3
SRO: 3

REFERENCES: CNS RO Audit 8/87 (Q3.10)
KSA 073/000 K4.01 (4.0/4.3)

ORIGINATOR: NRC

TIME: 4 minutes

RO Only

(/0) 1.5 PTS The Unit is in Mode 1. Following shift turnover, the Reactor operator notices the Spent Fuel Pool Level at 36 ft and stable on the control room gauge. The same indication was verified on the local indication. Irradiated fuel assemblies are stored in the pool.

Based on this level, state when and what operator action may be required.

ANSWER: Suspend movement of fuel assemblies (.5 pts.) and crane operation with loads over fuel storage areas. (.5 pts.) and restore level within 4 hours. (.5 pts.)

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 15c
SRO: 15c

REFERENCES: TS 3/4.9.2 Refueling Instrumentation
KSA 033/000/G-8/3.0/3.9
KSA 033/000/A2.03/3.1/3.5
KSA 033/000/K4.05/3.1/3.3

ORIGINATOR: McGuire

TIME: 3 minutes

(//) 1 PTS Indicate which one of the following is NOT CORRECT in describing the boundaries/requirements for entrance to/and occupation of the refueling area operating area.

A. Manipulator Crane is at full stop.

B. All fuel bundles are fully inserted in their proper storage rack locations.

C. Full attention of the manipulator crane operator is maintained.

D. Permission of the refueling SRO is granted through the Crane Operator.

ANSWER: B

OBJECTIVES: ENPF:
ISS:
RO:
SRO:

REFERENCES: OP/1/A/6550/07 Enclosure 4.8
KA034/000/G002 (2.3/3.1)
KA034/000/G009 (3.0/3.0)

ORIGINATOR: NRC

TIME: 3 minutes

August 18, 1989

Key

U.S. NUCLEAR REGULATORY COMMISSION
REACTOR OPERATOR REQUALIFICATION EXAMINATION

FACILITY: Catawba

REACTOR TYPE: WEC PWR

DATE ADMINISTERED. 9/8/89

OPERATOR: PART A-RO-2A

SECTION	CATEGORY VALUE	OPERATOR'S SCORE	% OF CATEGORY VALUE
A Plant Proficiency	13.0		
B Limits and Controls			

Final Grade

NAME _____

DATE _____

S.S. # _____

PART A
Test # RO-2A
SEPT. 8, 1989
Page of

Originated by: R.E. Kimray

Approved by: W K Bunn
DIR. OF OPER. TRNG.

TOTAL POINTS: 13.0
TOTAL QUESTIONS: 13

INSTRUCTIONS:

1. Put your name on each answer sheet
2. Write your answers on the answer sheet.
3. Ask the test monitor/instructor concerning questions which are not clear to you.
4. Cheating or evidence of cheating will not be tolerated.

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It further declares that I am aware that I am subject to termination from the training program immediately, and in addition, will be subject to further disciplinary action up to and including discharge from the company for cheating and/or compromising on exams/tests.

_____
Students signature

TURNOVER SHEET

Conditions Existing at the time of the Incident:

A. Plant Conditions

- Power History 100% EOL
- Boron 138 ppm
- Tave 590°F
- Xenon 2903 pcm
- Samarium -87 pcm

B. Tech. Spec. Action Items:

None current

C. Work in Progress:

None

D. Current Procedure:

OP/1/A/6100/03 Enclosure 4.1

Manual Actions Taken During the Incident:

A. Operator Computer Alarms Acknowledged
B. Control Room Annunciators Acknowledged

Simulator and chart recorders are "Frozen", the OAC is operational.

Points: [1.0] Based on current plant conditions, is the steam dump control system operating properly? Justify your answer.

TIME: 5 minutes

Question 15

K/A Catalog

Sys	Mode	No.	RO	SRO
041	020	A3.02	3.3	3.4

Answer 15: Yes. (.5 pts) (Tave - Tref = 17°F.) The high Tavg - Tref signal is calling for all banks to be open. (.5 pts)

References: OP-CN-SM-IDE Lesson Plan

Originator: GES

Points: [1.0] Which of the following has caused the "7KV Normal Aux Pwr System Trouble" annunicator to alarm?

A. Switchgear 1TA is de-energized

B. Undervoltage on A train Incoming Fdr. lines

C. Undervoltage on NC pump busses

D. Overcurrent sensed on B feeder breakers

TIME: 3 minutes

Question ✗ 2

K/A Catalog

Sys	Mode	No.	RO	SRO
62	000	K3.01	3.5	3.9

Answer 1: B

References: OP/1/B/6100/10L (Annunciator Response)

Originator:

Points: [1.0] Assume 1A Busline has been re-energized. Which of the following most accurately descibes the steps required to restore 1TA to its normal alignment.

A. Align 1A D/G to 1ETA, open Tie Breaker, close Normal Feeder A, align 1ETA to 1ATC.

B. Place 1TA Mode select switches in "Man A and Tie", close Normal Feeder A, verify Tie Breaker opens.

C. Place 1TA Mode select switches in "Man A and Tie", open Tie Breaker, verify Normal Feeder A closes.

D. Place 1TA Mode select switches in "Man B and Tie", open Tie Breaker, verify Normal Feeder B closes.

TIME: 2 minutes

Question # 3

K/A Catalog

Sys	Mode	No.	RO	SRO
62	000	A4.01	3.3	3.1

Answer 8: B

References: OP/1/A/6350/05 - Alternate AC power sources

Originator:

Points: [1.0] A turbine runback has occurred. Based on current conditions what two conditions could have initiated the runback?

TIME: 3 minutes

Question 13/4 RO ONLY

K/A Catalog

Sys	Mode	No.	RO	SRO
012	000	K3.02	3.2	3.3

Answer 13: OPΔT (.5 pts.)
Loss of 1A busline with turbine load >56% (.5 pts.)

References: 1AD-2

Originator: REK

Points: [1.0] Which of the following statements is correct concerning the present OPΔT Turbine Runback?

A. The runback was initiated when 1/4 ΔT channels, exceeded the Reactor Trip Setpoint.

B. The runback was initiated when 2/4 ΔT channels were within 3% of the Reactor Trip Setpoint.

C. The runback was initiated when 2/4 ΔT channels exceeded 109% regardless of Reactor power.

D. The runback was initiated when 1/4 ΔT channels exceeded 109% regardless of Reactor power.

TIME: 4 minutes

Question ~~16~~ 5

K/A Catalog

Sys	Mode	No.	RO	SRO
045	000	K4.12	3.3	3.6

Answer 16: B

References: OP/1/B/6100/10C

Originator: LBL

Points: [1.0] Per AP/15 (Rod Control Malfunction), which of the following options to restore Tavg to Tref is allowed by current plant conditions?

A. Manually insert rods to reduce Tavg.

B. Increase Turbine load to increase Tref.

C. Initiate Boration to reduce Tavg.

D. Increase dumping steam to reduce Tavg.

TIME: 3 minutes

Question 96

K/A Catalog

Sys	Mode	No.	RO	SRO
001	050	A2.01	3.7	3.9

Answer 9: C

References: AP/1/A5500/15 Rod Control Malfunction, Case I

Originator: LBC

Points: [1.0] Which of the following statements, is most correct concerning the expected response of rod control to the current plant conditions?

A. Rods should be inserting at 72 steps per minute due to a combined error signal of +20°F.

B. Rod motion is not required due to combined error signal of 0°F.

C. Rods should be inserting at 64 steps per minute due to a combined error signal of +20°F.

D. Rods should be inserting at 64 steps per minute due to a combined error signal of +0°F.

TIME: 2 minutes

Question 12 7

K/A Catalog

Sys	Mode	No.	RO	SRO
001	000	K1.04	3.2	3.4

Answer 12: A

References: 1MC1

Originator: GFW

Points: [1.0] Which of the following is a rod control interlock?

A. The C-3 interlock will stop rod withdrawal in automatic but not in manual when the OT Delta T signal is within 3% of the calculated trip value.

B. The C-2 interlock blocks automatic and manual control rod withdrawal when one power range channel exceeds 103%.

C. The C-5 interlock ensures that the rod control system is not placed in automatic until 10% turbine power is attained.

D. The C-4 interlock will stop all rod motion in automatic but not manual when the OP Delta T signal is within 3% of the calculated trip value.

TIME: 4 minutes

Question 17 8

K/A Catalog

Sys	Mode	No.	RO	SRO
001	000	K4.03	3.5	3.8

Answer 17: B

References: McGuire Audit Exam May 6, 1985
K/A 012000 K4.09 (2.8/3.1)

Originator: JLY

Points: [1.0] Given the present plant conditions, should an operator be dispatched to secure every other Cooling Bank of oil pumps and fans for the B main step-up transformer? Explain

TIME: 3 minutes

Question 3 9

K/A Catalog

Sys	Mode	No.	RO	SRO
62	000	A2.01	3.4	3.9

Answer 3: No (.5 pts.) - The 'B' transformer is still carrying >50% of its design electrical load. (.5 pts.) (This would reduce the available cooling).

References: AP/1/5500/03 (Load Rejection)
OP/1/6100/03 (Unit Operation)

Originator:

Points: [1.0] What sources are available to supply Auxiliary Steam?

A. Unit 1 "C" Bleed, Unit 2 SM, B AEB

B. Unit 1 "C" Bleed, Unit 1 SM, A AEB.

C. Unit 1 SM, Unit 2 SM, B AEB.

D. Unit 2 SM, A AEB, B AEB

RO Only

TIME: 4 minutes

Question # 10

K/A Catalog

Sys	Mode	No.	RO	SRO
62	000	K2.01	3.3	3.4

Answer 4: C

References:

Originator:

RO Only

THE FOLLOWING

QUESTIONS DO NOT

RELATE TO THIS

SCENARIO!

Points: [1.0] Assuming AMSAC is currently Bypassed (reset light dark), what AMSAC signal(s) would still generate a CA auto start?

TIME: 4 minutes

Question 11 NOT RELATED TO SCENARIO

K/A Catalog

Sys	Mode	No.	RO	SRO
061	000	K4.02	4.5	4.6

Answer 11: Loss of both CF pumps.

References: OP-CN-CF-CA Lesson Plan

Originator: RJK

Points: [1.0] Which of the following is correct concerning the OPΔT Reactor Trip setpoints?

A. The setpoints are calculated via input from Tavg.

B. The setpoints are calculated via input from Pressurizer Pressure

C. The setpoints are calculated via input from Axial Flux Difference

D. The setpoints are calculated via input from Quadrant Power Tilt Ratio

TIME: 4 minutes

Question 2 12 NOT SCENARIO DEPENDENT

K/A Catalog

Sys	Mode	No.	RO	SRO
12	000	K4.02	3.9	4.3

Answer 2: A

References: OP/1/B/6100/10A

Originator:

Points: [1.0] Assume the following indications are observed:

A. Highest wide range hot leg temp - 555°F.

B. Lowest wide range NC pressure - 1000 psig.

With these conditions, what is the current value of NC system subcooling?

TIME: 3 minutes

Question 14 13 NOT SCENARIO DEPENDENT

K/A Catalog

Sys	M[illegible]	No.	RO	SRO
002	000	K1.04	3.9	4.1

Answer 14: Current subcooling is - 25°F ± 5°F (1 pt.)

Calculation (not required for full credit)

T_{sat} for 1000 psig = 530°F (from data book curve 1.4)

530 - 555 = - 25°F subcooling

References: MC-5
Data Book

Originator: LBL

Key

U.S. NUCLEAR REGULATORY COMMISSION
REACTOR OPERATOR REQUALIFICATION EXAMINATION

FACILITY: Catawba

REACTOR TYPE: WEC PWR

DATE ADMINISTERED: 9/8/89

OPERATOR: PART A - RO-2B

SECTION	CATEGORY VALUE	OPERATOR'S SCORE	% OF CATEGORY VALUE
A Plant Proficiency	14.75		
B Limits and Controls			

Final Grade

NAME _____

DATE _____

S.S. # _____

PART A
Test # 20-2B
SEPT. 8, 1989
Page of

Originated by: R.E. Kimray

Approved by: W K Barron
DIR. OF OPER. TRNG.

TOTAL POINTS: 14.75
TOTAL QUESTIONS: 14

INSTRUCTIONS:

1. Put your name on each answer sheet
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_____
Students signature

TURNOVER SHEET

Conditions Existing at the time of the Incident:

A. Plant Conditions

- Power History 100% BOL
- Boron 959 ppm
- Tave 591°F
- Xenon 2939 pcm
- Samarium +54.6 pcm

B. Tech. Spec. Action Items:

None current

C. Work in Progress:

None

D. Current Procedure:

OP/1/A/6100/03 Enclosure 4.1

Manual Actions Taken During the Incident:

A. Operator Computer Alarms Acknowledged
B. Control Room Annunciators Acknowledged

Simulator and chart recorders are "Frozen", the OAC is operational.

Points: [1.25] List the existing plant conditions that could, by themselves, cause an auto start of each CA pump.

TIME: 3 minutes

Question 16 /

K/A Catalog

Sys	Mode	No.	RO	SRO
061	000	K4.02	4.5	4.6

Answer 16:

Motor Driven CA Pumps
- Ss
- Both CFPT's tripped
- Lo-Lo level in Steam Generator (C or D S/G)
- AMSAC

Turbine Driven CA Pump
- Lo-Lo level in two (or C & D) Steam Generators

(.25 pts each)

References: MC-1, 2, 10

Originator: LBL

Points: [1.0] What would be the effect on the plant electrical system if breaker GTB opened under the existing plant conditions?

A. Sequencer would Load Shed ETB and Load on Blackout and LOCA Loads.

B. Sequencer would Load Shed ETB and Load on Blackout only Loads.

C. Sequencer would reclose GTB Breaker in Load Group 13.

D. GTB will not reclose, thus FTB (B/O Switchgear) will remain de-energized.

TIME: 3 minutes

Question ~~12~~ 2

K/A Catalog

Sys	Mode	No.	RO	SRO
062	000	K4.03	2.8	3.1
062	000	K4.07	2.7	3.1

Answer 12: D.

References: 1MC11

Originator: GFW

Points: [1.0] Based on current Engineered Safeguards status and plant conditions, what action should be taken?

A. Manually initiate "A" Train Phase B Containment Isolation.

B. Manually initiate "A" Train Phase A Containment Isolation.

C. Manually initiate "B" Train Phase A Containment Isolation.

D. Manually initiate "B" Train Phase B Containment Isolation.

TIME: 2 minutes

Question # 3

K/A Catalog

Sys	Mode	No.	RO	SRO
013	Task	13	3.9	4.0

Answer 8: A.

References: EP/1/A/5000/01

Originator: GFW

Points: [1.0] Considering present plant conditions, what signal(s) could have caused an Automatic Main Feedwater Isolation?

TIME: 3 minutes

Question ~~13~~ 4

K/A Catalog

Sys	Mode	No.	RO	SRO
013	000	K4.13	3.7	3.9

Answer 13: SS Signal
Lo Tave with P-4 (Rx Trip)
(.5 pts each)

References: 1MC2
1MC11
OP/1/B/6100/10D

Originator: GFW

Points: [1.5] What valves should be verified closed upon a CF Isolation actuation? (Valve numbers not required)

TIME: 3 minutes

Question ~~3~~ 5

K/A Catalog

Sys	Mode	No.	RO	SRO
059	000	K4.19	3.2	3.4

Answer 3:
CF to CA Isol. Valves
Individual Tempering Valves
CF Cont. Isol. Valves
CF Cont. Isol. Bypasses
CF Reg. Valves
CF Reg. Valve Bypasses
(.25 pts. each)

References: EP/1/A/5000/1A

Originator: GFW

Points: [1.0] Which of the following is NOT contributing to NC System Heat Removal.

A. Forced Circulation

B. Turbine Stop Valve Stuck Open

C. CA Pump Flows

D. Steam Generators

TIME: 3 minutes

Question 10 6

K/A Catalog

Sys	Mode	No.	RO	SRO
002	000	K1.11	4.1	4.2

Answer 10: B.

References: MC-2, 10

Originator: LBL

Points: [1.0] Based on current plant condtions, is the status of the Reactor Coolant Pumps correct? (choose one)

A. Yes, because no critical parameters have been exceeded.

B. No, because KC to the pumps is isolated and cannot be re-established readily.

C. Yes, because EP/01 will direct the operator to restore KC before any pump damage occurs.

D. No, because under these conditions the pumps should be stopped to reduce NC System Inventory loss.

TIME: 3 minutes

Question ~~14~~ 7

K/A Catalog

Sys	Mode	No.	RO	SRO
003	000	A2.02	3.7	3.9

Answer 14: B.

References: EP/01 Enclosure 1

Originator: GFW

Points: [1.0] What was the cause of the high containment pressure? Be specific. Provide two control room indications which support your answer.

TIME: 4 minutes

Question # 8

K/A Catalog

Sys	Mode	No.	RO	SRO
000	040	EK1.06	3.7	3.8
000	040	11	4.1	4.3

Answer 4: Steam line break inside containment on 'C' S/G (.5 pt)
Any two (.25 each)
S/G 1C SM Flow (at ~40%)
"Main steam leak Detector" annunciator
S/G C CF vs STM Flow mismatch annunciator
S/G 'C' low SM Press.
S/G C level abnormally low (or decreasing abnormally)

References: 1MC2

Originator: GFW

Points: [1.0] What condition(s) must be established to satisfy the "NC Inventory" Critical Safety Function?

A. Increase PZR Level to > 45%

B. Decrease PZR Level to < 92%

C. Increase PZR Level to > 17%

D. Decrease PZR Level to < 80%

TIME: 2 minutes

Question 5/9 RO ONLY

K/A Catalog

Sys	Mode	No.	RO	SRO
000	028	EK2.01	3.4	3.6
000	028	EK1.01	3.8	3.9

Answer 5: A.

References: EP/1/A/5000/2F

Originator: GFW

Points: [1.0] Based on current plant conditions and the "Yellow Path" on heat sink, which of the following procedures should be referenced: (Select one)

A. EP/2C2

B. EP/2C3

C. EP/2C4

D. EP/2C5

TIME: 3 minutes

Question 6/10 RO ONLY

K/A Catalog

Sys	Mode	No.	RO	SRO
059	000	K1.02	3.4	3.4

Answer 6: D

References: OAC Tech Spec 23
EP/1/A/5000/2C

Originator: GFW

Points: [1.0] Explain why "B" S/G pressure is less than A & D S/G's.

TIME: 4 minutes

Question 2

K/A Catalog

Sys	Mode	No.	RO	SRO
000	040	EA1.23	3.6	3.5

Answer 2: "B" S/G pressure is slightly less than A & D S/G's due to supplying steam to the CA pump turbine.

References: MC-2

Originator: LBL

Points: [1.0] What two currently existing signals or plant conditions could have directly caused Letdown to isolate? Include any set points in your answer.

RO
Only

TIME: 4 minutes

Question ~~11~~ 12

K/A Catalog

Sys	Mode	No.	RO	SRO
004	010	A4.02	3.6	3.1

Answer 11: S_T Signal (.5 pts.), Pzr level (.25 pts.), < 17% (.25 pts.)

References:

Originator: GFW

Points: [1.0] Briefly explain why there is KC flow to 'B' Train ND Heat exchanger but not tc 'A' train.

TIME: 4 minutes

Question 9 (3)

K/A Catalog

Sys	Mode	No.	RO	SRO
000	025	EK3.08	3.1	3.4

Answer 9: 'B' Train has received a Sp signal which has aligned KC to the 'B' NDHX, 'A' Train has not received a Sp signal.

References: 1MC11

Originator: REK

THE FOLLOWING

QUESTIONS DO NOT

REL-ATE TO THIS

SCENARIO!

Points: [1.0] With "A" Train VC/YC running and both trains powered from Unit 1, what effect will a loss of 1ETB have on the operation of <u>each</u> train of VC/YC?

TIME: 4 minutes

Question 1/14 **NOT SCENARIO RELATED**

K/A Catalog

Sys	Mode	No.	RO	SRO
000	068	EK31.2	4.1	4.5

Answer 1: "A" Train not affected (.5 pts.)
"B" Train pressure filter fan and CR AHU start (.5 pts.)

Reference: 1MC5

Originator: GFW

Key

U.S. NUCLEAR REGULATORY COMMISSION
REACTOR OPERATOR REQUALIFICATION EXAMINATION

FACILITY: Catawba

REACTOR TYPE: WEC PWR

DATE ADMINISTERED: 9/8/89

OPERATOR: PART B- RO-2A

SECTION	CATEGORY VALUE	OPERATOR'S SCORE	% OF CATEGORY VALUE
A Plant Proficiency			
B Limits and Controls	12.0		

Final Grade

NAME_____

DATE _____

S.S. #_____

PART B
Test #RO-2A
SEPT. 8,1989
Page of

Originated by: R.E. Kimray

Approved by: W H Barnes
DIR. OF OPER. TRNG.

TOTAL POINTS: 12.0
TOTAL QUESTIONS: 11

INSTRUCTIONS:

1. Put your name on each answer sheet
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_____
Students signature

(/) 1 PTS The following plant conditions exist:

a) The plant is in cold shutdown.
b) RCS temperature is 200 degrees F.
c) Boron concentration is 1000 ppm.
d. The desired minimum Shutdown Margin is 1% ΔK/K

Based on these conditions, determine core burnup.

A. ~180 EFPD

B. ~190 EFPD

C. ~200 EFPD

D. ~210 EFPD

SRO Only

ANSWER: B

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 5d
SRO: 5d

REFERENCES: SRO Audit Exam
12-12-88
192/002/K1.13 (3.5*/3.7*)

ORIGINATOR: DRR

TIME: 3 minutes

March 29, 1989
RT-RB-11

(2) 1.0 PTS Reactor Power is at 20% when condenser vacuum decreases to 20"Hg.

A. Specifically state the method by which the Reactor Coolant System cooldown to 557°F should be accomplished?

B. What cooldown rate should be used?

ANSWER:
A. Dump steam with the Main Steam PORV's (.5pts) (since no C-9, Can't use dumps)
B. $\leq$ 50%/hr (.5pts) (per CAUTION STATEMENT prior to Step 4 in AP/02)

OBJECTIVES:
ENPF: N/A
ISS: N/A
RO: 5
SRO: 5

REFERENCES:
AP/1/A/5500/02
KA 000/051 EK3.01 (2.8/3.1)
EA2.02 (3.9/4.1)
041/020 G-15 (3.2/3.3)

ORIGINATOR: DRR

TIME: 5 minutes

(3) 1 PTS . The 'A' Train CA pump is started during a startup for normal feed while at 600 psig steam pressure in the S/G's. The operator sees very low amps, zero discharge pressure and zero flow. The surface temperature of the CA piping upstream of the CA discharge to S/G check valves is 240°F. What action must be taken to return CA Pump 'A' to an operable status?

ANSWER: (If temperature indicates steam binding) vent the pump (.5 pts.) then run it to cool the piping (.5 pts.)

(Per OP/6250/02, end 4.9)

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: 9
SRO: 9

REFERENCES: OP/1/A/6250/02
K/A 061000 A1.04 (3.9/3.9)

ORIGINATOR: CTK

TIME: 4 minutes

RO Only

Not SRO On

August 15, 1989
CF-CA-9

(4) 1.0 PTS A dropped rod has occured. The immediate actions of AP-14 have been performed. The plant is now stable at 90% with Tave = Tref. Repairs are in progress to allow recovering the dropped rod. The IAE Supervisor informed you that repairs will take 3 hours.

Which of the following actions must be taken in order for Power Operation to continue? (Choose one.)

A. Restore the rod to operable status within ± 12 steps of its bank within 72 hours.

B. Declare the rod inoperable and align the rest of the bank to within ± 12 steps of the inoperable rod.

C. Declare the rod inoperable and ensure the shutdown margin requirement of specification 3.1.1.1 is satisfied.

D. Declare the rod inoperable and be in Hot Standby within 6 hours.

ANSWER: C

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: 15
SRO: 15

REFERENCES: Tech Spec 3.1.3.1
K/A# 0010000 A2.08 (3.5/4.2)

ORIGINATOR: REK

TIME: 5 minutes

(5) 1 PTS The unit has a known primary-to-secondary leak. Which one of the following sets of conditions would require the SRO to transition from guidance as presented in AP/10 ("NC Leak") to that presented in EP/01 ("Rx trip or SI")?

A. Pressurizer level less than programmed level, letdown flow reduced to 45 gpm, one centrifugal charging pump at maximum output, charging pump suction from VCT, pressurizer level continues to slowly decrease.

B. Pressurizer level less than programmed level but greater than 17%, letdown flow reduced to 45 gpm, two centrifugal charging pumps at maximum output, charging pump suction from FWST, pressurizer level continues to slowly decrease.

C. Pressurizer level less than 17% letdown isolated, one centrifugal charging pump at maximum output, charging pump suction from FWST, pressurizer level continues to slowly decrease.

D. Letdown flow isolated, two centrifugal charging pumps at maximum output, charging pump suction from VCT, pressurizer level continues to slowly decrease.

RO only

ANSWER: B

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 1,2
SRO: 1,2

REFERENCES: CNS SRO Exam
9/88 (Q.7.0.6)
AP/10; EP/01; EP/1E
KA 000/037 G0.11 (3.7/4.0)
K3.05 (4.2/4.4)
K3.07 (3.9/4.1)

ORIGINATOR: DRR

TIME: 4 minutes

SRO only

(6) 1 PTS Supplemental actions are being performed to recover from a 500 gpm tube leak in S/G C. S/G C pressure is 800 PSIG, and narrow-range level is 87% and increasing. The NC System is at 900 psig and being cooled down by dumping steam from the unaffected S/G's. Based on these parameters, which of the following actions would be the most appropriate?

A. Establish maximum blowdown rate for S/G C

B. Pin all main steamline support hangers.

C. Establish conditions such that RCS pressure is less than S/G C pressure

D. Dump steam from S/G C via the Power Operated Valve.

ANSWER: C

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: 2
SRO: 2

REFERENCES: EP-1E P.19, 21, 32
EP-2C3 P.5, 7
EP-02 Status Tree
K/A# 000037 EA2.14 (4.0/4.4)
K/A# 000037 EA2.16 (4.1/4.3)

NOT ON SRO

ORIGINATOR:

TIME: 2 minutes

RO Only

(7) 1 PTS Given the following plant conditions, which critical safety function should be given highest priority:

Cont. Press		= 3.8 psig
PZR Press		= 2280 psig
PZR level		= 54%
S/G levels	A	= 38% NR
	B	= 43% NR
	C	= 0% NR
	D	= 40% NR
NC Cold leg Temp (lowest)		= 440°F
Core Exit T/C's		= 445°F
S/G Pressures:	A	= 900 psig
	B	= 910 psig
	C	= 50 psig
	D	= 895 psig
S/R SUR		= -0.33 dpm
Time since Rx Trip		= 50 minutes
RVLIS		= 100%

A. Heat Sink

B. Reactor Coolant Integrity

C. Containment Integrity

D. Reactor Coolant Inventory

ANSWER: ~~C~~ B

OBJECTIVES: ENPF:N/A
ISS:N/A
RO:4
SRO:4

REFERENCES: 1. EP/1/A/5000/02 Ret. #3
2. K/A 000/040 G-11 (4.1/4.3)
G-12 (3.8/4.1)

ORIGINATOR: C. O'Dell

TIME: 4 minutes

June 17, 1988
EP-CSF-48

(8) 2 PTS With the unit operating at 100% power, a steam line break outside containment occured on 1A S/G 60 minutes ago. Plant conditions are as follows:

SR SUR = 0 to -0.1 dpm
NC Press. = 2280 psig
PZR Level = 58%
S/G levels (B,C,D) = 40% NR
S/G levels (A) = 0% NR, 25% WR and decreasing
S/G Pressure (B,C,D) = 1120 psig
S/G Pressure (A) = < 50 psig and decreasing
NC Temperature (Highest) = 425°F (= stable)

Two NC pumps are running and SI has just been terminated.

A. State the CSF's (if any) which would be in alarm.

B. State any applicable actions/limits associated with this reactor coolant system pressure conditions.

ANSWER:
A. Heat Sink (.5 pts.) and NC Integrity (.5 pts.)
B. NC pressure should be reduced (.5) to within the bounds of enclosure 3 of EP-2D2 (.5 pts.) (<~~1000~~ 1600 psig)

KDM 9/19/89

OBJECTIVES:
ENPF:N/A
ISS:N/A
RO:4
SRO:4

REFERENCES:
1. EP/1/A/5000/02 Ret. #3
2. EP/1/A/5000/2D2 Ret. #4
3. K/A 000/040 G-11 (4.1/4.3)
G-12 (3.8/4.1)

ORIGINATOR: C. O'Dell

TIME: 5 minutes

(9) 1 PTS Unit startup is in progress. Reactor power is 3% when intermediate range 'N-36' fails low.

Which of the following is the required operator response? (Circle the correct response.)

A. Restore the channel prior to exceeding 10% rated thermal power

B. Restore the channel prior to exceeding 5% RTP

C. Continue the startup to 50% power

D. Reduce power to below the P-6 setpoint and restore the channel prior to returning power above the P-6 setpoint

ANSWER: A

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: ENB-10
SRO: ENB-10

REFERENCES: Tech. Spec. 3.3.1 AP/16
K/A# 000033 EK3.02 (3.6/3.9)

ORIGINATOR: GFW

TIME: 3 minutes

(10) 1 PTS For the leakage conditions shown below, indicate whether or not the leak exceeds the limiting condition for operation in Technical Specification. Consider each condition separately. Assume no other concurrent leakage. Answer either "EXCEED" or "DOES NOT EXCEED" for the following:

A. 0.5 GPM loop drain valve body leak

B. 1.2 GPM through valve 1NI-159

C. 1.5 GPM unidentified leakage

D. 3.0 GPM seat leakage from a pressurizer safety valve

ANSWER: (SRO)

A. Exceeds (0.25) (pressure boundary)
B. Exceeds (0.25)
C. Exceeds (0.25)
D. Does not exceed (0.25)

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: 6F
SRO: 6F

REFERENCES: Tech Spec 3.4.6.2
K/A# 000009 G.3 (3.5/4.1)

ORIGINATOR:

TIME: 4 minutes

(//) 1 PTS An I&E technician informs you that he must remove the control room air intake radioactivity monitor (EMF-43A) sample blower from service for periodic maintenance. The sample blower will be out of service for about 6 hours. You are performing a reactor startup with reactor power at 1% RTP.

Which of the following best describes your required course of action?

A. No action is required by Tech Specs

B. Startup may continue provided the affected air intake is isolated and the filter units are placed in service within one hour.

C. Startup may continue as long as power is maintained less than 5% rated thermal power.

D. Startup may continue provided BOTH trains of control room ventilation are placed in filter within one hour.

ANSWER: B

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 8
SRO: 8

REFERENCES: Tech. Spec. 3.3.3.1
Tech. Spec. 3.0.4
KA 073/000 G-5 (3.1/3.6)
073/000 G-11 (2.8/3.4)

ORIGINATOR: DRR

TIME: 3 minutes

January 17, 1989
WE-EMF-3

Key

U.S. NUCLEAR REGULATORY COMMISSION
REACTOR OPERATOR REQUALIFICATION EXAMINATION

FACILITY: Catawba

REACTOR TYPE: WEC PWR

DATE ADMINISTERED: 9/8/89

OPERATOR: Part B - RO-2B

SECTION	CATEGORY VALUE	OPERATOR'S SCORE	% OF CATEGORY VALUE
A Plant Proficiency	14.5		
B Limits and Controls			

Final Grade

NAME_____

DATE _____

S.S. #_____

PART B
Test # 20-28
SEPT. 8,1989
Page of

Originated by: R.E. Kimray

Approved by: W.H. Barron
DIR. OF OPER. TRNG.

TOTAL POINTS: 14.5
TOTAL QUESTIONS: 14

INSTRUCTIONS:

1. Put your name on each answer sheet
2. Write your answers on the answer sheet.
3. Ask the test monitor/instructor concerning questions which are not clear to you.
4. Cheating or evidence of cheating will not be tolerated.

My signature on this form is my declaration that the responses given on the attached test or quiz are entirely my own.

It further declares that I am aware that I am subject to termination from the training program immediately, and in addition, will be subject to further disciplinary action up to and including discharge from the company for cheating and/or compromising on exams/tests.

_____
Students signature

(/) 1 PTS What actions are required to be taken as a result of a fire alarm for Zone 172 (RCP 1D) which cannot be reset? Investigation reveals there is no fire in the area. The unit is in Mode 1 at 100% power.

ANSWER: Inspect the containment zone at least once every 8 hours (.5pts) or monitor containment air temperature every hour (.5pts)
(Tech. Spec. 3.3.3.8 Action b. for Zone in Containment)

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 17
SRO: 17

REFERENCES: Tech. Spec 3.3.3.8
KSA 086/000 G-11 (2.7/3.5)

ORIGINATOR: DRR

TIME: 4 minutes

(2) 1 PTS During escalation from cold shutdown to 100% power which of the following must the operator ensure for correct CA alignment? (Select one)

A. The CA pump turbine is aligned to all 4 steam generators.

B. The RN and RC supply valves are open.

C. The motor driven pumps are aligned to supply any of the 4 S/G's from either pump.

D. Flowpath from water source into S/G's is free from obstruction.

ANSWER: D

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 8
SRO: 8

REFERENCES: KSA 061-1 (3.7/3.9)
CA Lesson Plan

ORIGINATOR: JLY

TIME: 3 minutes

(3) 1 PTS The unit is at 100% power when a turbine runback occurs due to Low KG pressure of 10 psig. ~~The plant stabilizes at ~60% power.~~ Three minutes have elapsed since the loss of KG. Steam dumps have actuated as expected. (EDM 9/11/89)

Describe the expected response of the turbine generator. Include any applicable setpoints and time frames.

ANSWER: The turbine ~~should trip~~ will runback to ~25% (.25 pts) ~~because stator cooling has been lost~~ in 3 min (.25 pts) ~~for >2.5 minutes~~ No trip will occur (.25 pts) ~~with >23% load~~ at the runback will stop. (EDM 9/11/89)

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 17
SRO: 17

REFERENCES: OP/1/B/6100/10B
AP/1/A/5500/03 (Load Rejections
AP/1/A/5500/02 (Turbine Generator Trip)
KSA 045 000 A3.04 3.4/3.6
045 000 K4.12 3.3/3.6
045 050 G-8 2.6/2.7
045 050 K1.01 3/4.3.6
045 G-15 2.9/3.2

ORIGINATOR: McGuire

TIME: 4 minutes

(4) 1 PTS Unit 1 is at 100% power when the "Rod Control Urgent Failure" annunciator is received. The problem is verified to be a failure in the logic cabinet. The required immediate actions are taken and I&E reports that repairs will take at least 4 hours. Select the statement that best describes the correct action for the OATC to take.

A. No attempt should be made to move rods.

B. Maintain Tavg by using control rods by selecting individual control banks.

C. Contact I&E to reset the Rod Control System.

D. Reposition rods six to ten steps to determine rod motion is possible.

ANSWER: A

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 14
SRO: 14

REFERENCES: Open Reference
AP/15 Case 1 Step 2 & 7
T/S 3.1.3.6
001/050/A2.01 (3.7/3.9)

ORIGINATOR: GFW

TIME: 2 minutes

(5) 1 PTS A reactor trip has occured from full power. An operator checks the Safety Injection actuated and E/S load sequencer actuated status lights and finds them not illuminated. NC System pressure is ~1845 PSIG and steadily decreasing.

For this reactor trip event, Safety Injection has:

A. Not occurred but is required. The operator should manually initiate SI.

B. Not occurred and is not required. The operator should transfer to EP/1A (Reactor Trip Response) to stablize the primary and secondary plants at no load conditions.

C. Occurred and is required. The operator should continue with the immediate action steps of EP/01 because SI is already in progress.

D. Occurred but is not required. The operator should immediately terminate SI.

ANSWER: A

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: 2
SRO: 2

NOT ON SRO

REFERENCES: EP/1/A/5000/01
EP/1/A/5000/01 Symptoms
K/A# 000007 SG10 (4.2/4.1)
K/A# 000007 SG12 (3.8/3.9)

ORIGINATOR: REK

TIME: 3 minutes

RO Only

(6) 1 PTS A Safety Injection occurred on Unit 1 and the following conditions exist:

a. Containment Pressure - 4.5 psig
b. Core Exit Thermocouples - 300 degrees F
c. Containment Sump Level - 1.6 ft and increasing
d. NC Pressure - 100 psig
e. S/G Pressures - 1090 psig

Select the procedure path the operator would use to correctly address this accident.

A. EP/01 (Reactor Trip or Safety Injection), EP/1C (High Energy Line Break Inside Cont.) then EP/1C3 (Transfer to Cold Leg Recirc)

B. EP/01 (Reactor Trip or Safety Injection), EP/1C (High Energy Line Break Inside Containment) then EP/1C4 (Transfer to Hot Leg Recirc)

C. EP/01 (Reactor Trip or Safety Injection), EP/1C (High Energy Line Break Inside Containment) and EP/1C2 (Post LOCA Cooldown and Depressurization)

D. EP/01 (Reactor Trip or Safety Injection), EP/1C (High Energy Line Break Inside Containment) then EP/1C1 (SI Termination Following a High Energy Line Break Inside Containment)

ANSWER: A

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 6a
SRO: 6a

REFERENCES: EP/1/A/5000/1 Reactor Trip or Safety Injection

KSA 000/001/G-10/4.3/4.5
KSA 000/009/G-10/4.2/4.4

ORIGINATOR: McGuire

TIME: 3 minutes

(7) 1 PTS A reactor trip has occurred. The reactor trip and bypass breakers are open and neutron flux is decreasing. Rod bottom lights are lit and individual rod position is zero for all control rods except rods D-4 and J-2. They indicate they are in the full out position.

Select the statement that correctly describes the operator action required with respect to core reactivity.

A. No action is required unless a red path condition for the SUBCRITICALITY critical safety function is present.

B. Compensate for the stuck control rods by using the normal boration method to borate.

C. Compensate for the stuck control rods by using the emergency boration method to borate.

D. Go to EP-2A1 (ATWS) and perform subsequent actions.

ANSWER: C

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 4
SRO: 4

REFERENCES: EP-01
EP-1A
KA 000/024/EA2.05 (3.3/3.9)
KA 000/024/GEN. 11 (3.8/3.9)

ORIGINATOR: REK

TIME: 3 minutes

RO only

(8) 1 PTS Unit 1 has experienced a high energy line break inside Containment. After completing cooldown and depressurization, the following conditions exist:

- NCS pressure = 390 psig and slowly increasing
- Total CA flow to intact S/G's = 600 gpm
- Loop 'A' Tc = 405°F
- Loop 'B' Tc = 395°F
- Loop 'C' Tc = 400°F
- Loop 'D' Tc = 397°F

Based on the information given, the SRO informs the OATC that a transition to EP/1C1 (SI Termination following, a High Energy Line Break) will now be made.

State why this action is incorrect and what proper transition should be made.

ANSWER: (To go to EP/1C1, All Tc's should be > 400°F.) Loops B & D are < 400°F (.5 pts.) Go to EP/1D1 (SI Term. following Steam Line Break) (.5 pts.)

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 1c
SRO: 1c

REFERENCES: EP/1C2 Step 31
KSA 000/069.11 (4.0/4.2*)

ORIGINATOR: DRR

TIME: 4 minutes

(9) 1 PTS The plant tripped from 100% power, with indications in the Control Room that all offsite power had been lost (all 6.9 KV buses de-energized) and that one AC Emergency BUS is de-energized.

Indicate which of the following statements is most correct for this condition.

A. The Emergency Operating Procedures must always be entered through EP-01. The immediate actions of EP-01 will transfer the operators to EP-03 for the described conditions.

B. EP-01 is the appropriate Emergency Operating Procedures entry point for these conditions.

C. EP-03 should be entered with the symptoms of a loss of all offsite power.

D. Entry into the EP's is not required.

ANSWER: B

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: 2
SRO: 2

REFERENCES: OMP 1-4
EP-01 Symptoms
EP-03 Symptoms
EP-01 Immediate Actions
K/A# 000056 SG11 (3.5/3.8)
K/A# 000056 SG12 (3.4/3.6)

ORIGINATOR:

TIME: 2 minutes

(10) 1.5 PTS EP-2F3 (Void in Reactor Vessel) is in progress. The Reactor Vessel is being vented and the maximum vent time has been exceeded. Reactor Vessel Upper Range Level is 90% and stable. What actions are required?

ANSWER:
1. Close all vent valves (.5 pts.)
2. Return NC pressure to pressure recorded prior to venting and establish NC conditions for reventing. [Also accept: Increase NC pressure to value recorded on Enclosure 3 of EP-2F3 and return to Step 23] (1 pt)

OBJECTIVES:
ENPF: N/A
ISS: N/A
RO: 4
SRO: 4

REFERENCES:
EP/1/A/5000/2F3 Rev #5
KSA 000/040 (3.8/4.1)
000/074 (4.3/4.4)

ORIGINATOR: DRR

TIME: 4 minutes

(//) 1 PTS In the event that the Turbine Bldg. Sump Pump System for Unit 1 becomes contaminated, what should the procedure be to handle this situation?

A. Continue discharging to the WC System while continuously monitoring this system to ensure that radioactive discharge limits are being met.

B. Redirect the system flowpath in order for it to discharge into the waste monitor tank B. (in Aux. Bldg.)

C. Isolate discharge allowing the radioactive wastes to be discharge to the Aux. Bldg. floor drain tank.

D. Redirect discharge allowing the radioactive waste to be discharged to the Mixing and Settling Tank.

ANSWER: C

OBJECTIVES: ENPP:N/A
ISS: 5B
RO: 5B
SRO: 5B

REFERENCES: OP-CN-WE-SS
KA068.08 (2.6/2.8)

ORIGINATOR:

TIME: 4 minutes

(12) 1 PTS During the EMF trip point verification the "check-operate-trip adjust" switch is: (select one)

A. Held in the "check" position.

B. Set to the "trip adjust" position and released.

C. Set to the "trip adjust" position and required to be manually held there.

D. Not required to be operated.

ANSWER: C.

OBJECTIVES: ENPF: N/A
ISS: N/A
ROs: 4
SROs: 4

REFERENCES: KEA 073-7 (2.9/3.0)
WG Lesson Plan

ORIGINATOR:

TIME: 2 minutes

August 18, 1989
WE-WG-5

(13) 1 PTS ND Pump "A" is in operation with NC level 6.5%. You notice erratic motor amps for ND pump "A". What are your required actions?

A. Increase ND flow to sweep entrained air through the pump and out of the suction piping.

B. Stop the ND pump, raise NC level above the top of the Rx vessel hot legs and start "B" ND pump.

C. Raise NC system level while observing ND pump operating parameters.

D. Reduce "A" ND pump flow and start "B" ND pump to provide ND flow through core.

ANSWER: B

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 6.I.
SRO: 6.I.

REFERENCES: AP/19
005/0001 A4.01 (3.6/3.4)

ORIGINATOR: CWS

TIME: 4 minutes

(14) 1 PTS While operating at 100% power, the following annunciators and indications were received suddenly.

ANNUCIATORS
"NCP #1 seal leakoff Hi flow"
"NCP #1 seal leakoff Lo flow"
"NC pump #1 seal outlet Hi Temp"

INDICATIONS

(Seal injection flow)	A - 15 gpm B - 3.5 gpm C - 2.8 gpm D - 8
(Wide range seal leakoff)	1A NCP - greater than 6 gpm 1B NCP - .2 gpm 1C NCP - .25 gpm 1D NCP - .8 gpm

Based on the above information, which of the following is the appropriate corrective action that should be taken? (Circle the correct response.)

A. Close NV-52A (NC Pump 1A Seal Return Isolation) Pump operation may continue indefinitely since the #2 seal is a full pressure seal.

B. Close NV-52A (NC Pump 1A Seal Return Isolation) Ramp down to less than 48% power and stop the affected pump within 30 mins.

C. Close NV-52A (NC Pump 1A Seal Return Isolation) Ramp down, trip the reactor, and then trip the affected pump within 30 mins.

D. Continue NCP 1A pump operation up to 24 hours to allow #2 seal to reseat

NOT ON SRO - 3

ANSWER: B

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: 10.C.
SRO: 10.B.

REFERENCES: AP/1/A/5500/08 Case 1
K/A# 003000 A2.01 (3.5/3.9)

ORIGINATOR:

TIME: 2 minutes

RO only

KEY

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

FACILITY: CATAWBA

REACTOR TYPE: WEC PWR

DATE ADMINISTERED: 08/25/89

OPERATOR: PART A - SRO - 1A

SECTION	CATEGORY VALUE	OPERATOR'S SCORE	% OF CATEGORY VALUE
A Plant Proficiency	13 1/4 pts.		
B Limits and Controls			

Final Grade

NAME_____

DATE _____

S.S. #_____

PART A
Test #SRO-1A
AUGUST 25,1989
Page of

Originated by: R.E. Kimray

Approved by: W.H. Barron
DIR. OF OPER. TRNG.

TOTAL POINTS: 14
TOTAL QUESTIONS: 14

INSTRUCTIONS:

1. Put your name on each answer sheet
2. Write your answers on the answer sheet.
3. Ask the test monitor/instructor concerning questions which are not clear to you.
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_____
Students signature

TURNOVER SHEET

Conditions Existing at the time of the Incident:

A. Plant Conditions

- Power History 100% MOL
- Boron 464 ppm
- Tave 591°F
- Xenon 2914 pcm
- Samarium -47 pcm

B. Tech. Spec. Action Items:

- Turbine impulse Press channel II has failed Low.
- D/G 'B' Fuel oil level is below Tech. Spec. minimum.

C. Work in Progress:

- "PZR REF Level" meter is failed Low
- Power reduction in progress at ~10% per hour

D. Current Procedure:

OP/1/A/6100/03 Enclosure 4.2 Step 2.2

Manual Actions Taken During the Incident:

A. Operator Computer Alarms Acknowledged
B. Control Room Annunciators Acknowledged

Simulator and chart recorders are "Frozen", the OAC is operational.

Points: [1.0] Which of the following statements is correct concerning the present status of the steam dump load rejection controller?

A. Controller is armed and steam dumps will modulate to maintain $T_{avg} = T_{no\text{-}load}$.

B. Controller is armed and steam dumps will modulate when T_{avg} exceeds T_{ref} by 3°F.

C. Controller is armed but dumps will not modulate due to failure of Impulse pressure channel 2.

D. Controller will not arm due to failure of Impulse pressure channel 2.

TIME: 2 minutes

Question ~~3~~ 1

K/A Catalog

Sys	Mode	No.	RO	SRO
041	020	K4.03	2.8*	3.1

Answer 3: B.

References: 1MC-1

Originator: LBL

Points: [1.0] Which of the shutdown CRDM fans is (are) available? Explain your answer.

TIME: 3 minutes

Question ~~13~~ 2

K/A Catalog

Sys	Mode	No.	RO	SRO
062	000	K3.01	3.5	3.9

Answer 15: A, C & D fans are now available. (.5 pts)

D has power from its normal supply.(D-MXR) (.25 pts)

A & C have power from their alternate supply.(.25 pts)

(A-MXO, C-MXQ)

References: MC-1

Originator: LBL

Points: [1.0] With the current plant conditions, what is the status of the operability of the P-13 interlock? Justify your answer.

TIME: 4 minutes

Question # 3

K/A Catalog

Sys	Mode	No.	RO	SRO
012	000	K4.02	3.9	4.3

Answer 4: Inoperable (.5 pts.), T.S. Requires 2 channels minimum operable. CH-2 impulse press is failed Low. (.5 pts.)

References: T.S. Table 3.3-1

Originator:

Points: [1.0] Which of the following statements is correct concerning the current S/G Lo-Lo Level Reactor trip setpoints?

A. All four channels setpoints on all four S/G's are 40%.

B. Channels 1, 2 & 3 setpoints on all four S/G's are 40%, channel 4 setpoint on all S/G's is 17%.

C. All four channels setpoints on all four S/G's are 17%.

D. Channels 1, 3 & 4 setpoints on all four S/G's are 40%, channel 2 setpoint on all S/G's is 17%.

TIME: 3 minutes

Question 9 4

K/A Catalog

Sys	Mode	No.	RO	SRO
12	000	K4.02	3.9	4.3

Answer 9: D.

References: OP/1/A/6700/01 Fig 3.12

Originator: GFW

Points: [1.0] Current plant conditions begin to degrade and force the operators to perform the following actions:

- Reduce L/D to 45 gpm orifice
- Fully open NV294 (NV PMPS A&B Disch Flow Control)
- Swap NV pump suction to FWST and start second NV pump

Following the above actions, it is noted that the PZR level rate of decrease has slowed but is still decreasing. As CR SRO what operator action should you direct to be performed?

TIME: 2 minutes

Question ~~17~~ 5 SRO ONLY

K/A Catalog

Sys	Mode	No.	RO	SRO
006	030	K2.01	4.5	4.8

Answer 17: Manually Trip reactor (0.5 pts)
Manually initiate SI (0.5 pts)
(GO TO EP/01)

References: AP10 RNO Step 1b.

Originator: RJK

Points: [1.0] With the conditions that existed prior to the present incident, what actions would be required if NI-185A (ND Pump 1A Containment Sump Suction) was found to be inoperable?

A. Restore 1B D/G or NI-185A to operable status within 2 hours or be in Mode 3 within next 6 hours, Mode 5 within the following 30 hours.

B. Restore 1B D/G or NI-185A to operable status within 24 hours or be in Mode 3 within next 6 hours, Mode 5 within the following 30 hours.

C. Restore 1B D/G and NI-185A to operable status within 7 days or be in Mode 3 within next 6 hours, Mode 5 within the following 30 hours.

D. Restore 1B D/G and NI-185A to operable status within 72 hours or be in Mode 3 within next 6 hours, Mode 5 within the following 30 hours.

TIME: 6 minutes

Question ~~5~~ 6

K/A Catalog

Sys	Mode	No.	RO	SRO
064	Gen	11	3.4	3.9

Answer 5: A.

References: T. S. 3.8.1.1 Action C
T. S. I. 3.8.1 Dated 10-4-84

Originator: LBL

Points: [1.0] What event currently in progress is responsible for the recent increase in Tavg?

TIME: 3 minutes

Question ~~14~~ 7

K/A Catalog

Sys	Mode	No.	RO	SRO
059	000	K1.05	3.1	3.2

Answer 14: Feedwater flow to B & C S/G's has been reduced

References: MC-2

Originator: LBL

Points: [1.0] The "Comparator P/R Channel Deviation" annunciator is currently in alarm. What is the existing cause for this alarm?

TIME: 2 minutes

Question 1 ~~7~~ 8

K/A Catalog

Sys	Mode	No.	RO	SRO
015	020	K4.02	3.2	3.5

Answer 1: P/R Channel 42 has failed Low. (due to loss of detector volt.)

References: OP/1/B/6100/10C

Originator:

Points: [1.0] Which of the following is correct concerning the Immediate Actions of AP/1/A/5500/16 Case IV, Power Range Malfunction?

A. Reactor Trip is required but has not been performed.

B. Unwarranted rod motion is occurring but the Bank Select switch has not been placed in Manual.

C. S/G Level Program Select switch has not been placed to an operable channel.

D. Automatic rod withdrawal is not possible but the Bank Select switch has not been placed in Manual.

TIME: 3 minutes

Question ~~2~~ 9

K/A Catalog

Sys	Mode	No.	RO	SRO
015	Gen	14	3.6	3.6

Answer 2: C.

References: AP/1/A/5500/16, Case IV

Originator: LBL

Points: [1.0] With the conditions that existed prior to the present event and assuming that the unit shutdown is required by the D/G inoperability, what RN alignments are required to enable Unit 2 to remain at 100% power? (choose one)

A. Close 1RN-69B (RN Hdr 1B Supply ISOL), open and tag its supply breaker.

B. Close 1RN-47A (RN Supply Hdr X-Over ISOL) and 1RN-229B (NSHX 1B Outlet ISOL), tag the switches for these valves, open and tag the breaker for 1RN-310B (RN Hdr 1B to CA Pmp Suct ISOL).

C. Close 1RN-47A (RN Supply Hdr X-Over 1SOL), 1RN-229B (NSHX 1B Outlet ISOL) and 1RN-310B (RN Hdr 1B to CA Pmp Suct ISOL), open and tag the breakers for these valves.

D. Close 1RN-47A and 2RN-47A (RN Supply Hdr. X-Over ISOL), tag these valve switches, verify all NSHX Outlet isolation valves (1RN-148A, 1RN-229B, 2RN-148A, 2RN-229B) are closed.

TIME: 4 minutes

Question 6 / 10

K/A Catalog

Sys	Mode	No.	RO	SRO
076	000	K1.05	3.8	4.0

Answer 6: B.

References: OP/0/A/6400/06C, Encl. 4.12

Originator: LBL

Points: [~~1.0~~ 0] Which one of the following statements is not correct concerning the current seal injection flow rate?

A. NV-309 is closing down to reduce seal injection flow to 32 gpm.

B. "NCP Seal Water Low" is in alarm due to Low seal flow to 'A' NCP.

C. High flow rate is causing seal injection filter high differential pressure alarms.

D. Unidentified leakage is exceeding Technical Specification limits.

Question deleted since answer 'D' is also correct

TIME: 3 minutes

Question ~~11~~ 11

K/A Catalog

Sys	Mode	No.	RO	SRO
003	000	A1.09	2.8	2.8
003	000	K6.02	2.7	3.1
003	000	A2.01	3.5	3.9

Answer 11: A.

References: 1MC5
OP/1/B/6100/10H

Originator: GFW

Points: [1.0] Which one of the following statements is correct concerning the current status of 1C NC pump?

A. The #1 seal has failed, after the seal return isolation (NV-74A) is closed, operation may continue for 24 hours.

B. The #1 seal has failed, continued operation is allowable as long as leakage to the NCDT does not exceed 10 gpm.

C. The #1 seal has failed, the pump trip criteria has been met and the reactor and C NC pump should be tripped immediately.

D. The #1 seal has failed, the NC pump must be stopped within thirty minutes.

TIME: 3 minutes

Question 12

K/A Catalog

Sys	Mode	No.	RO	SRO
003	000	A2.01	3.5	3.9

Answer 12: D.

References: 1MC5
OAC Graphics 025
OP/1/B/6100/10H

Originator: GFW

Points: [1.0] Considering existing plant conditions, should 1NV-101A (NC Pumps #1 Seal Byp) be opened?

A. Yes. 1C NCP #1 seal outlet temp > 200°F and seal injection flow is > 6 gpm.

B. No. 1C NCP #1 seal leakoff flow > 1 gpm and NCS pressure is > 1000 psig.

C. No. 1C NCP seal injection flow is < 6 gpm and #1 seal leakoff is open.

D. Yes. 1C NCP #1 seal outlet temp > 200°F and #1 seal leakoff is open.

TIME: 3 minutes

Question 13

K/A Catalog

Sys	Mode	No.	RO	SRO
003	000	A2.01	3.5	3.9

Answer 13: B.

References: OP/1/B/6100/10H

Originator: GFW

THE FOLLOWING

QUESTIONS DO NOT

REL-ATE TO THIS

SCENARIO!

Points: [1.0] A Periodic Test has just been completed for NC Leakage. Results are as follows:

Identified Leakage:	13.57 gpm
Unidentified Leakage:	0.73 gpm
Total Seal Leakoff:	13.30 gpm
Total Accumulated Leakage:	27.60 gpm

Based on these results, which Tech Spec(s) action statement(s), if any, should be entered? (List number only).

TIME: 4 minutes

Question ~~16~~ 14 **SRO ONLY**
NOT SCENARIO RELATED

K/A Catalog

Sys	Mode	No.	RO	SRO
002	020	K4.01	3.6	3.8

Answer 16: T.S. 3.4.6.2 (Operational Leakage) (0.5 pts)

T.S. 3.7.13 (Standby Shutdown System) (0.5 pts)

References: Tech Specs

Originator: RJK

KEY

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

FACILITY: CATAWBA

REACTOR TYPE: WEC PWR

DATE ADMINISTERED: 08/25/89

OPERATOR: Part A - SRO - 1B

SECTION	CATEGORY VALUE 15 pts.	OPERATOR'S SCORE	% OF CATEGORY VALUE
A Plant Proficiency			
B Limits and Controls			

Final Grade

NAME _____

DATE _____

S.S. # _____

PART A
Test #SRO-18
AUGUST 25,1989
Page of

Originated by: R.E. Kimray

Approved by: W K Barron
DIR. OF OPER. TRNG.

TOTAL POINTS: 15
TOTAL QUESTIONS: 15

INSTRUCTIONS:

1. Put your name on each answer sheet
2. Write your answers on the answer sheet.
3. Ask the test monitor/instructor concerning questions which are not clear to you.
4. Cheating or evidence of cheating will not be tolerated.

My signature on this form is my declaration that the responses given on the attached test or quiz are entirely my own.

It further declares that I am aware that I am subject to termination from the training program immediately, and in addition, will be subject to further disciplinary action up to and including discharge from the company for cheating and/or compromising on exams/tests.

_____
Students signature

TURNOVER SHEET

Conditions Existing at the time of the Incident:

A. Plant Conditions

- Power History 100% BOL
- Boron 959 ppm
- Tave 591°F
- Xenon 2939 pcm
- Samarium +54.6 pcm

B. Tech. Spec. Action Items:

None

C. Work in Progress:

None

D. Current Procedure:

OP/1/A/6100/03 Enclosure 4.1

Manual Actions Taken During the Incident:

A. Operator Computer Alarms Acknowledged
B. Control Room Annunciators Acknowledged
C. Rx Trip Breakers opened

Simulator and chart recorders are "Frozen", the OAC is operational.

Points: [1.0] Which of the following best describes the currently existing CA auto start signals? (select one)

A. SI, AMSAC, both CFPT's tripped

B. AMSAC, 1/4 S/G Lo-Lo Level, S_T.

C. SI, Essential Switchgear B/O sequencers actuated, both CFPT's tripped.

D. SI, CF Isolation, 1/4 S/G Lo-Lo Level, AMSAC

TIME: 2 [illegible]nutes

Question ~~6~~ 1

K/A Catalog

Sys	Mode	No.	RO	SRO
061	000	K4.02	4.5	4.6

Answer 6: A.

References:

Originator: CWO

Points: [1.0] Why was OTΔT the cause of the Reactor Trip? Include the required logic in your answer.

TIME: 4 mintues

Question 1 2

K/A Catalog

Sys	Mode	No.	RO	SRO
000	009	EA2.25	3.9	4.1

Answer 1: The decrease in pressurizer pressure reduced the OTΔT setpoint on at least 2/4 channels to the existing ΔT.

Reference:

Originator: LBL

Points: [1.0] Based on current Engineered Safeguards and plant conditions, what action should be taken? (select one)

A. Manually initiate A Train Phase B Containment Isolation.

B. Manually initiate A Train Phase A Containment Isolation.

C. Manually initiate B Train Phase B Containment Isolation.

D. Manually initiate B Train Phase A Containment Isolation.

TIME: 2 minutes

Question 7

K/A Catalog

Sys	Mode	No.	RO	SRO
013	000	K1.01	4.2	4.4

Answer 7: D.

References:

Originator: CWO

Points: [1.0] With existing plant values, approximately how long will it be before the ND pumps automatically shift suction to the containment sump? (select one)

A. 170 minutes

B. 200 minutes

C. 240 minutes

D. 290 minutes

TIME: 7 minutes

Question ~~11~~ 4

K/A Catalog

Sys	Mode	No.	RO	SRO
000	025	9	3.4	3.6
000	025	12	3.3	3.5

Answer 11: C. FWST level = 95% ... ~ 375,000 gal

Swap at 36.6% ..... ~ 150,000 gal

225,000 gal to pump

(±10,000)

ECCS Flow:

NV ~ 580gpm

NI ~ 350 gpm

930 gpm (±100gpm) $\frac{225,00 \text{ gal}}{930 \text{ gpm}}$ = 242 min

or

4.03 hr

References: OP/1/A/6700/01 Curve 7.12
1MC5
1MC11

Originator: GFW

Rev: 01/08-01-89/REK

Points: [1.0] Based on current plant conditions, which of the following statements most accurately describes the method by which decay heat is being removed from the Reactor Core? (select one)

A. Forced circulation to S/G's, steam dumps to condenser.

B. Natural circulation to S/G's, steam dumps to condenser.

C. Natural circulation to S/G's, S/G PORV's to atmosphere.

D. Safety Injection flow through core and out the break.

TIME: 2 minutes

Question 12 5

K/A Catalog

Sys	Mode	No.	RO	SRO
000	074	EA1.27	4.2	4.2

Answer 12: D. Safety Injection flow through the core and out the break.

References: 1MC10
1MC5

Originator: GFW

Points: [1.0] Is NC Pump status correct for present plant conditions? (select one)

A. No. The NC Pumps should not be tripped until Phase B Isolation occurs.

B. Yes. #1 seal leakoff flows are in alarm, indicating seal failures.

C. No. The NC Pumps should not have been tripped due to voiding in the Reactor vessel head.

D. Yes. Subcooling is < 0°F and SI flow is indicated.

TIME: 3 minutes

Question 36

K/A Catalog

Sys	Mode	No.	RO	SRO
000	009	EK3.13	3.4	3.7
000	009	EK3.23	4.2	4.3
000	009	EA1.16	4.2	4.2
000	009	EA2.13	3.4	3.6

Answer 3: D. Yes, Subcooling is < 0 and S/I flow is indicated.

References:

Originator: CWO

Points: [1.0] Which of the following changes in plant conditions would cause "Core Cooling" Critical Safety Function to change to "Orange Path" Status? (select one)

A. Core Exit Thermocouples increase to 800°F, RVLIS L/R decrease to 40%.

B. Core Exit Thermocouples increase to 800°F, RVLIS L/R constant (at its present value)

C. Core Exit Thermocouples increase to 1250°F, RVLIS L/R increase to 97%.

D. B NCP started, RVLIS D/P range at 20% (both trains)

TIME: 4 minutes

Question 5 SRO ONLY

K/A Catalog

Sys	Mode	No.	RO	SRO
000	008	EA2.28	3.3	3.9

Answer 5: B.

References: EP/1/A/5000/02
OAC Tech Spec 22, 26

Originator: LBL

Points: [1.0] For the existing plant conditions, which of the following best describes the appropriate Emergency classification? (select one)

A. Notification of Unusual Event

B. Alert

C. Site Area Emergency

D. General Emergency

TIME: 4 minutes

Question ~~4~~ 8 **SRO ONLY**

K/A Catalog

Sys	Mode	No.	RO	SRO
000	009	G12	4.1	4.3

Answer 4: ~~C.~~ ~~Site Area Emergency~~
B.

References:

Originator: CWO

Points: [1.0] What two conditions have energized the pressurizer heaters? (select one)

A. PZR vapor space low temperature, PZR surge line low temperature.

B. PZR high level deviation, PZR low pressure.

C. PZR vapor space low temperature, PZR high level.

D. PZR high level deviation, PZR surge line low temperature.

TIME: 1 minutes

Question ~~15~~ 9

K/A Catalog

Sys	Mode	No.	RO	SRO
010	000	K2.01	3.0	3.4

Answer 15: B.

References: 1MC10
OP/1/B/6100/10G

Originator: GFW

Points: [1.0] What was the <u>specific</u> component failure that was the root cause of the Safety Injection?

TIME: 3 minutes

Question 2 10

K/A Catalog

Sys	Mode	No.	RO	SRO
000	008	EA2.20	3.4	3.6
000	009	EA2.02	3.5	3.8

Answer 2: Pzr Safety Valve 1NC-1 failed open. (1.0 pts)

References:

Originator: CWO

Points: [1.0] Which of the following most accurately explains the response of PZR level during this event? (select one)

A. Decreased due to post-trip cooldown then increased due to void formation in reactor vessel head.

B. Decreased due to LOCA then increased due to SI flow.

C. Decreased due to post-trip cooldown then increased due to heatup from lack of adequate decay heat removal.

D. Decreased due to LOCA then increased due to post-trip heatup.

TIME: 3 minutes

Question 14 //

K/A Catalog

Sys	Mode	No.	RO	SRO
000	008	EK3.01	3.7	4.4
000	008	EA2.29	3.9	4.2

Answer 14: A. Level decreased due to post trip cooldown then increased due to void formation in Rx Vessel Head

References: PZR Level Traces
RVLIS

Originator: LBL

Points: [1.0] What plant condition was the most probable cause of the "NCP Hi-Hi Vibration" annunciator alarm?

TIME: 4 minutes

Question ~~9~~ 12

K/A Catalog

Sys	Mode	No.	RO	SRO
002	000	K5.09	3.7	4.2
003	000	A1.07	3.4	3.4

Answer 9: Pumping 2 phase mixture before the pumps were tripped (caviation, loss of subcooling)

References: 1MC5
OP/1/B/6100/10G

Originator: GFW

Points: [1.0] Should this accident progress until the "Sp" condition is reached, which of the following automatic system actions will take place?

A. KC aligns to the Containment Chillers.

B. RN aligns to the ND Heat Exchangers.

C. KC aligns to the NS Heat Exchangers.

D. KC aligns to the ND Heat Exchangers.

TIME: 1 minute

Question ~~17~~ 13

K/A Catalog

Sys	Mode	No.	RO	SRO
000	026	EK3.02	3.6	3.9

Answer 17: D.

References: OP-CN-PSS-KC

Originator: RJK

THE FOLLOWING

QUESTIONS DO NOT

RELATE TO THIS

SCENARIO!

Points: [1.0] All three CA Pumps receive an auto start signal. Three (3) minutes later you notice "B" Motor Driven Pump failed to start. The "A" Motor Driven Pump and the Turbine Driven Pump are running. Explain the CA system response to this situation.

TIME: 3 minutes

Question ~~10~~ 14 NOT RELATED TO SCENARIO

K/A Catalog

Sys	Mode	No.	RO	SRO
061	000	K4.05	3.1	3.4

Answer 10: "B" S/G CA flow is isolated from "A" MD Pump (CA-58 shuts)

References: OP-CN-CF-CA

Originator: RJK

Points: [1.0] What is the consequence of P-4 failing to Actuate? (select one)

A. Phase "A" Isolation cannot be reset.

B. Safety Injection cannot be reset.

C. SM Isolation on "Sp" cannot be reset.

D. D/G Sequencer cannot be reset.

TIME: 2 minutes

Question 8/15 NOT SCENARIO RELATED

K/A Catalog

Sys	Mode	No.	RO	SRO
012	000	K6.04	3.3	3.6

Answer 8: B.

References:

Originator: RJK

KEY

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

FACILITY: CATAWBA

REACTOR TYPE: WEC PWR

DATE ADMINISTERED: 08/25/89

OPERATOR: Part B - SRO - 1A

SECTION	CATEGORY VALUE	OPERATOR'S SCORE	% OF CATEGORY VALUE
A Plant Proficiency			
B Limits and Controls	14 pts.		

Final Grade

NAME_____

DATE _____

S.S. #_____

PART B
Test #520-1A
AUGUST 25,1989
Page of

Originated by: R.E. Kimray

Approved by: W.K. Bonar
DIR. OF OPER. TRNG.

TOTAL POINTS: 14
TOTAL QUESTIONS: 14

INSTRUCTIONS:

1. Put your name on each answer sheet
2. Write your answers on the answer sheet.
3. Ask the test monitor/instructor concerning questions which are not clear to you.
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It further declares that I am aware that I am subject to termination from the training program immediately, and in addition, will be subject to further disciplinary action up to and including discharge from the company for cheating and/or compromising on exams/tests.

_____
Students signature

(/) 1 PTS If the control rod insertion limits are exceeded during critical operation:

A. QPTR may have been outside Tech Spec limits.

B. There may be excessive boron in the reactor coolant.

C. Radial peaking factors may have been exceeded.

D. The shutdown margin may be inadequate.

ANSWER: D

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 6
SRO: 6

REFERENCES: Sequoyah (Q#B-14)
TS 3/4.1.3 Bases
KSA 192/005 K1.15 (3.4/3.9)
001/000 K4.08 (3.9/4.4)
001/000 G6 (2.9/3.8)

ORIGINATOR: DRR

TIME: 3 minutes

(2) 1 PTS The reactor was at 100% power (MOL) when an emergency boration raised NC system boron concentration from 300 ppm to 720 ppm. Assuming that the boric acid charged into the NC system was at a concentration of 7500 ppmB, how many gallons of boric acid were added?

ANSWER: To go from 300 ppm to 600 ppm requires 2459 gal. (.5 pts.)
To go from 600 ppm to 720 ppm requires 1014 gal. (.5 pts.), or
The total required is then ~~3475~~ 3473 gal. (1.0 pts.)

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: 5d
SRO: 5d

REFERENCES:
1. Unit 1 Data book Sect 5.1 pg 4-9
2. 004/000 - A4.04 (3.2/3.6)
3. CNS AUDIT EXAM 8-21-87 (1.24/5.22)

ORIGINATOR: AUDIT EXAM

TIME: 4 minutes

(3) 1 PTS Work is to be performed on CA-2 (Hotwell Suction Isolation to CA Pumps), and CA-6 must be closed. Select the requirement which must be met prior to closing CA-6 (CA CST Suction Isolation to CA Pumps).

A. CA pump running in recirc

B. CA pump running for normal feedwater requirements

C. UST level >80%

D. Station management approval

ANSWER: D

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 9
SRO: 9

REFERENCES: OP/1/A/6250/02
K/A 061000 A1.04 (3.9/3.9)

ORIGINATOR: CFK

TIME: 4 minutes

Check Distribution

August 14, 1989
CF-CA-6

(4) 1 PTS A startup is in progress on Unit 1 from Mode 4. A failure of the breaker feeding 1EID causes 1EID and 1ERPD to become de-energized. What ACTION is required due to this event?

ANSWER: Re-energize 1ERPD within 2 hours. (.33 pts.) Restore 1EID to operable within 24 hours or (.33 pts.) be in Mode 5 within the next 30 hours. (.33 pts.)

OBJECTIVES: ENPF:N/A
ISS:N/A
RO:24
SRO:24

REFERENCES: 1. CNS Tech Spec 3.8.3.1
2. K/A 062 G-5 (3.1/3.8)

ORIGINATOR: C. O'Dell

TIME: 3 minutes

need 2 more checked by EHC

May 2, 1988
EL-EP-6

(5) 1 PTS With unit 1 in Mode 1, you receive the "Control Rod Bank Lo Limit" annunciator. Control Rods are stepping in at 8 steps per minute. The "Control Rod Bank Lo-Lo Limit" Annunciator starts alarming. The CR SRO orders Emergency Boration to be initiated but NV-236B cannot be opened. What action should the OATC or BOP take next.

ANSWER: Open NV 252 or 253 (.5 pts) and close NV-188 or 189 (.5 pts)
OR (Swap charging pump suction from VCT to FWST) (1.0 pts)

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 14
SRO: 14

REFERENCES: Open Reference
AP/13 Case I Step D.1
000/024/EA2.01 (3.8/4.1)

ORIGINATOR: GFW

TIME: 2 minutes

(6) 1 PTS A Safety Injection occurred on Unit 1 and the following conditions exist:

A)	Main Steam Header Pressure	950 psig ↔
B)	S/G Pressures	950 psig ↔
C)	Containment Pressure	.15 psig ↔
D)	S/G Narrow Range Levels	
	1) "1B" S/G	45% ↑ rapidly
	2) All other S/G's	25% ↑ slowly
E)	Floor & Equipment Sump Level	6 inches ↔
F)	NC Loop T-Hot All	540°F ↓ slowly
G)	EMF's (Radiation Monitoring)	all reading normal except:
	1) Steamline EMF's 27	Trip 1
	2) Condenser Air Ejector (1EMF-33)	Inoperable
	3) S/G Sample (1EMF-34)	Trip II

Select the procedure path the operator will use to correctly address this accident: (Select one)

A. AP/10 (Reactor Coolant Leak), EP/01 (Reactor Trip or Safety Injection), then EP/1C (High Energy Line Break Inside Containment)

B. AP/10 (Reactor Coolant Leak), EP/01 (Reactor Trip or Safety Injection), then EP/1D (Steam Line Break Outside Containment)

C. AP/10 (Reactor Coolant Leak), EP/01 (Reactor Trip or Safety Injection), then EP/1E (Steam Generator Tube Rupture)

D. AP/10 (Reactor Coolant Leak), EP/01 (Reactor Trip or Safety Injection), then EP/1B (SI Termination Following a Spurious SI)

ANSWER: C

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 3,7
SRO: 3,7

REFERENCES: EP/1/A/5000/01
KSA 000/037 EK3.02 (3.2/3.5)
000/037 EK3.05 (3.7/4.0)
000/037 EK3.07 (4.2/4.4)
000/037 EA1.06 (3.8/3.9)
000/037 EA1.13 (3.9/4.0)
000/037 G-11 (3.9/4.1)

ORIGINATOR: DRR

TIME: 3 minutes

(7) 1 PTS A natural circulation cooldown (EP-1A1) is in progress because offsite power has been lost. The CRDM Cooling Fans cannot be loaded onto the AC Blackout Buses.

How will the inoperability of the CRDM Fans affect the cooldown and depressurization?

A. It has little affect because the amount of NC System Heat removed by running the fans is of little insignificance compared to that removed by steaming the secondary plant.

B. Transfer to EP-2F3 "Void in Reactor Vessel" will be required because cooldown and depressurization will cause formation of a steam void in the vessel head.

C. Pressure must be reduced more rapidly to avoid a possible pressurized thermal shock transient.

D. Greater minimum subcooling must be maintained, and the total upper head cooldown rate will be less.

ANSWER: D

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: 7
SRO: 7

REFERENCES: EP-1A1 P.3, P.6, P.7, P.15
K/A# 000056 EK3.02 (4.4/4.7)

ORIGINATOR:

TIME: 3 minutes

(8) 1 PTS A safety injection has occurred due to a High Energy Line Break Inside the Containment (HELBIC). Upon transition into the HELBIC procedure the following is noted:

1)	Reactor Power	0%
2)	Intermediate Range SUR	-.33 dpm
3)	Source Range SUR	-.33 dpm
4)	Reactor Coolant Subcooling	2°F
5)	All Cold Leg Temperatures Decreased	60°F in last 60 min.
6)	Containment Pressure	3.5 psig
7)	Narrow Range S/G Levels	10%
8)	Total Feedwater Flow to Intact S/G's	400 gpm
9)	Pressurizer Level	30%
10)	Pressurizer Pressure	2300 psig
11)	RVLIS UR Level	100%

Based on this information which Critical Safety Function should be given highest priority?

A. Subcriticality

B. Heat Sink

C. Reactor Coolant Integrity

D. Reactor Coolant Inventory

ANSWER: B

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 9
SRO: 9

REFERENCES: EP/1/A/5000/2C1
EP/1/A/5000/1C
KSA 000/074 EK3.02 (3.7/4.2)
000/074 G011 (4.5/4.6)

ORIGINATOR: DRR

TIME: 4 minutes

(9) 1 PTS With a temperature decrease in <u>all</u> NC Cold legs having exceeded 100°F in the last 60 minutes, which of the following combinations of NC cold leg temperature and pressure will result in a red alarm on the Reactor Coolant Integrity CSF?

A. 240°F and 1000 psig

B. 240°F and 1500 psig

C. 340°F and 1800 psig

D. 340°F and 2400 psig

<u>ANSWER</u>: B

<u>OBJECTIVES</u>: ENPF:N/A
ISS:N/A
RO:3
SRO:3

<u>REFERENCES</u>:
1. EP/1/A/5000/02 Ret. #3
2. K/A 000/011 G-11 (4.3/4.5)
3. K/A 000/011 EA1.01 (3.7/3.8)

<u>ORIGINATOR</u>: C. O'Dell

<u>TIME</u>: 3 minutes

(10) 1 PTS The turbine is being prepared for loading. The reactor is critical at approximately 8% power. Annunciator IR HI VOLT FAIL alarms, and you determine that IR channel N36 has failed.

Which of the following best describes your required actions?

A. Place the N36 LEVEL TRIP switch in the BYPASS position, and continue power operation.

B. Reduce power to less than 5%, and place the N36 LEVEL TRIP switch in the BYPASS position.

C. Do not reduce power to less than 5% until the N36 LEVEL TRIP switch is placed in the BYPASS position.

D. Restore the N36 channel to operable status before increasing power above 10% of Rated Thermal Power.

ANSWER: D

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: ENB-10
SRO: ENB-10

REFERENCES: T.S. 3.3.1 Applicability
T.S. 3.3.1 Action 3
AP/16 P.8 Step 2
AP/16 P.10 Step 4
K/A# 000033 EK3.02 (3.6/3.9)
K/A# 000033 EA2.09 (3.4/3.7)

ORIGINATOR:

TIME: 3 minutes - RO

2 minutes - SRO

(11) 1 PTS The Reactor is critical at 10% power, Xenon is increasing at 0.8 pcm per minute and Tave is 550°F. Main Generator problems will delay loading the Generator 2 hours and the Tave-Tref Deviation alarm is present and the OAC is out of service. What surveillance check should the OATC make to ensure the plant remains above the minimum temperature for criticality and when can this surveillance be terminated?

ANSWER: Tave should be determined to be greater than or equal to 551°F at least once per 30 minutes (.25 pts) until Tave is > 561°F or the OAC is returned to service or Tavg-Tref alarm is reset. (0.25 pts)
Also, Tave must be returned to > 551°F in 15 minutes (0.25 pts) or be in hot standby within the next 15 minutes (0.25 pts)

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: 5a
SRO:5a

REFERENCES: OP Reference
TS 3.1.1.4
004/010/A3.02 (3.9/3.8)

ORIGINATOR: GFW

TIME: 3 minutes

SRO Only

(12) 1 PTS Indicate which one of the following best describes Catawba Nuclear Station's compliance in regard to Incore Instrumentation Room (IIR) Purge Subsystem requirements as deliniated in Tech Spec Surveillance Requirements 4.9.4.1 and 4.9.4.2 and Tech Spec 3.9.4 Limiting Condition for Operation (LCO).

A. Tech Spec Surveillance Requirements 4.9.4.1 and 4.9.4.2 do not apply to that subsystem and Tech Spec 3.9.4 LCO is not applicable.

B. PT/1, 2/A/4450/01, Containment Purge Periodic Test; is performed to satisfy Tech Spec Surveillance Requirement 4.9.4.2a.

C. There are no written Tech Spec Surveillance Requirements that verify operability of the IIR Purge filter; and Tech Spec 3.9.4. LCO does not apply to the IIR Purge subsystem.

D. The IIR Purge subsystem is not required to have an automatic isolation feature upon heater failure.

ANSWER: B

OBJECTIVES: ENPF:
ISS:
RO:
SRO:

REFERENCES: CNS LER 89-009-00

KA's 002/000/K4.03 (3.2/3.5)
029/000/K1.04 (3.0/3.1)
029/000/G011 (2.8/3.5

ORIGINATOR: NRC

TIME: 4 minutes

SRO Only

(13) 1 PTS A General Emergency has been declared and the OAC is out of service. Wind Direction is 85°. Windspeed is 7 MPH. Immediate Actions of RP-05 require that the recommendation be made to Offsite Agencies that all residents downwind of the plant seek immediate shelter and await further instructions.

Indicate all Zones which are affected by this recommendation:

A. A-0, C-1, D-1, E-1, F-1, D-2, E-2, F-2

B. A-0, C-1, E-1, D-2, E-2, F-2

C. A-0, C-1, D-1, E-1, F-1, C-2, D-2, E-2

D. A-0, C-1, D-1, E-1, D-2, E-2, F-2, F-3

ANSWER: A

OBJECTIVES: ENPF:N/A
ISS:N/A
RO:9
SRO:12

REFERENCES:
1. RP/0/A/5000/05 Ret. #5
2. RP/0/A/5000/11 Ret. #2
3. RP/0/A/5000/10 Ret. #1
4. K/A 194001 A1.16 (3.1/4.4)

ORIGINATOR: C. O'Dell

TIME: 3 minutes

SRO Only

(14) 1 PTS When Steam Generators are pressurized and CF flow is not aligned to the Main Feed Nozzles, how is the feed nozzle containment penetration piping kept above the brittle fracture temperature?

ANSWER: By maintaining S/G reverse purge flow

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: 9a
SRO: 9a

REFERENCES: 1. OP-CN-HO-CF
2. 035/000 - SG10 (3.2/3.4)
3. CNS NRC Exam 9-1-86 (4.07)

ORIGINATOR: NRC

TIME: 2 minutes

KEY

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

FACILITY: CATAWBA

REACTOR TYPE: WEC PWR

DATE ADMINISTERED: 08/25/89

OPERATOR: Part B - SRO-1B

SECTION	CATEGORY VALUE	OPERATOR'S SCORE	% OF CATEGORY VALUE
A Plant Proficiency			
B Limits and Controls	11.5 pts.		

Final Grade

NAME_____

DATE _____

S.S. #_____

PART B
Test #SEO-1B
AUGUST 25,1989
Page of

Originated by: R.E. Kimray

Approved by: W H Barron
DIR. OF OPER. TNG.

TOTAL POINTS: 11.5
TOTAL QUESTIONS: 11

INSTRUCTIONS:

1. Put your name on each answer sheet
2. Write your answers on the answer sheet.
3. Ask the test monitor/instructor concerning questions which are not clear to you.
4. Cheating or evidence of cheating will not be tolerated.

My signature on this form is my declaration that the responses given on the attached test or quiz are entirely my own.

It further declares that I am aware that I am subject to termination from the training program immediately, and in addition, will be subject to further disciplinary action up to and including discharge from the company for cheating and/or compromising on exams/tests.

_____
Students signature

(4) 1 PTS What ACTIONS/NOTIFICATIONS, if any, are required if one CAPT sump pump becomes inoperable in Mode 1? Include any applicable time frames.

ANSWER: Declare CAPT inoperable. (.25 pts.) Notify Security of SSF Degrade. (.25 pts.) Restore sump pump to operability ≤ 72 hours (.25 pts.) or be in Mode 3 in the next 6 hours and Mode 4 in the following 6 hours. (.25 pts.)

(T/S 3.7.13 Interpretation)

OBJECTIVES: ENPF:N/A
ISS:N/A
RO: 10
SRO:10

REFERENCES:
1. CNS Tech Spec 3.7.1.2
2. CNS Tech Spec Interpretation "3.7.1.2 Auxiliary Feedwater System - Operability Requirements for CA Pump Room Sump Pumps" Rev. 0
3. K/A 061 G-5 (3.3/4.0)

ORIGINATOR: C. O'Dell

TIME: 4 minutes

SRO Only

(2) 1 PTS Unit 1 is at 80% power with rods in manual due to an inoperable rod position indication system for Shutdown Bank 'E' rod D-8. While increasing turbine load to 100% power, the following alarms are received:

- RPI Urgent annunciator alarm
- Rod Bottom for H-8 in Control Bank 'D'
- General Warning for H-8 in Control Bank 'D'
- RPI Urgent alarm
- RPI Data A and B failure

The following action should be taken:

A. Apply Tech Spec 3.0.3 because two control rod position indications are inoperable.

B. Continue operation provided the non-indicating rod positions are determined once per 8 hours by the incore detector system and immediately after any non-indicating rod motion > 24 steps in one direction since the last determination.

C. Immediately trip the reactor since two control rod positions cannot be determined.

D. Verify that all digital rod position indicators for the affected bank are operable and that the most withdrawn rod and the least withdrawn rod of the bank are within a maximum of 12 steps of each other at least once per 8 hours.

ANSWER: B

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 15
SRO: 15

REFERENCES: TS 3/4.1.3 Movable Control Assemblies

KSA 014/000/G-8/3.6/4.3
KSA 014/000 A1.02/3.2/3.6

ORIGINATOR: McGuire

TIME: 3 minutes

(3) 1 PTS Unit 1 is at 95% steady state power. Shutdown Bank "A" is exercised for an operability test. The bank is inserted from 230 steps to 220 steps, then withdrawn to 230 steps. Rod C-9 stops at 222 steps. All other Shutdown Bank A rods are at 230 steps. An IAE technician is dispatched to monitor local cabinet currents. A second attempt to exercise Shutdown Bank "A" is initiated. After 10 steps of insertion, rods in the bank are at 220 steps with Rod C-9 at 210 steps. Withdrawal of the bank to 230 steps is initiated once again. Rod C-9 remains at 210 steps. All other Shutdown Bank "A" rods indicate 230 steps.

Which one of the following action(s) is correct? (Circle the correct response.)

A. With one full length rod trippable but inoperable due to causes other than mechanical binding or friction, determine shutdown margin requirements of specification 3.1.1.1 is satisfied and return to operable status within 1 hour and be in Hot Standby within 6 hours.

B. Within 1 hour, restore the rod to 230 steps or declare it inoperable and determine shutdown margin requirement of specification 3.1.1.1 is satisfied and reduce power $\leq$ 75% within the next hour.

C. Plant operations should continue. Surveillance results should be recorded. The affected rod should be monitored until further action is warranted.

D. Operations may continue, if within 6 hours a reevaluation of selected accident analysis, is satisfactorily completed.

ANSWER: B

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: 15
SRO: 15

REFERENCES: Tech Spec 3.1.3.5;
K/A# 0010000 A2.03 (3.5/4.2)

ORIGINATOR:

TIME: 6 minutes

SRO Only

(4) 1 PTS A plant cooldown is in progress and NC system temperature has just been reduced to less than 285°F. What operator action must be taken to ensure compliance with Tech Specs?

ANSWER: At least one NV pumps (.5 pts) and one NI pump (.5 pts) shall be made inoperable.

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 16
SRO: 16

REFERENCES: NI Lesson Plan
CNS Audit Exam (8/21/87) SRO - Q8.06
CNS Tech Spec 3.5.3 bases (pg B3/4 5-2) & Interpretation
KSA 006/00 K5.04 (2.9/3.1)

ORIGINATOR:

TIME: 3 minutes

(5) 1 PTS The control room operators are responding to a SGTR with pressurizer pressure control available. The ruptured steam generator has been identified and isolated with a proper NC System cooldown and depressurization completed. Prior to terminating SI, the ruptured steam generator goes water solid.

Select the statement that best describes the proper operator action.

A. Immediately go to EP/2C3 Steam Generator High Level. This heat sink challenge has the highest priority.

B. Refer to EP/2C3 but continue with the procedure in effect and terminate SI. Actions to stop primary-to-secondary leakage should retain the highest priority.

C. Immediately, take local actions to support the main steamlines, such as blocking steamlines and pinning pipe support hangers. Preventing a main steamline break has the highest priority.

D. Immediately go to EP/01 to rediagnose the event.

ANSWER: B

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: 2
SRO: 2

REFERENCES: EP-1E, EP-02, EP-2C3
K/A# 000038 EA2.16 (4.2/4.6)
K/A# 000038 SG12 (3.8/4.0)
K/A# 000038 EK3.06 (4.2/4.5)

ORIGINATOR:

TIME: 6 minutes

(6) 1.0 PTS Based on the following conditions, calculate the allowable reactor vessel venting time. Show all calculations and express units in minutes.
NC Pressure = 600 psig
Lower Containment Temp = 145°F
Containment Pressure = 3.1 psig
Containment H2 Concentration = 2.9%

ANSWER: (0.25 pt. each partial credit for A = 0354.8, B = 935, C = 2000)
.467 minutes (accept .434 to .5 minutes)

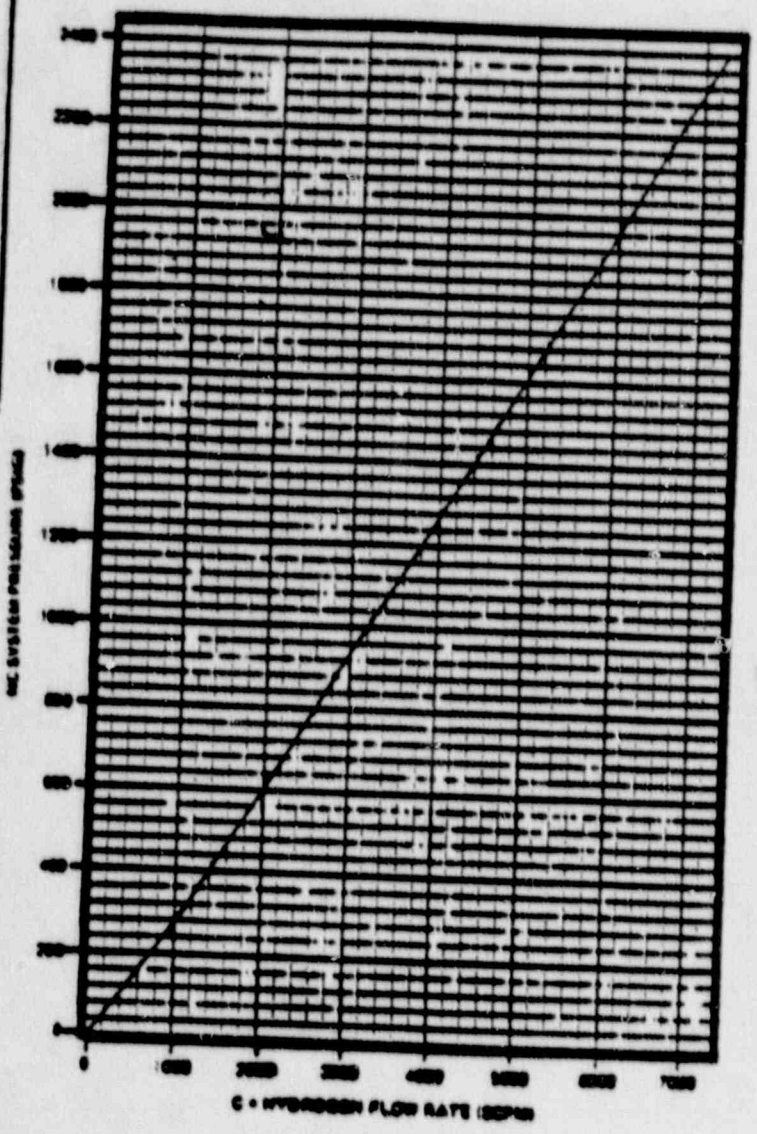
OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 4
SRO: 4

REFERENCES: EP/1/A/5000/2F3 Rev #4
KSA 000/040 (3.8/4.1)
000/074 (4.3/4.4)

ORIGINATOR: C. O'Dell

TIME: 5 minutes

Allowable Hydrogen Venting Time



CALCULATION OF MARINER
ALLOWABLE VENTING TIME

STEP 1: Calculate A

$$A = 9,500 \times \frac{(P + 14.7)}{14.7} \times \frac{492}{(T + 460)}$$

Where: P = Containment pressure (psig)
T = Lower containment temperature (F)

STEP 2: Calculate B

$$B = (3 - H) \times A$$

Where: H = Containment hydrogen concentration (%)

STEP 3: Determine C from the curve for the current NC system pressure.

STEP 4: Calculate T

T = B/C = Venting time in minutes.

EXAMPLE:

Containment pressure = 3.0 psig
Lower containment temperature = 150F
Containment hydrogen concentration = 1.0%
NC system pressure = 1000 psig

$$A = 9,500 \times \frac{(3.0 + 14.7)}{14.7} \times \frac{492}{(150 + 460)} = 9,228$$

$$B = (3 - 1.0) \times 9,228 = 18,452$$

C = 3,200 (from the curve for NC system pressure = 1000 psig)

T = 18,452/3,200 = 5.8 minutes

NC pressure _____ PSIG

Allowable venting time _____ min.

(7) 1 PTS Plant conditions have resulted in entry into EP/1/A/5000/2B1 (Inadequate Core Cooling). Core Exit T/C's are 715°F, NO NC Pumps are running and all NC system vent paths are isolated.

What course of action should be taken for NC system Cooldown/Depressurization?

ANSWER: (Depressurize NC using S/G) secondary depressurization of all intact S/G's. (1.0) (Then open PZR PORV's if that doesn't work)

OBJECTIVES: ENPF:N/A
ISS:N/A
RO:4
SRO:4

REFERENCES: 1. EP/1/A/5000/2B1 Ret. #5
2. K/A 000/074 G-11 (4.5/4.6)
3. K/A 000/074 G-12 (43./4.4)

ORIGINATOR: C. O'Dell

TIME: 5 minutes

(8) 1 PTS The plant is operating at 95% power when the shift radiochemist reports Dose Equivalent I-131 is 72 µCi/GM.

Choose the statament which best describes the correct operator action.

A. No action is required

B. Reduce reactor power to get within the limits of Figure 3.4-1.

C. Be in at least Hot Standby with T_{avg} less than 500°F within 6 hours

D. Be in at least Hot Standby within 6 hours and Hot Shutdown following 6 hours and Cold Shutdown within subsequent 24 hours.

ANSWER: C

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: 6.H.
SRO: 6.H.

REFERENCES: AP/18
K/A# 000075 3 (2.6/3.5)

ORIGINATOR: GFW

TIME: 3 minutes

SRO Only

(9) 1.5 PTS The Unit is in Mode 1. Following shift turnover, the Reactor operator notices the Spent Fuel Pool Level at 36 ft and stable on the control room gauge. The same indication was verified on the local indication. Irradiated fuel assemblies are stored in the pool.

Based on this level, state when and what operator action may be required.

ANSWER: Suspend movement of fuel assemblies (.5 pts.) and crane operation with loads over fuel storage areas. (.5 pts.) and restore level within 4 hours. (.5 pts.)

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 15c
SRO: 15c

REFERENCES: TS 3/4.9.2 Refueling Instrumentation
KSA 033/000/G-8/3.0/3.9
KSA 033/000/A2.03/3.1/3.5
KSA 033/000/K4.05/3.1/3.3

ORIGINATOR: McGuire

TIME: 3 minutes

November 1, 1988
FH-KF-2

(10) 1 PTS Indicate which one of the following is NOT CORRECT in describing the boundaries/requirements for entrance to/and occupation of the refueling area operating area.

A. Manipulator Crane is at full stop.

B. All fuel bundles are fully inserted in their proper storage rack locations.

C. Full attention of the manipulator crane operator is maintained.

D. Permission of the refueling SRO is granted through the Crane Operator.

ANSWER: B

OBJECTIVES: ENPF:
ISS:
RO:
SRO:

REFERENCES: OP/1/A/6550/07 Enclosure 4.8
KA034/000/G002 (2.3/3.1)
KA034/000/G009 (3.0/3.0)

ORIGINATOR: NRC

TIME: 3 minutes

~~SRO Only~~

August 18, 1989

FH-FL-3

( ))) 1 PTS Performance has placed 1A D/G Load Sequencer in "Test" as part of a periodic surveillance test. Describe the effect on the RN and VC/YC systems due to this action.

SRO only

ANSWER: - TRN A VC/YC will not get a start signal if a Unit 2 LOCA or Blackout occurred (.5 pts.)

- TRN A RN Pump (for the unit in Test) will not receive a start signal upon receipt of a Unit 2 LOCA or Blackout, or Low RN Pit Level Swapover. (.5 pts.)

OBJECTIVES: ENPF:
ISS:
RO:
SRO:

REFERENCES: K/A 064000K3.01 (3.8/4.1)

ORIGINATOR: NRC

TIME: 3 minutes

SRO Only

August 18, 1989

DG-EQB-1

Key

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

FACILITY: Catawba

REACTOR TYPE: WEC PWR

DATE ADMINISTERED: 9/8/89

OPERATOR: Prem A-SRO-2A

SECTION	CATEGORY VALUE	OPERATOR'S SCORE	% OF CATEGORY VALUE
A Plant Proficiency	13.0		
B Limits and Controls			

Final Grade

NAME _____

DATE _____

S.S. # _____

PART A
Test # SRO-24
SEPT. 8, 1989
Page of

Originated by: R.E. Kimray

Approved by: W K Bamm
DIR. OF OPER. TRNG.

TOTAL POINTS: 13.0
TOTAL QUESTIONS: 13

INSTRUCTIONS:

1. Put your name on each answer sheet
2. Write your answers on the answer sheet.
3. Ask the test monitor/instructor concerning questions which are not clear to you.
4. Cheating or evidence of cheating will not be tolerated.

My signature on this form is my declaration that the responses given on the attached test or quiz are entirely my own.

It further declares that I am aware that I am subject to termination from the training program immediately, and in addition, will be subject to further disciplinary action up to and including discharge from the company for cheating and/or compromising on exams/tests.

_____
Students signature

TURNOVER SHEET

Conditions Existing at the time of the Incident:

A. Plant Conditions

- Power History 100% EOL
- Boron 138 ppm
- Tave 590°F
- Xenon 2903 pcm
- Samarium -87 pcm

B. Tech. Spec. Action Items:

None current

C. Work in Progress:

None

D. Current Procedure:

OP/1/A/6100/03 Enclosure 4.1

Manual Actions Taken During the Incident:

A. Operator Computer Alarms Acknowledged
B. Control Room Annunciators Acknowledged

Simulator and chart recorders are "Frozen", the OAC is operational.

Points: [1.0] Based on current plant conditions, is the steam dump control system operating properly? Justify your answer.

TIME: 5 minutes

Question 15

K/A Catalog

Sys	Mode	No.	RO	SRO
041	020	A3.02	3.3	3.4

Answer 15: Yes. (.5 pts) (Tave - Tref = 17°F.) The high Tavg - Tref signal is calling for all banks to be open. (.5 pts)

References: OP-CN-SM-IDE Lesson Plan

Originator: GES

Points: [1.0] Which of the following has caused the "7KV Normal Aux Pwr System Trouble" annunicator to alarm?

A. Switchgear 1TA is de-energized

B. Undervoltage on A train Incoming Fdr. lines

C. Undervoltage on NC pump busses

D. Overcurrent sensed on B feeder breakers

TIME: 3 minutes

Question ~~1~~ 2

K/A Catalog

Sys	Mode	No.	RO	SRO
62	000	K3.01	3.5	3.9

Answer 1: B

References: OP/1/B/6100/10L (Annunciator Response)

Originator:

Points: [1.0] Assume 1A Busline has been re-energized. Which of the following most accurately descibes the steps required to restore 1TA to its normal alignment.

A. Align 1A D/G to 1ETA, open Tie Breaker, close Normal Feeder A, align 1ETA to 1ATC.

B. Place 1TA Mode select switches in "Man A and Tie", close Normal Feeder A, verify Tie Breaker opens.

C. Place 1TA Mode select switches in "Man A and Tie", open Tie Breaker, verify Normal Feeder A closes.

D. Place 1TA Mode select switches in "Man B and Tie", open Tie Breaker, verify Normal Feeder B closes.

TIME: 2 minutes

Question # 3

K/A Catalog

Sys	Mode	No.	RO	SRO
62	000	A4.01	3.3	3.1

Answer B: B

References: OP/1/A/6350/05 - Alternate AC power sources

Originator:

Points: [1.0] Which of the following statements is correct concerning the present OPΔT Turbine Runback?

A. The runback was initiated when 1/4 ΔT channels, exceeded the Reactor Trip Setpoint.

B. The runback was initiated when 2/4 ΔT channels were within 3% of the Reactor Trip Setpoint.

C. The runback was initiated when 2/4 ΔT channels exceeded 109% regardless of Reactor power.

D. The runback was initiated when 1/4 ΔT channels exceeded 109% regardless of Reactor power.

TIME: 4 minutes

Question ~~16~~ 4

K/A Catalog

Sys	Mode	No.	RO	SRO
045	000	K4.12	3.3	3.6

Answer 16: B

References: OP/1/B/6100/10C

Originator: LBL

Points: [1.0] Why does the present power mismatch exist in the Rod Motion Demand Circuitry?

TIME: 4 minutes

Question 75 SRO ONLY

K/A Catalog

Sys	Mode	No.	RO	SRO
15	000	K4.08	3.4	3.7

Answer 7: A Turbine Runback has taken place but Reactor power has not been sufficiently reduced. (Rods have not inserted as required)

References:

Originator:

Points: [1.0] Per AP/15 (Rod Control Malfunction), which of the following options to restore Tavg to Tref is allowed by current plant conditions?

A. Manually insert rods to reduce Tavg.

B. Increase Turbine load to increase Tref.

C. Initiate Boration to reduce Tavg.

D. Increase dumping steam to reduce Tavg.

TIME: 3 minutes

Question 96

K/A Catalog

Sys	Mode	No.	RO	SRO
001	050	A2.01	3.7	3.9

Answer 9: C

References: AP/1/A5500/15 Rod Control Malfunction, Case I

Originator: LBC

Points: [1.0] Which of the following statements, is most correct concerning the expected response of rod control to the current plant conditions?

A. Rods should be inserting at 72 steps per minute due to a combined error signal of +20°F.

B. Rod motion is not required due to combined error signal of 0°F.

C. Rods should be inserting at 64 steps per minute due to a combined error signal of +20°F.

D. Rods should be inserting at 64 steps per minute due to a combined error signal of +0°F.

TIME: 2 minutes

Question 12 7

K/A Catalog

Sys	Mode	No.	RO	SRO
001	000	K1.04	3.2	3.4

Answer 12: A

References: 1MC1

Originator: GFW

Points: [1.0] Which of the following is a rod control interlock?

A. The C-3 interlock will stop rod withdrawal in automatic but not in manual when the OT Delta T signal is within 3% of the calculated trip value.

B. The C-2 interlock blocks automatic and manual control rod withdrawal when one power range channel exceeds 103%.

C. The C-5 interlock ensures that the rod control system is not placed in automatic until 10% turbine power is attained.

D. The C-4 interlock will stop all rod motion in automatic but not manual when the OP Delta T signal is within 3% of the calculated trip value.

TIME: 4 minutes

Question 17 8

K/A Catalog

Sys	Mode	No.	RO	SRO
001	000	K4.03	3.5	3.8

Answer 17: B

References: McGuire Audit Exam May 6, 1985
K/A 012000 K4.09 (2.8/3.1)

Originator: JLY

Points: [1.0] Which of the following actions is not required by Technical Specification due to the present status of 1A Busline?

A. Verify all systems, subsystems, devices and components which receive power from ETB are operable.

B. Verify breaker alignment of the 1B Busline within 1 hour and every 8 hours thereafter.

C. Restore 1A Busline to operable status within 72 hours or be in Mode 3 within 6 hours and Mode 5 within the following 30 hours.

D. Perform operability tests on both D/G's within 24 hours unless they have been successfully tested within the previous 24 hours.

TIME: 3 minutes

Question 5/9 **SRO ONLY**

K/A Catalog

Sys	Mode	No.	RO	SRO
62	000	#11	3.1	3.7

Answer 5: A.

References: Tech Spec 3.8.1.1
AP/03 Load Rejection

Originator:

Points: [1.0] Given the present plant conditions, should an operator be dispatched to secure every other Cooling Bank of oil pumps and fans for the B main step-up transformer? Explain

TIME: 3 minutes

Question 3/10

K/A Catalog

Sys	Mode	No.	RO	SRO
62	000	A2.01	3.4	3.9

Answer 3: No (.5 pts.) - The 'B' transformer is still carrying >50% of its design electrical load. (.5 pts.) (This would reduce the available cooling).

References: AP/1/5500/03 (Load Rejection)
OP/1/6100/03 (Unit Operation)

Originator:

THE FOLLOWING

QUESTIONS DO NOT

RELATE TO THIS

SCENARIO!

Points: [1.0] Assuming AMSAC is currently Bypassed (reset light dark), what AMSAC signal(s) would still generate a CA auto start?

TIME: 4 minutes

Question 11 NOT RELATED TO SCENARIO

K/A Catalog

Sys	Mode	No.	RO	SRO
061	000	K4.02	4.5	4.6

Answer 11: Loss of both CF pumps.

References: OP-CN-CF-CA Lesson Plan

Originator: RJK

Points: [1.0] Which of the following is correct concerning the OPΔT Reactor Trip setpoints?

A. The setpoints are calculated via input from Tavg.

B. The setpoints are calculated via input from Pressurizer Pressure

C. The setpoints are calculated via input from Axial Flux Difference

D. The setpoints are calculated via input from Quadrant Power Tilt Ratio

TIME: 4 minutes

Question 2/12 NOT SCENARIO DEPENDENT

K/A Catalog

Sys	Mode	No.	RO	SRO
12	000	K4.02	3.9	4.3

Answer 2: A

References: OP/1/B/6100/10A

Originator:

Points: [1.0] Assume the following indications are observed:

A. Highest wide range hot leg temp - 555°F.

B. Lowest wide-range NC pressure - 1000 psig.

With these conditions, what is the current value of NC system subcooling?

TIME: 3 minutes

Question ~~14~~ 13 NOT SCENARIO DEPENDENT

K/A Catalog

Sys	Mode	No.	RO	SRO
002	000	K1.04	3.9	4.1

Answer 14: Current subcooling is - 25°F ± 5°F (1 pt.)

Calculation (not required for full credit)

T_{sat} for 1000 psig = 530°F (from data book curve 1.4)

530 - 555 = - 25°F subcooling

References: MC-5
Data Book

Originator: LBL

Key

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

FACILITY: Catawba

REACTOR TYPE: WEC PWR

DATE ADMINISTERED: 9/8/89

OPERATOR: PART A - SRO-2B

SECTION	CATEGORY VALUE	OPERATOR'S SCORE	% OF CATEGORY VALUE
A Plant Proficiency	13.75		
B Limits and Controls			

Final Grade

NA _____

DATE _____

S.S. #_____

PART A
Test #SPO-2B
SEPT. 8,1989
Page of

Originated by: R.E. Kimray

Approved by: W.H. Benson
DIR. OF OPER. TRNG.

TOTAL POINTS: 13.75
TOTAL QUESTIONS: 13

INSTRUCTIONS:

1. Put your name on each answer sheet
2. Write your answers on the answer sheet.
3. Ask the test monitor/instructor concerning questions which are not clear to you.
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My signature on this form is my declaration that the responses given on the attached test or quiz are entirely my own.

It further declares that I am aware that I am subject to termination from the training program immediately, and in addition, will be subject to further disciplinary action up to and including discharge from the company for cheating and/or compromising on exams/tests.

_____
Students signature

TURNOVER SHEET

Conditions Existing at the time of the Incident:

A. Plant Conditions

- Power History 100% BOL
- Boron 959 ppm
- Tave 591°F
- Xenon 2939 pcm
- Samarium +54.6 pcm

B. Tech. Spec. Action Items:

None current

C. Work in Progress:

None

D. Current Procedure:

OP/1/A/6100/03 Enclosure 4.1

Manual Actions Taken During the Incident:

A. Operator Computer Alarms Acknowledged
B. Control Room Annunciators Acknowledged

Simulator and chart recorders are "Frozen", the OAC is operational.

Points: [1.25] List the existing plant conditions that could, by themselves, cause an auto start of each CA pump.

TIME: 3 minutes

Question 16 /

K/A Catalog

Sys	Mode	No.	RO	SRO
061	000	K4.02	4.5	4.6

Answer 16:

Motor Driven CA Pumps
- Ss
- Both CFPT's tripped
- Lo-Lo level in Steam Generator C or D S/G
- AMSAC

Turbine Driven CA Pump
- Lo-Lo level in two (or C & D) Steam Generators

(.25 pts each)

References: MC-1, 2, 10

Originator: LBL

Points: [1.0] What would be the effect on the plant electrical system if breaker GTB opened under the existing plant conditions?

A. Sequencer would Load Shed ETB and Load on Blackout and LOCA Loads.

B. Sequencer would Load Shed ETB and Load on Blackout only Loads.

C. Sequencer would reclose GTB Breaker in Load Group 13.

D. GTB will not reclose, thus FTB (B/O Switchgear) will remain de-energized.

TIME: 3 minutes

Question ~~12~~ 2

K/A Catalog

Sys	Mode	No.	RO	SRO
062	000	K4.03	2.8	3.1
062	000	K4.07	2.7	3.1

Answer 12: D.

References: 1MC11

Originator: GFW

Points: [1.0] Based on current Engineered Safeguards status and plant conditions, what action should be taken?

A. Manually initiate "A" Train Phase B Containment Isolation.

B. Manually initiate "A" Train Phase A Containment Isolation.

C. Manually initiate "B" Train Phase A Containment Isolation.

D. Manually initiate "B" Train Phase B Containment Isolation.

TIME: 2 minutes

Question 53

K/A Catalog

Sys	Mode	No.	RO	SRO
013	Task	13	3.9	4.0

Answer 6: A.

References: EP/1/A/5000/01

Originator: GFW

Points: [1.0] Considering present plant conditions, what signal(s) could have caused an Automatic Main Feedwater Isolation?

TIME: 3 minutes

Question 13 4

K/A Catalog

Sys	Mode	No.	RO	SRO
013	000	K4.13	3.7	3.9

Answer 13: SS Signal
Lo Tave with P-4 (Rx Trip)
(.5 pts each)

References: 1MC2
1MC11
OP/1/B/6100/10D

Originator: GFW

Points: [1.5] What valves should be verified closed upon a CF Isolation actuation? (Valve numbers not required)

TIME: 3 minutes

Question ~~3~~ 5

K/A Catalog

Sys	Mode	No.	RO	SRO
059	000	K4.19	3.2	3.4

Answer 3:

CF to CA Isol. Valves
Individual Tempering Valves
CF Cont. Isol. Valves
CF Cont. Isol. Bypasses
CF Reg. Valves
CF Reg. Valve Bypasses
(.25 pts. each)

References: EP/1/A/5000/1A

Originator: GFW

Points: [1.0] A. Given the current control room indications, to which procedure should the CR SRO "Go to" from EP/01? What criteria is used to make that determination?

B. Is the criteria of that procedure met to terminate Safety Injection? Briefly explain.

TIME: 4 minutes

Question 7 6 SRO ONLY

K/A Catalog

Sys	Mode	No.	RO	SRO
013	000	A4.03	4.5	4.7
013	TASK	15	4.1	4.2

Answer 7: A. EP/1C High Energy Line Break Inside Containment (.25 pts)
Containment pressure is > .3 psig, Ice condenser doors are open (.25 pts)

B. No. (.25 pts)
PZR level not > 32%
NC pressure not increasing
(either acceptable, .25 pts)

References: EP/1/A/5000/01
EP/1/A/5000/1C

Originator: GFW

Points: [1.0] Which of the following is NOT contributing to NC System Heat Removal.

A. Forced Circulation

B. Turbine Stop Valve Stuck Open

C. CA Pump Flows

D. Steam Generators

TIME: 3 minutes

Question 10 7

K/A Catalog

Sys	Mode	No.	RO	SRO
002	000	K1.11	4.1	4.2

Answer 10: B.

References: MC-2, 10

Originator: LBL

Points: [1.0] Based on current plant condtions, is the status of the Reactor Coolant Pumps correct? (choose one)

A. Yes, because no critical parameters have been exceeded.

B. No, because KC to the pumps is isolated and cannot be re-established readily.

C. Yes, because EP/01 will direct the operator to restore KC before any pump damage occurs.

D. No, because under these conditions the pumps should be stopped to reduce NC System Inventory loss.

TIME: 3 minutes

Question ~~14~~ 8

K/A Catalog

Sys	Mode	No.	RO	SRO
003	000	A2.02	3.7	3.9

Answer 14: B.

References: EP/01 Enclosure 1

Originator: GFW

Points: [1.0] What was the cause of the high containment pressure? Be specific. Provide two control room indications which support your answer.

TIME: 4 minutes

Question # 9

K/A Catalog

Sys	Mode	No.	RO	SRO
000	040	EK1.06	3.7	3.8
000	040	11	4.1	4.3

Answer 4: Steam line break inside containment on 'C' S/G (.5 pt)
Any two (.25 each)
S/G 1C SM Flow (at ~40%)
"Main steam leak Detector" annunciator
S/G C CF vs STM Flow mismatch annunciator
S/G 'C' low SM Press.
S/G C level abnormally low (or decreasing abnormally)

References: 1MC2

Originator: GFW

Points: [1.0] Considering the current plant conditions and assuming we had been experiencing 12 gpm primary to secondary leakage, which of the following best describes the appropriate emergency classification for these conditions. (circle the correct response.)

A. Notification of Unusual Event.

B. Alert

C. Site Area

D. General

TIME: 4 minutes

Question 17/10 SRO ONLY

K/A Catalog

Sys	Mode	No.	RO	SRO
000	040	2	3.0	4.0

Answer 17: B.

References: RP/0/A/5000/01

Originator: GFW

Points: [1.0] Explain why "B" S/G pressure is less than A & D S/G's.

TIME: 4 minutes

Question # 11

K/A Catalog

Sys	Mode	No.	RO	SRO
000	040	EA1.23	3.6	3.5

Answer 2: "B" S/G pressure is slightly less than A & D S/G's due to supplying steam to the CA pump turbine.

References: MC-2

Originator: LBL

Points: [1.0] Briefly explain why there is KC flow to 'B' Train ND Heat exchanger but not to 'A' train.

TIME: 4 minutes

Question 9 / 12

K/A Catalog

Sys	Mode	No.	RO	SRO
000	025	EK3.08	3.1	3.4

Answer 9: 'B' Train has received a Sp signal which has aligned KC to the 'B' NDHX, 'A' Train has not received a Sp signal.

References: 1MC11

Originator: REK

THE FOLLOWING

QUESTIONS DO NOT

RELATE TO THIS

SCENARIO!

Points: [1.0] With "A" Train VC/YC running and both trains powered from Unit 1, what effect will a loss of 1ETB have on the operation of <u>each</u> train of VC/YC?

TIME: 4 minutes

Question # 13 NOT SCENARIO RELATED

K/A Catalog

Sys	Mode	No.	RO	SRO
000	068	EK31.2	4.1	4.5

Answer 1: "A" Train not affected (.5 pts.)
"B" Train pressure filter fan and CR AHU start (.5 pts.)

Reference: 1MC5

Originator: GFW

Key

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

FACILITY: Catawba

REACTOR TYPE: WEC PWR

DATE ADMINISTERED: 9/8/89

OPERATOR: Part B-SRO-2A

SECTION	CATEGORY VALUE	OPERATOR'S SCORE	% OF CATEGORY VALUE
A Plant Proficiency			
B Limits and Controls	12.0		

Final Grade

NAME_____

DATE _____

S.S. #_____

PART B
Test #SRO-2A
SEPT. 8,1989
Page of

Originated by: R.E. Kimray

Approved by: W K Bann
DIR. OF OPER. TRNG.

TOTAL POINTS: 12.0
TOTAL QUESTIONS: 11

INSTRUCTIONS:

1. Put your name on each answer sheet
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_____
Students signature

(/) 1.0 PTS Reactor Power is at 20% when condenser vacuum decreases to 20"Hg.

A. Specifically state the method by which the Reactor Coolant System cooldown to 557°F should be accomplished?

B. What cooldown rate should be used?

ANSWER:

A. Dump steam with the Main Steam PORV's (.5pts) (since no C-9, can't use dumps)

B. $\leq$ 50%/hr (.5pts) (per CAUTION STATEMENT prior to Step 4 in AP/02)

OBJECTIVES:

ENPF: N/A
ISS: N/A
RO: 5
SRO: 5

REFERENCES:

AP/1/A/5500/02
KA 000/051 EK3.01 (2.8/3.1)
EA2.02 (3.9/4.1)
041/020 G-15 (3.2/3.3)

ORIGINATOR: DRR

TIME: 5 minutes

(2) 1.0 PTS A dropped rod has occured. The immediate actions of AP-14 have been performed. The plant is now stable at 90% with Tave = Tref. Repairs are in progress to allow recovering the dropped rod. The IAE Supervisor informed you that repairs will take 3 hours.

Which of the following actions must be taken in order for Power Operation to continue? (Choose one.)

A. Restore the rod to operable status within ± 12 steps of its bank within 72 hours.

B. Declare the rod inoperable and align the rest of the bank to within ± 12 steps of the inoperable rod.

C. Declare the rod inoperable and ensure the shutdown margin requirement of specification 3.1.1.1 is satisfied.

D. Declare the rod inoperable and be in Hot Standby within 6 hours.

ANSWER: C

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: 15
SRO: 15

REFERENCES: Tech Spec 3.1.3.1
K/A# 0010000 A2.08 (3.5/4.2)

ORIGINATOR: REK

TIME: 5 minutes

(3) 1 PTS The plant is in hot standby (Mode 3). Preparations are being made for a reactor startup. Several surveillance tests are in progress. An instrument technician reports that the main steamline isolation actuation relay on train A (ESFAS) failed to operate when tested.

As a result of this information, the plant should

A. Continue with the reactor startup but NOT enter power operation (Mode 1) until the problem with the actuation relay is corrected.

B. Fix the problem with the actuation relay or be in hot shutdown (Mode 4) within the next 6 hours.

C. Fix the problem with the actuation relay within the next 6 hours or be in cold shutdown (Mode 5) within the following 30 hours.

D. Return the train A ESFAS to operable status within 48 hours or be in cold shutdown (Mode 5) within the next 6 hours.

ANSWER: B

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 6
SRO: 6

REFERENCES: T.S. 3.3.2 Action 21
T.S. Interpretation 3.3.2
K/A# 013000 SG11 (3.5/4.2)
K/A# 013000 SG5 (3.6/4.2)

ORIGINATOR:

SRO Only

TIME: 5 minutes

(4) 1 PTS The plant is operating at 100% power. Instrument NSPT5180 is inoperable. What actions must be taken in order to comply with Tech Specs?

ANSWER: The channel must be placed in the tripped condition within 1 hour (.5 pts) and declare NS pump 1A inoperable. (.5pts)

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 2D
SRO: 2D

REFERENCES: Tech Spec Table 3.3-3
Tech Spec Interpretation Table 3.3-3
026/Gen 3.3/3.9

ORIGINATOR: REK

TIME: 5 minutes

SRO Only

April 5, 1988
ECCS-NS-4

(5) 1 PTS Given the following plant conditions, which critical safety function should be given highest priority:

Cont. Press		= 3.8 psig
PZR Press		= 2280 psig
PZR level		= 54%
S/G levels	A	= 38% NR
	B	= 43% NR
	C	= 0% NR
	D	= 40% NR
NC Cold leg Temp (lowest)		= 440°F
Core Exit T/C's		= 445°F
S/G Pressures:	A	= 900 psig
	B	= 910 psig
	C	= 50 psig
	D	= 895 psig
S/R SUR		= -0.33 dpm
Time since Rx Trip		= 50 minutes
RVLIS		= 100%

A. Heat Sink

B. Reactor Coolant Integrity

C. Containment Integrity

D. Reactor Coolant Inventory

ANSWER: C B

OBJECTIVES: ENPF:N/A
ISS:N/A
RO:4
SRO:4

REFERENCES: 1. EP/1/A/5000/02 Ret. #3
2. K/A 000/040 G-11 (4.1/4.3)
G-12 (3.8/4.1)

ORIGINATOR: C. O'Dell

TIME: 4 minutes

(6) 2 PTS With the unit operating at 100% power, a steam line break outside containment occured on 1A S/G 60 minutes ago. Plant conditions are as follows:

SR SUR = 0 to -0.1 dpm
NC Press. = 2280 psig
PZR Level = 58%
S/G levels (B,C,D) = 40% NR
S/G levels (A) = 0% NR, 25% WR and decreasing
S/G Pressure (B,C,D) = 1120 psig
S/G Pressure (A) = < 50 psig and decreasing
NC Temperature (Highest) = 425°F (= stable)

Two NC pumps are running and SI has just been terminated.

A. State the CSF's (if any) which would be in alarm.

B. State any applicable actions/limits associated with this reactor coolant system pressure conditions.

ANSWER:
A. Heat Sink (.5 pts.) and NC Integrity (.5 pts.)
B. NC pressure should be reduced (.5) to within the bounds of enclosure 3 of EP-2D2 (.5 pts.) (<~~1000~~ 1600 psig)

RDM 9/12/89

OBJECTIVES:
ENPF:N/A
ISS:N/A
RO:4
SRO:4

REFERENCES:
1. EP/1/A/5000/02 Ret. #3
2. EP/1/A/5000/2D2 Ret. #4
3. K/A 000/040 G-11 (4.1/4.3)
G-12 (3.8/4.1)

ORIGINATOR: C. O'Dell

TIME: 5 minutes

(7) 1 PTS Unit startup is in progress. Reactor power is 3% when intermediate range 'B' fails low.

Which of the following is the required operator response? (Circle the correct response.)

A. Restore the channel prior to exceeding 10% rated thermal power

B. Restore the channel prior to exceeding 5% RTP

C. Continue the startup to 50% power

D. Reduce power to below the P-6 setpoint and restore the channel prior to returning power above the P-6 setpoint

ANSWER: A

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: ENB-10
SRO: ENB-10

REFERENCES: Tech. Spec. 3.3.1 AP/16
K/A# 000033 EK3.02 (3.6/3.9)

ORIGINATOR: GFW

TIME: 3 minutes

(8) 1 PTS For the leakage conditions shown below, indicate whether or not the leak exceeds the limiting condition for operation in Technical Specification. Consider each condition separately. Assume no other concurrent leakage. Answer either "EXCEED" or "DOES NOT EXCEED" for the following:

A. 0.5 GPM loop drain valve body leak

B. 1.2 GPM through valve 1NI-159

C. 1.5 GPM unidentified leakage

D. 3.0 GPM seat leakage from a pressurizer safety valve

ANSWER: (SRO)

A. Exceeds (0.25) (pressure boundary)
B. Exceeds (0.25)
C. Exceeds (0.25)
D. Does not exceed (0.25)

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 6F
SRO: 6F

REFERENCES: Tech Spec 3.4.6.2
K/A# 000009 G.3 (3.5/4.1)

ORIGINATOR:

TIME: 4 minutes

(9) 1 PTS Given the following plant conditions:

Reactor power 95% steady state

95% EQ Xe

Chemistry notifies you that the Primary System Specific Activity is 72 µCi/gm Dose Equivalent I-131.

What notifications are required by above indications? (Circle the correct response.)

A. Notification of Unusual Event

B. Alert

C. 4 hour report

D. 24 hour report

ANSWER: A

OBJECTIVES: EMPF: N/A
ISS: N/A
RO: 6G
SRO: 6G

REFERENCES: RP01
K/A# 194001 A1.16 (3.1/4.4)

ORIGINATOR:

TIME: 3 minutes

SRO Only

(10) 1 PTS An I&E technician informs you that he must remove the control room air intake radioactivity monitor (EMF-43A) sample blower from service for periodic maintenance. The sample blower will be out of service for about 6 hours. You are performing a reactor startup with reactor power at 1% RTP.

Which of the following best describes your required course of action?

A. No action is required by Tech Specs

B. Startup may continue provided the affected air intake is isolated and the filter units are placed in service within one hour.

C. Startup may continue as long as power is maintained less than 5% rated thermal power.

D. Startup may continue provided BOTH trains of control room ventilation are placed in filter within one hour.

ANSWER: B

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 8
SRO: 8

REFERENCES: Tech. Spec. 3.3.3.1
Tech. Spec. 3.0.4
KA 073/000 G-5 (3.1/3.6)
073/000 G-11 (2.8/3.4)

ORIGINATOR: DRR

TIME: 3 minutes

January 17, 1989
WE-EMF-3

(//) 1 PTS The Unit is in Mode 1, with the EMF 33 pump burned up, and remains unrepaired for 60 days. Indicate the most correct operator response.

A. Releases via this pathway may continue with special sampling requirements placed in effect. A Tech Spec Log entry describing the sampling procedure taken is required.

B. Releases via this pathway may continue with special sampling requirements placed in effect. A special report to the NRC and a Tech Spec Log entry stating the notification is required.

C. Any releases via this pathway must be stopped immediately and no further releases via this pathway are permitted. No special report to the NRC is required.

D. Any releases via this pathway must be stopped immediately and NO further releases via this pathway are permitted. A special report to the NRC is required.

ANSWER: B

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: 8
SRO:8

REFERENCES: EMF Lesson Plan
KSA 073-5 (3.1/3.6)

ORIGINATOR: JAA

TIME: 4 minutes

SRO Only

Key

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

FACILITY: Catawba

REACTOR TYPE: WEC PWR

DATE ADMINISTERED: 9/8/89

OPERATOR: PART B - SRO-2B

SECTION	CATEGORY VALUE	OPERATOR'S SCORE	% OF CATEGORY VALUE
A Plant Proficiency			
B Limits and Controls	14.5		

Final Grade

NAME_____

DATE _____

S.S. #_____

PART B
Test #SPO-26
SEPT. 8,1989
Page of

Originated by: R.E. Kimray

Approved by: W H Barnes
DIR. OF OPER. TRNG.

TOTAL POINTS: 14.5
TOTAL QUESTIONS: 14

INSTRUCTIONS:

1. Put your name on each answer sheet
2. Write your answers on the answer sheet.
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_____
Students signature

(/) 1 PTS What actions are required to be taken as a result of a fire alarm for Zone 172 (RCP 1D) which cannot be reset? Investigation reveals there is no fire in the area. The unit is in Mode 1 at 100% power.

ANSWER: Inspect the containment zone at least once every 8 hours (.5pts) or monitor containment air temperature every hour (.5pts)
(Tech. Spec. 3.3.3.8 Action b. for Zone in Containment)

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 17
SRO: 17

REFERENCES: Tech. Spec 3.3.3.8
KSA 086/000 G-11 (2.7/3.5)

ORIGINATOR: DRR

TIME: 4 minutes

(2) 1 PTS A unit startup is in progress from Mode 4. The Turbine Driven CA Pump has been torn down and reassembled for bearing inspection. What action(s) should be taken and notifications made after entry into Mode 3 but prior to entering Mode 2? (Include approximate setpoints)

ANSWER: Declare CAPT inoperable (.25 pts) Notify Security of SSF degrade (.25 pts) when SM pressure is adequate ($\geq$600 psig SM pressure) apply action statement. (.25 pts) Demonstrate CAPT operability prior to Mode 2. (.25pts)

OBJECTIVES: ENFF:N/A
ISS:N/A
RO:10
SRO:10

REFERENCES:
1. CNS Tech Spec 3.7.1.2
2. CNS Tech Spec Interpretation "4.7.1.2.1 Turbine Driven Auxiliary Feedwater Pump"
3. K/A 061 G-5 (3.3/4.0)

ORIGINATOR: C. O'Dell

TIME: 6 minutes

SRO Only

April 28, 1988
CF-CA-4

(3) 1 PTS During escalation from cold shutdown to 100% power which of the following must the operator ensure for correct CA alignment? (Select one)

A. The CA pump turbine is aligned to all 4 steam generators.

B. The RN and RC supply valves are open.

C. The motor driven pumps are aligned to supply any of the 4 S/G's from either pump.

D. Flowpath from water source into S/G's is free from obstruction.

ANSWER: D

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 8
SRO: 8

REFERENCES: KSA 061-1 (3.7/3.9)
CA Lesson Plan

ORIGINATOR: JLY

TIME: 3 minutes

(4) 1 PTS The unit is at 100% power when a turbine runback occurs due to Low KG pressure of 10 psig. ~~The plant stabilizes at ~60% power.~~ Three minutes have elapsed since the loss of KG. Steam dumps have actuated as expected. RDM 9/11/89

Describe the expected response of the turbine generator. Include any applicable setpoints and time frames.

ANSWER: The turbine ~~should trip~~ will runback to ~25% in 3 min (.25 pts) ~~because stator cooling has been lost~~ (.25 pts) ~~for >2.5 minutes~~ (.25 pts) ~~with >23% load~~ (.25 pts). No trip will occur at 23% load, the runback will stop

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 17
SRO: 17

RDM 9/11/89

REFERENCES: OP/1/B/6100/10B
AP/1/A/5500/03 (Load Rejections
AP/1/A/5500/02 (Turbine Generator Trip)
KSA 045 000 A3.04 3.4/3.6
045 000 K4.12 3.3/3.6
045 050 G-8 2.6/2.7
045 050 K1.01 3/4.3.6
045 G-15 2.9/3.2

ORIGINATOR: McGuire

TIME: 4 minutes

(5) 1 PTS Unit 1 is at 100% power when the "Rod Control Urgent Failure" annunciator is received. The problem is verified to be a failure in the logic cabinet. The required immediate actions are taken and I&E reports that repairs will take at least 4 hours. Select the statement that best describes the correct action for the OATC to take.

A. No attempt should be made to move rods.

B. Maintain Tavg by using control rods by selecting individual control banks.

C. Contact I&E to reset the Rod Control System.

D. Reposition rods six to ten steps to determine rod motion is possible.

ANSWER: A

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 14
SRO: 14

REFERENCES: Open Reference
AP/15 Case 1 Step 2 & 7
T/S 3.1.3.6
001/050/A2.01 (3.7/3.9)

ORIGINATOR: GHW

TIME: 2 minutes

(6) 1 PTS While operating Unit 1 at 100% RTP, with all control systems in automatic, the control rods begin a continuous insertion. The operator determines that the insertion is due to Turbine Impulse Pressure Channel I failing low. He then places rods in manual and returns Tavg equal to Tref by withdrawing rods.

What action is required to continue power operations? Include any applicable time frames.

ANSWER: Within 1 hour determine by observation of the asscciated permissive status light that the interlock is in its required state for the existing plant condition (1.0 pts)

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 7
SRO: 7

REFERENCES: AP/1/A/5500/15 (Rod Control Malfunction)
Tech. Spec. 3.3.1
KA 012/000 G-11 (3.6/4.2)
001/050 G-8 (3.4/4.3)
001/050 G-11 (3.4/3.9)
001/000 K4.08 (3.2/3.4)

ORIGINATOR: DRR

TIME: 4 minutes

SRO Only

(7) 1 PTS A Safety Injection occurred on Unit 1 and the following conditions exist:

a. Containment Pressure - 4.5 psig
b. Core Exit Thermocouples - 300 degrees F
c. Containment Sump Level - 1.6 ft and increasing
d. NC Pressure - 100 psig
e. S/G Pressures - 1090 psig

Select the procedure path the operator would use to correctly address this accident.

A. EP/01 (Reactor Trip or Safety Injection), EP/1C (High Energy Line Break Inside Cont.) then EP/1C3 (Transfer to Cold Leg Recirc)

B. EP/01 (Reactor Trip or Safety Injection), EP/1C (High Energy Line Break Inside Containment) then EP/1C4 (Transfer to Hot Leg Recirc)

C. EP/01 (Reactor Trip or Safety Injection), EP/1C (High Energy Line Break Inside Containment) and EP/1C2 (Post LOCA Cooldown and Depressurization)

D. EP/01 (Reactor Trip or Safety Injection), EP/1C (High Energy Line Break Inside Containment) then EP/1C1 (SI Termination Following a High Energy Line Break Inside Containment)

ANSWER: A

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 6a
SRO: 6a

REFERENCES: EP/1/A/5000/1 Reactor Trip or Safety Injection

KSA 000/001/G-10/4.3/4.5
KSA 000/009/G-10/4.2/4.4

ORIGINATOR: McGuire

TIME: 3 minutes

(8) 1 PTS Unit 1 has experienced a high energy line break inside Containment. After completing cooldown and depressurization, the following conditions exist:

- NCS pressure = 390 psig and slowly increasing
- Total CA flow to intact S/G's = 600 gpm
- Loop 'A' Tc = 405°F
- Loop 'B' Tc = 395°F
- Loop 'C' Tc = 400°F
- Loop 'D' Tc = 397°F

Based on the information given, the SRO informs the OATC that a transition to EP/1C1 (SI Termination following, a High Energy Line Break) will now be made.

State why this action is incorrect and what proper transition should be made.

ANSWER: (To go to EP/1C1, All Tc's should be > 400°F.) Loops B & D are < 400°F (.5 pts.) Go to EP/1D1 (SI Term. following Steam Line Break) (.5 pts.)

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 1c
SRO: 1c

REFERENCES: EP/1C2 Step 31
KSA 000/069.11 (4.0/4.2*)

ORIGINATOR: DRR

TIME: 4 minutes

(9) 1 PTS The plant tripped from 100% power, with indications in the Control Room that all offsite power had been lost (all 6.9 KV buses de-energized) and that one AC Emergency BUS is de-energized.

Indicate which of the following statements is most correct for this condition.

A. The Emergency Operating Procedures must always be entered through EP-01. The immediate actions of EP-01 will transfer the operators to EP-03 for the described conditions.

B. EP-01 is the appropriate Emergency Operating Procedures entry point for these conditions.

C. EP-03 should be entered with the symptoms of a loss of all offsite power.

D. Entry into the EP's is not required.

ANSWER: B

OBJECTIVES: ENPF:N/A
ISS: N/A
RO: 2
SRO: 2

REFERENCES: OMP 1-4
EP-01 Symptoms
EP-03 Symptoms
EP-01 Immediate Actions
K/A# 000056 SG11 (3.5/3.8)
K/A# 000056 SG12 (3.4/3.6)

ORIGINATOR:

TIME: 2 minutes

(10) 1.5 PTS EP-2F3 (Void in Reactor Vessel) is in progress. The Reactor Vessel is being vented and the maximum vent time has been exceeded. Reactor Vessel Upper Range Level is 90% and stable. What actions are required?

ANSWER:
1. Close all vent valves (.5 pts.)
2. Return NC pressure to pressure recorded prior to venting and establish NC conditions for reventing. [Also accept: Increase NC pressure to value recorded on Enclosure 3 of EP-2F3 and return to Step 23] (1 pt)

OBJECTIVES:
ENPF: N/A
ISS: N/A
RO: 4
SRO: 4

REFERENCES:
EP/1/A/5000/2F3 Rev #5
KSA 000/040 (3.8/4.1)
000/074 (4.3/4.4)

ORIGINATOR: DRR

TIME: 4 minutes

(//) 1 PTS Indicate the best approximation of the expected "weight of the cell" reading when a fuel assembly with full length RCC insert (wet) is being raised from a location not within the core.

A. 1204 lbs.

B. 2126 lbs.

C. 2200 lbs.

D. 2274 lbs.

A R: D

TIVES: ENPF:
ISS:
RO:
SRO:

REFERENCES: OP/1/A/6550/07 Enclosures 4.2 and 4.6
KA 034/000/A1.01 (2.4/3.2)
KA 034/000/G009 (3.0/3.0)

ORIGINATOR: NRC

TIME: 5 minutes

SRO Only

August 18, 1989

(/2) 1 PTS In the event that the Turbine Bldg. Sump Pump System for Unit 1 becomes contaminated, what should the procedure be to handle this situation?

A. Continue discharging to the WC System while continuously monitoring this system to ensure that radioactive discharge limits are being met.

B. Redirect the system flowpath in order for it to discharge into the waste monitor tank B. (in Aux. Bldg.)

C. Isolate discharge allowing the radioactive wastes to be discharge to the Aux. Bldg. floor drain tank.

D. Redirect discharge allowing the radioactive waste to be discharged to the Mixing and Settling Tank.

ANSWER: C

OBJECTIVES: ENPF:N/A
ISS: 5B
RO: 5B
SRO: 5B

REFERENCES: OP-CN-WE-SS
KA068.08 (2.6/2.8)

ORIGINATOR:

TIME: 4 minutes

August 18, 1989
WE-SS-2

(13) 1 PTS During the EMF trip point verification the "check-operate-trip adjust" switch is: (select one)

A.. Held in the "check" position.

B. Set to the "trip adjust" position and released.

C. Set to the "trip adjust" position and required to be manually held there.

D. Not required to be operated.

ANSWER: C.

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 4
SRO: 4

REFERENCES: KSA 073-7 (2.9/3.0)
WG Lesson Plan

ORIGINATOR:

TIME: 2 minutes

August 18, 1989
WE-WG-5

(14) 1 PTS ND Pump "A" is in operation with NC level 6.5%. You notice erratic motor amps for ND pump "A". What are your required actions?

A. Increase ND flow to sweep entrained air through the pump and out of the suction piping.

B. Stop the ND pump, raise NC level above the top of the Rx vessel hot legs and start "B" ND pump.

C. Raise NC system level while observing ND pump operating parameters.

D. Reduce "A" ND pump flow and start "B" ND pump to provide ND flow through core.

ANSWER: B

OBJECTIVES: ENPF: N/A
ISS: N/A
RO: 6.I.
SRO: 6.I.

REFERENCES: AP/19
005/0001 A4.01 (3.6/3.4)

ORIGINATOR: CWS

TIME: 4 minutes