U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-237/OL-88-01

Docket Nos. 50-237; 50-249 Licenses No. DPR-19; DPR-25

Licensee: Commonwealth Edison Company
Post Office Box 767
Chicago, IL 60690

Facility Name: Dresden Nuclear Station

Examination Administered At: Morris, Illinois

Examination Conducted: July 11-13, 1988

Examiner: J. C. Bjorgen J. C. Bjorgen 8/2/88
Date

Approved By: M. J. Jordan, Chief M. J. Jordan 8/2/88
Operator Licensing Section 1 Date

Examination Summary

Examination administered on July 11-13, 1988 (Report No. 50-237/OL 88-01))
A written examination was administered to two Senior Reactor Operator candidates. An operating examination was administered to one Senior Reactor Operator candidate.
Results: All personnel passed all portions of the examinations.

REPORT DETAILS

1. Examiners

J. C. Bjorgen, Region III

2. Exit Meeting

An exit meeting was held on July 13, 1988. The following personnel were present at this meeting:

Commonwealth Edison Company

E. D. Eenigenburg, Plant Manager
T. J. Lewis, Regulatory Assurance
K. Peterman, Regulatory Assurance Supervisor
R. Sitts, Training Department
J. J. Smentek, Quality Assurance

US NRC

J. C. Bjorgen, Chief Examiner
M. J. Jordan, Chief, Operator Licensing Section 1
S. G. DuPont, Senior Resident Inspector
P. Kaufman, Resident Inspector
D. Calhoun, Reactor Inspector

The following topics were discussed in the exit meeting:

a. The examiners identified no generic weaknesses at the exit meeting.

b. A general discussion was held concerning the examination process and the estimated date that the exam results would be completed.

c. The examiner noted that the simulator currently lacks a suitable table for the Senior Operators to place the Emergency Operating Procedures during simulated events. It was noted that plant management was aware of this problem and is proceeding with corrective action.

3. Examination Review

A copy of the written examination and answer key was given to facility personnel for review at the conclusion of the examination. The facility comments were provided to the examiner on July 21, 1988. The comments and resolution are provided as Attachment 1 to this report.

ATTACHMENT 1

Dresden's Comments
SRO Initial Exam

Administered July 12, 1988

Question #	Comment
5.01 DGP 1-1 Rev. 27	Additional acceptable answer per DGP1-1: T = 1.4 x Doubling Time T = 1.4 x 65 seconds T = 91 seconds
Resolution:	Comment not considered since all candidates answered the question correctly using the method(s) described in the answer key. Since the method used in DGP1-1 results in approximately a 3 second error, in this case, it is recommended that the licensee consider providing a more accurate multiplier in the procedure, i.e., 1.443 in lieu of 1.4.

Question	Comment
6.06.c 12E2465 and 12E2466	Additional acceptable answer: False - Failure of one 600# Scram Bypass Pressure Switch will cause a full scram if the MSIV's are closed or Condenser Vacuum is 23" Hg or less. See attached Electricals 12E2465 and 12E2466.
Resolution:	Comment noted. Answer key unchanged. Review of the reference drawings could not confirm the comment. Additional investigation not warranted since exam pass/fail decision would not change.

Question	Comment
7.04.b. Dresden II Tech. Specs. Pgs. B 3/4.8-32, -33, -34	The answer in the answer key is not included in the Technical Specification Bases as referenced. The answer in the answer key refers to table 4.8.1. as a whole and is not a reason for increased sampling. Dresden feels 7.04.b should be deleted.

Resolution: Comment noted. Answer key modified to add "will accept a reasonable discussion of the concern for the increased probability of fuel damage during rapid power changes and the need, therefore, to verify coolant activity changes, if any." Reference changed to add "and associated bases."

Question	Comment
7.05.a DGP 2-3 Rev. 12 Pgs. 2 and 3 of 8.	The answer key should be changed to the actions as listed in DGP 2-3 Rev 12 attached.

Resolution: Comment accepted. Answer key changed to reflect the latest revision of the procedure.

Question	Comment
7.07.b. NUREG-0121 ES-402 Pg. 3 of 4.	To answer this question requires the memorization of specific steps in a normal operating procedure. NUREG-0121 ES-402 states: "The candidate should be able to describe generally the objectives and methods used in the normal, off normal, and emergency operating procedures and the methods used to perform verifications." Since this is a normal operating procedure, Dresden feels this question should be deleted.

Resolution: Comment accepted. Since the majority of the verifications involve items (trips) that are bypassed in an accident situation (by the fast start relay). Part B was deleted from the exam. Answer key changed.

Question	Comment
8.04.b Dresden II Tech. Specs. Pgs. 3/4-5 and 3/4-6.	Additional acceptable answer: Uncoupled control rod per Technician Specifications 3.3.B.1.b. attached.

Resolution: Comment noted. Answer key changed to add "Uncoupled Control Rod, (depending on power levels and recoupling efforts) (.5)" It was noted that below 20% power, an uncoupled control rod is inoperable per T.S. 3.3.B.1.a. Point value of question changed to 1.5 points.

START 0800
STOP 2:10 pm

U. S. NUCLEAR REGULATORY COMMISSION
SENIOR REACTOR OPERATOR LICENSE EXAMINATION

FACILITY: DRESDEN

REACTOR TYPE: BWR-GE3

DATE ADMINSTERED: 88/07/12

EXAMINER: J. BJORGEN

CANDIDATE: _____

INSTRUCTIONS TO CANDIDATE:

Use separate paper for the answers. Write answers on one side only. Staple question sheet on top of the answer sheets. Points for each question are indicated in parentheses after the question. The passing grade requires at least 70% in each category and a final grade of at least 80%. Examination papers will be picked up six (6) hours after the examination starts.

CATEGORY VALUE	% OF TOTAL	CANDIDATE'S SCORE	% OF CATEGORY VALUE		CATEGORY
25.00	~~25.00~~ 25			5.	THEORY OF NUCLEAR POWER PLANT OPERATION, FLUIDS, AND THERMODYNAMICS
25.00	~~25.00~~ 25			6.	PLANT SYSTEMS DESIGN, CONTROL, AND INSTRUMENTATION
~~25.00~~ 23.5	~~25.00~~ 23.75			7.	PROCEDURES - NORMAL, ABNORMAL, EMERGENCY AND RADIOLOGICAL CONTROL
~~25.00~~ 25.5	~~25.00~~ 25.75			8.	ADMINISTRATIVE PROCEDURES, CONDITIONS, AND LIMITATIONS
~~100.0~~ 99.0			%		Totals

Final Grade

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

_____
Candidate's Signature

NRC RULES AND GUIDELINES FOR LICENSE EXAMINATIONS

During the administration of this examination the following rules apply:

1. **Cheating on the examination means an automatic denial of your application and could result in more severe penalties.**

2. **Restroom trips are to be limited and only one candidate at a time may leave. You must avoid all contacts with anyone outside the examination room to avoid even the appearance or possibility of cheating.**

3. **Use black ink or dark pencil only to facilitate legible reproductions.**

4. **Print your name in the blank provided on the cover sheet of the examination.**

5. Fill in the date on the cover sheet of the examination (if necessary).

6. Use only the paper provided for answers.

7. Print your name in the upper right-hand corner of the first page of each section of the answer sheet.

8. Consecutively number each answer sheet, write "End of Category __" as appropriate, start each category on a new page, write only on one side of the paper, and write "Last Page" on the last answer sheet.

9. Number each answer as to category and number, for example, 1.4, 6.3.

10. Skip at least three lines between each answer.

11. Separate answer sheets from pad and place finished answer sheets face down on your desk or table.

12. Use abbreviations only if they are commonly used in facility literature.

13. The point value for each question is indicated in parentheses after the question and can be used as a guide for the depth of answer required.

14. Show all calculations, methods, or assumptions used to obtain an answer to mathematical problems whether indicated in the question or not.

15. Partial credit may be given. Therefore, ANSWER ALL PARTS OF THE QUESTION AND DO NOT LEAVE ANY ANSWER BLANK.

16. If parts of the examination are not clear as to intent, ask questions of the examiner only.

17. You must sign the statement on the cover sheet that indicates that the work is your own and you have not received or been given assistance in completing the examination. This must be done after the examination has been completed.

8. When you complete your examination, you shall:

   a. Assemble your examination as follows:

      (1) Exam questions on top.

      (2) Exam aids - figures, tables, etc.

      (3) Answer pages including figures which are part of the answer.

   b. Turn in your copy of the examination and all pages used to answer the examination questions.

   c. Turn in all scrap paper and the balance of the paper that you did not use for answering the questions.

   d. Leave the examination area, as defined by the examiner. If after leaving, you are found in this area while the examination is still in progress, your license may be denied or revoked.

QUESTION 5.01 (1.50)

During a reactor startup, the reactor operator notes that from 25 on IRM Range 3 to 50 on Range 4, the increase in power took 65 seconds. CALCULATE the reactor period. Show all work.

QUESTION 5.02 (2.00)

Regarding Xenon-135:

a. During power operation, Xe is produced from two sources. What are those two sources? (1.0)

b. Following a reactor scram, peak Xe occurs in approximately _____ hours. (0.5)

c. Following a plant shutdown, what is the time required for the core to be essentially Xenon free? (0.5)

QUESTION 5.03 (2.00)

LIST 4 of the 5 positive reactivity effects which must be overcome by the Standby Liquid Control System if boron injection becomes necessary.

(***** CATEGORY 5 CONTINUED ON NEXT PAGE *****)

QUESTION 5.04 (2.00)

TRUE or FALSE:

a. Decay heat is the heat produced by the energy released from the radioactive decay of fission products. (0.5)

b. Decay heat is approximately 6% of the total energy released from fission. (0.5)

c. Decay heat can be determined by reading the SRMs when the reactor is shutdown. (0.5)

d. Decay heat contributes a significant amount of energy in the reactor core for hours after the reactor has been shut down. (0.5)

QUESTION 5.05 (2.00)

MATCH the following monitored parameters with its design basis. (Answers may be used more than once.)

___a. MAPLHGR
___b. Peak LHGR
___c. CMFLPD
___d. MCPR

1. Assures no fuel bundle experiences transition boiling during normal operations.
2. Assures peak clad temperature is less than 2200 degrees F.
3. Prevents clad cracking due to differential expansion between the fuel pellets and clad during normal operation.
4. Assures maximization of axial flux tilting during steady state power operation.

QUESTION 5.06 (2.00)

List four functions of the main condenser.

(***** CATEGORY 5 CONTINUED ON NEXT PAGE *****)

QUESTION 5.07 (2.00)

Briefly explain the operating principle of a jet pump. Specifically address the nozzle, mixer, and diffuser sections of the pump.

QUESTION 5.08 (2.00)

Gadolinia oxide is currently used as a burnable poison in BWR fuel rods. Answer TRUE or FALSE for the following:

a. Gadolinia oxide is used to increase effective core life. (0.5)

b. The addition of gadolinia oxide allows for better axial and radial flux shaping. (0.5)

c. As the amount of Gadolinia in the core burns out, control rod worth increases. (0.5)

d. The addition of gadolinia oxide to uranium oxide lowers the combined fuel melting point. (0.5)

QUESTION 5.09 (1.50)

LIST three design features that insure adequate Net Positve Suction Head (NPSH) for the Reactor Recirculation pumps.

QUESTION 5.10 (1.50)

Indicate whether the following reactivity coefficients become MORE NEGATIVE, LESS NEGATIVE, or REMAIN THE SAME as the core ages.

a. fuel temperature coefficient
b. moderature temperature coefficient
c. void coefficient (3 @ 0.5 pts each)

(***** CATEGORY 5 CONTINUED ON NEXT PAGE *****)

QUESTION 5.11 (1.50)

STATE what effect (if any) each of the following changes in core parameters would have on control rod worth.

a. increase in moderator temperature
b. increase in voids
c. increase in fuel temperature (3 @ 0.5 pts each)

QUESTION 5.12 (3.00)

Reactor power is reduced from 100% to 60% using recirculation flow. How will the following change (INCREASE, DECREASE, or REMAIN THE SAME), and WHY?

a. Pressure differential between the reactor and mainsteam pressure equalizing header.

b. Feedwater temperature.

c. Recirculation pump NPSH.

d. Condensate depression.

4@ (0.75 pts each)

QUESTION 5.13 (2.00)

LIST four factors that will add negative reactivity to the core as the reactor is taken from cold shutdown to 100% power.

(***** END OF CATEGORY 5 *****)

QUESTION 6.01 (2.00)

Regarding reactor vessel level instrumentation:

a. Briefly describe the location of instrument zero on the reactor vessel. (0.5)

b. Briefly explain the conditions when the fuel zone instrumentation is intended to be used. (0.5)

c. With the plant operating at 100% steam flow, briefly explain how actual vessel level (wide range) compares to indicated level including the reason for the difference. (1.0)

QUESTION 6.02 (2.00)

Using the attached Figure 2, "CRD Hydraulic Control Unit (Piping Diagram)" :

a. Briefly explain the sequence of valve operations to normally insert a control rod. Include a narrative description (or sketch) of the water flow path. (1.0)

b. Briefly explain the sequence of valve operations that occur to scram a control rod. Include a narrative description (or sketch) of the water flow path. (1.0)

QUESTION 6.03 (3.00)

Regarding the Rod Worth Minimizer (RWM):

a. There are four methods available to clear insert errors while operating below the low power setpoint (LPSP). Briefly describe these four methods. [2.0]

b. The RWM computer calculates reactor power for enforcing rod blocks. What input(s) are used to calculate reactor power? [0.5]

c. From what power supply does the RWM receive its electrical power? [0.5]

(***** CATEGORY 6 CONTINUED ON NEXT PAGE *****)

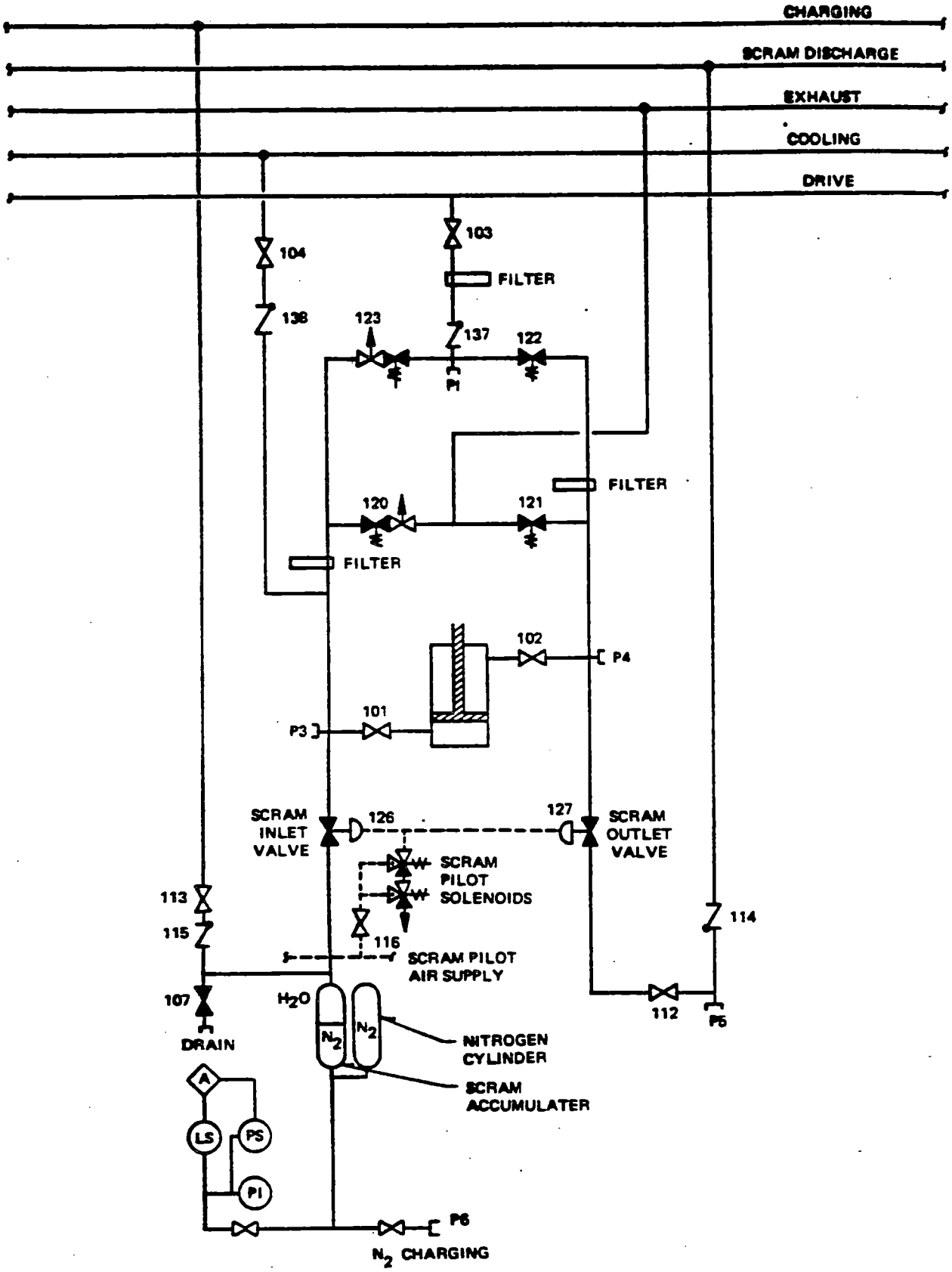

Figure 2. CRD Hydraulic Control Unit (Piping Diagram)

QUESTION 6.02

REV II
3/82

QUESTION 6.04 (2.00)

a. Briefly explain why SIX Average Power Range Monitor (APRM) channels are needed. (1.0)

b. Operating Order #12-88 provides special instructions for reducing power on Unit 3 to prevent a flow biased scram if one Recirculation pump trips. BRIEFLY EXPLAIN the interconnection between the Recirculation System and the Reactor Protection System that is used to establish the flow biased scram setpoint. Include sufficient detail to clarify HOW this creates an operational problem on Unit 3. Power to flow map attached for reference. (1.0)

QUESTION 6.05 (2.00)

Regarding the Electro Hydraulic Control(EHC) System, answer the following TRUE or FALSE:

a. If the "A" pressure regulator were to fail such that the Control Valves went toward full open, the "B" regulator would automatically take control of reactor pressure. (0.5)

b. If generator hydrogen pressure were low, the Load Limit could be set down to, say, 70%, which would limit control valve position and generator load. (0.5)

c. If steam flow produced in the reactor vessel exceeds the turbine steam flow, the EHC summing junction output represents a BYPASS VALVE DEMAND SIGNAL. (0.5)

d. Upon a loss of stator cooling, the turbine will trip if the stator amps are not below 25% within three minutes. (0.5)

(***** CATEGORY 6 CONTINUED ON NEXT PAGE *****)

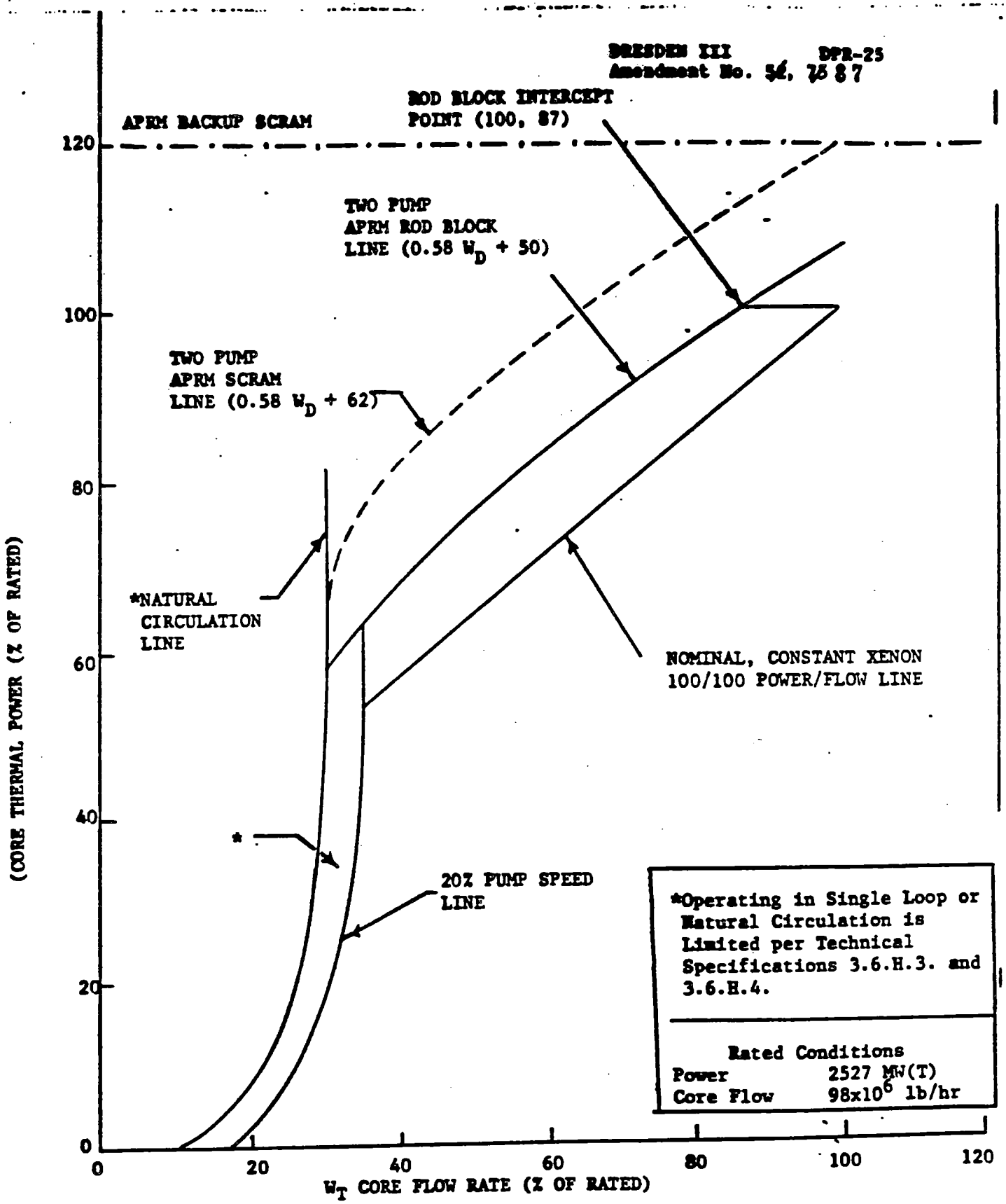

Figure 2.1-3
APRM FLOW BIAS SCRAM RELATIONSHIP
TO NORMAL OPERATING CONDITIONS

3892a

QUESTION 6.04

QUESTION 6.06 (2.00)

Units 2 and 3 are operating near full power. Answer the following TRUE or FALSE:

a. Unit 2 experiences an instrument line failure that causes drywell pressure to slowly increase. The Unit 2 operator requests the Unit 3 operator to place the Unit 3 keylock switch for the 2/3 swing diesel in "BYPASS". This makes Unit 2 the "PREFERRED" unit during an accident. (0.5)

b. A sudden increase in transformer internal nitrogen pressure could result in actuation of the transformer deluge system. (0.5)

c. The Reactor Protection System is designed such that a single component failure will neither cause nor prevent a SCRAM. (0.5)

d. The Reactor Protection System supply breakers are mechanically interlocked to prevent paralleling the two sources of power.(0.5)

QUESTION 6.07 (1.00)

During a Diesel Generator surveillance, a problem was found in the diesel governor. To prevent engine damage, the operator shut down the diesel using the emergency fuel cutoff valve. Following minor adjustment to the governor, the Diesel Generator was returned to standby status.

When notified of the situation, the operating engineer directs that the diesel injectors be disassembled for inspection. WHY?

QUESTION 6.08 (3.00)

a. State the four automatic start signals for the Emergency Diesel Generators. (2.00)

b. Briefly explain the purpose of the diesel fast start relay including its trip interlocks. (1.0)

(***** CATEGORY 6 CONTINUED ON NEXT PAGE *****)

QUESTION 6.09 (2.00)

Regarding the shutdown cooling system:

a. STATE the signal(s) and setpoint(s) that cause the system valves to close. (1.0)

b. STATE the signal(s) and setpoint(s) that cause the pumps to trip. (1.0)

QUESTION 6.10 (2.00)

a. Briefly state the purpose of the Standby Liquid Control System (SLC). (1.0)

b. State the four indications that are used to verify proper system operation. (1.0)

QUESTION 6.11 (4.00)

a. STATE the signal(s) that initiate the High Pressure Coolant Injection (HPCI) System. (1.0)

b. STATE the signal(s) that cause the HPCI System to isolate. (1.2)

c. STATE six of the seven HPCI turbine trips. (1.8)

(***** END OF CATEGORY 6 *****)

QUESTION 7.01 (1.50)

During the daily control rod operability check, the Unit 2 operator notes that one rod near the center of the core is positioned at 48 instead of the required position of 24. The unit is operating at 91% power.

STATE the immediate actions required by DOA 300-12, "Mispositioned Control Rod". INCLUDE the actions required if the on-call Nuclear Engineer cannot be reached.

QUESTION 7.02 (2.50)

DAP 12-8, "Access Control of Radiation Areas Significantly Affected by Hydrogen Addition", requires the Shift Engineer to be notified prior to entry into TEN areas of Unit 2 while the unit is operating.

a. List six of these areas. (1.5)

b. The Shift Engineer is responsible to take two specific actions prior to any of these entries. STATE the two actions. (1.0)

(***** CATEGORY 7 CONTINUED ON NEXT PAGE *****)

QUESTION 7.03 (2.00)

Regarding the limitations for refueling activities, as discussed in DFP 800-1,"Unit 2/3 Master Refueling Procedure", COMPLETE the following statements:

a. Whenever irradiated fuel is in the reactor vessel and the reactor is in Cold Shutdown, all low pressure core and containment cooling subsystems may be inoperable, provided (reason). (0.5)

b. During Core Alterations, (number) Source Range Monitors shall be operable, including (number) in the core quadrant where fuel or control rods are being moved. (0.5)

c. For an SRM to be considered operable, it shall be fully inserted and have a minimum of (number) counts per second with all control rods fully inserted. (0.5)

d. When secondary containment is required during REFUEL operations, both circuits of the (a system) shall be operable, including the diesel generators required for operation of the system(s). (0.5)

QUESTION 7.04 (2.50)

Procedure DGP 3-1,"Routine Power Changes", requires the Radiation Chemistry Department to be notified of THREE types of power changes for Technical Specification sampling requirements.

a. STATE these three power changes. (1.5)

b. BRIEFLY STATE the reasoning provided in Technical Specification Bases for the increased sampling requirements during certain power changes. (1.0)

(***** CATEGORY 7 CONTINUED ON NEXT PAGE *****)

QUESTION 7.05 (2.50)

Procedure DGP 2-3, "Reactor Scram", lists seven immediate operator actions to be taken following a scram.

a. STATE FIVE immediate operator actions. (1.5)

b. IF, while executing the post scram actions, you note that reactor water level has reached "0" inches on the narrow range instrumentation and drywell pressure is 2.5 psig, WHAT other procedure(s) should be entered? (1.0)

QUESTION 7.06 (2.00)

DEOP 400-3, "RPV Flooding", provides a table 4-2(below) to aid the operator in verifying that the reactor is above the Minimum Alternate RPV Flooding Pressure.

# of Open ADS Valves	Minimum Alternate Flooding Pressure
5	200
4	250
3	350
2	525
1	1025

TABLE 4-2

a. Define or briefly explain what is meant by the term Minimum Alternate Flooding Pressure. (1.0)

b. DEOP 400-3 General Instructions recommend that RPV pressure should be maintained as low as practical above the Minimum Alternate Flooding Pressure during floodup. BRIEFLY EXPLAIN WHY. (1.0)

(***** CATEGORY 7 CONTINUED ON NEXT PAGE *****)

QUESTION 7.07 (~~2.50~~ 1.0)

Regarding DOP 6600-5,"Diesel Generator 2/3 Startup":

a. State the two trips that are still in effect under "Automatic Start" conditions. (1.0)

b. ~~Upon automatic initiation of the Diesel Generator, the operator is required to verify six automatic actions occur. STATE FIVE of these actions (1.5)~~ deleted

QUESTION 7.08 (3.00)

DOP 6100-1,"Removing Transformer 22 from Service With Unit 2 Operating", has CAUTIONS and PRECAUTIONS to be observed during bus transfers.

a. Why does the procedure require minimizing the time that TR-21 and TR-22 are loaded in parallel? (0.5)

b. IF, while executing DOP 6100-1 above, power is lost to both TR-21 and TR-22, DGA-12,"Partial or Complete Loss of AC Power", requires the operator to perform six immediate actions. STATE FIVE of these actions, assuming the plant was initially at 90% power. (2.5)

QUESTION 7.09 (2.00)

Regarding DGA-13,"Loss of 125VDC Battery Chargers with Simultaneous Loss of Auxiliary Power":

a. The procedure requires that, if power is lost to the battery chargers, then 125VDC load shedding must be initiated immediately and completed within 30 minutes. BRIEFLY EXPLAIN why this load shedding must be urgently accomplished. (1.0)

b. Assume while executing the recovery steps of this procedure, that a Loss of Coolant Accident occurred. The procedure states that a LOCA would actually IMPROVE the plant situation. BRIEFLY EXPLAIN why. (1.0)

(***** CATEGORY 7 CONTINUED ON NEXT PAGE *****)

QUESTION 7.10 (1.00)

Following a recirculation pump trip, DOA 202-1, "Recirculating Pump(s) Trip", requires the seal purge flow to be isolated from the idle loop if initial restart attempts fail. BRIEFLY EXPLAIN the reason for isolating the seal purge flow.

QUESTION 7.11 (1.50)

Following a refueling outage, Unit 2 is in the process of a startup. The operator is ready to start drawing a vacuum in the condenser. Procedure DGP 1-1,"Normal Unit Startup", cautions the operator to closely control the EHC pressure setpoint while drawing a vacuum in the condenser. BRIEFLY EXPLAIN why this precaution is necessary, including the possible consequences.

QUESTION 7.12 (2.00)

With both Units 2 and 3 operating near rated power you, as Shift Engineer, are notified of a fire in the Control Room and the SCRE has already initiated evacuation actions due to the concern for personnel safety.

STATE your required actions as Shift Engineer as outlined in EPIP 200-20,"Control Room Evacuation/Safe Shutdown".

(***** END OF CATEGORY 7 *****)

QUESTION 8.01 (1.50)

DAP 7-2, "Conduct of Shift Operations", lists three criteria to be used by the Control Room Supervisor to authorize a Unit operator to leave his "STABLE AND UNDER CONTROL" reactor to help on the other unit. BRIEFLY STATE these three criteria. Assume a major event is in progress on the unit needing help.

QUESTION 8.02 (2.00)

Complete the following statements regarding DAP 7-4 "Control of Temporary System Modifications":

a. Electrical jumpers are to be colored (color). (0.5)

b. The (WHO?) is responsible to INITIATE AND FOLLOW the actions necessary for the removal of a temporary alteration, following the completion of the work. (0.5)

c. A quarterly review will be performed on each temporary alteration that has been installed for at least three months. This review is performed by the (WHO?). (0.5)

d. The (WHO?) verifies the removal of the temporary system alteration and system returning to normal. (0.5)

QUESTION 8.03 (2.50)

With Unit 2 operating at 35% power, a drywell entry is planned to investigate steam leakage. DAP 7-11, "Drywell Entry", requires:

a. Primary Containment Integrity to be maintained. Briefly describe how this is accomplished during drywell entry. Limit your answer to the Personnel Access Hatch. (0.5)

b. The Shift Supervisor to verify THREE systems OUT OF SERVICE and TWO systems TURNED ON prior to the entry. List FOUR of these five systems and the required status of each. (2.0)

(***** CATEGORY 8 CONTINUED ON NEXT PAGE *****)

QUESTION 8.04 ~~(1.00)~~ 1.50

Technical Specifications limit the number of inoperable control rods. BRIEFLY DEFINE how a control rod would be considered INOPERABLE. ~~(1.0)~~ 1.5

QUESTION 8.05 (1.00)

According to DAP 13-10, "Escort Duties", visitor escorts normally escort no more than (number) visitors. Exceptions to this must be approved by the (title).

QUESTION 8.06 (2.00)

a. LIST the THREE coolant chemistry parameters controlled by Technical Specifications. (1.5)

b. BRIEFLY EXPLAIN why coolant chemistry limits are less restrictive once steaming rates exceed 100,000 pounds per hour during plant startup. (0.5)

QUESTION 8.07 (2.00)

Operating Order #14-88 provides guidance on the use of procedures in the Operating Department.

Answer the following TRUE or FALSE:

a. Repetitive alarms received in conjunction with an ongoing surveillance do not require reference to the Alarm Response Procedure.

b. The Quarterly LPCI flow test requires using the procedure for the entire evolution.

c. If a feedwater pump were to trip from 100% power, the operator is expected to check the Abnormal Procedure prior to taking action.

d. A routine balancing of recirculation loop flows is required to done with the procedure in-hand.
be

(***** CATEGORY 8 CONTINUED ON NEXT PAGE *****)

QUESTION 8.08 (2.00)

Regarding DAP 3-5,"Out of Service and Personnel Protection Cards", answer the following TRUE or FALSE:

a. Equipment can be taken Out of Service and Held for all onsite Contractors.

b. For equipment being taken out of service for multiple work groups, a complete outage is developed for each job Supervisor, including associate cards being placed on the system, to assure adequate personnel protection.

c. All requests for outages that impair a Fire Protection System must be approved by the Station Fire Marshall or the person performing his function.

d. For urgent work on an RHR pump motor, an OUT-OF-SERVICE card attached to the pump control switch in the Control Room satisfies the minimum personnel protection requirements.

QUESTION 8.09 (2.50)

Regarding Shift Staffing requirements outlined in Technical Specifications:

a. State the required licensed operator shift staffing for both units operating at power. (1.5)

b. Complete the following statement:

Shift staffing may be less than required for up to (number)hours, provided (reason). (1.0)

(***** CATEGORY 8 CONTINUED ON NEXT PAGE *****)

QUESTION 8.10 (2.50)

10CFR 55.53 currently requires operator license holders to maintain their license in an ACTIVE status. Complete the following:

a. To maintain ACTIVE status, the licensee shall actively perform the functions of an operator or senior operator on a minimum of (number)eight hour shifts or (number)twelve hour shifts per calendar quarter. (1.0)

b. If your license were to become inactive, you would have to complete a minimum of (number)hours of onshift functions under the direction of an active license holder. (0.5)

c. The onshift time noted in part b. above must include the completion of two specific tasks. Briefly STATE these TWO tasks. (1.0)

QUESTION 8.11 (1.50)

During Emergency Conditions, such as a fire in the Control Room, 10CFR 50.54x allows operators to deviate from license conditions or Technical Specifications.

a. TWO conditions must be satisfied before the deviation can be authorized. BRIEFLY STATE these TWO conditions. (1.0)

b. Such a deviation shall be approved, as a minimum, by what individual(s)? (0.5)

(***** CATEGORY 8 CONTINUED ON NEXT PAGE *****)

QUESTION 8.12 (1.50)

EPIP 300-1 provides guidance on worker radiation exposure during an Emergency:

a. State the allowed dose limit for life saving actions. (0.5)

b. A Shift Foreman volunteers to enter a HIGH RADIATION area during an emergency to search for missing personnel. His reason is that five years ago he entered the same area under similar circumstances and feels confident about what is needed. He received 90% of the Emergency Dose Limit during the previous event. Radiation Protection estimates a whole body exposure of 80% of the limit for the current planned entry. Can this individual be allowed to enter? (0.5) Why or Why Not? (0.5)

QUESTION 8.13 (3.00)

EPIP 300-5 provides thirteen actions that the Shift Engineer will take upon notification of an onsite personnel injury. STATE SIX of these actions, assuming personnel contamination and probable hospitalization of the injured person.

(***** END OF CATEGORY 8 *****)
(********** END OF EXAMINATION **********)

EQUATION SHEET

$f = ma$

$W = mg$

$E = mc^2$

$KE = \frac{1}{2} mv^2$

$PE = mgh$

$V_f = V_0 + at$

$M = \sqrt{\Delta P}$

$\Delta E = 931\ \Delta m$

$\dot{Q} = \dot{m} C_p \Delta t$

$\dot{Q} = UA\Delta t$

$P_{wr} = W_f \Delta h$

$P = P_0 10^{SUR(t)}$

$P = P_0 e^{t/T}$

$SUR = 26.06/T$

$SUR = 26\rho'\ell^* + (\beta - \rho)T$

$T = (\ell^*/\rho) + [(\beta - \rho)/\bar{\lambda}\rho]$

$T = \ell/(\rho - \beta)$

$T = (\beta - \rho)/(\lambda\rho)$

$\rho = (K_{eff}-1)/K_{eff} = \Delta K_{eff}/K_{eff}$

$\rho = [(\ell/(T K_{eff})] + [\bar{\beta}_{eff}/(1 + \bar{\lambda}T)]$

$P = (\Sigma\phi V)/(3 \times 10^{10})$

$\Sigma = \sigma N$

$v = s/t$

$s = V_0 t + \frac{1}{2} at^2$

$a = (V_f - V_0)/t$

$w = \theta/t$

Cycle efficiency = (Network out)/(Energy in)

$A = \lambda N$ $\qquad A = A_0 e^{-\lambda t}$

$\lambda = \ln 2/t_{\frac{1}{2}} = 0.693/t_{\frac{1}{2}}$

$t_{\frac{1}{2}} eff = \dfrac{[(t_{\frac{1}{2}})\ (t_b)]}{[(t_{\frac{1}{2}}) + (t_b)]}$

$I = I_0 e^{-\Sigma x}$

$I = I_0 e^{-\mu x}$

$I = I_0\ 10^{-x/TVL}$

$TVL = 1.3/\mu$

$HVL = -0.693/\mu$

$SCR = S/(1 - K_{eff})$

$CR_x = S/(1 - K_{effx})$

$CR_1(1 - K_{eff1}) = CR_2(1 - k_{eff2})$

$M = 1/(1 - K_{eff}) = CR_1/CR_0$

$M = (1 - K_{eff0})/(1 - K_{eff1})$

$SDM = (1 - K_{eff})/K_{eff}$

$\ell^* = 10^{-5}$ seconds

$\bar{\lambda} = 0.1$ seconds^{-1}

$I_1 d_1 = I_2 d_2$

$I_1 d_1^{\ 2} = I_2 d_2^{\ 2}$

$R/hr = (0.5\ CE)/d^2$ (meters)

$R/hr = 6\ CE/d^2$ (feet)

Water Parameters

1 gal. = 8.345 lbm.
1 gal. = 3.78 liters
1 ft^3 = 7.48 gal.
Density = 62.4 lbm/ft
Density = 1 gm/cm^3
Heat of vaporization = 970 Btu/lbm
Heat of fusion = 144 Btu/lbm
1 Atm = 14.7 psi = 29.9 in. Hg.
1 ft H_2O = 0.433 lbf/in^2

Miscellaneous Conversions

1 curie = 3.7×10^{10} dps
1 kg = 2.21 lbm
1 hp = 2.54×10^3 Btu/hr
1 mw = 3.41×10^6 Btu/hr
1 in = 2.54 cm
°F = 9/5°C + 32
°C = 5/9 (°F-32)
1 BTU = 778 ft-lbf

ANSWER 5.01 (1.50)

Either of following two methods:
T=1.443x Doubling Time [.75]
T=1.443x 65 sec
T=93.8 sec +/- 0.2 sec [.75]

or

P=P0et/T (See equation sheet)
ln P/P0=t/T [.75]
T=t/.693=65/.693=93.8 +/- .2 sec [.75]

REFERENCE

Dresden Lesson Plan Vol 4 Chapter 14.H.2
Dresden Lesson Plan Vol 1 Chapter 9.F.10
292003K105 292003K109 292003K108 292008K108 ..(KA's)

ANSWER 5.02 (2.00)

a. Direct fission yield [0.5] and from decay of I-135 (or TE-135) [0.5]

b. 7-11 hours [0.5]

c. 70 hours (+/- 5 hours) [0.5]

REFERENCE

Dresden Lesson Plan Vol 4 Chapter 14.K.2
292006K107 292006K103 ..(KA's)

ANSWER 5.03 (2.00)

Any 4 of the following:

1. Elimination of steam voids.
2. Moderator temperature change from hot conditions to ambient.
3. Reduced doppler effect.
4. Decreased control rod worth as the moderator cools.
5. Xenon decay

4@ [0.5 each]

(***** CATEGORY 5 CONTINUED ON NEXT PAGE *****)

REFERENCE

Dresden Lesson Plan Vol 3 Chapter 5.F.2
211000G004 211000A407 211000K503 ..(KA's)

ANSWER 5.04 (2.00)

a. TRUE [0.5]
b. TRUE [0.5]
c. FALSE [0.5]
d. TRUE [0.5]

REFERENCE

Dresden Exambank Question 12-020266
292008K130 292008K129 ..(KA's)

ANSWER 5.05 (2.00)

a. 2 [0.5]
b. 3 [0.5]
c. 3 [0.5]
d. 1 [0.5]

REFERENCE

Dresden Lesson Plan Thermo, Heat Transfer, Fluid Flow
Review Section J. Tech Spec Bases 3.5 I, J, and K.
293009K111 293009K109 293009K119 293009K107 ..(KA's)

(***** CATEGORY 5 CONTINUED ON NEXT PAGE *****)

ANSWER 5.06 (2.00)

(Any four of the following):

1. To condense turbine exhaust steam.
2. To condense any bypass valve steam.
3. To accomodate heater drains, extraction steam which may be bypassed to the condenser.
4. To retain condensate for @ two minutes to allow decay of short-lived activity.
5. To deaerate the condensate and provide a mechanism for the removal of fission gases.
6. To provide NPSH for the condensate pumps.

[0.5 each]

REFERENCE

Dresden Lesson Plan Vol 2 Chapter 2.E.1.

293007K108 ..(KA's)

ANSWER 5.07 (2.00)

At the jet pump nozzle section, the high velocity of the driving flow results in a low static pressure, thereby drawing the surrounding fluid (the driven flow) into the jet pump throat. [0.75]

In the mixer section, the driving and driven flows are combined with a resultant increase in pressure. [0.5]

In the diffuser section, velocity head of the mixed fluid is converted to a static head achieving the resultant discharge head. [0.75]

REFERENCE

GE Thermo, Heat Transfer, and Fluid Flow Manual Chapter 9 Question 19. Dresden Exambank Question 12-020446.

293008K126 ..(KA's)

(***** CATEGORY 5 CONTINUED ON NEXT PAGE *****)

ANSWER 5.08 (2.00)

a. TRUE [0.5]
b. TRUE [0.5]
c. TRUE [0.5]
d. TRUE [0.5]

REFERENCE

Dresden Lesson Plan Vol 1 Chapter 2.E.2. Nuclear Energy Training Manual Module 3 Unit 9.5.

290002K503 ..(KA's)

ANSWER 5.09 (1.50)

Any three of the following:

1. Pumps are physically located below normal reactor vessel water level.

2. Minimum speed interlock on feedflow <20%.

3. Pump trip on a low reactor water level.

4. Pump trip with suction valve not full open.

3@ [0.5 each]

REFERENCE

Dresden Lesson Plan Vol 1 Chapter 15.G. Dresden Exambank Question 12-020433.

293006K110 ..(KA's)

(***** CATEGORY 5 CONTINUED ON NEXT PAGE *****)

ANSWER 5.10 (1.50)

a. More negative [0.5]
b. Less negative [0.5]
c. Less negative [0.5]

REFERENCE

Nuclear Energy Training Manual Module 3 Table 9.2-1

292004K113 292004K109 292004K102 ..(KA's)

ANSWER 5.11 (1.50)

a. CRW increases
b. CRW decreases
c. no effect

REFERENCE

Nuclear Training Manual Module 3 Chapter 9 Figure 46 and Table 9.2-1. Dresden Exambank Question 12-020888.
292005K109 ..(KA's)

(***** CATEGORY 5 CONTINUED ON NEXT PAGE *****)

ANSWER 5.12 (3.00)

a. Decreases [0.25]
Less steam flow, therefore less pressure drop through the mainsteam lines. [0.50]

b. Decreases [0.25]
Due to less extraction steam to the feedwater heaters. [0.50]

c. Decreases [0.25]
Proportion of feedwater flow to moister separator/dryer return flow decreases which causes a reduction in subcooling at recirc pump suction. [0.50]

d. Increases [0.25]
With the same amount of cooling water from the circulating water system through the main condenser and less heat load, condensate will be cooler. [0.50]

REFERENCE

Dresden Exambank Questions 12-020445 and 12-020434.

202001K402 259001K104 923007K109 293006K110 ..(KA's)

ANSWER 5.13 (2.00)

Any four of the following:

1. Formation of voids (Void coefficient)
2. Fuel heatup (Doppler coefficient)
3. Moderator heatup (Moderator temperature coefficient)
4. Xe buildup
5. Sm buildup

4@ [0.5 each]

REFERENCE

Dresden Exambank Question 12-020281

292004K102 292004K101 292006K119 292006K109 ..(KA's)

(***** END OF CATEGORY 5 *****)

ANSWER 6.01 (2.00)

a. 503" above vessel bottom head or bottom edge of steam separator lower skirt. [0.5]

b. For use under accident conditions. i.e., @ 0 psig with the reciculation pumps tripped. [0.5]

c. Actual level is 7" less than indicated level [0.5] due the pressure drop across the dryer. [0.5]

REFERENCE

Nuclear Boiler Instrumentation Lesson Plan pg 3, 7, 14 and 15.

216000K508 216000K501 216000K122 ..(KA's)

ANSWER 6.02 (2.00)

a. 1) Valves 121, 123 open
2) Valve 120 opens to allow drive to settle
3) Valves 121, 123 close
4) Valve 120 closes [0.25 each]

b. 1) Scram pilot valves open (vent)
2) Scram inlet & outlet valves open (126 & 127) [0.5 each]

REFERENCE

Control Rod Hydraulic System Lesson Plan pg 4-8.

201001K405 201001K410 ..(KA's)

(***** CATEGORY 6 CONTINUED ON NEXT PAGE *****)

ANSWER 6.03 (3.00)

a. 1) Enable an alternate limit.
   2) Insert rods until error clears.
   3) Declare rod out of service and drive it to 00.
   4) Withdraw rod to its proper position. [0.5 each]

b. Steam flow and feed flow (from FWLC system) [0.5]

c. The computer UPS. [0.5]

REFERENCE

Rod Worth Minimizer Lesson Plan pg 15 &17.

201006K201 201006K511 201006K406 201006K401 ..(KA's)

ANSWER 6.04 (2.00)

a. Four channels are needed for the one out of two twice RPS logic; two more are needed to allow one in each channel to be bypassed for maintenance. (1.0)
b. Each loop flow element converter provides half the input into the S=.58Wd+58.5(single loop operation) flow biased setpoint. As the running pump speed is reduced to minimum, Wd approaches "0". Thus the scram setpoint approaches the natural circulation line. (Alternate wording accepted). (1.0)

REFERENCE

Operating Order #12-88, Recirculation and APRM lesson plans, T/S table 2.1-3
215005K607 215005K407 215005K101 ..(KA's)

ANSWER 6.05 (2.00)

a. False
b. True
c. True
d. True (0.5 each)

(***** CATEGORY 6 CONTINUED ON NEXT PAGE *****)

REFERENCE

EHC lesson plan
241000K407 241000K306 241000K302 ..(KA's)

ANSWER 6.06 (2.00)

a. FALSE
b. TRUE
c. TRUE
d. TRUE

REFERENCE

AC Electrical Distribution Lesson Plan

264000G007 264000K101 262001K502 262001K306 ..(KA's)

ANSWER 6.07 (1.00)

The fuel oil cools the injectors. When the fuel cutoff valve was used to shut down the diesel, the injectors may have been damaged.

REFERENCE

Emergency Diesel Lesson Plan.

264000G010 ..(KA's)

ANSWER 6.08 (3.00)

a. 1) 2# drywell pressure (0.5)
2) -59" level (0.5)
3) Undervoltage on emergency bus (0.5)
4) 5 minutes degraded voltage (3952v) (0.5)

b. Prevents engine shutdown due to low oil or water pressure, high water temperature, or positive crankcase pressure. (1.0)

(***** CATEGORY 6 CONTINUED ON NEXT PAGE *****)

REFERENCE

Emergency Diesel Generator Lesson Plan pg 9.

264000K402 264000K408 ..(KA's)

ANSWER 6.09 (2.00)

a. 1) 350 degrees F +/- 5 degrees Recirc loop temperature (0.5)
   2) +8" level (0.5)

b. 1) 345 degrees F +/- 5 degrees suction temperature (0.5)
   2) 4 psig suction pressure (0.5)

REFERENCE

SDC System Lesson Plan pg 5-7.

205000K404 205000K403 205000K401 ..(KA's)

ANSWER 6.10 (2.00)

a. To bring the reactor to a shutdown condition from full power at any time in core life independent of the Control Rod Drive Hydraulic System. (1.0)

b. 1) Pump discharge pressure increase
   2) Pump indicating light illuminates
   3) Tank level decreases
   4) Squib lights extinguish (4@ 0.25 each)

REFERENCE

SLC Lesson Plan pg 2 & 15.

211000G001 211000A308 211000G004 ..(KA's)

(***** CATEGORY 6 CONTINUED ON NEXT PAGE *****)

ANSWER 6.11 (4.00)

a. 1) -59" level (low-low) (0.5)
   2) 2psig Drywell pressure (0.5)

b. 1) Reactor pressure low (80 psig) (0.4)
   2) Turbine area high temperature (200 degrees F) (0.4)
   3) Turbine steam flow high (300%) (0.4)

c. 1) High level (+48")
   2) High exhaust pressure (125 psig)
   3) Low suction pressure (-9.6" Hg)
   4) Remote trip P/B
   5) Remote overspeed trip (electrical)
   6) Mechanical overspeed trip
   7) Local trip lever

(Any 6 @ 0.3 each)

REFERENCE

HPCI Lesson Plan pg 37.

206000K401 206000K402 206000K407 ..(KA's)

(***** END OF CATEGORY 6 *****)

ANSWER 7.01 (1.50)

1). Discontinue rod movement and recirculation flow changes (i. e., power changes). (.75)
2). Immediately contact a Qualified Nuclear Engineer(QNE) for evaluation. IF a QNE cannot be reached, reduce power level 50 Mwe with recirculation flow or as determined by the Shift Supervisor. (.75)
NOTE: Will accept a reasonable discussion of paragraph E of DOA 300-12, i.e., Return the rod to it's required position ASAP, for one immediate action (.75).

REFERENCE

DOA300-12
201003G014 ..(KA's)

ANSWER 7.02 (2.50)

a. 1). Low Pressure Heater Bays
2). High Pressure Heater Bays
3). Moisture Separator Areas
4). Turbine Pipeway
5). X-areas
6). Drywell
7). Behind the biological shield on the turbine floor
8). Steam Jet Air Ejector Rooms
9). Recombiner Room
10). Condensers (Any 6 @ 0.25 each)
b. 1). The Shift Engineer will stop hydrogen addition until the work in the area is completed.
2). Verify that a log will be maintained in the Shift Engineer's Office, documenting entries and exits.
(0.5 each)

REFERENCE

DAP 12-8
294001K115 294001K104 294001K103 ..(KA's)

(***** CATEGORY 7 CONTINUED ON NEXT PAGE *****)

ANSWER 7.03 (2.00)

a. No work is being done which has the potential for draining the reactor vessel. (0.5)
b. two (.25)
one (.25)
c. three (0.5)
d. Standby Gas Treatment System (0.5)

REFERENCE

DFP 800-1, Technical Specifications 3.10
290001K104 209001G005 215004G005 ..(KA's)

ANSWER 7.04 (2.50)

a. 1). Reactor startups
2). Reactor shutdown(including scrams)
3). Power changes of 500MWT (or 20%) or more within one hour.
(0.5 each)
b. To verify offsite release rates are maintained within 10CFR limits. (1.0) WILL ACCEPT A REASONABLE DISCUSSION OF THE INCREASED CONCERN FOR THE PROBABILITY OF FUEL DAMAGE DURING RAPID POWER CHANGES AND THE NEED, THEREFORE, TO VERIFY COOLANT ACTIVITY CHANGES, IF ANY.

REFERENCE

DGP 3-1 and Technical Specifications Table 4.8.1 & ASSOCIATED BASES
271000G006 271000G010 271000G002 295006G001 ..(KA's)

ANSWER 7.05 (2.50)

a. 1). Verify all rods in; ~~insert any not full in.~~
2). Initiate manual scram and place the Mode Switch in Shutdown.
3). Maintain water level +8 to +40 inches.
4). ~~If all rods are in,~~ Verify turbine and generator tripped.
5). Verify Recirculation pump runback.
6). Verify Auxiliary Power transferred.
7). Insert SRM/IRM's.
(Any five @ 0.3 each)
b. DEOP 100 series, Reactor Control, and 200 series, Containment control. (0.5 each)

(***** CATEGORY 7 CONTINUED ON NEXT PAGE *****)

REFERENCE

DGP 2-3, DEOP 100 and 200
295006G011 295006G010 ..(KA's)

ANSWER 7.06 (2.00)

a. The lowest pressure at which steam flow through SRV's will remove all decay heat by steam cooling (from a completely uncovered core ten minutes after shutdown with no clad temperature in excess of 1500F). (Exact wording not required). (1.0)
b. To control flooding rate (this avoids power excursions and excessive thermal and hydraulic stresses on the RPV). (1.0)

REFERENCE

DEOP 400-3
295031A204 295031G007 295031K304 295031K101 ..(KA's)

ANSWER 7.07 ~~(2.50)~~ 1.0

a. 1). Engine Overspeed (1010 rpm) (0.5)
2). Generator Differential current (0.5)
~~b. 1). 4KV breaker closes onto the bus if the bus has an undervoltage condition without fault.~~
~~2). D/G cooling water pump starts.~~
~~3). D/G room vent fan starts.~~
deleted
~~4). Lube oil circulating pump stops.~~
~~5). Red "RUN" light comes on @ 902-8.~~
~~6). D/G RUNNING alarm is annunciated @ 902~~-8.
(~~Any FIVE~~ @ 0.3 each)

REFERENCE

DOP 6600-5
~~264000A303~~ ~~264000A306~~ ~~264000A301~~ 264000K403 ..(KA's)

(***** CATEGORY 7 CONTINUED ON NEXT PAGE *****)

ANSWER 7.08 (3.00)

a. Circulating current may cause bus overload conditions.(0.5)
b.1). Verify a reactor scram; enter DEOP 100, "Reactor Control".
2). Verify D/G's start and tie onto bus 23-1 and 24-1.
3). Start turbine Emergency Bearing Oil Pump.
4). Verify restart of RBCCW pump(s).
5). Restart Drywell Cooler Fans
6). Reset the undervoltage relays on buses 28 and 29

(Any five @0.5 each)

REFERENCE

DOP 6100-1 and DGA-12
262001G014 262001A102 262001K404 262001K501 ..(KA's)

ANSWER 7.09 (2.00)

a. To assure the battery will last four hours as designed.
b. A LOCA would increase the cooldown rate, which would aid in getting to Cold Shutdown within the life of the battery.
(1.0 each)

REFERENCE

DGA-13
263000G010 263000A101 263000K401 263000K201 ..(KA's)

ANSWER 7.10 (1.00)

To reduce the idle loop cooldown rate(and minimize reheat time to meet T/S 50F differential temperature startup limitation.

REFERENCE

DOA 202-1
202001G010 202001A203 ..(KA's)

(***** CATEGORY 7 CONTINUED ON NEXT PAGE *****)

ANSWER 7.11 (1.50)

As vacuum increases above 7" Hg, the bypass valves may open/cycle causing a level/power transient and possible scram. (Exact wording not required)

REFERENCE

DGP 1-1 pg 12
241000G010 241000A114 241000K101 ..(KA's)

ANSWER 7.12 (2.00)

1). Take SE log, proceed to the TSC as Station Director.
2). Make initial GSEP notifications
3). Dispatch the Fire Brigade to combat the fire and assess damage.
4). Coordinate the activities of the fire brigade and Safe Shutdown team. (four @ 0.5 each)

REFERENCE

EPIP 200-20 pg 3
294001A116 294001A112 ..(KA's)

(***** END OF CATEGORY 7 *****)

ANSWER 8.01 (1.50)

1. A licensed operator has been specifically assigned to the unit. (0.5)
2. This same operator remains in the line of sight of the Unit's front panels. (0.5)
3. The licensed operator periodically (5 to 10 minutes) returns to his unit to verify that it remains "stable and under control". (0.5)

REFERENCE

DAP 7-2 paragraph 8 a.(4)
209000G001 294001A109 ..(KA's)

ANSWER 8.02 (2.00)

a. red
b. requestor(originator)
c. Technical Staff or engineer
d. Second Shift Supervisor(Shift Foreman or Shift Engineer)

0.5 points each

REFERENCE

DAP 7-4 b.1.c, b.1.d, b.2.d, b.3.c
294001K107 294001K102 ..(KA's)

ANSWER 8.03 (2.50)

a. Only one hatch door is opened at a time. (0.5) Exact wording not required.
b. Any four of the following: (0.5 each)
1). Containment Makeup and Inerting out of service.
2). TIP system out of service.
3). Hydrogen injection out of service. (for 35 minutes)
4). All drywell coolers on.
5). Drywell lighting turned on.

(***** CATEGORY 8 CONTINUED ON NEXT PAGE *****)

REFERENCE

DAP 7-11 B.7, B.10
294001K114 294001K113 294001A110 223001G010 223001G001
..(KA's)

ANSWER 8.04 (~~1.00~~ 1.50)

A rod that cannot be moved with normal drive pressure (0.5) or with excessive scram times (0.5), OR AN UNCOUPLED CONTROL ROD (DEPENDING ON POWER LEVELS AND RECOUPLING EFFORTS (0.5).

REFERENCE

Technical Specification 3.3.A.2, BASES 3.3.c, T.S. 3.3.B.1.a & b
201001G005 201001G010 201001G006 ..(KA's)

ANSWER 8.05 (1.00)

five
Station Security Administrator

REFERENCE

DAP 13-10
294001A112 294001A110 ..(KA's)

ANSWER 8.06 (2.00)

a. 1). Activity (or Radioactivity)
2). Chlorides
3). Conductivity (3 @ 0.5 EA)
b. Boiling effects result in deaeration of the reactor water thus maintaining dissolved oxygen at low levels. (exact wording not required). (0.5)

REFERENCE

Technical Specifications 3.6.c and it's BASES.
204000G006 204000K301 ..(KA's)

(***** CATEGORY 8 CONTINUED ON NEXT PAGE *****)

ANSWER 8.07 (2.00)

a. True
b. True
c. False
d. False (0.5) each

REFERENCE

Operating Order #14-88
294001A111 ..(KA's)

ANSWER 8.08 (2.00)

a. False
b. False
c. True
d. False

REFERENCE

DAP 3-5 sections B1 and B2
294001K102 ..(KA's)

ANSWER 8.09 (2.50)

a. 2 SRO's (0.5)
3 RO's (0.5)
1 SCRE (0.5)
b. two hours, provided immediate action is taken to restore the shift crew to within the minimum requirements. (1.0)

REFERENCE

Technical Specifications Table 6.1.1
294000A110 294001A109 ..(KA's)

(***** CATEGORY 8 CONTINUED ON NEXT PAGE *****)

ANSWER 8.10 (2.50)

a. seven (0.5)
five (0.5)
b. 40 (0.5)
c. 1). A complete plant tour (0.5)
2). All required shift turnover procedures (0.5)

REFERENCE

10CFR55.53 e and f.
201000G001 294001K116 ..(KA's)

ANSWER 8.11 (1.50)

a. 1). The deviation is needed to protect the health and safety of the public. (0.5)
2). No action, consistent with licensed requirements, that can provide adequate or equivalent protection is immediately apparent. (0.5) (Alternate wording accepted).
b. A licensed SRO. (one half credit given for a titled position, such as Shift Engineer). (0.5)

REFERENCE

EPIP 200-20 paragraph E-2
294000A112 294000A110 294001A116 ..(KA's)

ANSWER 8.12 (1.50)

a. 75 REM (0.5)
b. No (0.5) Emergency Limits are "Once in a lifetime". This individual will exceed the limit. (0.5) (Exact wording not required).

REFERENCE

EPIP 300-1 section B.1.b
294001K103 ..(KA's)

(***** CATEGORY 8 CONTINUED ON NEXT PAGE *****)

ANSWER 8.13 (3.00)

1). Notify Radiation Protection
2). Dispatch a Shift Supervisor to the scene to direct first aid efforts and coordinate other assistance.
3). Send other personnel trained in first aid as requested.
4). Arrange for ambulance service.
5). Notify Security that an ambulance has been called.
6). Dispatch Radiation Protection to the main gate to coordinate with the ambulance for dosimetry and directions to the injured's location.
7). Declare an Unusual Event.
8). Notify the Station Director.
9). Notify the hospital of the injury and contamination.
10). Assure Radiation Protection accompanies the injured person to the hospital.
11). Arrange for a management person to go to the hospital with the injured person.
12). Make a second call to the hospital, confirming the initial report.
13). Notify the Operating Engineer or Personnel Administrator of the situation for required followup.

Any six @ 0.5 points each. Exact wording not required.

REFERENCE

EPIP 300-5
294001A116 ..(KA's)

(***** END OF CATEGORY 8 *****)
(********** END OF EXAMINATION **********)

QUESTION	VALUE	REFERENCE
5.01	1.50	ZZZ0000026
5.02	2.00	ZZZ0000027
5.03	2.00	ZZZ0000028
5.04	2.00	ZZZ0000029
5.05	2.00	ZZZ0000030
5.06	2.00	ZZZ0000034
5.07	2.00	ZZZ0000035
5.08	2.00	ZZZ0000036
5.09	1.50	ZZZ0000037
5.10	1.50	ZZZ0000038
5.11	1.50	ZZZ0000039
5.12	3.00	ZZZ0000043
5.13	2.00	ZZZ0000044
	25.00	
6.01	2.00	ZZZ0000031
6.02	2.00	ZZZ0000032
6.03	3.00	ZZZ0000033
6.04	2.00	ZZZ0000040
6.05	2.00	ZZZ0000041
6.06	2.00	ZZZ0000042
6.07	1.00	ZZZ0000045
6.08	3.00	ZZZ0000046
6.09	2.00	ZZZ0000047
6.10	2.00	ZZZ0000048
6.11	4.00	ZZZ0000049
	25.00	
7.01	1.50	ZZZ0000014
7.02	2.50	ZZZ0000015
7.03	2.00	ZZZ0000016
7.04	2.50	ZZZ0000017
7.05	2.50	ZZZ0000018
7.06	2.00	ZZZ0000019
7.07	2.50	ZZZ0000020
7.08	3.00	ZZZ0000021
7.09	2.00	ZZZ0000022
7.10	1.00	ZZZ0000023
7.11	1.50	ZZZ0000024
7.12	2.00	ZZZ0000025
	25.00	
8.01	1.50	ZZZ0000001
8.02	2.00	ZZZ0000002
8.03	2.50	ZZZ0000003
8.04	1.00	ZZZ0000004
8.05	1.00	ZZZ0000005
8.06	2.00	ZZZ0000006
8.07	2.00	ZZZ0000007
8.08	2.00	ZZZ0000008
8.09	2.50	ZZZ0000009
8.10	2.50	ZZZ0000010

QUESTION	VALUE	REFERENCE
8.11	1.50	ZZZ0000011
8.12	1.50	ZZZ0000012
8.13	3.00	ZZZ0000013
	25.00	
	100.0	