

Attachment 1 to AECM-84/0180

Emergency Assessment Training Examination

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14-S-01-4	Rev. 1
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EXAMINATION

(Student Name) \_\_\_\_\_

RTYPE
E2.07

TITLE
-

RCVK
(SSAN)

XREF
------

DATE \_\_\_\_\_

EXAM SCORE \_\_\_\_\_

Total Points: 20.25

Actual Points: \_\_\_\_\_

- EAL-1      2 pts.      1. Considering core fuel damage, indicate the appropriate EAL.
- A. degraded core with loss of coolant geometry \_\_\_\_\_.
  - B. severe loss of fuel cladding \_\_\_\_\_.
  - C. fuel damage indication \_\_\_\_\_.
  - D. loss of 2 of 3 fission product barriers with a potential loss of the 3rd barrier \_\_\_\_\_.
- EAL-2      2 pts.      2. Considering "loss of 2 of 3" fission product barriers in 1D above, what boundaries or parameters are used to define this condition?
- A. \_\_\_\_\_.
  - B. \_\_\_\_\_.
  - C. \_\_\_\_\_.
- EAL-3      2 pts.      3. Indicate the appropriate EAL
- A. MSL break outside containment w/o(without) isolation \_\_\_\_\_.
  - B. MSL break inside containment with isolation \_\_\_\_\_.
  - C. RCIC steam line break outside of containment w/o isolation \_\_\_\_\_.

- EAL-4      2 pts.      4. Considering major A.C. electrical failures, what initiating conditions would require
- A. Site Emergency declaration?
  - B. Alert declaration?
- EAL-5      2 pts.      5. Considering fire, what initiating condition would require
- A. Alert declaration?
  - B. Site Emergency declaration?
- EAL-6      2 pts.      6. Under what circumstance would an overexposed and/or contaminated injured individual be considered an Unusual Event?
- EAL-7      1.5 pts.      7. As an Operator, how would you handle a security threat given to you over the phone? What EAL would this require?
- EAL-8      1 pt.      8. Under natural events, what natural events would constitute declaring an Alert?
- EAL-9      3.75 pts.      9. Under "other" categories, list five(5) initiating conditions along with the      for each.
- EAL-10      2 pts.      10. Why should abnormal Primary Coolant Chemistry limits as defined in EPP-1 constitute an Unusual Event situation?

Attachment 2 to AECM-84/0180

Systems Training and Examinations



# GRAND GULF NUCLEAR STATION

## SHIFT ADVISOR TRAINING

### GRAND GULF TECHNOLOGY

#### I. INTRODUCTION

This outline describes the systems training for shift advisors. Systems training is a three week self-study course.

#### II. PURPOSE

The purpose of this course is to cover the Grand Gulf Nuclear Station systems with an emphasis on safety systems and the differences between a BWR-4 and a BWR-6.

#### III. CONTENT

Because the course is self-study, systems to be covered are assigned on a weekly basis. Upon the completion of each week of systems, an exam of 1 to 2 hours in length will be given. Systems assigned for each week of self-study are per the following list.

##### A. Week 1 Systems:

- |     |        |                                     |
|-----|--------|-------------------------------------|
| 1.  | B13    | Nuclear Boiler and Vessel Internals |
| 2.  | B21    | Vessel Instrumentation              |
| 3.  | B33-1  | Recirculation System                |
| 4.  | B33-2  | Recirculation Flow Control System   |
| 5.  | C11-1A | Control Rod Drive Hydraulic System  |
| 6.  | C11-1B | Control Rod Drive Mechanism System  |
| 7.  | C11-2  | Rod Control and Information System  |
| 8.  | C41    | Standby Liquid Control System       |
| 9.  | C51-1  | Source Range Monitor System         |
| 10. | C51-2  | Intermediate Range Monitor System   |
| 11. | C51-3  | Local Power Range Monitor System    |
| 12. | C51-4  | Average Power Range Monitor System  |
| 13. | J11    | Nuclear Fuel                        |

## B. Week 2 Systems:

- 14. C71 Reactor Protection System
- 15. D17 Process Radiation Monitoring System
- 16. E12 Residual Heat Removal System
- 17. E21 Low Pressure Core Spray System
- 18. E22 High Pressure Core Spray System
- 19. E22-1 Automatic Depressurization System
- 20. E30 Suppression Pool Makeup System
- 21. E32 MSIV Leakage Control System
- 22. E38 Feedwater Leakage Control System
- 23. E51 Reactor Core Isolation Cooling System
- 24. E61 Combustible Gas Control System
- 25. G33/36 Reactor Water Cleanup System
- 26. G41/46 Fuel Pool Cooling and Cleanup System
- 27. T48 Standby Gas Treatment System

## C. Week 3 Systems:

- 28. L11 Plant DC System
- 29. M41 Containment Cooling System
- 30. M41-1 Containment System
- 31. M51 Drywell Cooling System
- 32. M71 CTMT and DW Instrumentation and Control
- 33. N11 Main and Reheat Steam System
- 34. N19 Condensate System
- 35. N21 Feedwater System
- 36. N22/P60 Condensate and Suppression Pool Cleanup System
- 37. N32-2 Electro-Hydraulic Control Logic System
- 38. N62 Condenser Air Removal System
- 39. N64 Low Temperature Offgas System
- 40. N71 Circulating Water System
- 41. P41 Standby Service Water System
- 42. P42 Component Cooling Water System
- 43. P44 Plant Service Water System
- 44. P75 Div. I/II Standby Diesel Generators

- 45. PS1 Div. III Standby Diesel Generator
- 46. R20 Normal AC Power System
- 47. R21 ESF Power System

#### IV. MATERIALS

Each student is given a copy of the Grand Gulf Nuclear Station System Lesson Notes for each of the applicable systems. Additionally, a copy of the System Descriptions are made available for use as reference material.

#### V. FSAR REQUIREMENTS

The FSAR does not address training for Shift Advisors, so no FSAR requirements are met by this course.

- VI. Successful completion of this course meets the commitment for Systems Training for Shift Advisors per the November 23, 1983 letter, AECM-83/0750, to the NRC.

SHIFT ADVISOR TRAINING  
Grand Gulf Technology Exam  
GGT 8405-02  
Week 1

- |           |          |     |  |
|-----------|----------|-----|--|
| B13/21-19 | (3.0 pt) | 1.  | Label the attached drawing B13/21-19A.   |
| B13/21-29 | (1.5 pt) | 2.  | What is the function of the steam line flow restrictor? To what value is steam flow limited?   |
| B13/21-26 | (1.5 pt) | 3.  | Will a level indicator calibrated for operating conditions give an accurate reading as the vessel water cools down? Explain your answer.   |
| B13/21-27 | (3.0 pt) | 4.  | List the five (5) ranges of vessel level instrumentation. Give the ranges referenced to instrument zero and state the Rx condition each is used for.   |
| B33-23    | (3.0 pt) | 5.  | Preparing for a Rx startup, the operator pushes the start button on CB-5 for Recirc Pump A. Feedwater flow is less than 30% and all other interlocks are met. Basically describe what will happen. |
| B33-24    | (3.0 pt) | 6.  | a) List the indications you would receive if Recirc Pump A-#2 seal completely failed.<br><br>b) Would you expect to receive any other drywell or containment alarms shortly afterward?             |
| B33-25    | (2.0 pt) | 7.  | What are the vessel thermal shock interlocks? List the setpoints and where they are measured.  |
| B33-26    | (2.0 pt) | 8.  | List three (3) things that will cause the recirc pumps to down shift hi to lo speed. List setpoints.   |
| J11-31    | (2.0 pt) | 9.  | List five (5) ways to determine proper fuel assembly orientation in the core.  |
| J11-33    | (2.0 pt) | 10. | Where are the fuel assembly water rods located? How many are there in each assembly, and what is their purpose?  |

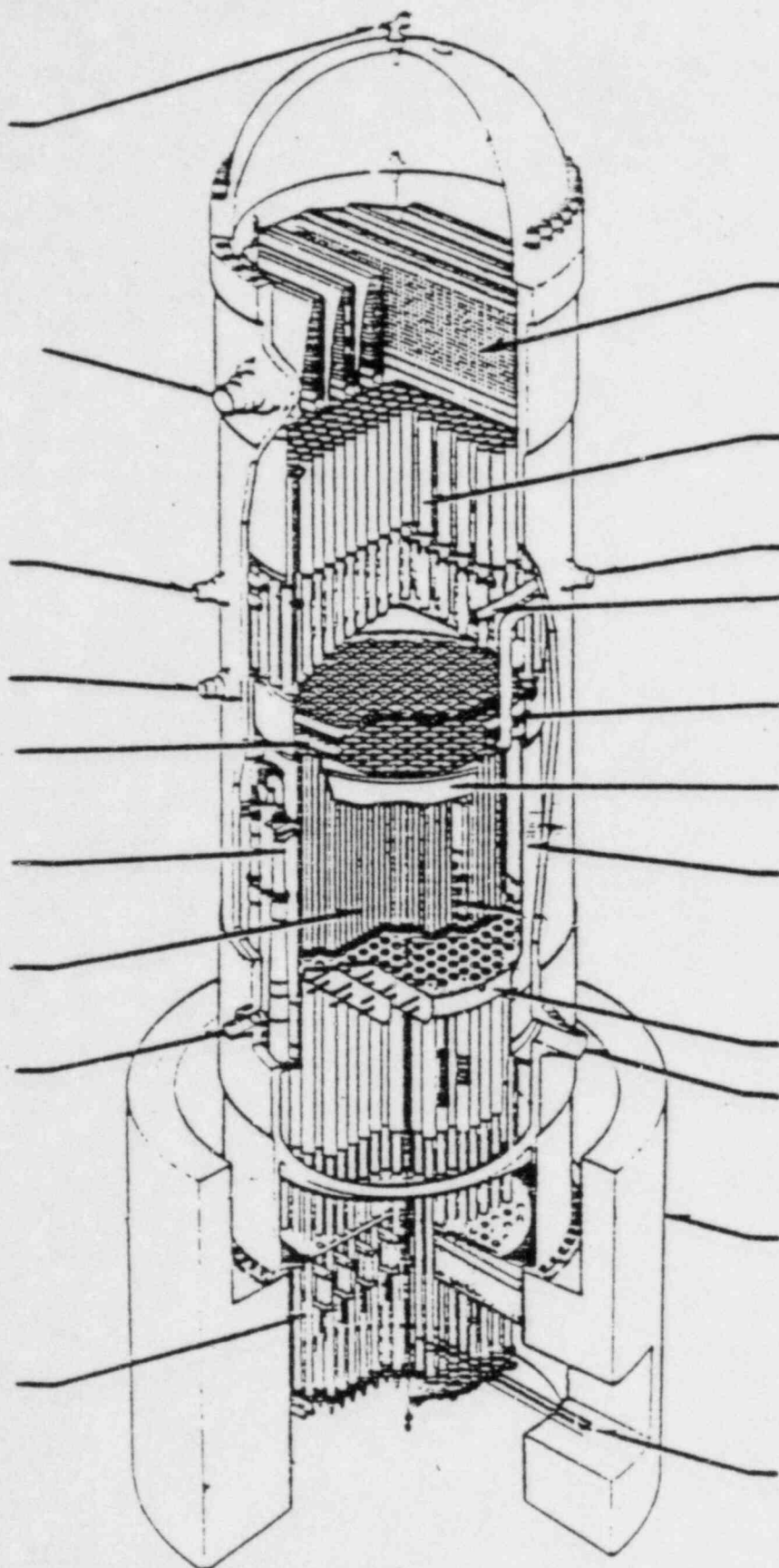


Figure 1. Reactor Vessel

B 13/24 - 19A



- |           |          |     |   |
|-----------|----------|-----|---|
| C11-H-33  | (1.5 pt) | 11. | What is the purpose of the stabilizing valves in the CRD Hydraulic System? How many valves are there and how many activate on an insert signal?   |
| C11-H-34  | (1.0 pt) | 12. | What is the purpose of the restricting orifice in the CRD Hydraulic System charging water header? Why is a check valve included in the header?  |
| C11-M-06  | (1.0 pt) | 13. | What is the purpose of the CR velocity limiter?   |
| C11-M-17  | (1.0 pt) | 14. | What is the purpose of the ball check valve in the CRDM? When does it function?   |
| C11-R-15  | (1.5 pt) | 15. | With regard to the RC&IS System, what is the significance of the LPSP, LPAP, HPSP. Give setpoints and limits (not rod pattern limits).  |
| C41-15    | (2.0 pt) | 16. | List when SLC must be injected by Plant Procedures.   |
| C41-16    | (2.0 pt) | 17. | Describe the operation of SLC System upon initiation and include how the operator verifies SLC is injecting into the RPV after initiation.  |
| C51-AV-14 | (2.5 pt) | 18. | Answer the following for each of the subsystems of the neutron monitoring system (SRM, IRM, LPRM, APRM):<br><br>a) number of detectors or channels<br>b) type of detector<br>c) method used to determine power<br>d) method used to compensate for gammas<br>e) units (output)<br>f) scale (output) |
| C51-S-15  | (2.0 pt) | 19. | What conditions in the SRM monitor must the operator verify before Rx startup?  |



- C51-IR-16 (1.0 pt) 20. What are the purposes of the Mean Square Analog Unit in the IRM System?
- C51-LPRM-13 (2.0 pt) 21. How can the LPRM System give representative values of heat flux ( $\text{w/cm}^2$ ) at every uncontrolled gap? Give the LPRM core axial locations referenced to BAF.
- C51-AV-15 (1.5 pt) 22. What minimum LPRM inputs are required to an APRM channel to keep it from being declared inop?
- C51-T-7 (2.0 pt) 23. Name the major components of the TIP System and briefly describe the purpose of each.

# EXAMINATION

## SHIFT ADVISOR TRAINING

GGT-8405-02

WEEK 2

- |          |          |     |   |
|----------|----------|-----|---|
| C71-3    | 1.0 pt.  | 1.  | What is the function of the "Scram Discharge Volume"?   |
| C71-4    | 2.0 pts. | 2.  | According to Technical Specifications, what is the purpose of the reactor protection system? (T.S. Basis)                                       |
| D17-2    | 2.0 pts. | 3.  | List the processes that are monitored by the Process Radiation Monitoring System.   |
| D17-4    | 2.0 pts. | 4.  | List the Liquid Process Radiation Monitors. Include any automatic actions which function to safeguard the environment.                          |
| E12-2    | 2.0 pts. | 5.  | What are five basic modes of operation of the RHR System?   |
| E12-9    | 1.5 pts. | 6.  | When would the Steam Condensing Mode of the RHR System be used? Describe the flowpath for the Steam Condensing Mode.                            |
| E21-6    | 2.5 pts. | 7.  | What actions take place on a LPCS initiation?   |
| E21-5    | 1.0 pt.  | 8.  | Why is there a jockey pump in the LPCS System?  |
| E22-7    | 2.0 pts. | 9.  | How is a minimum volume of water insured for the HPCS System? What would happen if all this water was used?                                     |
| E22-4    | 1.5 pts. | 10. | What will cause initiation of the HPCS?   |
| E22-1-11 | 1.0 pt.  | 11. | What would the consequences be if the ADS control switch (keylock) was left in the "off" position on Panel 601?                                 |
| E30-4    | 5.0 pts. | 12. | What will cause the Suppression Pool Makeup Subsystems A and B to automatically initiate? Manual initiation?                                    |
| E30-9    | 2.0 pts. | 13. | What are the interlocks associated with the Suppression Pool Makeup System valves F001 A/B and F002 A/B and give the purpose of the interlocks. |
| E32/38-4 | 2.0 pts. | 14. | What happens when the outbd MSIV leak control system is initiated (Include interlocks).   |
| E32/38-3 | 2.0 pts. | 15. | What happens when the Feedwater leakage control system is initiated? (Include interlocks)   |

- E51-3 1.0 pt. 16. What will cause RCIC system to initiate?
- E51-4 3.0 pts. 17. What will cause the RCIC turbine to trip?
- E61-2 1.5 pts. 18. What are the three subsystems of the Combustible Gas Control System that will reduce the percent of  $H_2$  in the containment? How does each reduce the  $H_2$  concentration?
- G33/36-8 2.0 pts. 19. What conditions will cause an automatic trip of the RWCU pumps?
- G33/36-9 1.0 pt. 20. Explain the advantage of using the "Post-Pump" mode of operation.
- G41/46-1 1.0 pt. 21. What are the trips of the Fuel Pool Cooling pumps?
- G41/46-6 2.0 pts. 22. What supplies cooling water to fuel pool heat exchangers during normal operations? During loss of normal power operations? Provide detailed explanation.
- 11-12 2.0 pts. 23. What conditions will automatically initiate the SBGTS?

# SHIFT ADVISOR TRAINING EXAM

GGT 8405-02

Week 3

- |            |          |     |   |
|------------|----------|-----|---|
| L11-04     | (1.0 pt) | 1.  | How is the 250V Battery System different than any one of the 125V Battery Systems?  |
| M41-11     | (1.5 pt) | 2.  | What are the functions of the suppression pool?   |
| M41-28     | (1.0 pt) | 3.  | a) What are the design temperature and pressure for the drywell?<br><br>b) for the containment?   |
| M71-03     | (3.0 pt) | 4.  | Describe the Drywell Air Monitoring System.   |
| M71-12     | (2.0 pt) | 5.  | a) List the signals that will cause an auto isolation of the Containment and Drywell Isolation Subsystem.<br><br>b) List the signals that will cause an auto isolation of the Auxiliary Building Isolation Subsystem. |
| N11-04     | (1.5 pt) | 6.  | What is the purpose of the main steam moisture separator/reheaters? How do they work?   |
| N19-13     | (1.0 pt) | 7.  | a) What will cause an automatic isolation of Low Pressure Heater String?<br><br>b) Why is this isolation provided?  |
| N19-17     | (1.0 pt) | 8.  | List at least 5 loads that are supplied directly from the Condensate Makeup/Reject Header.  |
| N21/C34-04 | (1.0 pt) | 9.  | Describe the interlocks associated with the (F029 A/B) RFP suction valves.  |
| N21/C34-12 | (2.0 pt) | 10. | Concerning the programmed level of the Feedwater Control System:<br><br>a) What is the purpose?<br><br>b) Describe how this is accomplished.  |

- N22-04 (1.5 pt) 11. Condensate flow through the various in service demineralizers is regulated by a flow balancing system:
- a) What is the purpose of the flow balancing system?
  - b) Why do we need a flow balancing system?
- N32-01 (3.0 pt) 12. Describe the effects of increasing Rx pressure on a direct cycle BWR.
- N32-04 (1.0 pt) 13. What is the purpose of the bypass control unit of the EHC System?
- N62-04 (1.5 pt) 14. a) What is the normal and backup steam supply the SJAEs?
- b) What actions automatically occur when a low steam flow from the air ejector normal supply?
- N64-20 (1.0 pt) 15. List in order of flow path the major components of the OFF GAS.
- N71-01 (2.0 pt) 16. What are the starting interlocks for the circulating water pumps?
- P41-04 (2.0 pt) 17. What are the start signals which will start-up the A Standby Service Water System?
- P42-06 (2.0 pt) 18. a) How does the CCW System respond to a loss of offsite power during a LOCA?
- b) What loads can be supplied?
- P44/47-01 (2.0 pt) 19. List at least 10 loads served by the Plant Service Water System.
- R21-27 (1.5 pt) 20. List three (3) DG trips that are bypassed when the diesel starts due to an ECCS signal.
- R21-31 (1.5 pt) 21. List the signals and the associated setpoint that will automatically start the HPCS Division III Diesel Generator.

- R21-35 (1.0 pt) 22. What is the minimum day tank fuel capacity as required by Tech Specs for the HPCS DG?
- R20-13 (1.0 pt) 23. What are the voltage level designations for the normal AC Power Distribution System?
- R21-03 (1.0 pt) 24. What components supply power to the ESF buses and how many of the ESF buses can each supply?



Attachment 3 to AECM-84/0180

Simulator,  
Administrative Procedure,  
Technical Specification and  
Mitigation of Core Damage Training  
and Examinations

## GRAND GULF NUCLEAR STATION

### SHIFT ADVISOR TRAINING

#### I. INTRODUCTION

This outline describes the four parts of a program of training for shift advisors. The program included training in the following areas: Simulator, Administrative Procedures, Technical Specifications, and Mitigated Core Damage. The duration of the program was 7 days.

#### II. PURPOSE

The purpose of this course was to provide familiarization training for GCNS plant specific items. The guidelines for this course were listed in memo IPC 83-10,448. The GCNS Systems Course and Emergency Assessment Training addressed in the memo were covered in separate courses and are documented in separate course packages.

#### III. CONTENT

This training program covered four areas. Each area is discussed in the order in which training was conducted.

##### A. Simulator

Simulator training was 2 days in length. No performance exams were given. The following is a summary of the training conducted.

1-23-84

- Conducted a panel walkdown of all simulator panels discussing equipment layout and system operation.
- As an introduction to simulator training, inserted a spurious reactor scram and took no operator action. Discussed plant response. Inserted another spurious reactor scram and carried out immediate and subsequent operator actions. Discussed plant response.
- Discussed feedwater and feedwater control systems. Performed several feedwater control manipulations including single RFP trips, RFP startups, RFP controlled shutdowns, shifting feedwater controllers, and transferring level control to and from the startup level control valve.

## SHIFT ADVISOR TRAINING

- Discussed Recirc System and Recirc Control. Performed several Recirc System manipulations including FCV runbacks, resetting FCV runbacks, trip of one recirc pump, trip of both recirc pumps, associated technical specification LCO's, recirc pump starts, recirc pump downshifts, and shifting recirc controllers.

1-24-84

- Discussed the main turbine and EHC System including EHC logic. Performed a main turbine startup including rolling the turbine to 1800 RPM and loading the turbine to 300 MWe. Discussed main turbine startup limitations and TSE interface.
- Initiated and discussed plant response to the following malfunctions (casualties):
  1. recirc loop suction pipe rupture; performed this several times to analyze the effects of various size ruptures.
  2. Steam line rupture in the drywell.
  3. Feedwater line rupture outside containment.
  4. Fuel cladding leak.
  5. Steam line rupture in turbine building.
  6. Loss of feedwater flow - trip of both RFP's.
  7. ATWS: discussed EP-10, "Reactivity Control".
  8. Pressure control failure - Various combinations of bypass stop and control valve failures and main turbine stop and control valve failures.
  9. Loss of electrical buses.
  10. Main turbine trip.
- As a final evolution, discussed the steam condensing mode of RHR and placed the A loop of RHR in the steam condensing mode.

B. Administrative Procedures

The administrative procedure training was one day in length and covered selected portions of the following administrative procedures:

1. 01-S-01-1, Grand Gulf Nuclear Station Organizational Structure
2. 01-S-01-4, Operations Section Organizational Structure

## SHIFT ADVISOR TRAINING

3. 01-S-02-2, Control and Use of the GGNS Operations Manual
4. 01-S-03-1, GGNS Quality Program
5. 01-S-03-4, GGNS Quality Classifications
6. 01-S-06-1, Protective Tagging System
7. 01-S-06-2, Conduct of Operations
8. 01-S-06-3, Control of Temporary Alterations
9. 01-S-06-4, Access and Conduct in the Control Room
10. 01-S-06-5, Incident Reports/Reportable Events
11. 01-S-06-7, Containment and Drywell Access Control
12. 01-S-06-12, GGNS Surveillance Program
13. 01-S-06-14, Communications Plan
14. 01-S-07-1, Control of Work on Plant Equipment and Facilities
15. 01-S-07-2, Test and Retest Control
16. 01-S-07-4, Plant Changes and Modifications
17. 01-S-08-1, Administration of the GGNS Health Physics Program
18. 01-S-08-2, Exposure and Contamination Control
19. 01-S-08-3, Personnel Monitoring
20. 01-S-08-8, Alara Program
21. 01-S-10-1, Fire Protection Plan
22. 02-S-01-3, Responsibilities and Authorities of Operations Shift Personnel
23. 02-S-01-4, Shift Relief and Turnover
24. 02-S-01-5, Shift Logs and Records
25. 02-S-01-8, Component Identification and Labeling
26. 02-S-01-9, Key Control
27. 02-S-01-12, Station Operating Orders
28. 02-S-01-17, Control of Limiting Conditions for Operation

## SHIFT ADVISOR TRAINING

Upon completion of the above training, an exam of 1 to 2 hours in length was given.

C. Technical Specifications

The Technical Specifications training was 2½ days in length and covered all of Technical Specifications with the exception of section 4 (surveillance requirements) and the bases. Of those areas, only selected portions were covered. Upon completion of the above training, an exam of 1 to 2 hours in length was given.

D. Mitigated Core Damage

Mitigated Core Damage training was 1½ days in length and placed special emphasis on GGNS plant specifics. Upon completion of this training, an exam of 1 to 2 hours in length was given.

IV. MATERIALS

The Simulator Training required no materials. For the Administrative Procedure training, a copy of all 28 procedures was given to each student. For the Technical Specification training, a copy of Technical Specifications updated through amendment 11 was given to each student. For the Mitigated Core Damage training, a copy of the Grand Gulf Nuclear Station Lesson Notes covering Mitigated Core Damage was given to each student.

V. FSAR REQUIREMENTS

The FSAR does not address training for Shift Advisors, so no FSAR requirements are met by this course.



TECHNICAL SPECIFICATIONS EXAM  
Shift Advisor Training  
SAT 8420

- TS-01 (1.0 pt) 1. Define Identified Leakage.
- TS-02 (1.5 pt) 2. What defines control rod operability?
- TS-03 (1.0 pt) 3. When must Standby Liquid Control be operable?
- TS-04 (3.0 pt) 4. a) Define Safety Limit.  
b) What are the Grand Gulf Safety Limits?
- TS-09 (3.0 pt) 5. What AC electrical power sources must be operable during operating conditions 1, 2, and 3?
- TS-22 (1.5 pt) 6. Define Drywell Integrity.
- TS-20 (2.5 pt) 7. Complete the following table:
- | <u>Condition</u> | <u>Mode Switch<br/>Position</u> | <u>Average Reactor<br/>Coolant Temperature</u> |
|------------------|---------------------------------|--|
| 1.               |                                 |  |
| 2.               |                                 |  |
| 3.               |                                 |  |
| 4.               |                                 |  |
| 5.               |                                 |  |
- TS-29 (1.0 pt) 8. What is the basis of the high Rx water level scram?
- TS-13 (1.5 pt) 9. What is the minimum shift crew composition during operating conditions 1, 2, and 3?
- TS-30 (2.0 pt) 10. What are the time interval requirements, including extensions, for surveillances?
- TS-36 (2.0 pt) 11. Recirculation loop flow mismatch shall be maintained within what limits?
- TS-48 (1.0 pt) 12. Where does the Rod Withdrawal Limiter input power signal originate?
- TS-63 (1.0 pt) 13. What is the basis for the limitation of 135°F on drywell average air temperature?
- TS-67 (1.0 pt) 14. a) What is the Exclusion Area radius?  
b) What is the Low Population Zone radius?



- TS-73 (1.0 pt) 15. Define Core Alteration.
- TS-74 (1.0 pt) 16. Define Critical Power Ratio.
- TS-76 (2.0 pt) 17. a) When must the Standby Gas Treatment System be operable?
- b) How long can one Standby Gas Treatment subsystem be inoperable before action must be taken?
- TS-77 (2.0 pt) 18. a) What is the Minimum Critical Power Ratio (MCPR) limit at rated conditions?
- b) What two parameters dictate the MCPR limit?
- c) What is the Linear Heat Generation Rate (LHGR) limit?
- TS-79 (2.0 pt) 19. What are the Tech Specs requirements for starting an idle recirc pump with:
- a) both recirc loops idle?
- b) one recirc loop idle?
- TS-80 (2.0 pt) 20. Concerning the suppression pool temperature limits:
- a) what is the normal limit?
- b) what is the limit during testing which adds heat to the suppression pool?
- c) at what temperature must the Rx be scrammed?
- d) at what temperature must the RPV be depressurized to < 200 psig within 12 hours?
- TS-81 (2.0 pt) 21. Define Shutdown Margin and list the Tech Specs limit(s).
- TS-84 (2.0 pt) 22. What are the temperature and level requirements for the ~~reactor~~ fuel storage pool when it contains irradiated fuel?

TS-85 (1.5 pt) 23. What are the Tech Specs surveillance requirements for Linear Heat Generation Rate when thermal power is  $\geq 25\%$  of rated (i.e., when shall LHGR be determined)?

MITIGATION OF CORE DAMAGE EXAM  
Shift Advisor Training  
SAT 8420

- MCD-01 (1.5 pt) 1.  $H_2$  production created concern for days at TMI-2:
- a) list all sources of  $H_2$  production following a LOCA with a severely damaged core.
  - b) why is  $H_2$  a problem?
  - c) what ways does Grand Gulf have to mitigate and control the production of  $H_2$ ?
- MCD-02 (1.0 pt) 2. Define "Adequate Core Cooling" with respect to your Administrative Procedures.
- MCD-05 (1.0 pt) 3. ADS is a high pressure ECCS System:
- a) what functions does ADS serve?
  - b) under what conditions would you manually initiate ADS?
- MCD-09 (1.5 pt) 4. Define:
- a) Conduction
  - b) Convection
  - c) Radiation
- MCD-12 (1.5 pt) 5. List the following limits:
- a) Steady - state 100% power, 100% flow MCPR
  - b) Transient CPR limit
  - c) Maximum LHGR
- MCD-17 (2.0) 6. What is meant by the term "reference leg flashing"?

- |        |          |   |
|--------|----------|---|
| MCD-18 | (5.0 pt) | 7. List the ranges of all Rx water level instruments. Include the calibration conditions and where the instrument is located in the control room.   |
| MCD-25 | (1.0)    | 8. Why does the fuel zone level instrument have a different variable leg tap than the other level instruments?  |
| MCD-27 | (1.0 pt) | 9. List the four (4) classes of emergencies at GGNS.  |
| MCD-29 | (1.5 pt) | 10. Define the following:<br>a) Laminar flow<br>b) Subcooled nucleate boiling<br>c) Slug flow   |
| MCD-42 | (1.0 pt) | 11. A saturated Geiger-Meuller tube will have (max output, zero output) Select one.   |
| MCD-45 | (1.0 pt) | 12. What is the purpose of the Hydrogen Igniter System?   |
| MCD-46 | (1.0 pt) | 13. True or False<br><br>_____ a) There are only 4 ranges of level instrumentation at Grand Gulf.<br><br>_____ b) Level instruments are calibrated at the temperatures and pressures in which they are to operate.<br><br>_____ c) All Grand Gulf Rx vessel instruments are referenced to instrument zero, 533" above vessel zero.<br><br>_____ d) Water density has an effect on indicated vs. actual level. |
| MCD-50 | (2.0 pt) | 14. Define the following:<br>a) Exclusion Zone<br>b) Low Population Zone  |

MCD-54 (2.0 pt) 15. Match the following: Answers may be used more than once.

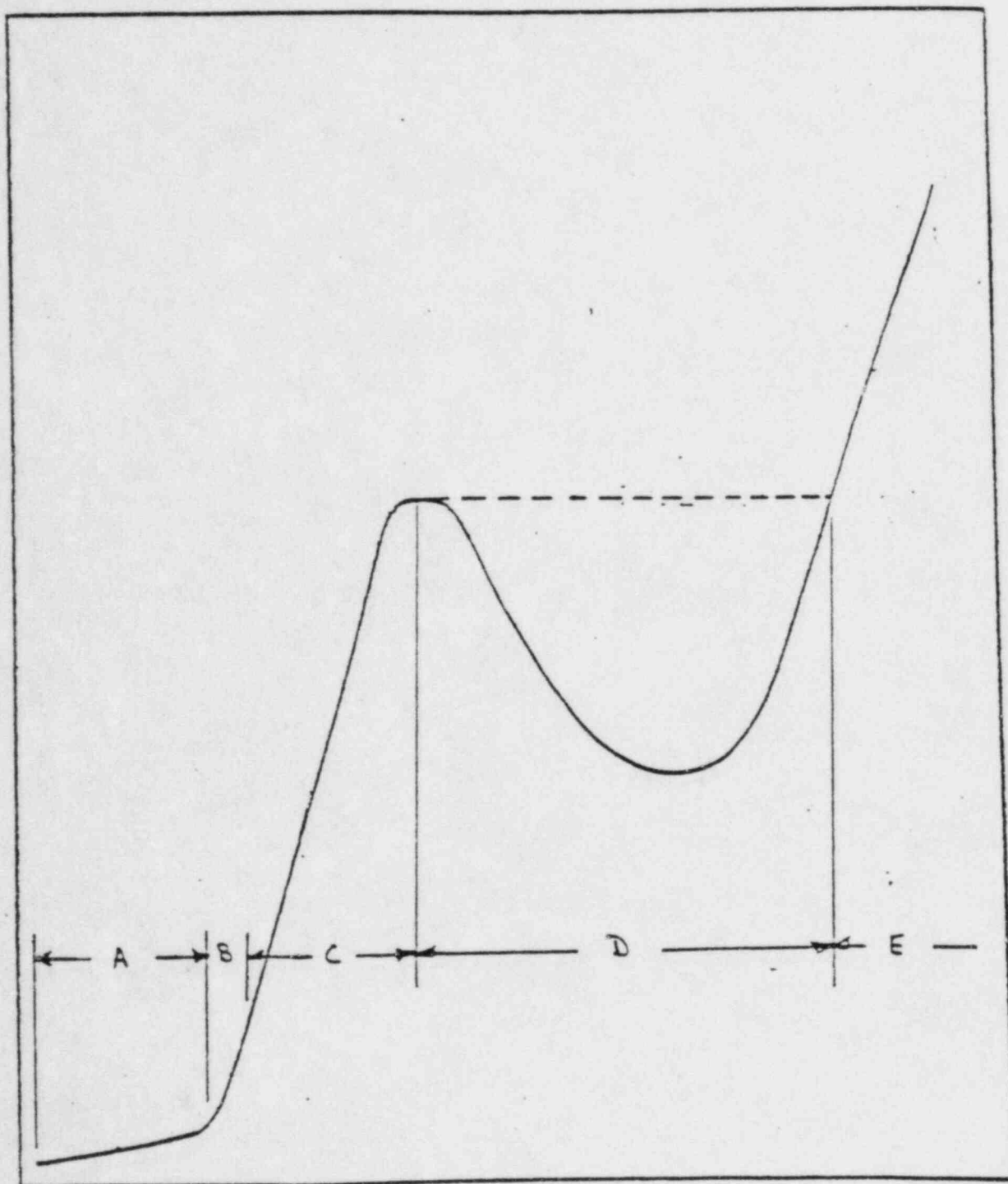
- |        |                             |    |                        |
|--------|-----------------------------|----|------------------------|
| ___ 1) | Main steam line monitors    | a) | Geiger Meuller Tube    |
| ___ 2) | Liquid process monitors     | b) | Ion chamber            |
| ___ 3) | Off Gas monitor             | c) | Scintillation detector |
| ___ 4) | Vent release monitors       | d) | none of the above      |
| ___ 5) | Carbon bed vault monitor    |    |                        |
| ___ 6) | Ventilation System monitors |    |                        |
| ___ 7) | Area radiation monitoring   |    |                        |
| ___ 8) | Hi range accident monitors  |    |                        |

MCD-21 (4.0 pt) 16. a) On the attached graph, identify the region or points labeled A - E.  
b) Define or describe the above regions/points A - E.  
c) Discuss which region a BWR normally operates in.

MCD-33 (2.5 pt) 17. Name five (5) types of corrosion discussed in this course.



SURFACE HEAT FLUX



SURFACE TEMPERATURE

MED -21 A



SHIFT ADVISOR TRAINING EXAM  
ADMINISTRATIVE PROCEDURES  
SAT 8420

- |         |          |   |
|---------|----------|---|
| ACRS-03 | (2.0 pt) | 1. What tags issued under the protective tagging system require independent verification?   |
| ACRS-04 | (1.0 pt) | 2. What activities and/or functions does the Operational QA Program apply to?   |
| ACRS-06 | (1.0 pt) | 3. Who has direct responsibility for conduct and access to the Control Room?  |
| ACRS-19 | (2.0 pt) | 4. Define adequate core cooling.  |
| ACRS-23 | (2.0 pt) | 5. Describe the requirements and procedure for implementing TCNs.   |
| ACRS-78 | (2.0 pt) | 6. List the Federal and GGNS quarterly exposure limits.   |
| ACRS-43 | (1.5 pt) | 7. What are the 3 types of RWP's used at GGNS?  |
| ACRS-49 | (2.0 pt) | 8. What is the difference between a Red equipment clearance and a Brown equipment clearance?  |
| ACRS-52 | (1.0 pt) | 9. Under what condition(s) is the manipulation of controls at GGNS by a person who is not a Licensed Reactor Operator or a Senior Reactor Operator permitted?   |
| ACRS-53 | (1.0 pt) | 10. Who has the responsibility and the authority for shutting down the reactor when it is determined that the safety of the reactor is in jeopardy, or when a safety limit is exceeded, or when operating parameters exceed any portion of the Reactor Protection System logic setpoints and automatic shutdown does not occur? |
| ACRS-59 | (1.0 pt) | 11. What are the color codes for electrical equipment in ESF supplied systems?  |

- ACRS-67 (2.0 pt) 12. When used in a directive, the following shall be construed to have the special definitions given; define the following:
- a) shall/will
  - b) should
  - c) may
  - d) must
- ACRS-70 (1.5 pt) 13. The term "safety related" shall be applied to those structures, systems, components, services, activities and directives that are necessary to ensure what?
- ACRS-71 (1.5 pt) 14. The Surveillance Program implements the surveillance requirements of the Technical Specifications into a monitoring program consisting of 3 sub-programs. What are the 3 sub-programs?
- ACRS-72 (1.5 pt) 15. While doing a surveillance there are 3 types of notes for personnel to be aware of. They are NOTE, CAUTION, and WARNING. Describe what each means.
- ACRS-76 (1.0 pt) 16. An ALARA committee review is required for jobs expected to require a total man-rem exposure of?
- ACRS-36 (1.0 pt) 17. What is a Temporary Alteration?

Attachment 4 to AECM-84/0180

Power Ascension Testing Procedure Training  
and Plant Transient Recovery  
Simulator Training and  
Examination Summaries

MEMO TO: Terry Mayfield  
FROM: Gary Lhamon, Operations Training Supervisor  
SUBJECT: Simulator Training for Shift Advisors

We have committed to provide the Shift Advisors with two additional weeks of simulator training.

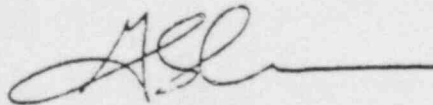
It is requested, therefore, that you and/or the other simulator instructors formulate the program using the following guidelines:

1. 1st WEEK
  - a. Procedures used during start-up program (>5% power).
  - b. Transients likely to occur during the start-up test program.
  - c. Each advisor must manipulate the controls and align equipment IAW procedures.
  - d. Performance exam administered by M. Shelly or myself to assure sufficient specific plant knowledge to properly perform their advisory function.
2. 2nd WEEK
  - a. Training to insure proper identification response and recovery from plant transients.
  - b. Focus on Emergency Procedures, ONEP's and Accident Response.
  - c. Each advisor must manipulate controls.
  - d. Performance exam again administered by M. Shelly or myself to verify the above.

The course is currently scheduled for the weeks of February 27 and March 5. There should be 5 or possibly 6 advisors attending. The package needs to be ready and approved before the start of training.

Please contact me if you have any questions.

Thank you.



G. D. Lhamon  
2/14/84

GDL:daw

cc: J. W. Yelverton  
D. L. Hunt  
M. Shelly  
B. G. Jones  
File

POWER ASCENSION TESTING  
TRAINING COURSE OUTLINE

I. Scope/Purpose

- A. Familiarize Shift Advisors with the overall scope of the Power Ascension Testing training program.

II. General Description

- A. Generally, the day will start out with a brief description of the days activities on the simulator. As the days progress, the classroom portion will involve a detailed discussion of the transient tests performed, including the actions to be taken during the test. Generally, static tests will be discussed, but not performed.
- B. All procedures and actions normally used during the actual power ascension will be used throughout the Power Ascension Testing program. This includes, but is not limited to:
  - 1. Integrated Operating Instructions
  - 2. System Operating Instructions
  - 3. Startup Test Instructions
  - 4. Technical Specifications

III. Outline

Day 1

Overview of Power Ascension Tests

Phase I, II, III complete

Emphasis on Phase IV and V

Discussed TC 1 to 6 and level criteria

Day 1 1-E51-SU-14-1-1 RCIC

Sections.

3.4/4.4

1-000-SU-23-1 Feedwater

Sections.

3.1/4.1

1-B33-SU-29-1 Recirc

Sections.

3.1/4.1

1-E12-SU-71-1 RHR

Sections.

3.1/4.1

Steps 4.1.1 to 4.1.47

Day 2 1-000-SU-31-2 Loss of T.G & Offsite Power

Sections.

3.1/4.1

1-000-SU-28-2 SD from RSD Panel

Sections.

3.1/4.1

3.2/4.2

1-B33-SU-30-2 Recirc

Sections.

3.1/4.1

1-B21-SU-26-2 Relief Valves

Sections.

3.1/4.1 One Valve

1-E51-SU-14-2 RCIC

Sections.

3.1/4.1

3.2/4.2



Day 3            1-B33-SU-30-3            Reactor Recirc

Sections.

3.5/4.5  
3.8/4.8  
3.9/4.9  
3.10/4.10

1-000-SU-23-2            Feedwater System

Sections.

3.2/4.2  
3.5/4.5

1-000-SU-27-3            Turbine Trip

Sections.

3.1/4.1

1-N32-SU-22-4            IPC

Sections.

3.1/4.1  
3.2/4.2

1-000-SU-23-6            Feedwater

Sections.

3.2/4.2  
3.4/4.4  
3.5/4.5  
3.6/4.6  
3.7/4.7

1-000-SU-24-6            Turbine Valve Surv.

Sections.

3.1/4.1

1-N32-SU-22-6            IPC

Sections.

3.4/4.4  
3.6/4.6

Day 3            1-000-SU-27-6            Gen. Load Reject

Sections.

3.1/4.1

Day 4            1-B33-SU-30-6            Recirc

Sections.

3.6/4.6

3.8/4.8

1-B21-SU-25-6            MSIV's

Sections.

3.4/4.4

3.5/4.5

Review

Day 5            Review

And

Exam

## PLANT TRANSIENT RESPONSE AND RECOVERY

### TRAINING COURSE OUTLINE

#### I. Scope/Purpose

- A. Familiarize Shift Advisors with the overall scope of response and recovery to plant transients.

#### II. General Description

- A. The day will start out with a general description of the plant condition, as malfunctions are placed into the simulator the individuals will perform as the situation requires. After each scenario is over, a critique will be given to the individuals involved.
- B. All actions and procedures used during the Transient Response and Recovery Training will be in accordance with, but not limited to:
  - 1. System Operating Instructions
  - 2. Emergency Procedures
  - 3. Emergency Plan Procedures
  - 4. Off-Normal Event Procedures
  - 5. Technical Specifications
  - 6. Integrated Operating Instructions

#### III. Outline

##### DAY 1

IOI-1 from 850#  
IC-10 850# H/U, seq. A step 6B  
Turbine roll  
Increase power to 50%

## DAY 2

IC-16

100% power, Xenon equilibrium, Group 10-4  
G6 to 08

Malf. # 72 Main Steam Line High Radiation

IC-16

Malf. # 59 Main Steam Relief Valve 51D Fails Open

IC-16

Malf. # 62 Instrument Line Leak

Malf. # 76 Failure to Scram (Manual Scram Function Operable)

IC-16

Malf. # 69 Instrument Line Leak Outside Containment

## DAY 3

IC-16

Insert Malfunction # 24, 8 times  
Control Rod \_\_\_\_\_ Accumulator Trouble

Malfunction # 25

Scram Control Rod \_\_\_\_\_

Malfunction # 21

Control Rod \_\_\_\_\_ Drift in

Malfunction # 75

Failure to Scram

Malfunction # 110 A or B

SJAE - Steam Supply Failure (Total)

Malfunction # 121 A or B

Feedwater Pump \_\_\_\_\_ Signal Failure

Malfunction # 123 A and B

Feedwater Pump Turbine \_\_\_\_\_ Overspeed Trip

## DAY 3 CONTINUED

IC-16

Malfunction # 1 &amp; 1B

Feedwater Pump \_\_\_\_\_ Signal Failure

Malfunction # 125

Failure of Steam Flow Signal to FW Control

Malfunction # 159A

Mechanical Seizure of Selected MOV

E22-F004 HPCS Injection

Malfunction # 13A

Recirc Pump Motor \_\_\_\_\_ Hi Temperature

Malfunction # 14A

Recirc Pump \_\_\_\_\_ Hi Vibration

Malfunction # 17B

Recirc Loop \_\_\_\_\_ Flow Control Valve Signal Failure

Malfunction # 126B

Feedwater Control Vessel Level \_\_\_\_\_ Sensor Failure

Malfunction # 44

RCIC Turbine Speed Control Failure

Malfunction # 73E

Main Steam Isolation Valve \_\_\_\_\_ Fails Shut

Malfunction # 76

Failure to Scram (Manual Scram Function Operable)

Malfunction # 159A

MOV Failure HPCS Injection Valve

Malfunction # 123 A and B

Feedwater Pump Turbine \_\_\_\_\_ Overspeed Trip

. DAY 4

IC-16

Malf. # 83A

Turbine Bypass Control Valve Fails Open

Malf. # 12A

Reactor Recirculation Pump Trip

Malf. # 22

Twice

Control Rod \_\_\_\_\_  
Stuck

Malf. # 76

Failure to Scram

(Manual Scram Function Operable)

Malf. # 12B

Reactor Recirculation Pump Trip

Malf. # 13A

Recirc Pump Motor Hi Temperature

Malf. # 14A

Recirc Pump \_\_\_\_\_ High Vibration

Malf. # 123A

Feedwater pump Turbine \_\_\_\_\_ Overspeed Trip

Malf. # 15A, 15B

Recirc 1st, 2nd Stage Seal Failure

Malf. # 63

Recirc Loop Rupture (Variable)

Malf. # 89A, C

Turbine Control Valve Servo Failure (Variable)

Malf. # 12B

Rec. Pump \_\_\_\_\_ Trip

Malf. # 21

Control Rod \_\_\_\_\_ Drift in



## DAY 4 CONTINUED

IC-16

Malf. # 83A, B

Turbine Bypass Control Valve Fails Open

Malf. # 76

Failure to Scram (Manual Scram Function Operable)

Malf. # 9A

APRM Channel ————— fullscale

Malf. # 151A

Component Cooling Water Pump Trip

Malf. # 148A, B

Standby Service Water Pump ————— trip

Malf. # 121A

Feedwater Pump ————— signal failure

Malf. # 53

Spurious HPCS initiation

Malf. # 103

Generator Trip

Malf. # 22

Control Rod ————— stuck

## DAY 5

Review &amp; Exam

SUMMARY OF SIMULATOR PERFORMANCE EXAM  
Week One - Power Ascention 3/2/84

Initial Conditions - In startup test procedure SU-22-4, Section 4.1 -  
Pressure Control Step Change Stability testing.

Problem - Failure of EHC control of turbine with load at 50%.

- Grade on:
- 1) Manipulatory Skills.
  - 2) Expected response to overall test.
  - 3) Effects on power with Recirculation Flow Control in Manual?  
Automatic?
  - 4) Interrelationships between various turbine control modes,  
i.e. Speed demand, load demand, speed setter and starting device.
  - 5) Feedwater Motor Speed Control vs. Electro-automatic positioner.
  - 6) Sensing point for 30% feedflow automatic recirculation downshift.
  - 7) Explanation of Cavitation and how to detect on Recirculation  
system using P680 indications.
  - 8) When EHC failed, was positive action taken to control turbine?
  - 9) How are EHC circuits removed to allow further turbine load  
increase?

SUMMARY OF SIMULATOR PERFORMANCE EXAM  
Week Two - Transient Response 3/9/84

Initial Conditions: About 95% power - normal operating line-vv. Operating per Power Operations procedure. Hypothesizes special test instruction for testing of one SRV.

Problem: Failure of SRV to reseal completely - after recognized by student and proper action taken, followed in 2 minutes by failure of SRV in full open position.

- Grade on:
- 1) Recognition of problems with testing SRV at high power.
  - 2) Recommending appropriate precautions to Shift Supervisor.
  - 3) Manipulation of Turbine. By-pass valves.
  - 4) Technical Specifications associated with open bypass valves.
  - 5) Recommending proper action with respect to personnel in containment prior to SRV actuation.
  - 6) Manipulation of SRV.
  - 7) Manipulation of RHR for Suppression Pool Cooling.
  - 8) Recognition of Leaking SRV.
  - 9) Recommending proper action to correct SRV leaking.
  - 10) Referring to proper procedures for leaking SRV.
  - 11) Recognition of Failing Open SRV.
  - 12) Consulting proper ONEP's.
  - 13) Carrying out proper action on Scram and Manipulations.
  - 14) Consultation of Emergency Procedures and Emergency Plan Procedures.
  - 15) Recommending long-term action to Shift Supervisor.

Attachment 5 to AECM-84/0180

Summation of OTEC Oral Board Questions

SUMMATION OF ORAL BOARD QUESTIONS  
given by OTEC 2/23/84 for Shift Advisor Certification

1. State the purpose of the ADS system.
2. What are the indications of a leaking SRV?
3. What is the air supply to ADS?
4. Discuss the operation of an SRV.
5. What other ECCS systems do we have at GGNS?
6. What is the initiation setpoints for each of these (ECCS) systems?
7. Discuss the design for the containment and suppression pool- Design valves.
8. Discuss the operation of containment spray - include setpoints, interlocks, etc.
9. What are the first indications of fuel damage?
10. By what means can we determine if we have fuel damage and extent of fuel damage?
11. Discuss the Design Basis Accident (Recirculation line break).
12. Define adequate core cooling.
13. Discuss Thermal limits including how obtained, and actual limit.
14. Discuss condition each thermal limit is designed to prevent.
15. How do we determine if there is a break in the LPCS line, inside or outside vessel.
16. Condition -  $\frac{1}{2}$  scram in on 1 trip system, 1 fuse supplying scram solenoids on other trip system blows. What is the result? What would happen? How would you recommend to the Shift Supervisor that he recover?
17. What are some of your immediate concerns with the above (16)?
18. What would you do if Shift Supervisor refused to follow your recommendations above (17)? Suppose you have a genuine safety concern, what would you do?
19. How does initial power vary with flow.
20. Define a radiation area here at GGNS. Define a High Radiation Area.
21. What are the GGNS exposure limits? What are the emergency exposure limits?
22. Explain the operation of a G-M tube. What are some of its advantages and disadvantages?
23. What are the Technical Specification Limits on Suppression Pool Temperature? Basis?
24. What are the Technical Specification Thermal Limits?
25. Discuss what you feel is your role as a Shift Advisor.