Draft Submittal
(Pink Paper)

1. Reactor Operator Written Exam

SURRY EXAM 2002-301

50-280, 281/2002-301
MARCH 18 - 28, 2002

Surry Initial RO Exam 03/2002

QUESTIONS REPORT
for Surry2002

1.

Which of the following is used as a direct indication of reactor power to the rod insertion limit circuitry.

A. Total Steam Flow.

B. Median Auctioneered Delta T Control

C. Impulse Pressure.

D. Tave Median Signal Selector.

REF: 1987 Farley exam, Lesson Plans Surry; ND-93-LP-2, ND-93-LP-3
MCS Time: 1 Points: 1.00 Version: 0 1 2 3 4 5 6 7 8 9
Answer: BDBADDCBCD Scramble Range: A - D

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	3.8/4.2 MEMORY
Source:	MOD	Exam:	SR02301
Test:	R	Misc:	GWL

QNUM 2903
*HNUM 2903 (Do NOT change If < 9,000,000)
*ANUM
*QCHANGED FALSE
*ACHANGED FALSE
*QDATE 1987/08/24
*FAC 348 Farley 1 & 2
*RTYP PWR-WEC3
*EXLEVEL R
*EXMNR
*QVAL
*SEC
*SUBSORT
*KA 001000A101 001000A103
*QUESTION
Which one of the following is used as a DIRECT indication of reactor power to the rod insertion limit calculator.

a.) Impulse Pressure

b.) ~~Auctioneered~~ High Tavg ~~Median Tavg~~ TAVE Median Signal Sele

c.) Total Steam Flow

d.) ~~Auctioneered High Delta-T~~ Median Autioneered ΔT Contol

*ANSWER
d.)
*REFERENCE
FNP Tavg, Delta-T, and Pimp X G

b. Alarms at >3.5% deviation between loops. This alarm would indicate a malfunctioning circuit or a power tilt in one of the loops. (HA2, HB2, HC2)

5. Median Delta T Signal Selector

a. The output from each loop's Delta T computer inputs to the Median Signal Selector (MSS) after passing through the Delta T Defeat Switch. The defeat switch is used only during Instrument Tech channel calibration and trouble shooting procedures.

b. The MSS will select the median signal of the three loops and output that signal to the remainder of the circuitry.

c. The use of a MSS ensures that the control systems are provided with a valid temperature signal when a single channel fails.

d. If one of the input signals deviate excessively from the median, the circuit eliminates the deviated signal and becomes a high selector of the remaining valid inputs.

6. The output from the MSS goes to the Rod Insertion Limit Computer. The RIL circuitry will be covered in detail in the Rod Control lesson plan.

E. Tave Protection

Refer to/display H/T-2.8, Tave Protection Circuit.

1. The RTDs, used for generating the Tave signal, are the same RTDs that are used for the Delta T circuitry.

Refer to/display H/T-3.12, Startup Pushbutton Resets.

2. An alarm reset pushbutton is also provided on benchboard 1-2 (just beside the startup pushbutton). Its purpose is to reset any internal alarms associated with the Rod Control System without resetting any controls or indicators.

3. Depressing the Startup or Alarm Reset pushbutton in the MCR will reset all alarms in the logic and all power cabinets. If the condition that caused the alarm to initially activate has not been cleared, then the alarm will return. If the reactor trip breakers are open or the MG sets are secured, these alarms will not clear when the buttons are pushed.

4. The Rx trip breaker reset pushbutton is located on benchboard 1-1 near the Rx trip pushbutton. When this pushbutton is pressed, the reactor trip breakers will close if all trip signals are clear.

H. Insertion Limits

Ask trainees why insertion limits are of concern.

Answer:
- Provide adequate SDM upon trip
- limit the + reactivity insertion upon ejected rod
- enhance more even flux distribution (limit HCFs)

1. Technical Specifications require insertion limits be observed whenever the reactor is critical. The curve for checking insertion limits can be found in DRP-021, Core Operating Limits Report, Curve Book, DRP-003, or Precautions Limitations and Setpoints, DRP-004 (this one is more detailed than DRP-003).

Refer to trainees to DRP-003, Curve Book, CONTROL ROD INSERTION LIMITS VS POWER LEVEL.

As reactor power is increased, the rod insertion limits on CC and CD are required to be progressively higher due to power defect. CD starts with an insertion limit of 23 steps on CBD at criticality and the insertion limit rises to a value of 183 steps at full power.

Refer to/display H/T-3.13, Insertion Limit Circuitry.

2. The insertion limit alarms are generated from the comparison of the outputs of the insertion limit computer and the P/A converter's outputs. The median auctioneered delta T control signal is input into the Insertion Limit Computer for CC and CD. Here, the delta T signal is converted into a "steps inserted" signal and is sent to remaining IL circuitry. CA and CB have fixed insertion limit annunciators of 93% of the fully withdrawn position for the low-low limit. The CC low-low limit annuciator varies from 151 steps inserted to 93% of the fully withdrawn value as delta T changes from 0 to approximately 36% (the actual power level is found by taking 93% of the fully withdrawn position and looking up the equivalent power level on the insertion limit graph). The CD low-low limit annunciator varies from 23 steps to 183 steps as delta T changes from 0 to 100%. The low limit for all control banks is 10 steps greater than the low-low limit. On the IL Recorder, the computed insertion limit is graphically compared to the actual rod insertion values coming from the P/A converter.

3. The Pulse-to-Analog Converter converts the pulsed output signals from the slave cyclers (demand signals) into an analog signal. This signal comes from the logic cabinet and is the same signal that is input into the Group 1 digital rod step counters on the main control board. The P/A converter also sends its output signals to the rod bottom bypass bistables in the IRPI system for CB, CC, and CD.

4. The P/A converter has a bank display unit. The bank display unit contains a digital meter for reading the bank position (demand position) of each of the control banks. A five-position selector switch is provided for selecting the appropriate bank or Off. An Auto/Man switch is also provided with associated up and down pushbuttons for manually changing the P/A counter values. The P/A counter is changed manually during rod alignment procedures. The P/A converter is located in one of the IRPI cabinets located in the relay room.

5. Another output from the P/A converter is a signal that is sent to the IL Comparator. Here the actual rod demand signal is compared to the calculated insertion limit and generates alarms accordingly. The alarms generated are:

Write on chalkboard: Insertion limit LOW alarm -- 10 steps > limit Insertion limit EXTRA-LOW alarm -- at limit

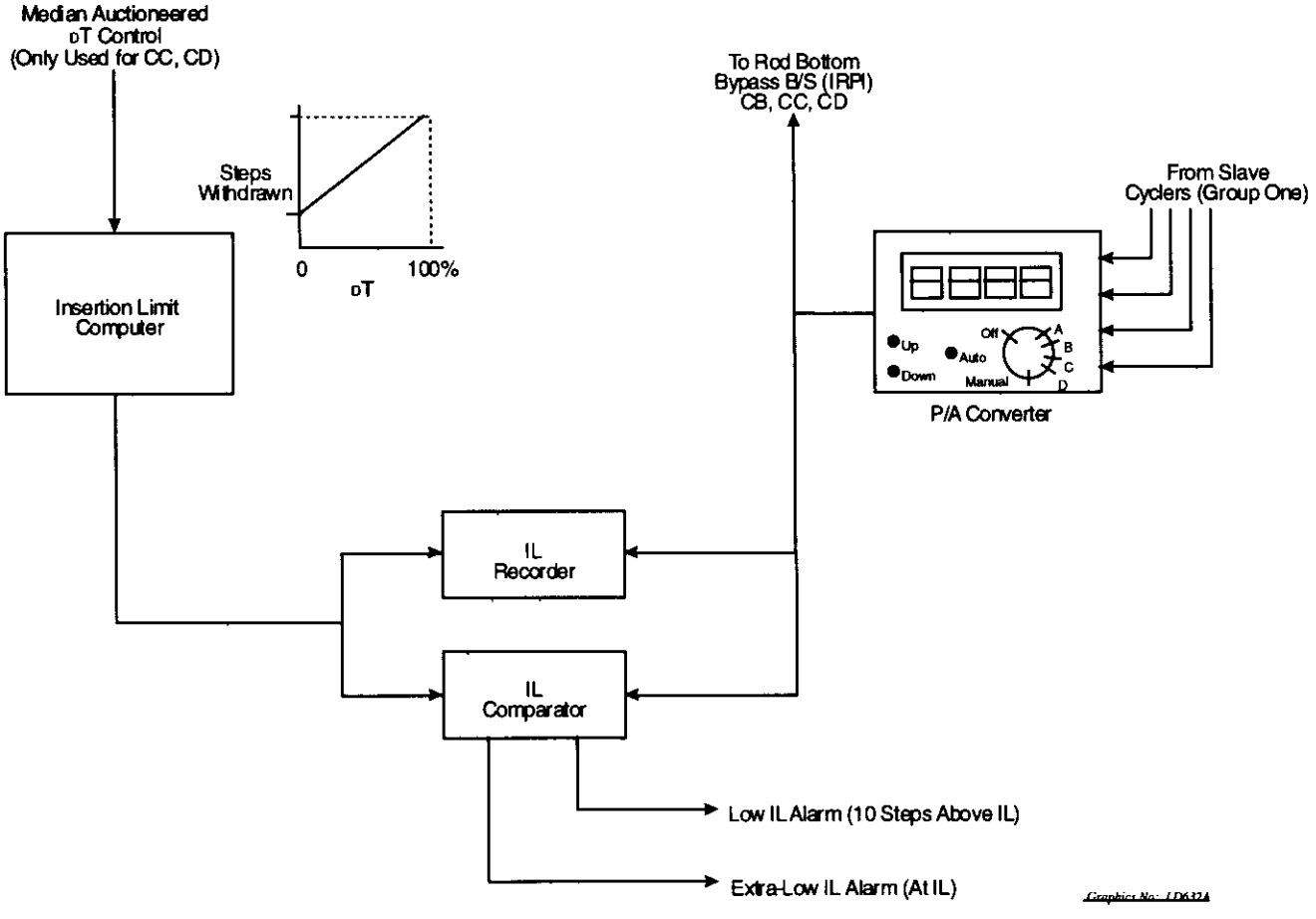
CD has a rod withdrawal annunciator ROD BANK D WITHDRAWEL (G-F-8) that is set for 2 steps greater than the fully withdrawn position.

Ensure trainees have most recent revisions of AP-1.00 and AP-1.01.

I. AP-1.00, Rod Control System Malfunction and AP-1.01, Control Rod Misalignment

1. AP-1.00, Rod Control System Malfunction

Have trainees follow along in AP-1.00 for this presentation.



INSERTION LIMIT CIRCUITRY

QNUM 2903
*HNUM 2903 (Do NOT change If < 9,000,000)
*ANUM
*QCHANGED FALSE
*ACHANGED FALSE
*QDATE 1987/08/24
*FAC 348 Farley 1 & 2
*RTYP PWR-WEC3
*EXLEVEL R
*EXMNR
*QVAL
*SEC
*SUBSORT
*KA 001000A101 001000A103
*QUESTION
Which one of the following is used as a direct indication of reactor power to the rod insertion limit calculator.

a.) Impulse Pressure

b.) Median Autioneered Delta T Control.

c.) Total Steam Flow.

d.) Tave Median Signal Selector.

*ANSWER
B.)
*REFERENCE
Surry Lesson plans ND-93.3-LP-2 and ND-93.3-LP-3.

Modified from the farley question.

QUESTIONS REPORT

for Surry2002

1. 003K4.07 001/T2G1/T2G1//M 3.2/3.4/B/SR02301/R/GWL

Which one of the following describes the Reactor Coolant Pump#1 seal leak-off flow path at 100% Reactor Power?

A. Number 2 seal only.
B. Number 2 seal and standpipe.
C. VCT and standpipe.
D. VCT and number 2 seal.

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	M 3.2/3.4
Source:	B	Exam:	SR02301
Test:	R	Misc:	GWL

QNUM 31194
*HNUM 31710 (Do NOT change If < 9,000,000)
*ANUM
*QCHANGED FALSE
*ACHANGED FALSE
*QDATE 1992/07/20
*FAC 261 H. B. Robinson 2
*RTYP PWR-WEC3
*EXLEVEL S
*EXMNR
*QVAL
*SEC
*SUBSORT
*KA **003000K407**
*QUESTION
Which ONE of the following describes the Reactor Coolant Pump #1 seal leak-off flow path at 100% Reactor Power?

a. Number 2 seal.

b. Number 2 seal and standpipe.

c. VCT and standpipe.

d. VCT and number 2 seal.

*ANSWER
d.

Lesson Plan 88.1 LP-6 OBJ C

Introduction

The Reactor Coolant Pumps are vital to the safe operation of the Reactor. They provide the motive force necessary to move large volumes of hot pressurized coolant through the core. A detailed knowledge of the construction and limitations of the pumps and seals is required as a violation of even the most basic limitation could cause a Loss of Coolant Accident or an extended plant outage. The information presented during this lesson provides a detailed knowledge base of the operation and limitations of the reactor coolant pumps and seals, necessary for safe operation of the reactor.

Objectives

After receiving this instruction, the trainee will be able to:

A. Describe the construction and operation of a Reactor Coolant Pump identifying each of its major components.

B. Describe the construction and operation of a Reactor Coolant Pump motor identifying each of its major components.

C. Describe the construction and operation of the Reactor Coolant Pump seals.

D. State the power supplies for the Reactor Coolant Pumps.

E. Describe the instrumentation, alarms and controls associated with the Reactor Coolant Pumps.

QUESTIONS REPORT
for Surry2002

1. - Unit One is Shutdown.
   - 1H1-2S-7C (Noun name for Breaker) is tagged open.
   - The Shift Supervisor has directed an Emergency Boration IAW AP-3.00

   Which one of the follwing describes the corect flowpath IAW AP-3.00?

   A. Manually open 1-CH-FCV-1113A, Locally open 1-CH-228, and Monitor Boric Acid flow on 1-CH-FI-1110.
   B. Manually open 1-CH-MOV-1350 from the MCB, Monitor Boric Acid flow on FR-1-113 (Red Pen).
   → C. Locally open 1-CH-FCV-1113A, Locally open 1-CH-228, and Monitor Boric acid flow on FR-113 (Red Pen).
   D. Locally open 1-CH-MOV-1350, Monitor Boric Acid flow on 1-CH-FI-1110.

K/A 004 K6.17

answer D.

- Unit One is Shutdown.
- 1H1-2S-7C(Noun name for Breaker) is tagged open.
- The Shift Supervisor has directed an Emergency Boration IAW AP-3.00

Which one of the following describes the correct flowpath IAW AP-3.00.

A. Manually open 1-CH-FCV-1113A, Locally open 1-CH-228, and monitor boric acid flow on 1-CH-FI-1110.

B. Manually open 1-CH-MOV-1350 from the MCB, Monitor Boric Acid flow on FR-1-113 (red pen).

C. Locally open 1-CH-FCV-1113A, Locally open 1-CH-228, and monitor boric acid flow on FR-1-113 (red pen).

D. Locally open 1-CH-MOV-1350, Monitor Boric Acid flow on 1-CH-FI-1110.

Answer D.

K/A 004K6.17

New; C/A RO only

Objectives

After receiving this instruction, the trainee will be able to:

A. Describe the Primary Grade Water System including the following:

- function/systems supplied
- capacity of PG tanks and pumps
- method of system pressure control

B. Describe the Boric Acid Transfer and Storage System including the following:

- function/systems supplied
- capacity of tanks and pumps
- methods of system temperature control
- component power supplies

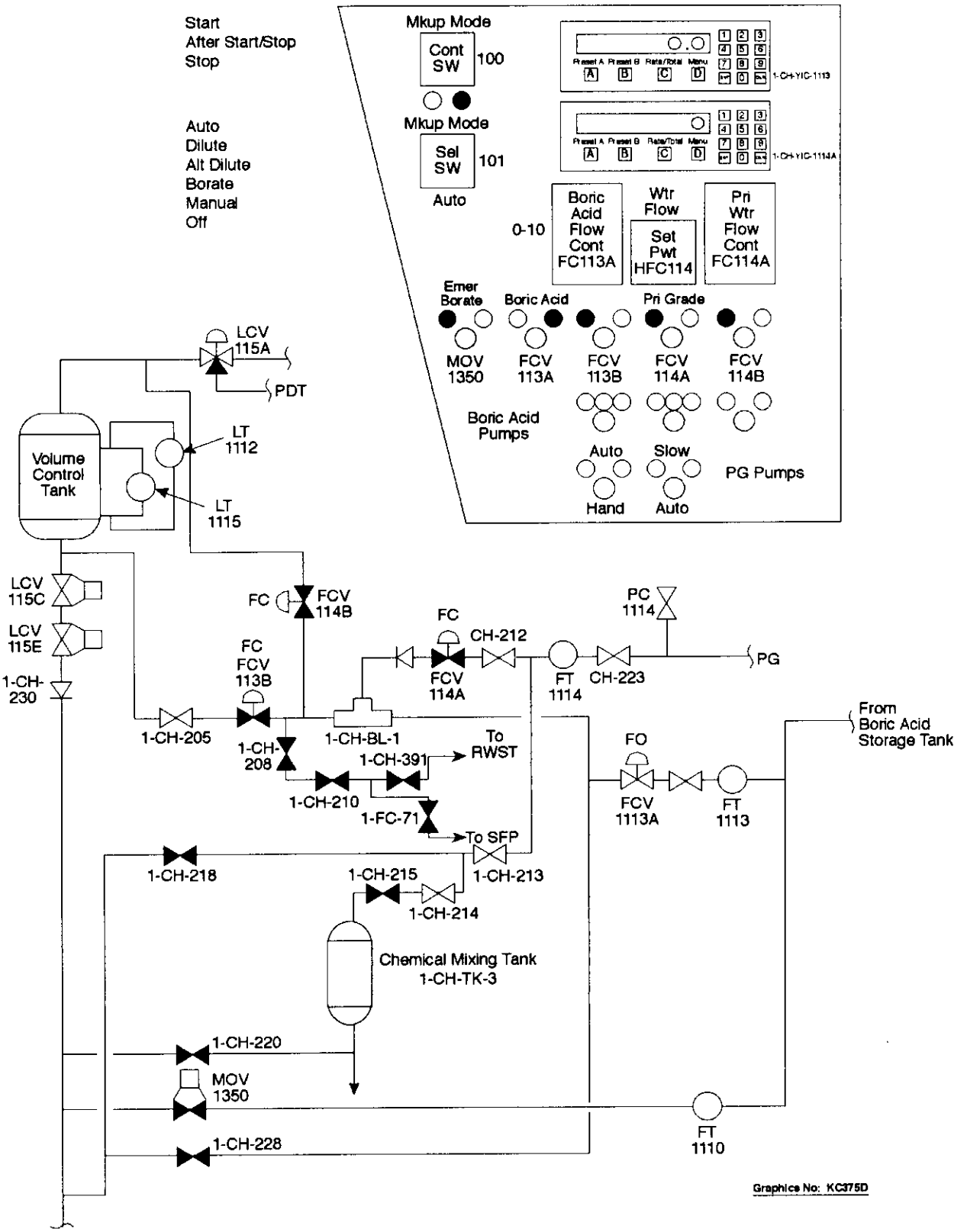
C. Using a sketch of the system drawn from memory, describe the flowpaths into and out of the blender.

D. Describe the operation of the blender control system during all modes of operation.

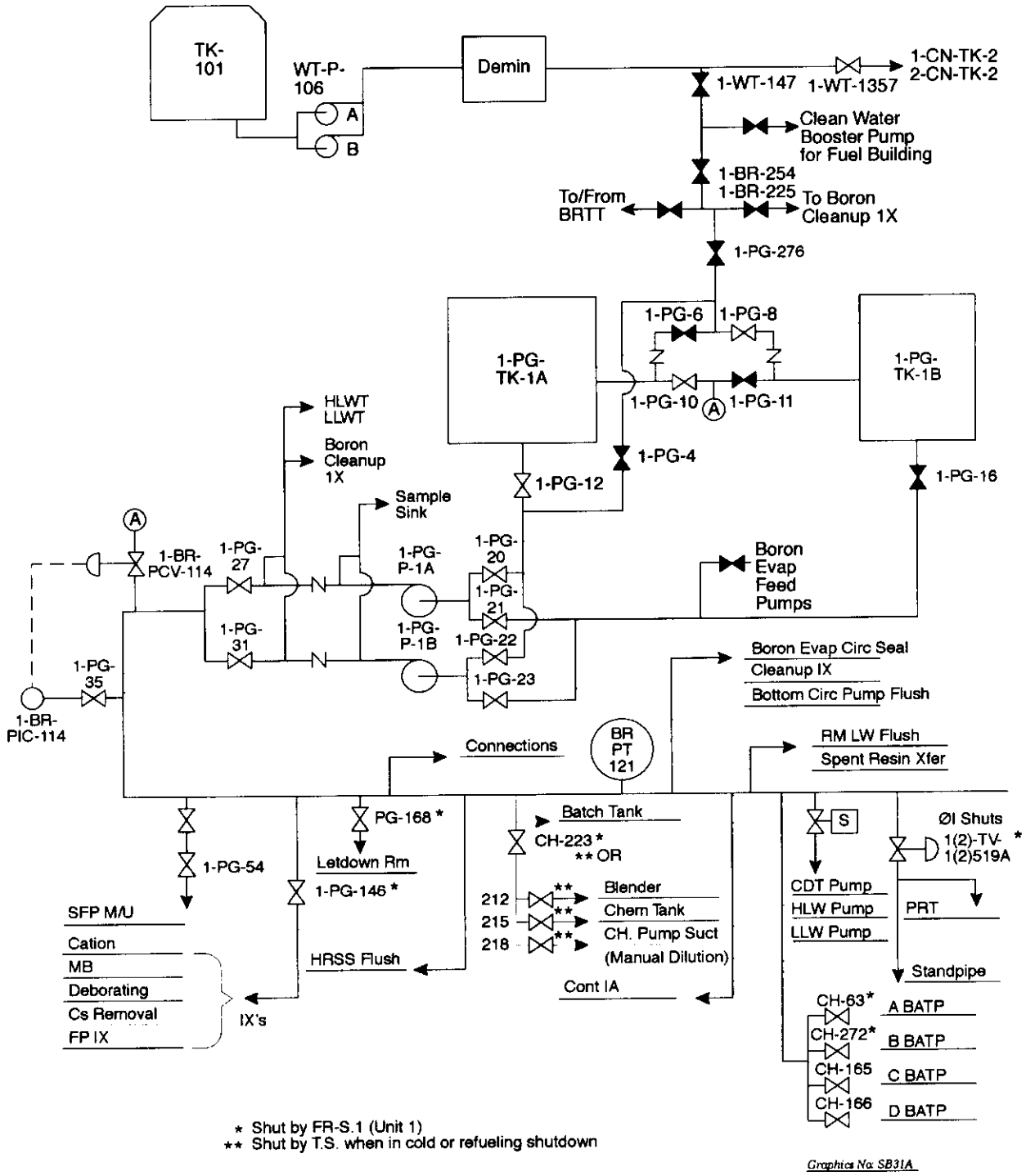
E. Describe in detail the operation of the blender control system and associated subsystems.

Presentation

Distribute all handouts. Refer to/display H/T-9.1, Objectives, and review with class.



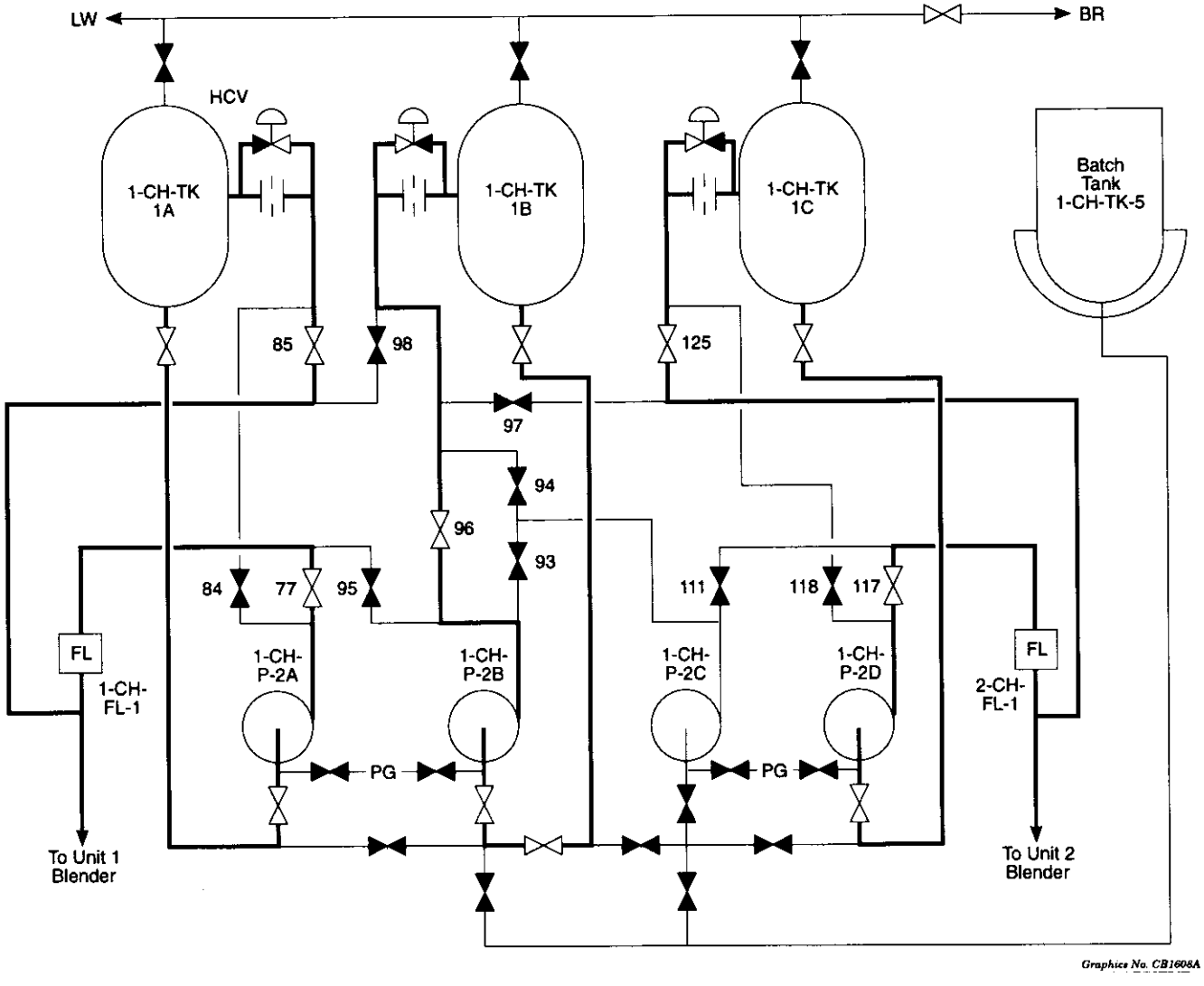
NORMAL BLENDER LINE UP



* Shut by FR-S.1 (Unit 1)
** Shut by T.S. when in cold or refueling shutdown

Graphics No. SB31A

PRIMARY GRADE WATER SYSTEM



BORIC ACID TRANSFER AND STORAGE TYPICAL SYSTEM LINEUP

QUESTIONS REPORT
for Surry2002

1. 005K6.03 001

Which one of the following would prevent the RHR heat exchangers from performing their design function?

A. A loss of air to Heat Exchanger outlet valve HCV-1758.

B. Manually closing RH-25, inlet to RHR letdown valve HCV-1142.

C. A loss of air to Heat Exchanger bypass valve FCV-1605.

D. Manually closing the Component Cooling outlets to the RHR heat exchangers.

Lesson plan ND-88.2-LP-1 objective C.

MCS Time: 1 Points: 1.00 Version: 0 1 2 3 4 5 6 7 8 9

Answer: Scramble Range: A - D

RO Tier:	T2G3	SRO Tier:	T2G3
Keyword:		Cog Level:	2.5/2.6 MEMORY
Source:	NEW	Exam:	SR02301
Test:	R	Misc:	GWL

Which one of the following would prevent the RHR heat exchangers from performing their design function.?

A. A loss of air to Heat Exchanger outlet valve HCV-1758.

B. Manually closing RH 25, inlet to RHR letdown valve HCV-1142.

C. A loss of air to Heat Exchanger Bypass valve FCV-1605.

D. Manually closing Component Cooling to the 1A and 1B RHR heat exchanger.

Answer: D

1954 **ID: RHR0044** **Points: 1.00**

Which ONE of the following describes an affect of PT-403 failing high?

A. MOV-1700 can be positioned as desired by the operator, but MOV-1701 cannot be closed if it was open.

B. MOV-1701 can be positioned as desired by the operator, but MOV-1700 cannot be opened if it was shut.

C. MOV-1701 can be positioned as desired by the operator, but MOV-1700 cannot be closed if it was open.

D. MOV-1700 can be positioned as desired by the operator, but MOV-1701 cannot be opened if it was shut.

Answer: B

Question 1954 Details

Question Type:	Multiple Choice
Topic:	RHR0044
System ID:	74938
User ID:	RHR0044
Status:	Active
Must Appear:	No
Difficulty:	0.00
Time to Complete:	0
Point Value:	1.00
Cross Reference:	
User Text:	1.00
User Number 1:	0.00
User Number 2:	0.00
Comment:	ND-88.2-LP-1C

1955 **ID: RHR0045** **Points: 1.00**

Which ONE of the following does NOT describe the RHR System?

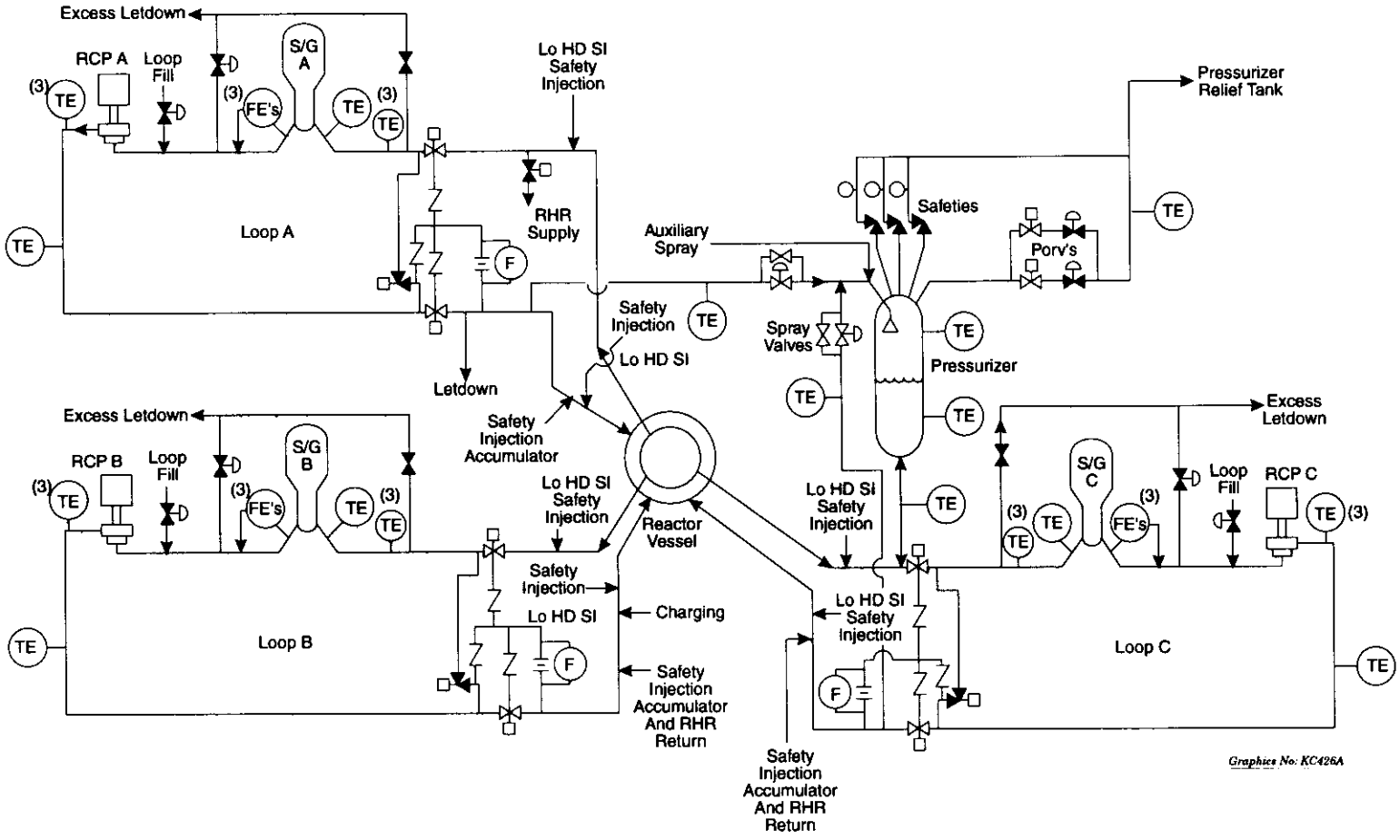
A. The RHR relief valve provides overpressure protection and relieves to the PRT.

B. The RHR heat exchanger outlet valve, HCV-1758, fails shut on a loss of air.

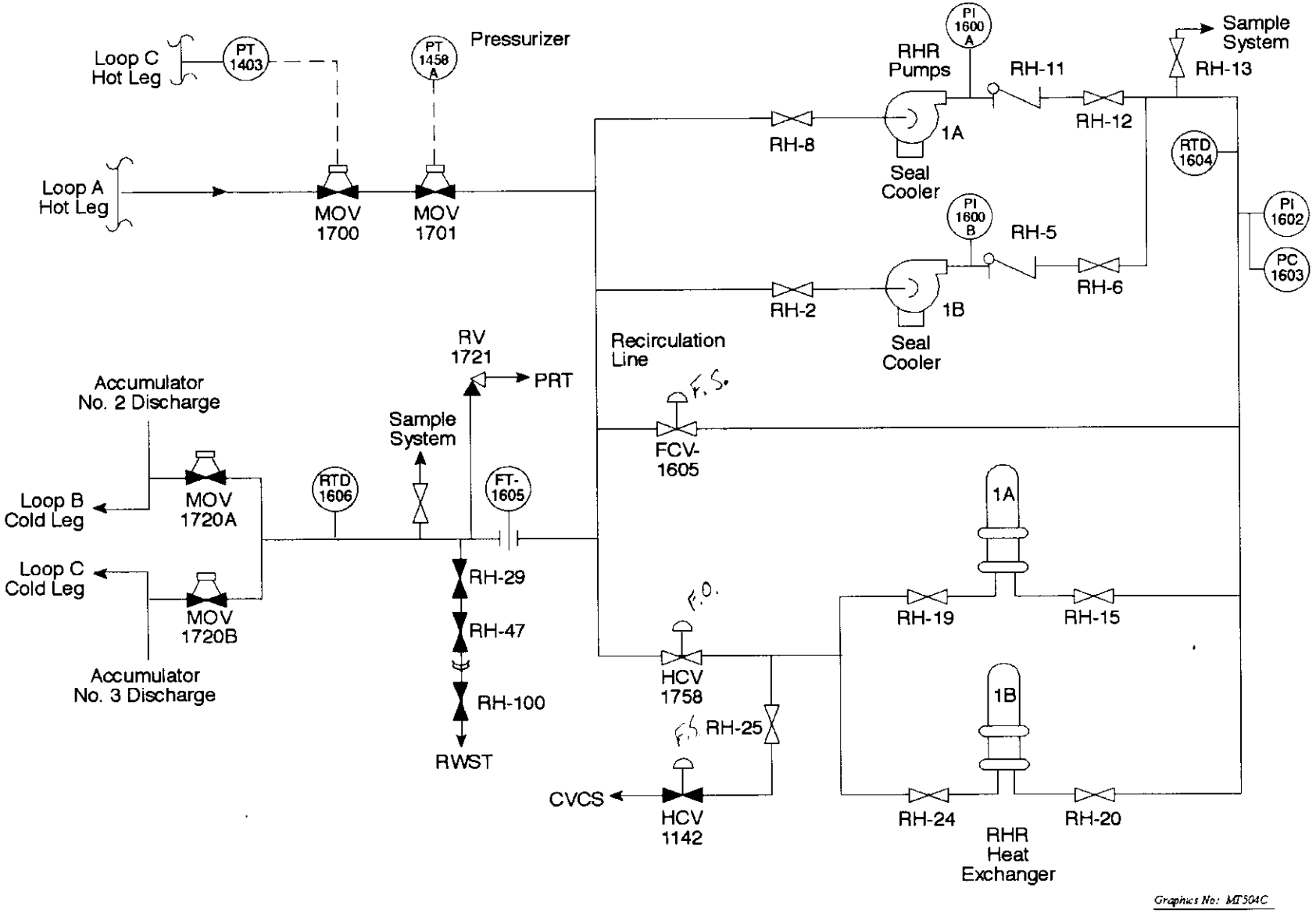
C. RHR letdown valve, HCV-1142, fails shut on a loss of air.

D. To open RHR suction valve MOV-1700, loop C pressure must be less than 460 psig.

Answer: B



REACTOR COOLANT SYSTEM DIAGRAM



RESIDUAL HEAT REMOVAL SYSTEM

QUESTIONS REPORT
for Surry2002

1. 007A2.02 001/T2G3/T2G3/HI PRT PRESSURE/C/A 2.6/3.2/N/SR02301/R/RLM

Unit 1 is at 100 % power.

Inleakage to the Pressurizer Relief Tank (PRT) from the excess letdown and RCP return relief valve, 1-DG-RV-100 has caused annunciator 1C-F7, PZR RELIEF TK HI PRESS, to alarm.

What are the effects on the function of the PRT system and what actions should be taken?

A. No effect on the function. Reduce pressure per 1-OP-RC-011, PRESSURIZER RELIEF TANK OPERATION.
B. Reduced pressure relief capacity. Reduce water level per 1-OP-RC-011, PRESSURIZER RELIEF TANK OPERATION.
C. No effect on the function. Reduce water level per 1-OP-RC-011, PRESSURIZER RELIEF TANK OPERATION.
D. Reduced pressure relief capacity. Reduce pressure per 1-OP-RC-011, PRESSURIZER RELIEF TANK OPERATION.

Ref: Surry lesson plan ND-88.1-LP-3, objective E
Answers A and C are incorrect because at a higher PRT initial pressure, the PRT will be more likely to rupture its disks on a design safety valve lift.
Answer D is incorrect because the cause of the problem is liquid inleakage from the seal return relief valve. If the operators only vent of the pressure, the PRT will eventually go solid which will in turn increase the likelyhood of a ruptured tank.
MCS Time: 1 Points: 1.00 Version: 0 1 2 3 4 5 6 7 8 9
Answer: B D D C B D C A B C Scramble Range: A - D

Which PRT alarm comes in first is a function of the initial value of both pressure + level. If the tank is low in the level band + high in the pressure band, then the high pressure alarm will come in first. This question comes from that direction. Both ARP's point to the same final control procedure.

C. Describe the construction, location, and interrelationships of the following major pressurizer relief tank components:

- PRT vessel
- Sparger pipe
- Primary grade spray
- Nitrogen, vent and drain lines
- Instrumentation

D. Explain the operation of the Pressurizer and Pressure Relief System during normal and transient operations.

E. **Describe the overall integrated operation of the pressurizer and pressure relief system.**

Presentation

Distribute all handouts. Refer to/display H/T-3.1, Objectives.

A. Pressurizer and Pressure Relief Purposes and Design Bases

1. Pressurizer Purposes and Design Bases

a. In conjunction with the RCS operation, the pressurizer has three basic purposes. They are:

(1) To provide pressure control of the RCS during plant heat-ups and cooldowns, in order not to exceed the allowable pressure-temperature relationships (operator's curve).

NUMBER	PROCEDURE TITLE	REVISION
1C-F7	PRZR RELIEF TK HI PRESS	4
		PAGE 1 of 3

1C-47

REFERENCES

1. UFSAR 4.2
2. 11448-ESK-10C, 10AJ
3. 11448-FM-83B, 86B
4. Tech Spec Table 3.7-6
5. Tech Spec 3.1
6. 1-DRP-005, Instrumentation Setpoints
7. 0-DRP-004, Precautions, Limitations and Setpoints
8. Tech Spec Amendment 198
9. DCP 95-001.40, MI Setpoint Changes

PROBABLE CAUSES

1. Alarm actuates when pressure comparator PC-RC-472 senses PRT pressure greater than or equal to 10 psig.

   High PRT pressure may be caused by one or more of the following:

   - Nitrogen regulator leaking
   - High PRT level
   - PRZR PORV lifting or leaking
   - Safety Valve lifting or leaking
   - Component relief valve lifting

2. Instrumentation failure has occurred.

APPROVAL RECOMMENDED	APPROVED	DATE
S E Gardner	W G Henry	3-26-9
REVIEWED		

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	__VERIFY PRT PRESSURE - GREATER THAN OR EQUAL TO 10 PSIG • PI-1-472	Do the following: a) Increase surveillance of PRT parameters. b) Initiate a Work Request. c) GO TO Step 11.
2.	__CHECK PRZR SAFETY VALVE(s) AND PORV(s) - ANY LEAKING • Decreasing RCS Pressure • Increasing PORV or Safety Line Temperature Indication	Check relief valves from other components: • 1-RH-RV-1721, RHR HX • 1-CH-RV-1203, Regenerative Heat Exchanger • 1-SI-RV-1859, SI ACCUM Relief VV • 1-DG-RV-101, PDTT Relief VV • 1-DG-RV-100, Excess Letdown & RCP Seal Return Relief VV
3.	__CHECK RCS PRESSURE - RX TRIP REQUIRED	Do the following: a) Verify closed or close 1-SI-TV-100. b) Initiate 1-AP-31.00, INCREASING OR DECREASING RCS PRESSURE. c) GO TO Step 5.
4.	__INITIATE 1-E-0, REACTOR TRIP OR SAFETY INJECTION	
5.	__MONITOR ACOUSTIC MONITORING PANEL	
6.	__PERFORM 1-OPT-RC-10.0, REACTOR COOLANT LEAKAGE	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

7. __REVIEW TECH SPEC TABLE 3.7-6

8. __REVIEW TECH SPEC 3.1.A.6 AND 3.1.G

9. __INITIATE WORK REQUEST

10. __RETURN PRT PRESSURE TO NORMAL USING 1-OP-RC-011, PRESSURIZER RELIEF TANK OPERATION

11. __PROVIDE NOTIFICATIONS AS NECESSARY:

- OMOC
- STA
- Shift Supervisor

- END -

ANNUNCIATOR RESPONSE PROCEDURE

NUMBER	PROCEDURE TITLE	REVISION
1C-G7	PRZR RELIEF TK HI LVL	1
		PAGE 1 of 3

REFERENCES

1C-55

1. UFSAR 4.2
2. 11448-ESK-10C, 10AJ
3. 11448-FM-83B, 86B
4. 0-DRP-004, Precautions, Limitations and Setpoints
5. 1-DRP-005, Instrument Setpoints
6. Tech Spec Amendment 198

PROBABLE CAUSES

1. Alarm actuates when comparator LC-RC-470A senses PRT level greater than or equal to 83%.

   High PRT level may be caused by one or more of the following:

   - PRZR PORV leaking.
   - Safety Valve leaking.
   - Component relief valve lifting.
   - Makeup valve leaking.

2. Instrumentation failure has occurred.

ENTERED BY
MAY 26 1995
WGS

APPROVAL RECOMMENDED	APPROVED	DATE
REVIEWED IRWIN	CHAIRMAN STATION NUCLEAR SAFETY AND OPERATING COMMITTEE	5-25-95

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
1.	__VERIFY PRT LEVEL - GREATER THAN OR EQUAL TO 83% • LI-1-470	Do the following: a) Increase surveillance of PRT parameters. b) Initiate a Work Request. c) GO TO Step 11.
2.	__CHECK PRZR SAFETY VALVE(s) AND PORV(s) - ANY LEAKING • Decreasing RCS Pressure • Increasing PORV or Safety Line Temperature Indication	Check relief valves from other components: • 1-RH-RV-1721, RHR HX • 1-CH-RV-1203, Regenerative Heat Exchanger • 1-SI-RV-1859, SI ACCUM Relief VV • 1-DG-RV-101, PDTT Relief VV • 1-DG-RV-100, Excess Letdown & RCP Seal Return Relief VV
3.	__CHECK RCS PRESSURE - RX TRIP REQUIRED	Do the following: a) Initiate 1-AP-31.00, INCREASING OR DECREASING RCS PRESSURE. b) GO TO Step 5.
4.	__INITIATE 1-E-0, REACTOR TRIP OR SAFETY INJECTION	
5.	__MONITOR ACOUSTIC MONITORING PANEL	
6.	__PERFORM 1-OPT-RC-10.0, REACTOR COOLANT LEAKAGE	
7.	__REVIEW TECH SPEC TABLE 3.7-6	

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

8. __REVIEW TECH SPEC 3.1.A.6 AND 3.1.G

9. __INITIATE A WORK REQUEST

10. __RETURN PRT LEVEL TO NORMAL USING 1-OP-RC-011, PRESSURIZER RELIEF TANK OPERATION

11. __PROVIDE NOTIFICATIONS AS NECESSARY:

- OMOC
- STA
- Shift Supervisor

- END -

QUESTIONS REPORT
for Surry2002

1. 008A1.04 001

Unit 2 is at Intermediate Shutdown at 300 degrees F. Unit one is operating at 100% power.

A leak in

Which one of the following could cause an increase in CC Surge Tank level?

A. Regenerative heat exchanger.

B. Seal return heat exchanger.

✓C. RHR heat exchanger.

D. RCP bearing lube oil cooler.

Surry Bank question slightly modified.

Ref: ND-88.5-LP-1 objective A

MCS Time: 1 Points: 1.00 Version: 0 1 2 3 4 5 6 7 8 9

Answer: Scramble Range: A - D

RO Tier:	T2G3	SRO Tier:	
Keyword:	T2G3	Cog Level:	3.1/3.2 C/A
Source:	BANK SURRY	Exam:	SR02301
Test:	R	Misc:	GWL

COMPONENT COOLING SYSTEM LOADS

CARF/NST

17. Containment Instrument Air Compressor
18. Containment Air Recirc Fan Coolers
19. Neutron Shield Tank Coolers

CRDM Shroud Cooling/RCP

19. Shroud Cooling Coils
21. RCP Thermal Barrier Heat Exchangers †
22. RCP Motor Air Coolers
23. RCP Bearing Lube Oil Coolers

Hot Pipe Containment Penetration Cooling (>150^{0}F)

24. Containment Penetration Coolers
    a. Letdown
    b. Blowdown
    c. Main Steam
    d. Main Feed

Excess Letdown/RHR

25. Excess Letdown Heat Exchanger †
26. Primary Drains Cooler
27. RHR Heat Exchanger †
28. RHR Pump Seals †
29. Primary Shield Wall Coolers - for each loop penetration

Notes:

† Possible source of leakage into Component Cooling

COMPONENT COOLING SYSTEM LOADS

Common BR Components

1. Stripper Overhead Condenser
2. PDT Vent Chiller Condenser
3. PDT Pump
4. High Level Waste Drain Tank Pump
5. Overhead Gas Compressor
6. Stripper Trim Cooler

BR Evaporator Components

7. HRSS Sample Coolers †
8. BR Evaporator Circ Pumps •
9. BR Distillate Coolers •
10. BR Overhead Condensers •
11. BR Evaporator Distillate Pumps •
12. Primary Sample Coolers †

Spent Fuel Pit Coolers/Cask

13. Spent Fuel Pit Coolers †
14. Spent Fuel Pit Cask

NRHX/Seal Water RTN

15. Nonregenerative Heat Exchanger †
16. Seal Water Return Cooler

Notes:

† Possible source of leakage into Component Cooling

• Abandoned in place equipment

Question 420 Details

Question Type:	Multiple Choice
Topic:	CC00042
System ID:	72760
User ID:	CC00042
Status:	Active
Must Appear:	No
Difficulty:	0.00
Time to Complete:	0
Point Value:	1.00
Cross Reference:	
User Text:	1.00
User Number 1:	0.00
User Number 2:	0.00
Comment:	ND-88.5-LP-1F
	[S95-0312]

421 **ID: CC00044** **Points: 1.00**

Unit 2 is at Intermediate Shutdown at 300øF, 325 psig. Unit 1 is operating at 100% power.

Which ONE of the following could cause an increase in CC Surge Tank level?

A. RCP lube oil cooler leak.

B. RHR HX leak.

C. Seal return HX leak.

D. CC HX tube leak.

Answer: B

Question 393 Details

Question Type:	Multiple Choice
Topic:	CC00012
System ID:	72732
User ID:	CC00012
Status:	Active
Must Appear:	No
Difficulty:	0.00
Time to Complete:	0
Point Value:	1.00
Cross Reference:	
User Text:	1.00
User Number 1:	0.00
User Number 2:	0.00
Comment:	ND-88.5-LP-1C [S98-0041], [S96-1270A], [S95-0312]

394 **ID: CC00013** **Points: 1.00**

Which ONE of the following leaking components would result in an INCREASING level in the Component Cooling Water Surge Tank?

A. Regenerative heat exchanger

B. RCP bearing lube oil cooler

C. Excess letdown heat exchanger

D. Component cooling water heat exchanger

Answer: C

Question 394 Details

Question Type:	Multiple Choice
Topic:	CC00013
System ID:	72733
User ID:	CC00013
Status:	Active
Must Appear:	No
Difficulty:	0.00
Time to Complete:	0
Point Value:	1.00
Cross Reference:	
User Text:	1.00
User Number 1:	0.00
User Number 2:	0.00
Comment:	ND-88.5-LP-1A [S95-0312]

QUESTIONS REPORT
for SURRY2002

1. 010A2.03 001

The folowing Unit 1 Plant conditions exist.

-PT-1445 has failed full scale HIGH.
-AP-31 "Increasing or Decreasing RCS Pressure", has been entered.

Which one of the following describes actions that would mitigate this event in accordance with AP-31?

A. Place 1-CH-PC-1444J, PRZR PRESS MASTER CNTRL in MANUAL and increase demand to increase RCS Pressure.

B. Place 1-CH-PC-1444J, PRZR PRESS MASTER CNTRL in MANUAL and decrease demand to decrease RCS pressure.

C. Manually adjust spray valves open, and turn Pressureizer heaters off to decrease RCS pressure.

D. Manually close or verifly closed PRZR PORV1456 to increase RCS pressure

Source: Modified from question in the Surry Exam bank.
Ref: ND-93.3-LP-5. Pressurizer Pressure Control.
~~Answer: B~~

A. Incorrect, Pressure is decreasing due to PT-1445 being failed high. This would raise pressure.

B. Incorrect, If PT-1444 was failed high this would mitigate this event.

C. Incorrect, PT- 1445 failing high causes a low RCS pressure condition, these actions would also lower RCS pressure and would not mitigae the event.

D. Correct, Closing PORV 1456 will stop the pressure decrease caused by 1456 being open due to the PT-1445 transmitter being failed high.

MCS Time: 1 Points: 1.00 Version: 0 1 2 3 4 5 6 7 8 9
Answer: D D A C B D B D C C Scramble Range: A - D

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	C/A 4.1/4.2
Source:	N	Exam:	SR02301
Test:	R	Misc:	GWL

Event Description: Pressurizer Pressure Controller fails high slowly enough for crew to take manual control prior to trip

Time	Position	Applicant's Actions or Behavior
	RO	Diagnoses high failure of either PZR Pressure Transmitter PT 444 or Master Controller Alarms: PRZR PRESS CONTR HI (1C-A8) PRZR LO PRESS (1C-B8) PRZR SFTY VV PWR RELIEF VV OPEN (1D-H4) PRZR LO LVL PRZR PWR RELIEF LINE HI TEMP (1C-D7) PRZR RELIEF TK HI PRESS OVTEMP DELTA T TURB RNBK & ROD STOP (1G-F3,F4) Indications: MCB meter for PT 444 reads maximum pressure PRZR Master Controller goes to maximum output PRZR Spray valves go full open PORV 1455C opens
		Takes action IAW ARP 1C-A8 (Note: actions taken for any other ARP will delay actions necessary to avoid a Rx Trip or SI) Place Master Controller in MANUAL and decrease output. Verify closed or close 1-RC-PCV-1455C Verify closed or close PZR spray valves.
	SRO	Directs RO to control pressure IAW 1-AP-31.00. Should note that 1-RC-PCV-1455C is inoperable while control is in manual. This makes BOTH PORV's inoperable. SRO should re-review TS 3.1.6
	RO	Maintains RCS pressure IAW 1-AP-31.00 (see attached)
	SRO	Provide notifications: OMOC STA

QUESTIONS REPORT

for Surry2002

1. 010A2.03 001/T2G2/T2G2//C/A 4.1/4.2/M/SR02301/R/GWL

All PZR pressure controls are in automatic with the plant operating at 100% power. The controlling PZR pressure transmitter, PT-1445, fails high.

Which one of the following indicates how the following PZR components will respond, as a result of this failure?

A. One PORV opens, both spray valves open, and all pressurizer heaters energize.

B. One PORV opens, both spray valves close, B/U heaters energize and proportional heaters go to maximum.

C. Both PORVs open, both spray valves open, and all heaters deenergize.

D. Both PORVs open, both spray valve close , B/U heaters denergize and proportional heaters go to minimum.

Source: Modified from question in the Surry Exam bank.
Ref: ND-93.3-LP-5. Pressurizer Pressure Control.
Answer: B

EXAMINATION ANSWER KEY

RO/SRO Exam Bank

Question 1637 Details

Question Type:	Multiple Choice
Topic:	PPC0007
System ID:	74478
User ID:	PPC0007
Status:	Active
Must Appear:	No
Difficulty:	0.00
Time to Complete:	0
Point Value:	1.00
Cross Reference:	
User Text:	1.00
User Number 1:	0.00
User Number 2:	0.00
Comment:	ND-93.3-LP-5D [S96-0818]

1638 **ID: PPC0010** **Points: 1.00**

The following conditions exist:

- PT-1445 has failed full scale HIGH.
- A PORV has opened.
- RCS depressurization is in progress.

Which ONE of the following actions would isolate flow through the open PORV?

A. Defeat the affected channel using the channel defeat switch.

B. Place the control switch for PORV 455C in the CLOSE position.

C. Place the control switch for PORV 456 in the CLOSE position.

D. Place Pressure Controller in manual and lower controller demand.

Answer: C

LESSON PLAN

Introduction

The Pressurizer Pressure Control System is a useful and important system. Since it provides the means for assuring that pressure is maintained near the design operating value, it helps to prevent void formation in the core which would interfere with core heat removal. In order to prevent this departure from nucleate boiling from occurring in the coolant, pressurizer pressure is maintained at a value greater than the saturation pressure for full load and transient operation core outlet temperatures. By understanding the operation and design of the Pressure Control System, timely and proper actions can be taken upon a system malfunction to ensure that core voiding does not occur.

Objectives

After receiving this instruction, the trainee will be able to:

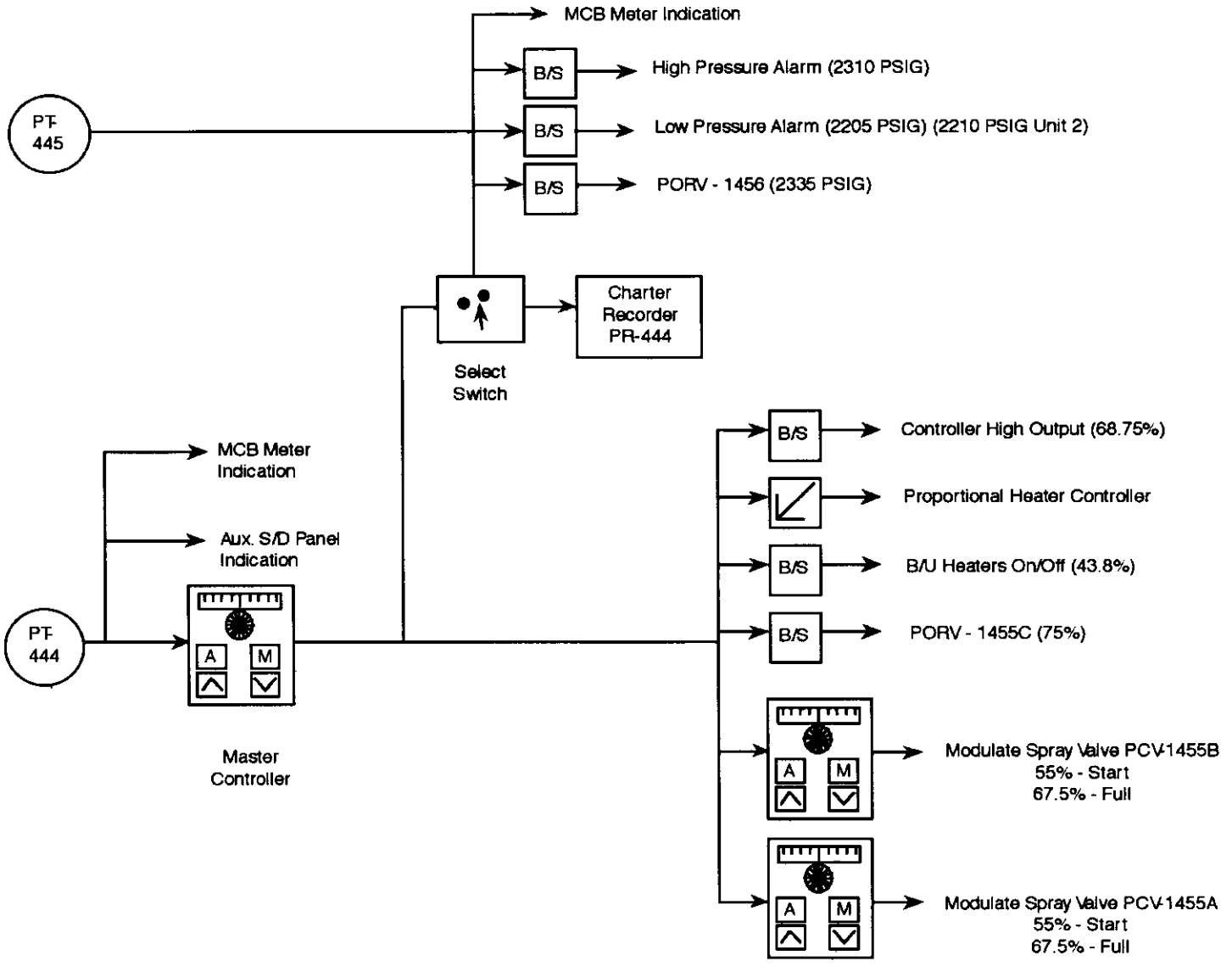
A. Describe the major components associated with the Pressurizer Pressure Control System.

B. Using a one-line diagram, drawn from memory, describe all design characteristics of the Pressurizer Pressure Control System, including setpoints, controls, interlocks, inputs, and outputs.

*C. In accordance with AP-31, explain the operator actions necessary during abnormal functioning of the Pressurizer Pressure Control System.

D. Using a one-line diagram drawn from memory for illustrating system outputs, explain the overall integrated operation of the Pressurizer Pressure Control System.

* Not applicable for STAs.



Graphics No: MT97

PRESSURE CONTROL SYSTEM OUTPUTS

QUESTIONS REPORT
for Surry2002

1.

All PZR pressure controls are in automatic with the plant operating at 100% power. The controlling PZR pressure transmitter, PT-1445, fails high.

Which one of the following indicates how the following PZR components will respond, as a result of this failure?

A. One PORV opens, both spray valves open, and all pressurizer heaters energize.

B. One PORV opens, both spray valves close, B/U heaters energize and proportional heaters go to maximum.

C. Both PORVs open, both spray valves open, and all heaters deenergize.

D. Both PORVs open, both spray valve close , B/U heaters denergize and proportional heaters go to minimum.

Source: Modified from question in the Surry Exam bank.
Ref: ND-93.3-LP-5. Pressurizer Pressure Control.
Answer: B
MCS Time: 1 Points: 1.00 Version: 0 1 2 3 4 5 6 7 8 9
Answer: BACDBDBABD Scramble Range: A - D

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	4.1/4.2
Source:	MOD	Exam:	SR02301
Test:	S R	Misc:	GWL

Modified this Question

All PZR pressure controls are in automatic with the plant operating at 100% power. The controlling PZR pressure transmitter, PT-~~1444~~ 1445, fails high.

Which ONE of the following indicates how the following PZR components will respond, as a result of this failure? (Assume ALL components listed are in automatic)

A. One PORV opens, both sprays open, and all heaters energized.

B. Both PORVs closed, both sprays open, B/U heaters energize, and prop heaters at minimum.

C. One PORV opens, both sprays open, B/U heaters off, and prop heaters at minimum.

D. Both PORVs open, one spray opens, and all heaters energized.

Answer: C

QUESTIONS REPORT
for Surry2002

1.

Unit 1 is operating at 30% power when all three "A" loop flows and "A" RCP amps suddenly decrease to minimum. The breaker for the "A" RCP remains closed. Select the reactor protection system response to this event.

A. No automatic reactor trip will occur due to the "A" RCP breaker remaining closed.

B. An automatic reactor trip will occur due to power being > P-10.

C. No automatic reactor trip will occur due to reactor power being < P-8.

D. An automatic reactor trip will occur only if the "A" RCP breaker is opened.

Ref: Surry Exam Bank. Lesson Plan ND-93.3-LP-10 objective D.
Answer: C
MCS Time: 1 Points: 1.00 Version: 0 1 2 3 4 5 6 7 8 9
Answer: CABDDDDBCD Scramble Range: A - D

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	3.2/3.5
Source:	BANK	Exam:	SR02301
Test:	R	Misc:	GWL

Surry Exam Bank

Which ONE of the following describes how the Reactor Trip Breakers (RTBs) and Bypass Breakers (BBs) are opened by the Reactor Protection System from any manual or automatic trip signal?

A. The UV coil energizes for both the RTBs and the BBs. The trip coil de-energizes for both the RTBs and the BBs.

B. The UV coil de-energizes for both the RTBs and the BBs. The trip coil energizes for the RTBs.

Question 1697

C. The UV coil and the trip coil de-energize for the RTBs and the trip coil energizes for the BBs.

D. The undervoltage (UV) coil and the trip coil for both the RTBs and the BBs de-energize.

Unit 1 is operating at 28% power when all three "A" RCS loop flows and the "A" RCP amps suddenly decrease to minimum. The breaker for the "A" RCP is still closed. Select the reactor protection system response to this event.

A. No automatic reactor trip due to <P-8.

B. No automatic reactor trip due to the "A" RCP breaker remaining closed.

QA 1720

C. Automatic reactor trip since power is >P-10.

D. Automatic reactor trip only if the "A" RCP breaker is opened.

Answer: A

017K406

Which ONE of the following describes how the Reactor Trip Breakers (RTBs) and Bypass Breakers (BBs) are opened by the Reactor Protection System from any manual or automatic trip signal?

A. The UV coil energizes for both the RTBs and the BBs. The trip coil de-energizes for both the RTBs and the BBs.

B. The UV coil de-energizes for both the RTBs and the BBs. The trip coil energizes for the RTBs.

C. The UV coil and the trip coil de-energize for the RTBs and the trip coil energizes for the BBs.

D. The undervoltage (UV) coil and the trip coil for both the RTBs and the BBs de-energize.

LESSON PLAN

Introduction

In order to assure the maintenance of the reactor system's integrity and to prevent causing unnecessary risks to the health and safety of the general public, an extensive and detailed network of reactor protection subsystems is needed. These systems work cooperatively to supply reactor and component trip signals and ESF initiating signals in order to provide the necessary protection for all normal and accident conditions. These initiating and trip signals are normally automatically provided.

In the case of an automatic initiation, the role of the operator is to verify proper automatic actuation and operation. In the event of a system malfunction, however, the operator's role is transformed. Here, the manual initiation of these signals is vital to ensure the health and safety of the public and protection of the reactor core. This lesson will provide the basic information necessary for building and understanding of the interrelationships existing between the many protection subsystems.

Objectives

After receiving this instruction, the trainee will be able to:

A. Describe the functions of the Reactor Protection Subsystem.

B. Explain the operation of the Reactor Trip Breakers in response to a manual or automatic trip signal.

C. Explain all RPS reactor trip signals, including setpoints, coincidences, and purpose.

D. Explain the Reactor Protection System philosophy, including trip signals, method of tripping, and need of protection.

QUESTIONS REPORT
for Surry2002

1.

During performance of testing, the mode selector switch on the B train output relay test panel is placed in the TEST position. If an actual plant condition calling for an automatic safety injection (SI) occurs, which one of the following will occur?

A. No SI actuation or reactor trip will occur on either train.

B. No SI actuation will occur on either train, but the reactor will trip.

C. SI actuation will occur on A train only, and the reactor will trip.

D. SI actuation will occur on both A and B trains, and the reactor will trip.

Farley exam 1994.

K/A 013K5.02 2.9/3.3

ANSWER C

TALK TO MIKE !!

*QDATE 1993/10/19
*FAC 348 Farley 1 & 2
*RTYP PWR-WEC3
*EXLEVEL S
*EXMNR
*QVAL
*SEC
*SUBSORT
*KA 013000K502
*QUESTION
During the performance of a surveillance test, the mode selector switch on the B train output relay test panel is placed in the TEST position. If an actual plant condition calling for an automatic safety injection (SI) occurs, which one of the following will occur?

a. No SI actuation or reactor trip will occur on either train.

b. No SI actuation will occur on either train, but the reactor will trip.

c. SI actuation will occur on A train only, and the reactor will trip.

d. SI actuation will occur on both A and B trains, and the reactor will trip.

*ANSWER
c.

*REFERENCE
LP OPS-52201I, Obj. 26; Exam Bank Question 052201I09063

KA 013000K502 [2.9/3.3]

QUESTIONS REPORT
for Surry2002

1. Given the following conditions:
   - Reactor Startup is in progress.
   - Source range channel N-31 indicates 9.4E4 cps.
   - Source range channel N-32 indicates 1E5 cps.
   - Intermediate range channel N-35 indicates 4E-10 amps
   - Intermediate range channel N-36 indicates 1.5E-11 amps.

   Which one of the following statements describes the condition of the nuclear instruments?

   A. N-35 is undercompensated.

   B. N-36 is undercompensated.

   C. N-35 is overcompensated.

   D. N-36 is overcompensated.

Modified from Farley 1993 exam.

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	3.96/3.9 C/A
Source:	BANK	Exam:	SR02301
Test:	R	Misc:	

015 A3.03

ANSWER D

ANUM
*QCHANGED FALSE
*ACHANGED FALSE
*QDATE 1993/10/19
*FAC 348 Farley 1 & 2
*RTYP PWR-WEC3
*EXLEVEL S
*EXMNR
*QVAL
*SEC
*SUBSORT
*KA 015000A303
*QUESTION
Given the following conditions:

- Reactor startup is in progress
- Source range channel N31 indicates 1E5 cps
- Source range channel N32 indicates 9.5E4 cps
- Intermediate range channel N35 indicates 1.5E-11 amps
- Intermediate range channel N36 indicates 4E-10 amps

Which one of the following statements describes the condition of the nuclear instruments?

a. N35 is overcompensated.

b. N35 is undercompensated.

c. N36 is overcompensated.

d. N36 is undercompensated.

*ANSWER
a.

*REFERENCE

LESSON PLAN

Introduction

The Intermediate Range Nuclear Instrumentation System provides the indication of reactor power between the source and power range scales. By proper monitoring and operation of the Intermediate Range NIS, the capability of this system to perform its prime directives of displaying core power and providing alarms, interlocks, and trips will be maintained. The material presented in this section will provide the information necessary to safely monitor and operate the Intermediate Range NIS.

Objectives

After receiving this instruction, the trainee will be able to:

A. Explain the construction and operation of an Intermediate Range compensated ion chamber detector.

B. Using the supplied drawing as an initial reference, draw from memory a one-line diagram of the Intermediate Range detection circuit, illustrating and explaining the design and operation of each of the circuit components, detector logics, output signals, and power supplies.

C. Explain the terms "undercompensated" and "overcompensated" as they apply to the Intermediate Range NIS, including in the explanation, the indications, causes, and potential problems associated with each condition.

D. Explain the operation of the Intermediate Range detection system during both normal and abnormal operating conditions.

C. Over and Under-Compensation

Refer to/display H/T-3.5, Under/Overcompensation Effects.

1. Reliable intermediate range indication in the overlap region between source and intermediate ranges is dependent upon proper adjustment of compensating voltage to the CIC.

2. If the compensating voltage for the detector is set too high, the detector is Overcompensated.

   a. The current generated in the inner can is greater than the current produced by the outer can.

   b. When the inner and outer can currents are summed, all of the outer can γ current and some of the Neutron current will be cancelled by the excessive inner can γ current.

   c. This effect causes the IR indication to be less than actual core power which is non-conservative.

3. When compensating voltage is set too low, the detector is Undercompensated.

   a. The inner can γ current will be too small to cancel out the outer can γ current.

   b. This results in the IR indication being greater than actual core power.

QUESTIONS REPORT
for Surry2002

1. 016K4.03 001/T2G2/T2G2/AMSAC/M 2.8/2.9/B/SR02301/R/RLM

WHICH ~~ONE (1)~~ one of the following describes the MINIMUM setpoints and coincidence required for the Anticipatory Mitigating Systems Actuation Circuitry, AMSAC, to actuate? conditions

A. 2/2 Turbine first stage pressures greater than 37% turbine load, AND 2/3 S/G narrow range level transmitters less than 13%.
B. 1/2 Turbine first stage pressures greater than 37% turbine load, AND 1/3 S/G narrow range level transmitters less than 13%.
C. 2/4 Power Range NI's greater than 37%, AND 1/3 S/G narrow range level transmitters less than 13%.
D. 2/4 Power Range NI's greater than 37%, AND 2/3 S/G narrow range level transmitters less than 13%.

Ref: Source: Robinson EB# 43744
Surry Lesson Plan ND-93.3-LP-17, objective B
Answer: Lesson Plan p. 7

Objectives

After receiving this instruction, the trainee will be able to:

A. Describe the purpose of the AMSAC system.

B. **Describe the initiating signals and the output of the AMSAC system.**

C. Describe the AMSAC system indications available to the MCR operators.

D. Describe the power supplies to the AMSAC system.

E. Describe the Anticipatory Mitigating System Actuating Circuitry (AMSAC).

Presentation

Distribute all handouts. Refer to/display H/T-17.1, Objectives, and review with trainees.

A. Requirements and Purpose

1. The Anticipatory Mitigating System Actuating Circuitry (AMSAC) was installed to provide an independent method of providing reactor protection should the reactor protection system fail to actuate during a loss of heat sink accident.

2. Installation of the AMSAC panel was mandated by the NRC as defined by 10 CFR 50.62.

3. [Industry events such as the Salem and Browns Ferry events indicated that an additional trip delivery system was required. SOER 83-08.]

b. Both turbine 1st stage pressures must be >37%. This is an "and" circuit, providing an input to each of the PLCs. When either 1st stage pressure decreases below 37%, the signal is removed, but only after a 360 second (6 minutes) time delay clocks out.

- The logic for the AMSAC signal, in regards to the Pimp signal is met as soon as **both channels are greater than 37%.**

- When 1/2 channels decreases to <37%, the 6 minute time delay begins. If the channel returns to >37% during this time delay, the 6 minute timer is interrupted and reset.

c. **2 out of 3 steam generator narrow range level channels <13% provide a generator low level signal.**

d. With the turbine at a substantial power level (> 37%) and a low level condition in the steam generator (< 13%), the potential loss of heat sink is recognized, and the PLC develops an output signal. The signal is held up for 27 seconds from reaching the final 2 of 3 PLC logic matrix to allow the RPS system to operate. However, the delay is short enough, <30 seconds, to provide for the turbine trip required in the ATWS analysis.

QUESTIONS REPORT
for Surry2002

1.

A Large Steam Line Break has occured on Unit 1.
Containment pressure is 16 psia and rising,

Which one of the following describes what will automatically occur as pressure continues to rise.

A. At 3.0 psig all the containment recirculation fans will shift to slow speed.

B. At 8.3 psig all the containment recirculation fans will trip off.

C. At 17.7 psia the containment recirculation Fan C will trip off.

D. At 23.0 psia the containment recirculation Fans A and B will trip off.

ND-88.4-LP-6 modified from Surry 1990 nrc exam question.

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	3.8/3.8
Source:	MOD	Exam:	SR02301
Test:	R	Misc:	

Answer D

022 A4.05

Unit 1 was operating at 100% power when it tripped due to a Large Steam Line break in containment.

Containment pressure is now 16 psia. and increasing.

Which of the following describes what will automatically occur as pressure continues to rise.

A. At 23 psia the containment recirculation fans A&B will trip off.

B. At 17.7 psia all the containment Fan C will trip off.

C. At 8.3 psig all the containment recirculation fans will trip off.

D. At 3.0 psig all the containment recirulation fans will shift to slow speed.

answer: A.

*QNUM 22353
*HNUM 22494 (Do NOT change If < 9,000,000)
*ANUM
*QCHANGED FALSE
*ACHANGED FALSE
*QDATE 1990/08/06
*FAC 280 Surry 1 & 2
*RTYP PWR-WEC3
*EXLEVEL S
*EXMNR
*QVAL
*SEC
*SUBSORT
*KA 022000K403
*QUESTION
If containment pressure increases to 23.0 psia, which ONE of the following responses is the correct response of the Containment Ventilation System ?

8.3 PSIG

a. All Containment Recirculation Fans trip off.

b. All Containment Recirculation Fans shift to high speed.

c. Containment Recirculation Fans A & B will trip off.

d. Containment Recirculation Fan C will trip off.

*ANSWER
c.
*REFERENCE
022000K403 3.6/4.0 Automatic containment isolation
ND-91-LP-4; p.4.10; Section Obj. D

Steam Break IN CTMT.
Pressure is Rising

9

LESSON PLAN

Introduction

The Containment Ventilation System is designed to maintain the containment temperature within specific limits for equipment operation and personnel habitability, and to ensure the containment remains within the design pressure limits during the design basis accident. This lesson will provide the trainee with the information necessary to properly operate each of the Containment Ventilation Systems and to ensure the containment temperature is maintained within the limits assumed in the UFSAR.

Objectives

After receiving this instruction, the trainee will be able to:

A. Describe the operation of the Containment Air recirculation System, including flowpaths, capacities, power supplies and trip signals.

B. Describe the operation of the control rod drive mechanism cooling system, including flowpaths, capacities, and power supplies.

C. Describe the purpose and operation of the iodine filtration system.

D. Describe the operation of the Containment Purge System, including the purpose, flowpaths, and trip signals.

E. Explain the Technical Specifications associated with the Containment Ventilation System, including for SRO candidates, the basis behind these specifications.

QUESTIONS REPORT
for Surry2002

1. 029G2.4.49 001

-Reactor Power is at 85%.
-A failure in the pressurizer pressure control system has caused pressurizer pressure to lower to 1800 psig.
-The reactor failed to trip, FR-S.1 has been entered.
-The Main Turbine failed to trip automatically and from the MCR benchboard.

Which one of the following describes the actions required to be taken IAW FR-S.1?

A. Initiate a Safety Injection based on low Pressurizer pressure.

B. Place control rods in automatic and place the EHC switches in pull to lock.

C. Drive control rods in manual and immediately shut the MSTV and direct MSTV bypass closure.

D. Place control rods in automatic and manually runback the turbine using the valve position limiter.

Ref: Surry Lesson Plan ND-95.3-36 Objective ¢. D.
Modified from question # 983.

A. Incorrect, FR-S.1 does not instruct the team to Initate an SI. This would trip the Main Feed pumps an potentially make the event worse.

B. Incorrect, Placing the control rods in automatic is a correct action but placing the EHC switches in pull is not in the procedure.

C. Incorrect, Manually driving the control rods in would be acceptable if automatic did not work but the procedure directs the operator to remove the turbine by lowering the limiter.

D. Correct, IAW FR-S.1

MCS Time: 1 Points: 1.00 Version: 0 1 2 3 4 5 6 7 8 9
Answer: D B B B B C B B A B Scramble Range: A - D

RO Tier:	T1G2	SRO Tier:	T1G1
Keyword:		Cog Level:	C/A 4.0/4.0
Source:	M	Exam:	SR02301
Test:	R	Misc:	GWL

The Function Restoration procedure, FR-S.1, Response to Nuclear Power Generation/ATWS, provides guidance in the event of an unexpected nuclear flux condition following a Reactor Trip or SI actuation or if an ATWS has occurred.

The objective of the recovery/restoration technique of FR-S.1 is to add negative reactivity to restore the core to subcriticality; restoration of shutdown margin is desired, but is not a necessity to exit this procedure.

This lesson on FR-S.1, Response to Nuclear Power Generation/ATWS, will provide an in-depth look at the designed response to this challenge to the Subcriticality Critical Safety Function.

Objectives

After receiving this instruction, the trainee will be able to:

A. Given a simulated plant condition requiring the use of the critical safety function status trees, transition through the subcriticality status tree denoting, in accordance with the rules of priority, any applicable function restoration procedure needing implementation.

B. Given the Major Action Categories associated with FR-S.1, Response to Nuclear Power Generation/ATWS, explain the purpose of FR-S.1, the transition criteria for entering and exiting FR-S.1, and the types of operator actions that will occur within each category.

C. Given a copy of FR-S.1, Response to Nuclear Power Generation/ATWS, explain the basis of each procedural step.

D. Given actual or simulated plant conditions requiring implementation of FR-S.1, Response to Nuclear Power Generation/ATWS, successfully transition through the procedure, performing immediate operator actions from memory and applying step background knowledge as required, to address the Critical Safety Function challenge in progress.

EXAMINATION ANSWER KEY

RO/SRO Exam Bank

983 **ID: EOP0235** **Points: 1.00**

Which ONE of the following actions is required if the main turbine does not trip automatically and cannot be tripped using the Main Turbine trip pushbuttons from the MCR Benchboard, per FR-S.1, "Response to Nuclear Generation/ATWS"?

A. Manually runback the turbine, using the valve position limiter.

B. Shut the MSTV and direct the MSTV bypass valves to be opened to permit Steam Dump operation.

C. Place the EHC pumps control switches in PULL TO LOCK.

D. Open the generator output breakers.

Answer: A

Question 983 Details

Question Type:	Multiple Choice
Topic:	EOP0235
System ID:	73523
User ID:	EOP0235
Status:	Active
Must Appear:	No
Difficulty:	0.00
Time to Complete:	0
Point Value:	1.00
Cross Reference:	
User Text:	1.00
User Number 1:	0.00
User Number 2:	0.00
Comment:	ND-95.3-LP-36C; 1-FR-S.1
	[S96-1348], [S95-1063]

QUESTIONS REPORT
for Surry2002

1.

Unit 1 is at 80% power, and the "A" MFW pump trips.

Which one of the following describes the **First** plant response to the MFW pump trip.

A. The reactor will trip on a loss of feedwater signal.

B. A Reactor trip will occur due to a main steam flow/ main feed flow mismatch and low Steam Generator level.

C. The Auxiliary Feedwater Pumps automatically start on the trip of the MFW Pump.

D. A Reactor trip will occur due to lo-lo Steam generator level.

K/A 059K3.03
Ref: ND-95.1-LP-4 Modified from a question in Surry Exam bank.
MCS Time: 1 Points: 1.00 Version: 0 1 2 3 4 5 6 7 8 9
Answer: BADBCACCBA Scramble Range: A - D

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	3.5/3.7 C/A
Source:	MOD	Exam:	SR02301
Test:	R	Misc:	GWL

Presentation

A. Sequence of Events (Loss of Main Feed)

Distribute all handouts. Refer to/display H/T 4.1, Objectives. Review objectives with trainees

Ask trainees to come up with the following protection items.

1. The following items provide the necessary protection for a loss of main feedwater accident:

   a. Reactor trip on a low-low water level in any steam generator (2/3 ch < 17%) (unless that RCS loop stop valves are closed).

   b. Reactor trip on main steam flow/feedwater flow mismatch coincidental with a low water level in any S/G (1/2 ch feed < steam by .709 x E6 pph ICW 1/2 ch level < 20%).

   c. The operation of two motor-driven auxiliary feedwater pumps (350 gpm each), which can be started either manually or automatically. Auto-starts are

      (1) Low-low water level in any one S/G (2/3 ch < 17%).

      (2) Opening of 1/2 bkrs on 2/2 main feedwater pumps.

      (3) Any SI signal (after 50 sec T.D.).

OBJECTIVES

After receiving this instruction, the trainee will be able to:

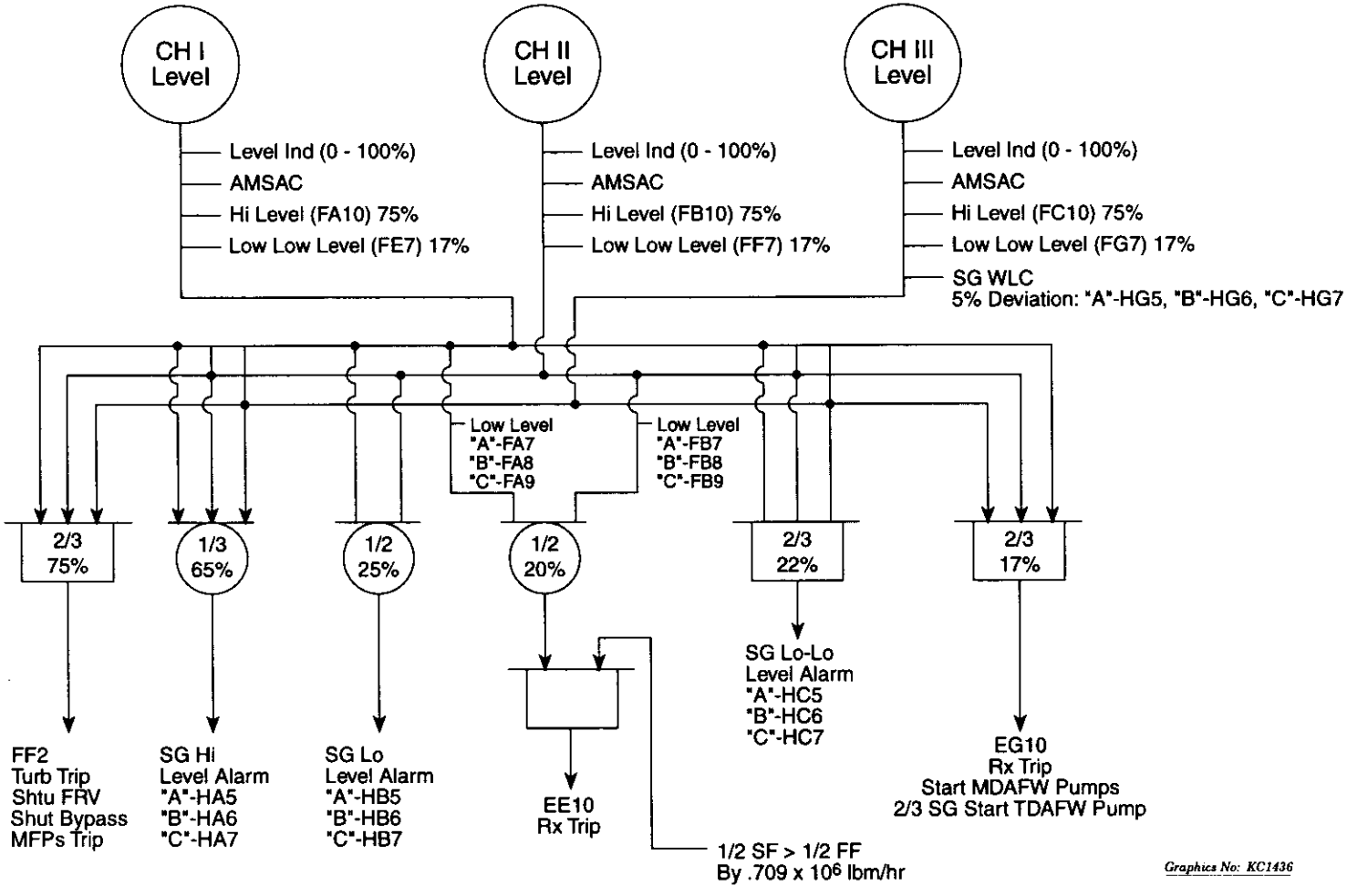
A. Describe the values of the SG level program, including the design considerations for the levels.

B. Reproducing from memory a simplified one-line diagram for illustration purposes, explain the operation of the SGWLC system.

C. Describe the protective functions provided by the SG level instruments.

D. Describe the effects and required operator actions for a failure of an input to the SGWLC System.

E. Using a simplified one-line diagram drawn from memory, explain the operation of the Steam Generator Water Level Control System, including its purpose, level program design, and protective actions.



SG LEVEL CONTROL AND PROTECTION

QUESTIONS REPORT
for Surry2002

1. 062K1.02 001 occurred

A complete loss of off-site power has occured and the following conditions exist:

- #1 EDG is supplying 1H bus.
- #2 EDG is inoperable.
- #3 EDG is supplying 2J bus.
- The AAC Diesel has auto-started and functioned normally.

Which one of the following would restore power to all Unit 1 and Unit 2 emergency busses without a procedure change?

A. Crosstie 2H and 2J busses; supply 1J bus with the AAC Diesel.

B. Supply 1J bus with #3 EDG; supply 2H and 2J with the AAC Diesel.

C. Crosstie 1H and 1J busses; supply 2J bus with the AAC Diesel.

✓D. Supply both 1J and 2H busses with the AAC Diesel.

From Surry Exam Bank Question # 756
Lesson Plan ND-90.3-LP-9 OBJ. Dand E.

MCS Time: 1 Points: 1.00 Version: 0 1 2 3 4 5 6 7 8 9
Answer: D B B D C A D A B C Scramble Range: A - D

RO Tier:	T2G2	SRO Tier:	T2G2
Keyword:		Cog Level:	4.1/4.4
Source:	BANK	Exam:	SR02301
Test:	R	Misc:	GWL

EXAMINATION ANSWER KEY

RO/SRO Exam Bank

Question 755 Details

Question Type:	Multiple Choice
Topic:	EDG0061
System ID:	73206
User ID:	EDG0061
Status:	Active
Must Appear:	No
Difficulty:	0.00
Time to Complete:	0
Point Value:	1.00
Cross Reference:	
User Text:	1.00
User Number 1:	0.00
User Number 2:	0.00
Comment:	ND-90.3-LP-9C [S98-0048], [S96-1181]

756 **ID: EDG0062** **Points: 1.00**

A complete loss of off-site power has occurred and the following conditions exist:

- #1 EDG is supplying 1H bus.
- #2 EDG is inoperable.
- #3 EDG is supplying 2J bus.
- The AAC Diesel has auto-started and functioned normally.

Which ONE of the following would restore power to all Unit 1 and Unit 2 emergency busses without a procedure change?

A. Supply 1J bus with #3 EDG; supply 2H and 2J busses with the AAC Diesel.

B. Supply both 1J and 2H busses with the AAC Diesel.

C. Crosstie 2H and 2J busses; supply 1J bus with the AAC Diesel.

D. Crosstie 1H and 1J busses; supply 2J bus with the AAC Diesel.

Answer: B

B. Describe the operations performed at the control panels located in the AAC Diesel Building, including:

- Engine Control Panel
- Generator Control Panel
- AAC Breaker Control Panel

C. Describe the automatic start up sequence of the AAC diesel.

D. Describe AAC diesel operation IAW AP-17.06.

E. Describe AAC diesel system design and operation.

Presentation

Distribute all handouts. Refer to/display H/T-9.1, Objectives.

A. AAC Diesel and Support Systems

1. AAC diesel generator unit

a. The AAC diesel is designated non-safety related but with special regulatory significance (NSQ).

b. The AAC diesel design and rating data is as follows:

(1) The engine is turborcharged and after-cooled, 12 cylinder, 4 cycle.

Evaluation Items
(Continued)

The following question is related to the conditions and task that has just been performed. However, a condition not presented in the task briefing has been added. Please indicate when you have finished answering the question.

2. If a station blackout occurred with all EDGs loading normally (#3 onto 1J bus), how could all 4 emergency busses be reenergized?

ANSWER

1) Strip Unit 1 and 2 "J" loads. (.2)
2) Deenergize 1J verify 2J energizes. (.4)
3) Load AAC on 1J (.4)

COMMENTS

_____

_____

_____

_____

_____

_____

_____

_____

NUREG-1122 K/A REFERENCE		**EST TIME**	**ACTUAL TIME**
APE056.AK3.02	(RO 4.4/SRO 4.7)	5 Min	_____
SYS062.K1.04	(RO 3.7/SRO 4.2)		

QUESTION REFERENCE	**REFERENCE ALLOWED?**
• AP-17.06	YES

QUESTIONS REPORT

for Surry2002

1. 069AA2.01 001/T1G1/T1G1/CONTAINMENT INTEGRIT/3.7/4.3/B/SR02301/R/RLM

Which ONE of the following conditions is a loss of containment integrity as defined in Technical Specifications?

A. The leakage rate of a containment penetration exceeds the limits of Technical Specifications while in COLD SHUTDOWN.
B. An inner airlock door is left open to perform maintenance in containment while in POWER OPERATION.

C. The fuel transfer tube blind flange is not installed with the fuel building transfer tube valve shut while in STARTUP.
D. An outer airlock door is found open while in STARTUP.

VPAP 2002: p. 67

Need copy of VPAP 2002 (Later)

READ T.S. again

QUESTIONS REPORT
for Surry2002

1.

The "A" WGDT is in service when the relief valve on that tank lifts and fails to reseat. Which one of the following describes the effects of this event?

A. The release will not be automatically isolated but will be monitored by the Vent- Vent radiation monitor.

B. The discharge will be automatically isolated when the Process Vent radiation monitor reaches the high alarm setpoint.

C. The discharge will be automatically isolated when the Vent- Vent radiation monitor reaches the high alarm setpoint.

D. The release will not be automatically isolated but will be monitored by the Process Vent radiation monitor.

Surry Exam bank question.
Ref: ND-93.5-LP-1 and ND-93.5-LP-3
Answer: D
MCS Time: 1 Points: 1.00 Version: 0 1 2 3 4 5 6 7 8 9
Answer: Scramble Range: A - D

RO Tier:	T2G1	SRO Tier:	T2G1
Keyword:		Cog Level:	3.0/3.5
Source:	BANK	Exam:	SR02301
Test:	R	Misc:	GWL

The "A" WGDT is in service when the relief valve on that tank lifts and fails to reseat.

Which ONE of the following describes the effects of this event?

A. The release will not be automatically isolated but will be monitored by the Vent-Vent radiation monitor.

B. The discharge will be automatically isolated when the Process Vent radiation monitor reaches the high alarm setpoint.

C. The discharge will be automatically isolated when the Vent-Vent radiation monitor reaches the high alarm setpoint.

D. The release will not be automatically isolated but will be monitored by the Process Vent radiation monitor.

Answer: D

ORIGINAL K/A 071 A2.02

This Question Fits 071A2.09 - Change K/A. 3.0/3.5

LP 9 2.4 LP. 1

(4) Filter advance pushbutton - Will advance filter paper to put clean paper in front of monitor.

(5) Filter fault light - Indicates paper jam, out of paper, or take-up mechanism malfunction.

(6) Flow fault light - Indicates low flow condition for the monitor.

(7) Purge pushbutton - Operates valves to take suction from the Aux Building to purge the gas monitor. Valves are positioned to purge whenever the button in held in. Valves automatically return to normal when the button is released.

6. Automatic Functions on High Radiation Alarms

a. Certain effluent processes have automatic functions associated with high radiation alarms from various radiation monitors. The automatic function is to isolate the effluent flowpath or to isolate specific inputs into the effluent flowpath.

b. Each of the radiation monitors listed on the transparency has an automatic function that a high alarm condition will activate.

Refer to/display H/T-1.9, Radiation Monitors Automatic Actions, to assist with the following information.

(1) Process vent particulate and gas monitors (Victoreen & Kaman) (RM-RI-101/102 and GW-130-1).

(a) Shuts FCV-GW-160 and 260 - Isolates both units containment vacuum pump discharge.

(b) Shuts FCV-GW-101 - Isolates WGDT discharge.

(2) Component cooling water monitor (CC-RI-105/106) - Shuts CC surge tank vent valve.

(3) Condenser air ejector monitor (SV-RI-111)

(a) Opens TV-SV-102, Lines up air ejector discharge to containment. This TV closes on Hi CLS, but will auto reopen when CLS reset if High Alarm still present.

(b) Shuts TV-SV-103, Isolates discharge to atmosphere.

(4) Containment particulate and gas (RM-RI-159/160); and manipulator crane monitors (RM-RI-162)

(a) Trips affected unit's purge supply fans (4A and 4B).

(b) Shuts MOV-VS-100A, B, C and D, purge isolation valves.

(c) Shuts suction valves for containment instrument air compressor (TV-IA-101 A/B) which opens the outside suction valve.

c. If the automatic actions did not occur for a high radiation alarm, the operator is responsible to manually perform the isolations.

~~A~~ WGDT Release is in Progress.

RM-GW-101 Has failed Low.

~~In Response to~~ High Activity exceeds the alarm setpoint.

Which one of the following describes the RM System Response.

A. RM-RI-102 Will detect the high Activity and Automatically Close ~~the WGDT~~ FCV-GW-101

B. With RM-GW-101 Process Vent Particulate and Gas Monitor Failed Low ~~the WGDT Discharge Valve MUST Be Manually~~ FCV-GW-101 Stop Closed

C. C

~~D.~~

QUESTIONS REPORT

for Surry2002

1. 074EA2.01 001/T1G1/T1G1/SUBCOOLING/4.6/4.9/B/SR02301/R/RLM

Unit 1 has tripped from 100% power due to a Loss of Coolant Accident.
-Pressurizer pressure is 450 psig.
-Thot is 430 degrees F.
-Tcold is 400 degrees F.
-Tavg is 415 degrees F.
-CETCs indicate 435 degrees F.

Which One (1) of the following is the RCS Subcooling Margin?

A. 15 degrees F
B. 25degrees F
C. 30 degrees F
D. 45degrees F.

REF: Source SR EB #43926
F-2, "Core Cooling", Dwg # CB380
Steam Tables
Lesson Plan ND-83-LP-3-DRR, p.9.
Learning objective: F

8. degree of superheat
9. saturation pressure
10. saturation temperature

E. Define moisture and quality, both verbally and mathematically, and how they are related.

F. Determine the Degrees of Subcooling of liquid water given appropriate information.

G. Describe the properties of water and how these properties change with a change in state.

Presentation

Distribute all handouts. Refer to/display H/T-3.1, Objectives, and discuss with the class.

A. Phase Diagram for Pure Water

1. Definitions and Terminology

a. A phase is a physical characteristic of any substance which describes its fluidity. A solid is less fluid than a liquid which is less fluid than is a gas or vapor.

b. For water, the solid phase is ice, the liquid phase is called liquid water, and the vapor or gas phase is called steam.

An example of condensate depression/degrees subcooling is as follows:

Given water at 180°F, 14.69 psia, express the condition of the water in terms of degrees subcooling.

Answer = T_{SAT} at 14.69 psia is 212°F

°S.C. = $T_{SAT} - T_{LIQ}$

= 212°F – 180°F

= 32°F

As additional heat is added to the working substance at point 4, vapor is formed. Ultimately, at point 5 all the liquid is converted to vapor. For water, at atmospheric pressure, this energy addition is 970 BTU-lbm and is referred to as the latent heat of vaporization.

In the process, 4 to 5, weak intermolecular forces between the water molecules are being broken, and water molecules gain sufficient kinetic energy to escape the liquid's surface.

At equilibrium, the number of molecules escaping the liquid's surface is exactly equal to the number returning to the liquid.

b. Saturated Vapor Defined

At point 5, all the liquid that has been converted to the vapor phase of the steam which exists at the saturation temperature is referred to as saturated vapor.

QUESTIONS REPORT

for Surry2002

1. 076K3.01 001/T2G3/T2G3/SERVICE WATER FOULIN/C/A 3.4/3.6/N/SR02301/R/RLM

-Unit 1 is at 100% power
-1-VS-S-1B, Self Cleaning Strainer supply to #3 MER has failed due to a broken shaft and has been bypassed to allow repairs to be made to the strainer.
-Annunciator 0-VSP-D5 MER-3, Chiller Trouble" illuminates.
-The ~~AO~~ reports that the on service chiller unit, 1-VS-E-4C has tripped on High Pressure Cutout. FBO ISSB
-The 1-VS-E-4B chiller is started and trips on High Pressure Cutout after about 20 minutes of operation.

Which ONE of the following is the most probable cause.?

A. The bypass valve for 1-VS-S-1B Self Cleaning Strainer is not fully open.
B. The heat load on the chiller is above the design capacity.
C. The chiller Service Water pumps 1-VS-P-1B and C are air bound.
D. The chiller Service Water pump strainers are clogged.

Ref: Surry Lesson Plan ND-89.5-LP-2, obj E and I
Surry ARP 0-VSP-D5

Answer A is incorrect because the other train of Service Water remains in service and has 100% capability.
Answer B is incorrect because the design capacity of the chiller does not change
Answer C is incorrect because the effects of clogging will not cause enough air to come out of solution to bind the pumps before low service flowrate to the chiller heat exchanger exhibits itself as high compressor discharge pressure.
Answer D is correct based on the most recent change to the system (bypassing the strainer) has been the placing in service of a stagnent service water line.

Note: Need to verify Procedure 0-OP-VS-006. Also, if high oil temp on charging pump gives direct control room alarm, would prefer to use it vice 2nd chiller.

MCS Time: 1 Points: 1.00 Version: 0 1 2 3 4 5 6 7 8 9
Answer: D C D B A A C D B D Scramble Range: A - D

RO Tier:	T2G3	SRO Tier:	T2G3
Keyword:	SERVICE WATER FOULIN	Cog Level:	C/A 3.4/3.6
Source:	N	Exam:	SR02301
Test:	R	Misc:	RLM

C. State in general the flowpath of service water from the high level intake to the discharge tunnel for the systems served by service water.

D. Describe the Charging Pump Service Water System.

E. Describe the MCR Chiller Service Water System.

F. Explain the controls associated with the system.

G. State the technical specifications associated with the Service Water Systems, including for SRO candidates, the basis behind these specifications.

H. Describe the system interconnections associated with the Service Water Systems, flowpaths affected and safety implications of stop logging, and abnormal procedures associated with the systems.

I. Describe in detail the Service Water Systems.

Presentation

Distribute all handouts. Refer to/display H/T-2.1, Objectives, and discuss objectives with trainees.

A. Purpose of Service Water System

1. Maintain water in the intake canal for long-term cooling of safety-related systems, including:

a. Recirculating spray (for post-accident cooling of containment)

c. Service water flowpath for the #3 MER chillers.

(1) From 1D, 2A or 2C CW inlets to Turbine Building Equipment Room.

(2) Through either self-cleaning strainer or a duplex strainer.

(3) To 1-VS-P-1A, 1B or 1C, each pump has a suction strainer element.

(4) Through 1-VS-E-4A, 4B or 4C A/C chiller condensers.

(5) To Unit 1 and/or Unit 2 discharge canal.

2. #5 MER SW System

Refer to/display H/T-2.6, #5 MER SW Distribution.

a. Condenser outlet PCV's work in tandem to provide minimum flow, control SW pump suction temperature and compressor discharge pressure.

b. Service water flowpath for the #5 MER chillers.

(1) Supply is from either 2A or 2C water box inlets.

(2) A duplex strainer.

(3) 1-VS-P-4D or 1-VS-P-4E chiller service water pumps.

(4) Through the 1-VS-E-4D and 1-VS-E-4E chiller condensers.

(5) Through the chiller condenser outlet PCV's.

D. Charging Pump Service Water

1. Removes heat from the charging pump lube oil.

2. Service water flowpath

Refer to/display H/T-2.5, Service Building Service Water Subsystem.

a. From circ water inlet piping to Mechanical Equipment Room #3 and to charging pump service water pump room in Unit 2 Turbine Building.

(1) From 1D, 2A or 2C CW inlets to the distribution manifold in #4 MER.

(a) Through either self-cleaning strainer or a duplex strainer.

(b) Discharge of both self-cleaning strainers are cross connected by AOV (1-SW-263).

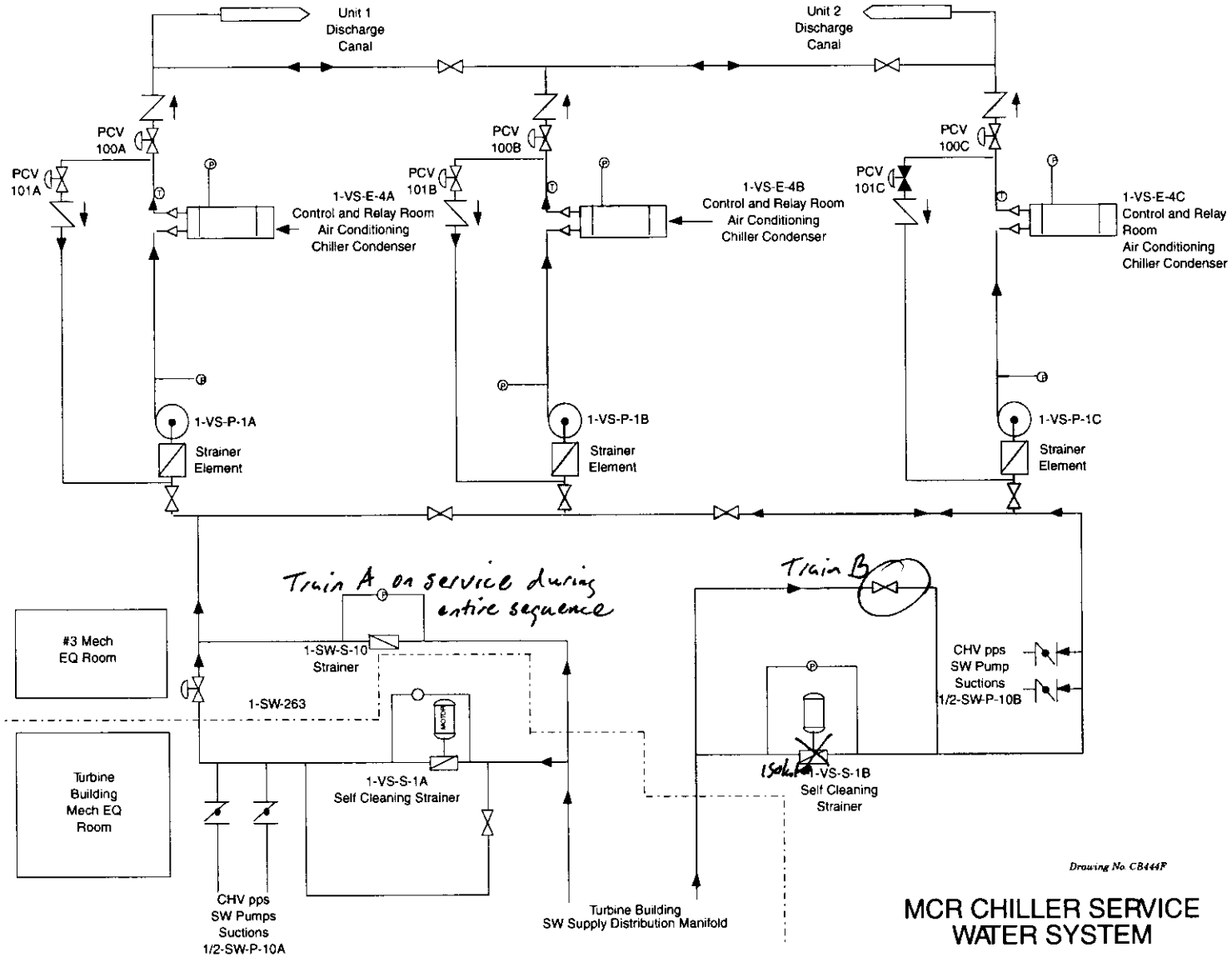
(c) To both Units SW-P-10A located in #4 MER.

(d) To both Units SW-P-10B located in #3 MER.

(e) Also to MCR chiller cooling pumps VS-P-1A, 1B and 1C which can be supplied by either inservice service water header.

(2) Charging pump service water pumps

(a) Both Units' A pumps located in Mechanical Equipment Room #4.


Unit 1
Discharge
Canal
Unit 2
Discharge
Canal
PCV
100A
PCV
101A
PCV
100B
PCV
101B
PCV
100C
PCV
101C
1-VS-E-4A
Control and Relay Room
Air Conditioning
Chiller Condenser
1-VS-E-4B
Control and Relay Room
Air Conditioning
Chiller Condenser
1-VS-E-4C
Control and Relay
Room
Air Conditioning
Chiller Condenser
1-VS-P-1A
Strainer
Element
1-VS-P-1B
Strainer
Element
1-VS-P-1C
Strainer
Element
Train A on service during entire sequence
Train B
#3 Mech
EQ Room
1-SW-S-10
Strainer
1-SW-263
CHV pps
SW Pump
Suctions
1/2-SW-P-10B
Turbine
Building
Mech EQ
Room
1-VS-S-1A
Self Cleaning Strainer
Isolate
1-VS-S-1B
Self Cleaning
Strainer
CHV pps
SW Pumps
Suctions
1/2-SW-P-10A
Turbine Building
SW Supply Distribution Manifold
Drawing No. CB444F
MCR CHILLER SERVICE
WATER SYSTEM

3. MCR/ESGR air handling units (AHU) and chill water loops

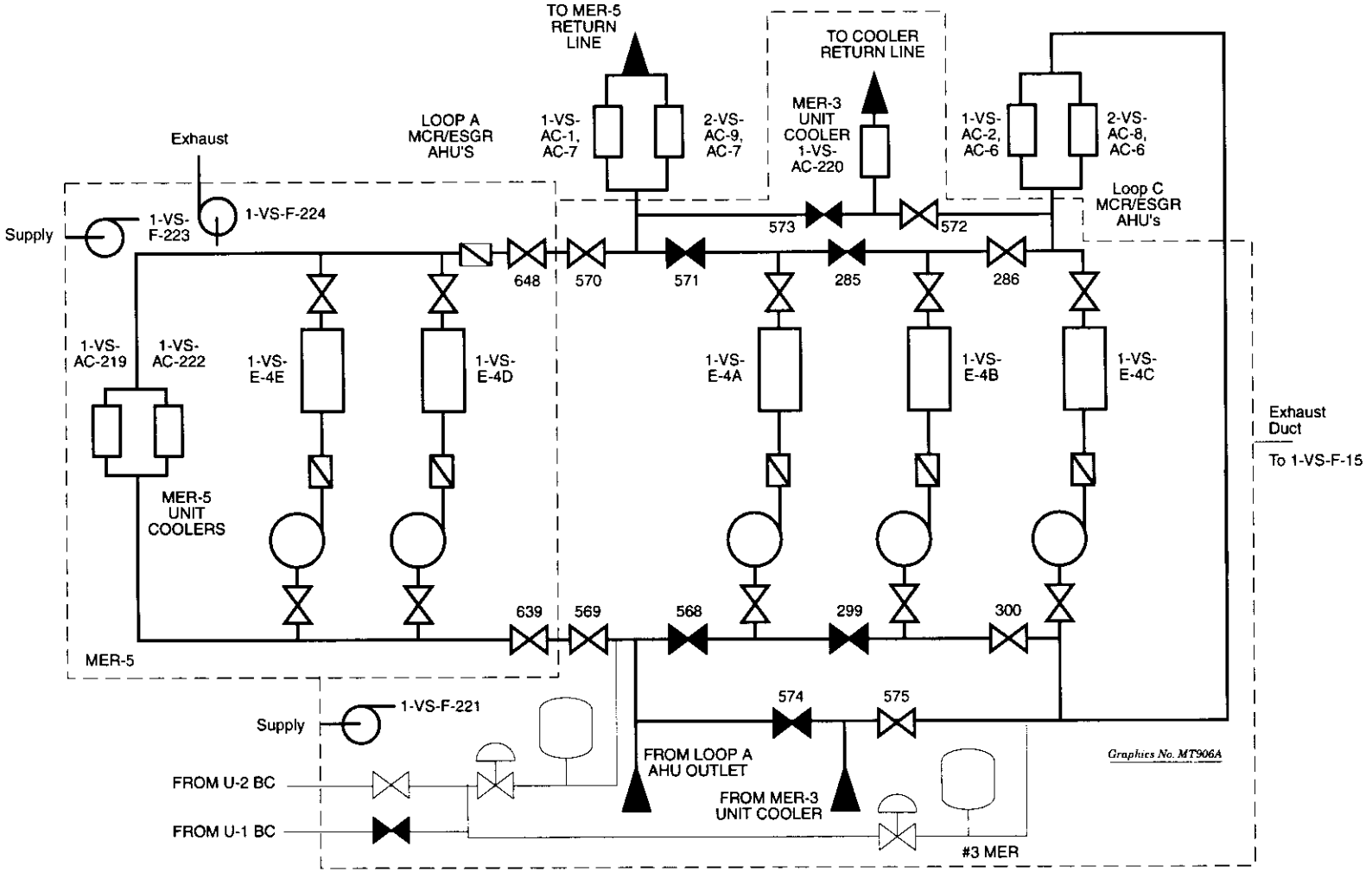
Refer to/display H/T-2.4, Main Control Room and Emergency Switchgear Room Chilled Water.

a. There are two 100% capacity redundant AHU trains for both the MCR and the ESGR. Only one AHU for each ESGR and each unit's Control Room are required to be running to remove 100% of the heat load generated in that area.

b. Temperature control for the MCR and ESGR AHU's is accomplished by manual control of the chill water flow through the cooling coils. Under accident conditions where operation of various safety related equipment adds to the heat load, chill water flow will be manually increased to control temperature.

c. Chillers B and C supply chilled water to air handler loop C, consisting of one air handler in each Main Control Room (1-VS-AC-2 and 2-VS-AC-8), and one air handler in each Emergency Switchgear Room (1-VS-AC-6 and 2-VS-AC-6). Loop C air handlers and these two chillers are powered by Emergency Buses 1J and 2H.

d. Chillers D and E supply chiller water to air handler loop A, consisting of Control Room Air Handlers 1-VS-AC-1 and 2-VS-AC-9 and Emergency Switchgear Room Air Handlers 1-VS-AC-7 and 2-VS-AC-7. These air handlers and chillers D and E are powered by Emergency Buses 1H and 2J.



MAIN CONTROL ROOM AND EMERGENCY SWITCHGEAR ROOM CHILLED WATER

QUESTIONS REPORT
for Surry2002

1. 103A4.09 001

Which one of the following is an Operator Action following a High Alarm Trip of Process Vent Radiation Monitor R1-GW-101/102?

A. Stop Containment Vacuum (CV) pumps to prevent blowing off discharge hose.

B. Place filter selector switches for areas tripped to close to isolate all release paths.

C. Stop Containment (CV) pumps to prevent collapsing suction hoses.

D. Place filter selector switches for areas tripped to filter position to provide filtered release.

Ref: Surry exam bank question 1980.
Lesson Plan ND-88.4-LP-5 Objective C.

MCS Time: 1 Points: 1.00 Version: 0 1 2 3 4 5 6 7 8 9
Answer: A A B C A D B A B D Scramble Range: A - D

RO Tier:	T2G3	SRO Tier:	T2G2
Keyword:		Cog Level:	3.1/3.7
Source:	BANK	Exam:	SR02301
Test:	R	Misc:	GWL

LESSON PLAN

Introduction

The containment is maintained at subatmospheric pressure during reactor operation by the containment vacuum system in order to limit the effects of the design basis accident. Proper operation of the containment vacuum system is necessary to ensure containment pressure remains within Technical Specification limits. This lesson is designed to give the trainee the knowledge required of the containment vacuum system so he (she) can properly operate the system within the design criteria assumed in the UFSAR analysis of the design basis accident.

Objectives

After receiving this instruction, the trainee will be able to:

A. Describe the instrumentation associated with the containment vacuum system, including how the containment partial pressure is derived.

B. Describe the operation of the containment vacuum system, including all of the starting and stopping signals for the containment vacuum pumps.

C. Describe the containment vacuum system including how it functions to establish and maintain containment vacuum.

Question 710 Details

Question Type:	Multiple Choice
Topic:	CV00003
System ID:	73121
User ID:	CV00003
Status:	Active
Must Appear:	No
Difficulty:	0.00
Time to Complete:	0
Point Value:	1.00
Cross Reference:	
User Text:	1.00
User Number 1:	0.00
User Number 2:	0.00
Comment:	ND-88.4-LP-5C [S96-0790], [S95-0252], [S94-0280]

711 **ID: CV00004** **Points: 1.00**

Which ONE of the following radiation monitors will stop the discharge of the Containment Vacuum System when the alarm level is reached?

A. Process vent particulate and gas monitor (RM-GW-101/102).

B. Containment particulate and gas monitor (RM-RMS-159/160).

C. Ventilation vent particulate and gas monitor (RM-VG-109/110).

D. Manipulator crane area monitor (RM-RMS-162).

Answer: A

Question 711 Details

Question Type:	Multiple Choice
Topic:	CV00004
System ID:	73122
User ID:	CV00004
Status:	Active
Must Appear:	No
Difficulty:	0.00
Time to Complete:	0
Point Value:	1.00
Cross Reference:	
User Text:	1.00
User Number 1:	0.00
User Number 2:	0.00
Comment:	ND-88.4-LP-5C [S96-0790], [S95-0252], [S94-0280]

Question 1979 Details

Question Type:	Multiple Choice
Topic:	RM00017
System ID:	74972
User ID:	RM00017
Status:	Active
Must Appear:	No
Difficulty:	0.00
Time to Complete:	0
Point Value:	1.00
Cross Reference:	
User Text:	1.00
User Number 1:	0.00
User Number 2:	0.00
Comment:	[S96-0091B]

1980 **ID: RM00018** **Points: 1.00**

Which ONE of the following is an Operator Action following a HIGH alarm trip of Process Vent Radiation Monitor R1-GW-101/102?

A. Place filter selector switches for areas tripped to close to isolate all release paths.

B. Stop Containment Vacuum (CV) pumps to prevent blowing off discharge hose.

C. Stop Containment Vacuum (CV) pumps to prevent collapsing suction hoses.

D. Place filter selector switches for areas tripped to filter position to provide filtered release.

Answer: B

Question 1980 Details

Question Type:	Multiple Choice
Topic:	RM00018
System ID:	74973
User ID:	RM00018
Status:	Active
Must Appear:	No
Difficulty:	0.00
Time to Complete:	0
Point Value:	1.00
Cross Reference:	
User Text:	1.00
User Number 1:	0.00
User Number 2:	0.00
Comment:	[S96-0091B]

QUESTIONS REPORT
for Surry2002

1. WE01G2.4.5 001

Which one of the following correctly describes the conditions that allow implentation of ES-0.0, "Rediagnosis"?

A. Entry is based solely on operator judgement and ES-0.0 may be entered at any time.

B. ES-0.0 may be entered anytime that an SI has been actuated, and an ERG is in effect.

C. Entry is based on an SI being in service and E-0 "Reactor Trip/Safety Injection" has been completed.

D. ES-0.0 may be entered anytime that the EOP's have been entered.

Surry Exam Bank Question # 903.
Surry Lesson Plan ND-95.3-LP-33 objectives A and B.

A. Incorrect, ES-0.0 entry requires an SI to be in service and E-0 to be completed.

B. Incorrect, E-0 must be completed.

C. Correct, an SI must be in service, and E-0 has been completed.

D. Incorrect, an SI must be present, and E-0 completed.

MCS Time: 1 Points: 1.00 Version: 0 1 2 3 4 5 6 7 8 9
Answer: C D A C B B B A B A Scramble Range: A - D

RO Tier:	T1G2	SRO Tier:	T1G1
Keyword:		Cog Level:	M 2.9/3.6
Source:	B	Exam:	SR02301
Test:	R	Misc:	GWL

LESSON PLAN

Introduction

Although the ERG Procedure Set is designed to be nearly "fool-proof", it has been proven that there are possible circumstances where the user has either taken a "wrong turn" or made a "reading error" which has placed the team in the wrong procedure. So, as good as these procedures are, it is possible that the user could need a procedure to assist during times of error or confusion.

This "rediagnosis" procedure provides a mechanism for the user to either confirm that the team is in the correct Optimal Recovery Guideline procedure or direct them to the proper ORG that should be in effect.

Objectives

After receiving this instruction, the trainee will be able to:

A. Given the Major Action Categories associated with ES-0.0, Rediagnosis, explain the purpose of ES-0.0, the transition criteria for entering and exiting ES-0.0, and the types of operator actions that will occur within each category.

B. Given a copy of ES-0.0, Rediagnosis, explain the basis of each procedural step.

C. **Given actual or simulated plant conditions requiring implementation of ES-0.0, Rediagnosis, successfully transition through the procedure, applying step background knowledge as required, to identify the correct Optimal Recovery Guideline to address the event in progress.**

e. This applicability includes cases where the team has not necessarily regained control of the plant and may question the diagnostic capabilities of E-1, E-2, and the fold-out pages.

f. **Rediagnosis only applies to Optimal Recovery Guidelines, NOT to Function Restoration Guidelines.**

3. Upon completion of ES-0.0, the team will either have confirmed that they are in the correct procedural series or will be directed to the appropriate series.

4. Major Action Categories

Refer to/display H/T-33.2, Major Action Categories.

a. The objective of the recovery technique incorporated into this procedure is a summary of the diagnostic steps in the ORGs so that the team can quickly confirm they are in the correct procedure.

b. Individual MACs

(1) **CHECK FOR ANY NON-FAULTED SGs.**

The first determination that should be made is whether there are any SGs that are NOT faulted. If all SGs are faulted, then the proper ORG would be ECA-2.1 for an uncontrolled depressurization of all SGs.

Presentation

Distribute all handouts. Refer to/display H/T-33.1, Objectives, and review with trainees.

A. Major Actions of ES-0.0, Rediagnosis

1. The purpose of ES-0.0, Rediagnosis, is to provide a mechanism to allow the operator to determine or confirm the most appropriate post-accident recovery procedure.

2. Entry conditions

   a. The procedural criteria for entry into ES-0.0 is "Operator Judgement".

   b. The procedure is entered when, most likely, there is doubt in the user's mind that he is in the correct procedure.

   c. **This procedure has <u>LIMITED APPLICABILITY</u> that is not brought out on the cover page entry conditions.**

   d. The applicability of this procedure is limited to those cases when:

      (1) Safety Injection is in service or is required, <u>AND</u>

      (2) E-0 has been executed and a transition has been made to another ORG.

EXAMINATION ANSWER KEY

RO/SRO Exam Bank

903 **ID: EOP0152** **Points: 1.00**

Which ONE of the following is correct concerning ES-0.0, Rediagnosis, implementation?

A. ES-0.0 may be entered at any time. Entry is based solely on operator judgement.

B. ES-0.0 may be entered at any time, provided that an EOP is in effect.

C. ES-0.0 may be entered at any time, provided that SI is in service, and E-0 has been completed.

D. ES-0.0 may be entered at any time, provided that SI is in service.

Answer: C

Question 903 Details

Question Type:	Multiple Choice
Topic:	EOP0152
System ID:	73442
User ID:	EOP0152
Status:	Active
Must Appear:	No
Difficulty:	0.00
Time to Complete:	0
Point Value:	1.00
Cross Reference:	
User Text:	1.00
User Number 1:	0.00
User Number 2:	0.00
Comment:	ND-95.3-LP-33A and B [S96-1346]

2.4.5

QUESTIONS REPORT
for Surry2002

1. WE03G2.4.4 002

-The team has transitioned to ES-1.1,"SI Termination" from E-1,"Loss of Reactor or Secondary Coolant".

-At step 4 the team secures all but one charging pump as directed.

Which one of the following describes the required operator actions IAW ES1.1 if RCS Pressure begins to decrease after the pump is secured?

A. Restart the last charging pump secured and transition back to E-1 "Loss of Reactor or Secondary Coolant".

B. Start another Charging pump to stablize RCS pressure and continue with ES-1.1 "SI Termination".

C. Manual re-initiate SI and Transition to E-0 "Reactor Trip or Safety Injection" step 4.

D. Monitor RCS Pressure if it continues to fall then transition to ES-1.2 "Post LOCA Cooldown and Depressurization".

Surry Exam Bank Question # 1005, slightly modified.
Surry Lesson Plan ND-95.3-LP-8 and 9. Objective A.

A. Incorrect, the procedure step directs a transition to ES-1.2 if RCS pressure continues to fall.

B. Incorrect, the procedure does not direct another charging pump to be started in ES-1.1.

C. Incorrect, SI re-initiation is not directed and the team would not transition to step 4 of E-0.

D. Correct, If RCS pressure contiues to fall the team is directed to transition to ES-1.2.

MCS Time: 1 Points: 1.00 Version: 0 1 2 3 4 5 6 7 8 9
Answer: D B D C A B C C A A Scramble Range: A - D

RO Tier:	T1G2	SRO Tier:	T1G2
Keyword:		Cog Level:	C/A 4.0/4.3
Source:	B	Exam:	SR02301
Test:	R	Misc:	GWL

Question 1004 Details

Question Type:	Multiple Choice
Topic:	EOP0259
System ID:	73544
User ID:	EOP0259
Status:	Active
Must Appear:	No
Difficulty:	0.00
Time to Complete:	0
Point Value:	1.00
Cross Reference:	
User Text:	1.00
User Number 1:	0.00
User Number 2:	0.00
Comment:	ND-95.3-LP-13B and C [S96-1333], [S95-1085]

1005 **ID: EOP0260** **Points: 1.00**

Step 4 of ES-1.1, SI Termination directs the operator to stop all but one charging pump. Which ONE of the following describes the required operator actions if RCS pressure starts to decrease after the operator secures all but one charging pump?

A. Re-initiate SI by pushing the manual SI pushbuttons and transitioning to E-0 Step 1.

B. If pressure does not stabilize, then transition to ES-1.2, Post LOCA Cooldown and Depressurization. It is not expected for RCS pressure to decrease until the normal charging flowpath is established.

C. Restart the last charging pump secured and continue performance of ES-1.1.

D. Continue with performance of ES-1.1, it is expected for RCS pressure to decrease until the normal charging flowpath is established.

Answer: B

LESSON PLAN

Introduction

This lesson plan will provide classroom training for ES-1.1, SI Termination. The material will be presented first as an overall "big picture" of the procedure which will then be followed up by an in-depth presentation of the step backgrounds and required knowledges of the procedure. Shortly after the classroom presentation, the simulator will be used to reinforce this material and allow practice of the techniques incorporated into ES-1.1.

In its entirety, ES-1.1 provides the necessary instructions to terminate SI and stabilize plant conditions.

It is entered from E-0, Reactor Trip or Safety Injection, from E-1, Loss of Reactor or Secondary Coolant, or FR-H.1, Loss of secondary Heat Sink, when the SI termination criteria are satisfied. The goal of ES-1.1 is to stop SI pumps in a prescribed sequence while maintaining control of the RCS, until makeup is by charging flow alone. Following termination of SI, the operator will exit to normal procedures for either startup or cooldown.

Objectives

After receiving this instruction, the trainee will be able to:

A. Given the major action categories associated with ES-1.1, SI Termination, explain the purpose of ES-1.1, the transition criteria for entering and exiting ES-1.1 and the types of operator actions that will occur within each category.

B. Given a copy of ES-1.1, SI Termination, explain the basis of each step of the procedure.

LESSON PLAN

Introduction

ES-1.2, Post-LOCA Cooldown and Depressurization, provides guidance to cooldown and depressurize the RCS to cold shutdown conditions following a loss of reactor coolant. This procedure and supporting analyses are structured to deal primarily with small LOCAs where SI flow can keep up with break flow, at pressures above the shutoff head of the LHSI pumps.

In addition, if a LOCA occurs and the HHSI system fails, the procedure provides optimal recovery actions to try to prevent an inadequate core cooling condition while trying to restore SI flow.

After reaching and maintaining cold shutdown conditions (RCS temperature less than 200°F), the final step of ES-1.2 instructs the team and plant engineering staff to evaluate the long-term plant status. At this time, the RCS will be cooled by either RHR or the cold/hot leg recirculation mode.

This lesson plan on the post-LOCA cooldown and depressurization will present the procedure both from a "big-picture" perspective and from an "in-depth" perspective.

Objectives

After receiving this instruction, the trainee will be able to:

A. Given the major action categories associated with ES-1.2, Post-LOCA Cooldown and Depressurization, explain the purpose of ES-1.2, the transition criteria for entering and exiting ES-1.2 and the types of operator actions that will occur within each category.

B. Given a copy of ES-1.2, Post-LOCA Cooldown and Depressurization, explain the basis of each procedural step.

QUESTIONS REPORT
for Surry2002

1. WE04G2.4.9 001

-Unit 1 has experienced a SBLOCA. A
-The team has entered and is performing actions in ECA-1.2 "LOCA Outside Containment".
-The operators are directed to close SI-MOV-1890A, SI-MOV-1890B, and SI-MOV-1890C.
-RCS pressure continues to fall.

Which one of the following describes what actions should be performed next?

A. Re-open SI-MOV-1890A and B, then transition to E-1 "Loss of Reactor or Secondary Coolant".

B. Re-open SI-MOV-1890C, then transition to ECA-1.1, "Loss of Emergency Coolant Recirculation".

C. Re-open SI-MOV-1890A and B, then transition to ECA-1.1, "Loss of Emergency Coolant Recirculation".

D. Re-open SI-MOV-1890C, then transition to E-1 "Loss of Reactor or Secondary Coolant".

Surry Exam Bank, question #1007 slightly modified.
Surry lesson Plan ND-95.3-LP-21 objective B. A.

A. Incorrect, SI-MOV 1890A and B are not reopend, and with pressure still decreasing the correct transition is to ECA 1.1.

B. Correct, the procedure directs the operator to open SI-MOV 1890C to provide a flow path, and the correct transition is to ECA-1.1.

C. Incorrect, SI-MOV 1890A and B are not reopend.

D. Incorrect, the procedure directs the operator to open SI-MOV 1890C to provide a flow path, but the correct transition is to ECA-1.1.

MCS Time: 1 Points: 1.00 Version: 0 1 2 3 4 5 6 7 8 9
Answer: B D B B B B B D D C Scramble Range: A - D

RO Tier: T1G2 SRO Tier: T1G1
Keyword: Cog Level: M 3.3/3.9
Source: B Exam: SR02301
Test: R Misc: GWL

Question 1006 Details

Question Type:	Multiple Choice
Topic:	EOP0261
System ID:	73546
User ID:	EOP0261
Status:	Active
Must Appear:	No
Difficulty:	0.00
Time to Complete:	0
Point Value:	1.00
Cross Reference:	
User Text:	1.00
User Number 1:	0.00
User Number 2:	0.00
Comment:	ND-95.3-LP-36A
	[S96-1348]

1007 **ID: EOP0262** **Points: 1.00**

During the performance of ECA-1.2, LOCA Outside Containment, the operator is directed to close or verify closed SI-MOV-1890A and 1890B (LHSI to Hot Legs), and SI-MOV-1890C (LHSI to Cold Legs). If RCS pressure is not increasing after these valves are closed, the operator is directed to reopen SI-MOV-1890 C but not 1890 A and B. Which ONE of the following describes why only SI-MOV-1890C is reopened?

A. SI-MOV-1890A and B are more probable leakage paths and are therfore left closed.

B. SI-MOV-1890C is in the normal LHSI flowpath and therfore must be reopened to provide a flowpath to the core.

C. SI-MOV-1890C is reopened to provide a cooling water flowpath for the LHSI pumps.

D. SI-MOV-1890A, B, and C are normally closed valves, but since 1890A and B are in the Hot Leg flowpath, they are left closed.

Answer: B

Question 1007 Details

Question Type:	Multiple Choice
Topic:	EOP0262
System ID:	73547
User ID:	EOP0262
Status:	Active
Must Appear:	No
Difficulty:	0.00
Time to Complete:	0
Point Value:	1.00
Cross Reference:	
User Text:	1.00
User Number 1:	0.00
User Number 2:	0.00
Comment:	ND-95.3-LP-21B; ND-95.4-LP-12B [S96-1030], [S96-1341]

1008 **ID: EOP0263** **Points: 1.00**

The following conditions exist:

- A manual Rx trip was initiated 10 minutes ago based on AP-16.00 criteria
- Pressurizer level is off-scale low
- Pressurizer pressure is 1500 psig and decreasing
- All SG levels are 5% NR and slowly increasing
- All SG pressures are 1005 psig
- All main steam line radiation monitors are reading .02 mr/hr
- Vent-Vent radiation monitor is reading 4.3 E6 cpm
- Containment pressure is 9.2 psia
- Containment sump level is 47%
- Safeguards Area Sump high level alarm is locked in

Which ONE of the following is the correct procedure transitions for the event in progress if the leak is unisolable?

A. E-0, E-1, ECA-1.2 (LOCA Outside Containment), ECA-1.1 (Loss of Emergency Coolant Recirculation)

B. E-0, ECA-1.1 (Loss of Emergency Coolant Recirculation), ECA-1.2 (LOCA Outside Containment)

C. E-0, E-1, ECA-1.1 (Loss of Emergency Coolant Recirculation), ECA-1.2 (LOCA Outside Containment)

D. E-0, ECA-1.2 (LOCA Outside Containment), ECA-1.1, (Loss of Emergency Coolant Recirculation)

Answer: D

Introduction

The Loss Of Coolant Accident, in itself, is a serious plant accident. However, the level of severity can be compounded by the fact that the LOCA is outside of the FINAL fission product barrier - Containment. Now, there is no protective shield enveloping the spilled reactor coolant water and fission products carried out of the RCS. This type of accident poses both a serious threat to the post-accident cooling capability of the plant and a potential hazard to the general public in the form of radioactive releases.

This lesson on the Emergency Response Guideline for LOCA Outside Containment is designed to provide an introduction to the accident and an in-depth analysis of the procedure associated with combatting this event.

Objectives

After receiving this instruction, the trainee will be able to:

A. Given the major action categories associated with ECA-1.2, LOCA Outside Containment, explain the purpose of ECA-1.2, the transition criteria for entering and exiting ECA-1.2, and the types of operator actions that will occur within each category.

B. Given a copy of ECA-1.2, LOCA Outside Containment, explain the basis of each step of the procedure.

C. Given actual or simulated plant conditions requiring implementation of ECA-1.2, LOCA Outside Containment, successfully transition through the procedure, applying step background knowledge as required, to address the challenge to plant and public safety.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
2.	__TRY TO IDENTIFY AND ISOLATE BREAK:	
	a) Close LHSI to cold legs • 1-SI-MOV-1890C	
	b) Check RCS pressure - INCREASING	b) Open 1-SI-MOV-1890C AND continue efforts to identify and isolate leakage: • Check for annunciators: 1) AUX Building Sump HI Level (VSP-F-4) 2) RS Pit A Hi Level (B-D-1) 3) RS Pit B Hi Level (B-D-2) 4) SFGDS Area Sump Hi Level (B-F-3) • Locally check auxiliary building and safeguards recirculation loops for leakage, • Notify TSC of any damage control needs. • GO TO 1-ECA-1.1, LOSS OF EMERGENCY COOLANT RECIRCULATION.
	c) Place LHSI pumps in PTL	
	d) Close LHSI pump suctions from RWST • 1-SI-MOV-1862A • 1-SI-MOV-1862B	
	e) GO TO 1-E-1, LOSS OF REACTOR OR SECONDARY COOLANT	
	- END -	

QUESTIONS REPORT
for Surry2002

1. WE05EK2.1 002

-Unit 1 has experienced a Reactor Trip.
-E-0 has been completed and the transitioned to ES-0.1
-Subsquently all AFW pumps were lost and the team ~~entered~~ FR-H.1
-The operators have started a MFW pump and are begining to open FRV bypasses to control flow.

Which one of the following describes the response of the FRV bypass valves if plant conditions met the coincidence for a SI?

A. The FRV bypasses would remain open, all SI signals are blocked.

B. The FRV bypasses would remain open, because they are controlled manually.

C. The FRV bypasses would close, and could not be re-opened.

D. The FRV bypasses would close, ~~and could be re-opened if the SI and FWI signal was reset.~~ and could be re-opened by depressing the S/G Level reset PB

Surry Lesson Plan ND-89-3-LP-3 Condensate and Main Feed. Objectives B and D.
ND-95.3-LP-41 Resoponse to Loss of Heat Sink. Objectives C and D.

A. Incorrect, all SI signals are not blocked.

B. ? Need help form utility, this is not covered in lesson material, do they have a manual operator and would this override the SI and FWI signal.

C. Incorrect, the SI and FWI should be able to be reset, and the valves opened.

D. Correct, ? Need more information.

MCS Time: 1 Points: 1.00 Version: 0 1 2 3 4 5 6 7 8 9
Answer: D D C D D C C D A D Scramble Range: A - D

RO Tier:	T1G2	SRO Tier:	T1G2
Keyword:		Cog Level:	M 3.7/3.9
Source:	N	Exam:	SR02301
Test:	R	Misc:	GWL

Introduction

The main feedwater system, by providing a continuous supply of makeup water to the steam generators, enables the plant to operate at full-load steaming conditions. Without this pre-heated supply of feedwater for the production of steam, the water inventory in the steam generator would decrease rapidly. Upon losing the secondary heat sink, the RCS would rapidly approach saturated conditions and the probability for fuel damage increases. This lesson plan will present a description of the main feedwater system to assist the development of trainee skills associated with operating the Main Feedwater System.

Objectives

After receiving this instruction, the trainee will be able to:

A. Describe the flowpath of the Main Feedwater System from the main feed pump suction to the steam generator inlets.

B. Describe the major main feedwater system components including, if applicable, their functions, power supply and operation.

C. Describe the operation of the main feed pump support subsystems including their function and flowpath.

D. Describe the operation of the main feedwater system during normal and abnormal operations.

E. Describe the overall integrated operation of the Main Feedwater System, including pump and valve interlocks, support subsystems, flow paths and normal and abnormal operations.

Presentation

Distribute all handouts. Refer to/display H/T-3.1, Objectives, and review with trainees.

A. Flow Path

1. The purpose of the Feedwater System is to supply and maintain water inventory in the steam generators for the production of steam, and to provide a secondary heat sink for the Reactor Coolant System.

2. The Condensate System is the source of water for the main feed pumps. The relatively cool discharge of the drain coolers is heated in a series of six (6) feedwater heaters, compressed by the main feedwater pumps and distributed to the three (3) steam generators. The feedwater flowrate and the corresponding S/G level is determined by the position of the feed reg or feed reg bypass valves. In auto, the feed reg valve positioning control signals are provided by the S/G Water Level Control Subsystem. The bypass valve is manually controlled by the operator.

Refer to/display H/T-3.2, Main Feed System Diagram, and refer to during discussion.

Objectives

After receiving this instruction, the trainee will be able to:

A. [Given a simulated plant condition requiring the use of the Critical Safety Function Status Trees, transition through the Heat Sink status tree denoting, in accordance with the rules of priority, any applicable Function Restoration Procedure needing implementation. SOER 86-01, Recommendation 7]

B. Given the Major Action Categories associated with FR-H.1, Response to Loss of Secondary Heat Sink, explain the purpose of FR-H.1, the transition criteria for entering and exiting FR-H.1, and the types of operator actions that will occur within each category.

C. Given a copy of FR-H.1, Response to Loss of Secondary Heat Sink, explain the basis of each procedural step.

D. Given actual or simulated plant conditions requiring implementation of FR-H.1, Response to Loss of Secondary Heat Sink, successfully transition through the procedure, applying step background knowledge as required, to address the Critical Safety Function challenge in progress.

Presentation

Distribute all handouts. Refer to/display H/T-41.1, Objectives, and review with trainees.

QUESTIONS REPORT
for Surry2002

1. WE08EK3.3 001

-An excessive RCS cooldown occured following a main steam line break outside containment.
-1-FR-P.1"Response to Imminent Pressurized Thermal Shock Condition" is in progress.
-An RCS pressure reduction is in progress using a single pressurizer PORV.
-The RO observes that RCS subcooling is 39 degrees F.

Which one of the following describes the correct action/reason that should be implemented.

A. Terminate the depressurization: the subcooling value has been reached.

B. Cooldown the RCS by dumping steam to increase subcooling

C. Continue with the depressurization to reduce pressure stresses.

D. Start an additional charging pump to raise subcooling.
Ref: Qusetion taken from Farley Exam bank.
Surry Lesson Plan ND-95.3-LP-46 Objectives C and D.

A. Incorrect, The procedure has the crew reduce pressure until a subcooling valueof 30 degrees F is reached.

B. Incorrect, FR-P.1 directs the operators to stop the cooldown and soak the RCS, not continue to cooldown.

C. Correct, the procedure directs the operators to continue deprssurization until 30 degrees subcooling is reached to reduce pressure stress.

D. Incorrect, starting another charging pump would increase pressure stresses, this could lead to crack propigation.

MCS Time: 1 Points: 1.00 Version: 0 1 2 3 4 5 6 7 8 9
Answer: Scramble Range: A - D

RO Tier:	T1G1	SRO Tier:	T1G1
Keyword:		Cog Level:	M 3.4/3.9
Source:	B	Exam:	SR02301
Test:	R	Misc:	GWL

Level of difficulty too hard for RO.

Objectives

After receiving this instruction, the trainee will be able to:

A. Given a simulated plant condition requiring the use of the critical safety function status trees, transition through the Integrity Status Tree denoting, in accordance with the rules of priority, any applicable function restoration procedure needing implementation.

B. Given the Major Action Categories associated with FR-P.1, Response To Imminent Pressurized Thermal Shock Condition, explain the purpose of FR-P.1, the transition criteria for entering and exiting FR-P.1, and the types of operator actions that will occur within each category.

C. Given a copy of FR-P.1, Response To Imminent Pressurized Thermal Shock Condition, explain the basis of each procedural step.

D. Given actual or simulated plant conditions requiring implementation of FR-P.1, Response To Imminent Pressurized Thermal Shock Condition, successfully transition through the procedure, applying step background knowledge as required, to address the Critical Safety Function challenge in progress.

Presentation

Distribute all handouts. Refer to/display H/T-46.1, Objectives. Review objectives with trainees.

b. During depressurization, the hotter regions of the RCS (upper head) will tend to void and cause pzr level to increase rapidly. This effect would be more likely to occur when the RCPs are not operating.

23. **STEP 18: DEPRESSURIZE RCS TO DECREASE SUBCOOLING.**

a. The purpose of this step is to decrease RCS pressure to the lowest pressure possible without losing subcooling.

b. The RCS pressure reduction is intended to decrease pressure stress on the vessel wall as much as possible.

c. The RCS should be depressurized until subcooling is less than 40°F [95°F]. This gives a 10°F operating margin to reaching the minimum subcooling value of 30°F. If normal pzr spray is not available, and the RCS cannot be depressurized using any pzr PORV, then the team is instructed to use Aux spray.

(1) This preferred order takes into account that letdown has not been established yet to heat the Aux spray flow and minimize the thermal shock to the spray nozzle.

(2) Once letdown has been established, using Aux spray for depressurization is preferred before using a pzr PORV. If the team is directed to return to this step after letdown has been established, and normal pzr spray is not available, Aux spray should be used for depressurization.

(3) If a PORV is used and RCS subcooling decreases to less than 30°F, before the PORV is closed or isolated, SI pumps should be manually operated as necessary to restore subcooling to greater than 30°F.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

. . . . . .

CAUTION: Voiding may occur in the RCS during RCS depressurization. Voiding will result in a rapidly increasing PRZR level.

. . . . . .

18. __DEPRESSURIZE RCS TO REDUCE SUBCOOLING:

a) Use normal PRZR spray

a) IF normal spray NOT available, THEN use one PRZR PORV. Manually operate CHG pumps to maintain RCS subcooling greater than 30°F [85°F].

IF RCS can NOT be depressurized using any PRZR PORV, THEN use auxiliary spray.

b) Depressurize RCS until ANY of the following conditions satisfied:

- RCS subcooling based on CETCs - LESS THAN 40°F [95°F]

OR

- PRZR level - GREATER THAN 68% [60%]

OR

- RCS pressure - LESS THAN 125 PSIG [200 PSIG]

c) Stop RCS depressurization