FACILITY NAME: Summer Section 8

REPORT NUMBER: 05000395/2009301

FINAL RO WRITTEN EXAM

CONTENTS:

- ☒ **Final RO Written Exam (75 'as given' questions with changes made during administration annotated)**
- ☒ **Reference Handouts Provided To Applicants**
- ☒ **Answer Key**

Location of Electronic Files:

As given RO Written:

Attached

References:

Attached

Answer Key:

Attached

Submitted By: _____ Verified By: _____

1. Which ONE (1) of the choices below completes the following statement?

   After a Large Break LOCA, the crew must initiate Hot Leg Recirculation within 8 hours _____, and to minimize boron precipitation in the _____.

   A. of the transfer to Cold Leg Recirculation;

      core

   B. of the transfer to Cold Leg Recirculation;

      cold leg nozzles

   C. after event initiation;

      core

   D. after event initiation;

      cold leg nozzles

2. A cooldown is in progress, in accordance with AOP-112.2, *Steam Generator Tube Leak Not Requiring SI,* for tube leakage in Steam Generator 'B'.

   Which ONE (1) of the following identifies the status of PVT-2010, PWR RELIEF B, and MVG-2802A, MS LOOP B TO TD EFP?

	PVT-2010	**MVG-2802A**
A.	MAN/CLOSED	CLOSED/ENERGIZED
B.	MAN/CLOSED	CLOSED/DE-ENERGIZED
C.	AUTO/1150 PSIG	CLOSED/ENERGIZED
D.	AUTO/1150 PSIG	CLOSED/DE-ENERGIZED

3. Given the following plant conditions:

   - Due to a LOCA, RB pressure peaked at 18 psig and is now 2.5 psig.
   - During the implementation of the EOPs, the crew completed actions in EOP-14.0, *Response to Inadequate Core Cooling.*
   - The crew is now performing actions in EOP-1.2, *Safety Injection Termination.*

   Which ONE (1) of the choices below completes the following statement?

   The RB spray pumps must be run for a MINIMUM of _____ hours, and BOTH _____ pushbuttons must be depressed to secure the RB spray pumps and place in standby.

   A. 8;

      RESET TRAIN A(B) RB SPRAY RESET

   B. 2;

      RESET TRAIN A(B) RB SPRAY RESET

   C. 8;

      PHASE B - TRAIN A(B) CNTMT ISOL

   D. 2;

      PHASE B - TRAIN A(B) CNTMT ISOL

4. Given the following plant conditions:

   - 100% power
   - A LOCA has occurred in the Auxiliary Building.
   - A Reactor Trip and Safety Injection are manually actuated.
   - The crew has entered EOP-2.5, *LOCA Outside Containment.*
   - SI has NOT been reset.

   Which ONE (1) of the following describes the MINIMUM action(s) required to CLOSE MVG-8888A, RHR LP A TO COLD LEGS?

   A. Take the MVG-8888A Control Switch on the MCB to CLOSE ONLY.

   B. RESET Train A of Safety Injection; AND

      Take the MVG-8888A Control Switch on the MCB to CLOSE.

   C. Take the Train A Power Lockout Switch to ON; AND

      Take the MVG-8888A Control Switch on the MCB to CLOSE.

   D. RESET both trains of Safety Injection; AND

      Take the MVG-8888A Control Switch on the MCB to CLOSE.

5. Given the following plant conditions:

   - 100% power
   - Electrical grid disturbances on 230 KV Bus #1 have resulted in the operator making manual adjustments with the GEN FIELD VOLT ADJ (AUTO) Control Switch.
   - The EX2000 Voltage Regulator Core 1 fails electrically.

   Which ONE (1) of the following describes how the operator's adjustments for the electrical grid disturbances affected the Main Generator AND how the Main Generator will respond to the Core 1 failure?

   A. Main Generator reactive load will vary

      The Main Generator Breaker and Generator Field Breaker will remain CLOSED

   B. Main Generator reactive load will vary

      The Main Generator Breaker and Generator Field Breaker will OPEN

   C. Main Generator real load will vary

      The Main Generator Breaker and Generator Field Breaker will remain CLOSED

   D. Main Generator real load will vary

      The Main Generator Breaker and Generator Field Breaker will OPEN

6. Given the following plant conditions:

   - 100% power
   - The electric plant is in a normal, at-power lineup.
   - Annunciator 7.2 KV BOP BUSSES LOSS OF DC (XCP-635, 6-1) has actuated.
   - Electricians report that the supply breaker from DPN-1HX3 to XSW-1A has tripped open.

   Which ONE (1) of the following identifies the opening capability for the XSW-1A feeder breaker?

   A. Can be opened manually using the trip pushbutton at the breaker ONLY .

   B. Can be opened manually using the open contactor with a screwdriver at the breaker OR using the trip pushbutton at the breaker.

   C. Can be opened manually using the trip pushbutton at the breaker OR automatically by protective relay actuation.

   D. Can be opened manually using the open contactor with a screwdriver at the breaker OR automatically by protective relay actuation.

7. Given the following plant conditions:

   - 14% power
   - A main turbine warmup is in progress.
   - Main Feedwater (MFW) Pump 'B' is in service.
   - The normal feeder breaker for service bus XSW-1A tripped OPEN.
   - The alternate feeder breaker to XSW-1A failed to CLOSE.

   Which ONE (1) of the choices below completes the following statement?

   The 'A' S/G FRV will be operated in _____ to prevent a _____.

   A. MANUAL;

      High-High S/G level

   B. AUTOMATIC;

      High-High S/G level

   C. MANUAL;

      Low-Low S/G level

   D. AUTOMATIC;

      Low-Low S/G level

8. Given the following plant conditions:

   - Power was being maintained at 12-15% while preparing to synchronize the Main Generator to the grid.
   - Main Feed Pump (MFP) 'A' was running.
   - MFPs 'B' and 'C' were tripped.
   - Main Feed Pump 'A' tripped for an unknown reason.
   - The Reactor tripped on S/G Low-Low level and the operating crew is now implementing EOP-1.1, *Reactor Trip Recovery*.

   Which ONE (1) of the following describes the response of the MDEFP Flow Control Valves (FCVs) and the MINIMUM actions necessary to throttle the FCVs?

   A. The FCVs receive an open signal due to the trip of MFP 'A';

      Take the MD EFP RESET Switch to RESET, take the individual FCV control switch to MAN, adjust the Hagan controller.

   B. The FCVs receive an open signal due to the trip of MFP 'A';

      Take the individual FCV control switch to MAN, adjust the Hagan controller.

   C. The FCVs receive an open signal due to the S/G Low-Low level;

      Take the MD EFP RESET Switch to RESET, take the individual FCV control switch to MAN, adjust the Hagan controller.

   D. The FCVs receive an open signal due to the S/G Low-Low level;

      Take the individual FCV control switch to MAN, adjust the Hagan controller.

9. Given the following plant conditions:

   - The unit was at 100% power when the turbine tripped.
   - All controllers were in the normal, full power alignment.
   - The crew is performing EOP-1.1, *Reactor Trip Recovery.*
   - Tavg is 557°F and rising.
   - Condenser pressure is 6.0" Hg abs.

   The required operator action is to use the _____ to lower Tavg.

   If this action is NOT taken, steam pressure will rise to _____.

   A. Steamline Power Reliefs;

      1133 psig

   B. Condenser Dumps;

      1133 psig

   C. Steamline Power Reliefs;

      1176 psig

   D. Condenser Dumps;

      1176 psig

10. Given the following plant conditions:

    - 90% power
    - An instrument failure causes a plant transient, which results in a Reactor Trip.
    - On the trip, TWO (2) control rods remain at 6 steps, ONE (1) control rod remains at 12 steps, and ONE (1) control rod remains at 18 steps.

    According to EOP-1.1, *Reactor Trip Recovery*, which ONE (1) of the following describes the required response and the MINIMUM amount of boric acid to be added?

    A. Borate through the Boric Acid Blender and set the batch integrator to 2500 gallons.

    B. Borate through the Boric Acid Blender and set the batch integrator to 5800 gallons.

    C. Emergency borate 2500 gallons through MVT-8104, EMERG BORATE.

    D. Emergency borate 5800 gallons through MVT-8104, EMERG BORATE.

11. Given the following plant conditions:

- A plant load increase at ½% per minute is in progress.
- A malfunction in the Rod Control System results in Control Rods stepping out TEN (10) steps, at which point they are placed in MANUAL and stop moving.
- The load increase is stopped 2 minutes after the rods are placed in MANUAL.
- Control Rods are manually inserted to restore Tavg to Tref.

Considering ONLY the conditions stated, which ONE (1) of the choices below completes the following statement?

Total Power Defect has become _____ negative, and Control Rods were inserted _____ to restore Tavg to Tref.

A. less;

less than10 steps

B. less;

10 steps

C. more;

less than10 steps

D. more;

10 steps

12. Given the following plant conditions:

- ALL offsite power (ESF & BOP) is lost, resulting in a Reactor Trip following 30 days of operation at 100% power.
- The operating crew is responding per EOP-1.1, *Reactor Trip Recovery*.
- Both MDEFPs are running.
- RCS pressure is 2085 psig.
- ALL S/G pressures are 1035 psig.
- The Core Subcooling Monitor is NOT available.

Which ONE (1) of the following combinations of RCS Thot and Tcold indicate that natural circulation is in progress?

STEAM TABLES PROVIDED

	Thot (°F)	Tcold (°F)
A.	615	557
B.	615	551
C.	585	557
D.	585	551

13. Given the following plant conditions:

- 8% power
- The crew is making preparations to roll the Main Turbine to 1800 RPM.

Which ONE (1) of the following conditions REQUIRES the associated Reactor Coolant Pump(s) to be stopped IMMEDIATELY using SOP-101, *Reactor Coolant System*?

A. RCP 'C' #1 seal DP is 350 psid and decreasing.

B. MVG-9600, RCP THERM BAR ISOL, closes due to a failure in the control circuit.

C. Annunciator RCP 'B' UP OIL RESVR HI/LO (XCP-617,1-4) actuates due to a HIGH level.

D. Annunciator RCP 'A' VIBR HI (XCP-617, 1-3) actuates. Shaft vibration is 15.1 mils and increasing at 0.1 mils / hr. Frame vibration is 5.1 mils and increasing at 0.1 mils / hr.

14. Given the following plant conditions:

- Mode 5
- The RCS is solid with pressure being automatically maintained.
- A licensed operator trainee inadvertently energized one set of PZR Backup Heaters.

Assuming NO operator action, which ONE (1) of the following describes the **FIRST** response to the rising RCS pressure?

A. Annunciator LP LTDN FLO/PRESS HI (XCP-613, 2-4) actuates.

B. Letdown flow increases as HCV-142, LTDN FROM RHR, opens.

C. Annunciator DEMIN FLO DIVERT TEMP HI (XCP-613, 1-2) actuates.

D. Letdown flow increases as PCV-145, Letdown Pressure Control Valve, opens.

15. Which ONE (1) of the choices below completes the following statement?

LCV-115D, RWST TO CHG PP SUCT, is powered from _____ and MVG-8106, CHG PP, is powered from _____.

A. 1DA2Z; 1DB2Z

B. 1DB2Y; 1DB2Z

C. 1DB2Y; 1DA2Y

D. 1DA2Z; 1DA2Y

16. Given the following plant conditions:

- A cooldown is in progress.
- Mode 4 was just entered.
- RHR Train 'A' was just started in the cooldown mode.

Which ONE (1) of the following describes the operability of RHR **Train 'A'** with respect to Technical Specification 3.5.3, ECCS SUBSYSTEMS – TAVG <350°F?

A. INOPERABLE until Thot is < 250°F because of RHR suction voiding concerns.

B. INOPERABLE because it is no longer in the injection alignment described in the surveillance.

C. OPERABLE because Train 'A' is capable of being manually realigned to RWST in the injection mode.

D. OPERABLE because Train 'A' is fulfilling the core cooling basis for the Limiting Condition for Operation.

17. Given the following plant conditions:

- A large break LOCA has occurred.
- The operating crew has verified cold leg recirculation alignment per EOP-2.2, *Transfer to Cold Leg Recirculation.*
- RHR Pump 'A' and 'B' are in service with 3750 gpm flow indicated on FI-602A/B.
- RHR Pump 'A' amps have decreased and are oscillating.
- RHR Pump 'A' flow and discharge pressure have begun to oscillate.

Which ONE (1) of the following is the FIRST required action(s) to stabilize RHR Pump 'A' amps?

A. Go to EOP-2.4, *Loss of Emergency Coolant Recirculation.*

B. Place Charging Pump 'A' in PULL TO LK NON-A; then evaluate RHR Pump amps.

C. Ensure HCV-603A, A OUTLET, is closed; then throttle closed FCV-605A, A BYP, as necessary

D. Ensure FCV-605A, A BYP, is closed; then throttle closed HCV-603A, A OUTLET, as necessary.

18. Given the following plant conditions:

- 55% power
- A Main Generator Field Failure (40 Relay) occurs.
- Due to the transient, ALL Pressurizer PORVs opened for ONE (1) minute.
- The NROATC notes that PRT pressure rises, then rapidly drops.

Which ONE (1) of the choices below completes the following statement?

Pressurizer Relief Tank (PRT) pressure will _____. The crew will then initially implement _____.

A. stabilize at a higher than normal pressure.

EOP-1.0, *Reactor Trip/Safety Injection Actuation*

B. stabilize at a higher than normal pressure.

AOP-214.2, *Response to Load Rejection/Runback*

C. stabilize at a lower than normal pressure.

EOP-1.0, *Reactor Trip/Safety Injection Actuation*

D. stabilize at a lower than normal pressure.

AOP-214.2, *Response to Load Rejection/Runback*

19. Given the following plant conditions:

- 100% power
- CCW Loop 'A' is the Active Loop.
- The CCW Booster Pump alignment is as follows.
  - CCW Booster Pump (CCBP) 'A' is in AUTO and NOT running.
  - CCBP 'B' is in AUTO and running.
  - CCBP 'C' is in OFF.
- A leak develops in the discharge header of CCBP Pump 'B' and discharge pressure drops to 40 psig.

Which ONE (1) of the following describes the resulting Component Cooling Booster Pump configuration?

A. No CCBPs are running.

B. ONLY CCBP 'A' is running.

C. ONLY CCBP 'B' is running.

D. CCBPs 'A' and 'B' are running.

20. Given the following plant conditions:

- 100% power
- PZR level is 59% and slowly DECREASING.
- Tavg is 587°F and stable.
- RCS pressure is 2220 psig and slowly DECREASING.
- RM-A2 gaseous and particulate radiation monitor indications are INCREASING.
- RB pressure is 1.1 psig and slowly RISING.
- Annunciators RBCU 1A/2A (1B/2B) DRN FLO HI (XCP-607 (608) 2-2) actuated.
- PZR PORV and safety valve tailpipe temperatures are slowly RISING.
- PRT pressure is 7 psig and STABLE.

Which ONE (1) of the choices below completes the following statement?

The event in progress is a _____ and charging flow will _____ prior to a subsequent automatic Reactor Trip/SI.

A. leaking PZR PORV;

increase

B. leaking PZR PORV;

decrease

C. PZR steam space leak;

increase

D. PZR steam space leak;

decrease

21. Given the following plant conditions:

- Backup Group 1 PZR heaters control switch is in NORMAL-AFTER-STOP.
- Backup Group 2 PZR heaters control switch is in NORMAL-AFTER-START.
- Control Group PZR heaters control switch is in NORMAL-AFTER-START.
- The CNTRL GRP AMPs meter reads approximately 12 amps.
- PZR pressure is 2235 psig and decreasing slowly.
- The NROATC then notes the following:

	Green Light	Amber Light	Red Light
B/U Group 1 Heaters:	ON	OFF	OFF
B/U Group 2 Heaters:	ON	ON	OFF
Control Group Heaters:	OFF	OFF	ON

- The NROATC takes manual control of PK-444A, PZR PRESS MASTER CONTROL

Which ONE (1) of the choices below identifies the alarm that should accompany these indications and the action that would mitigate the downward trend in PZR pressure?

A. PZR HTR CNTRL OR BU GRP 1/2 TRIP (XCP-616, 3-1);

Increase the M/A station output (% demand)

B. PZR HTR CNTRL OR BU GRP 1/2 TRIP (XCP-616, 3-1);

Decrease the M/A station output (% demand)

C. SCR OUTPUT LOSS (XCP-616, 4-6);

Increase the M/A station output (% demand)

D. SCR OUTPUT LOSS (XCP-616, 4-6);

Decrease the M/A station output (% demand)

22. Given the following plant conditions:

- A Small Break LOCA has occurred.
- PZR pressure is stable at 1275 psig.
- Containment temperature is 192°F.
- Actual PZR level is 50%.

Which ONE (1) of the following describes the effect that the above plant conditions will have on LI-460, PZR LEVEL %?

A. Both containment temperature and PZR pressure will make LI-460 read HIGHER than actual.

B. Containment temperature will make LI-460 read HIGHER than actual, while PZR pressure will make LI-460 read LOWER than actual.

C. Both containment temperature and PZR pressure will make LI-460 read LOWER than actual.

D. Containment temperature will make LI-460 read LOWER than actual, while PZR pressure will make LI-460 read HIGHER than actual.

23. Given the following plant conditions:

- 25% power
- Reactor Engineering is evaluating physics data prior to giving clearance to raise power.
- LT-460, Pressurizer Level Channel, failed and has been removed from service and the associated bistables are tripped per AOP-401.6, *Pressurizer Level Control and Protection Channel Failure*.

According to Technical Specifications Table 3.3-1, *Reactor Trip Instrumentation*, the Pressurizer Water Level - High reactor trip is _____ to be operable for these conditions.

The number of REMAINING channels necessary to initiate a PZR high water level trip would be _____.

A. NOT required;

ONE (1)

B. required;

ONE (1)

C. NOT required;

TWO (2)

D. required;

TWO (2)

24. Given the following plant conditions:

- Mode 3
- The plant is being cooled down to Cold Shutdown per GOP-6, *Plant Shutdown from Hot Standby to Cold Shutdown (Mode 3 to Mode 5).*
- The NROATC begins depressurizing the RCS to 900-950 psig.
- At 1970 psig, the NROATC takes both PZR SI Train 'A', and Train 'B', Switches to BLOCK.
- PT-457, PRESSURIZER PRESSURE TRANSMITTER, fails HIGH.
- All remaining Pressurizer Pressure Transmitters read 1950 psig and slowly decreasing.

Which ONE (1) of the following identifies the result of this failure?

A. PZR PORV 445B block logic changes state.

B. The Pressurizer Pressure Safety Injection block is automatically reset.

C. PZR PORV 445B will automatically open.

D. The Pressurizer Pressure Safety Injection block is unaffected.

25. Given the following plant conditions:

- 100% power
- IPT-951, Reactor Building Pressure Channel II, has failed HIGH.
- IPT-951 was properly removed from service per Technical Specifications.

Which ONE (1) of the following indicates the number of OPERABLE channels required to **initiate** a HIGH-1 and a HIGH-3 RB pressure actuation signal?

REFERENCE PROVIDED

	HIGH -1	HIGH-3
A.	1	1
B.	1	2
C.	2	1
D.	2	2

INSTRUMENTATION

3/4 3.2 ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.2 The Engineered Safety Feature Actuation System (ESFAS) instrumentation channels and interlocks shown in Table 3.3-3 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-4 and with RESPONSE TIMES as shown in Table 3.3-5.

APPLICABILITY: As shown in Table 3.3-3.

ACTION:

a. With an ESFAS Instrumentation or Interlock Trip Setpoint trip less conservative than the value shown in the Trip Setpoint Column but more conservative than the value shown in the Allowable Value Column of Table 3.3-4, adjust the Setpoint consistent with the Trip Setpoint value.

b. With an ESFAS Instrumentation or Interlock Trip Setpoint less conservative than the value shown in the Allowable Value Column of Table 3.3-4, declare the channel inoperable and apply the applicable ACTION statement requirements of Table 3.3-3 until the channel is restored to its OPERABLE status with its setpoint adjusted consistent with the Trip Setpoint value.

c. With an ESFAS instrumentation channel or interlock inoperable take the ACTION shown in Table 3.3-3.

SURVEILLANCE REQUIREMENTS

4.3.2.1 Each ESFAS instrumentation channel and interlock and the automatic actuation logic and relays shall be demonstrated OPERABLE by performance of the engineered safety feature actuation system instrumentation surveillance requirements specified in Table 4.3-2.

4.3.2.2 The ENGINEERED SAFETY FEATURES RESPONSE TIME of each ESFAS function shall be verified to be within the limit at least once per 18 months. Each verification shall include at least one train such that both trains are verified at least once per 36 months and one channel per function such that all channels are verified at least once per N times 18 months where N is the total number of redundant channels in a specific ESFAS function as shown in the "Total No. of Channels" Column of Table 3.3-3.

TABLE 3.3-3

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
1. SAFETY INJECTION, REACTOR TRIP, FEEDWATER ISOLATION, CONTROL ROOM ISOLATION, START DIESEL GENERATORS, CONTAINMENT COOLING FANS AND ESSENTIAL SERVICE WATER.					
a. Manual Initiation	2	1	2	1, 2, 3, 4	18
b. Automatic Actuation Logic and Actuation Relays	2	1	2	1, 2, 3, 4	14
c. Reactor Building Pressure - High-1	3	2	2	1, 2, 3	24*
d. Pressurizer Pressure - Low	3	2	2	1, 2, 3#	24*
e. Differential Pressure Between Steam Lines - High	3/steam line	2/steam line twice and 1/3 steam lines	2/steam line	1, 2, 3	24*

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
f. Steam Line Pressure-Low	1 pressure/ loop	1 pressure and 2 loops	1 pressure and 2 loops	1, 2, 3##	24*
2. REACTOR BUILDING SPRAY					
a. Manual	2 sets - 2 switches/set	1 set	2 sets	1, 2, 3, 4	18
b. Automatic Actuation Logic and Actuation Relays	2	1	2	1, 2, 3, 4	14
c. Reactor Building Pressure--High-3 (Phase 'A' isolation aligns spray system discharge valves and NaOH tank suction valves)	4	2	3	1, 2, 3	16

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
3. CONTAINMENT ISOLATION					
a. Phase "A" Isolation					
1) Manual	2	1	2	1, 2, 3, 4	18
2) Safety Injection	See 1 above for all safety injection initiating functions and requirements.				
3) Automatic Actuation Logic and Actuation Relays	2	1	2	1, 2, 3, 4	14
b. Phase "B" Isolation					
1) Automatic Actuation Logic and Actuation Relays	2	1	2	1, 2, 3, 4	14
2) Reactor Building Pressure--High-3	4	2	3	1, 2, 3	16
c. Purge and Exhaust Isolation					
1) Safety Injection	See 1 above for all safety injection initiating functions and requirements.				
2) Containment Radioactivity- High	2*	1	2*	1, 2, 3, 4	17
3) Automatic Actuation Logic and Actuation Relays	2	1	2	1, 2, 3, 4	17

*Purge exhaust monitor not required when purge exhaust is closed.

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
4. STEAM LINE ISOLATION					
a. Manual					
i. One Switch/line	1/steam line	1/steam line	1/operating steam line	1, 2, 3###	23
ii. One Switch/all lines	1	1	1	1, 2, 3###	23
b. Automatic Actuation Logic and Actuation Relays	2	1	2	1, 2, 3###	21
c. Reactor Building Pressure--High-2	3	2	2	1, 2, 3###	24*
d. Steam Flow In Two Steam Lines--High	2/steam line	1/steam line any 2 steam lines	1/steam line	1, 2, 3###	24*
COINCIDENT WITH T_{avg}--Low-Low	1 T_{avg}/loop	1 T_{avg} any 2 loops	1 T_{avg} any 2 loops	1, 2, 3###	24*

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
e. Steam Line Pressure-Low	1 pressure/ loop	1 pressure any 2 loops	1 pressure any 2 loops	1, 2, 3[#,###]	24*
5. TURBINE TRIP & FEEDWATER ISOLATION					
a. Steam Generator Water Level--High-High	3/loop	2/loop in any operating loop	2/loop in each operating loop	1, 2	24*
b. Automatic Actuation Logic and Actuation Relay	2	1	2	1, 2	25

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
6. EMERGENCY FEEDWATER					
a. Manual Initiation	1 per pump	1 per pump	1 per pump	1, 2, 3	22
b. Automatic Actuation Logic and Actuation Relays	2	1	2	1, 2, 3	21
c. Stm. Gen. Water Level-Low-Low					
i. Start Motor-Driven Pumps	3/stm. gen.	2/stm. gen. any stm gen.	2/stm. gen.	1, 2, 3	24*
ii. Start Turbine-Driven Pump	3/stm. gen.	2/stm. gen. any 2 stm. gen.	2/stm. gen	1, 2, 3	24*
d. Undervoltage-both ESF Busses Start Turbine-Driven Pump	2-1/bus	2	2	1, 2, 3	19
e. S.I. Start Motor-Driven Pumps	See 1 above (all S.I. initiating functions and requirements)				
f. Undervoltage-one ESF bus Start Motor-Driven Pumps	2-1/bus	1	2	1, 2	22
g. Trip of Main Feedwater Pumps Start Motor-Driven Pumps	3-1/pump	3-1/pump	3-1/pump	1, 2	19
h. Suction Transfer on Low Pressure	4	2	3	1, 2, 3	16

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
7. LOSS OF POWER					
a. 7.2 kv Emergency Bus Undervoltage (Loss of Voltage)	2-1/bus	1	2	1, 2, 3, 4	18
b. 7.2 kv Emergency Bus Undervoltage (Degraded Voltage)	2-1/bus	1	2	1, 2, 3, 4	18
8. AUTOMATIC SWITCHOVER TO CONTAINMENT SUMP					
a. RWST level low-low	4	2	3	1, 2, 3	16
b. Automatic Actuation Logic and Actuation Relays	2	1	2	1, 2, 3	21
9. ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INTERLOCKS					
a. Pressurizer Pressure, P-11	3	2	2	1, 2, 3	20
b. Low-Low T_{avg}, P-12	3	2	2	1, 2, 3###	20
c. Reactor Trip, P-4	2	2	2	1, 2, 3	22

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TECHNICAL SPECIFICATION INFORMATION/RELOCATION FORM

This information is provided as "REFERENCE ONLY" and IS NOT part of the formal, NRC approved Technical Specifications.

I. The Technical Specification was deleted by Amendment No. N/A :
T/S Number: _____
Title: _____

Reference Document to which requirements were relocated:

Document ID: N/A
Title: _____

Section: _____

II. A Regulatory Interpretation or other reference document provides amplifying information relative to this Technical Specification.

T/S Number: 3/4.3.2 ESFAS Instrumentation
REFERENCES: TSR 1028 - inserted between pages 3/4 3-8 and 3/4 3-9

Approval: Robert M. Gruber
Manager, Nuclear Licensing & Operating Experience

Issue Date: 03/17/95

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V. C. SUMMER NUCLEAR STATION
REGULATORY INTERPRETATION

Document Affected: Technical Specification 3/4.3.2 -- Engineered Safety Features Actuation System Instrumentation

INTERPRETATION:

The following interpretation refers to TS Table 3.3-3, action statement 14.

This interpretation is identical to that of TSR 1028 (inserted between TS pages 3/4 3-8 and 3/4 3-9) related to SSPS surveillance testing on both the Reactor Trip Breaker and the Automatic Actuation Logic and Actuation Relays.

BASIS: None

REFERENCES: None

Recommended Approval: _____
Supervisor, Nuclear Licensing & Operating Experience

Approval: _____
General Manager, Nuclear Plant Operations

Issue Date: 03/17/95

TABLE 3.3-3 (Continued)

TABLE NOTATION

Trip function may be blocked in this MODE below the P-11 (Pressurizer Pressure Interlock) setpoint.

Trip function may be blocked in this MODE below the P-12 (Low-Low T_{avg} Interlock) setpoint.

Except when below P-12 with all MSIVs and bypasses closed and disabled.

* The provisions of Specification 3.0.4 are not applicable.

ACTION STATEMENTS

ACTION 14 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 24 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours; however, one channel may be bypassed for up to 4 hours for surveillance testing per Specification 4.3.2.1, provided the other channel is OPERABLE.

ACTION 15 - DELETED

ACTION 16 - With the number of OPERABLE channels one less than the Total Number of Channels, operation may continue provided the inoperable channel is placed in bypass and the Minimum Channels OPERABLE requirement is met. Restore the inoperable channel to OPERABLE status within 72 hours otherwise;

Be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

One additional channel may be bypassed for up to 12 hours for surveillance testing per Specification 4.3.2.1.

ACTION 17 - With less than the Minimum Channels OPERABLE requirement, operation may continue provided the containment purge supply and exhaust valves are maintained closed.

ACTION 18 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

ACTION 19 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 1 hour.

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 2 hours for surveillance testing of other channels per Specification 4.3.2.1.

TABLE 3.3-3 (Continued)

ACTION STATEMENTS (Continued)

ACTION 20 - With less than the Minimum Number of Channels OPERABLE, within one hour determine by observation of the associated permissive annunciator window(s) that the interlock is in its required state for the existing plant condition, or apply Specification 3.0.3.

ACTION 21 - With the number of OPERABLE Channels one less than the Minimum Channels OPERABLE requirement, restore the inoperable channel to OPERABLE status within 24 hours or be in at least HOT STANDBY within the next 6 hours and in at least HOT SHUTDOWN within the following 6 hours; however, one channel may be bypassed for up to 4 hours for surveillance testing per Specification 4.3.2.1 provided the other channel is OPERABLE.

ACTION 22 - With the number of OPERABLE channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 48 hours or be in at least HOT STANDBY within 6 hours and in at least HOT SHUTDOWN within the following 6 hours.

ACTION 23 - With the number of OPERABLE channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 48 hours or declare the associated valve inoperable and take the ACTION required by Specification 3.7.1.5.

ACTION 24 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the following conditions are satisfied:

a. The inoperable channel is placed in the tripped condition within 72 hours.

b. The Minimum Channels OPERABLE requirement is met; however, the inoperable channel may be bypassed for up to 12 hours for surveillance testing of other channels per Specification 4.3.2.1.

ACTION 25 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, restore the inoperable Channel to OPERABLE status within 24 hours or be in at least HOT STANDBY within the next 6 hours; however, one channel may be bypassed for up to 4 hours for surveillance testing per Specification 4.3.2.1, provided the other channel is OPERABLE.

26. Given the following plant conditions:

- 100% power
- The NROATC notes the following conditions exist on RCP 'A':
  - #1 Seal Leakoff flow drops to 0.6 gpm.
  - RCP A STNDPIP LVL HI/LO (XCP-617, 2-4) has NOT actuated.
  - The Lower Seal Water Bearing Temperature is 205°F and increasing at 3°F/minute.
  - The Seal Water Outlet Temperature is 200°F and increasing at 2°F/minute.

Which ONE (1) of the following identifies the malfunction that has occurred AND the required action?

A. The #1 Seal is NOT operating properly;

   Trip the reactor and stop RCP 'A'.

B. The #1 Seal is NOT operating properly;

   Reduce power to less than P-8 using GOP-4C, Rapid Downpower, stop RCP 'A', and perform a controlled shutdown of the plant.

C. The #2 Seal is NOT operating properly;

   Trip the reactor and stop RCP 'A'.

D. The #2 Seal is NOT operating properly;

   Reduce power to less than P-8 using GOP-4C, Rapid Downpower, stop RCP 'A', and perform a controlled shutdown of the plant.

27. Given the following plant conditions:

- 60% power
- An electrical fault occurs in the non safety-related circuit of the Turbine 1st Stage Pressure PT-446.

Which ONE (1) of the following identifies a set of signals that are potentially affected by this fault?

REFERENCE PROVIDED

A. High Steamline Flow coincident with Lo-Lo Tavg actuation; AND

P-13 actuation.

B. High Steamline Flow coincident with Lo-Lo Tavg actuation; AND

Steam Dump actuation.

C. AMSAC actuation; AND

P-13 actuation.

D. AMSAC actuation; AND

Steam Dump actuation.

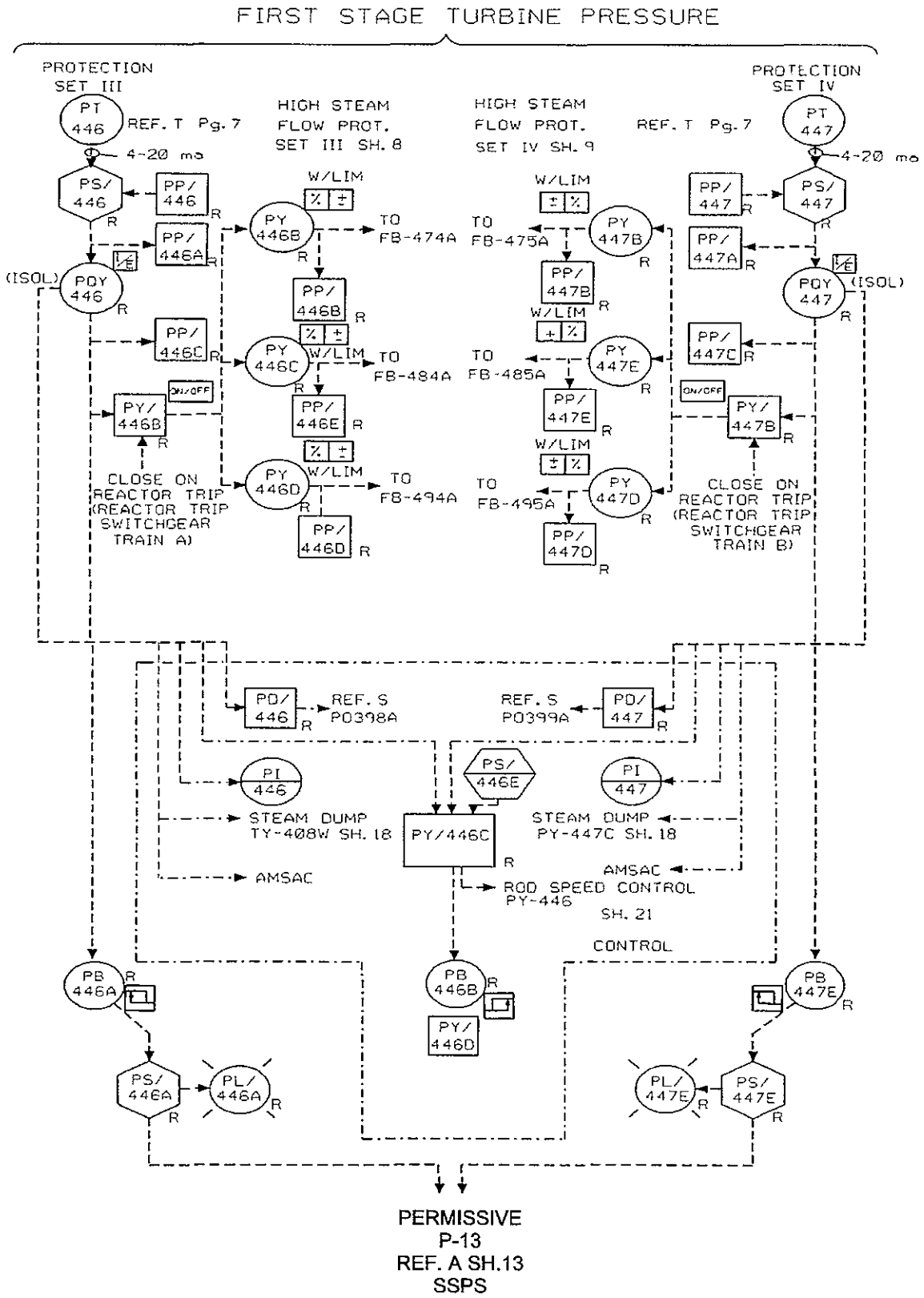


FIGURE IC9.27

28. Given the following sequence of events:

- 100% power
- The following annunciators actuate:
  - VCT LVL HI/LO
  - VCT LCV-115A TO HU-TK LVL HI
- LI-112A, VCT LEVEL %, reads 0%
- LI-115, VCT LEVEL %, reads 100%
- PZR level starts to decrease.
- The NROATC notes the following conditions:
  - Charging flow decreases to 0 gpm.
  - Charging Pump amps are at minimum and fluctuating.
  - Charging Pump discharge pressure is 15 psig and fluctuating.
- The ABAO reports charging pump suction pressure at 15 psig.

Which ONE (1) of the following describes what happened to the Charging Pump (Charging Pump lineup)?

A. Gas binding of the pump has occurred.

B. LCV-115A did not divert flow to the RHT.

C. The suction to the pump has swapped to the RWST.

D. One phase of electrical power to the pump motor was lost due to overheating.

29. On an Safety Injection, which ONE (1) of the following describes the response of the status lights on XCP-6103, SAFETY INJECTION, and XCP-6104, SAFETY INJECTION PHASE A ISOL, for the Train 'B' RBCUs when the ESFLS sequence is complete?

	(XCP-6103) SW TO RB IN B ISOL 3106B CLSD	**(XCP-6104) RB OUT B ISOL 3111B CLSD**
A.	DIM	DIM
B.	DIM	BRIGHT
C.	BRIGHT	DIM
D.	BRIGHT	BRIGHT

30. Which ONE (1) of the following identifies the actions, per AOP-106.1, *Emergency Boration*, that must be taken to align the Charging Pump suction to the next PREFERRED boration source if the Boric Acid Filter will not pass flow?

    A. Open BOTH Boric Acid Tank to Charging Pump Suction Header Isolation Valves (XVD-8329 and XVD-8331);

       Isolate Makeup Water to the Blender

    B. Open BOTH Boric Acid Tank to Charging Pump Suction Header Isolation Valves (XVD-8329 and XVD-8331);

       Isolate the VCT

    C. Open BOTH RWST to Charging Pump Suction Valves (LCV-115B and LCV-115D);

       Isolate Makeup Water to the Blender

    D. Open BOTH RWST to Charging Pump Suction Valves (LCV-115B and LCV-115D);

       Isolate the VCT

31. Which ONE (1) of the following places the plant in the action statement with the SHORTEST time in accordance with its associated Technical Specification?

    A. The unit is in Mode 1 at 100% power. RHR Pump 'A' breaker trips during a surveillance test.

    B. The unit is in Mode 4 with RCP 'A' and both RHR loops in operation. RHR Pump 'A' breaker trips.

    C. The unit is in Mode 5 with the RCS loops filled. S/G Narrow Range levels are: 'A' - 27%; 'B' - 14%; 'C' - 26%. RHR Pump 'A' breaker trips. RHR Pump 'B' is started.

    D. The unit is in Mode 6 with water level maintained at 4 feet above the reactor vessel flange. RHR Pump 'A' breaker trips. RHR Pump 'B' is started.

32. Given the following plant conditions;

- 75% power
- A TOTAL loss of Component Cooling Water occurs.
- Local temperature monitoring is in progress on Charging Pump 'A' with all temperatures within allowable limits.

In accordance with AOP-118.1, *Total Loss of Component Cooling Water*, which ONE (1) of the following describes the preferred action that must be taken in regard to subsequent operation of Charging Pump 'A'?

A. Trip Charging Pump 'A' if CCW is not restored within 10 minutes.

B. Trip Charging Pump 'A' if CCW is not restored within 20 minutes.

C. Establish alternate cooling using the Demin Water System.

D. Establish alternate cooling using the Chilled Water System.

33. Given the following plant conditions:

- 100% power
- PZR pressure control is in AUTO at 2235 psig.
- Group 1 Backup Heaters are ON.
- Group 2 Backup Heaters are OFF.
- PT-444, PZR Pressure Transmitter, starts to slowly drift HIGH.
- The operator places the Master Pressure Controller in MANUAL when PT-444 reads 2275 psig, but does NOT adjust the output of the controller.

Which ONE (1) of the choices below completes the following statement?

When placed in MANUAL, the output on the Master Pressure Controller is _____ than its original output, AND the PZR Spray Valves will be approximately _____ open.

A. HIGHER;

80%

B. HIGHER;

30%

C. the SAME as;

80%

D. the SAME as;

30%

34. Given the following plant conditions:

- Annunciator RB SPR NAOH STOR TK LVL HI/LO (XCP-608, 1-1) alarms on the MCB.
- LI-7356, NAOH TK LEVEL %, indicates 97%.
- The ABAO reports that the NaOH gauge glass reads approximately 450' 11".

Which ONE (1) of the following identifies the **TOTAL** volume in the tank per Curve Book Figure VI-27 AND the status of the Spray Additive System per Technical Specification 3.6.2.2 *Spray Additive System*?

REFERENCE PROVIDED

A. 3085 gallons;

OPERABLE.

B. 3085 gallons;

INOPERABLE.

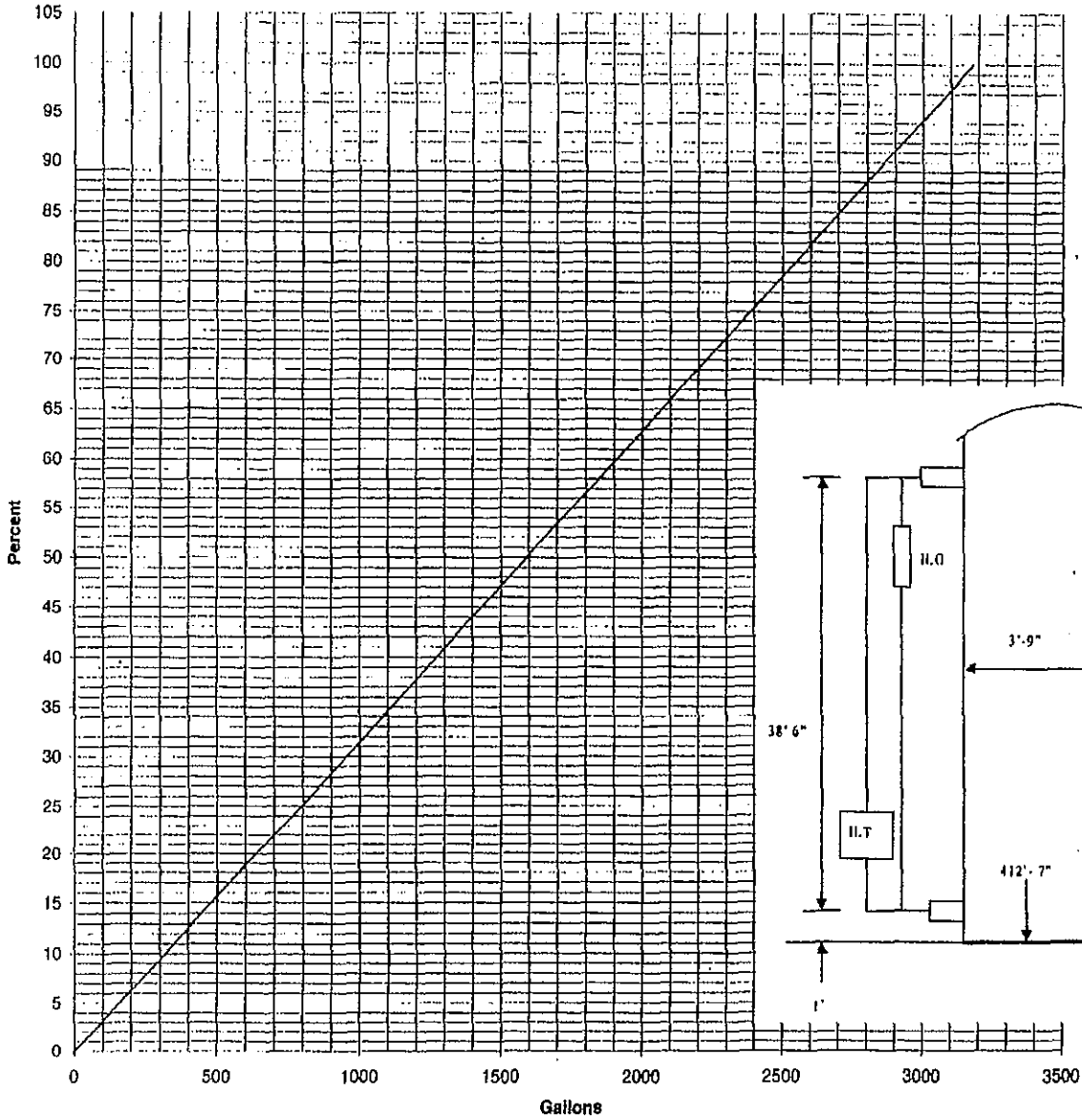
C. 3165 gallons;

OPERABLE.

D. 3165 gallons;

INOPERABLE.

Sodium Hydroxide Spray Addition Tank
XTK0060



Percent	Gallons
0	0
5	159.04
10	318.09
15	477.13
20	636.17
25	795.22
30	954.26
35	1,113.30
40	1,272.35
45	1,431.39
50	1,590.44
55	1,749.48
60	1,908.52
65	2,067.57
70	2,226.61
75	2,385.65
80	2,544.70
85	2,703.74
90	2,862.78
95	3,021.83
100	3,180.87

Figure: VI-27

Revision Date: 21-Feb-01

Prepared By: Steven A. Scott

Verified By: T. CLARK

Approved By:

XTK0060

This figure only includes volume above the pump suction centerline. Technical Specifications includes the total volume of the tank.
(Volume below pump suction centerline is 79.61 gallons).

SIGHT GLASS READINGS
FOR TOTAL VOLUME OF TANK
(Including Volume below Pump Suction)

451' 10"	= 3242.83 GAL
451' 8"	= 3230.00 GAL
451'	= 3173.98 GAL
450' 7 - 3/16"	= 3140.00 GAL
450' 3"	= 3112.02 GAL

NOTE: 1 inch = 6.885 GAL

Tech Spec Ref: 3.6.2.2.a & 4.6.2.2.b.1 Procedure Ref: STP-112.009 Figure Ref: DC09620-016 & DC09620-004

35. Which ONE (1) of the following is the LOWEST Intermediate Range Startup Rate that will generate an **ORANGE** Path transition TO EOP-13.0, *Response to Abnormal Nuclear Power Generation*.

    No CSF Red Path conditions exist.

    A. + 0.2 DPM

    B. 0.0 DPM

    C. - 0.2 DPM

    D. - 0.33 DPM

36. Given the following plant conditions:

- Mode 5
- Reactor Building Integrity is established.
- A Reactor Building Purge (36") is in progress with BOTH trains of RB Purge in service.
- ONE (1) RB Purge exhaust fan trips.
- Annunciator CONTAIN. DP HI (XCP-6210-LCB2, 4-9) actuates.
- RB pressure is 1.1 psig.
- The 36" Purge has been secured and the crew is monitoring for leakage.

Which ONE (1) of the following describes the impact these conditions have on Reactor Building pressure limits, and the NEXT action required to restore RB pressure to the normal band?

A. RB pressure is above the upper limit for normal operations.

Shift the cooling water supply to the RBCUs to Service Water per SOP-117.

B. RB pressure is above the upper limit for normal operations.

Start the alternate purge exhaust fan per SOP-114.

C. RB pressure is below the lower limit for for normal operations.

Start the alternate purge exhaust fan per SOP-114.

D. RB pressure is below the lower limit for for normal operations.

Shift the cooling water supply to the RBCUs to Service Water per SOP-117.

37. Given the following plant conditions:

- 7% power
- Power is being raised slowly in preparation for rolling the Main Turbine.
- Intermediate Range Detector N-35 has failed LOW.

Which ONE (1) of the following is the required action and the MAXIMUM allowed power level increase in accordance with Technical Specification 3.3.1 *Reactor Trip Instrumentation*?

A. Place the N-35 LEVEL TRIP Switch in BYPASS.

Maintain power less than 10% until the channel is returned to service.

B. Place the N-35 LEVEL TRIP Switch in BYPASS.

Maintain power less than 15% while the channel is repaired.

C. Direct I&C to trip the N-35 associated bistables.

Maintain power less than 10% until the channel is returned to service.

D. Direct I&C to trip the N-35 associated bistables.

Maintain power less than 15% while the channel is repaired.

38. Given the following plant conditions:

- 100% power
- All Steam Generators are at programmed level.
- Steam Generator 'B' level is being controlled manually.

Subsequently, a Stator Cooling Turbine Runback occurs for 20 seconds and then stops.

Assuming NO operator action, which ONE (1) of the following describes the response of Steam Generator 'B' level?

A. Initially decreases;

SG High-High water level will occur.

B. Initially decreases;

SG Low-Low water level will occur.

C. Initially increases;

SG High-High water level will occur.

D. Initially increases;

SG Low-Low water level will occur.

39. Given the following plant conditions:

- The crew is responding to a tube rupture on SG 'B' IAW EOP-4.0, *Steam Generator Tube Rupture.*
- RCS pressure is 1365 psig.
- RCS temperature is 552°F (Core Exit Thermocouples)
- Steam pressures are as follows:
  - 1005 psig on SG 'A'
  - 1085 psig on SG 'B'
  - 1045 psig on SG 'C'.

Which ONE (1) of the following values of core exit thermocouples is the target temperature for RCS cooldown, with an allowance of 50°F for subcooling?

STEAM TABLES PROVIDED

A. 497°F

B. 501°F

C. 506°F

D. 535°F

40. Given the following plant conditions:

- 100% power
- Charging Pump 'A' is removed from service with its breaker racked down.
- Charging Pump 'B' is in standby.
- Charging Pump 'C' breaker is racked up onto Bus 1DA and running.
- ALL Offsite Power (BOP & ESF) is lost.
- Both DG 'A' and 'B' start and restore power to their respective bus.
- ESFLS status lights on the MCB are as follows:

TRAIN A:

- TRN BLACKOUT SEQ INIT -lit
- STEP 1 through 5 START - lit
- STEP 6 through 8 START - off

TRAIN B:

- TRN BLACKOUT SEQ INIT - lit
- STEP 1 through 8 START - off
- TRN BLACKOUT SEQ COMPLETE - lit

Which ONE (1) of the following describes which Charging Pump(s), if any, will be running?

A. NO Charging Pumps

B. ONLY Charging Pump 'B'

C. ONLY Charging Pump 'C'

D. BOTH Charging Pumps 'B' & 'C'

41. Given the following plant conditions:

- 2% power
- Nuclear Instrument Channel N44 is in TEST.
- Power is lost to APN-5903 when the associated inverter normal AC input breaker opens and the inverter fails to swap to alternate power.

Which ONE (1) of the choices below completes the following statements?

The operator will use _____ to initially respond to the plant conditions.

Concurrently, _____ will direct Electrical Maintenance to investigate and repair the breaker malfunction **AND** provide direction to restore power to the APN.

A. an Emergency Operating Procedure;

an Annunciator Response Procedure

B. an Emergency Operating Procedure;

a System Operating Procedure

C. an Abnormal Operating Procedure;

an Annunciator Response Procedure

D. an Abnormal Operating Procedure;

a System Operating Procedure

42. Given the following plant conditions:

- 10^{-3}% power
- The Train 'B' Class IE 125 VDC battery breaker is open for urgent battery maintenance.

Which ONE (1) of the choices below completes the following statement?

If the normal supply breaker to Bus 1DB subsequently trips open, the Reactor _____ automatically trip and D/G 'B' _____ automatically start.

A. will

will

B. will

will NOT

C. will NOT

will

D. will NOT

will NOT

43. Given the following plant conditions:

- Mode 1
- A LOCA occurs.
- RM-G7, RB High Range Monitor, is in alarm and the alarm is determined to be valid.
- RM-G17A & B, MANIP CRN, high radiation alarms have actuated.

Which ONE (1) of the following describes why the Annunciator Response Procedure for RM-G7 directs the operator refer to EOP-17.2, *Response to High Reactor Building Radiation Levels*?

EOP-17.2 will REQUIRE the **operating crew** to _____.

A. Ensure Containment Ventilation Isolation; AND

   Verify that the RB Spray system is in service.

B. Ensure Containment Ventilation Isolation; AND

   Place both RBCU HEPA Filter trains in service.

C. Place both RB Charcoal Cleanup Units in service; AND

   Verify that the RB Spray system is in service.

D. Place both RB Charcoal Cleanup Units in service; AND

   Place both RBCU HEPA Filter trains in service.

44. Given the following plant conditions:

- At **0900**, the Reactor tripped when a loss of ALL off-site power (ESF & BOP) occurred.
- The crew has entered EOP-15.0, *Response to Loss of Secondary Heat Sink*.
- Condenser pressure is 5.1" Hg absolute.
- During the event, **WIDE RANGE** Steam Generator levels were noted as follows:

0905	**0920**	**0930**
SG 'A' **WR** - 85%	SG 'A' **WR** - 65%	SG 'A' **WR** - 50%
SG 'B' **WR** - 74%	SG 'B' **WR** - 56%	SG 'B' **WR** - 40%
SG 'C' **WR** - 77%	SG 'C' **WR** - 58%	SG 'C' **WR** - 37%

Which ONE (1) of the following describes the response of RCS temperature and pressure from **0905 to 0920**?

A. RCS temperature is maintained by condenser steam dumps.

RCS pressure stabilizes below the PZR PORV setpoint.

B. RCS temperature is maintained by SG power reliefs.

RCS pressure stabilizes below the PZR PORV setpoint.

C. RCS temperature rises steadily as SG level lowers.

RCS pressure rises to the PZR spray 100% full open setpoint.

D. RCS temperature rises steadily as SG level lowers.

RCS pressure rises to the PZR PORV setpoint and cycles around this value.

45. Given the following plant conditions:

- 100% power
- The following annunciators actuate simultaneously:
  - EMERG AUX XFMR XTF-31 TRBL (XCP-633,1-4)
  - XFMR XTF31 LCKOUT 86T31 (XCP-639, 4-2)

Which ONE (1) of the following identifies the condition than can cause the simultaneous actuation of these alarms, and describes the expected status of Bus 1DB ONE (1) minute later?

A. SUDDEN PRESSURE at 5.5 psi/sec;

Bus 1DB deenergized

B. SUDDEN PRESSURE at 5.5 psi/sec;

Bus 1DB powered from EDG 'B'

C. WINDING OVERLOAD at 110°C;

Bus 1DB deenergized

D. WINDING OVERLOAD at 110°C;

Bus 1DB powered from EDG 'B'

46. Which ONE (1) of the following describes the MINIMUM AC power sources required by GOP-9, *Mid-Loop Operation*, for mid-loop operations?

    A. TWO independent sources of off-site power to the ESF buses.

    B. ONE source of off-site power to the ESF buses and ONE Emergency Diesel Generator operable.

    C. ONE source of off-site power to the ESF buses and BOTH Emergency Diesel Generators operable.

    D. TWO independent sources of off-site power to the ESF buses and ONE Emergency Diesel Generator operable.

47. Given the following plant conditions:

- 100% power
- Normal full power alignment

Which ONE (1) of the following Bus 1DA conditions will cause the Emergency Safeguards Loading Sequencer (ESFLS) to actuate in the BLACKOUT mode?

With respect to bus 1DA:

A. A lightning strike causes a reduction in voltage to 5600V for 3 (THREE) seconds.

B. A transformer windings problem causes a voltage reduction to 6680V for 10 (TEN) seconds.

C. A degraded voltage sensor fails to ZERO while another degraded voltage sensor is being tested.

D. A CCW Pump 'A' motor failure causes voltage on two phases to drop to 6500V for 5 seconds before the pump breaker trips.

48. Given the following plant conditions:

- 100% power
- A pipe rupture in the Instrument Air System results in a sustained loss of system pressure.
- The operating crew implements the appropriate procedures.
- Remote control of the EFW Flow Control Valves has been lost.

Which ONE (1) of the following describes what is required, in accordance with AOP-220.1, *Loss of Instrument Air*, to prevent exceeding MDEFP operating limitations?

A. Expand the SG Narrow Range level control range.

Alternate starting the two MD EFW Pumps.

B. Expand the SG Narrow Range level control range.

Isolate blowdown and sampling from the Steam Generators.

C. Alternate steaming one Steam Generator at a time to control RCS temperature.

Alternate starting the two MD EFW Pumps.

D. Alternate steaming one Steam Generator at a time to control RCS temperature.

Isolate blowdown and sampling from the Steam Generators.

49. Given the following plant conditions:

- Following a Control Room Evacuation, the plant is being controlled in accordance with GOP-8, *Plant Shutdown from Hot Standby to Cold Shutdown with the Control Room Inaccessible Mode 3 to Mode 5.*
- The CRS directs the RO to perform calculations for Mode 5, Short Term Cold Shutdown conditions (bubble in the PZR) to raise boron concentration *by* 300 ppm.
- Present RCS boron concentration is 100 ppm.
- MVT-8104, Emergency BA Flow Control Valve, has been opened.
- Boric Acid Transfer Pump 'B' has been started.

Which ONE (1) of the following describes the CREP indication that will be used to monitor the amount of boron injected into the Reactor Coolant System AND the **MINIMUM** specific criteria which will be used to terminate the boration in accordance with GOP-8?

REFERENCES PROVIDED

A. FI-122B, CHARGING FLOW GPM;

30 gpm for 127 minutes.

B. FI-122B, CHARGING FLOW GPM;

85 gpm for 34 minutes.

C. FI-110A, EMERGENCY BA FLOW GPM;

30 gpm for 127 minutes.

D. FI-110A, EMERGENCY BA FLOW GPM;

85 gpm for 34 minutes.

Revision Date: 11-11-94
Prepared By: LR Carter
Verified By: P.R. Boyle
Approved By:: Will Hallinger

FIGURE III-6
BORON CHANGE CORRECTION FACTORS

Plant Conditions			Correction Factor (k)
Coolant Pressure (psig)	Coolant Temperature (°F)	Pressurizer Level	
2,235	587.4	Normal Operating	1
2,235	557	No-Load	1
1,600	500	No-Load	1.06
1,200	450	No-Load	1.11
800	400	No-Load	1.15
400	350	No-Load	1.19
400	300	No-Load	1.23
400	250	No-Load	1.26
400	200	No-Load	1.28
400	300	Solid Water	1.37
400	250	Solid Water	1.4
400	200	Solid Water	1.43
400	150	Solid Water	1.45
400	100	Solid Water	1.47

NOTE: Correction Factors are applied as follows:

Boron Addition and Dilution Total Volume Figures

$V_{(corrected)} = K \times V_{(figure)}$

Coolant Boration and Dilution Rate Figures

$$\left(\frac{dc}{dt}\right)_{corrected} = \frac{\left(\frac{dc}{dt}\right)_{figure}}{K}$$

Tech. Spec. Ref.: N/A Procedure Ref.: N/A Figure Ref: DC00040-068

Revision Date: 11-11-94
Prepared By: LL Carter
Verified By: P.R. Bingham
Approved By: Will Hatteberg

FIGURE III-2. RCS BORATION
GALLONS (V_B) OF BORIC ACID REQUIRED

$$V_B = \frac{M}{8.33} \ln\left(\frac{7000-C_i}{7000-C_f}\right) = 49640 \ln\left(\frac{7000-C_i}{7000-C_f}\right)$$

M = RCS Mass (413,500 lbm) **C_i = Initial ppm** **C_f = Final ppm**

C_i ppm	PPM BORON ADDITION (C_f - C_i)									
	10	20	30	40	50	60	70	80	90	100
100	72	144	216	289	361	434	506	579	652	725
200	73	146	219	293	366	440	514	587	661	735
300	74	148	223	297	372	447	521	596	671	746
400	75	151	226	302	377	453	529	605	682	758
500	76	153	230	306	383	460	537	615	692	770
600	78	155	233	311	389	468	546	624	703	782
700	79	158	237	316	396	475	555	634	714	794
800	80	160	241	321	402	483	564	645	726	807
900	81	163	245	327	409	491	573	655	738	821
1,000	83	166	249	332	415	499	583	666	750	834
1,100	84	169	253	338	422	507	592	678	763	849
1,200	86	171	257	344	430	516	603	689	776	863
1,300	87	174	262	350	437	525	613	702	790	879
1,400	89	178	267	356	445	535	624	714	804	894
1,500	90	181	272	362	453	545	636	727	819	911
1,600	92	184	277	369	462	555	648	741	834	928
1,700	94	188	282	376	471	565	660	755	850	946
1,800	96	191	287	383	480	576	673	770	867	964
1,900	97	195	293	391	489	587	686	785	884	983
2,000	99	199	299	399	499	599	700	801	902	1,003
2,100	101	203	305	407	509	612	714	817	920	1,024
2,200	104	207	311	415	520	624	729	834	940	1,045
2,300	106	212	318	424	531	638	745	852	960	1,068
2,400	108	216	325	434	543	652	761	871	981	1,091
2,500	110	221	332	443	555	666	778	890	1,003	1,116

Note: See Figure III-6 For Correction Factor

Tech. Spec. Ref.: N/A Procedure Ref.: N/A Figure Ref: DC00040-068 Rev 1.

Revision Date: 10-26-95
Prepared By: L. R Cartin
Verified By: P. R Boylan
Approved By: Will Hatter

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FIGURE III-2. RCS BORATION GALLONS (V_B) OF BORIC ACID REQUIRED

$$V_B = \frac{M}{8.33} \ln\left(\frac{7000-C_i}{7000-C_f}\right) = 49640 \ln\left(\frac{7000-C_i}{7000-C_f}\right)$$

M = RCS Mass (413,500lbm) C_i = Initial ppm C_f = Final ppm

C_i ppm	PPM BORON ADDITION (C_f - C_i)									
	120	140	160	180	200	220	240	260	280	300
100	871	1,018	1,165	1,312	1,460	1,609	1,757	1,907	2,056	2,207
200	884	1,033	1,182	1,332	1,482	1,633	1,784	1,935	2,087	2,240
300	897	1,048	1,200	1,352	1,504	1,657	1,811	1,965	2,119	2,274
400	911	1,064	1,218	1,373	1,528	1,683	1,839	1,995	2,152	2,309
500	925	1,081	1,237	1,394	1,551	1,709	1,868	2,026	2,186	2,346
600	940	1,098	1,257	1,416	1,576	1,736	1,897	2,059	2,221	2,383
700	955	1,116	1,277	1,439	1,601	1,764	1,928	2,092	2,257	2,422
800	970	1,134	1,298	1,462	1,628	1,793	1,960	2,127	2,294	2,462
900	986	1,153	1,319	1,487	1,655	1,823	1,993	2,162	2,333	2,503
1,000	1,003	1,172	1,342	1,512	1,683	1,854	2,026	2,199	2,372	2,546
1,100	1,020	1,192	1,365	1,538	1,712	1,886	2,061	2,237	2,414	2,590
1,200	1,038	1,213	1,389	1,565	1,742	1,920	2,098	2,277	2,456	2,636
1,300	1,056	1,234	1,413	1,593	1,773	1,954	2,135	2,318	2,500	2,684
1,400	1,075	1,257	1,439	1,622	1,805	1,989	2,174	2,360	2,546	2,733
1,500	1,095	1,280	1,465	1,652	1,839	2,026	2,215	2,404	2,594	2,784
1,600	1,116	1,304	1,493	1,683	1,873	2,065	2,257	2,450	2,643	2,837
1,700	1,137	1,329	1,522	1,715	1,909	2,105	2,300	2,497	2,694	2,892
1,800	1,159	1,355	1,551	1,749	1,947	2,146	2,346	2,546	2,748	2,950
1,900	1,182	1,382	1,582	1,784	1,986	2,189	2,393	2,597	2,803	3,009
2,000	1,206	1,410	1,614	1,820	2,026	2,234	2,442	2,651	2,861	3,071
2,100	1,231	1,439	1,648	1,858	2,069	2,280	2,493	2,706	2,921	3,136
2,200	1,257	1,469	1,683	1,897	2,113	2,329	2,546	2,764	2,984	3,204
2,300	1,284	1,501	1,719	1,938	2,159	2,380	2,602	2,825	3,049	3,274
2,400	1,312	1,534	1,757	1,981	2,207					
2,500										

Note: See Figure III-6 For Correction Factor

Tech. Spec. Ref.: N/A Procedure Ref.: N/A Figure Ref: DC00040-068 Rev 1.

Revision Date: 11-11-94
Prepared By: LL Carter
Verified By: P.R. Bayless
Approved By: Will Hatteberg

FIGURE III-2. RCS BORATION GALLONS (V_B) OF BORIC ACID REQUIRED

$$V_B = \frac{M}{8.33} \ln\left(\frac{7000-C_i}{7000-C_f}\right) = 49640 \ln\left(\frac{7000-C_i}{7000-C_f}\right)$$

M = RCS Mass (413,500lbm) C_i = Initial ppm C_f = Final ppm

C_i ppm	PPM BORON ADDITION (C_f - C_i)									
	325	350	375	400	425	450	475	500	550	600
100	2,395	2,584	2,774	2,964	3,156	3,348	3,541	3,734	4,123	4,516
200	2,431	2,623	2,816	3,009	3,204	3,399	3,595	3,791	4,187	4,585
300	2,468	2,663	2,859	3,056	3,253	3,451	3,650	3,850	4,252	4,657
400	2,507	2,705	2,904	3,104	3,304	3,505	3,708	3,911	4,319	4,731
500	2,546	2,748	2,950	3,153	3,357	3,561	3,767	3,973	4,389	4,808
600	2,587	2,792	2,997	3,204	3,411	3,619	3,828	4,038	4,460	4,887
700	2,629	2,837	3,046	3,256	3,467	3,679	3,891	4,105	4,535	4,968
800	2,673	2,884	3,097	3,311	3,525	3,740	3,957	4,174	4,611	5,052
900	2,718	2,933	3,149	3,367	3,585	3,804	4,024	4,245	4,691	5,140
1,000	2,764	2,984	3,204	3,425	3,647	3,870	4,094	4,319	4,773	5,230
1,100	2,813	3,036	3,260	3,485	3,711	3,938	4,166	4,396	4,858	5,324
1,200	2,863	3,090	3,318	3,547	3,778	4,009	4,241	4,475	4,946	5,421
1,300	2,914	3,146	3,378	3,612	3,846	4,082	4,319	4,557	5,037	5,521
1,400	2,968	3,204	3,441	3,679	3,918	4,158	4,400	4,643	5,132	5,626
1,500	3,024	3,264	3,505	3,748	3,992	4,237	4,484	4,731	5,230	5,734
1,600	3,081	3,326	3,573	3,820	4,069	4,319	4,571	4,823	5,332	5,847
1,700	3,141	3,391	3,643	3,895	4,149	4,404	4,661	4,919	5,439	5,964
1,800	3,204	3,459	3,715	3,973	4,233	4,493	4,755	5,018	5,549	6,086
1,900	3,269	3,529	3,791	4,054	4,319	4,585	4,853	5,122	5,665	6,213
2,000	3,336	3,602	3,870	4,139	4,410	4,682	4,955	5,230	5,785	6,346
2,100	3,407	3,679	3,952	4,227	4,504	4,782	5,062	5,343		
2,200	3,480	3,758	4,038	4,319						
2,300										
2,400										
2,500										

Note: See Figure III-6 For Correction Factor

Tech. Spec. Ref.: N/A Procedure Ref.: N/A Figure Ref: DC00040-068 Rev 1.

50. Given the following plant conditions:

- 100% power
- A sudden double-ended shear of a tube (450 gpm) occurs in Steam Generator 'A'.

Which ONE (1) of the following radiation monitors will provide the **FIRST** indication of this event AND how will this monitor trend following the Reactor Trip and SI?

A. RM-G19A, Main Steam Line Monitor;

Increase.

B. RM-G19A, Main Steam Line Monitor;

Decrease.

C. RM-A9, Condenser Exhaust Monitor;

Increase.

D. RM-A9, Condenser Exhaust Monitor;

Decrease.

51. Given the following plant conditions:

- 100% power
- A liquid waste discharge is in progress.
- Annunciator MON TK DISCH RM-L5 TRBL (XCP-646, 2-6) has actuated.

Which ONE (1) of the following is the MINIMUM condition and/or action required to terminate the discharge?

A. Loss of power to the monitor ONLY.

B. Loss of power to the monitor AND

the RML5 INTERLOCK Switch is THEN placed in ON.

C. Loss of power to the monitor AND

the RML5 INTERLOCK Switch is THEN placed in OFF.

D. Radiation level increases to the WARNING setpoint.

52. With the plant operating at 35% power, which ONE (1) of the following conditions would require the plant to be placed in Hot Standby within ONE (1) hour per the associated Technical Specification.

A. A plant transient causes Tavg to rise to 590°F.

B. An electrical malfunction causes RCP 'C' flow to drop to 30%.

C. A plant transient causes ΔI to exceed 5% from the target value.

D. A instrument malfunction associated with the Master Pressure Controller causes Pressurizer pressure to drop to 2200 psig.

53. Which ONE (1) of the following annunciators, when lit, indicates a condition which will prevent a Circulating Water Pump (CWP) from starting?

A. CW JOCKEY PP TRIP (XCP-628, 4-1)

B. CNDSR A VACUUM LO (XCP-628, 2-1)

C. CW INTAKE TRBL (XCP-628, 4-2)

D. CNDSR B CW OUT A/B LVL LO (XCP-628, 2-4)

54. Given the following plant conditions:

- 100% power
- Service Water (SW) Pump 'A' was isolated due to a leak and placed in PULL-TO-LOCK.
- The SW Pump 'A' breaker is still racked up.
- SW Pump 'C' has been racked up on Bus 1EA but has not yet been started.
- A grid disturbance caused a loss of 115 Kv and 230 Kv offsite power (BOP & ESF).

Which ONE (1) of the choices below completes the following statement?

If an automatic Safety Injection actuates TWO (2) minutes following the loss of offsite power, SW Pump 'B' _____.

A. will trip, then restart, and SW Pump 'C' will start

B. will trip, then restart, and will be the only running SW Pump

C. will continue to run and SW Pump 'C' will start

D. will continue to run and will be the only running SW Pump

55. Given the following plant conditions:

- XSW-1DA2 is OOS while maintenance is working on the feeder breaker from the transformer.
- A loss of ALL (ESF & BOP) offsite power occurred, resulting in a loss of BOP and ESF buses.
- Both Emergency Diesel Generators started and restored power to their respective ESF buses.
- ALL BOP buses remain de-energized.

Which ONE (1) of the following identifies the motor-driven air compressors with an available power supply?

A. XAC-3A, INSTR AIR CMPR A, ONLY

B. XAC-3B, INSTR AIR CMPR B, ONLY

C. XAC-3A and Supplemental Air Compressor

D. XAC-3B and Supplemental Air Compressor

56. Given the following plant conditions:

- 100% power
- A fire occurs in the transformer to Bus XSW-1C2, causing the bus to de-energize.
- The Fire Brigade responds 3 minutes after the event - routing, pressurizing, and using fire hoses to fight the fire.

Which ONE (1) of the following describes the ***FIRST*** response of the fire pumps to this event?

A. The Electric Fire Pump started within one minute of the fire.

B. The Diesel Fire Pump started within one minute of the fire.

C. The Electric Fire Pump started when the fire hoses were pressurized.

D. The Diesel Fire Pump started when the fire hoses were pressurized.

57. A small break LOCA has caused an SI actuation.

Which ONE (1) of the following identifies the expected status of the specified indicating lights when performing EOP-1.0, Attachment 4 - *Containment Isolation Valve MCB Status Light Locations*?

	XCP-6104 Status Light "CRDM CLG WTR ISOL 7502 CLSD"	**XCP-6106 Status Light** "ACCUM N2 SPLY ISOL 8880 OPEN"
A.	DIM	DIM
B.	DIM	BRIGHT
C.	BRIGHT	BRIGHT
D.	BRIGHT	DIM

58. Which ONE (1) of the following meets ALL entry conditions for entering EOP-1.5, *Rediagnosis*?

A. The crew has just entered EOP-15.0, *Response to Loss of Secondary Heat Sink*, following a Reactor Trip with NO SI and the CRS is NOT sure this is the appropriate procedure.

B. The crew has entered GOP-6, *Plant Shutdown from Hot Standby to Cold Shutdown (Mode 3 to Mode 5)* from EOP-1.1, *Reactor Trip Response*, and the CRS wants to verify that this is the correct procedure.

C. The crew is implementing EOP-4.0, *Steam Generator Tube Rupture*, and the CRS is NOT sure that this procedure is appropriate.

D. Due to a LOCA with NO SI in Mode 4, the crew has entered AOP-112.1, *Shutdown LOCA*, and the CRS is NOT sure this is the appropriate procedure.

59. Given the following plant conditions:

- After a LOCA, the crew has transitioned to EOP-2.1, *Post-LOCA Cooldown and Depressurization*, and is presently assessing the status of the Critical Safety Functions (CSFs).
- Maximum total EFW Flow is 400 gpm.
- The IPCS is unavailable.

Which ONE (1) of the following sets of conditions will result in an RED path to the Heat Sink CSF?

	A SG NR Level	**B SG NR Level**	**C SG NR Level**	**Present RB Pressure**	**Peak RB Rad Levels**
A.	12%	22%	32%	3 psig	10^5 mr/hr
B.	31%	32%	12%	3 psig	10^4 mr/hr
C.	28%	38%	48%	4 psig	10^5 mr/hr
D.	28%	28%	51%	4 psig	10^4 mr/hr

60. Given the following plant conditions:

- MODE 3, following a plant trip.
- A Red Path exists on Heat Sink and the crew has entered EOP-15.0, *Response to Loss of Secondary Heat Sink*,
- PZR Pressure is 2300 psig and increasing slowly.

- Steam Generator Levels are as follows:

  - Steam Generator 'A' WIDE Range 6%
  - Steam Generator 'B' WIDE Range 12%
  - Steam Generator 'C' WIDE Range 32%

Which ONE (1) of the following describes the action(s) in accordance with EOP-15.0 that is/are required NEXT?

A. Restore flow from the Main Feedwater System.

B. Restore flow from the Condensate System.

C. Trip RCPs, manually initiate Safety Injection, and allow the PZR PORVs to automatically open.

D. Trip RCPs, manually initiate Safety Injection, and manually open the PZR PORVs.

61. Which ONE (1) of the following spoken statements meets the MINIMUM acceptable station requirements for proper communication in accordance with OAP-100.4, *Communications*?

    A. "Control rods are stepping IN."

    B. "Tom, RCS Tavg is 557°F."

    C. "Tom, Pressurizer pressure is 2205 psig, trending towards 2235 psig."

    D. "Turbine Building Operator, Perform SOP-214, Steps 2.14 and Steps 2.15." (*procedure NOT available to the TBAO*)

62. Given the following plant conditions:

- The unit is at 100% power.
- MCB logs are in progress.
- AUTO TOUR is not available.
- ECCS Accumulator 'A' MCB indicator is reading 60%, which is out-of-limit/spec.
- ECCS Accumulator 'A' indication on the computer is 75%.

In accordance with OAP-106.1, *Operating Logs*, which ONE (1) of the following are the MINIMUM required actions with respect to logging ECCS Accumulator 'A' level?

A. Record the reading as 60%, red circle, inform the CRS, explain actions taken in the Comments section.

B. Record the reading as 75%, red circle, inform the CRS, assign a number in the right margin, and explain actions taken in the Comments section.

C. Record the reading as 75%, red circle, inform the CRS, explain actions taken in the Comments section.

D. Record the reading as 60%, red circle, inform the CRS, assign a number in the right margin, and explain actions taken in the Comments section.

63. Which ONE (1) of the following are the MINIMUM required actions per GOP Appendix A, *Generic Operating Precautions,* if it appears that criticality will be achieved below the LO-LO Rod Insertion Limit?

    A. Suspend positive reactivity additions. Recalculate the Estimated Critical Condition (ECC). Dilute to criticality per REP-107.001, *Controlling Procedure for Refueling Startup and Power Ascension Testing.*

    B. Borate (normal method) as necessary to achieve the required Shutdown Margin; shutdown the Reactor per GOP-5 and recalculate the ECC.

    C. Emergency Borate through MVT-8104, EMERG BORATE, to achieve the required Shutdown Margin and shutdown the Reactor per GOP-5.

    D. Recalculate the ECC, adjust the RCS boron concentration. Continue the startup

64. Given the following plant conditions:

- Mode 6
- As part of scheduled outage work, IFV-3531-O-EF, OPER-SG A MTR DR EF PUMP FLOW CONT VLV, has been isolated to replace the actuator.

Which ONE (1) of the choices below completes the following statements?

Per SAP-205, *Status Control and Removal and Restoration*, an _____ Removal and Restoration will be used to track the status of IFV-3531-O-EF.

Per OAP-106.3, *Locked Valve Program*, a _____ chain will be installed when the valve is restored to the normal configuration.

A. ACTION;

RED

B. ACTION;

SILVER

C. OUTAGE;

RED

D. OUTAGE;

SILVER

65. Given the following plant conditions:

- 100% power
- Charging/SI Pump 'B' is running
- The crew will be shifting to Charging/SI Pump 'C' running on Train 'B' in accordance with SOP-102, *Chemical and Volume Control System.*

Which ONE (1) of the following describes ECCS Subsystem/Train operability status while the procedure is performed?

A. INITIAL entry into the LCO for Train 'B' is required at the time when both Charging/SI Pumps 'B' and 'C' breakers are racked up AND closed.

B. INITIAL entry into the LCO for Train 'B' is required at the time when both Charging/SI Pumps 'B' and 'C' breakers are racked up ONLY.

C. BOTH trains remain OPERABLE because at least ONE pump is running throughout the procedure.

D. BOTH trains remain OPERABLE because the swing pump is available as the standby pump throughout the procedure.

66. During preparation for a Waste Monitor Tank release, which ONE (1) of the following identifies how the HI RAD setpoint for RM-L5, LIQUID WASTE EFFLUENT MONITOR, is adjusted and where is the release setpoint found?

A. Set at 2X background;

SOP-108, *Liquid Waste Processing System*, Attachment VA, *Liquid Waste Release Worksheet - Control Room*

B. Set at 2X background;

HPP-904, *Use of the Radiation Monitoring System*

C. Based on tank sample;

SOP-108, *Liquid Waste Processing System*, Attachment VA, *Liquid Waste Release Worksheet - Control Room*

D. Based on tank sample;

HPP-904, *Use of the Radiation Monitoring System*

67. Which ONE (1) of the following describes how an active (in use) RWP is REQUIRED to be posted by HPP-151, *Use of the Radiation Work Permit and Standing Radiation Work Permit*?

On the computers at the entrance to the RCA _____.

A. ONLY.

B. and a hardcopy at the job site.

C. and a hardcopy in the dress out area of the AB 436'.

D. and a hardcopy outside of the east wall of the dressing room on the CB 412'.

68. Which ONE (1) of the following identifies an event where the subsequent power change, as listed in AOP-210.3, *Feedwater Pump Malfunction,* requires notification of the Chemistry Department and identifies the sample required to be analyzed?

A. ONE of TWO running Main Feedwater Pumps trips at 65% power;

Iodine isotopic analysis

B. ONE of TWO running Main Feedwater Pumps trips at 65% power;

100/E-bar determination

C. ONE of THREE running Main Feedwater Pumps trips at 100% power;

Iodine isotopic analysis

D. ONE of THREE running Main Feedwater Pumps trips at 100% power;

100/E-bar determination

69. Given the following plant conditions:

- 100% power
- A severe lightning storm has resulted in problems with many Main Control Board annunciator panels and individual annunciators.
- One of the affected panels is XCP-615, which includes annunciator RCS LEAK DET >1 GPM (point 3-6) and several others.

Which ONE (1) of the choices below completes the following statements?

The crew will enter _____ in response to the loss of annunciators.

The crew will compensate for the loss of the RCS LEAK DET >1 GPM alarm using an attachment in _____?

A. OAP-100.5, *Guidelines for Configuration Control and Operation of Plant Equipment*

   OAP-106.1, *Operating Logs*

B. AOP-100.5, *Loss of Main Control Board Annunciators*

   OAP-106.1, *Operating Logs*

C. OAP-100.5, *Guidelines for Configuration Control and Operation of Plant Equipment*

   GTP-702, *Surveillance Activity Tracking and Triggering*

D. AOP-100.5, *Loss of Main Control Board Annunciators*

   GTP-702, *Surveillance Activity Tracking and Triggering*

70. Which ONE (1) of the following describes the limitation on Containment Air Temperature in Technical Specification 3.6.1.5, *Containment Air Temperature*?

A. The HIGHEST temperature reading cannot exceed 120°F.

B. The HIGHEST temperature reading cannot exceed 135°F.

C. The AVERAGE temperature reading cannot exceed 120°F.

D. The AVERAGE temperature reading cannot exceed 135°F.

71. Given the following plant conditions:

- A cooldown is in progress in accordance with GOP-6, *Plant Shutdown from Hot Standby to Cold Shutdown.*

Which ONE (1) of the following identifies the RCS temperature where the MOST restrictive cooldown limit is in effect and the reason in accordance with Technical Specification 3.4.9 *RCS Pressure/Temperature Limits*?

A. RCS temperature GREATER THAN 200°F to prevent a non-ductile component failure.

B. RCS temperature GREATER THAN 200°F to prevent bubble formation in the reactor vessel head.

C. RCS temperature LESS THAN 200°F to prevent a non-ductile component failure.

D. RCS temperature LESS THAN 200°F to prevent bubble formation in the reactor vessel head.

72. Given the following plant conditions:

- 100% power
- A leak develops in the Main Condenser causing vacuum to decrease.
- The crew enters AOP-206.1, *Decreasing Main Condenser Vacuum.*
- Main Condenser pressure INCREASES at 1" Hg Absolute every five minutes.
- The crew initiates a downpower in accordance with GOP-4C, *Rapid Downpower*, at 5%/minute.
- All control systems are in AUTO.

Which ONE (1) of the following conditions will REQUIRE the operator to trip the Reactor?

A. Pressurizer pressure approaches 1985 psig.

B. Main Condenser pressure rises above 5" Hg Absolute.

C. Tavg is 8°F greater than Tref and Control Rods are NOT moving in AUTO.

D. Tavg is 12°F greater than Tref and Control Rods are moving inward at 72 steps/minute.

73. Which ONE (1) of the following describes a condition that will require the crew to transition out of EOP-6.0, *Loss of All ESF AC Power* prior to restoring power to at least one AC ESF Bus?

    A. The T_{colds} for all three RCS loops decrease to less than 280°F.

    B. Both Intermediate and Source Range startup rates are positive.

    C. Wide range levels in ALL 3 S/Gs drop below 30%.

    D. Core Exit T/Cs indicate greater than 1200°F and rising.

74. Given the following plant conditions:

- An AUTO SI actuated when a Pressurizer Safety Valve failed OPEN.
- All Steam Generator (SG) Narrow Range levels are at 15%.
- Tavg is 550°F, lowering.

Which ONE (1) of the following is the required action with respect to Emergency Feedwater flow in accordance with EOP-1.0, *Reactor Trip/Safety Injection Actuation*?

A. Maintain maximum available EFW flow until at least one SG narrow range level is greater than 26% [40%].

B. Reduce total EFW flow to no less than 380 GPM to stop the cooldown.

C. Reduce total EFW flow to no less than 450 GPM to stop the cooldown.

D. Reduce EFW flow to each SG to no less than 50 GPM to stabilize Tavg at the no load value.

75. When restoring the vital buses to off-site power in accordance with SOP-306, *Emergency Diesel Generator,* the respective diesel generator speed and voltage droop circuits are placed in service when _____.

A. depressing the local TEST START pushbutton

B. momentarily placing the MCB TEST Switch to START

C. depressing the local EMERG START RESET pushbutton

D. depressing the MCB EMERG START OVRRIDE pushbutton

You have completed the test!

KEY ID
Ⓐ Ⓑ Ⓒ Ⓓ

SCORING & PRINTING OPTIONS:
○ RESCORE ○ MULTIPLE ANSWER SCORING
○ CORRECT ANSWER ○ MARK X ○ TOTAL ONLY
MARK ONLY ONE

Pearson NCS Test Sheet 100/W

1

Form No. 95677

Reorder Form No. 95677
1-800-367-6627
Fax 1-507-451-4513
valuebridge.ncspearson.com

FEED IN THIS DIRECTION

	T	F
1	A	B● C D E
2	A B C● D E	
3	A● B C D E	
4	A B● C D E	
5	● B C D E	
6	● B C D E	
7	● B C D E	
8	A B● C D E	
9	● B C D E	
10	A B C● D E	
11	A B● C D E	
12	A B C● D E	
13	A B C● D E	
14	A B C● D E	
15	A B● C D E	
16	● B C D E	
17	A B C● D E	
18	A B● C D E	
19	A B C● D E	
20	A B● C D E	
21	A● B C D E	
22	● B C D E	
23	A● B C D E	
24	A B C● D E	
25	A● B C D E	
26	● B C D E	
27	A B C● D E	
28	● B C D E	
29	A● B C D E	
30	A● B C D E	
31	A B C● D E	
32	A B C● D E	
33	A● B C D E	
34	A B● C D E	
35	● B C D E	
36	A● B C D E	
37	● B C D E	
38	● B C D E	
39	A B● C D E	
40	A B● C D E	
41	● B C D E	
42	A● B C D E	
43	A● B C D E	
44	A● B C D E	
45	A● B C D E	
46	A B C● D E	
47	● B C D E	
48	● B C D E	
49	A B C● D E	
50	A● B C D E	
51	● B C D E	
52	A● B C D E	
53	A B C● D E	
54	A B C● D E	
55	A B● C D E	
56	A● B C D E	
57	A B C● D E	
58	A B● C D E	
59	A B● C D E	
60	A B C● D E	
61	A B● C D E	
62	A B C● D E	
63	A● B C D E	
64	A B C● D E	
65	A● B C D E	
66	A B● C D E	
67	● B C D E	
68	● B C D E	
69	A● B C D E	
70	A B● C D E	
71	A B● C D E	
72	A B C● D E	
73	A B C● D E	
74	A B● C D E	
75	A● B C D E	
76	A B C D E	
77	A B C D E	
78	A B C D E	
79	A B C D E	
80	A B C D E	
81	A B C D E	
82	A B C D E	
83	A B C D E	
84	A B C D E	
85	A B C D E	
86	A B C D E	
87	A B C D E	
88	A B C D E	
89	A B C D E	
90	A B C D E	
91	A B C D E	
92	A B C D E	
93	A B C D E	
94	A B C D E	
95	A B C D E	
96	A B C D E	
97	A B C D E	
98	A B C D E	
99	A B C D E	
100	A B C D E	

ANSWER KEY INFO.
OF KEYS
ITEM COUNT
0 1 2 3 4

PERFORMANCE ASSESSMENT
% OF TOTAL SCORE
00 = 100%
EQUAL PT VALUE
POINTS EARNED

Bar Code

FEED IN THIS DIRECTION

NUMBER CORRECT	
PERCENT CORRECT	
ROSTER NUMBER	
SCORE	
RESCORE	

PEARSON NCS

COMBINED POINTS EARNED	
COMBINED PERCENT CORRECT	
LETTER GRADE	
SCORE	
RESCORE	

100 ITEM

STUDENT ID NUMBER
0 1 2 3 4 5 6 7 8 9

NAME VCSNS 2009 RO
SUBJECT KEY
PERIOD DATE

MARKING INSTRUCTIONS

Use a No. 2 Pencil

A ● C D E
Fill oval completely

A B C D E
Erase cleanly