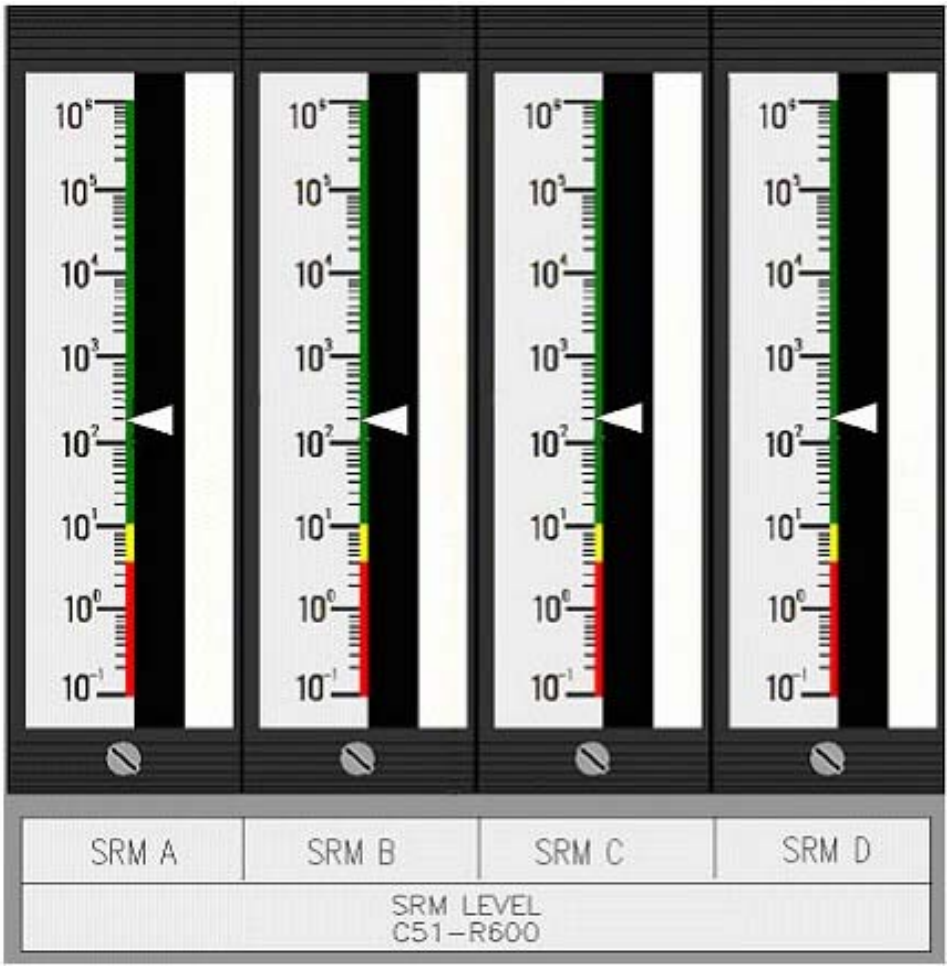
1. The initial SRM count rates are as observed below.



The Unit Two control room staff is ready to withdraw control rods for a reactor startup.

Which one of the following identifies when criticality is expected to be achieved IAW 0GP-02, Approach To Criticality and Pressurization of the Reactor?

A. At ~800 cpm

B. At ~1000 cpm

C. At ~3200 cpm

D. At ~6400 cpm

2. Unit Two is in MODE 2 starting up after a refueling outage.
   The 2A CRD Pump has tripped and the operator is unable to restart the pump.

   The following conditions exist:

Reactor water level	187 inches
Reactor power	Range 8 on all IRM's
Reactor pressure	700 psig
Charging water pressure	700 psig
Reactor temperature	505°F
2B CRD Pump	Out-of-service

   Which one of the following identifies when a manual scram is required to be inserted IAW 0AOP-02.0, Control Rod Malfunction/Misposition?

   A. If one control rod scrams.

   B. If there are nine or more inoperable rods.

   C. If A-05 (3-2) *Rod Drift* alarms due to a single control rod drift.

   D. If A-07 (6-1) *CRD Accum Lo Press Hi Level* alarms due to low pressure.

3. Unit One is operating at 32% power when one of the four Main Steam Line Flow Transmitter inputs to the Feedwater Level Control System has failed downscale.

   Which one of the following identifies the effect this will have, if any, on the RWM?

   The RWM will:

   A. display BYPASSED.

   B. provide alarms ONLY.

   C. provide alarms and enforce rod blocks.

   D. NOT provide alarms or enforce rod blocks.

4. The BOP operator is aligning RHR Loop B to transfer water from the Suppression Pool to the Auxiliary Surge Tank.

   Which one of the following identifies how far the suppression pool level is expected to drop if 3,100 gallons is transferred IAW 1OP-17, Residual Heat Removal System Operating Procedure?

   A. ~½ inch

   B. ~1½ inch

   C. ~4 inches

   D. ~5 inches

5. Unit Two was operating at rated power when a LOCA occurred. ADS has automatically initiated and reactor pressure is lowering.

   Which one of the following identifies the highest reactor pressure that will allow RHR injection flow to be seen on E11-FI-R603B, RHR System B Flow?

   A. ~400 psig.

   B. ~300 psig.

   C. ~200 psig.

   D. ~100 psig.

6. Unit Two is in day 4 of a refueling outage with RHR Loop 2B operating in Shutdown Cooling IAW 2OP-17, Residual Heat Removal System Operating Procedure.

   Which one of the following completes the statements below?

   The lowest reactor pressure that will cause a Group 8 isolation is __(1)__ psig.

   The Group 8 isolation pressure signal __(2)__ cause E11-F015B, Inboard Injection Vlv to auto close.

   A. (1) ~135
      (2) will

   B. (1) ~135
      (2) will NOT

   C. (1) ~200
      (2) will

   D. (1) ~200
      (2) will NOT

7. During accident condition on Unit Two the following plant conditions exist:

RPV water level	-30 inches
Reactor power	4%
Suppr pool temp	142°F
Suppr pool level	-24 inches

HPCI operation is required.

Which one of the following identifies:
(1) the preferred suction source for HPCI and
(2) the reason that suction source is preferred?

A. (1) Suppression pool.
(2) To prevent continued rise in suppression pool level.

B. (1) Suppression pool.
(2) To provide a warmer source of injection to the reactor.

C. (1) CST.
(2) To prevent damage to the HPCI pump due to cavitation.

D. (1) CST.
(2) To prevent overheating of HPCI lubricating and control oil.

8. Which one of the following identifies the Unit Two HPCI turbine speed control power supply?

   A. 125 VDC Panel 3A

   B. 125 VDC Panel 3B

   C. 125 VDC Panel 4A

   D. 125 VDC Panel 4B

9. Unit Two is operating at rated power when the following alarm is received:

   A-01 (2-10) *Core Spray Loop A Sys Press Low*

   Which one of the following identifies the impact of this condition on the Core Spray System?

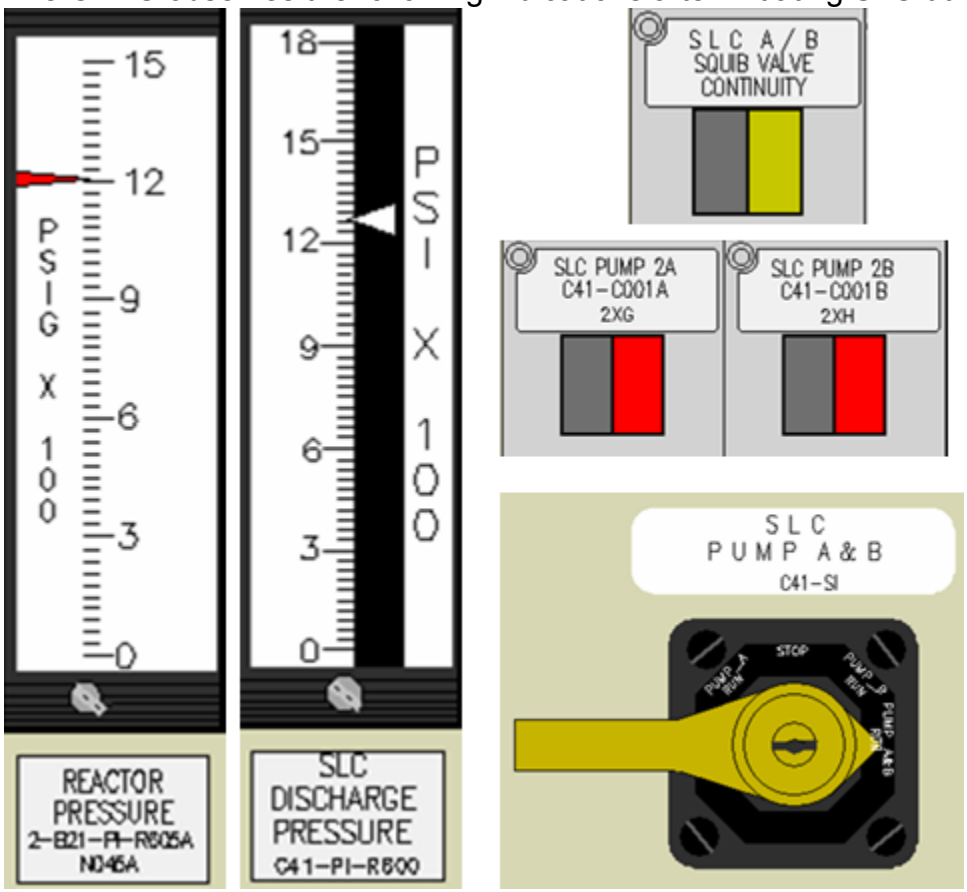
   A. Core Spray Pump A may cause piping damage, if started.

   B. Core Spray Pump A is incapable of producing an ADS Logic permissive signal, if started.

   C. E21-F005A, Inboard Inject Valve, will immediately open if the Core Spray Initiation Logic is actuated.

   D. E21-F004A, Outboard Inject Valve, can be opened while E21-F005A, Inboard Inject Valve, is open.

10. The OATC observes the following indications after initiating SLC during an ATWS.



Which one of the following completes the statements below?

Squib valve __(1)__ has failed to fire.

IAW 2OP-05, Standby Liquid System Operating Procedure, the OATC is required to __(2)__.

A. (1) A
   (2) place the CS-S1, SLC Pump A & B, in the PUMP A RUN position

B. (1) A
   (2) leave the CS-S1, SLC Pump A & B, in the PUMP A/B RUN position

C. (1) B
   (2) place the CS-S1, SLC Pump A & B, in the PUMP A RUN position

D. (1) B
   (2) leave the CS-S1, SLC Pump A & B, in the PUMP A/B RUN position

11. Which one of the following identifies which RPS MG Set and EPA breakers that trip on a loss of 480 VAC Substation E7?

    RPS MG Set __(1)__ EPA breakers __(2)__.

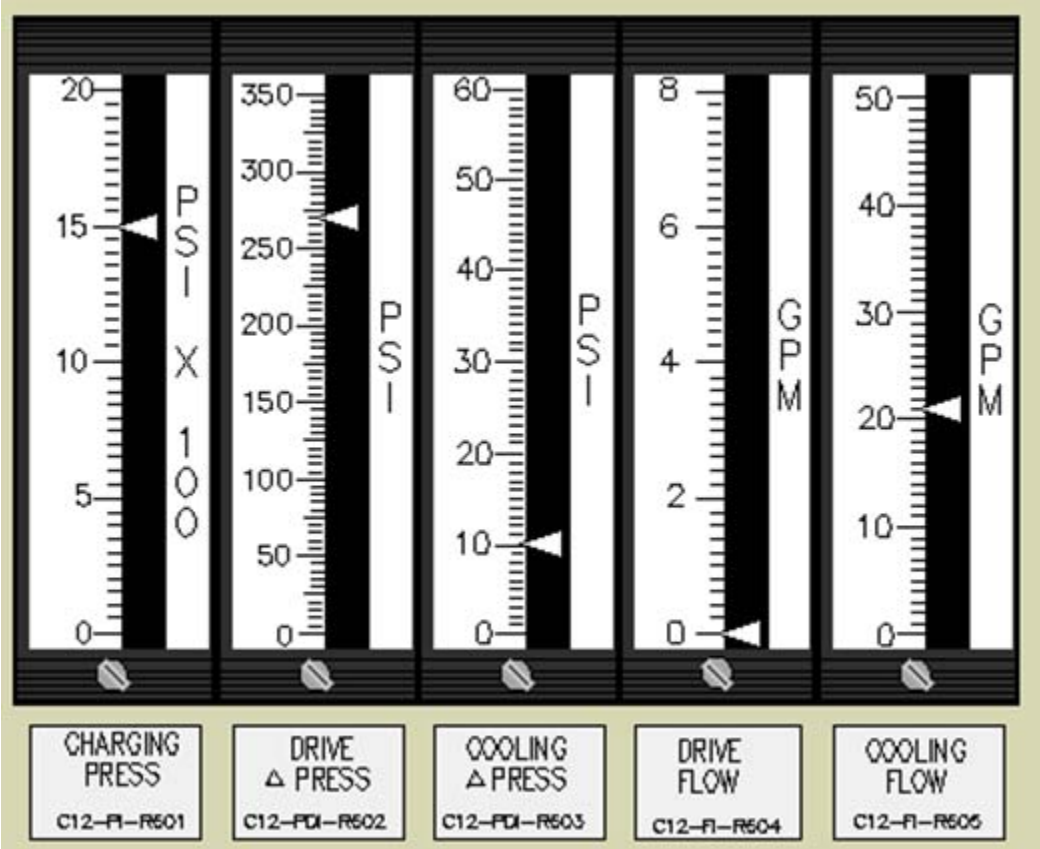
    A. (1) A
       (2) 1 & 2 ONLY

    B. (1) B
       (2) 3 & 4 ONLY

    C. (1) A
       (2) 1 & 2 and alternate source EPA breakers 5 & 6

    D. (1) B
       (2) 3 & 4 and alternate source EPA breakers 5 & 6

12. Unit Two is operating at rated power when A-05 (1-2) *CRD Hyd Temp High* annunciates and the OATC observes the following CRD indications.



Which one of the following completes the statements below?

A-05 (1-2) *CRD Hyd Temp High* setpoint is __(1)__ °F.

The APP will provide guidance to adjust C11-FC-R600, CRD Flow Controller, in the __(2)__ direction.

A. (1) 350
   (2) open

B. (1) 350
   (2) closed

C. (1) 340
   (2) open

D. (1) 340
   (2) closed

13. Which one of the following completes the statement below?

The Intermediate Range Monitor (IRM) detectors may be positioned full in __(1)__, full out __(2)__, or any intermediate position.

A. (1) 18 inches above the core centerline
   (2) bottom of the core

B. (1) 18 inches above the core centerline
   (2) 24 inches below the core

C. (1) at the core centerline
   (2) bottom of the core

D. (1) at the core centerline
   (2) 24 inches below the core

14. The reactor has just been declared critical during a reactor startup IAW 0GP-02, Approach To Criticality and Pressurization of the Reactor, with SRM channel A bypassed. A-05 (2-2) *Rod Out Block* and A-05 (2-3) *SRM Upscale/Inop* are in alarm.

    As the operator attempts to withdraw SRM B detector is stuck and will not retract from the full in position.

    Which one of the following completes the statement below?

    Rods cannot be withdrawn until the IRMs are ranged to Range _____.

    A. 2

    B. 3

    C. 7

    D. 8

15. A plant startup is in progress. The OATC was withdrawing SRMs when a control rod block occurred. The following nuclear instrument indications are noted:

SRM	Counts	Position
A	95	Mid Position
B	190	Mid Position
C	$6x10^4$	Full In
D	155	Mid Position

IRM	Counts	Range
A	25/125	3
B	65/125	2
C	35/125	3
D	15/125	3
E	12/125	2
F	55/125	3
G	30/125	2
H	25/125	3

Which one of the following actions will clear the control rod block?

A. Inserting SRM A.

B. Withdrawing SRM C.

C. Ranging IRM G ONLY to range 3.

D. Ranging IRM B and G to range 3.

16. Unit Two is operating at rated power with the following conditions:

A-05 (2-2) *Rod Out Block*	In alarm
A-05 (4-8) *OPRM Trip Enabled*	NOT in alarm
A-06 (2-8) A*PRM Upscale*	NOT in alarm
A-06 (5-7) *Flow Ref Off Normal*	In alarm

Which one of the following completes the statements below?

A total recirc flow channel has failed __(1)__.

IAW APP A-06 (5-7) *Flow Ref off Normal,* the OATC will __(2)__ the affected APRM.

A. (1) downscale
   (2) bypass

B. (1) downscale
   (2) place the mode switch in INOP for

C. (1) upscale
   (2) bypass

D. (1) upscale
   (2) place the mode switch in INOP for

17. A reactor vessel instrument reference leg (with both level and pressure instruments) has CRD backfill in service.

    A blockage of reference leg causes the instrument piping outside containment to equalize with CRD pressure.

    Which one of the following completes the statements below?

    The blockage will cause indicated level on the affected level instruments to __(1)__.

    An expected pressure alarm for these conditions would be __(2)__.

    A. (1) lower
       (2) A-04 (1-8) *Steam Line Lo Press A*

    B. (1) lower
       (2) A-07 (3-2) *Reactor Press High*

    C. (1) rise
       (2) A-04 (1-8) *Steam Line Lo Press A*

    D. (1) rise
       (2) A-07 (3-2) *Reactor Press High*

18. Given the following plant conditions with RCIC in pressure control mode:

RCIC controller output	70%
E51-F022, Bypass to CST Vlv.	Throttled
RCIC Flow	300 gpm
RPV pressure	810 psig, slowly lowering
RCIC controller	Automatic set @ 300 gpm

Which one of the following identifies two independent actions that will stabilize RPV pressure?

The RO can throttle the E51-F022 in the ____(1)____ direction, or by ____(2)____ the RCIC Flow Controller auto setpoint.

A. (1) open
   (2) lowering

B. (1) open
   (2) raising

C. (1) close
   (2) lowering

D. (1) close
   (2) raising

19. Unit Two has inserted a manual scram.

Suppression Pool temperature is 90°F and rising due to HPCI/RCIC usage
Suppression Pool level is -25 inches
CST level is 21 feet

Which one of the following identifies:
(1) the lowest Suppression Pool Temperature that requires PCCP entry and
(2) the current suction source for the RCIC system?

A. (1) 96°F.
(2) CST.

B. (1) 96°F.
(2) Suppression Pool.

C. (1) 106°F.
(2) CST.

D. (1) 106°F.
(2) Suppression Pool.

20. Which one of the following completes the statements below concerning operation of the SRVs?

__(1)__ causes annunciation of A-03 (1-10) *Safety / Relief Valve Open*.

Upon receipt of this alarm, at least one SRV __(2)__ will be illuminated on the apron section of RTGB Panel P601.

A. (1) High temperature on recorder B2l-TR-6l4
   (2) red light ONLY

B. (1) High temperature on recorder B2l-TR-6l4
   (2) red and amber lights

C. (1) Activation of a SRV sonic detector
   (2) red light ONLY

D. (1) Activation of a SRV sonic detector
   (2) red and amber lights

21. Which one of the following states the normal electrical power supply to the following Unit One RHR Suppression Pool Cooling valves?

(1) 1-E11-F024A, RHR Torus Cooling Isolation Valve
(2) 1-E11-F028A, RHR Torus Spray Valve

A. (1) E5
(2) E5

B. (1) E5
(2) E7

C. (1) E7
(2) E5

D. (1) E7
(2) E7

22. Unit Two is operating at power with DG3 under clearance for maintenance activities. Bus E3 Master/Slave Breakers trip.

Which one of the following completes the statements below?

The __(1)__ RWCU isolation valve auto closes.

Technical Specification LCO 3.6.1.3, Primary Containment Isolation Valves (PCIVs), states each PCIV, except __(2)__, shall be OPERABLE.

A. (1) Inboard
   (2) reactor building-to-suppression chamber vacuum breakers

B. (1) Inboard
   (2) main steam isolation valves (MSIVs)

C. (1) Outboard
   (2) reactor building-to-suppression chamber vacuum breakers

D. (1) Outboard
   (2) main steam isolation valves (MSIVs)

23. During a line break inside the drywell, plant conditions are:

RPV water level	200 inches
RPV pressure	800 psig
Drywell pressure	12 psig

Which one of the following completes the statements below?

In order to initiate Suppression Pool Sprays, operation of the "2/3 Core Height LPCI Initiation" keylock override switch is __(1)__.

The Suppression Pool Spray valves __(2)__ automatically close when drywell pressure lowers below 2.7 psig.

A. (1) required
   (2) will

B. (1) required
   (2) will NOT

C. (1) NOT required
   (2) will

D. (1) NOT required
   (2) will NOT

24. Which one of the following identifies the loads that can be supplied by the Backup Nitrogen System?

A. Inboard MSIVs, SRV Accumulators, and Hardened Wetwell Vent Isolation valves.

B. Inboard MSIVs, Suppression Chamber to Drywell Vacuum Breakers, and Hardened Wetwell Vent Isolation valves.

C. SRV Accumulators, Reactor Building to Suppression Chamber Vacuum Breakers, and Hardened Wetwell Vent Isolation valves.

D. SRV Accumulators, Suppression Chamber to Drywell Vacuum Breakers, and Reactor Building to Suppression Chamber Vacuum Breakers

25. Which one of the following identifies the affect that a loss of E8 will have on the Unit Two Safety Relief Valve (SRV) system?

A. Inability to manually operate SRV's from the RTGB

B. Inability to manually operate SRV's from the RSDP

C. Loss of SRV position indication on the RTGB

D. Loss of SRV position indication on the RSDP

26. Unit Two is being shutdown for entry into the main generator for repairs.

Which one of the following completes the statement below concerning the flowpath for purging the Main Generator IAW 2OP-27.3, Generator Gas System Operating Procedure?

Carbon Dioxide exits through the __(1)__ distribution tube in the main generator while __(2)__ is admitted through the other distribution tube.

A. (1) upper
   (2) Hydrogen

B. (1) upper
   (2) Service Air

C. (1) bottom
   (2) Hydrogen

D. (1) bottom
   (2) Service Air

27. Unit Two is operating at 30% power when a Heater Drain (HD) Deaerator level controller failure results in HD Deaerator level rising to 62 inches.

Which one of the following completes the statements below?

MVD-LV-266 / 267, Deaerator Extraction Line MRVs, are __(1)__.

EX-V11 / V12, 9th Stage Extraction Steam Non Return Valves, are __(2)__.

A. (1) open
   (2) open

B. (1) open
   (2) closed

C. (1) closed
   (2) open

D. (1) closed
   (2) closed

28. Unit Two is performing plant heatup and pressurization with the reactor at 250 psig. Reactor Feed Pump (RFP) 2A indicates 185 RPM with the following status:

    Suction valve is open
    Recirc valve is open
    Discharge valve is closed
    UA-04 (1-2) *RFP A Turbine Tripped* is clear
    HPU oil pressure is 275 psig
    Reactor water level is 200 inches
    A-07 (2-2) *Reactor Water Level High / Low* is in alarm

    The operator depresses the RFPT A Start push button on XU-1 panel.

    Which one of the following identifies how the 2A RFP will respond?

    A. Rolls to 1000 RPM.

    B. Rolls to 2450 RPM.

    C. Remains at 185 RPM.

    D. Trips on emergency shutdown logic.

29. Given the following plant conditions on Unit One:

MODE 2 at 6% power
RPV pressure is 800 psig
SULCV is in Auto (40% valve demand)
Master Level Controller is in Manual set at 187 inches

A loss of UPS V7A results in blank displays on the Startup Level and Master Level Controllers.

Which one of the following identifies the response of the SULCV and the effect on reactor water level based on the above conditions?

The SULCV will:

A. close and the reactor will scram on low reactor water level.

B. open and the running Reactor Feed Pump will trip on high level.

C. remain at 40% valve demand position irrespective of reactor level changes.

D. change valve position as required to maintain reactor water level at 187 inches.

30. Unit One primary containment venting is being performed IAW 1OP-10, Standby Gas Treatment System Operating System with the following plant status:

1-VA-1F-BFV-RB, SBGT DW Suct Damper	Open
1-VA-1D-BFV-RB, Reactor Building SBGT Train 1A Inlet Valve	Closed
1-VA-1H-BFV-RB, Reactor Building SBGT Train 1B Inlet Valve	Closed

Which one of the following completes the statements below concerning the predicted SBGT response if drywell pressure reaches 1.9 psig?

1-VA-1F-BFV-RB __(1)__.

Both 1-VA-1D-BFV-RB and 1-VA-1H-BFV-RB __(2)__.

A. (1) auto closes
   (2) auto open

B. (1) auto closes
   (2) remain closed

C. (1) remains open
   (2) auto open

D. (1) remains open
   (2) remain closed

31. The following sequence of events occur on Unit Two:

    1156 Reactor scram due to high drywell pressure
    1158 Off-site power is lost, DG4 locks out
    1200 Reactor water level drops below LL2
    1202 Bus E2 cross-tie breaker is placed to MAINT
    1204 Reactor water level drops below LL3
    1206 Bus E4 cross-tie breaker is placed to MAINT
    1208 Reactor pressure lowers to 410 psig

    Which one of the following identifies the earliest time that E4 is allowed to be energized from E2 IAW 0AOP-36.1, Loss of Any 4160V Buses or 480V E-Buses?

    A. 1206

    B. 1208

    C. 1214

    D. 1216

32. The indications and status of the UPS System are:

	Primary UPS	Standby UPS
Load on UPS (DS10)	OFF	OFF
Load on Inverter (DS151)	OFF	ON
Load on Alternate (DS152)	ON	OFF
Alt Source Failure (DS11)	OFF	OFF
Manual Bypass Switch (S1)	NORM	BYP TEST

Which one of the following identifies the status of UPS System Loads?

A. de-energized.

B. powered from the primary inverter.

C. powered from the standby inverter.

D. powered from the alternate source.

33. Which one of the following completes the statements below regarding 125/250 VDC Station Distribution?

In the equalize charge mode, the charger output voltage is at a __(1)__ voltage when compared to the float charge mode.

The 125 VDC batteries are sized to supply emergency power at a 150 amp rate for __(2)__ hours.

A. (1) lower
   (2) 8

B. (1) lower
   (2) 10

C. (1) higher
   (2) 8

D. (1) higher
   (2) 10

34. During an ATWS on Unit Two, RPV level is being controlled at Top of Active Fuel.

The RHR pumps have been overridden OFF.

A fault then occurs on Bus 2C which results in loss of Bus E4.

Which one of the following identifies the RHR pump response as DG4 re-energizes Bus E4?

A. RHR pumps 2B and 2D both remain overridden off.

B. RHR pumps 2B and 2D both restart 10 seconds later.

C. RHR pump 2D restarts 10 seconds later, RHR pump 2B remains off.

D. RHR pump 2B restarts 10 seconds later, RHR pump 2D remains off.

35. Unit Two is operating at rated power with Offgas Train A in full load.
A tube rupture occurs inside the Offgas Aftercondenser.

Which one of the following parameters will lower in response to this event?

A. Aftercondenser Outlet Temperature

B. Offgas Filter differential pressure

C. Main condenser vacuum

D. Aftercondenser Level

36. Which one of the following identifies the action that is required to be taken in response to annunciator UA-05 (1-9) *Fan Clg Unit CS Pump Rm A Inl Press Lo*?

IAW the APP, the reactor operator will open:

A. SW-V105, Nuc SW Supply Vlv.

B. SW-V101, Conv SW Supply Vlv.

C. SW-V143, Well Water Supply Vlv.

D. SW-V117, Nuc SW to Vital header Vlv.

37. A reactor recirc pump has tripped on Unit Two.

Which one of the following completes the statement below for determining stability region compliance?

The primary indication of total core flow is determined using:

A. Core Support Plate Delta-P.

B. PPC Point U2NSSWDP (WDP).

C. Total Core Flow recorder (R613).

D. PPC Point U2CPWTCF (WTCF).

38. Both Units were operating at rated power when ALL switchyard PCB position indications turn green.

Diesel Generator status:

DG1	Running loaded
DG2	Under clearance
DG3	Running loaded
DG4	Tripped on low lube oil pressure

Which one of the following identifies the AOP(s) that Unit One and Unit Two are required to perform?

Unit One is required to perform __(1)__.
Unit Two is required to perform __(2)__.

A. (1) 0AOP-36.1, Loss of Any 4160V Buses or 480V E-Buses
   (2) 0AOP-36.2, Station Blackout

B. (1) 0AOP-36.1, Loss of Any 4160V Buses or 480V E-Buses
   (2) 0AOP-36.1, Loss of Any 4160V Buses or 480V E-Buses

C. (1) 0AOP-36.2, Station Blackout
   (2) 0AOP-36.2, Station Blackout

D. (1) 0AOP-36.2, Station Blackout
   (2) 0AOP-36.1, Loss of Any 4160V Buses or 480V E-Buses

39. Which one of the following identifies how the manually initiated, automatically executed, fast bus transfer capability is affected following a loss of 125V DC Panel 9A?

The fast bus transfer will ____(1)____ if attempted for 4 KV Bus 1B.
The fast bus transfer will ____(2)____ if attempted for 4 KV Bus 1C.

A. (1) occur
   (2) NOT occur

B. (1) occur
   (2) occur

C. (1) NOT occur
   (2) NOT occur

D. (1) NOT occur
   (2) occur

40. Which one of the following completes the statements below concerning the Turbine Trip / Turbine Stop Valve (TSV) closure scram?

Anticipates the pressure, neutron flux, and heat flux rise due to the __(1)__ in voids.

The TSV closure scram is automatically bypassed on a signal from __(2)__.

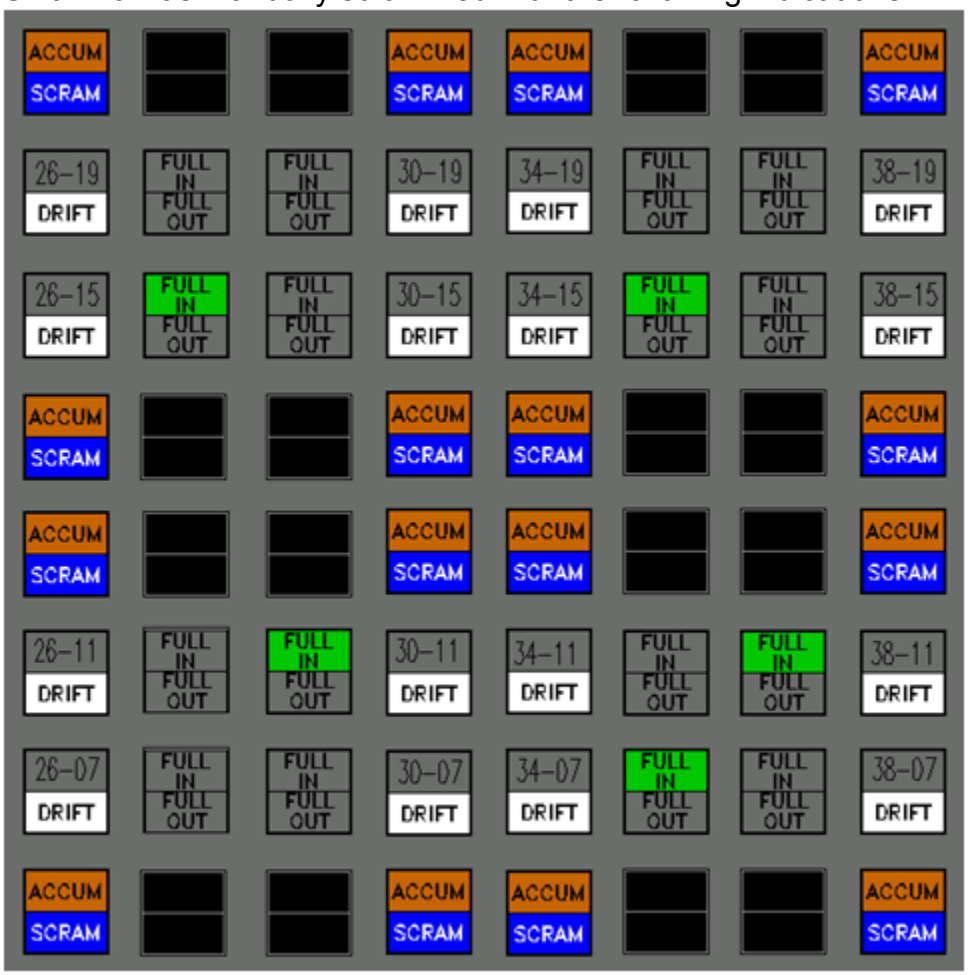
A. (1) increase
   (2) total steam flow

B. (1) increase
   (2) turbine first stage pressure

C. (1) decrease
   (2) total steam flow

D. (1) decrease
   (2) turbine first stage pressure

41. Unit Two was manually scrammed with the following indications.



Which one of the following completes the statements below?

__(1)__ ATWS has occurred.

The reactor __(2)__ remain shutdown under all conditions without boron.

A. (1) A hydraulic
   (2) will

B. (1) A hydraulic
   (2) will NOT

C. (1) An electrical
   (2) will

D. (1) An electrical
   (2) will NOT

42. Following a reactor scram on Unit One, plant conditions are:

Reactor water level	220 inches, rising
Reactor pressure	350 psig, steady
Drywell ref leg temp	205°F, steady

Which one of the following identifies the indicated level (on level indicator N027A/B) that corresponds to the bottom of the Main Steam Lines?

(Reference provided)

A. 240 inches

B. 245 inches

C. 250 inches

D. 255 inches

43. Unit Two is operating at 60% when Reactor Recirculation Pump 2A speed begins to slowly rise.

    Which one of the following identifies an immediate action required IAW 2AOP-03.0, Positive Reactivity Addition?

    A. Insert control rods.

    B. Depress the Man Runback pushbutton.

    C. Depress 2A Emerg Stop A pushbutton.

    D. Depress 2A VFD Lower Fast pushbutton.

44. Which one of the following completes the statements below IAW LEP-02, Alternate Control Rod Insertion?

The RWM is bypassed using a __(1)__.

The reason that the RWM is bypassed is because the __(2)__.

A. (1) keylock switch
   (2) Emergency Rod In Notch Override switch will not work when an Insert Block exists

B. (1) joystick
   (2) Emergency Rod In Notch Override switch will not work when an Insert Block exists

C. (1) keylock switch
   (2) Mode Switch in Shutdown generates a Control Rod Block

D. (1) joystick
   (2) Mode Switch in Shutdown generates a Control Rod Block

45. Which one of the following systems used during plant shutdown from outside the control room has both flow indication and flow control capability at the Remote Shutdown Panel?

A. CRD

B. RCIC

C. RHR Loop B

D. RHRSW Loop B

46. Unit Two is performing a reactor startup.

The following events occur prior to rolling the main turbine:

Bus 2C experiences a fault and trips
Unit Two NSW header ruptures in the Service Water Building
All Unit Two Service Water pumps supplying the NSW Header are manually tripped

Which one of the following identifies the status of the Diesel Generators and the cooling water supply?

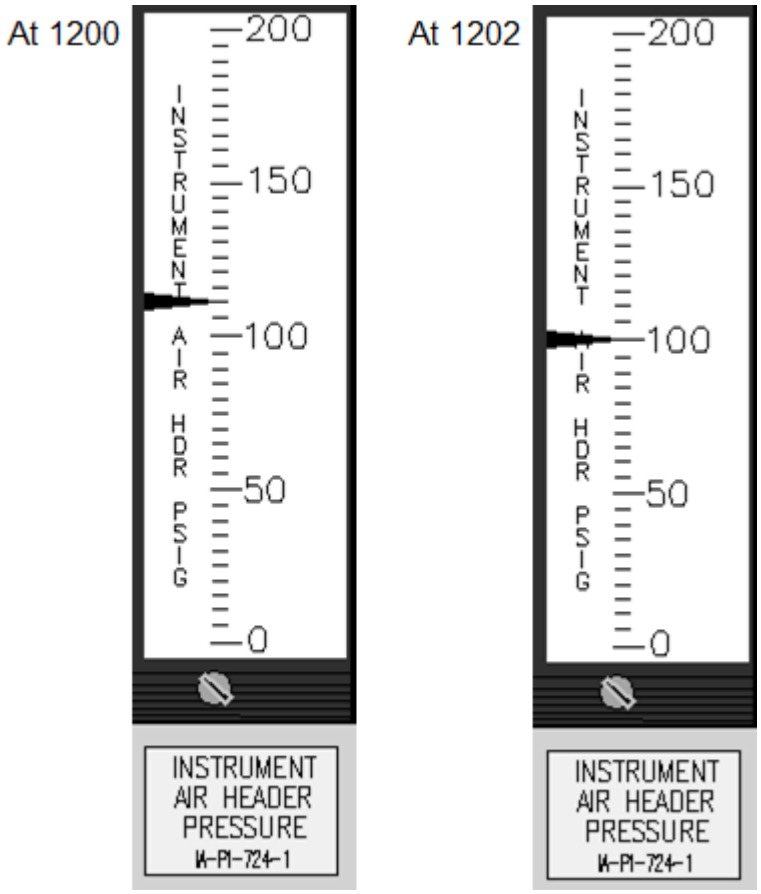
A. ONLY DG4 is running with cooling water supplied from the Unit One NSW Pumps.

B. ONLY DG4 is running with cooling water supplied from the Unit Two CSW Pumps

C. DG2 is running with cooling water supplied from the Unit One NSW Pumps and DG4 is running with cooling water supplied from the Unit One NSW Pumps.

D. DG2 is running with cooling water supplied from the Unit One NSW Pumps and DG4 is running with cooling water supplied from the Unit Two CSW Pumps.

47. During operation at rated power with the instrument air NOT cross-tied, the following indication is observed:



Assuming the situation continues to degrade at the current rate, which one of the following represents the earliest time that the MSIVs may start drifting closed IAW 0AOP-20.0, Pneumatic (Air/Nitrogen) System Failures?

A. 1203

B. 1208

C. 1210

D. 1212

48. Unit Two is in Cold Shutdown with both Reactor Recirculation pumps shutdown. Shutdown Cooling (SDC) has been established using RHR Loop B.

Which one of the following completes the statement below for a loss of shutdown cooling under the above conditions IAW 0AOP-15.0, Loss of Shutdown Cooling?

RPV Level must be raised to at least __(1)__ inches to establish __(2)__.

A. (1) 254
(2) natural circulation

B. (1) 254
(2) feed and bleed evolutions

C. (1) 200
(2) natural circulation

D. (1) 200
(2) feed and bleed evolutions

49. Which one of the following is a Plant Design Feature credited for minimizing the radiological impact of a Design Bases Refueling Accident IAW the Updated Final Safety Analysis Report (UFSAR)?

A. Control Building Ventilation Radiation Monitoring System auto start of CREV.

B. Reactor Building Ventilation Radiation Monitoring System auto start of SBGT.

C. Refueling Bridge Boundary Zone Control System preventing fuel movements into forbidden areas.

D. Spent Fuel Pool and Cooling System maintaining spent fuel pool level greater than 23 feet over irradiated fuel.

50. The following conditions exist on Unit Two:

Drywell pressure	2 psig
Drywell temperature	180°F
Reactor water level	95 inches
Reactor pressure	450 psig

Which one of the following completes the statements below?

The Drywell Cooler fans __(1)__ running.

The DW Lower Vent Dampers are in the __(2)__ position.

A. (1) are
(2) MIN

B. (1) are
(2) MAX

C. (1) are NOT
(2) MIN

D. (1) are NOT
(2) MAX

51. A loss of off-site power occurs on Unit Two with the following plant conditions:

Reactor water level	200 inches - stable
HPCI	In MAN in pressure control
RCIC	Tripped, ready for restart
Reactor pressure	1125 psig and rising

If reactor pressure is allowed to continue to rise, which one of the following identifies the reason the HPCI system will trip?

A. Turbine overspeed

B. High reactor water level

C. Steam Line High Flow

D. High turbine exhaust pressure

52. Which one of the following completes the statements below?

The purpose of the RHR Heat Exchangers is to reject heat from the suppression pool to the __(1)__ System.

In order to increase an established cooldown rate of the suppression pool IAW 2OP-17, Residual Heat Removal System Operating Procedure, throttle __(2)__ E11-F048A, HX 2A Bypass Valve.

A. (1) Service Water
   (2) open

B. (1) Service Water
   (2) closed

C. (1) Reactor Building Closed Cooling Water
   (2) open

D. (1) Reactor Building Closed Cooling Water
   (2) closed

53. During an accident, reactor pressure and drywell reference leg area temperature are in the Unsafe region of the Reactor Saturation Limit.

Which one of the following reactor water level instruments are least likely to become unreliable due to reference leg flashing?

A. Fuel zone

B. Wide Range

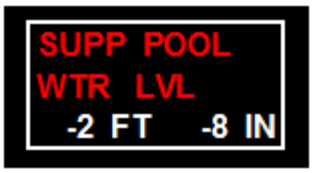
C. Narrow Range

D. Shutdown Range

54. With Unit One at rated power, the following control room indications are observed:

A-01 (3-7) *Suppression Chamber Lvl Hi/Lo* in alarm

ERFIS indication



Which one of the following completes the statements below?

The suppression chamber water level is __(1)__.

This condition requires entry into __(2)__.

A. (1) low
(2) LCO 3.6.2.2, Suppression Pool Water Level and PCCP

B. (1) low
(2) LCO 3.6.2.2, Suppression Pool Water Level, ONLY

C. (1) high
(2) LCO 3.6.2.2, Suppression Pool Water Level and PCCP

D. (1) high
(2) LCO 3.6.2.2, Suppression Pool Water Level, ONLY

55. During an accident, Unit Two plant conditions are:

Reactor water level	-35 inches, lowering
Reactor pressure	900 psig
Drywell average temp	185°F
Drywell ref leg temp	215°F
Injection sources	None available

Under these conditions, which one of the following is the LOWEST RPV water level that still assures adequate core cooling is being maintained?

(Reference provided)

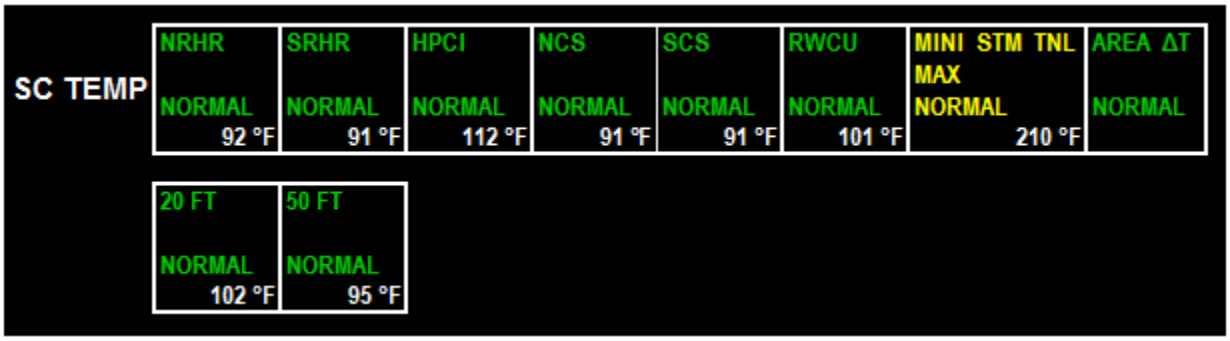
A. -45 inches

B. -60 inches

C. -72.5 inches

D. -82.5 inches

56. Unit Two is operating at rated power.
The following ERFIS indications are observed ten minutes into the event:



Which one of the following identifies the status of the HPCI and RCIC systems based on the conditions above?

A. HPCI ONLY is isolated.

B. RCIC ONLY is isolated.

C. Both HPCI and RCIC are isolated.

D. Neither HPCI nor RCIC are isolated.

57. Which one of the following radiation annunciators requires entry into RRCP?

A. UA-03 (1-6) *RBCCW Liquid Process Rad High*

B. UA-03 (2-3) *Rx Bldg Roof Vent Rad High*

C. UA-03 (2-7) *Area Rad Rx Bldg High*

D. UA-03 (4-5) *Process Rx Bldg Vent Rad High*

58. Unit Two is at rated power when the following annunciators are received:

UA-03 (5-2) *Process Off-Gas Rad High*
UA-03 (4-5) *Process Rx Bldg Vent Rad High*
UA-03 (3-5) *Process Rx Bldg Vent Rad Hi-Hi*

Which one of the following identifies the automatic actions that should occur?

A. PASS sample valves close and AOG-HCV-102, AOG System Bypass Valve, shuts (if open).

B. Group 6 initiation and AOG-HCV-102, AOG System Bypass Valve, shuts (if open).

C. Process Off-Gas Timer initiation and SBGT initiation.

D. Group 6 isolation and SBGT initiation.

59. Following a complete loss of RBCCW, a manual reactor scram was inserted.
Following the scram, the Scram Discharge Volume ruptured.
Plant conditions are:

Drywell average temp	190°F
Drywell pressure	2.3 psig
Rx Bldg 20' south temp	195°F

UA-12 (1-4) *South RHR Rm Flood Lvl Hi-Hi* is in alarm
UA-12 (1-3) *South CS Rm Flood Lvl Hi-Hi* is in alarm

Which one of the following identifies the operator action required by SCCP?

A. Perform emergency depressurization.

B. Reset RPS to isolate the primary system discharge.

C. Commence a reactor cooldown not to exceed 100°F/hr.

D. Rapidly depressurize to the main condenser irrespective of cooldown rate.

60. An ATWS condition currently exists on Unit Two with the following plant conditions:

Reactor Power	4%
Reactor pressure	controlled by EHC
Drywell pressure	2.1 psig
Reactor water level	95 inches
LEP-02 Section 3	jumpers have just been installed

Which one of the following completes the statements below concerning the required actions prior to resetting RPS IAW LEP-02, Alternate Control Rod Insertion, Section 3?

ARI is placed to __(1)__ and then RESET.
The SDV Vents and Drains are confirmed to be __(2)__.

A. (1) NORM
   (2) open

B. (1) NORM
   (2) closed

C. (1) INOP
   (2) open

D. (1) INOP
   (2) closed

61. Unit Two has experienced a leak in the steam tunnel and the control building ventilation has realigned.

Which one of the following identifies:
(1) in what location will 1 mR/hr cause annunciator UA-03 (6-7) *Area Rad Control Room High* and
(2) the reason the control building ventilation has realigned?

A. (1) Control room.
(2) To protect all Main Control Room personnel from elevated radiological conditions.

B. (1) Control room.
(2) To protect personnel working in the Control Room and the control building from elevated radiological conditions.

C. (1) Ventilation intake duct.
(2) To protect all Main Control Room personnel from elevated radiological conditions.

D. (1) Ventilation intake duct.
(2) To protect personnel working in the Control Room and the control building from elevated radiological conditions.

62. Unit Two is in MODE 3 following a seismic event with the following plant conditions:

Reactor level	55 inches
Reactor pressure	500 psig
Drywell pressure	9 psig

UA-01 (4-4) *Instr Air Press-Low* in Alarm
UA-01 (4-5) *Service Air Press-Low* in Alarm
UA-01 (1-2) *RB Inst Air Receiver 2B Press Low* in Alarm

Which one of the following completes the statements below?

RNA-SV-5481, Div II Backup N2 Rack Isol Vlv, is __(1)__.

RNA-SV-5261, Div II Non-Inrpt RNA, is __(2)__.

A. (1) open
   (2) open

B. (1) open
   (2) closed

C. (1) closed
   (2) open

D. (1) closed
   (2) closed

63. Unit One was operating at rated power when a loss of the SAT occurs with the following plant conditions:

Reactor water level	120 inches
Reactor pressure	320 psig
Drywell pressure	13 psig
DG1	Running loaded
DG2	Tripped/Unavailable

Which one of the following completes the statements below concerning the operation of the RBCCW system?

A & C RBCCW pumps __(1)__ running.

RCC-V-28 and RCC-V-52, DW Header Equipment Isolation Valves, __(2)__.

A. (1) are
   (2) auto closed

B. (1) are
   (2) remain open

C. (1) are NOT
   (2) auto closed

D. (1) are NOT
   (2) remain open

64. A Unit One reactor building fire has occurred affecting safe shutdown Train B equipment.

Which one of the following identifies a component that is classified as ASSD Train B Equipment IAW 0ASSD-00, User's Guide?

A. CSW Pump 1B

B. NSW Pump 1B

C. HPCI System

D. CRD Pump 1B

65. During rated power operation, plant status is:

UA-06 (1-2) *Gen Under Freq Relay* in alarm
Generator frequency is 59.2 Hertz

Which one of the following identifies why the turbine must be tripped if frequency remains at its present value?

To prevent damage to the:

A. Generator.

B. Main Transformer.

C. Low Pressure Turbine.

D. High Pressure Turbine.

66. A grid disturbance occurs with the following Unit One plant parameters:

Generator Load	980 MWe
Generator Reactive Load	160 MVARs, out
Generator Gas Pressure	50 psig

Which one of the following identifies the available options that will place the Unit within the Estimated Capability Curve?

(Reference provided)

A. Raise gas pressure to 58 psig or lower power to 940 MWe.

B. Raise gas pressure to 58 psig or raise reactive load to 240 MVARs.

C. Raise gas pressure to 58 psig or lower reactive load to 70 MVARs.

D. Lower power to 940 MWe or raise reactive load to 240 MVARs.

67. Which one of the following completes the statement below concerning the purpose of the High Pressure Coolant Injection (HPCI) System IAW Technical Specifications Bases?

HPCI is designed to provide sufficient coolant injection to maintain the reactor core covered during a __(1)__ Loss-Of-Coolant-Accident to maintain fuel cladding temperatures below __(2)__.

A. (1) small break
(2) 1800°F

B. (1) small break
(2) 2200°F

C. (1) large break
(2) 1800°F

D. (1) large break
(2) 2200°F

68. TIP traces are in progress with all TIP drawer Mode Switches in Auto.

A small steam leak in containment causes drywell pressure to rise to 2.7 psig.

Which one of the following predicts the final TIP ball valve position indication(s) and also identifies all available location(s) for verifying their position?

A. Green light indication illuminated on each TIP drawer at Back Panel P607 ONLY.

B. White Valve Light illuminated on each TIP drawer at Back Panel P607 ONLY.

C. Red light indication illuminated on P601 Panel and on each TIP drawer at Back Panel P607.

D. Green light indication illuminated on P601 Panel and a white Valve Light illuminated on each TIP drawer at Back Panel P607.

69. Which one of the following Scram Immediate Operator actions has a different setpoint between Unit One and Unit Two?

A. Tripping of the main turbine.

B. Tripping of the first feed pump.

C. Master level controller setpoint setdown.

D. Placing the reactor mode switch to Shutdown.

70. IAW OPS-NGGC-1301, Equipment Clearance, which one of the following identifies who can waive the requirement for a double valve isolation?

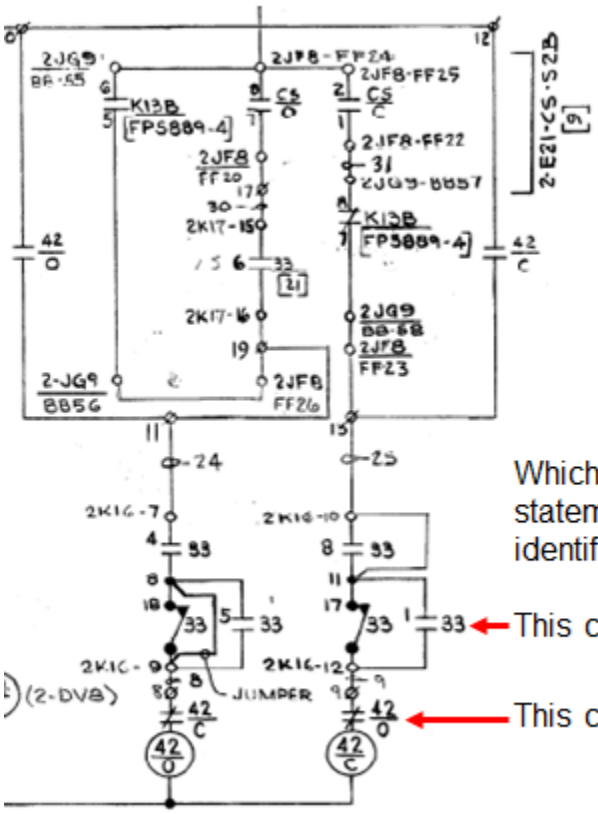
A. Assistant Operations Manager - Shift

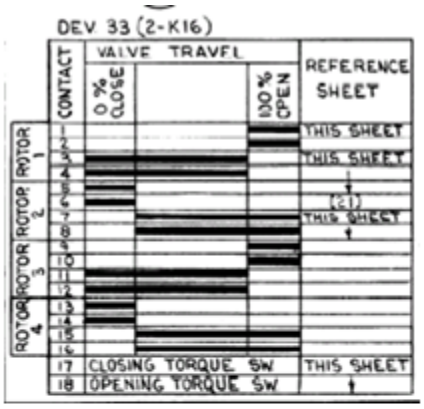
B. Maintenance Manager

C. Work Week Manager

D. Plant Manager

71.





Which one of the following completes the statements below concerning the contacts identified in the drawing?

This contact closes when the valve is (1) .

This contact opens when the 42/O relay is (2) .

A. (1) Full open
(2) energized

B. (1) Full open
(2) de-energized

C. (1) NOT full open
(2) energized

D. (1) NOT full open
(2) de-energized

72. Which one of the following completes the following statements IAW 0OI-01.03, Non-Routine Activities, Section 5.6.1, Primary Containment Access.

The TIP system __(1)__ required to be placed under clearance.

A clearance to prevent the withdrawal of control rods __(2)__ required.

A. (1) is
(2) is

B. (1) is
(2) is not

C. (1) is not
(2) is

D. (1) is not
(2) is not

73. Unit Two is in MODE 1 when the following alarms and indications occur:

UA-23 (2-6) *Main Steam Line Rad Hi*	In alarm
RWCU Conductivity Recorder	rising reactor water conductivity
Reactor power	remains steady
No other annunciators are in alarm	

Initiation of which one of the following identifies the cause of these conditions?

A. Zinc injection.

B. Resin injection.

C. Hydrogen injection.

D. Noble metals injection.

74. Alternate shutdown cooling using SRV's has been established IAW 0AOP-15.0, Loss of Shutdown Cooling. SRV B21-F013B is currently open. The cooldown rate is approaching 100°F/hr. The CRS has directed you to lower the cool down rate.

RHR A/C
B21-F013F B21-F013H
B21-F013G B21-F013J
B21-F013A B21-F013B B21-F013K
B21-F013C B21-F013D
B21-F013E B21-F013L

Which one of the following completes the statement below IAW the 0AOP-15.0 cooldown table above?

The RO can lower the cooldown rate by closing B21-F013B and opening _____.

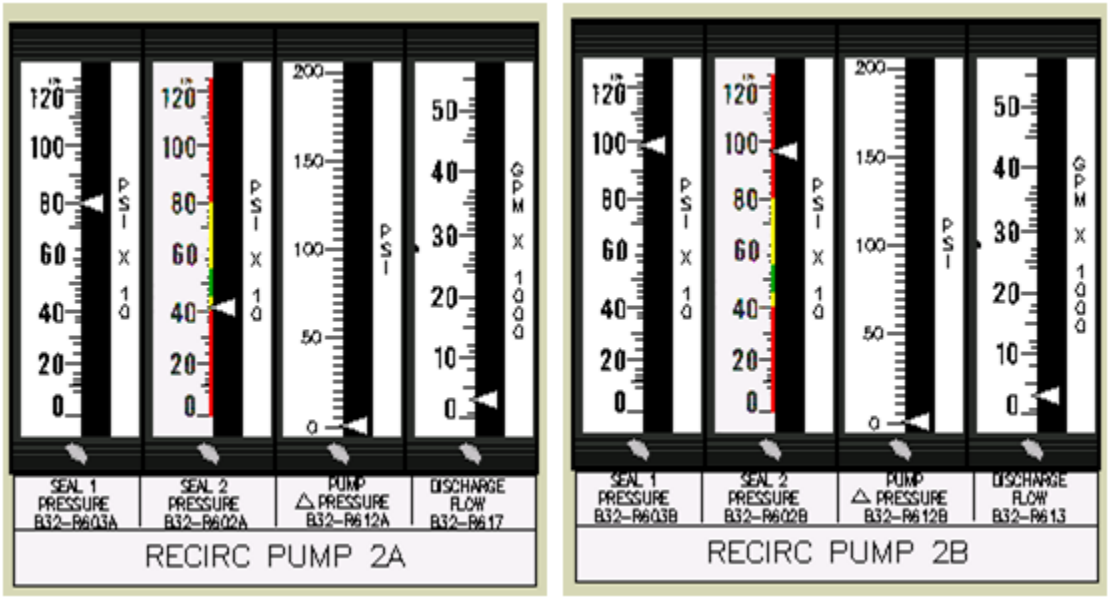
A. B21-F013A

B. B21-F013C

C. B21-F013J

D. B21-F013K

75. Unit Two was at power when a trip and lockout of BOP Bus 2B required insertion of a manual reactor scram. Shortly after the scram, the following indications are noted:



Drywell pressure	1.4 psig, rising
Average drywell temp	140°F, rising

Which one of the following completes the statement below?

The crew will be required to enter __(1)__ and isolate Recirc Pump __(2)__.

A. (1) 0AOP-14.0
(2) 2A

B. (1) 0AOP-14.0
(2) 2B

C. (1) PCCP
(2) 2A

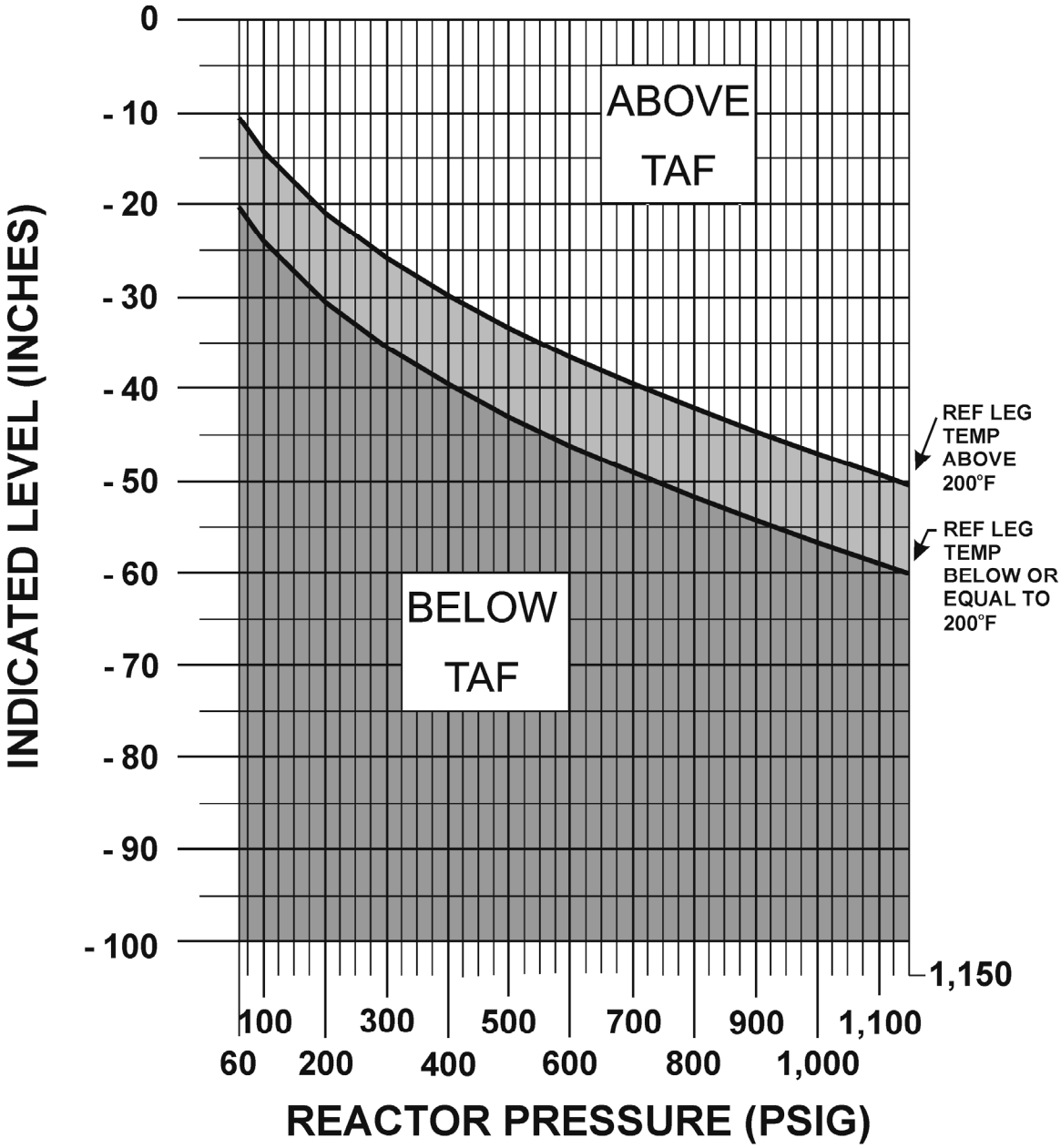
D. (1) PCCP
(2) 2B

RO Written Exam Reference Index

1. 0EOP-01-UG, User's Guide, Attachment 6, Figure 17A, Unit 2 Reactor Water Level at TAF
2. 0EOP-01-UG, User's Guide, Attachment 6, Figure 18A, Unit 2 Reactor Water Level at LL-4 (Minimum Steam Cooling Level)
3. 0EOP-01-UG, User's Guide, Attachment 6, Figure 19A, Unit 2 Reactor Water Level at LL-5 (Minimum Zero Injection Level)
4. 0EOP-01-UG, User's Guide, Attachment 6, Figure 21, Reactor Water Level at MSL (Main Steam Line Flood Level)
5. 1OP-27, Figure 1, Estimated Capability Curves.

FIGURE 17A

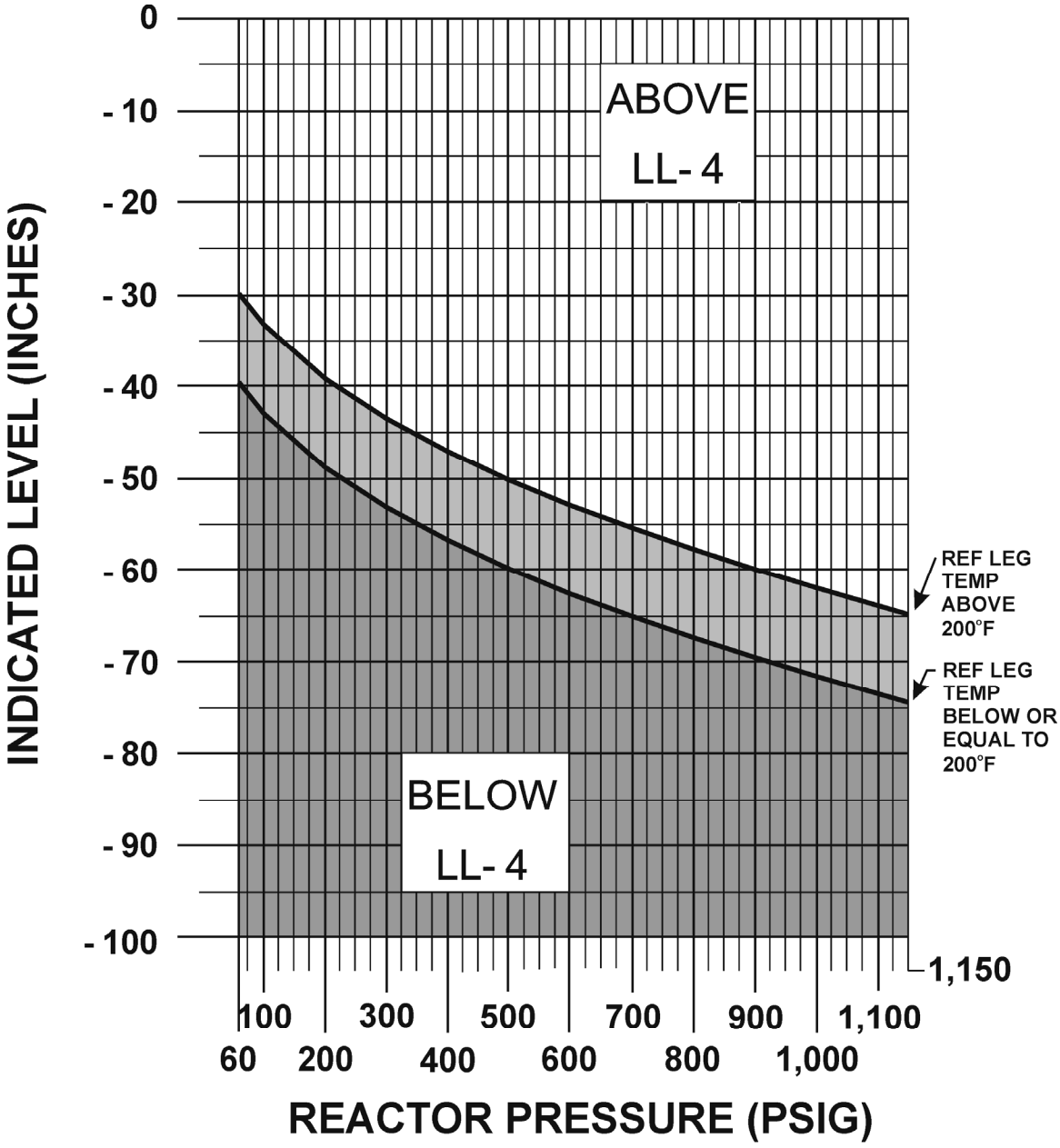
Unit 2 Reactor Water Level at TAF



WHEN REACTOR PRESSURE IS LESS THAN
60 PSIG, USE INDICATED LEVEL.
TAF IS -7.5 INCHES.

FIGURE 18A

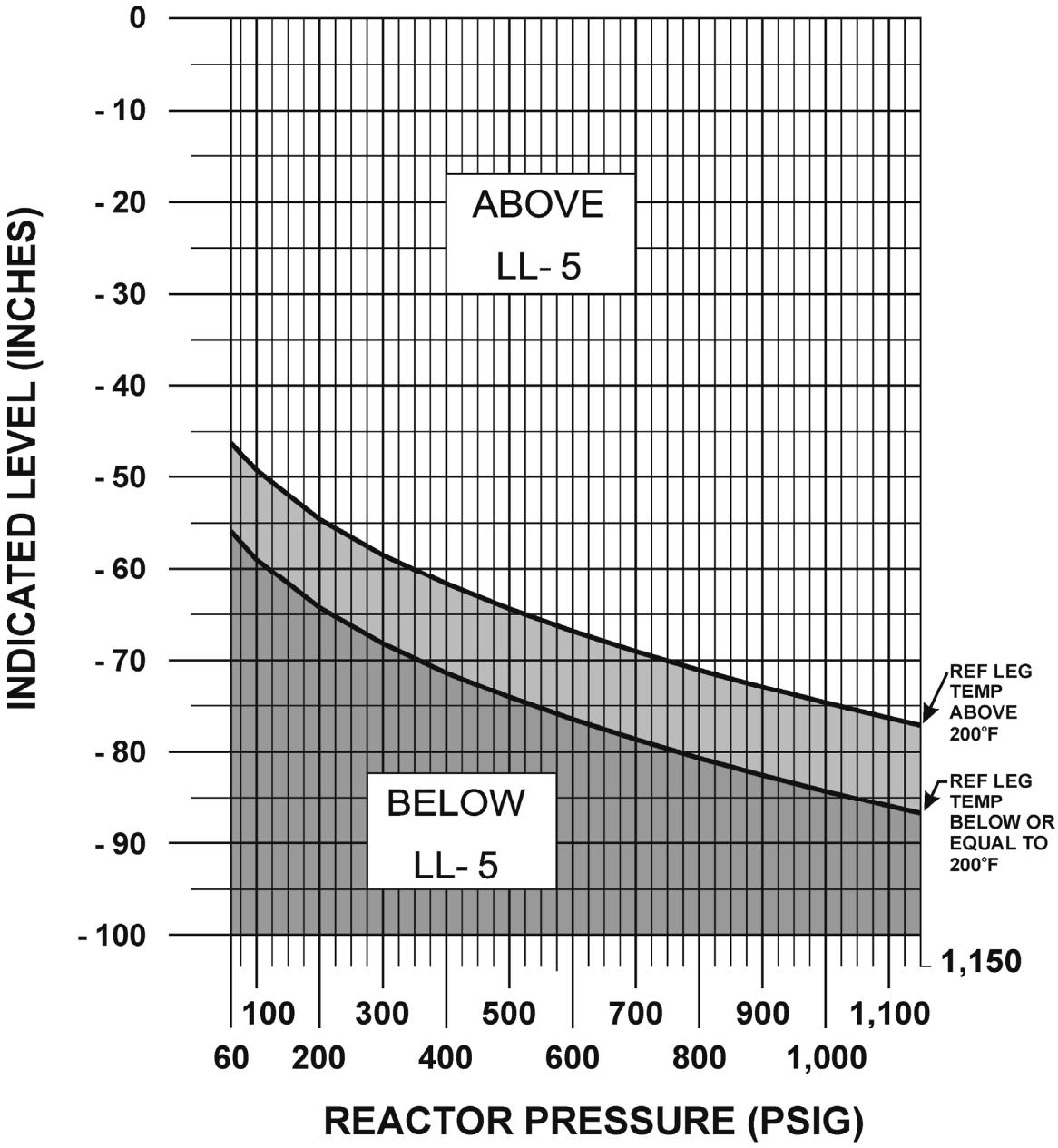
Unit 2 Reactor Water Level at LL-4
(Minimum Steam Cooling Level)



WHEN REACTOR PRESSURE IS LESS THAN
60 PSIG, USE INDICATED LEVEL.
LL-4 IS -27.5 INCHES.

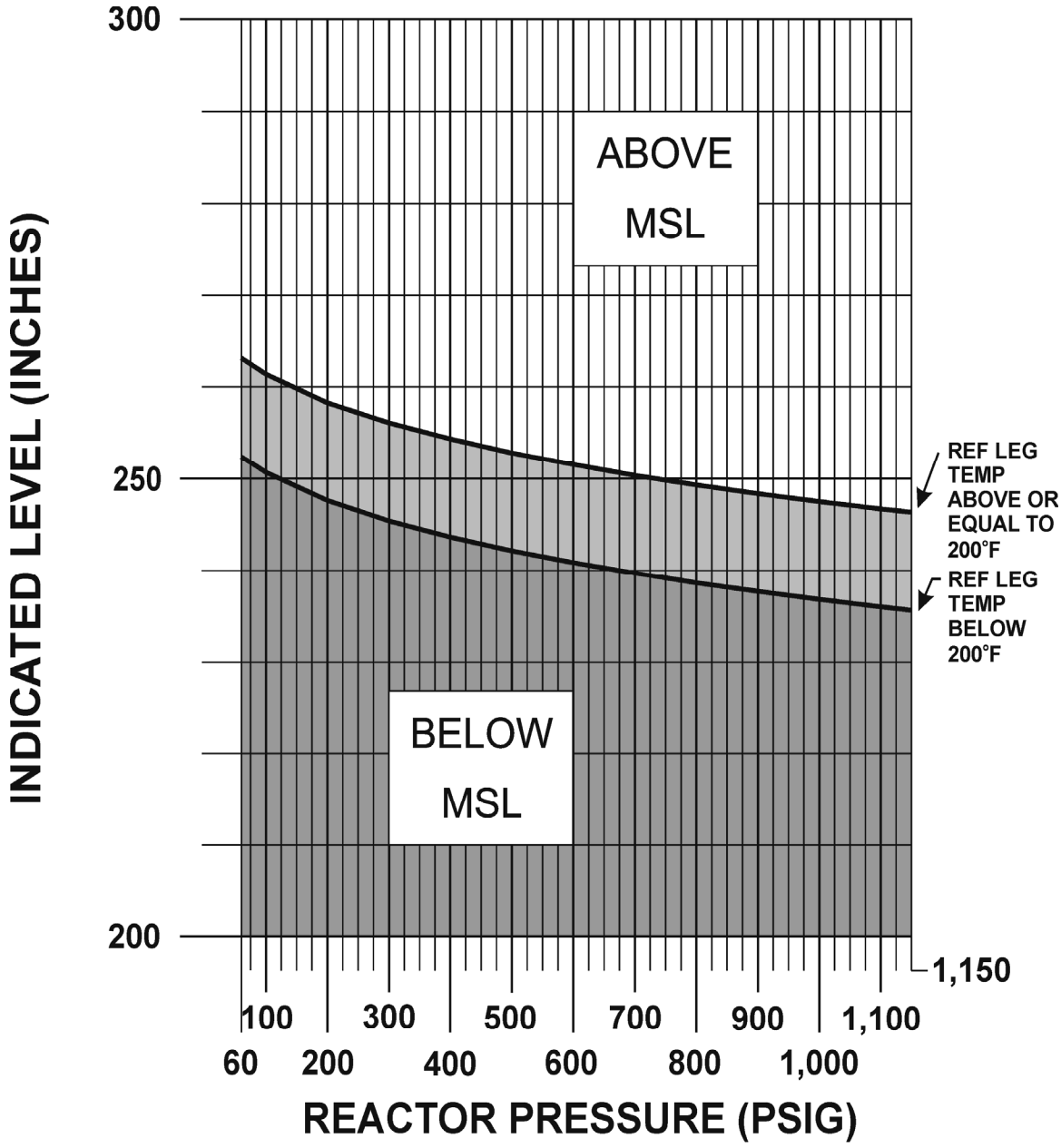
FIGURE 19A

Unit 2 Reactor Water Level at LL-5
(Minimum Zero Injection Level)



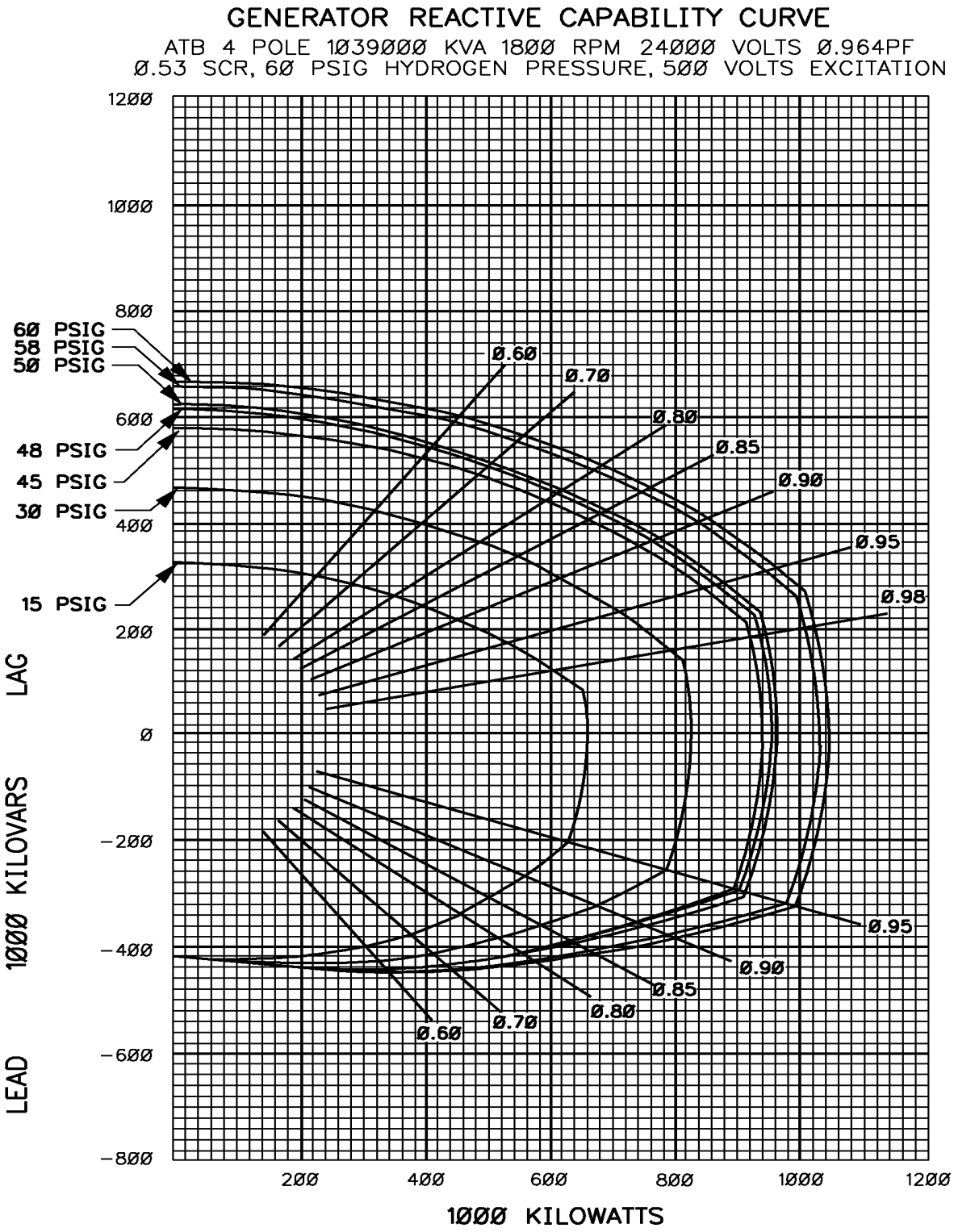
WHEN REACTOR PRESSURE IS LESS THAN
60 PSIG, USE INDICATED LEVEL.
LL-5 IS -45.0 INCHES.

FIGURE 21
Reactor Water Level at MSL
(Main Steam Line Flood Level)



WHEN REACTOR PRESSURE IS LESS THAN
60 PSIG, USE INDICATED LEVEL.
MSL IS +250 INCHES.

FIGURE 1
Page 1 of 1
Estimated Capability Curves



BRUNSWICK 2014-301 RO ANSWER KEY

1.	D	26.	B	51.	B
2.	D	27.	B	52.	B
3.	B	28.	A	53.	B
4.	A	29.	D	54.	A
5.	C	30.	A	55.	C
6.	B	31.	D	56.	A
7.	D	32.	D	57.	B
8.	C	33.	C	58.	D
9.	A	34.	D	59.	A
10.	C	35.	C	60.	D
11.	C	36.	D	61.	A
12.	C	37.	D	62.	A
13.	B	38.	B	63.	D
14.	D	39.	A	64.	B
15.	A	40.	D	65.	C
16.	C	41.	B	66.	A
17.	B	42.	D	67.	B
18.	A	43.	C	68.	D
19.	A	44.	A	69.	D
20.	D	45.	B	70.	A
21.	B	46.	C	71.	A
22.	C	47.	B	72.	B
23.	B	48.	C	73.	B
24.	C	49.	B	74.	B
25.	C	50.	B	75.	A