Indian Point Unit 2
NRC Written Exam

Answer Key

Date: 7/6/2001

References to be given to the candidates:

Question #	Reference
Q022	Technical Specifications, section 3.6.A, with bases deleted
Q027	Technical Specifications, section 3.1.F.2, with bases deleted
Q031	Graph ASC-2C and graph ASC-2D
Q044	Graph RV-3 and graph RV-7, graph RV-1
Q055	Technical Specifications, section 3.4, with bases deleted
Q085	SOP-1.3
Q086	AOI-26.4.1.2
Q098	EAL Tables
Q054	AOI-21.1.1, "Loss of Feedwater"

As given

Question # 001

Given the following plant conditions:

- Reactor is at 70% power
- Reactor power is higher than turbine power
- Pressurizer level is increasing
- Tave is greater than Tref and increasing
- T AVE T REF DEVIATION 5°F (FCF 4-6) has actuated

Which ONE of the following has caused these conditions?

A. Uncontrolled rod withdrawal.

B. Inadvertent steam dump actuation.

C. Excessive boration.

D. Inadvertent AFW actuation.

Answer: A

Explanation/Justification:

A. Correct. Uncontrolled rod withdrawal would cause reactor power to be above turbine power and temperature to be increasing.

B. Incorrect. Inadvertent steam dump would cause reactor power to be above turbine power but, Tavg would be below Tref.

C. Incorrect. Excessive boration would cause temperature to decrease.

D. Incorrect. Inadvertent AFW actuation would cause reactor power to be above turbine power but, Tavg would be below Tref.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		000001.AA2.05
	Importance		4.6

Technical References: AOI 3.4; SD # 15
References to be provided: None
Learning Objective: EOP-C-001 Obj 4424

Question Source: (check one): ☒ New
☐ Bank: Facility: Question #:
☐ NRC Exam: Facility: Year:

Question Cognitive Level: (check one) Memory or Fundamental Knowledge: ☐
Comprehension or Analysis: ☒

10 CFR Part 55 Content: (check one) 55.41 ☒
55.43 ☐

As given

Question # 002

Given the following conditions:

- Unit 2 is operating at 100% power
- Plant conditions are stable, with no abnormal conditions
- All control systems, except Rod Control, are in automatic
- No maintenance activities in progress

Under these conditions, which ONE of the following components would cause a dropped control rod, if there were a blown fuse in that component?

A. Lift Coil.

B. Moveable Gripper Coil.

C. DC Hold Cabinet.

D. Stationary Gripper Coil.

Answer: D

Explanation/Justification:

A. Incorrect. Will stop rod motion.

B. Incorrect. Will stop rod motion.

C. Incorrect. If a control rod is on the DC Hold Bus and a DC Hold Cabinet fuse blows, the rod will drop. However, having a rod on the DC Hold Bus is not a normal alignment.

D. Correct. A blown stationary gripper coil fuse will cause a rod to drop.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		000003.AK2.05
	Importance		2.8

Technical References: SD # 16 Rod Control System
References to be provided: None
Learning Objective: LP SYS-C- 161, Enabling Objective 274

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 003

Which ONE of the following is NOT included in the Technical Specification basis for inoperable rod control limitations?

A. Ensure the requirements for power distribution limits are satisfied.

B. Ensure adequate shutdown margin.

C. Ensure rod insertion limits are satisfied.

D. Minimize the consequences of a rod ejection accident.

Answer: C

Explanation/Justification:

A. Incorrect. Spelled out in basis for inoperable control rods.

B. Incorrect. Spelled out in basis for inoperable control rods.

C. Correct. Inoperable control rod limits do NOT ensure RIL is satisfied.

D. Incorrect. Spelled out in basis for inoperable control rods.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		000005.AK3.04
	Importance		4.1

Technical References: T/S 3.10 basis
References to be provided: None
Learning Objective: SYS-C-161, Obj 286-12c

Question Source: (check one): ☒ New

☐ Bank: Facility: Question #:

Modified Question for IP-2 Use ☐ NRC Exam Facility: Year:

Question Cognitive Level: Memory or Fundamental Knowledge: ☒

Comprehension or Analysis: ☐

10 CFR Part 55 Content: 55.41 ☐

55.43 ☒

Question # 004

Which ONE of the following is a mitigation strategy in E-1, "Loss of Reactor or Secondary Coolant" for a large break LOCA?

A. Ensure the core is covered and being cooled, and that containment integrity is maintained.

B. Ensure the Post Accident Containment Ventilation System maintains vapor containment hydrogen concentration below 4.0%.

C. Isolate RCP Seal Injection to prevent thermal shocking the seals.

D. Limit RCS cooldown rate to minimize the chance of reactor vessel head voiding.

Answer: A.

Explanation/Justification:

A. Correct Answer: Background document basis

B. Not accomplished in E-1

C. Strategy of ECA-0.0

D. ES-0.2 strategy.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	K/A #		000011.Gen.2.4.6
	Importance		4.0

Technical References: E-1 Background document
References to be provided: None
Learning Objective: LP EOP-C-001 A4424

Question Source: (check one): ☒ New

☐ Bank: Facility: Question #:

Modified Question for IP-2 use.. ☐ NRC Exam: Facility: Year:

Question Cognitive Level: Memory or Fundamental Knowledge: ☒

Comprehension or Analysis: ☐

10 CFR Part 55 Content: 55.41 ☒

55.43 ☐

Question # 005

Operators are responding to an unisolable LOCA outside of containment and have entered ECA-1.1, "Loss Of Emergency Coolant Recirculation". Per ECA-1.1, the CRS directs the operator to establish only one train of SI system flow to the core.

What is the basis for establishing only one train of SI?

A. To prevent over pressurizing the RCS.

B. To prepare for further RCS depressurization and cooldown.

C. To minimize risk of damaging more than one SI pump.

D. To extend the time before RWST inventory is depleted.

Answer: D

Explanation/Justification:

A. The SI pumps are not capable of over pressurizing the RCS

B. Procedure does not direct cooldown activities

C. Cooldown and depressurization are performed to limit break flow. Mminimizing risk of damage to pumps is an RCP concern, not an SI pump concern.

D. Correct Answer: Allows RWST level to be extendedt.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		W/E04.EK3.2
	Importance		4.0

Technical References: ECA-1.1 and EOP Background document
References to be provided: None
Learning Objective: LP EOP C 001A Objective 4423

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 006

Given the following conditions:

- A reactor trip and safety injection occur while operating at 22% power
- The operators are performing the actions of E-0, "Reactor Trip Or Safety Injection".
- SG NR levels are 39% - STABLE
- SG pressures are 950 psig - STABLE
- WR RCS pressure is 1820 psig - INCREASING
- Subcooling is 60°F - INCREASING
- Pressurizer PORVs are CLOSED
- Pressurizer level is 40% - STABLE
- Secondary Radiation is NORMAL
- Containment pressure is 0.1 psig - STABLE
- Containment radiation is NORMAL
- Containment sump levels are NORMAL

Based on these conditions, to what procedure will the crew transition from E-0?

A. E-1, "Loss Of Reactor Or Secondary Coolant".

B. ES-0.0, "Re-diagnosis".

C. ES-0.1, "Reactor Trip Response".

D. ES-1.1, "SI Termination".

Answer: D

Explanation/Justification: E-0 step 31

A. No indication of coolant loss

B. Can't do "rediagnosis" if "diagnosis" has not been performed.

C. This action is incorrect if SI is in service

D. Correct Answer: Directed by E-0 step 31 to go to ES-1.1

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		W/E01 & E02.Gen. 2.4.18
	Importance		3.6

Technical References: E-0, step 30, 31

Question # 006

References to be provided:	None				
Learning Objective:	LP EOP	C	001A	Objective 33	
Question Source: (check one):	☒	New			
	☐	Bank:	Facility:		Question #:
	☐	NRC Exam:	Facility:		Year:
Question Cognitive Level:	Memory or Fundamental Knowledge:	☐			
	Comprehension or Analysis:	☒			
10 CFR Part 55 Content:	55.41	☐			
	55.43	☒			

Question # 007

Given the following conditions:

- Unit 2 is operating at 100% power
- RCP 1 SEAL RETURN FLOW HIGH/LOW (COMMON) (SFF 1-5) has just actuated
- Seal return flow for RCP 21 indicates 0.9 gpm on panel FDF

Which ONE of the following is the cause for the seal return flow alarm?

A. Loss of 21 RCP thermal barrier cooling flow.

B. Loss of seal injection flow.

C. Excessive #2 seal leakage on 21 RCP.

D. Low VCT pressure.

Answer: C

Explanation/Justification:

A. Seal return flow is not affected by loss of thermal barrier cooling flow.

B. Seal leakoff from the number 1 seal is dependent upon the pressure felt downstream of the seal which is controlled by the amount of leakage through the number 2 seal, not the seal injection flow.

C. Seal leakoff from the number 1 seal is dependent upon the pressure felt downstream of the seal which is controlled by the amount of leakage through the number 2 seal. Therefore, increased leakage through the number 2 seal will reduce the return flow from number 1 seal.

D. Low Volume Control Tank pressure would increase the leakoff flow from the number 1 seal.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		003.K6.02
	Importance		3.1

Technical References: AOI 1.3, Reactor Coolant Pump Malfunction
References to be provided: None
Learning Objective: LP SYS-C-013 Objective 37

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 008

What is the basis for maintaining RVLIS Natural Circulation Range above 75% when performing a natural circulation cooldown with voids in the reactor vessel head?

A. Prevents upper range RVLIS from reading off scale low due to upper head voiding.

B. Prevents voids from entering the hot legs and being swept into the SG U-tubes.

C. Prevents Pressurizer level from going solid due to upper head voiding.

D. Prevents voids from entering the cold legs and being swept into the SG U-tubes.

Answer: B

Explanation/Justification:

A. Upper head voiding will not impact RVLIS level indication

B. Correct Answer: ES-0.3 Step 6

C. With voiding in the upper head, Pzr Level is controlled via charging and letdown

D. Entire core would have to be voided before Cold Legs would be affected

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		W/E09 & E10.EA1.2
	Importance		3.9

Technical References: ES-0.3. Step 6
References to be provided: None
Learning Objective: SYS-C-011 Obj 8

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year: 2000

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 009

Which ONE of the following boration methods will increase RCS boron concentration at the fastest rate? (assume maximum charging flow for all cases)

A. Charging Pump suction lined up to the RWST via manual valve 288, RWST Manual Inlet Stop.

B. Charging Pump suction lined up to the RWST via LCV-112B, Emergency RWST Makeup Stop.

C. Emergency borate via MOV-333, Emergency Boration Stop, with at least one Boric Acid Pump in fast speed.

D. Borate through the boric acid blender with at least one Boric Acid Pump in fast speed.

Answer: C

Explanation/Justification:

A. Lower boric acid concentration from RWST will not increase boron concentration as rapidly as BASTs.

B. Lower boric acid concentration from RWST will not increase boron concentration as rapidly as BASTs.

C. Correct. Emergency boration directly from the Boric Acid Storage Tanks to the Charging Pump suction.

D. Although high boric acid concentration is available from the BASTs, the maximum flow rate is restricted by flowing through the blender.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		000024.AK2.01
	Importance		2.7

Technical References: System Description 3 section 3.6.F.4
References to be provided: None
Learning Objective: LP SYS C-30 CVCS Enabling Objective 79.2.b

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 010

Given the following conditions:

- Unit 2 is at 100% power
- COMPONENT COOLING SURGE TANK LEVEL (SGF 1-2) has actuated
- CCW Surge Tank Level is lowering

Which ONE of the following, assuming an inter-system leak, is a potential location for the loss of CCW?

A. Letdown heat exchanger.

B. Excess letdown heat exchanger.

C. Thermal barrier heat exchanger.

D. Seal water heat exchanger.

Answer: D

Explanation/Justification:

A. Incorrect. Letdown is at a higher pressure than CCW.

B. Incorrect. Excess Letdown is at a higher pressure than CCW.

C. Incorrect. Thermal Barrier is at a higher pressure than CCW.

D. Correct. Seal Water return is at approximately VCT pressure. Therefore, leakage would be from the CCW system into the Seal Water return.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		000026.AA2.01
	Importance		3.5

Technical References: System Description 4.1
References to be provided: None
Learning Objective: Enabling Objective 107

Question Source: (check one):

- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:

- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:

- 55.41 ☒
- 55.43 ☐

Question # 011

Given the following:

- A failure of the reactor to automatically trip has been identified
- The control room team has just entered E-0, "Reactor Trip Or Safety Injection"
- The control room operators report that the reactor will NOT trip manually
- Reactor power is 95%

Which ONE of the following actions is required to be performed first?

A. Dispatch an operator to locally open the breaker for both rod drive motor generator sets.

B. Direct the BOP operator to deenergize 480V Busses 2A and 6A for 10 seconds.

C. Manually insert control rods.

D. Initiate boration of the RCS.

Answer: B

Explanation/Justification:

A. Incorrect. This is done later in FR-S.1.

B. Correct. This de-energizes both rod drive MG sets.

C. Incorrect. This is done in FR-S.1, step 1 RNO.

D. Incorrect. This is done in FR-S.1, step 5.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		000029.EA1.12
	Importance		4.0

Technical References: FR-S.1, Response to Nuclear Power Generation/ATWS

References to be provided: None

Learning Objective: EOP-C-001 Obj 4424

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 012

What is the reason for tripping the turbine in response to an ATWS?

A. To maintain SG inventory.

B. To ensure adequate steam pressure to run the 22 AFW Pump.

C. To shutdown the reactor by moderator temperature increase.

D. To prevent turbine overspeed when the Main Generator output breakers open.

Answer: A

Explanation/Justification:

A. Correct. Basis from FR-S.1 background document.

B. Incorrect. 22 AFW pump will run with low SG pressure.

C. Incorrect. Removes a large source of positive reactivity addition (heat removal by steaming) but, does not shutdown the reactor.

D. Incorrect. The generator output breakers will not open until the turbine is tripped.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		000029.EK3.12
	Importance		4.7

Technical References: FR-S.1 Background Document
References to be provided: None
Learning Objective: Enabling Objective 3559

Question Source: (check one):

- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:

- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:

- 55.41 ☒
- 55.43 ☐

Question # 013

Given the following conditions:

- Plant heatup is being performed per POP-1.1, "Plant Restoration from Cold Shutdown to Hot Shutdown Conditions"
- Initial RCS temperature was 430 °F
- Uncontrolled depressurization of all SGs has occurred
- RCS temperature is now 290 °F
- The crew is proceeding through FR-P.1, "Response to Imminent Pressurized Thermal Shock Condition", due to excessive cooldown.

Which ONE of the following statements describes the action(s) necessary for these conditions?

A. Initiate an RCS heat up at 25 °F per hour until RCS temperature is greater than the entry conditions for FR-P.1.

B. Realign ECCS to the RCS Hot Legs to minimize boron precipitation in the core.

C. Maintain current RCS pressure, until temperature has been stable for one hour to relieve Reactor Vessel thermal stresses.

D. Initiate boration and start a RCP to ensure adequate mixing.

Answer: C

Explanation/Justification:

A. This will relieve the stress; however the procedure directs the operator to maintain temperature.

B. This is a concern in E-1 when Boron precipitation would occur if there was a steam void in the core. In this condition we are well under saturation conditions

C. Correct Answer: per FR – P.1, 25.b.1&2 requires holding RCS temperature stable for one hour before cooling down or raising pressure.

D. Starting an RCP would create a pressure transient in the RCS; boration would help offset positive reactivity.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		000040 W/E12 EK2.1
	Importance		3.7

Technical References: FR-P.1 EOP background document
References to be provided: None
Learning Objective: EOP-C-001 Obj 4423

Question Source: (check one): ☒ New

☐ Bank: Facility: Question #:

Question # 013

Modified Question	☐	NRC Exam:	Facility:	Year:
Question Cognitive Level:	Memory or Fundamental Knowledge:	☐		
	Comprehension or Analysis:	☒		
10 CFR Part 55 Content:	55.41	☐		
	55.43	☒		

As given

Question # 014

Given the following conditions:

- Two Steam Generators have faulted inside containment
- Reactor Trip and Safety Injection have initiated
- All Reactor Coolant Pumps have been stopped due to a loss of Component Cooling Water.
- FR-P.1, "Response to Imminent Pressurized Thermal Shock Condition", has been entered due to an ORANGE condition on the Critical Safety Function Status Tree for Integrity

Which ONE of the following describes why using a pressurizer PORV to depressurize the RCS is preferred over using Auxiliary Spray?

A. Prevent overfilling the pressurizer.

B. Minimize thermal shock to the spray nozzle.

C. Since letdown is not in service, Auxiliary Spray will be ineffective.

D. Auxiliary Spray will not work without at least one RCP in service.

Answer: B

Explanation/Justification:

A. Incorrect. Using a PORV will actually cause PZR level to rise.

B. Correct. Pressurizer level is low enough to cause automatic isolation of charging and letdown. Therefore aux spray would thermally shock the nozzle.

C. Incorrect. Letdown is only required to minimize the temperature differential between charging and the Pressurizer steam space.

D. Incorrect. A Reactor Coolant Pump needs to be in service for normal spray, not auxiliary spray.

Exam Outline Cross Reference:	Level	<u>RO</u>	<u>SRO</u>
	Tier #		1
	Group #		1
	K/A #		W/E08.EK3.2
	Importance		4.0

Technical References: FR-P.1, Response to Imminent Pressurized Thermal Shock Condition Background Information

References to be provided: None

Learning Objective: Enabling Objective 3557

Question Source: (check one):	☒	New		
	☐	Bank:	Facility:	Question #:
	☐	NRC Exam:	Facility:	Year:

Question Cognitive Level: Memory or Fundamental Knowledge: ☐

Question # 014

Comprehension or Analysis: ☒

10 CFR Part 55 Content: 55.41 ☒

55.43 ☐

Question # 015

Given the following conditions:

- Condenser vacuum is currently at 27 inches Hg.
- A leak develops causing condenser vacuum to decrease at a rate of 2 inches Hg / min.

Assuming no operator action, how long will condenser vacuum continue to decrease before an automatic turbine trip occurs?

A. 1 minute.

B. 4 minutes.

C. 5 minutes.

D. 6 minutes.

Answer: B

Explanation/Justification:

A. Incorrect. Condenser vacuum must decrease to 19" Hg. to initiate an automatic trip.

B. Correct. Condenser vacuum must decrease to 19" Hg. to initiate an automatic trip.

C. Incorrect. Condenser vacuum must decrease to 19" Hg. to initiate an automatic trip.

D. Incorrect. Condenser vacuum must decrease to 19" Hg. to initiate an automatic trip.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		000051.AA2.02
	Importance		4.1

Technical References: AOI-20.1
References to be provided: None
Learning Objective: Enabling Objective 4155

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 016

Given the following conditions:

- A loss of all AC power has occurred
- ECA-0.0, "Loss of All AC Power" is in progress

Which ONE of the following ensures that sufficient heat transfer capability exists to remove heat from the RCS via natural circulation after the RCS reaches saturation?

A. Maintaining the Low Pressure Steam Dump system available.

B. Maintaining at least one Main Boiler Feed Pump available.

C. Maintaining at least one SG narrow range level greater than 9%.

D. Maintaining at least one steam generator wide range level greater than 9%.

Answer: C

Explanation/Justification:

A. Incorrect. Condenser steam dumps not available during a blackout.

B. Incorrect. Main Steam Isolation Valves are required to be closed by ECA-0.0.

C. Correct. Maintaining SG narrow range levels above 9% ensures that the SG U-Tube remain covered thus ensuring an adequate heat sink exists.

D. Incorrect. Adequate heat sink is based on SG narrow range level.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		000055.EA2.02
	Importance		4.6

Technical References: ECA-0.0 Loss of All AC Power Background Information
References to be provided: None
Learning Objective: Enabling Objective 3554

Question Source: (check one):
☒ New
☐ Bank: Facility: Question #:
☐ NRC Exam: Facility: Year:

Question Cognitive Level:
Memory or Fundamental Knowledge: ☒
Comprehension or Analysis: ☐

10 CFR Part 55 Content:
55.41 ☒
55.43 ☐

Question # 017

Given the following conditions:

- Unit 2 is operating at 100% power
- VCT level controls are aligned for automatic makeup
- Power has just been lost to Instrument Bus 21

Assuming no operator action, which ONE of the following describes the operation of CVCS approximately two minutes after the loss of Instrument Bus 21?

A. The charging pumps will be taking a suction on the RWST.

B. LCV-112A, Divert Normal VCT Inlet Valve, will be in the Divert position.

C. VOLUME CONTROL TANK HIGH PRESS (SFF 2-2) will be in alarm.

D. The CVCS Makeup System will be making up to the charging pump suction.

Answer: D

Explanation/Justification:

A. Incorrect. Charging pump suction has swapped to the RWST, but makeup flow will keep the check valve closed.

B. Incorrect. Level fails LOW, so the valve remains in the VCT position.

C. Incorrect. Pressure transmitter feeding the alarm fails low.

D. Correct. Auto makeup initiates on LOW VCT level, if in AUTO and in START.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		000057.AA1.06
	Importance		3.5

Technical References: AOI-3.1
References to be provided: None
Learning Objective: Enabling Objective 86.

Question Source: (check one):

- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:

- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:

- 55.41 ☒
- 55.43 ☐

Question # 018

Given the following conditions:

- Unit 2 is operating at 100% power
- A high radiation alarm occurs on SG Blowdown Radiation monitor R-49

Which ONE of the following sets of valves will automatically close?

A. SG Blowdown Sample Valves and Blowdown Tank Inlet Valves only.

B. SG Blowdown Isolation and Blowdown Sample Valves only.

C. SG Blowdown Isolation and Blowdown Tank Inlet Valves only.

D. SG Blowdown Isolation, Blowdown Sample, and Blowdown Tank Inlet Valves.

Answer: D

Explanation/Justification:

A. Incorrect. Automatically closes BD Isolation, BD Sample, and BD Tank Inlet valves.

B. Incorrect. Automatically closes BD Isolation, BD Sample, and BD Tank Inlet valves.

C. Incorrect. Automatically closes BD Isolation, BD Sample, and BD Tank Inlet valves.

D. Correct. Automatically closes BD Isolation, BD Sample, and BD Tank Inlet valves.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		000059.AA1.01
	Importance		3.5

Technical References: ARP SAF-1
References to be provided: None
Learning Objective: Enabling Objective 2645

Question Source: (check one):
- [x] New
- [ ] Bank: Facility: Question #:
- [ ] NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: [x]
- Comprehension or Analysis: [ ]

10 CFR Part 55 Content:
- 55.41 [x]
- 55.43 [ ]

 As given

Question # 019

Given the following conditions:

- The Service Water Pump Mode Selector Switch is in the "1, 2, 3" position
- A reactor trip and Safety Injection have occurred from 100% power
- Subsequently, Bus 2A de-energized on a bus fault

How will the Service Water Pumps respond to these conditions?

A.
- 21 SWP – starts on Bus 5A
- 22 SWP – starts on Bus 12RW3
- 23 SWP – off

B.
- 21 SWP – starts on Bus 5A
- 22 SWP – starts on Bus 3A
- 23 SWP – starts on Bus 6A

C.
- 21 SWP – starts on Bus 5A
- 22 SWP – off
- 23 SWP – starts on Bus 6A

D.
- 21 SWP – starts on Bus 12RW3
- 22 SWP – starts on Bus 3A
- 23 SWP – starts on Bus 6A

Answer: B

Explanation/Justification:

A. 21 SWP is always on Bus 5A, 22 SWP is normally on Bus 2A / with 3A as automatic backup, 23 is normally on Bus 6A / with 12RW3 as a manually aligned backup.

B. 21 SWP is always on Bus 5A, 22 SWP is normally on Bus 2A / with 3A as automatic backup, 23 is normally on Bus 6A / with 12RW3 as a manually aligned backup.

C. 21 SWP is always on Bus 5A, 22 SWP is normally on Bus 2A / with 3A as automatic backup, 23 is normally on Bus 6A / with 12RW3 as a manually aligned backup.

D. 21 SWP is always on Bus 5A, 22 SWP is normally on Bus 2A / with 3A as automatic backup, 23 is normally on Bus 6A / with 12RW3 as a manually aligned backup.

Exam Outline Cross Reference:	Level	RO	SRO

Question # 019

	Tier #			1	
	Group #			1	
	K/A #			062.AK3.02	
	Importance			3.9	
Technical References:	FSAR section 9.6.1.2; SD # 24				
References to be provided:	None				
Learning Objective:	LP SYS	C	240	Objective 391	Objective 392

Question Source: (check one):

- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:

- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:

- 55.41 ☒
- 55.43 ☐

Question # 020

Given the following conditions:

- The plant is operating at 100% power
- 21 MAIN XFMR FIRE (SOF 1-3) has actuated
- Smoke is reported coming off the 21 Main Transformer
- The deluge system has not activated

Why did the deluge system NOT actuate?

A. Deluge activation will not automatically actuate on the main transformer until the transformer is actually on fire.

B. Deluge activation will not automatically actuate on the main transformer until the main generator is tripped and output voltage disappears.

C. Deluge activation will not automatically actuate on the main transformer until main transformer temperature exceeds 250 °F.

D. Deluge activation on the main transformer can only occur by manual actuation.

Answer: B.

Explanation/Justification:

A. Temperature > 200 °F w/ no gen. voltage

B. Correct Answer; EO 3.5.2 / AOI 29.6, pg. 1, note 1.

C. Activation is not dependent temperature.

D. Deluge will activate automatically.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		000067 AA2.03
	Importance		3.5

Technical References: AOI 29.6, pg. 1, note 1, EO 3.5.2
References to be provided: None
Learning Objective: LP SYS-C-296 Objective 487

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:
- 55.41 ☐
- 55.43 ☒

Question # 021

Given the following conditions:

- Operating crew has entered AOI-27.1.9, "Control Room Inaccessibility Safe Shutdown Control"
- The Safe Shutdown Control section of AOI-27.1.9, directs the operator to open 288, RWST Manual Inlet Stop

What is the reason for opening manual valve 288?

A. The procedure assumes the operator is unable to open LCV-112B, Emergency RWST Makeup Stop.

B. A fire in the cable spreading room could have faulted the Control Rod position indicators giving a false indication that all rods are inserted.

C. Ensures an adequate supply of makeup water for the RCS cooldown.

D. Ensure adequate shutdown margin is maintained.

Answer: D.

Explanation/Justification:

A. Not correct; the procedure does not direct the operator to take any actions with LCV-112B, either with or without a fire.

B. Not Correct: Not just Cable Spreading room Dependent.

C. Not Correct: procedure only takes the plant to hot shutdown conditions, no cooldown is performed.

D. Correct Answer: Ensures Shut Down Margin is not lost.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		000068.AK3.13
	Importance		3.9

Technical References: AOI 27.1.9 Rev 30 step 5.1.5 and 7.2.1(1)(a)
References to be provided: None
Learning Objective: LP SYS-C-030 Objective 79.2.b

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 022

Given the following conditions:

- The plant is operating at 100% power
- A routine surveillance test of Containment Isolation Phase A is in progress
- One of the automatic isolation valves that receives a close signal did not close

Using Technical Specification 3.6.A, determine the actions must be taken to allow for continued plant operation.

A. Corrective action shall be taken within four hours or be at cold shutdown within the next 36 hours utilizing normal operating procedures.

B. Normal operation may continue as long as all other automatic valves associated with affected flow path responds correctly to the Phase A signal.

C. Correct the problem within six hours or be at cold shutdown within the next 30 hours utilizing normal operating procedures.

D. Normal operation may continue, if the affected flow path can be isolated by a manual valve or flange that meets the design criteria for an isolation valve within six hours.

Answer: A

Explanation/Justification:

A Correct .Answer: TS requires the problem to be corrected within 4 hours or in cold shutdown within the next 36 hours.

B. Not Correct. TS requires the problem to be corrected within 4 hours or in cold shutdown within the next 36 hours.

C. Not Correct. TS requires the problem to be corrected within 4 hours or in cold shutdown within the next 36 hours.

D. Not Correct. TS requires the installation of the blank flange within 4 hours

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		000069.W/E AA1.03
	Importance		3.0

Technical References: Technical Specification 3.6.A.
References to be provided: Technical Specification 3.6.A, with bases deleted.
Learning Objective: LP EOP Objective 4423

Question Source: (check one): ☒ New

☐ Bank: Facility: Question #:

Question # 022

	☐ NRC Exam:	Facility:		Year:
Question Cognitive Level:	Memory or Fundamental Knowledge:		☐	
	Comprehension or Analysis:		☒	
10 CFR Part 55 Content:	55.41 ☐			
	55.43 ☒			

Question # 023

Which ONE of the following allows starting a RCP in the absence of normal support conditions?

A. FR-H.1, "Loss of Secondary Heat Sink".

B. FR-I.3, "Voids in Reactor Vessel".

C. FR-C.1, "Inadequate Core Cooling".

D. E-3, "Steam Generator Tube Rupture".

Answer: C

Explanation/Justification:

A. Incorrect. Starting a RCP is only started in FR-C.1.

B. Incorrect. Starting a RCP is only started in FR-C.1.

C. Correct. In FR-C.1 the RCPs are started regardless of whether support conditions can be establshed.

D. Incorrect. Starting a RCP is only started in FR-C.1.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		000074.EK2.01
	Importance		3.8

Technical References: FR-C.1, Inadequate Core Cooling
References to be provided: None
Learning Objective: LP EOP Objective 4424

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☐
- 55.43 ☒

Question # 024

The Unit is operating at 100% power with steady state conditions. At 0600 hours on 07/05/2001, Chemistry reports the following RCS Activity Levels for the past 3 hours:

- 0400 - 75 μCi/cc
- 0500 - 105 μCi/cc
- 0600 - 121 μCi/cc

Given: $\bar{E}$ = .51(Mev/Dis)

Which ONE of the following action(s) is required based on the chemistry reports?

A. Be in at least HOT SHUTDOWN with Tave less than 500°F by 1100 on 07/05/2001.

B. Restore the RCS Activity level within limits by 0500 on 07/07/2001, or be in HOT SHUTDOWN by 1100 on 07/07/2001.

C. Be in at least HOT SHUTDOWN with Tave less than 500°F by 1300 on 07/05/2001.

D. Restore the RCS Activity level within limits by 0600 on 07/07/2001, or be in HOT SHUTDOWN by 1200 on 07/07/2001.

Answer: C

Explanation/Justification: With Reactor Power at 100% and exceeding the limits of T.S.3.1.D.1 at 0600, the Unit should be shutdown and placed in Hot Standby within 7 hours per TS 3.0.1.

A. Wrong time

B. Wrong time and doesn't address TAVE

C. Correct Answer: 60/E bar = 117 μCi/cc; TS limit exceeded by 0600, should be in Hot shut down below 500°F within the next seven hours, i.e.,= 1300 hours.

D. Wrong time and doesn't address TAVE

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		1
	K/A #		076.Gen.2.1.12
	Importance		4.0

Technical References: T.S.3.1.D.1, TS 3.0.1
References to be provided: None
Learning Objective: LP EOP 33

Question Source: (check one): ☒ New

☐ Bank: Facility: Question #:

Question # 024

	☐ NRC Exam:	Facility:	Year:
Question Cognitive Level:	Memory or Fundamental Knowledge:	☐	
	Comprehension or Analysis:	☒	
10 CFR Part 55 Content:	55.41 ☐		
	55.43 ☒		

Question # 025

Given the following conditions:

- The plant is at 20% power
- A plant shutdown is in progress
- One Intermediate Range channel is failed high

What effect will this have on the shutdown if no action is taken for the failed channel?

A. The plant will trip when Power Range indications decrease below 10%.

B. The plant will have to be manually tripped from the Intermediate Range due to unavailability of Source Range instrumentation.

C. Source Range instrumentation will have to be manually energized.

D. Rods must remain above the zero power Rod Insertion Limit until hot xenon-free shutdown boron concentration is attained.

Answer: A.

Explanation/Justification:

A. Correct Answer Dropping below the P-10 setpoint will remove the IR High Neutron Flux Reactor Trip Block function and the reactor will trip due to having 1 of 2 channels high.

B. Incorrect. Dropping below the P-10 setpoint will remove the IR High Neutron Flux Reactor Trip function and the reactor will trip due to having 1 of 2 channels high. The candidate does not understand the operation of the nuclear instrumentation system.

C. Incorrect. Dropping below the P-10 setpoint will remove the IR High Neutron Flux Reactor Trip function and the reactor will trip due to having 1 of 2 channels high.

D. Incorrect. This is testing the candidate's knowledge of procedures and Technical Specifications.

Exam Outline Cross Reference:	Level	<u>RO</u>	<u>SRO</u>
	Tier #		1
	Group #		2
	K/A #		000033.AK2.02
	Importance		2.6

Technical References: Figure 7.2-5 Nuclear Instrumentation Trip
References to be provided: None
Learning Objective: LP SYS-C-130 Objective 3961

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 026

Given the following conditions:

- The unit was operating at 100% power
- A malfunction has caused a Pressurizer Safety Valve to open and stick open
- A Reactor Trip and Safety Injection occurred
- The RCS rapidly depressurized to saturation conditions
- Pressurizer level initially dropped and then began to increase rapidly

What is the relationship between pressurizer level and RCS inventory under these conditions?

A. Level is not an accurate indication of inventory, because the pressurizer level channels are calibrated for normal operating temperature and pressure.

B. Level is not an accurate indication of inventory, because RCS voiding may result in a rapidly increasing pressurizer level.

C. Level is an accurate indication of inventory, because hydraulic pressure would force any voids into the pressurizer steam space and out the safety valve.

D. Level is an accurate indication of inventory, because voiding would occur in the pressurizer prior to reaching saturation conditions in the RCS.

Answer: B.

Explanation/Justification:

A. Voiding in the core is the overriding concern.

B. Correct answer: Pressurizer level may not be a true indication of RCS inventory if RCS sub-cooling does not exist and a steam vent path is established from the PZR vapor space.

C. Concern is a formation of a void in the vessel head. The RCS has been brought to saturation conditions; therefore the hot areas of the RCS could form a steam bubble.

D. Pressurizer is by definition, at saturation conditions at all times. However, the circumstances described indicate a rapid depressurization to saturation in the RCS resulting in the formation of voids.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #		000008.AK2.01
	Importance		2.7

Technical References: EOP Background Document
References to be provided: None
Learning Objective: SYS-C-014 Obj 55

Question # 026

Question Source: (check one):	☒	New		
	☐	Bank:	Facility:	Question #:
	☐	NRC Exam:	Facility:	Year:
Question Cognitive Level:	Memory or Fundamental Knowledge:	☐		
	Comprehension or Analysis:	☒		
10 CFR Part 55 Content:	55.41	☒		
	55.43	☐		

Question # 027

Given the following conditions:

- The RO reports an increase in charging flow from the previous hour
- Indicated charging header flow rate is 65 gpm
- Indicated Letdown flow rate is 87 gpm
- Seal Injection is 8 gpm to each Reactor Coolant Pump
- Seal Return flow is 1.5 gpm from each RCP
- Steam Generator leakage is as follows (no SG tubes are plugged):
  - 21 SG - none detected
  - 22 SG - 60 gallons per day
  - 23 SG - 75 gallons per day
  - 24 SG - none detected
- The Reactor Operator reports an increase in containment humidity

Using Technical Specification 3.1.F.2, determine how soon the reactor must be placed in cold shutdown?

A. 24 hours.

B. 30 hours.

C. 37 hours.

D. 40 hours.

Answer: A

Explanation/Justification:

A. Correct. Leakage is from 2 or more SG's.

B. Incorrect. This is not applicable for any leakage situation, but could be arrived at mistakenly if the TS 's are read to quickly.

C. Incorrect. This applies for any situation which falls under the provisions of 3.0.1.

D. Incorrect. This applies for Identified or Unidentified Leakage situations.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #		000009.EA2.33
	Importance		3.8

Technical References: T/S 3.1.F.2

References to be provided: T/S 3.1.F.2, with bases deleted.

Learning Objective: SYS-C-013 Objective 12

Question Source: (check one): ☒ New

☐ Bank: Facility: Question #:

Question # 027

	☐ NRC Exam: Facility:		Year:
Question Cognitive Level:	Memory or Fundamental Knowledge:	☐	
	Comprehension or Analysis:	☒	
10 CFR Part 55 Content:	55.41 ☐		
	55.43 ☒		

As given

Question # 028

Given the following conditions:

- The crew is responding to a large break LOCA
- A CORE COOLING status tree ORANGE path causes a transition to FR-C.2, "Response to Degraded Core Cooling"
- During performance of FR-C.2, the CORE COOLING status tree changes from ORANGE to YELLOW
- An ORANGE path exists on the CONTAINMENT status tree
- FR-Z.1, "Response to High Containment Pressure", is the procedure referenced by the CONTAINMENT status tree

Which ONE of the following describes the required action(s)?

A. Complete FR-C.2 and then go to FR-Z.1, because a functional restoration procedure must be completed unless preempted by a higher priority condition.

B. Go to FR-Z.1, because an ORANGE path has higher priority than a YELLOW path. Completion of FR-C.2 is not needed.

C. Go to FR-Z.1, then complete FR-C.2 because the CORE COOLING status tree had been in an ORANGE path.

D. Perform FR-C.2 and FR-Z.1 concurrently, because FR procedures of the same priority can be executed together.

Answer: A

Explanation/Justification:

A. Correct Answer: Step 4.11 of OAD 26 requires the completion of a FRP entered due to a RED or ORANGE condition unless that FRP is preempted by a higher priority condition.

B. Orange is higher priority than Yellow, but OAD 26 step 4.11 requires the completion of the current procedure.

C. FR-C.2 has higher priority than FR-Z.1 and needs to be completed first in accordance with OAD 26 step 4.11.

D. FR-C.2 is the higher priority and needs to be completed first in accordance with OAD 26 step 4.11.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #		W/E03.Gen. 2.4.6
	Importance		4.0

Technical References: OAD 26 EOP Users Guide
References to be provided: None
Learning Objective: EOP-001 Obj 4425

Question Source: (check one): ☒ New

Question # 028

☐ Bank:	Facility:		Question #:
☐ NRC Exam:	Facility:		Year:

Question Cognitive Level: Memory or Fundamental Knowledge: ☐

Comprehension or Analysis: ☒

10 CFR Part 55 Content: 55.41 ☐

55.43 ☒

 As given

Question # 029

Given the following conditions:

- A large break LOCA has occurred
- The crew has transitioned from E-0, "Reactor Trip Or Safety Injection", to E-1, "Loss of Reactor or Secondary Coolant"
- At E-1, step 20.a., it was noted that power to Recirculation and RHR pumps was not available
- The crew then transitioned to ECA-1.1, "Loss of Emergency Coolant Recirculation"
- At Step 9, "Establish One Train of SI System Flow", power is restored to the RHR pumps

What action needs to be taken next?

A. Continue in ECA-1.1, to Step 10.

B. Return to ECA-1.1, Step 1.

C. Go to E-1.3, "Transfer to Cold Leg Recirculation".

D. Return to E-1, Step 20.a.

Answer: D

Explanation/Justification:

A. Not Correct: Caution for step 1 directs the user to return to the procedure and step in affect prior to entering the ECA if emergency coolant recirculation capability is restored.

B. Not Correct: Caution for step 1 directs the user to return to the procedure and step in affect prior to entering the ECA if emergency coolant recirculation capability is restored.

C. Not Correct: Caution for step 1 directs the user to return to the procedure and step in affect prior to entering the ECA if emergency coolant recirculation capability is restored.

D. Correct Answer: Caution for step 1 directs the user to return to the procedure and step in affect prior to entering the ECA if emergency coolant recirculation capability is restored.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #		W/E11.EK1.3
	Importance		4.0

Technical References: ECA-1.1
References to be provided: None
Learning Objective: EOP-001 Obj 23

Question Source: (check one): ☒ New

☐ Bank: Facility: Question #:

As given

Question # 029

☐ NRC Exam: Facility: Year:

Question Cognitive Level: Memory or Fundamental Knowledge: ☐

Comprehension or Analysis: ☒

10 CFR Part 55 Content: 55.41 ☐

55.43 ☒

Question # 030

Given the following conditions:

- The plant is operating at 100% power
- All control systems, except Rod Control, are in automatic
- 22 Charging pump is running
- Charging and RCP seal injection flows are erratic
- 22 Charging pump has just tripped

Which ONE of the following reasons explains why AOI-3.1, "Chemical Volume Control System Malfunctions", directs the operators to properly vent the standby Charging Pump prior to starting?

A. Prevent gas binding of the Regenerative Heat Exchanger.

B. Prevent gas binding of the standby charging pump.

C. Prevent excessive starting current on the standby charging pump.

D. Prevent rupturing the standby charging pump pulsation dampener.

Answer: B

Explanation/Justification:

A. Incorrect. Regenerative Heat Exchanger is maintained at a high pressure and has a high flow which should prevent gas binding.

B. Correct. Gas in the pump would prevent the pump from functioning as designed (AOI 3.1 Caution 4.1.2)

C. Incorrect. Gas in the charging pump would actually minimize the starting current.

D. Incorrect. Misconception that a low charging flow would cause the letdown valves to close.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #		000022.AK3.02
	Importance		3.8

Technical References: AOI 3.1
References to be provided: None
Learning Objective: SYS-C-030 Objective 3567

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 031

Given the following conditions

- The plant is at Cold Shutdown and has been off-line 22 days
- One train of RHR is tagged out and one train is supplying RCS cooling
- RCS level is being maintained at the hot leg centerline
- The Steam Generator primary side manways are open in preparation for nozzle dam installation
- RCS Temperature is 140 °F
- Pressurizer Temperature is 160 °F
- Running RHR pump has tripped

Determine the MINIMUM estimated time for the RCS to reach 212 °F.
(graphs ACS-2C and ACS-2D provided)

A. 23.1 minutes.

B. 25.6 minutes.

C. 32.0 minutes.

D. 90.0 minutes.

Answer: C.

Explanation/Justification:

A. Not Correct. Right curve, but the wrong temperature (160°F).

B. Not Correct Right curve, but the wrong point on the curve.

C. Correct Answer: 22 days after shutdown the core heat up rate is 2.25 °F per minute per ACS-2C rev.7. Heating up from 140 °F to 212 °F is a change of 72 °F. Dividing 72 °F by 2.25 °F per minute yields 32 minutes.

D. This answer could be obtained if wrong curve is used.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #		000025.AK2.02
	Importance		3.2

Technical References: AOI 4.2.1, Curve ACS-2C
References to be provided: Curve ACS-2C and curve ASC-2D
Learning Objective: SYS-C-042 Obj 120

Question Source: (check one):	☒	New		
	☐	Bank:	Facility:	Question #:
Modified Question	☐	NRC Exam:	Facility:	Year:

Question # 031

Question Cognitive Level:	Memory or Fundamental Knowledge:	☐
	Comprehension or Analysis:	☒
10 CFR Part 55 Content:	55.41	☒
	55.43	☐

As given

Question # 032

Given the following conditions:

- The plant is at 100% power
- Pressurizer pressure is in AUTOMATIC control
- Pressurizer Pressure Defeat switch is in the "Defeat 3 & 4" position.

Assuming no operator action is taken, which ONE of the following will occur if Pressurizer Pressure Channel 1 fails LOW?

A. Pressurizer pressure decreases, resulting in a low pressure reactor trip.

B. Pressurizer pressure increases, resulting in a high pressure reactor trip.

C. Pressurizer pressure increases, resulting in the pressurizer PORV (PCV-456) cycling to maintain pressure below the reactor trip setpoint.

D. Pressurizer pressure remains unchanged, resulting in pressurizer heaters and spray valves maintaining normal pressurizer pressure.

Answer: C

Explanation/Justification:

A. Incorrect. Pressurizer pressure would decrease if the controlling channel had failed high.

B. Incorrect. PCV-456 will cycle to maintain RCS pressure below the trip setpoint.

C. Correct. The pressure inputs to PCV-456 and its block valve are unaffected by the failure or by the Defeat Switch position.

D. Incorrect. Pressurizer heaters energize, spray valves remain closed. With no operator action, the high pressure reactor trip is reached.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #		000027.AA1.01
	Importance		3.9

Technical References: AOI-28.6
References to be provided: None
Learning Objective: Enabling Objectives 53 and 56

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 033

Given the following conditions:

- Reactor startup is in progress
- Both Intermediate Ranges are reading 1.0 E-8 amps
- Start Up Rate is 0 decades per minute
- Control Bank D is at 62 steps
- All control systems, except Rod Control, are in automatic
- A reactor trip occurs
- Both Source Range channels fail to reenergize

Which ONE of the following describes how to validate the Reactor Trip?

A.
- Negative SUR
- Atmospheric Steam Dump valve position remains the same
- IR indication is decreasing

B.
- IR indication is decreasing
- Atmospheric Steam Dump valve position remains the same
- Charging pump speed increasing

C.
- Negative SUR
- Atmospheric Steam Dump valve position closes
- IR indication is decreasing

D.
- Negative SUR
- Atmospheric Steam Dump valve position closes
- Charging pump speed increasing

Answer: A.

Explanation/Justification:

A. IR SUR will be negative, SD will be unaffected (below the POAH), NFIR level will decrease

B. NFIR level will decrease, SD will be unaffected (below the POAH), PZR level is unaffected (below the POAH)

C. IR SUR will be negative, SD will be unaffected (below the POAH), NFIR level will decrease

D. IR SUR will be negative, SD will be unaffected (below the POAH), PZR level is unaffected (below the POAH)

Question # 033

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #		000032.AA2.06
	Importance		4.1

Technical References: T/S 3.5 table 3.5-2, line 4.
References to be provided: None
Learning Objective: 2899

Question Source: (check one): ☒ New

☐ Bank: Facility: Question #:

Modified Question ☐ NRC Exam: Facility: Year:

Question Cognitive Level: Memory or Fundamental Knowledge: ☐

Comprehension or Analysis: ☒

10 CFR Part 55 Content: 55.41 ☐

55.43 ☒

As given

Question # 034

Given the following conditions:

- The plant was operating at 100% power
- A 220 gpd SG tube leak has developed on 21 SG
- The control room crew has entered AOI-1.2, "Steam Generator Tube Leak"
- A controlled shutdown has been performed
- The control room crew is performing AOI-1.2, Attachment 6, "Cooldown Using Backfill"
- Step 5 of this attachment directs the crew to "Check Affected SG Narrow Range Level - Greater than 8%"

What is the basis for maintaining the affected SG Narrow Range Level greater than 8%?

A. Ensure adequate inventory for secondary side heat sink.

B. Cover the U-tubes to avoid a rapid depressurization of the SG.

C. Avoid potential pressurizer overfill in subsequent backfill steps.

D. Avoid inadvertent automatic starting of the AFW pumps.

Answer: B.

Explanation/Justification:

A. Incorrect, heat sink is insured by 8% NR level in the intact SGs

B. Correct Answer:ES-3.1 step 5

C. Incorrect, SG narrow range level will not impact the potential for PRZR overfill

D. Incorrect, AFW pumps will already be automatically started at 8% NR level.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #		000037.AK3.07
	Importance		4.4

Technical References: WOG background document for ES-3.1 step 5
References to be provided: None
Learning Objective: SYS-C-012 Obj 23

Question Source: (check one):	☒ New			
	☐ Bank:	Facility:	Question #:	
	☐ NRC Exam:	Facility:	Year:	

Question Cognitive Level: Memory or Fundamental Knowledge: ☒

Question # 034

	Comprehension or Analysis:	☐
10 CFR Part 55 Content:	55.41	☒
	55.43	☐

Question # 035

Which ONE of the following is a concern during a SGTR with natural circulation that is NOT a concern during a SGTR with forced flow?

A. Pressurized Thermal Shock to the RCS.

B. Minimal cooling flow to the Reactor Vessel head.

C. Overfill of the Pressurizer due to backfill from the SG.

D. Overfill of the ruptured SG due to differential pressure between the RCS and the SG.

Answer: B.

Explanation/Justification:

A. Not Correct; Pressurized Thermal Shock is a concern during a SGTR with forced circulation.

B. Correct Answer; Forced flow ensures adequate flow to the reactor vessel head, so this is only a concern during natural circulation.

C. Not Correct. It is possible to overfill the PZR during either natural circulation or forced flow SGTR.

D. Not Correct. It is possible to overfill the ruptured SG during either natural circulation or forced flow SGTR.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #		000038.EK1.04
	Importance		3.3

Technical References: E-3, Steam Generator Tube Rupture, EOP Background Document
References to be provided: None
Learning Objective: SYS-C-012 Obj 29

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 036

Given the following conditions:

- The Reactor has tripped from 100% power
- The BOP operator reports that all AFW pumps failed to start
- Actions of E-0, "Reactor Trip or Safety Injection" are complete
- Entered FR-H.1, "Response To Loss Of Secondary Heat Sink"

Which ONE of the following is an alternate feed source according to FR-H.1?

A. A Fire Pump connected to City Water.

B. A Heater Drain Tank Pump through the feedwater header.

C. A Service Water Pump aligned to the AFW piping.

D. A Condensate Pump supplied from the Condenser Hotwell.

Answer: D

Explanation/Justification:

A. Not Correct: there is no physical connection for supplying city water to the generator, nor is it desired..

B. Not Correct Cannot take a suction on the condenser or the Condensate Storage Tank.

C. Not Correct: There is no physical connection for supplying SW (river water) to the generator, nor is it desired.

D. Correct Answer: FR – H.1 step 12

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #		000054.AA1.01
	Importance		4.4

Technical References: FR – H.1 step 12
References to be provided: None
Learning Objective: SYS-C-200 Obj 364

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 037

Given the following conditions:

- The reactor has tripped from 100% power
- 21 AFW pump is out of service for maintenance
- 22 AFW pump has tripped on overspeed
- Level is at 30% WR in all SGs
- Pressurizer level is 17% - STABLE
- AC 480V Bus 6A Normal Supply Breaker 52/6A opened on a bus overcurrent
- ES-0.1, "Reactor Trip Response" has been entered

What action is required?

A. Go to FR-I.2, "Response to Low Pressurizer Level".

B. Remain in ES-0.1, "Reactor Trip Response".

C. Go to FR-H.1, "Response to Loss of Secondary Heat Sink".

D. Enter ES-0.0, "Re-Diagnosis".

Answer: C

Explanation/Justification:

A. FR-1.2 is a valid procedure; however, it is a lower priority than the actions for loss of secondary heat sink

B. Monitoring of critical safety functions are in effect and the operator should recognize loss of secondary heat sink conditions are present.

C. Operator should recognize that loss of all AFW is a loss of secondary heat sink condition

D. Operator does not recognize the loss of secondary heat sink conditions have occurred.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #		W/E05.EA2.1
	Importance		4.4

Technical References: Critical Safety Function Status Tree, ES-0.1
References to be provided: None
Learning Objective: EOP-001 Obj 33

Question Source: (check one):

- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level: Memory or Fundamental Knowledge: ☐

Question # 037

Comprehension or Analysis: ☒

10 CFR Part 55 Content: 55.41 ☐

55.43 ☒

Question # 038

Given the following conditions:

- The plant is at 100% power
- 23 Large Gas Decay Tank is aligned for in-service and re-use
- 24 Large Gas Decay Tank is in standby
- 22 Large Gas Decay Tank is isolated with a pressure of 90 psig and a content of 5000 Curies
- All remaining Gas Decay Tanks are inerted with nitrogen
- 22 Large Gas Decay Tank relief valve (1622) has failed open

What is the expected plant response?

A. High radiation level alarm on R-50, Waste Gas Decay Tank Monitor.

B. High radiation level alarm on R-44, Plant Vent Air Monitor.

C. PAB Exhaust Fans 21 and 22 start and/or shift to high speed.

D. PAB Exhaust Fans 21 and 22, and PAB Supply Fan stops.

Answer: B

Explanation/Justification: RCV-014 is in the discharge line from the gas decay tank room to the Plant Vent and receives a close signal from R-44 when it alarms on Hi Radiation. This is to isolate the Gas Decay tank room from the plant vent

A. Incorrect Answer: R-50 is upstream of RCV-014 and the WGDT relief valve discharges downstream of RCV-014. Therefore, R-50 will not alarm when the relief valve opens.

B. Correct: R-44 will alarm due to the release of the 22 Large Gas Decay Tank out the PAB ventilation exhaust.

C. Incorrect: PAB Exhaust Fans do not have any automatic functions.

D. Incorrect: PAB Exhaust and Supply Fans do not have any automatic functions.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #		000060.AK2.02
	Importance		3.1

Technical References: SOP 5.1.5
References to be provided: None
Learning Objective: SYS-C-052 Obj 3698 & 3699

Question Source: (check one):

- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level: Memory or Fundamental Knowledge: ☐

Question # 038

Comprehension or Analysis: ☒

10 CFR Part 55 Content: 55.41 ☒

55.43 ☐

Question # 039

E-0, "Reactor Trip or Safety Injection", directs the operator to close PCV-1228, Instrument Air Isolation to Containment, if Instrument Air header pressure cannot be stabilized.

What is the reason for closing PCV-1228 if Instrument Air header pressure cannot be stabilized?

A. Allow swap-over to Unit 2 Station Air for restoration of Instrument Air to air operated valve control inside Containment.

B. Prevent an air leak inside Containment from pressurizing Containment.

C. Prevent an Instrument Air fault outside Containment from affecting components inside Containment.

D. Allow control of the PORVs from nitrogen accumulators.

Answer: B.

Explanation/Justification:

A. Back-up supply to Instrument Air affects the entire system. Isolating the containment for swap over indicates the candidate does not understand the system interrelationship.

B. Correct Answer: Unstable Instrument Air header pressure is considered an indication of an instrument air leak inside containment (EOP background document for E-0).

C. Instrument Air breaks outside Containment can be isolated (less restrictive environment). Isolating air to containment will not make the instrument air header inside the containment more stable.

D. PORV accumulators are a reliable source for operation; however, it would place the plant into a more limited condition (capacity of the PORV accumulators).

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #		000065.AK3.08
	Importance		3.9

Technical References: EOP Background Document for E-0
References to be provided: None
Learning Objective: SYS-C-106 Obj 196

Question Source: (check one): ☒ New

☐ Bank: Facility: Question #:

Modified Question. ☐ NRC Exam: Facility: Year:

Question Cognitive Level: Memory or Fundamental Knowledge: ☐

Comprehension or Analysis: ☒

10 CFR Part 55 Content: 55.41 ☒

55.43 ☐

Question # 040

Given the following conditions:

- The reactor has tripped from 100% power
- Safety Injection has actuated
- RCS pressure is 1200 psig - DECREASING
- Containment pressure is 15 psig - DECREASING
- Peak containment pressure was 18 psig
- Intermediate Range SUR is approximately - 0.3 decade per minute
- RCS temperature is 400°F - SLOWLY DECREASING
- RCS Subcooling is 168°F - INCREASING
- The operating crew has entered E-1, "Loss of Reactor or Secondary Coolant"
- HIGH RANGE CONTAINMENT MONITORING RE-25 (AS-1, 1-1) has actuated

Which ONE of the following Functional Restoration Procedures would be appropriate for these conditions?

A. FR-P.2, "Response to Anticipated Pressurized Thermal Shock".

B. FR-S.2, "Response to Loss of Core Shutdown".

C. FR-Z.3, "Response to High Containment Radiation Level".

D. FR-C.2, "Response to Degraded Core Cooling".

Answer: C

Explanation/Justification:

A. RCS conditions do not meet the conditions for PTS.

B. Entry for FR-S.2 is Int. Range SUR less negative than 0.2 dpm.

C. R-25 High Alarm is at 3 R/Hr which is the condition for entering FR-Z.3

D. RCS subcooling conditions would indicate adequate core cooling exists and temperature is no where near the entry conditions for FR-C.2.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		2
	K/A #		W/E16.Gen. 2.4.4
	Importance		4.3

Technical References: Critical Safety Function Status Tree F-0.5
References to be provided: None

Question # 040

Learning Objective:	EOP-001 Obj 4425			
Question Source: (check one):	☒ New			
	☐ Bank:	Facility:		Question #:
	☐ NRC Exam:	Facility:		Year:
Question Cognitive Level:	Memory or Fundamental Knowledge:	☐		
	Comprehension or Analysis:	☒		
10 CFR Part 55 Content:	55.41	☐		
	55.43	☒		

Question # 041

Given the following:

- Unit 2 is in a refueling shutdown
- As the Refueling SRO you are on the refueling bridge in containment directing fuel movement operations
- The spent fuel assembly in the mast has just been pulled from the core
- SPENT FUEL PIT LEVEL 6" (SGF 2-2) has actuated
- The control room operator informs you that the alarm has been verified as a low level in the Spent Fuel Pit

What is the proper location for storing the assembly currently in the mast?

A. Leave it in the mast.

B. Place it in the containment upender, in the vertical position.

C. Place it in the Rod Control Cluster Assembly Change Fixture.

D. Place it in any accessible core location.

Answer: D

Explanation/Justification:

A. Incorrect. The assembly may become uncovered if left in the mast.

B. Incorrect. AOI-17.0.5 required that the assembly be place in an appropriate storage location. In this condition the core is the most appropriate storage location.

C. Incorrect. The RCCA change fixture is not an acceptable storage location as the assembly may become uncovered.

D. Correct. Since the assembly was just removed from the core, placing the assembly back in the core is the most appropriate storage location.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		3
	K/A #		000036.AA1.04
	Importance		3.7

Technical References: AOI-17.0.5
References to be provided: None
Learning Objective: Enabling Objective 319

Question Source: (check one):
☒ New
☐ Bank: Facility: Question #:
☐ NRC Exam: Facility: Year:

Question Cognitive Level:
Memory or Fundamental Knowledge: ☐
Comprehension or Analysis: ☒

Question # 041

10 CFR Part 55 Content:	55.41	☒
	55.43	☐

As given

Question # 042

ECA-0.0, “Loss of All AC Power”, step 17, directs the operator to depressurize intact SGs to 210 psig.

What is the basis for depressurizing the SGs at this point in ECA-0.0?

A. To minimize RCS inventory loss.

B. To conserve secondary inventory sources.

C. To minimize SG stresses.

D. To minimize containment heating.

Answer: A

Explanation/Justification:

A. Correct. Minimizes leakage through the Reactor Coolant Pump seals. This minimizes the RCS inventory loss allowing more time to restore power, thereby extending the time before core uncovery.

B. Incorrect. Conservation of secondary inventory is not a major concern.

C. Incorrect. SG stresses are not a major concern.

D. Incorrect. Containment heating is not a major concern.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		3
	K/A #		000056.AK3.02
	Importance		4.7

Technical References: ECA-0.0 Loss of All AC Power Background Information
References to be provided: None
Learning Objective: Enabling Objective 3554

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 043

Given the following conditions:

- A reactor trip and SI have occurred as a result of a large break LOCA
- ES -1.3, "Transfer to Cold Leg Recirculation", has just been completed
- The Watch Engineer reports the following conditions associated with the Containment Critical Safety Function:
  - Containment pressure is 2.0 psig – STABLE
  - Containment sump level is 54 feet – STABLE
  - Containment radiation is 1400 R/hr – STABLE

Which ONE of the following presents a severe challenge under these conditions?

A. Containment structural integrity.

B. Erroneous instrumentation readings.

C. Inadequate suction to the RHR pumps.

D. Flooding vital equipment in containment.

Answer: D

Explanation/Justification:

A. No structural concern at 2 psig. Design basis accident pressure is 47 psig

B. Environmentally qualified instruments wouldn't be affected.

C. With higher water level in containment RHR suction head increases.

D. At this sump level vital equipment could be submerged.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		1
	Group #		3
	K/A #		W/E15.EA2.2
	Importance		3.3

Technical References: FR–Z.2, step 1.
References to be provided: None
Learning Objective: EO 593

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 044

Given the following conditions:

- Reactor power is 80%
- Rod control is in AUTO
- A dilution is being performed to reduce RCS boron concentration by 11 ppm
- Tave is equal toTref
- Control Bank D is at 220 steps
- RCS Boron concentration is 1125 ppm

After the dilution is complete and Tave is again equal to Tref, what will be the height of Control Bank D? (Graphs RV-3 and RV-7 provided) and RV-1

A. 180 steps.

B. 190 steps.

C. 200 steps.

D. 210 steps.

deleted

Answer: B

Explanation/Justification:

A. Incorrect, if candidate makes a math error, could arrive at 180 steps

B. Correct, 11ppm x 8.37 pcm/ppm=92 pcm, from graph RV-7 190 steps

C. Incorrect. If candidate thinks dilution will raise power, then this choice would be made

D. Incorrect, using same math as B above but candidate thinks rods should move out.i

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		001.A3.07
	Importance		3.7

Technical References: Graph RV-3, RV-7, and applied fundamentals.
References to be provided: Graph RV-3, RV-7
Learning Objective: EO 7184

Question Source: (check one):

- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:

- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

Question # 044

10 CFR Part 55 Content: 55.41 ☒

55.43 ☐

deleted

Question # 045

What is the reason for closing the RCP Seal Water Supply Needle Valves (241A, 241B, 241C, and 241D) on loss of charging and seal injection flow?

A. Prevent thermal shock to the RCP seal package when seal injection flow is restored.

B. Prevent water hammer damage to the RCP seal injection filters when seal injection flow is restored.

C. Prevent backflow through the seal injection filters before seal injection flow is restored.

D. Prevent water hammer damage to the RCP seal package when seal injection flow is restored.

Answer: A

Explanation/Justification:

A. AOI 3.1 cautions the user to restore seal injection flow slowly to prevent rapid temperature changes to the seals.

B. Restoration of flow to the seal injection filters will not exceed the design of the filters.

C. Check valves in each RCP seal injection line prevents backflow through the filter.

D. Water flowing to the RCP seals from the RCS is cooled by the thermal barrier heat exchangers and would not cause water hammer on restoration of seal injection.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		003.K6.02
	Importance		3.1

Technical References: AOI 3.1
References to be provided: None
Learning Objective: SYS-C-030 Obj 87.9.g

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 046

What is the effect of high oxygen concentration in the RCS during operation at 100% power?

A. Increase in scale formation on heat transfer surfaces.

B. Increase in non-condensable gases collecting in the SG U-tubes.

C. Increase in corrosion of the RCS pipes.

D. Increase in N-16 gamma radiation.

Answer: C

Explanation/Justification:

A. Scale formation is associated with chemical plate out on piping and components. Scale formation is not dependent on oxygen concentration

B. During normal operation the SG tubes are a high flow area therefore, non-condensable gases would not collect in the SG U-tubes.

C. Minimizing oxygen in turns minimizes corrosion and erosion, thereby increasing component life and system efficiency.

D. O-16 + Neutron interactions create more N-16's

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		004.K5.01
	Importance		3.3

Technical References: Technical Specifications 3.1 E
References to be provided: None
Learning Objective: SYS-C-011 Obj 12.g

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 047

Which ONE of the following conditions will automatically UNBLOCK the Low Pressurizer Pressure Safety Injection actuation signal?

A. RCS pressure increases to 1940 psig on Pressurizer pressure transmitters PT 457 and PT 474.

B. RCS pressure increases to 1840 psig on Pressurizer pressure transmitters PT 455 and PT 458.

C. RCS pressure increases to 1940 psig on Pressurizer pressure transmitters PT 455 and PT 456.

D. RCS pressure increases to 1840 psig on Pressurizer pressure transmitters PT 456 and PT 457.

Answer: C

Explanation/Justification:

A. Control channels are 455, 456, and 457. Low PZR pressure SI unblock setpoint is 1940 PSIG. PT 474 does not have an input to the control circuit.

B. Control channels are 455, 456, and 457. Low PZR pressure SI unblock is 1940 PSIG. PT 458 is not used.

C. Control channels are 455, 456, and 457. Low PZR pressure SI unblock is 1940 PSIG.

D. Control channels are 455, 456, and 457. Low PZR pressure SI unblock is 1940 PSIG.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		013.A1.01
	Importance		4.2

Technical References: Drawing A225102
References to be provided: None
Learning Objective: SYS-C-014 Obj 54.a

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

As given

Question # 048

With the Reactor at 45% power, which ONE of the following is a Limiting Condition for Operation associated with the Rod Position Indication system?

A. The Individual Rod Position Indicators shall be monitored and logged once every four hours to verify rod position within each bank assignment.

B. The Individual Rod Position Indicators shall be monitored and logged once each eight hours to verify rod position within each bank assignment.

C. Rod position indication shall be capable of determining control rod position within $\pm$12 steps with the reactor at power.

D. Rod position indication shall be capable of determining control rod position within $\pm$24 steps with the reactor at power.

Answer: D

Explanation/Justification:

A. TS limit 3.10.3.3 requires the verification of IRPI each shift.

B. TS limit 3.10.3.3 requires the verification of IRPI each shift.

C. TS limit 3.10.6.1 requires verification within $\pm$12 steps only when greater than 50% power

D. TS limit 3.10.6.1 requires verification within $\pm$24 steps when less than or equal to 50% power Above 50% power a tighter limit applies.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		014.Gen.2.2.2 2
	Importance		4.1

Technical References: T/S 3.10.3.3, T/S 3.10.6.1
References to be provided: None
Learning Objective: E0 303

Question Source: (check one):
☒ New
☐ Bank: Facility: Question #:
☐ NRC Exam: Facility: Year:

Question Cognitive Level:
Memory or Fundamental Knowledge: ☒
Comprehension or Analysis: ☐

10 CFR Part 55 Content:
55.41 ☐
55.43 ☒

Question # 049

Given the following conditions:

- The Control Room team is performing a reactor startup
- Reactor Power is critical at 2.4 E+4 counts per seconds.
- Power Range Channel N-41 has failed
- The actions of AOI-13.1.3, "Power Range Channel Failure", have been completed

What would be the effect of a subsequent failure of Power Range Channel N-43 high?

A. The reactor will trip and both Source Ranges deenergize.

B. The reactor will trip and both Source Ranges remain energized.

C. The reactor will remain critical and the NIS Power Range Overpower Rod Stop will prevent rod motion.

D. The reactor remains critical and both Source Ranges deenergize.

Answer: A

Explanation/Justification:

A. Correct. A second power range channel above P-8 would cause the reactor to trip when the turbine is tripped.

B. Incorrect. Source Range channels are automatically energized when both IR channels decrease below P-6.

C. Incorrect. Steam Dumps are armed and modulated from turbine first stage pressure.

D. Incorrect. A problem would be indicated if the "Below P-7" status light were NOT illuminated.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		015.K3.01
	Importance		4.3

Technical References: Drawing A225098
References to be provided: None
Learning Objective: SYS-C-130 Enabling Objective 245

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 050

Information provided by Core Exit Thermocouples during natural circulation should be considered:

A. Inaccurate due to neutron streaming as upper head voiding occurs.

B. Accurate due to being located near the fuel assembly exit flow.

C. Inaccurate due to flow stagnation in the upper head area.

D. Accurate due to being calibrated at zero/low flow conditions.

Answer: B

Explanation/Justification:

A. Thermocouples are not affected by Neutron Streaming

B. Correct Answer: Thermocouples located on the core top plate.

C. Natural Circulation Flow provides adequate mixing to minimize stagnation.

D. Thermocouples are calibrated for temperature response and their accuracy is not dependent on flow conditions.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		017.K1.02
	Importance		3.5

Technical References: System Description 14, Incore Instruments
References to be provided: None
Learning Objective: SYS-C-140 Obj 260.6a

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 051

Given the following conditions:

- The plant is operating at 100% power
- All control systems, except Rod Control, are in automatic
- Cooling water to all Containment Cooling Fan Units is lost
- Assume no operator actions are taken

Which ONE of the following instruments would be the FIRST to fail?

A. Pressurizer level detector.

B. Wide Range RCS pressure detector.

C. Power Range NI detector.

D. SG Narrow Range level detector.

Answer: C

Explanation/Justification:

A. Designed to provide indication during Design Basis Accidents

B. Designed to provide indication during Design Basis Accidents

C. FSAR states the detectors can operate continuously at 135°F or at least 8 hours at 175°F

D. Designed to provide indication during Design Basis Accidents

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		022.K3.01
	Importance		3.2

Technical References: UFSAR Section7.2.4.2
References to be provided: None
Learning Objective: 180

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 052

Given the following conditions:

- The plant is operating at 100% power.
- 21 Containment Spray pump is isolated from the spray header and is running on recirculation back to the RWST for surveillance testing.
- A Main Steam Line break inside containment occurs, resulting in a Containment pressure of 26 psig.

Which ONE of the following describes the expected response of the Containment Spray system?

A.
- 21 Containment Spray Pump continues to run in recirculation
- 22 Containment Spray Pump STARTS
- 22 Containment Spray Pump discharge valves (866C and 866D) OPEN

B.
- 21 Containment Spray Pump is stripped and then sequences back ON
- 22 Containment Spray Pump STARTS
- 22 Containment Spray Pump discharge valves (866C and 866D) OPEN

C.
- 21 Containment Spray Pump is stripped and then sequences back ON
- 22 Containment Spray Pump STARTS
- 21 and 22 Containment Spray Pump discharge valves (866A, 866B, 866C, and 866D) OPEN

D.
- 21 Containment Spray Pump continues to run in recirculation
- 22 Containment Spray Pump STARTS
- 21 and 22 Containment Spray Pump discharge valves (866A, 866B, 866C, and 866D) OPEN.

Answer: C

Explanation/Justification:

A. High Containment pressure (24 psig) generates a start signal for both pumps, and an open signal for the discharge valves. The21 and 22 pump's associated discharge valves open.

Question # 052

B. High Containment pressure (24 psig) generates a start signal for both pumps, and an open signal for the discharge valves. The 21 and 22 pump's associated discharge valves open.

C. High Containment pressure (24 psig) generates a start signal for both pumps, and an open signal for the discharge valves. The 21 and 22 pump's associated discharge valves open.

D. High Containment pressure (24 psig) generates a start signal for both pumps, and an open signal for the discharge valves. The 21 and 22 pump's associated discharge valves open.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		026.A3.01
	Importance		4.5

Technical References: System Description 10.2 section 5.2.A and 5.2.B
References to be provided: None
Learning Objective: SYS-C-102 Obj 165.7d

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 053

Given the following conditions:

- The plant is in a startup with reactor power level at 55% - INCREASING
- All control systems, except Rod Control, are in automatic
- The following equipment is operating:
  - 21 Condensate Pump
  - 23 Condensate Pump
  - 21 Main Boiler Feed Pump
  - 22 Main Boiler Feed Pump
- High Pressure Steam Dump system is in Temperature Mode

Which ONE of the following is the expected plant response following a trip of the 23 Condensate Pump, without any operator action?

A. The 22 Condensate Pump automatically starts.

B. Turbine runback occurs.

C. Motor Driven Auxiliary Feed Water Pumps automatically start.

D. Main Boiler Feedwater Pump low suction cutback occurs.

Answer: A

Explanation/Justification:

A. 22 Condensate pump automatic start is not armed until both Main Boiler Feed Pumps are greater than 3300 RPM and reactor power is greater than 50 percent. The conditions exist to have armed the condensate pump; therefore, the correct response is the auto start of the 22 condensate pump.

B. Turbine runback does not arm until first stage impulse pressure is equivalent to 85 percent turbine power

C. AFW pumps will start on low low level in the steam generators or trip of the Main Feed pump. Neither of these conditions will exist in this situation.

D. MBFP should not actuate under this condition

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		056.K4.14
	Importance		2.6

Technical References: POP 1.3
References to be provided: None
Learning Objective: SYS-C-200 Obj362.7b

Question Source: (check one): ☒ New

☐ Bank: Facility: Question #:

Question # 053

	☐ NRC Exam:	Facility:		Year:
Question Cognitive Level:	Memory or Fundamental Knowledge:		☐	
	Comprehension or Analysis:		☒	
10 CFR Part 55 Content:	55.41 ☒			
	55.43 ☐			

Question # 054

Given the following conditions:

- The turbine was operating at 900 MWe
- 21 MBFP has tripped
- All automatic actions have occurred as designed
- Turbine load is now 740 MWe
- SG NR levels are 15-20%

What effects on plant control will be seen, and what actions will be required to control these effects?
(AOI-21.1.1, "Loss of Feedwater" provided)

A. Steam flow exceeds feed flow, causing SG levels to rise. Manually control AFW pump discharge valves to control SG levels.

B. Relatively cold water supplied by the MDAFW pumps has caused an initial SG level shrink, followed by a subsequent swell. Secure the MDAFW pumps when SG levels swell to 30-40%.

C. AFW is the sole source of feedwater and power is greater than 4%. Trip the reactor and go to E-0, "Reactor Trip Or Safety Injection".

D. The combined effects of SG blowdown isolating and the turbine runback have caused an immediate swell in SG levels. Manually reduce turbine load an additional 100 MWe.

Answer: B

Explanation/Justification:

A. Incorrect. There are NO actions in AOI-21.1.1 to control AFW discharge valves to mitigate lowering SG levels.

B. Correct.

C. Incorrect. 22 MBFW p[ump is also feeding the SGs.

D. Incorrect. Turbine runback would cause an initial SHRINK, due to reducing steam demand.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		059.A2.01
	Importance		3.6

Technical References: FSAR 10.2.6.2
References to be provided: None
Learning Objective: SYS-C-210 Obj 378.7f

Question Source: (check one): ☒ New

☐ Bank: Facility: Question #:

Question # 054

	☐ NRC Exam:	Facility:	Year:
Question Cognitive Level:	Memory or Fundamental Knowledge:	☐	
	Comprehension or Analysis:	☒	
10 CFR Part 55 Content:	55.41 ☒		
	55.43 ☐		

Question # 055

Given the following conditions:

- The plant is operating at 100% power
- All three AFW pumps have been determined to be inoperable
- Technical Specification 3.4.B.(1)(c) states:

"With three Auxiliary Feedwater pumps inoperable, immediately initiate corrective action to restore at least one Auxiliary Feedwater pump to OPERABLE status while maintaining power at existing level until at least one Auxiliary Feedwater pump has been restored to operable status..."

Why does this Technical Specification require maintaining current power level instead of placing the reactor in hot shutdown conditions, as specified in 3.4.B? (Technical Specification 3.4 provided)

A. The Main Feedwater system cannot control SG levels below 5% reactor power.

B. Insufficient water volume exists to cooldown and depressurize the SGs to allow feeding with a condensate pump.

C. The primary plant cannot be maintained in a stable Hot Standby condition without AFW available.

D. The AFW system is required to be OPERABLE in Hot Standby and Technical Specifications prohibit a change in operational conditions reliant upon an LCO.

Answer: C

Explanation/Justification:

A. Though the main feedwater system is available in the current conditions, it will not be available through the time required to cool the RCS to less than 350°F if the reactor was brought to less than power operations. The unavailability of AFW would preclude stable shutdown conditions.

B. FR-H.1 provides guidance for using the condensate system for feeding the SGs. However, to voluntarily enter into this condition would be in violation of Technical Specifications.

C. During power operation the main feedwater system is available to feed the steam generators. During a complete loss of electrical power to the station, decay heat removal would continue to be assured by the availability of either the steam-driven AFW pump or by one of the two motor driven AFW pumps.

D. This restriction is for escalation to the next higher operational condition.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		061.K5.01

Question # 055

	Importance	3.9
Technical References:	Technical Specification 3.4.B	
References to be provided:	Technical Specification 3.4	
Learning Objective:	SYS-C-210 Obj 383.12b	
Question Source: (check one):	☒ New	
	☐ Bank: Facility:	Question #:
	☐ NRC Exam: Facility:	Year:
Question Cognitive Level:	Memory or Fundamental Knowledge:	☐
	Comprehension or Analysis:	☒
10 CFR Part 55 Content:	55.41 ☐	
	55.43 ☒	

Question # 056

Given the following conditions:

- A plant cooldown is initiated following a reactor trip
- AFW is in service with a constant flow rate of 800 gpm
- Atmospheric Steam Dumps are being used for cooldown
- Condensate Storage Tank (CST) level is initially at 29.63 feet (565,000 gal)

Assuming 800 gpm AFW flow will be maintained throughout the cooldown, approximately how much time will it take before CST level drops below the Technical Specification minimum?

A. 3.6 hours.

B. 4.3 hours.

C. 5.8 hours.

D. 6.2 hours.

Answer: B

Explanation/Justification:

A. Candidate must know the minimum CST Technical Specification level is 360,000 gallons, then calculate the amount of time to reduce the CST to that level. This number calculates time based on minimum volume of 400000 gallons (approximately 66 percent level)

B. Candidate must know the minimum CST Technical Specification level is 360,000 gallons, then calculate the amount of time to reduce the CST to that level.

C. Candidate must know the minimum CST Technical Specification level is 360,000 gallons, then calculate the amount of time to reduce the CST to that level. This number calculates time based on minimum volume of 300000 gallons (approximately 50 percent level)

D. Candidate must know the minimum CST Technical Specification level is 360,000 gallons then calculate the amount of time to reduce the CST to that level. This number calculates time based on minimum volume of 280,000 gallons (approximately 47 percent level).

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		061.A1.04
	Importance		3.9

Technical References: TS 3.4.A.3
References to be provided: None
Learning Objective: SYS-C-200 Obj 366.12a

Question Source: (check one):

- [x] New
- [ ] Bank: Facility: Question #:
- [ ] NRC Exam: Facility: Year:

Question # 056

Question Cognitive Level:	Memory or Fundamental Knowledge:	☐
	Comprehension or Analysis:	☒
10 CFR Part 55 Content:	55.41 ☒	
	55.43 ☐	

Question # 057

Given the following conditions:

- Reactor Power – 100 %
- All control systems, except Rod Control, are in automatic
- 21 Battery is disconnected for cell replacement
- Expected duration of condition is 12 hours
- During performance of the battery cell replacement, the 21 Battery Charger output breaker opens

What is the expected plant, and operator, response?

A. Reactor trips, complete E-0, "Reactor Trip or Safety Injection", then go to AOI-27.1.11, "Loss of 125V DC Power".

B. Reactor trips, go to E-0, "Reactor Trip or Safety Injection" in response to a reactor trip and complete the actions of AOI-27.1.11, "Loss of 125V DC Power" concurrently with ES-0.1, "Reactor Trip Response".

C. Reactor does not trip, complete the actions of AOI-27.1.11, "Loss of 125V DC Power".

D. Reactor does not trip, complete the actions of AOI-27.1.11, "Loss of 125V DC Power", and AOI-27.0, "Diagnosis and Response to Electrical Failure".

Answer: B

Explanation/Justification:

A. AOI 27.1.11 directs the operator to "GO TO E-0" and to use the guidance of AOI 27.1.11 to supplement the actions in E-0.

B. AOI 27.1.11 directs the operator to "GO TO E-0" and to use the guidance of AOI 27.1.11 to supplement the actions in E-0.

C. Loss of the 21 125V DC bus will cause a reactor trip and the operator is directed to take the actions of E-0

D. Loss of the 21 125V DC bus will cause a reactor trip and the operator is directed to take the actions of E-0. Additionally, 27.0 does not address the loss of a 125V DC bus.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		063.Gen.2.4.11
	Importance		3.6

Technical References: AOI 27.1.11, Loss of 125V DC Power
References to be provided: None
Learning Objective: SYS-C-271 Obj 428.5k

Question Source: (check one):
- [x] New
- [ ] Bank: Facility: Question #:

As given

Question # 057

	☐ NRC Exam:	Facility:	Year:
Question Cognitive Level:	Memory or Fundamental Knowledge:	☐	
	Comprehension or Analysis:	☒	
10 CFR Part 55 Content:	55.41 ☐		
	55.43 ☒		

Question # 058

Given the following conditions:

- The plant was operating at 100% power
- A Station Blackout has occurred
- 23 Emergency Diesel Generator failed to start
- 125V DC loads on the 24 DC Bus are being supplied by the station batteries

What is the expected action or system response for loss of the normal power supply to the 24 DC bus?

A. The 24 Battery Charger will reenergize on restoration of AC power to MCC 27A, since it is not stripped on the blackout condition.

B. The 24 Battery Charger will be sequenced onto the 24 DC bus following restoration of AC power to MCC 27A.

C. Dispatch a Nuclear Plant Operator to manually reenergize the 24 Battery Charger when AC power is restored to MCC 27A.

D. Dispatch a Nuclear Plant Operator to reenergize the 24 battery charger from an alternate power supply per SOP 27.1.6, "Instrument Bus, DC Distribution System, and PA System Inverter".

Answer: A

Explanation/Justification:

A. The 24 Battery Charger breaker does NOT get stripped during a blackout condition

B. The 24 Battery Charger breaker does NOT get stripped during a blackout condition, nor does the Blackout Sequencer automatically load the battery charger back on the bus.

C. Local action is required for the 21 and 22 battery chargers; however, it is not required for the 24 battery charger

D. SOP 27.1.6 provides guidance for powering the static inverter from the alternate power supply prior to reenergizing the battery charger. However, it does not provide direction to power the battery charger from an alternate power supply.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		063.K4.02
	Importance		3.2

Technical References: SOP 27.1.6, System Description 27.1 section 3.9
References to be provided: None
Learning Objective: SYS-C-271 Obj428.5e

Question Source: (check one): ☒ New

☐ Bank: Facility: Question #:

As given

Question # 058

	☐ NRC Exam:	Facility:	Year:
Question Cognitive Level:	Memory or Fundamental Knowledge:	☐	
	Comprehension or Analysis:	☒	
10 CFR Part 55 Content:	55.41 ☒		
	55.43 ☐		

 As given

Question # 059

A Distillate Storage Tank release is in progress when a high alarm is received on R-54, Liquid Waste Distillate Monitor.

Which ONE of the following describes how the Reactor Operator can verify the release has been terminated?

A. Dispatch an NPO to verify Distillate Tank discharge valves (CT 965, CT 982, CT 971) closed on the Chemical Systems Control Room panel.

B. Verify R-54 Liquid Waste Monitor radiation level decreasing.

C. Dispatch an NPO to verify dilution flow indicates 0 gpm on the Chemical Systems Control Room panel.

D. Verify the Distillate Transfer Pumps tripped on the Digital Radiation Monitoring System Console.

Answer: A

Explanation/Justification:

A. The pump trips on high radiation and the discharge valves close. Valve position is indicated on the Chemical Systems Control Room panel.

B. Decreasing radiation levels on the radiation monitor is not a good indication of termination of discharge. Actual radiation level may have decreased and the release still in progress.

C. Dilution flow does not display in the CSCR.

D. The pump trips on high radiation and the discharge valves close. Only checking the pump tripped is a misconception that stopping the pump will stop the discharge. The discharge valve must be closed to ensure the discharge is stopped. Additionally, the pumps do not have indication on the DRMS console.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		068.A4.03
	Importance		3.8

Technical References: AOI 12.1.6
References to be provided: None
Learning Objective: 3240

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

As given

Question # 060

Which ONE of the following actions is required if R-44, Unit 2 Plant Vent Gaseous Activity Monitor becomes inoperable during a release from the Gaseous Waste System?

A. Continue with the release and monitor the release using R-43, Plant Vent Monitor.

B. Continue with the release and perform two independent samples once an hour for the duration of the release.

C. Terminate the release, if it is desired to resume the release recalculate the release permit using R-27.

D. Terminate the release, if it is desired to resume the release install a portable continuous air monitor for monitoring the release.

Answer: C

Explanation/Justification:

A. R-43 is a particulate and iodine monitor. It will not provide adequate monitoring for a release of the gas decay tanks.

B. SOP 5.4.2, Gas Decay Tank Gaseous Releases states the release must be terminated if any radiation monitor, whose operability was assumed in the preparation of the release permit, becomes inoperable.

C. Termination of the release and completing the actions for an inoperable monitor prior to continuing with the release is required by SOP 5.4.2.

D. Termination of the release is required by SOP 5.4.2; however, the procedure does not address the use of a portable air sampler for monitoring the release. Also the portable air monitor could not meet the FSAR requirements for automatic isolation.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		071.A4.26
	Importance		3.9

Technical References: AOI 12.1.2, SOP 5.4.2, TS 3.9.B.2 and Table 3.9-2
References to be provided: None
Learning Objective: 3700

Question Source: (check one):
- ☐ New
- ☒ Bank: Facility: Indian Point 2 (modified) Question #: SYSC120-7
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Comments: Changed the Rad Monitor from R-42, rewrote the distractors. See original question attached to hard copy.

Question # 061

Given the following conditions:

- The plant is in a refueling outage and fuel is being moved between the Fuel Building and the Vapor Containment
- Rad Waste personnel are conducting a general clean up of containment
- A high radiation alarm is received on R-2, Containment Area Monitor

What is the cause for the radiation alarm?

A. Fuel movement through the fuel transfer canal is increasing the general area radiation levels.

B. Additional irradiated fuel in the containment is increasing the general area radiation levels.

C. Staging of waste bags near the containment airlock is increasing the general area radiation levels.

D. Increased airborne activity as a result of containment clean up is increasing general area radiation levels.

Answer: C

Explanation/Justification:

A. Fuel movement will not place R-2 in alarm. R-2 is located on the 80 foot level near the containment airlock.

B. Refueling cavity level during refueling operation prevents the general area radiation level from increasing to the alarm point on R-2

C. Radioactive material staged near the containment airlock will be detected by R-2.

D. Increased airborne contamination could increase general area radiation levels; however, it would have been detected by the containment particulate monitor first.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		072.A1.01
	Importance		3.6

Technical References: U1 ARP 3
References to be provided: None
Learning Objective: 239

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

As given

Question # 062

Which ONE of the following describes the status of the Control Room Area Radiation Monitor (R-1) during a station blackout?

A. Monitor is unavailable as a result of the loss of power.

B. Monitor is unaffected because it is powered from an instrument bus.

C. Monitor is available, but inaccurate due to loss of flow.

D. Monitor is unaffected because it has an internal battery for back-up power.

Answer: B

Explanation/Justification:

A. R-1 is powered from Instrument Bus 21 which will not lose power on a station blackout

B. R-1 is powered from Instrument Bus 21 which will not lose power on a station blackout

C. The first part is true; however, the second part is false. Area radiation monitors do NOT use process flows.

D. R-1 is powered from Instrument Bus 21 which will not lose power on a station blackout

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		1
	K/A #		072.K2.01
	Importance		2.5

Technical References: AOI 27.1.6
References to be provided: None
Learning Objective: SYS-C-120 Obj 236.6a

Question Source: (check one):

- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:

- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:

- 55.41 ☒
- 55.43 ☐

Question # 063

With the plant at 50% power, what will be the effect of the Loop 21 wide range hot leg temperature resistance temperature detector failing low?

A. Inaccurate Over Temperature Delta-T setpoints.

B. Pressurizer level setpoint decreases to 37%.

C. Rod Control system generates a motion demand signal.

D. Reactor Vessel Level Indication System indication changes.

Answer: D

Explanation/Justification:

A. Wide range hot leg temperature provides wide range indication, input to the saturation monitor, and input to RVLIS. Failure of the WR Hot Leg RTD will not affect the OTDT setpoint.

B. Wide range hot leg temperature provides wide range indication, input to the saturation monitor, and input to RVLIS. Failure of the WR Hot Leg RTD will not affect the Pzr Level setpoint.

C. Wide range hot leg temperature provides wide range indication, input to the saturation monitor, and input to RVLIS. Failure of the WR Hot Leg RTD will not affect the Rod Control system.

D. Wide range RTD provides density compensation for the RVLIS

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #		002.K1.07
	Importance		3.7

Technical References: A225104, AOI 28.2
References to be provided: None
Learning Objective: SYS-C-011 Obj 8b

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

 As given

Question # 064

Given the following conditions:

- The RCS has been drained to the target level of 62 feet 9 inches elevation
- 21 RHR pump is maintaining the RCS temperature at 120°F
- The Ultrasonic level indicator is in service monitoring RCS level

Which ONE of the following indications will the operator use for identification of vortexing conditions?

A. RHR motor amperes.

B. RHR suction pressure.

C. RVLIS level.

D. RCS loop level.

Answer: B

Explanation/Justification:

A. RHR motor amps would be a good indication of vortexing; however, the RHR motor amps are not available to the operator.

B. Fluctuating or reduced loop flow (pump discharge) is described in AOI 4.2.1 as an indication of vortexing

C. RVLIS will provide a visual clue when vortexing conditions are being approached; however, it is not an actual indication of vortexing.

D. RCS loop level is an indication of possible vortexing conditions, but does not provide a positive mean of identifying vortexing conditions

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #		006.A4.01
	Importance		3.9

Technical References: SOP 1.2, AOI 4.2.1
References to be provided: None
Learning Objective: SYS-C-042 Obj 120.9c

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

As given

Question # 065

Given the following conditions:

- Plant startup and power ascension are in progress
- Reactor is at 22% power
- Pressurizer pressure is 2180 psig - DECREASING
- Pressurizer Spray Valve PCV 455B is fully OPEN and mechanically bound

Based on the applicable procedure, what action is required?

A. Trip the reactor and stop 23 RCP.

B. Stop 23 RCP and initiate a plant shutdown.

C. Ensure all pressurizer heaters are energized, and initiate a plant shutdown.

D. Dispatch an NPO to close 4154, PCV 455B Spray Valve Inlet Stop.

Answer: A

Explanation/Justification:

A. Operator should recognize the flow from one pressurizer spray valve will overcome the pressurizer heaters, making RCS pressure control impossible. Additionally, the operator must understand that the RCP cannot be tripped in this condition without placing the plant outside conditions for operation (3 loop operations).

B. Operator must understand that the RCP cannot be tripped in this condition without placing the plant outside conditions for operation (3 loop operations).

C. Operator should recognize the flow from one pressurizer spray valve will overcome the pressurizer heaters, making RCS pressure control impossible; therefore the appropriate action is to trip the plant and the RCP.

D. Operator should recognize the NPO could not isolate the valves in time.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #		010.A2.02
	Importance		3.9

Technical References: ARP SAF
References to be provided: None
Learning Objective: SYS-C-014 Obj 57d

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:
- 55.41 ☐
- 55.43 ☒

Question # 066

Given the following conditions:

- The plant is at 100% power
- All control systems, except Rod Control, are in automatic
- Pressurizer Level Defeat switch (L 460A) is in Defeat 3
- One charging pump is running in automatic
- Pressurizer level channel LT-459 (Channel 1) failed low

Which ONE of the following is the expected plant response in the first two minutes of the event?

A. Charging pump speed increases.

B. Pressurizer heaters energize.

C. Letdown Isolation valve (LCV-459) closes.

D. Letdown Orifice Isolation valves (200A, 200B, 200C) close.

Answer: C

Explanation/Justification:

A. Charging pump speed is controlled by LT 461 when in defeat 3 – so charging pump speed will not be affected in the time frame considered for the question

B. Pressurizer heaters will deenergize on the failure of LT 459 when in the defeat 3 position

C. LT-459 controls the letdown isolation valve when in defeat 3 position

D. Letdown orifice isolation valves automatically close on a Phase A signal, not pressurizer low level

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #		011.K4.06
	Importance		3.7

Technical References: AOI 3.1
References to be provided: None
Learning Objective: SYS-C-014 Obj56.I

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 067

The plant is operating at 100% power when a loss of 6900 V Bus No. 2 occurs, resulting in a reactor trip.

In what order would the reactor trip signals be generated?

A.
- LOSS OF FLOW SINGLE LOOP
- 24 SG LOW LEVEL
- RCP BREAKER OPEN

B.
- LOSS OF FLOW SINGLE LOOP
- RCP BREAKER OPEN
- 24 SG LOW LEVEL

C.
- UNDERVOLTAGE TRIP 75%
- LOSS OF FLOW SINGLE LOOP
- 24 SG LOW LEVEL

D.
- 24 SG LOW LEVEL
- UNDERVOLTAGE TRIP 75%
- LOSS OF FLOW SINGLE LOOP

Answer: B

Explanation/Justification:

A. The RCS flow will decrease as the RCP slows on loss of power generating the first trip signal. The RCP breaker will open after a 30 second time delay on low voltage, generating the second trip signal. Loss of transported heat to the steam generator will cause the level to drop low, generating the third trip signal.

B. The RCS flow will decrease as the RCP slows on loss of power generating the first trip signal. The RCP breaker will open after a 30 second time delay on low voltage, generating the second trip signal. Loss of transported heat to the steam generator will cause the level to drop low, generating the third trip signal.

C. RCP Undervoltage trip 75% requires 2 of 4 RCPs with low voltage. Loss of flow single loop would be the first trip signal and the SG low level would be the last signal.

D. RCP Undervoltage trip 75% requires 2 of 4 RCPs with low voltage. Loss of flow single loop would be the first trip signal and the SG low level would be the last signal.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2

As given

Question # 067

	Group #	2
	K/A #	012.K4.02
	Importance	4.3
Technical References:	FSAR 14.1	
References to be provided:	None	
Learning Objective:	SYS-C-280 Obj 41555.8a	
Question Source: (check one):	☒ New	
	☐ Bank: Facility:	Question #:
	☐ NRC Exam: Facility:	Year:
Question Cognitive Level:	Memory or Fundamental Knowledge:	☐
	Comprehension or Analysis:	☒
10 CFR Part 55 Content:	55.41 ☒	
	55.43 ☐	

As given

Question # 068

Given the following conditions:

- The plant is being started up following a refueling outage
- The plant is at 1% power
- Both motor driven AFW pumps are supplying the Steam Generators
- AFW discharge pressure is 1400 psig for both pumps
- Level is decreasing in 21 SG and 22 SG
- There are no feedwater leaks in the plant

What is the cause for the SG level decrease?

A. High temperature in the AFW pump room has closed the steam supply valves to the steam driven AFW pump (1310A and 1310B).

B. Reactor power has exceeded the capacity of the AFW system.

C. Low pressure as sensed by PT-406A, 21 AFW Pump Discharge Pressure Transmitter, has caused the AFW control valve to throttle closed.

D. FC-1135A-S, 21 AFW pump suction flow transmitter has failed low.

Answer: D

Explanation/Justification:

A. High temperature in the auxiliary feedwater pump room will close the steam supply to the Turbine Driven Auxiliary Feedwater pump; however, the turbine driven pump is not running.

B. This is the power level that main feedwater is placed in service and auxiliary feedwater is secured; however, the capacity of the AFW system is greater than 3 percent.

C. Low pump discharge pressure will cause the flow control valves to reposition to prevent pump runout. There are no conditions given that would indicate the control valves should reposition.

D. Low suction flow will cause the recirculation valve to open. The AFW flow control valves are set to maintain 200 gpm to each steam generator which is above the setpoint to cause the valves to close (170 gpm). A failure of the flow control switch (FC-1135A-S) would cause the valve to open under these conditions.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #		016.K3.06
	Importance		3.7

Technical References: ARP-SCF, Condensate and Boiler Feed, System Description 21 section 3.2
References to be provided: None
Learning Objective: SYS-C-210 Obj 382.11p

Question Source: (check one):

☒ New

☐ Bank: Facility: Question #:

☐ NRC Exam: Facility: Year:

As given

Question # 068

Question Cognitive Level:	Memory or Fundamental Knowledge:	☐
	Comprehension or Analysis:	☒
10 CFR Part 55 Content:	55.41 ☒	
	55.43 ☐	

As given

Question # 069

Given the following plant conditions:

- A large break LOCA has occurred
- The plant is 20 days into post event recovery on long term recirculation

Which ONE of the following is expected to produce the largest amount of hydrogen following the LOCA?

A. Radiolysis of water.

B. Corrosion of Zinc.

C. Corrosion of aluminum.

D. Dissolution of hydrogen from the RCS.

Answer: A

Explanation/Justification:

A. Correct. Approximately 40% of the hydrogen released during a large break LOCA will be from radiolysis.

B. Incorrect. Insignificant amount of hydrogen generated.

C. Incorrect. Insignificant amount of hydrogen generated.

D. Incorrect. Second largest contributor of hydrogen during a large break LOCA.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #		028.K5.03
	Importance		3.6

Technical References: WOG Mitigating Core Damage module 1 page 1-116, FSAR 14.3, MCD-C-001
References to be provided: None
Learning Objective: MCD-C-001 Obj 1756

Question Source: (check one):

- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:

- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:

- 55.41 ☒
- 55.43 ☐

As given

Question # 070

Given the following conditions:

- Unit 2 is in a refueling outage
- The Containment Purge system is in service to reduce gas concentration in the Vapor Containment
- An inadvertent Safety Injection actuation occurs

Which ONE of the following describes the response of the Containment Purge System?

A. Because the SI trip is blocked, the SI actuation signal has no effect on the Containment Purge system.

B. Containment Purge supply and exhaust valves close if high containment radiation is received in conjunction with the SI actuation signal.

C. Containment Purge supply and exhaust fans trip due to the SI actuation signal.

D. Containment Purge supply and exhaust valves close due to the SI actuation signal.

Answer: D

Explanation/Justification:

A. The SI actuation signal input to the Containment Ventilation is not isolable

B. R-43 does not input in to the containment ventilation isolation system.

C. Only one high radiation signal is needed to generate a containment ventilation signal. Removal of R-41 from service is enough to cause the isolation. Student does not know the isolation logic, and does not understand the effect of removing R-41 from service.

D. Containment ventilation isolation is generated by any one of the following signals: R-41, R-42, R-44, Containment Isolation Phase A, or Spray Actuation.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #		029.A3.01
	Importance		4.0

Technical References: Figure 7.2-12, Safeguard Actuation Signals
References to be provided: None
Learning Objective: SYS-C-110 Obj 223.b

Question Source: (check one):
- [x] New
- [ ] Bank: Facility: Question #:
- [ ] NRC Exam: Facility: Year:

Question Cognitive Level: Memory or Fundamental Knowledge: [ ]

As given

Question # 070

	Comprehension or Analysis:	☒
10 CFR Part 55 Content:	55.41	☒
	55.43	☐

Question # 071

Given the following conditions:

- Plant is at 100% power
- Purification of the RWST is in progress

What would be the effect of a leak upstream of the Spent Fuel Pit (SFP) filter outlet valve?

A. No effect on the RWST water level because RWST purification bypasses the SFP filter .

B. Decrease in only the RWST water level because the SFP Cooling System is isolated from the purification loop.

C. Decrease in both the SFP and RWST water level because both systems use the SFP filter.

D. No effect on the RWST because the RWST return line is upstream of the filter.

Answer: B

Explanation/Justification:

A. Both the demineralizer and filter is valved in for RWST purification.

B. SFP is isolated from the demineralizer and filter during RWST purification. Both the demineralizer and filter is valved in for RWST purification.

C. SFP is isolated from the demineralizer and filter during RWST purification. Both the demineralizer and filter is valved in for RWST purification.

D. Return to the RWST is located downstream of the filter.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #		033.K1.05
	Importance		2.8

Technical References: Drawing 9321-F-2720 and A227781, SOP 10.1.3
References to be provided: None
Learning Objective: SYS-C-043 Obj 2634

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 072

Which ONE of the following is an indication of a decreasing level in the Refueling Cavity due to Refueling Cavity seal leakage?

A. REACTOR CAVITY SUMP PIT WATER LEVEL HIGH (SBF-1, 4-2).

B. PROTEUS RHR FLOW LO/LOSS OF FLOW (SGF 4-5).

C. RCS REDUCED INVENTORY (SGF 2-9).

D. HIGH RANGE CONTAINMENT RADIATION MONITORING RE-26 (AS-1, 1-5).

Answer: A

Explanation/Justification:

A. High reactor cavity sump pit water level is an indication to leakage from the refueling cavity in accordance with AOI-17.0.3, Undesirable Decrease in Refueling Cavity Water Level

B. This alarm should not come in, even if the entire refueling cavity is drained.

C. RCS reduced inventory is used to monitor RCS inventory during mid loop operations

D. High radiation in the containment could be an indication of decreased reactor cavity level; however, radiation level may be affected by other than leakage. Additionally, level would have to drop significantly for the rad monitor to alarm.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #		034.A1.02
	Importance		3.7

Technical References: AOI 17.0.3, ARP SBF, ARP SGF, ARP AS-1
References to be provided: None
Learning Objective: SYS-C-170 Obj 317.9i

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

As given

Question # 073

With the plant operating at 100% power, which ONE of the following could cause water hammer conditions in the Main and Reheat Steam System?

A. Opening of an Atmospheric Steam Dump valve.

B. Inadvertent closure of one MSIV.

C. Closure of a Main Turbine Stop Valve.

D. A blocked steam trap on a main steam line .

Answer: D.

Explanation/Justification:

A. Could cause some mechanical shock on the system, but not related to water hammer.

B. Could cause some mechanical shock on the system, but not related to water hammer.

C. Could cause some mechanical shock on the system, but not related to water hammer.

D. Allows water to accumulate in the drain line, and could fill to the point where water in the steam line has no place to drain.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #		039.K5.01
	Importance		3.1

Technical References: POP-1.3
References to be provided: None
Learning Objective: EO 1782

Question Source: (check one): ☒ New

☐ Bank: Facility: Question #:

☐ NRC Exam: Facility: Year:

Question Cognitive Level: Memory or Fundamental Knowledge: ☒

Comprehension or Analysis: ☐

10 CFR Part 55 Content: 55.41 ☒

55.43 ☐

As given

Question # 074

Given the following conditions:

- Main Turbine power was ramped from 90% to 100% in the last hour
- Previous surveillances have identified tube leakage from SG 23
- RCS activity indicates a fuel pin leak

Which ONE of the following is the expected plant response?

A. R-45, Condenser Air Ejector Discharge Monitor will divert Condenser Air Removal flow from the atmosphere to the containment.

B. R-49, Steam Generator Blowdown Monitor will divert Condenser Air Removal flow from the atmosphere to the containment.

C. R-55C, Steam Generator Secondary System monitor will divert Condenser Air Removal flow from the atmosphere to the PAB exhaust.

D. R-61C, Main Steam/Steam Generator Tube Leakage Monitor will divert Condenser Air Removal flow from the atmosphere to the PAB exhaust.

Answer: A

Explanation/Justification :AOI 20.1 step requires the reactor to be tripped if power is greater than p-8 (!9%) power.

A. R-45 monitors and diverts as described

B. R-49 acts as a backup for R-45 (monitoring) and closes the SG blowdown valves

C. R-55 provides monitoring only. Additionally, CARS exhaust is diverted to the containment

D. R-61 provides monitoring only. Additionally, CARS exhaust is diverted to the containment

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #		055.K4.02
	Importance		2.6

Technical References: UFSAR Chapter 11, ARP SAF-1
References to be provided: None
Learning Objective: SYS-C-120 Obj 239

Question Source: (check one): ☒ New

☐ Bank: Facility: Question #:

☐ NRC Exam: Facility: Year:

Question Cognitive Level: Memory or Fundamental Knowledge: ☒

Comprehension or Analysis: ☐

10 CFR Part 55 Content: 55.41 ☒

55.43 ☐

Question # 075

The 21 Emergency Diesel Generator (EDG) has been started and loaded for testing. Following the start of the 21 EDG, power is lost to the 21 Day Tank fill valves.

Which ONE of the following describes the expected system response?

A. All three Fuel Oil Transfer pumps start on low level in the 21 Day Tank and fills the Day Tank to overflowing (fuel oil returns to Fuel Oil Storage Tank).

B. Fuel Oil Transfer pump 21 starts on low level in the 21 Day Tank and runs until a high level in the 21 Day Tank is reached.

C. Fuel Oil Transfer pump 21 starts on low level in the 21 Day Tank, but 21 EDG stops when the fuel currently in the Day Tank is used.

D. All three Fuel Oil Transfer pumps start on low level in the 21 Day Tank, but 21 EDG stops when the fuel currently in the Day Tank is used.

Answer: B

Explanation/Justification:

A. All three pumps will not automatically start on low level in one tank. The second part of the answer would be true if the back-up pump started with the day tank fill valves failed.

B. The associated fuel oil transfer pump starts on low level in the day tank and stops on either a high level or the day tank valves closing (on both the associated and related tank).

C. The day tank fill valves fail open on loss of power, making this an incorrect answer.

D. The day tank fill valves fail open on loss of power, making this an incorrect answer.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #		064.K6.08
	Importance		3.3

Technical References: 9321-LL-3133 Sheet 2 and 3
References to be provided: None
Learning Objective: SYS-C-273 Obj 2797 & 2798

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

As given

Question # 076

Which ONE of the following will terminate a radioactive release from R-54, Unit 1 Liquid Waste Distillate monitor?

A. R-54 monitor in "SOURCE CHECK".
B. R-54 monitor low flow.
C. R-54 monitor high flow rate.
D. R-54 monitor loss of power.

Answer: D.

Explanation/Justification:

A. Source Check causes the monitor's check source to be exposed to determine if an increased radiation level is detected. Going to "Source Check" will not cause the monitor to trip.
B. Low flow will generate a trouble alarm but not cause a trip
C. High flow will generate a trouble alarm, but not cause a trip
D. Loss of power to the monitor will deenergize the relay that controls power to the release valve, causing the valve to close.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #		073.K3.01
	Importance		4.2

Technical References: AOI 12.1.6, ARP SAF-1
References to be provided: None
Learning Objective: SYS-C-120 Obj 239

Question Source: (check one): ☒ New

Modified ☐ Bank: Facility: Question #:

☐ NRC Exam: Facility: Year:

Question Cognitive Level: Memory or Fundamental Knowledge: ☒

Comprehension or Analysis: ☐

10 CFR Part 55 Content: 55.41 ☒

55.43 ☐

As given

Question # 077

What is the function of the Service Water Pump Transfer Switches (EDG3 and EDG4)?

A. When selected to the "Emergency" position the associated SWP is capable of being powered from 12RW3.

B. When selected to the "Emergency" position the associated SWP is capable of being controlled locally at the Service Water Pump enclosure.

C. To shift control of the associated SWPs from the Control Room to the 480 Volt Switchgear Room.

D. To shift control and indication of the associated SWPs from the Control Room to the Safe Shutdown Panel.

Answer: A

Explanation/Justification:

A. Correct. The transfer switches are used if the CCR and 480Volt switch room are inaccessible, and serve to transfer the associated SWP pump (22 or 25) to its respective alternate power supply.

B. Incorrect. The transfer switches are used if the CCR and 480Volt switch room are inaccessible, and serve to transfer the associated SWP pump (22 or 25) to its respective alternate power supply.

C. Incorrect. The transfer switches are used if the CCR and 480Volt switch room are inaccessible, and serve to transfer the associated SWP pump (22 or 25) to its respective alternate power supply.

D. Incorrect. The transfer switches are used if the CCR and 480Volt switch room are inaccessible, and serve to transfer the associated SWP pump (22 or 25) to its respective alternate power supply.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		3
	K/A #		076.K.4.02
	Importance		3.2

Technical References: AOI-27.1.9
References to be provided: None
Learning Objective: SYS-C-240 Obj 388 & 392

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

As given

Question # 078

What indication of Fire Protection System status is available in the Central Control Room?

A. 12 Fire Pump running annunciator.

B. Fire header status on the Safety Assessment System computer.

C. Fire Header pressure gauge.

D. Motor driven Fire Pump running status lights on the CCR panel.

Answer: A

Explanation/Justification:

A. Alarm procedure 1FAF states Fire Pump 12 will auto start when fire header pressure is less than 105 psig. Fire header pressure will drop below 105 psig when water is flowing from a fire hydrant.

B. Fire protection system is not displayed on the SAS computer.

C. There are no pressure indicators on the main control board.

D. There are no motor driven fire pump status lights on the main control board.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #		086.A4.01
	Importance		3.3

Technical References: ARP 1FAF
References to be provided: None
Learning Objective: SYS-C-296 Obj 487 & 488

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 079

Given the following conditions:

- The 23 RCP lower radial bearing temperature has been trending up for several months
- At-power Vapor Containment (VC) entries have been made periodically to add oil to 23 RCP
- VC BLDG EQUIP HATCH PERSNL INNER DOOR SEALS FUEL TUBE LOW PRESS (SLF 1-5) alarm failed to clear following the last entry
- Weld Channel and Penetration Pressurization System air consumption was calculated to be less than 0.1% of the Containment volume per day
- A poly bag is discovered between the Personnel Air Lock inner door seals during the investigation

Which ONE of the following statements describes the effect on Containment Integrity?

A. Containment Integrity was maintained because the outer door was properly closed during this period.

B. Containment Integrity was maintained because containment leakage was within the requirements of Specifications 3.3.D, Weld Channel and Penetration Pressurization System.

C. Containment Integrity was lost due to the compromise of the inner door sealing surface at the same time the outer door was open.

D. Containment Integrity was lost due to the excessive Weld Channel and Penetration Pressurization System air consumption.

Answer: C

Explanation/Justification: See ARP SLF window 1-5

A. Containment integrity was lost when the outer door was opened for access to and from the containment due to the inner door not being properly closed.

B. Air consumption is within the limits of 0.2%. The concern is with the door sealing surface.

C. Containment integrity was lost when the outer door was opened for access to and from the containment due to the inner door not being properly closed.

D. Air consumption is within the limits of 0.2%. The concern is with the door sealing surface.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		2
	K/A #		103.K3.02
	Importance		4.2
Technical References:	T/S 3.3D, ARP SLF		

As given

Question # 079

References to be provided:	None		
Learning Objective:	SYS-C-106 Obj 198.12a		
Question Source: (check one):	☒ New		
	☐ Bank:	Facility:	Question #:
	☐ NRC Exam:	Facility:	Year:
Question Cognitive Level:	Memory or Fundamental Knowledge:	☐	
	Comprehension or Analysis:	☒	
10 CFR Part 55 Content:	55.41	☐	
	55.43	☒	

As given

Question # 080

Given the following conditions:

- The plant is operating at 100% power
- All control systems are in Automatic
- PCV 473 PRT Nitrogen supply pressure regulator, malfunctions and raises PRT pressure to 50 psig before the crew is able to isolate the nitrogen supply to the PRT

What action is required to reduce PRT pressure, and what are the consequences of not performing this action?

A. Spray the PRT, to avoid PRT rupture disk deformation.

B. Vent the PRT, to avoid PRT rupture disk deformation.

C. Spray the PRT, to avoid inhibiting proper PORV operation.

D. Vent the PRT, to avoid inhibiting proper PORV operation.

Answer: B

Explanation/Justification:

A. Incorrect Spraying the PRT will be ineffective since the pressure rise is due to an inert gas, not high temperature

B. Correct. Precaution and Limitation 2.6 of SOP 1.6 rev 17

C. Incorrect. Spraying the PRT will be ineffective since the pressure rise is due to an inert gas, not high temperature, and N-16 is formed from O-16 and neutron flux

D. Incorrect N-16 is formed from O-16 and neutron flux.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		3
	K/A #		007.A2.05
	Importance		3.6

Technical References: SOP-1.6
References to be provided: None
Learning Objective: SYS-C-014 Obj 56.56d

Question Source: (check one):
☒ New
☐ Bank: Facility: Question #:
☐ NRC Exam: Facility: Year:

Question Cognitive Level:
Memory or Fundamental Knowledge: ☒
Comprehension or Analysis: ☐

10 CFR Part 55 Content:
55.41 ☒
55.43 ☐

As given

Question # 081

A complete loss of condenser vacuum has caused a turbine/reactor trip from 100% power.

Once stabilized, what would be the expected value for RCS Tave?

A. 547°F.

B. 549°F.

C. 554°F.

D. 559°F.

Answer: B

Explanation/Justification:

A. Incorrect. Equivalent to No-Load Tave..

B. Correct. Equivalent to 1020 psig, the Atmospheric Steam Dump setpoint.

C. Incorrect. Equivalent to 1065 psig, the first SG safety setpoint.

D. Incorrect. Equivalent to full power Tave.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		3
	K/A #		041K.3.02
	Importance		3.9

Technical References: POP-3.1, step 3.3
References to be provided: None
Learning Objective: SYS-C-181 Obj 3963.c

Question Source: (check one):

- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:

- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:

- 55.41 ☒
- 55.43 ☐

As given

Question # 082

Which ONE of the following will cause a start of the Service Water Pumps selected for the Non-Essential Header?

A. Operation of the SI recirculation phase switches.

B. An SI signal with no station blackout.

C. A unit trip with blackout and no SI.

D. Low Non-Essential Header pressure.

Answer: A

Explanation/Justification:

A. Correct. This is the ONLY auto start for these pumps.

B. Incorrect. This starts the Essential Header pumps.

C. Incorrect. This starts the Essential Header pumps.

D. Incorrect. This is not an auto start for any SWPs.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		3
	K/A #		076.K.4.02
	Importance		3.2

Technical References: System Description 24, AOI 24.1
References to be provided: None
Learning Objective: SYS-C-240 Obj 393.7.A

Question Source: (check one):

- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:

- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:

- 55.41 ☒
- 55.43 ☐

As given

Question # 083

How will plant equipment be affected by a loss of instrument air?

A.
- Running charging pumps – minimum speed
- VC Monitors R-41/R-42 Supply/Return (PCV-1234, 1235, 1236, 1237) – closed
- Diesel Generator Cooler Outlets (FCV-1176, 1176A) – open

B.
- Condenser Steam Dump valves (PCV-1120-1131) – closed
- Main Feedwater Regulating valves (FCV-417, 427, 437, 447) – closed
- Bypass Feedwater Regulators (FCV-417L, 427L, 437L, 447L) – open

C.
- Power Operated Atmospheric Reliefs (PCV-1134-1137) – closed
- CST to Hotwell Makeup (LCV-1128) – open
- Non-Regenerative Heat Exchanger (TCV-130) – open

D.
- Pressurizer Spray valves (PCV-455A, 455B) – closed
- Loop Charging (204A/204B) – closed
- Charging Control (HCV-142) – closed

Answer: C

Explanation/Justification:

A. Incorrect. Charging pumps go to maximum speed

B. Incorrect. Bypass Feedwater Regulators fail OPEN on a loss of IA

C. Correct. As specified in AOI 29.2 Table 1

D. Incorrect. Loop Charging valves OPEN on a loss of IA

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		2
	Group #		3
	K/A #		078.K.3.02
	Importance		3.6

Technical References: AOI-29.2
References to be provided: None
Learning Objective: SYS-C-292Obj 15

Question Source: (check one): ☒ New

☐ Bank: Facility: Question #:

As given

Question # 083

	☐ NRC Exam:	Facility:		Year:
Question Cognitive Level:	Memory or Fundamental Knowledge:		☒	
	Comprehension or Analysis:		☐	
10 CFR Part 55 Content:	55.41 ☒			
	55.43 ☐			

Question # 084

Given the following conditions:

- The plant is at 100% power
- Current date and time are: 07/06/2001 at 1030
- Axial Flux Difference is outside the target band
- RCS Chloride concentration is 0.13 ppm
- 21 Auxiliary Feedwater Pump has been INOPERABLE since 07/05/2001 at 1130

Based on these conditions, how soon must the Control Room team take corrective action?

A. Immediately.

B. 1 hour.

C. 7 hours.

D. 2 days.

Answer: A

Explanation/Justification:

A. Correct. TS 3.10.2.5.1 Axial Flux Difference outside the bank above 90% power

B. Incorrect. TS for AFD allows up to one hour outside band if less than 90%

C. Incorrect, None of the above conditions require the actions of TS 3.0.1

D. Incorrect. The Aux Feed Pump is a 72 hour action, 23 hours have elapsed

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		3
	Group #		Cat 1
	K/A #		Gen.2.1.11
	Importance		3.8

Technical References: T/S 3.0.1, TS 3.1.E.2, T/S 3.4.B.1.a, T/S 3/10.2.5.1, T/S 3/10.2.6.1
References to be provided: None
Learning Objective: TSP-C-001 Obj 2618 & 2623& 04511

Question Source: (check one):
☒ New
☐ Bank: Facility: Question #:
☐ NRC Exam: Facility: Year:

Question Cognitive Level:
Memory or Fundamental Knowledge: ☐
Comprehension or Analysis: ☒

10 CFR Part 55 Content:
55.41 ☐
55.43 ☒

Question # 085

Given the following conditions:

- Plant cooldown is in progress
- RCS temperature - 300 °F
- RCS pressure - 380 psig
- Pressurizer level - 35%
- SG temperatures:
    - 21 SG - 310 °F
    - 22 SG - 300 °F
    - 23 SG - 290 °F
    - 24 SG - 280 °F
- OPS is NOT in service
- 23 RCP has just tripped, and 23 RCP was designated as the second operable RCP
- Natural circulation has been verified

Using SOP-1.3, "Reactor Coolant Pump Startup and Shutdown", determine if plant conditions support starting 23 RCP, and explain the basis for this decision.

A. Start 23 RCP; SG parameters are within prescribed limits.

B. Start 23 RCP; RCS parameters are within RCP operating limits.

C. Do not start 23 RCP; limitations on positive reactivity additions will be exceeded.

D. Do not start 23 RCP; an RCS overpressurization event may occur.

Answer: D

Explanation/Justification:

A. Incorrect. SG parameters are within limits but RCS temperature is not.

B. Incorrect. RCP operating limits are satisfied but not all starting limits.

C. Incorrect. Cold water addition is not a concern under these conditions.

D. Correct. Cannot start 23 RCP because RCS temperature is between 275 and 305 °F.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		3
	Group #		Cat 1
	K/A #		Gen.2.1.32
	Importance		3.8

Question # 085

Technical References:	SOP 1.3, T/S 3.1.A and Basis		
References to be provided:	None		
Learning Objective:	SYS-C-40.9a		
Question Source: (check one):	☒ New		
	☐ Bank:	Facility:	Question #:
	☐ NRC Exam:	Facility:	Year:
Question Cognitive Level:	Memory or Fundamental Knowledge:	☒	
	Comprehension or Analysis:	☐	
10 CFR Part 55 Content:	55.41 ☒		
	55.43 ☐		

As given

Question # 086

Given the following plant conditions:

- The plant was initially operating at 50% power during a plant startup
- Initial rod height was 180 steps
- The plant is at 160 MWe following an excessive load decrease
- Turbine control valves (UL and LL) are fully closed
- Turbine control valves (UR and LR) are partially open
- All turbine stop valves are fully open
- Reactor power is now 16%
- Rod height is now 180 steps

Using AOI-26.4.1.2, "Excessive Load Decrease", identify the required action(s) for this condition.

A. Trip the reactor and go to E-0, "Reactor Trip Or Safety Injection".

B. Trip the turbine and go to AOI-26.4.6, "Main Turbine Trip Without A Reactor Trip".

C. Determine if the excessive load decrease is due to the Turbine Control System.

D. Determine if the excessive load decrease is due to the Control Rod insertion.

Answer: C

Explanation/Justification:

A. Incorrect. True if power is above 250 MWe and below P-8.

B. Incorrect. True if power is above 250 MWe and above P-8.

C. Correct. Step 3.3 of AOI 26.4.1.2

D. Incorrect. Rods have NOT moved.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		3
	Group #		Cat 1
	K/A #		Gen.2.1.20
	Importance		4.2

Technical References: AOI-26.4.1.2
References to be provided: AOI-26.4.1.2
Learning Objective: TAA-C-005 Obj 2506

Question Source: (check one):

☒ New

☐ Bank: Facility: Question #:

☐ NRC Exam: Facility: Year:

As given

Question # 086

Question Cognitive Level:	Memory or Fundamental Knowledge:	☐
	Comprehension or Analysis:	☒
10 CFR Part 55 Content:	55.41 ☐	
	55.43 ☒	

As given

Question # 087

While at 100% power, which ONE of the following areas is considered a Permit Required Confined Space?

A. Service Water Valve Pit when no maintenance activities are ongoing.

B. Vapor Containment while at 100% power.

C. Fuel Storage Pit Pump Room during normal plant conditions.

D. Zurn Strainer Pit when welding activities are ongoing.

Answer: D

Explanation/Justification:

A. Incorrect. Meets the definition for a confined space, but is not permit required confined space based on historical data and CSP 16.00 guidance.

B. Incorrect. Though access is limited during 100% power conditions, the containment is not considered a permit required confined space IAW CSP 16.00.

C. Incorrect. Possible personnel hazard (atmosphere); however, room is ventilated, has normal means of ingress and egress; therefore is not a permit required confined space.

D. Correct. Limited access and egress, potential hazardous atmospheric conditions due to the welding activities.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		3
	Group #		Cat 1
	K/A #		Gen.2.1.26
	Importance		2.6

Technical References: CSP16.00, Permit Required Confined Space Program
References to be provided: None
Learning Objective: 1065

Question Source: (check one):

- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:

- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:

- 55.41 ☐
- 55.43 ☒

As given

Question # 088

Which ONE of the following is a basis for the design of the pressurizer and the Pressure Relief System?

A. Provide sufficient steam space volume to accommodate an insurge from a 50% load rejection, without pressure reaching the PORV setpoint.

B. Provide sufficient water volume to ensure the pressurizer will not empty following a reactor trip concurrent with a turbine trip.

C. Prevent uncovering the pressurizer heaters during a 10% per minute load increase.

D. Prevent water relief through the PORVs, following a complete loss of load, with automatic rod control and steam dumps available.

Answer: B

Explanation/Justification:

A. Incorrect. Concern is with PZR level reaching the reactor trip setpoint.

B. Correct. FSAR 4.2.2.2

C. Incorrect. 10% step change.

D. Incorrect. Concern is relief through ***safeties***, ***<u>with</u> out*** rods ***or*** steam dumps.

Exam Outline Cross Reference:	Level	<u>RO</u>	<u>SRO</u>
	Tier #		3
	Group #		Cat 1
	K/A #		Gen.2.1.28
	Importance		3.3

Technical References: FSAR 4.2.2.2
References to be provided: None
Learning Objective: SYS-C-014 Obj 48a

Question Source: (check one): ☒ New
☐ Bank: Facility: Question #:
☐ NRC Exam: Facility: Year:

Question Cognitive Level: Memory or Fundamental Knowledge: ☒
Comprehension or Analysis: ☐

10 CFR Part 55 Content: 55.41 ☒
55.43 ☐

As given

Question # 089

The plant is in cold shutdown with fuel movement in progress. Maintenance personnel request permission to remove one Source Range Channel from service to perform a modification.

When may one Source Range Channel be removed from service?

A. One Source Range Channel may be removed from service any time for a period of up to 1 hour.

B. If the Source Range Channel is not monitoring the quadrant of the core affected by the fuel movement in progress.

C. The Reactor Coolant System must be sampled for boron concentration at least every 12 hours.

D. Core geometry changes must be terminated.

Answer: D

Explanation/Justification:

A. Incorrect. Must have 2 SR in service whenever core geometry is being changed.

B. Incorrect. Must have 2 SR in service whenever core geometry is being changed.

C. Incorrect. This is accurate if no geometry changes are in progress and 2 SR's are out of service.

D. Correct. Tech Spec 3.8.A.2

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		3
	Group #		Cat 2
	K/A #		Gen.2.2.28
	Importance		3.5

Technical References: Tech Spec 3.8.A.2
References to be provided: None
Learning Objective: TSP-C-001 Obj 2616

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:
- 55.41 ☐
- 55.43 ☒

As given

Question # 090

Which ONE of the following is a responsibility of the Refueling SRO (RSRO)?

A. Forward requests for the use of any manipulator interlock bypasses not specifically approved in refueling procedures to the Shift Manager for approval.

B. Initial each step of SOP-17.31, "Refueling Operation Surveillance", to indicate the conditions of Checklists 1 and 2 are satisfied.

C. Ensure the initiation of refueling AOI implementation by communication with the CCR, CRS, or SM.

D. Perform 1/M plots.

Answer: C

Explanation/Justification:

A. Incorrect. RSRO is the approval authority.

B. Incorrect. CRS, RO, or NPO responsibility.

C. Correct. OAD 15 step 4.7.3

D. Incorrect. Working copy in VC, and official in CCR (fax daily from VC). OAD 3 step 4.4.7.(6)(a)

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		3
	Group #		Cat 2
	K/A #		Gen.2.2.29
	Importance		3.8

Technical References: OAD-3, OAD-15, SOP-17.31
References to be provided: None
Learning Objective: OAD-C-009 Obj 395, OAD-C-007 Obj 2259

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☐
- 55.43 ☒

As given

Question # 091

The basis for the Technical Specification LCO for Maximum Reactor Coolant Activity ensures that the limits of:

A. 10CFR20 are not exceeded at the site boundary during a ruptured-faulted steam generator event.

B. 10CFR20 are not exceeded at the site boundary during a steam line break accident, with steam generator tube leakage at the technical specifications limit.

C. 10CFR100 are not exceeded at the site boundary during a loss of reactor coolant accident.

D. 10CFR100 are not exceeded at the site boundary during a double-ended steam generator tube break, with the air ejector discharging to the atmosphere.

Answer: D

Explanation/Justification:

A. Incorrect. 10CFR100 applies.

B. Incorrect. 10CFR100 applies.

C. Incorrect. LOCA is not the worst case event for this calculation.

D. Correct. Resulting dose at the site boundary from RCS activity equivalent to 60/E is about 0.75mrem/hr, which is less than 10% of the 10CFR100 guideline values.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		3
	Group #		Cat 2
	K/A #		Gen.2.2.25
	Importance		3.7

Technical References: T/S 3.1.D.1 Basis
References to be provided: None
Learning Objective: TSP-C-001 Obj 2618

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

As given

Question # 092

Which ONE of the following evolutions requires using the controls prescribed in SAO-206, "Temporary Facility Changes"?

A. Disabling the visual or audible function of annunciators .

B. The operation of an installed defeat switch that is part of plant design and use is covered by approved procedures.

C. Hoses connected to a drain for draining into the atmosphere.

D. Modifications to equipment which is defined to be outside of the power block.

Answer: A

Explanation/Justification:

A. Correct. SAO-206, section 3.1

B. Incorrect. SAO-206, section 3.2

C. Incorrect. SAO-206, section 3.2

D. Incorrect. SAO-206, section 3.2

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		3
	Group #		Cat 2
	K/A #		Gen.2.2.5
	Importance		2.7

Technical References: SAO-206
References to be provided: None
Learning Objective:

Question Source: (check one):

☒ New

☐ Bank: Facility: Question #:

☐ NRC Exam: Facility: Year:

Question Cognitive Level:

Memory or Fundamental Knowledge: ☒

Comprehension or Analysis: ☐

10 CFR Part 55 Content:

55.41 ☐

55.43 ☒

As given

Question # 093

Which ONE of the following reflects a requirement for manual Log Sheet Data Entry?

A. Entries shall be made using only a black ink pen.

B. Entries shall be made at the designated time, + 50% or – 25% of the time interval.

C. Data to be corrected shall be lined out and dated.

D. Midnight readings shall be taken between 2000 and 0400.

Answer: B

Explanation/Justification:

A. Incorrect. Blue or black ballpoint pen only. NOTE: Use of felt tip pens is prohibited.

B. Correct OAD 3 step 4.1.2(3)(c).

C. Incorrect. Lined out, initialed, and corrected.

D. Incorrect. 2000 to 0100

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		3
	Group #		Cat 2
	K/A #		Gen.2.2.12
	Importance		3.4

Technical References: OAD-3
References to be provided: None
Learning Objective:

Question Source: (check one):
☒ New
☐ Bank: Facility: Question #:
☐ NRC Exam: Facility: Year:

Question Cognitive Level:
Memory or Fundamental Knowledge: ☒
Comprehension or Analysis: ☐

10 CFR Part 55 Content:
55.41 ☒
55.43 ☐

As given

Question # 094

Given the following conditions:

- The Ion Exchange Valve Gallery must be entered to perform a tagout of the mixed bed ion exchanger.
- The general radiation level in the Ion Exchange Valve Gallery is 875 mrem/hr.
- The area is barricaded and conspicuously posted as a High Radiation Area.

Prior to dispatching operators to the Ion Exchange Valve Gallery, what additional requirements must be met to comply with the Technical Specification requirements for entry to this area?

A. Sign on to a radiation work permit and provide the individuals with respiratory protection.

B. Issue a High Radiation Area key and sign on to a radiation work permit.

C. Issue a High Radiation Area key and provide the individuals with a radiation monitoring device that continuously indicates total dose received.

D. Sign on to a radiation work permit and provide the individuals with a radiation monitoring device that continuously indicates dose rate.

Answer: D

Explanation/Justification:

A. Incorrect, respiratory protection is not addressed in the TS

B. Incorrect, high radiation area keys are only required if the levels exceed 1000 mr/hr

C. Incorrect, neither item is required by TS

D. Correct, meets all the requirements of TS

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		3
	Group #		Cat 3
	K/A #		Gen.2.3.5
	Importance		2.5

Technical References: Tech Spec 6.12.1.a
References to be provided: None
Learning Objective: OAD-C-007 Obj 2277

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level: Memory or Fundamental Knowledge: ☒

As given

Question # 094

	Comprehension or Analysis:	☐
10 CFR Part 55 Content:	55.41	☒
	55.43	☐

Question # 095

During a refueling outage a mechanic who has been working in containment exits the Radiologically Controlled Area. It is later discovered that he was exposed to 26.2 Rem during the last entry into the Vapor Containment.

Which ONE of the following actions is appropriate for this situation?

A. The worker must submit the requisite samples for bioassay assessment.

B. Immediate notification shall be made to the NRC.

C. An emergency exposure must be authorized prior to further exposure.

D. The worker is prevented from further exposure until his lifetime dose is less than (N-18).

Answer: B

Explanation/Justification:

A. Incorrect. Bioassay is required for INTERNAL overexposures.

B. Correct. The immediate notification is for causing or threatening to cause an exposure in excess of 5 times the NRC limit.

C. Incorrect. Authorization must be made prior to exceeding NRC and company limits.

D. Incorrect. N-18 is no longer used.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		3
	Group #		Cat 3
	K/A #		Gen.2.3.4
	Importance		3.1

Technical References: SAO-301
References to be provided: None
Learning Objective: 2398

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☐
- Comprehension or Analysis: ☒

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

As given

Question # 096

Which ONE of the following would require having radiological controls and ALARA techniques incorporated into the applicable procedures?

A. Work to be performed in High Radiation Areas, where the general area working dose rates are greater than 10 mR/hr.

B. Work to be performed inside the normal RCA, which will open systems or components, containing or having the potential to contain radioactive material or radioactive liquids.

C. Work which involves expected exposures greater than 50 mrem.

D. Work which involves the potential for the release of radioactive material to the environment.

Answer: D

Explanation/Justification:

A. Incorrect. The threshold is 100 mR/hr.

B. Incorrect. This restriction is for work OUTSIDE the Normal RCA.

C. Incorrect. The threshold is 1 person-rem

D. Correct. SAO 303 step 4.3.1.d

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		3
	Group #		Cat 3
	K/A #		Gen.2.3.2
	Importance		2.9

Technical References: SAO-303
References to be provided: None
Learning Objective: 2003

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☐
- 55.43 ☒

Question # 097

In the event of a fire incident, who is responsible for determining if offsite fire fighting assistance is needed?

A. Control Room Supervisor.

B. Shift Manager.

C. Field Support Supervisor.

D. Watch Engineer.

Answer: C

Explanation/Justification:

A. Incorrect. Does NOT participate in Fire Brigade responsibilities.

B. Incorrect. Does NOT participate in Fire Brigade responsibilities.

C. Correct. FSS is the Fire Brigade Leader, and makes the decision for offsite assistance.

D. Incorrect. Does NOT participate in Fire Brigade responsibilities.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		3
	Group #		Cat 4
	K/A #		Gen.2.4.27
	Importance		3.5

Technical References: OAD-9, SAO-706
References to be provided: None
Learning Objective: OAD-C-007 Obj 2256

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☒
- 55.43 ☐

Question # 098

Given the following conditions:

- A large break LOCA has occurred, coincident with a station blackout
- Core Exit Thermocouples are reading 704°F
- RVLIS, Natural Circulation Range, indicates 50%
- All RCPs are secured
- Containment Radiation Monitors (R-25 and R-26) are reading 15 R/hr
- Containment pressure is 25 psig

Using the IP2 Emergency Action Level tables, identify the Emergency Action Level classification for these conditions.

A. Unusual Event.

B. Alert.

C. Site Area Emergency.

D. General Emergency.

Answer: C

Explanation/Justification:

A. Incorrect. UE only requires loss or potential loss of containment barrier.

B. Incorrect. Alert only requires loss or potential loss of either Fuel or RCS barrier.

C. Correct. Requires loss or potential loss of two barriers. EAL 9.1.6

D. Incorrect. Have not yet LOST 2 barriers.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		3
	Group #		Cat 4
	K/A #		Gen.2.4.41
	Importance		4.1

Technical References: EAL Tables
References to be provided: EAL Tables
Learning Objective: EOP-C-001 Obj 4425

Question Source: (check one):
☒ New
☐ Bank: Facility: Question #:
☐ NRC Exam: Facility: Year:

Question Cognitive Level:
Memory or Fundamental Knowledge: ☐
Comprehension or Analysis: ☒

10 CFR Part 55 Content: 55.41 ☐

As given

Question # 098

55.43 ☒

Question # 099

Which ONE of the following requires NRC notification within one hour?

A. An accidental criticality.

B. A fire in the Operations Department office area.

C. A unit startup.

D. An oil leak of 1 gallon in the protected area near the Circulating Water Pumps.

Answer: A

Explanation/Justification:

A. Correct. This is a one hour notification as prescribed in SAO-124, Attachment 1 and 10CFR50.72.

B. Incorrect. This is a two hour notification as prescribed in SAO-124, Attachment 1 and 10CFR50.72.

C. Incorrect. This is a two hour notification as prescribed in SAO-124, Attachment 1 and 10CFR50.72.

D. Incorrect. The threshold for reportability is 5 gallons.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		3
	Group #		Cat 4
	K/A #		Gen.2.4.30
	Importance		3.6

Technical References: SAO-124, 10CFR50.72
References to be provided: None
Learning Objective: TSP-C-001 Obj 2618

Question Source: (check one):

- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:

- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:

- 55.41 ☐
- 55.43 ☒

As given

Question # 100

EOP E-1, "Loss of Reactor or Secondary Coolant", step 23, "Check If Transfer To Cold Leg Recirculation Is Required", directs the Control Room team to return to step 15, and continue to evaluate plant status, until the RWST level is less than 9.24 feet.

Which ONE of the following describes the basis for continuing on to Cold Leg Recirculation when RWST level is less than 9.24 feet?

A. To ensure most of the boric acid available in the RWST has been flushed through the core.

B. To ensure there is sufficient water in the containment recirculation sumps.

C. To ensure most of the water available in the RWST has been used for core cooling.

D. To ensure sufficient boric acid and trisodium phosphate mixing in the containment recirculation sumps to maintain the proper pH for the water for recirculation.

Answer: B

Explanation/Justification:

A. Incorrect. Transfer to Cold Leg Recirc is based solely on having sufficient water in the recirc sump.

B. Correct. RWST level below 9.24 ft. ensures containment recirc sump level greater than that needed to provide adequate suction head for the ECCS pumps.

C. Incorrect. Transfer to Cold Leg Recirc is based solely on having sufficient water in the recirc sump.

D. Incorrect. Transfer to Cold Leg Recirc is based solely on having sufficient water in the recirc sump.

Exam Outline Cross Reference:	Level	RO	SRO
	Tier #		3
	Group #		Cat 4
	K/A #		Gen.2.4.18
	Importance		3.6

Technical References: EOP E-1 Background Document
References to be provided: None
Learning Objective: EOP-001 Obj 73

Question Source: (check one):
- ☒ New
- ☐ Bank: Facility: Question #:
- ☐ NRC Exam: Facility: Year:

Question Cognitive Level:
- Memory or Fundamental Knowledge: ☒
- Comprehension or Analysis: ☐

10 CFR Part 55 Content:
- 55.41 ☐
- 55.43 ☒

Intentionally left blank