

**NRC SRO License Exam  
Three Mile Island Nuclear Station  
July 2001**

**Written Examination Question  
Worksheets  
Form ES-401-6**

**Nuclear Regulatory Commission  
SRO Licensing Examination  
Three Mile Island Nuclear Station  
July 2001**

**Examination Answer Key**

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001 C	026 C	051 C	076 A
002 D	027 A	052 C	077 B
003 D	028 B	053 B	078 A
004 D	029 C	054 A	079 B
005 D	030 D	055 D	080 A
006 B	031 B	056 D	081 D
007 D	032 D	057 D	082 B
008 B	033 D	058 A	083 D
009 C	034 D	059 D	084 C
010 C	035 A	060 B	085 C
011 C	036 A	061 A	086 C
012 B	037 D	062 C	087 B
013 C	038 B	063 D	088 C
014 A	039 D	064 C	089 C
015 A	040 C	065 A	090 A
016 D	041 C	066 D	091 C
017 B	042 C	067 D	092 C
018 C	043 B	068 C	093 D
019 B	044 C	069 B	094 A
020 D	045 B	070 D	095 C
021 A	046 A	071 B	096 A
022 C	047 D	072 B	097 C
023 C	048 C	073 A	098 B
024 A	049 D	074 A	099 C
025 A	050 D	075 C	100 C

**VALIDATION**

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# Authorized Open References

Nuclear Regulatory Commission  
SRO Licensing Examination  
Three Mile Island Nuclear Station  
July 2001

Q #	Authorized Open Reference	Justification
005	P-T Plot.	TMI Obj. # IV.E.23.02 Identify and explain the P/T plot trace for the following events: b. LOCA c. Overcooling  Given plant conditions, determine if entry is required into ATP 1210-7 Large Break LOCA Cooldown.
009	1103-15A Figure 3	TMI Obj. # V.B.10.04 Perform SDM and Reactivity Balance calculations using OP 1103-15A.
021	Steam Tables	TMI Obj. # V.E.02.07 Given plant conditions determine if entry into ATP 1210-2 Loss of 25F Subcooled Margin, is required and what actions are to be taken.
022	Steam Tables	TMI Obj. # V.E.06.10 Given plant conditions determine if entry into ATP-1210-6, Small Break LOCA Cooldown, is required and what actions are to be taken.
024	Steam Tables	TMI Obj. # V.E.10.08 Given plant condition/status determine what "Rules" of ATP 1210-10 Abnormal Transient Rules, Guides and Graphs, apply and what actions are required to be taken.
025	Steam Tables.	TMI Obj. # V.G.04.05 Explain Pressurizer level indication response when the RCS is saturated (PORV open or closed).
033	302-11 302-141	TMI Obj. #
039	Steam Tables	TMI Obj. # V.E.08.09 Given plant conditions determine if the RCS is superheated and what actions are required.

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# Authorized Open References

Nuclear Regulatory Commission  
SRO Licensing Examination  
Three Mile Island Nuclear Station  
July 2001

Q #	Authorized Open Reference	Justification
040	Steam Tables.	TMI Obj. # V.E.02.06 Describe the conditions under which you exit 1210-2, Loss of 25F Subcooled Margin for 1210-6, Small Break LOCA Cooldown.
045	1103-15B, Estimated Critical Conditions, entire procedure. Calculator Ruler	TMI Obj. # V.B.11.05  Prior to startup, perform independent estimated critical rod position and estimated critical boron concentration calculations in accordance with OP 1103-15B.
051	Steam Tables	TMI Obj. # V.E.08.10 Given plant conditions determine if entry into ATP 1210-8 (RCS Superheated) is required and what actions are to be taken.
054	Blowup from drawing showing FW12.1 module.	TMI Obj. # IV.E.27.22  Predict the effect of a feedwater temperature change (increase or decrease) on the total feedwater demand signal.
062	Tech. Specs.	TMI Obj. # IV.E.06.11 Given the condition/status of the RMS and the appropriate section of Tech Specs / ODCM, determine if operability requirements are met and what actions, if any, are required.
064	Steam Tables	TMI Obj. # V.D.11.03 Given a list of symptoms, identify the event, determine what Immediate Automatic Actions will occur and what Immediate Manual Actions are required IAW EP 1202-29.
080	1104-4, Figure 2A page 66	TMI Obj. # IV.A.11.24 Given a set of plant conditions and appropriate curves, determine if DHR operating limits have been exceeded for: 1. Simultaneous RCP operation

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# Authorized Open References

Nuclear Regulatory Commission  
SRO Licensing Examination  
Three Mile Island Nuclear Station  
July 2001

Q #	Authorized Open Reference	Justification
086	OP 1106-1, page 57.	TMI Obj. #
089	Tech. Specs.	TMI Obj. # V.F.01.08 Given specific plant conditions and a copy of Tech. Specs., identify any Limiting Conditions for Operation (LCOs) which are challenged by such conditions, and determine remedial actions permitted or required by those LCOs.
090	Tech Specs	TMI Obj. # IV.B.06.10 Given plant conditions and access to technical specifications, determine Tech Spec operability requirements, required actions and applicable time clocks.

## Examination Outline Cross Reference

KA # 2.4.7

Page 2-11

Tier #

1

RO/SRO Importance Rating 3.1 3.8

Group #

1

**Measurement:** Knowledge of event based EOP mitigation strategies.**Proposed Question:** RO SRO PRA Related**Correct Answer:**

C

During a plant startup, the reactor was raised to the point of adding heat and conditions stabilized at 1% indicated Power. Three minutes later, the following conditions/indications are observed:

- Reactor power is 4% and rising.
- RCS Pressure is 2180 psig and rising slowly.
- RCS T-HOT is rising.
- Motor Fault lamp on Diamond is lit.
- RB pressure is stable at 0.14 psig
- OTSG pressures are 1010 and stable.
- OTSG levels are 25 inches and stable.
- Turbine Bypass Valve demand is 10% and rising.

Based on above conditions, which ONE of the following actions must be taken?

- A. Place Turbine Bypass Valve Controller in hand and stabilize steam flow.
- B. Place Spray Valve in MANUAL and fully open RC-V-1.
- C. Select JOG speed on the Diamond station.
- D. Initiate Emergency Boration.

**Technical Reference:** 1202-8, CRD Equipment Failure, page 23.

**Open Exam Reference:**

**Learning Objective:** V.D.03.03 Given a list of symptoms identify the event, determine what Immediate Automatic Actions will occur and what Immediate Manual Actions are required IAW EP 1202-8.

**Question Source:** New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

**Question Cognitive Level:** Memory or Fundamental Knowledge Comprehension or Analysis**10 CFR Part 55 Content:** 55.41 .10 55.43 .5 55.45 .13**Discriminant Validity Statements:**

- A Plausible due to potential positive reactivity addition.
- B Plausible response to RCS P increase.
- C Correct answer.
- D Plausible response to add negative reactivity.

**Comments:** None.

## Examination Outline Cross-Reference

KA # AK2.05

Page 4.2-2

Tier #

1

RO/SRO Importance Rating 2.9 3.1

Group #

1

Measurement Rod motion lights.

## Proposed Question

 RO SRO PRA Related

Correct Answer

D

The plant is at 50% power when the following indications are observed:

- Neutron error on the console is +6% and becoming more positive.
- The Diamond rod control panel IN command lamp is illuminated continuously.
- The Diamond rod control panel MOTOR fault lamp is illuminated.
- Reactor power is rising.

Which ONE of the following would cause all of these indications to occur?

- A. Reactor Crosslimits
- B. Feedwater Crosslimits
- C. Continuous Rod Insertion
- D. Continuous Rod Withdrawal

Technical Reference EP 1202-8, CRD Equipment Failure, page 23.

## Open Exam Reference

Learning Objective V.D.03.03 Given a list of symptoms identify the event, determine what Immediate Automatic Actions will occur and what Immediate Manual Actions are required IAW EP 1202-8.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .8 55.43 55.45 .3

## Discriminant Validity Statements

- A. Plausible due to the neutron error > 5%.
- B. Plausible due to the neutron error > 5%.
- C. Plausible due to the IN command light illuminated.
- D. Correct answer

Comments None.

## Examination Outline Cross Reference

KA # AA2.02

Page 4.2-5

Tier #

1

RO/SRO Importance Rating 2.7 2.8

Group #

1

Measurement Signal inputs to rod control system.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

D

Current plant conditions:

- The reactor is operating at 95% power.
- Control Rod exercising is in progress.
- Rod Control, Feedwater, and Reactor-Steam Generator Master controls are in MANUAL.
- An "OUT-INHIBIT" condition is illuminated on the Diamond rod control panel.
- A rapid reduction in power level has just occurred with fluctuations in RCS temperature, pressure and pressurizer level.
- Asymmetric Rod alarm is actuated.
- Current NI readings:
  - NI-5 = 90%
  - NI-6 = 96%
  - NI-7 = 97%
  - NI-8 = 96%

Identify the ONE cause for the above conditions:

- A. Partial insertion of rods during exercising.
- B. NI detector power supply fault.
- C. Azimuthal xenon oscillation.
- D. Dropped control rod.

Technical Reference EP 1202-8 CRD Equipment Failure, Page 8.

## Open Exam Reference

Learning Objective V.D.03.03

## Question Source

 New  TMI BankTMI Question # 30 FROM 98  
SRO EXAM Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .5,.10 55.43 .6 55.45 .13

## Discriminant Validity Statements

- A Plausible misconception regarding effect of partial insertion of safety rod groups during exercise testing.
- B Plausible misconception regarding ion chamber failure modes.
- C Plausible misconception regarding initiation of Xenon oscillations due to control rod insertion and withdrawal.
- D Correct answer.

Comments None.

## Examination Outline Cross-Reference

KA # AK1.01

Page

Tier #

1

RO/SRO Importance Rating 3.2 3.7

Group #

1

Measurement Reason for turbine following reactor on dropped rod event.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

D

Which ONE of the following is the reason for the Turbine following the Reactor during a dropped control rod event?

- A. To prevent a reduction in the minimum required Shutdown Margin.
- B. To minimize Xenon concentration shifts and the resultant oscillations.
- C. To ensure that at least 35°F of superheat is maintained at the exit of the OTSGs.
- D. To ensure balanced heat transfer by coordination of the reactor, OTSGs and turbine.

Technical Reference OPM F-3

## Open Exam Reference

## Learning Objective

IV.E.27.60 Given a set of plant conditions, determine the correct ICS response and any actions that must be taken if the ICS response is incorrect.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .8,.10 55.43 .3 55.45

## Discriminant Validity Statements

- A Plausible since the dropped rod and power reduction may be construed as having an effect on SDM.
- B Plausible since this will occur with a dropped rod.
- C If the turbine did not follow the reactor, the amount of superheat would actually increase as OTSG pressure drops.
- D Correct answer.

## Comments

None.

## Examination Outline Cross-Reference

KA # EA2.13

Page 4.1-8

Tier #

1

RO/SRO Importance Rating 3.7 3.7

Group #

1

Measurement Difference between overcooling and LOCA indications.

## Proposed Question

RO

SRO

PRA Related

## Correct Answer

D

Diagnose the transient occurring from the attached P-T plot.

Which ONE of the following is the correct ATOG flowpath to mitigate this event?

- A. ATP 1210-1 to 1210-3
- B. ATP 1210-1 to 1210-2 to 1210-3
- C. ATP 1210-1 to 1210-2 to 1210-6
- D. ATP 1210-1 to 1210-2 to 1210-7

Technical Reference ATP 1210-1 Reactor Trip page 4, 1210-2, Loss of 25°F Subcooled Margin, page 2.

Open Exam Reference P-T Plot.

Learning Objective IV.E.23.02 Identify and explain the P/T plot trace for the following events:  
 V.E.07.06 b. LOCA  
 c. Overcooling

Given plant conditions, determine if entry is required into ATP 1210-7  
 Large Break LOCA Cooldown.

## Question Source

New

TMI Bank

TMI Question #

Modified TMI Bank

Parent Question #

## Question Cognitive Level

Memory or Fundamental Knowledge

Comprehension or Analysis

## 10 CFR Part 55 Content

55.41 .7

55.43 .5

55.45 .5,.6

## Discriminant Validity Statements

- A. Plausible because trace does have some aspects of an overcooling.
- B. Plausible because trace does have some aspects of an overcooling.
- C. Plausible because examinee may choose to transition to small break LOCA instead of large break LOCA directly from 1210-2.
- D. Correct answer.

## Comments

Requires P-T Plot of a Large Break LOCA showing RCS pressure &lt; 600 psig.

## Examination Outline Cross-Reference

KA #	Page	Tier #	RO	SRO
2.1.7	2-1			
RO/SRO Importance Rating	3.7	4.4		
		Group #		1

**Measurement:** Ability to evaluate plant performance and make operational judgements based on operating characteristics, reactor behavior and instrumentation interpretation.

## Proposed Question

 RO
  SRO
  PRA Related

**Correct Answer:** **B**

Which ONE of the following sets of Reactor Coolant Pump motor temperatures would require a power reduction and trip of the affected pump?

## RC-P-1A

Motor stator - 110°C  
 Motor radial bearings - 170°F  
 Motor thrust bearing - 185°F

## RC-P-1B

Motor stator - 120°C  
 Motor radial bearings - 190°F  
 Motor thrust bearing - 180°F

## RC-P-1C

Motor stator - 130°C  
 Motor radial bearings - 150°F  
 Motor thrust bearing - 175°F

## RC-P-1D

Motor stator - 140°C  
 Motor radial bearings - 170°F  
 Motor thrust bearing - 170°F

- A. RC-P-1A
- B. RC-P-1B
- C. RC-P-1C
- D. RC-P-1D

**Technical Reference:** 1203-16, Reactor Coolant Pump and Motor Malfunction, page 4.

## Open Exam Reference

**Learning Objective:** V.C.06.03 State the immediate manual actions required for the following RCP malfunctions per AP 1203-16:  
 b. Loss of RCP motor cooling water (NSCCW)

## Question Source

New  TMI Bank **TMI Question #**  
 Modified TMI Bank **Parent Question #**

## Question Cognitive Level

Memory or Fundamental Knowledge  
 Comprehension or Analysis

## 10 CFR Part 55 Content

55.41 .5  55.43  55.45 .12,.13

## Discriminant Validity Statements

A Plausible due to high thrust bearing temperature that may be mistaken for radial bearing temperature requirement.

- B Correct answer.
- C Plausible due to high radial bearing temperature.
- D Plausible due to high stator temperature.

**Comments** None.

## Examination Outline Cross-Reference

KA # AK2.08

Page 4.2.10

Tier #

1

RO/SRO Importance Rating 2.6 2.6

Group #

1

Measurement CCWS

## Proposed Question

 RO SRO PRA Related

Correct Answer

D

Which ONE of the following events will cause a loss of motor cooling water to the Reactor Coolant Pumps?

- A. Loss of Instrument Air
- B. Loss of Offsite Power
- C. Loss of "A" DC
- D. 30# ES

Technical Reference OPM F-06

## Open Exam Reference

## Learning Objective

IV.E.24.06 State or identify those components which are effected by the following ESAS signals:  
d. RB high high pressure (30 PSI RB bldg press)

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 55.45 .7

## Discriminant Validity Statements

- A Plausible if examinee does not know the effects of this event on the Nuclear Services Closed Cooling Water system.
- B Plausible if examinee does not know the effects of this event on the Nuclear Services Closed Cooling Water system.
- C Plausible if examinee does not know the effects of this event on the Nuclear Services Closed Cooling Water system.
- D Correct answer.

Comments None.

## Examination Outline Cross Reference

KA # AK2.10

Page 4.2-10

Tier #

1

RO/SRO Importance Rating 2.8 2.8

Group #

1

Measurement RCP indicators and controls

## Proposed Question

 RO SRO PRA Related

Correct Answer

B

Initial Conditions:

- Plant at 50% power
- All four Reactor Coolant Pumps are running

Which ONE of the following indications associated with RC-P-1A would indicate that the pump has a sheared shaft?

- A. RC LOOP A FLOW LO alarm  
60% indicated amps on console  
High Shaft vibrations on Bently Nevada
- B. RC LOOP A FLOW LO alarm  
15% indicated amps on console  
High Motor Stand vibrations on computer
- C. RCP A MOTOR TROUBLE alarm  
High Shaft vibrations on Bently Nevada  
Low "A" loop RCS flow indication on console
- D. RCP A MOTOR TROUBLE alarm  
High Motor Stand vibrations on computer  
Low "A" loop RCS flow indication on console

Technical Reference 1203-16

## Open Exam Reference

Learning Objective V.C.06.01 Given a list of symptoms, identify which RCP malfunction is occurring per AP 1203-16:  
f. Pump motor separation-dropped impeller

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 55.45 .7

## Discriminant Validity Statements

- A Plausible because two of the three symptoms are correct, and the third is easily misconstrued as a symptom.
- B Correct answer.
- C Plausible because two of the three symptoms are correct, and the third is easily misconstrued as a symptom.
- D Plausible because two of the three symptoms are correct, and the third is easily misconstrued as a symptom.

Comments None.

## Examination Outline Cross-Reference

KA # AK1.02

Page 4.2-14

Tier #

1

RO/SRO Importance Rating 3.6 3.9

Group #

1

Measurement Relationship between boron addition and reactor power.

## Proposed Question

 RO SRO PFA Related

## Correct Answer

C

Initial Plant conditions:

- Core age 500 EFPD
- RCS boron is at 470 ppmB
- Reactor tripped from 100% power
- Several rods failed to insert fully
- Current Shutdown Margin is calculated at 0.80% delta k/k

Which ONE of the following is the MINIMUM final RCS boron concentration to meet Technical Specification Hot Shutdown requirements?

- A. 442.1 ppmB
- B. 444.0 ppmB
- C. 496.0 ppmB
- D. 497.9 ppmB

Technical Reference 1103-15A Figure 3  
T.S. Definition 1.2.2

Open Exam Reference 1103-15A Figure 3

Learning Objective V.B.10.04 Perform SDM and Reactivity Balance calculations using OP 1103-15A.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .8,.10 55.43 .2,.6 55.45 .3

## Discriminant Validity Statements

- A Uses correct curve, but subtracts from initial RCS boron.
- B Uses incorrect curve and subtracts from initial RCS boron.
- C Correct answer.
- D Uses incorrect curve for boron worth

## Comments

HSD = 1% delta k/k  
 1.0% - 0.8% = 0.2% delta k/k  
 HZP Boron worth = 130 ppmB/% delta k/k  
 0.2 x 130 = 26 ppmB increase needed  
 470 ppmB + 26 ppmB = 496 ppmB

## Examination Outline Cross-Reference

KA # 2.4.49

Page 2-16

Tier #

1

RO/SRO Importance Rating 4.0 4.0

Group #

1

**Measurement:** Ability to perform without reference to procedures those actions which require immediate operation of system components and controls.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

C

Plant conditions:

- At 100% Reactor power.
- Partial Loss of Intermediate closed cooling has occurred due to IC-V-6 drifting partially closed.
- Letdown has automatically isolated due to high CRD outlet temperature.
- Pressurizer level is 335" and rising at 1" a minute.
- The Shift Maintenance Foreman reports that he will have IC-V-6 open in 15 minutes.

What is the appropriate action for this condition?

- A. Continue 100% power operation until Maintenance can get IC-V-6 open.
- B. Defeat MU-V-1A & 1B interlock and re-establish letdown flow.
- C. Commence a plant shutdown.
- D. Trip the Reactor.

**Technical Reference:** 1202-17, Loss of Intermediate Closed Cooling System, page 4.

## Open Exam Reference

**Learning Objective:** V.D.10.04 Given plant conditions and a Loss of Intermediate Closed Cooling System, determine if a reactor shutdown or unit trip is required per EP 1202-17.

## Question Source

 New TMI Bank

TMI Question #

QR5D10-04-Q05

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .10 55.43 .5 55.45 .6

## Discriminant Validity Statements

- A Non-conservative decision, and in violation of the procedure.
- B This will restore inventory control, but could damage the ion exchanger.
- C Correct answer.
- D Plausible since required at 380 inches.

**Comments:** None.

## Examination Outline Cross-Reference

KA # AA1.09

Page 4.2-32

Tier #

1

RO/SRO Importance Rating 3.4 3.4

Group #

1

**Measurement** Setpoints of main steam safety and PORVs.**Proposed Question** RO SRO PRA Related**Correct Answer**

C

Which ONE of the following designs is based upon OTSG and Main Steam Line over-pressure protection?

- A. Anticipatory Reactor Trip on Turbine Trip > 45% reactor power
- B. HSPS Main Feedwater Isolation on High OTSG level
- C. Turbine Bypass Valves open at 1040 psig
- D. ICS Runback on High Load Limit

**Technical Reference** OPM F-03**Open Exam Reference****Learning Objective**

IV.E.27.17 State the set point and biases for the turbine bypass valves and the bases for each bias.

**Question Source** New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

**Question Cognitive Level** Memory or Fundamental Knowledge Comprehension or Analysis**10 CFR Part 55 Content** 55.41 .7 55.43 55.45 .5,.6**Discriminant Validity Statements**

- A. Plausible because this does present a high steam pressure condition, but the basis is to prevent challenges to the pressurizer PORV.
- B. Plausible because this does provide main steam line protection, but the basis is water hammer.
- C. Correct answer.
- D. Plausible because it prevents a over-power condition, but the basis is nuclear over-power.

**Comments**

None.

## Examination Outline Cross-Reference

KA #	AK3.01	Page	4.2-33	Tier #	1
RO/SRO Importance Rating	3.1*	Group #			1

**Measurement** Loss of steam dump capability upon loss of condenser vacuum.

**Proposed Question**  RO  SRO  PRA Related **Correct Answer** B

On a loss of condenser vacuum, OTSG pressure control swaps from the turbine bypass valves to the atmospheric dump valves to prevent which ONE of the following?

- A. Excessive hotwell levels.
- B. Rupture of the condenser boot seal.
- C. Loss of RMS monitoring capability.
- D. Damage to TBV operating diaphragm.

**Technical Reference** OPM Section H-4 page 3.  
OPM Section F-03 page 31.

## Open Exam Reference

**Learning Objective** IV.C.06.07 Describe how the main condenser is over-pressure protected.

**Question Source**  New  TMI Bank **TMI Question #**  
 Modified TMI Bank **Parent Question #**

**Question Cognitive Level**  Memory or Fundamental Knowledge  
 Comprehension or Analysis

**10 CFR Part 55 Content**  55.41 .5,.10  55.43  55.45 .6,.13

## Discriminant Validity Statements

- A High hotwell level could flood condenser tubes, reducing heat removal capabilities.
- B Correct answer.
- C Plausible since condenser off gas is monitored.
- D Plausible due to overdemand on the TBV to maintain same OTSG pressure.

**Comments** None.

## Examination Outline Cross-Reference

KA # EA2.06

Page 4.1-15

Tier #

1

RO/SRO Importance Rating

4.1

Group #

1

## Measurement

Faults and lockouts that must be cleared prior to re-energizing buses

## Proposed Question

 RO SRO PRA Related

## Correct Answer

C

Plant conditions:

- ES Actuation Signal Present.
- Loss of Off-site Power.
- Both Diesel Generators Operating.
- Equipment flags have been matched.
- Amber disagreement lights have been cleared.

Which ONE of the following is/are the MINIMUM required action(s) to restore control of ES equipment affected by 27/86 Lockout relays?

- A. Clear the ES Actuation signal.
- B. Reset the 27/86 Lockout relays.
- C. Clear the ES Actuation Signal AND reset the 27/86 lockout relays.
- D. Restore Off-site Power AND clear the ES Actuation signal AND reset the 27/86 Lockout Relays.

## Technical Reference

1202-2, Loss of Station Power, page 8.

## Open Exam Reference

## Learning Objective

IV.E.24.22 Given the following conditions,  
 a. Load shed, or  
 b. 27/86 lockout, or  
 c. Auto transfer of 1C ES valves and 1M DC buses  
 demonstrate or describe the method(s) for gaining control of those components affected by these signals.

## Question Source

 New TMI Bank

TMI Question #

QR4E24-22-Q02

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 55.43 .5 55.45 .13

## Discriminant Validity Statements

- A Plausible because this is half of the required action.
- B Plausible because this is half of the required action.
- C Correct answer.
- D Plausible because it contains the correct answer, but also an action that is not necessary.

## Comments

None.

## Examination Outline Cross Reference

KA # 2.4.10

Page 2.4.10

Tier #

1

RO/SRO Importance Rating 3.0 3.1

Group #

1

Measurement Knowledge of annunciator response procedures.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

A

During a radioactive gaseous release from a Waste Gas Decay Tank, RM-A-7 HIGH alarm actuated.

Which ONE of the following identifies all responses required to be verified per the alarm response?

- A. WDG-V-47 closed
- B. MAP-5 Iodine Sampler in operation
- C. WDG-V-47 closed  
AH-E-11 tripped
- D. AH-E-10 & 11 tripped  
MAP-5 Iodine Sampler in operation

Technical Reference ARP C-1-1 page 17 and 18.

## Open Exam Reference

## Learning Objective

- IV.B.08.08 Describe the flow path for a normal gas release and explain the following actions concerning the gas release.
- a. initiating
  - b. monitoring
  - c. securing
  - d. interlocks

## Question Source

 New  TMI Bank

TMI Question #

98 SRO Exam #  
35 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .10 55.43 .5 55.45 .13

## Discriminant Validity Statements

- A. Correct answer.
- B. Correct answer with plausible misconception that a MAP iodine sampler is installed on gas release flowpath as it is on the adjacent RB Purge Exhaust duct.
- C. Plausible misconception since AH-E-11 provides ventilation flow to the Auxiliary Building, and the release is routed into the building exhaust ventilation flow. RM-A-8, if in HI alarm, would perform this action.
- D. Plausible misconception since AH-E-10 and AH-E-11 provide ventilation supply air flow to the Auxiliary and Fuel Handling buildings, and the release is routed into the combined building exhaust ventilation flow. Also includes plausible misconception that a MAP sampler is located on gas release flowpath as it is on the adjacent RB Purge exhaust duct.

## Comments

Modified stem of question to be more operationally oriented. Modification does not meet requirements for a significant modification designation.

## Examination Outline Cross Reference

KA # AA2.08

Page 4.2-53

Tier #

1

RO/SRO Importance Rating 2.9 3.6

Group #

1

Measurement Limits of affected area

## Proposed Question

 RO SRO PRA Related

Correct Answer

A

Plant conditions:

- A major fire is reported in the East Inverter Room
- Spurious equipment actuations or losses are occurring

Which ONE of the following denotes the equipment at risk AND the proper procedure to address this situation?

- A. "A" side ESAS equipment  
OP 1104-45P, Fire Mitigation
- B. "A" side ESAS equipment  
EP 1202-37, Cooldown From Outside the Control Room
- C. "B" side ESAS equipment  
OP 1104-45P, Fire Mitigation
- D. "B" side ESAS equipment  
EP 1202-37, Cooldown From Outside the Control Room

Technical Reference 1104-45P

## Open Exam Reference

## Learning Objective

## Question Source

 New  TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 55.43 .5 55.45 .13

## Discriminant Validity Statements

- A. Correct answer.
- B. Plausible because the EP is higher in hierarchy than the OP and does address a similar situation. But the EP is for fire in the Control Room or Relay Room.
- C. Plausible if the examinee does not know what train of equipment is in the East inverter room.
- D. Plausible because the EP is higher in hierarchy than the OP and does address a similar situation. But the EP is for fire in the Control Room or Relay Room.

Comments None.

## Examination Outline Cross-Reference

KA # AK3.07

Page 4.2-54

Tier #

1

RO/SRO Importance Rating 4.0 4.3

Group #

1

**Measurement** Maintenance of SG water level using AFW flow control valves.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

D

During the implementation of 1202-37, Cooldown from Outside the Control Room, OTSG level control is established using \_\_\_\_\_ in order to \_\_\_\_\_.

- A. Only EF-V-30B/D  
prevent excessive overcooling in the event of a faulted OTSG.
- B. EF-V-30A/B/C/D  
prevent excessive overcooling in the event of a faulted OTSG.
- C. Only EF-V-30B/D  
establish and control Primary to Secondary heat transfer.
- D. EF-V-30A/B/C/D  
establish and control Primary to Secondary heat transfer.

**Technical Reference** 1202-37, Cooldown from Outside the Control Room page 3.**Open Exam Reference**

**Learning Objective** V.D.18.07 Explain how a plant cooldown is initiated, controlled and monitored from outside the control room per EP 1202-37, Cooldown from Outside the Control Room.

**Question Source** New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

**Question Cognitive Level** Memory or Fundamental Knowledge Comprehension or Analysis**10 CFR Part 55 Content** 55.41 .5,.10 55.43 55.45 .6,.13**Discriminant Validity Statements**

- A Misconception that only B train valves are used for control. 1202-37 uses B train components for the most part in the procedure.
- B Correct valves, wrong reason.
- C Wrong valves, correct answer.
- D Correct answer.

**Comments** None.

## Examination Outline Cross-Reference

KA # AA1.01

Page 4.2-57

Tier #

1

RO/SRO Importance Rating 3.5 3.7

Group #

1

Measurement Isolation valves, dampers and electropneumatic devices.

## Proposed Question

 RO SRO PRA Related

Correct Answer

B

Which ONE of the following would constitute a LOSS of containment integrity during refueling operations?

- A. Reactor Building purge in progress.
- B. An open penetration is sealed with fire foam.
- C. One airlock door on the personnel hatch open.
- D. The equipment hatch is secured with four (4) bolts.

Technical Reference Tech. Specs. page 3-44

## Open Exam Reference

Learning Objective V.B.01.05 State the Containment Integrity requirements for moving fuel during a refueling outage.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 .1 55.45 .5,.6

## Discriminant Validity Statements

- A. Plausible, the examinee may consider purging not allowed while refueling.
- B. Correct answer. This is a low pressure containment closure requirement.
- C. Plausible, the examinee may consider normal containment integrity requirements.
- D. Plausible, the examinee may consider four bolts insufficient.

Comments None.

## Examination Outline Cross-Reference

KA # AA1.03

Page 4.2-57

Tier #

1

RO/SRO Importance Rating 2.8 3.0

Group #

1

Measurement Fluid systems penetrating containment.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

C

Which ONE of the following valves must be capable of performing it's design function in order to provide containment integrity?

- A. MU-V-16A, HPI Throttle Valve
- B. DH-V-4A, Decay Heat Discharge
- C. CA-V-4A, OTSG Feedwater Sample
- D. RR-V-3A, Emergency Cooling Coil Inlet

Technical Reference 1101-3

## Open Exam Reference

Learning Objective V.B.01.01 State the conditions necessary for containment integrity to exist per OP 1101-3.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 .1 55.45 .5,.6

## Discriminant Validity Statements

- A. Plausible since this is the first valve on the outside of the containment penetration.
- B. Plausible since this is the first valve on the outside of the containment penetration.
- C. Correct answer.
- D. Plausible since this is the first valve on the outside of the containment penetration.

Comments None.

## Examination Outline Cross-Reference

KA # AA1.3

Page 4.3-29

Tier #

1

RO/SRO Importance Rating 3.4 3.6

Group #

1

**Measurement** Desired operating results during abnormal and emergency situations.**Proposed Question** RO SRO PRA Related**Correct Answer**

B

## Plant conditions:

- Reactor Power is 100%.
- The following ICS Stations are in HAND due to a BTU Limit modification in progress:
  - FW-P-1A, FW-P-1B
  - FW-V-16A, FW-V-16B
  - FW-V-17A, FW-V-17B
  - MAP alarm H-1-2, OTSG A BTU LIMIT, is actuated
  - MAP alarm H-1-3, OTSG B BTU LIMIT, is actuated
- All other ICS stations are in AUTOMATIC

A Loss of ICS HAND Power occurs.

Identify the ONE statement below that describes required operator action(s) for this situation.

- A. Stabilize reactor power to match Main Feedwater flow.
- B. Trip the Reactor, Turbine and both Main Feedwater Pumps.
- C. Place both Feedwater Pumps and all Feedwater Valves into ICS Auto.
- D. Transfer both Feedwater Pumps to the Motor Speed Changers in the Control Room.

**Technical Reference** EP 1202-41, Total or Partial Loss of ICS/NNI Hand Power, page 4.**Open Exam Reference****Learning Objective** V.D.21.03 State the Immediate Manual Actions required for a Total or Partial Loss of ICS/NNI Hand power per EP 1202-41.**Question Source** New  TMI Bank

TMI Question #

 Modified TMI BankParent Question # #15 FROM 2000  
RO EXAM**Question Cognitive Level** Memory or Fundamental Knowledge Comprehension or Analysis**10 CFR Part 55 Content** 55.41 .7 55.43 55.45 .5,.6**Discriminant Validity Statements**

- A Plausible since this action would attempt to balance heat production with heat removal.
- B Correct answer.
- C Plausible since this would address the loss of ICS Hand power, but not the BTU limits.
- D Plausible since this is an alternate method of Feedwater Pump control, but will not address the Feedwater valves.

**Comments** None.

## Examination Outline Cross-Reference

KA # AK3.3

Page 4.3-31

Tier #

1

RO/SRO Importance Rating 2.5 3.0

Group #

1

**Measurement** Manipulation of controls required to obtain desired operating results during abnormal and emergency conditions.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

D

Initial Conditions:

- Plant is at 100% power.
- All ICS H/A stations are in AUTO.
- ICS Power Supplies are in their normal line-up.

A loss of power supply ATA occurs.

For these conditions, which ONE of the following describes the equipment response and the reason for the response?

- A. MU-V-5 controller fails to the mid position due to loss of ICS HAND Power.
- B. MU-V-5 controller fails to the mid position due to loss of ICS AUTO Power.
- C. MS-V-4A/B control transfers to the Back-up Loaders due to loss of ICS HAND Power.
- D. MS-V-4A/B control transfers to the Back-up Loaders due to loss of ICS AUTO Power.

**Technical Reference** 1202-42, Total or Partial Loss of ICS/NNI Auto Power, Page 3

## Open Exam Reference

**Learning Objective** V.D.22.04 Given a list of symptoms, identify the event, determine what immediate automatic actions will occur and what immediate manual actions are required IAW EP 1202-42.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .8,.10 55.43 55.45 .3

## Discriminant Validity Statements

- A MU-V-5 fails to mid position on loss of HAND power. AUTO power was lost.
- B MU-V-5 fails to mid position on loss of HAND power. AUTO power was lost.
- C Plausible, controllers swap to BU loader, but only on loss of AUTO power.
- D Correct answer. Requires manual control via BU loader.

**Comments** None.

## Examination Outline Cross-Reference

KA #	Page	Tier #	RO	SRO
EK1.3	4.3-4	1		
RO/SRO Importance Rating	4.0	4.0		
		Group #		1

**Measurement** Annunciators and conditions indicating signals, and remedial actions associated with the inadequate subcooling margin.

## Proposed Question

 RO  SRO  PRA Related

## Correct Answer

A

The following conditions exists:

- A Loss of Station Power occurred, resulting in a reactor trip.
- Operators are completing the required Immediate Actions of ATP 1210-1, Reactor Trip.
- RCS pressure is 1800 psig and decreasing.
- RCS Thots are 571° F and decreasing.
- RCS Tcolds are 544° F and decreasing.
- Average of Five highest Incore Thermocouples is 618° F.
- Pressurizer level is 75 inches and decreasing.
- OTSG levels are at 14% (O.R.) and are increasing.
- OTSG pressures are 800 psig and decreasing.
- An Alert alarm is verified on RM-A5 gas, but levels have stabilized.

From the list below, identify the ONE correct response to these conditions.

- A. Initiate HPI.
- B. Close MU-V-3.
- C. Isolate both OTSGs.
- D. Reduce RCPs to one per loop.

**Technical Reference** 1210-1, Reactor Trip, page 4.  
Steam Tables

**Open Exam Reference** Steam Tables

**Learning Objective** V.E.02.07 Given plant conditions determine if entry into ATP 1210-2 Loss of 25F Subcooled Margin, is required and what actions are to be taken.

## Question Source

 New  TMI Bank  Modified TMI Bank

TMI Question #

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge  
 Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .8,.10  55.43 .5  55.45 .3

## Discriminant Validity Statements

- A Correct answer.
- B Plausible if examinee responds to RMS indication. Lower priority.
- C Plausible if examinee responds to lowering OTSG pressures. Lower priority.
- D Plausible if examinee responds to high RCS temperature. Lower priority.

**Comments** None.

## Examination Outline Cross Reference

KA # EK2.2

Page 4.3-34

Tier #

1

RO/SRO Importance Rating 4.3 4.3

Group #

1

## Measurement

Facilities heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

C

The following plant conditions exist:

- Small Break LOCA cooldown in progress
- RCPs are tripped.
- HPI is in operation and is throttled to control cooldown rate.
- Natural circulation has not been verified.
- Average of the five highest Incore Thermocouples is 456°F.

In order to address PTS concerns, the CRS directs the CRO to establish RCS pressure at \_\_\_\_\_

- A. 550 +/- 25 psig
- B. 600 +/- 25 psig
- C. 800 +/- 25 psig
- D. 850 +/- 25 psig

Technical Reference Steam Tables

Open Exam Reference Steam Tables

Learning Objective V.E.06.10 Given plant conditions determine if entry into ATP-1210-6, Small Break LOCA Cooldown, is required and what actions are to be taken.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .8/.10 55.43 55.45 .3

## Discriminant Validity Statements

- A Low end and high end provide >25°F SCM, but less than required 30°F SCM.
- B Low end provides >25°F SCM, but less than required 30°F SCM. High end provides 30°F SCM.
- C Correct answer, allowable band is 584 psig to 840 psig in order to minimize subcooling requirements, which is 30 to 70 degrees.
- D Low end meet 30°F SCM, high end exceeds 70°F SCM.

## Comments

None.

## Examination Outline Cross Reference

KA # EA1.2

Page 4.3-10

Tier #

1

RO/SRO Importance Rating 3.6 3.6

Group #

1

Measurement Operating behavior characteristics of the facility.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

C

Plant conditions:

- Reactor trip has occurred.
- RCS pressure is 1800 psig,
- RCS T-cold is 532 degrees F,
- OTSG 1A pressure is 650 psig,
- OTSG 1B pressure is 970 psig,
- Reactor Building pressure is 6 psig.

Which ONE of the following procedures would be transitioned to from 1210-1, Reactor Trip?

- A. 1203-24, Steam Leak
- B. 1210-2, Loss of 25 Degrees Subcooled Margin
- C. 1210-3, Excessive Primary to Secondary Heat Transfer
- D. 1210-9, HPI Cooling - Recovery from Solid Operations

Technical Reference 1210-1, Reactor Trip page 4

## Open Exam Reference

## Learning Objective

V.E.03.06 Given plant conditions determine if entry into ATP 1210-3, Excessive Primary to Secondary Heat Transfer is required, and what action(s) must be taken.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question # QR5E03-06-Q05

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 .5 55.45 .5,.6

## Discriminant Validity Statements

- A Steam leak is the cause and would isolate the leak, but transition is incorrect.
- B Incorrect transition from 1210-1.
- C Correct answer.
- D Incorrect transition from 1210-1.

## Comments

This question meets 55.43(b)5 criteria for SRO level of knowledge.

## Examination Outline Cross-Reference

KA # EK3.3

Page 4.3-16

Tier #

1

RO/SRO Importance Rating 3.8 3.4

Group #

1

**Measurement** Manipulation of controls required to obtain desired operating results during abnormal and emergency situations.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

A

The following conditions/indications exist following a trip from 100% power:

- RCPs tripped in response to a loss of SCM
- RCS Pressure is 1900 psig and stable.
- Average of the 5 highest thermocouples is 615 °F and stable.
- OTSG Pressures are 1010 psig and stable.
- Both MFW and EFW are available
- OTSG level is responding as expected

Which ONE of the following describes the MINIMUM feed requirements to establish natural circulation in the RCS AND the basis for those requirements?

- A. EFW minimum flow of 215 gpm per OTSG to promote primary to secondary heat transfer.
- B. EFW minimum flow of 215 gpm per OTSG to minimize thermal stress to OTSG components.
- C. MFW minimum flow of 0.05 X E6 lbm/hr per OTSG to promote primary to secondary heat transfer.
- D. MFW minimum flow of 0.05 X E6 lbm/hr to minimize thermal stress to OTSG components.

**Technical Reference** 1210-10 Abnormal Transients Rules, Guidelines and Graphs page 5.

**Open Exam Reference** Steam Tables

**Learning Objective** V.E.10.08 Given plant condition/status determine what "Rules" of ATP 1210-10 Abnormal Transient Rules, Guides and Graphs, apply and what actions are required to be taken.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .8/.10 55.43 55.45 .3

## Discriminant Validity Statements

- A Correct answer.
- B Plausible, but the basis is for dry OTSG limits.
- C Plausible since MFW is a potential source of feed under loss of SCM conditions.
- D Plausible since MFW is a potential source of feed under loss of SCM conditions, but these are dry OTSG limits.

**Comments** None.

**Examination Outline Cross-Reference**

KA # AK3.01

Page 4.2-8

Tier #

1

RO/SRO Importance Rating 4.4

Group #

2

**Measurement** Why pressurizer level may come back on scale if RCS is saturated.**Proposed Question** RO SRO PRA Related**Correct Answer**

A

Plant conditions:

- Reactor is tripped due to a loss of all main and emergency feedwater.
- PORV is manually opened and flow has been confirmed.
- RCS pressure is currently 2000 psig.
- All 4 RCPs have been tripped.
- RB pressure is 0.2 psig and rising at 0.05 psig per minute.
- Pressurizer level is 220 inches.
- Average of the 5 highest incore thermocouples is 640 degrees F.
- Pressurizer temperature is 616 degrees F.

Identify the ONE statement below that describes why current Pressurizer level indication is NOT providing accurate indication of RCS inventory conditions.

- A. Voids are forming in the RCS.
- B. Pressurizer temperature is low.
- C. Level sensor reference leg fluid is flashing.
- D. Mass transport through the Pressurizer PORV.

**Technical Reference** Steam Tables.**Open Exam Reference** Steam Tables.**Learning Objective** V.G.04.05 Explain Pressurizer level indication response when the RCS is saturated (PORV open or closed).**Question Source** New  TMI Bank

TMI Question #

QR5G04-05-Q07  
from 2000 RO  
Exam. Modified TMI Bank

Parent Question #

**Question Cognitive Level** Memory or Fundamental Knowledge Comprehension or Analysis**10 CFR Part 55 Content** 55.41 .5,.10 55.43 55.45 .6/.13**Discriminant Validity Statements**

- A Correct answer. RCS is saturated.
- B Plausible misconception that level indication is temperature calibrated rather than compensated.
- C Plausible misconception regarding reference leg conditions and dynamics.
- D Plausible misconception of effects of turbulent flow through the Pressurizer.

**Comments** None.

## Examination Outline Cross-Reference

KA # EK2.03

Page 4.1-4

Tier #

1

RO/SRO Importance Rating 3.0 3.3\*

Group #

2

## Measurement S/Gs

## Proposed Question

 RO SRO PSA Related

## Correct Answer

C

The Abnormal Transient Procedures require Primary to Secondary heat transfer during small break LOCA conditions even with core cooling provided by high pressure injection.

Which ONE of the following is the basis for this requirement?

- A. Maintain main steam supply to EF-P-1.
- B. Expedite recovery of at least 25°F Subcooled Margin.
- C. Ensure core cooling is maintained if HPI cooling flow is insufficient.
- D. Achieve and maintain core cooldown rate greater than 100° F per hour.

**Technical Reference** ATOG OS-24, ATOG Theory and Practice, page 5.

**Open Exam Reference**

**Learning Objective** V.E.11.06 Explain the assumed operator practices for each of the following items:  
- Maintaining OTSGs available as heat sinks

**Question Source** New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

**Question Cognitive Level** Memory or Fundamental Knowledge Comprehension or Analysis**10 CFR Part 55 Content** 55.41 .7 55.43 55.45 .7**Discriminant Validity Statements**

- A Plausible because EF-P-1 may be required for PSHT.
- B Plausible because this is desired, but is a function of RCS break size.
- C Correct answer.
- D Plausible because core cooldown should be maintained, but NOT greater than 100F/hour.

**Comments** None.

## Examination Outline Cross-Reference

KA # AK1.01

Page 4.2-12

Tier #

1

RO/SRO Importance Rating 2.8 3.2\*

Group #

2

Measurement Consequences of thermal shock to RCP seals.

## Proposed Question

 RO SRO PRA Related

Correct Answer

A

The reason for limiting the rate of seal water temperature change during restoration of seal injection to a RCP following a loss of seal injection is to prevent thermal shock to the RCP \_\_\_\_\_

- A. seals, resulting in excessive seal leakoff.
- B. seals, resulting in inadequate seal cooling.
- C. thermal barrier, resulting in excessive seal flow.
- D. thermal barrier, resulting in inadequate seal flow.

Technical Reference 1203-15

## Open Exam Reference

## Learning Objective

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .8/.10 55.43 55.45 .3

## Discriminant Validity Statements

- A Correct answer.
- B Plausible if failure mechanism is understood.
- C Plausible since seal flow also goes through the thermal barrier.
- D Plausible since seal flow also goes through the thermal barrier.

Comments None.

## Examination Outline Cross-Reference

KA # AK2.03

Page 4.2-20

Tier #

1

RO/SRO Importance Rating 2.6 2.8

Group #

2

Measurement Controllers and positioners

## Proposed Question

 RO SRO PFA Related

## Correct Answer

B

Sequence of events:

- Initial reactor power = 90%.
- FW-P-1A trips and an automatic ICS runback is in progress.
- At 2225 psig RCS pressure (still rising), the selected RCS pressure transmitter fails low (SASS DOES NOT ACTUATE).
- NO manual operations have been performed.

From the list below, identify the ONE group of automatic actions that will occur if this plant situation continues and no operator actions are taken.

- A. RC-V-1 CLOSES;  
Pressurizer heaters ENERGIZE;  
Reactor trips on LOW RCS pressure.
- B. RC-V-1 CLOSES;  
Pressurizer heaters ENERGIZE;  
Reactor trips on HIGH RCS pressure.
- C. RC-V-1 remains OPEN;  
Pressurizer heaters DE-ENERGIZE;  
Reactor trips on HIGH RCS pressure.
- D. RC-V-1 remains OPEN;  
Pressurizer heaters DE-ENERGIZE;  
Reactor trips on LOW RCS pressure.

Technical Reference EP 1202-29, Pressurizer System Failure, Pages 5 and 7.

## Open Exam Reference

## Learning Objective

V.D.11.03 Given a list of symptoms, identify the event, determine what Immediate Automatic Actions will occur and what Immediate Manual Actions are required IAW EP 1202-29.

## Question Source

 New  TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 55.45 .7

## Discriminant Validity Statements

- A Plausible because all actions listed occur in response to an actual decrease in RCS pressure.
- B Correct answer. The first two actions result in the third action
- C Plausible because all actions listed occur in response to an actual increase in RCS pressure.
- D Plausible because first two actions occur in response to an actual increase in RCS pressure.

## Comments

None.

## Examination Outline Cross Reference

KA # AK3.01

Page 4.2-24

Tier #

1

RO/SRO Importance Rating 3.2 3.6

Group #

2

Measurement Startup termination on source range loss.

## Proposed Question

RO

SRO

PRA Related

## Correct Answer

C

Plant startup is in progress. Source Range channels indicate 100 cps. Group 5 rods are being withdrawn from 75% to 100% when Source Range Channel NI-11 fails low.

Based on this condition, the startup:

- A. Should be terminated AND verify the core is 1% deltaK/K shutdown.
- B. Should be terminated AND Group 5 rods fully inserted.
- C. May continue provided NI-12 is operational.
- D. May continue provided NI-3 is operational.

Technical Reference T.S 3.5.1 pages 3-27 and 3-29.

## Open Exam Reference

Learning Objective IV.E.11.15 State or identify the Nuclear Instrumentation channel operability requirements for a plant startup and power operation as delineated in Tech Specs section 3.5.

## Question Source

New

TMI Bank

TMI Question #

Modified TMI Bank

Parent Question #

## Question Cognitive Level

Memory or Fundamental Knowledge

Comprehension or Analysis

## 10 CFR Part 55 Content

55.41 .5,.10

55.43 .1

55.45 .6/.13

## Discriminant Validity Statements

- A Plausible if it is determined to terminate the startup, 1% deltak/k shutdown would be a required condition.
- B Plausible since this would have all controlling groups inserted back to the original position prior to initiating startup.
- C Correct answer.
- D Plausible since this instrument would be required for continuing the startup.

## Comments

None.

## Examination Outline Cross-Reference

KA # AA2.02

Page 4.2-25

Tier #

1

RO/SRO Importance Rating 3.6 3.9

Group #

2

**Measurement** Expected change in source range count when control rods are moved.**Proposed Question** RO SRO PRA Related**Correct Answer**

D

Plant startup is in progress with the following conditions:

- Safety Groups 1 through 4 are fully withdrawn.
- Regulating Groups 5 through 7 are fully inserted.
- Group 8 is 30% withdrawn.
- ECP is for 75% on Group 6.
- NI-11 reads 30 cps.
- NI-12 reads 31 cps.

Group 5 is now withdrawn 25%. The following indications are now present:

- NI-11 reads 33 cps.
- NI-12 reads 65 cps.

These readings indicate that during the rod pull:

- A. NI-11 pulse height discriminator has failed high.
- B. NI-12 pulse height discriminator has failed high.
- C. NI-11 pulse height discriminator has failed low.
- D. NI-12 pulse height discriminator has failed low.

**Technical Reference** OPM Section F-4, Nuclear Instrumentation page 28.**Open Exam Reference****Learning Objective**

No direct TMI objective matches this KA.

**Question Source** New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

**Question Cognitive Level** Memory or Fundamental Knowledge Comprehension or Analysis**10 CFR Part 55 Content** 55.41 .5 55.43 55.45 .13**Discriminant Validity Statements**

- A High failure would cause the NI to read low, however, counts would only rise slightly on the first rod pull.
- B Indication would fail low.
- C Indication would fail high.
- D Correct answer.

**Comments**

No direct TMI objective matches this KA.

**Examination Outline Cross-Reference**

KA # AK1.02

Page 4.2.29

Tier #

1

RO/SRO Importance Rating 3.5 3.9

Group #

2

**Measurement** Leak rate vs. pressure drop.**Proposed Question** RO SRO PRA Related**Correct Answer**

B

While performing ATP 1210-5, "OTSG Tube Leakage," the basis for minimizing RCS Subcooling Margin is to reduce the:

- A. Time required for cooldown of the RCS.
- B. Leak rate across the leaking/ruptured tube.
- C. The amount of inventory loss from the BWST.
- D. Possibility of lifting Main Steam safety valves.

**Technical Reference** OS-24, ATOG Theory and Practice, page 5.**Open Exam Reference****Learning Objective**

V.E.05.05 Describe the methods available in ATP 1210-5, OTSG Tube Leakage, for limiting integrated OTSG tube leakage.

**Question Source** New TMI Bank

TMI Question #

SR5E05-05-Q03

 Modified TMI Bank

Parent Question #

**Question Cognitive Level** Memory or Fundamental Knowledge Comprehension or Analysis**10 CFR Part 55 Content** 55.41 .8/.10 55.43 55.45 .3**Discriminant Validity Statements**

- A Cooldown time not affected by SCM, but is a major concern for design cooldown considerations in the FSAR.
- B Correct answer.
- C BWST inventory is one of the criteria for isolating the OTSG to ensure adequate borated water source for long term cooldown.
- D A goal of the procedure, but minimizing SCM does not prevent lifting the safetys.

**Comments**

None.

## Examination Outline Cross-Reference

KA # AA1.11

Page 4.2-30

Tier #

1

RO/SRO Importance Rating 3.4 3.3

Group #

2

Measurement PZR level indicator.

## Proposed Question

 RO SRO PRA Related

Correct Answer

D

The following sequence of events has occurred:

- Plant was stable at 100% power.
- RMS alarms actuated on RM-A-5 and RM-G-26
- Operators diagnosed an estimated 10 gpm tube leak from OTSG A.
- Plant shutdown at 2%/minute was commenced IAW ATP 1210-5, OTSG Tube Leakage.

Power is now at 60%, and the following indications are present:

- MU-T-1 is 67 inches and dropping at 0.5 inch per minute.
- Pressurizer level is 145 inches and dropping at 1 inch per minute.
- Makeup flow indicates 120 gpm.
- Batch controller indicates a makeup rate of 90 gpm.
- MU-V-3 is closed.

Which ONE of the following actions should be taken?

- A. Raise makeup rate to MU-T-1.
- B. Lower power reduction to 1 %/minute.
- C. Open MU-V-14A or MU-V-14B.
- D. Trip the reactor and initiate both trains of HPI.

Technical Reference 1210-10, Abnormal Transients Rules, Guidelines and Graphs, page 6.

## Open Exam Reference

Learning Objective V.E.10.08 Given plant condition/status determine what "Rules" of ATP 1210-10 Abnormal Transient Rules, Guides and Graphs, apply and what actions are required to be taken.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 55.45 .5,.6

## Discriminant Validity Statements

- A Plausible since this would allow the operators to address the MU-T-1 inventory issue.
- B Plausible since this would reduce RCS shrinkage.
- C Plausible since this would allow the operators to address the MU-T-1 inventory issue and raise charging flow.
- D Correct answer since pressurizer level is not greater than 150".

Comments None.

## Examination Outline Cross-Reference

KA # AA2.03

Page 4.2-47

Tier #

1

RO/SRO Importance Rating

3.9

Group #

2

## Measurement

The steps necessary to isolate a given radioactive-gas leak, using P&amp;IDs.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

D

Initial plant conditions:

- Plant is being cooled down due to a OTSG tube leak.
- OTSG pressure is 850 psig.

A body to bonnet leak occurs on GS-V-4, requiring Turbine Building evacuation due to radiological conditions.

Which ONE of the following identifies the minimum required isolation points for isolating the release AND allow maximum safety for maintenance on GS-V-4?

- A. MS-V-7  
GS-V-5  
GS-V-8
- B. MS-V-1D  
GS-V-5  
GS-V-8
- C. MS-V-7  
MS-V-1D  
GS-V-5  
GS-V-8
- D. MS-V-7  
MS-V-1C  
MS-V-1D  
GS-V-5  
GS-V-8

Technical Reference 302-11 302-141

Open Exam Reference 302-11 302-141

## Learning Objective

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .5 55.43 55.45 .13

## Discriminant Validity Statements

- A Plausible, but only provides single valve isolation on the high pressure side and misses the crossconnect.
- B Plausible, but only provides single valve isolation on the high pressure side and misses the crossconnect.
- C Plausible, but misses the crossconnect.
- D Correct answer.

## Comments

None.

Examination Outline Cross-Reference

KA # AK3.02

Page 4.2-48

Tier #

1

RO/SRO Importance Rating 3.4 3.6

Group #

2

Measurement Guidance contained in alarm response for ARM system.

Proposed Question

RO

SRO

PRA Related

Correct Answer

D

While pumping down the RCDT, it's radiation monitor (RM-G-20) unexpectedly goes into HIGH alarm.

Which ONE of the following identify the proper procedures to reference in order to mitigate the problem?

- A. EP 1202-29, Pressurizer System Failure  
AbP 1203-15, Loss of RC Makeup/Seal Injection
- B. EP 1202-11, High RCS Activity  
EP 1202-12, Excessive Radiation Levels  
AbP 1203-15, Loss of RC Makeup/Seal Injection
- C. EP 1202-12, Excessive Radiation Levels  
EP 1202-29, Pressurizer System Failure  
AbP 1203-15, Loss of RC Makeup/Seal Injection
- D. EP 1202-11, High RCS Activity  
EP 1202-12, Excessive Radiation Levels  
EP 1202-29, Pressurizer System Failure

Technical Reference C-1-1 for RM-G-20

Open Exam Reference

Learning Objective

All EPs have an objective to recognize the symptoms and/or entry conditions.

Question Source

New

TMI Bank

TMI Question #

Modified TMI Bank

Parent Question #

Question Cognitive Level

Memory or Fundamental Knowledge

Comprehension or Analysis

10 CFR Part 55 Content

55.41 .5,.10

55.43 .5

55.45 .6/.13

Discriminant Validity Statements

- A Plausible because this EP is addressed for all radiation alarms.
- B Plausible because high RCS activity would be involved.
- C Plausible because there must be leakage from the pressurizer.
- D Correct answer.

Comments None.

## Examination Outline Cross-Reference

KA # AK2.1

Page 4.3-26

Tier #

1

RO/SRO Importance Rating 3.7 3.5

Group #

2

## Measurement

Components, and functions of control and safety systems, including implementation, signals, interlocks, failure modes and automatic and manual features.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

A

Initial conditions:

- Plant at 80% power during a power escalation.
- Rod index is 275
- FW-P-1A and FW-P-1B in operation

The following sequence of events occurred:

- Loss of FW-P-1A
- Runback initiated in response to the loss of FW-P-1A
- 3 seconds after the runback initiated, a rod in Group 5 drops to the bottom of the core.

The runback will continue at:

- A. 30% per minute to 482 MWe
- B. 30% per minute to 585 MWe
- C. 50% per minute to 482 MWe
- D. 50% per minute to 585 MWe

Technical Reference ARP MAP H-1-1, page 1.

## Open Exam Reference

## Learning Objective

IV.E.27.60 Given a set of plant conditions, determine the correct ICS response and any actions that must be taken if the ICS response is incorrect.

## Question Source

 New  TMI Bank

TMI Question #

19 FROM  
WAPLE RETAKE Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .8/.10 55.43 55.45 .3

## Discriminant Validity Statements

- A Correct answer.
- B Plausible if runback rate determination and setpoint hierarchy are misinterpreted.
- C Plausible if runback rate determination and setpoint hierarchy are misinterpreted.
- D Plausible if runback rate determination and setpoint hierarchy are misinterpreted.

## Comments

None.

## Examination Outline Cross-Reference

KA # AK1.3

Page 4.3-32

Tier #

1

RO/SRO Importance Rating 3.2 3.3

Group #

2

**Measurement:** Annunciators and conditions indicating signals, and remedial actions associated with the turbine trip.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

A

The reactor was just tripped from 100% power due to a loss of feedwater. The turbine was tripped, and the following indications are observed on console left:

	1	2	3	4
STOP Valve	0%	0%	0%	100%
Control Valve	0%	0%	0%	35%

Which ONE of the following actions is required?

- A. Place EHC-P-1A&B in Pull to Lock.
- B. Open the generator exciter field breaker.
- C. Manually trip the turbine at the front standard.
- D. Open generator output breakers, GB1-12 and GB1-02.

**Technical Reference:** 1210-1, Reactor Trip, page 2.

## Open Exam Reference

**Learning Objective:** V.E.01.02 State and explain the Immediate Action(s) of ATP 1210-1, Reactor Trip, in the required order.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .8/.10 55.43 55.45 .3

## Discriminant Validity Statements

- A. Correct answer.
- B. Plausible if examinee incorrectly assumes that generator loading is 0.
- C. Plausible since this will trip the turbine.
- D. Plausible if examinee incorrectly assumes that generator loading is 0.

**Comments:** None.

## Examination Outline Cross-Reference

KA # EA1.3

Page 4.3-2

Tier #

1

RO/SRO Importance Rating 3.0 3.2

Group #

2

**Measurement** Desired operating results during abnormal and emergency situations.

## Proposed Question

 RO SRO PRA Related

Correct Answer

D

The follow conditions exist:

- Following a reactor trip, a 1600 psig ESAS automatic actuation occurred.
- RCS pressure dropped to 1500 psig and stabilized.
- Block loading is complete.
- The CRO is verifying ESAS status on Panel Console Right (PCR).

Which ONE of the following light indications on PCR, if lit, will require manual component manipulation to obtain the correct ESAS alignment?

- A. DR-V-1B OPEN
- B. DH-V-5A OPEN
- C. MU-V-37 CLOSED
- D. RR-V-1A CLOSED

**Technical Reference** OPM F-06, Engineering Safeguards Actuation System page 10/11.

## Open Exam Reference

**Learning Objective** IV.E.24.06 State or identify those components which are effected by the following ESAS signals:  
a. HPI (1600 PSI) ECCS components only

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 55.45 .5/.6

## Discriminant Validity Statements

- A Component affected by ESAS signal and in correct position.
- B Component affected by ESAS signal and in correct position.
- C Component affected by ESAS signal and in correct position.
- D Correct answer.

**Comments** None.

## Examination Outline Cross-Reference

KA #	EA1.2	Page	4.3.8	Tier #	1
RO/SRO Importance Rating	3.4	3.8		Group #	2

**Measurement** Operating behavior characteristics of the facility.

**Proposed Question**  RO  SRO  PRA Related **Correct Answer** B

Sequence of events:

- Reactor tripped due to a loss of both Main Feedwater pumps.
- EF-P-1 tripped and CANNOT be reset.

While verifying 1210-1 actions, the following conditions are observed:

- Thot is 600°F and increasing.
- Tcold is 595°F and increasing.
- RCS pressure is 2185 psig and increasing.
- OTSG levels are 20 inches and decreasing.
- Atmospheric Dump Valves are in automatic.
- OTSG pressures are 1010 psig.
- RM-G-5, RM-G-15 and RM-G-26 are in ALERT and counts are increasing.

Which ONE of the following describe the procedurally required action applicable to these plant conditions?

- A. Initiate HPI/PORV cooling.
- B. Reduce Reactor Coolant Pumps to one per loop.
- C. Evaluate RCS inventory and close MU-V-3 if necessary.
- D. Reduce OTSG pressures to establish Condensate Booster Pump flow to the OTSGs.

**Technical Reference** ATP 1210-4, Lack of Primary to Secondary Heat Transfer, page 2.

## Open Exam Reference

**Learning Objective** V.E.04.08 Given plant conditions determine the method to be used for core cooling in accordance with the Abnormal Transient Procedures.

**Question Source**  New  TMI Bank **TMI Question #**  
 Modified TMI Bank **Parent Question #**

**Question Cognitive Level**  Memory or Fundamental Knowledge  
 Comprehension or Analysis

**10 CFR Part 55 Content**  55.41 .7  55.43 .5  55.45 .5,.6

## Discriminant Validity Statements

- A This action would be taken in 1210-4 when RCS pressure reaches PORV setpoint.
- B Correct answer. Transition from 1210-1 to 1210-4. This is an IMA for this procedure.
- C Plausible because this is an action for an OTSG tube leak, however, lack of heat transfer is a higher priority.
- D Plausible because this is an action for more severe plant conditions.

**Comments** None.

## Examination Outline Cross-Reference

KA # EA2.1

Page 4.3-13

Tier #

1

RO/SRO Importance Rating 2.8 4.2

Group #

2

## Measurement

Facility conditions and selection of appropriate procedures during abnormal and emergency conditions.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

D

A Small Break LOCA occurred.

The CRS is currently initiating the followup actions of ATP 1210-6.

The following plant conditions exist:

- all four (4) Reactor Coolant Pumps are secured
- HPI/PORV cooling is in operation
- RCS pressure is 385 psig and stable
- both OTSGs are available as a heat sink.
- both T-hots are approximately 410°F
- both T-colds are approximately 400°F
- the five highest incore thermocouples average 410°F

Based on current plant conditions, as the CRS implements the followup actions of 1210-6, he/she will transition to:

- A. ATP 1210-4, Lack of Primary to Secondary Heat Transfer.
- B. ATP 1210-7, Large Break LOCA Cooldown.
- C. ATP 1210-8, RCS Superheated.
- D. ATP 1210-9, HPI Cooling - Recovery from Solid Operations.

## Technical Reference

ATOG 1210-6, Small Break LOCA Cooldown, page 2.

## Open Exam Reference

Steam Tables

## Learning Objective

V.E.08.09 Given plant conditions determine if the RCS is superheated and what actions are required.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question # 2000 NRC

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 .5 55.45 .5,.6

## Discriminant Validity Statements

- A Plausible because a lack of primary to secondary heat transfer is occurring.
- B Plausible because core flood tanks should be dumping.
- C Plausible because HPI cooling may be in progress, but 1210-8 would be a higher priority.
- D Correct answer.

## Comments

None.

## Examination Outline Cross-Reference

KA # EA2.1

Page 4.3-13

Tier #

1

RO/SRO Importance Rating 2.9 4.0

Group #

2

Measurement Ability to apply technical specifications for a system.

## Proposed Question

RO

SRO

PRA Related

## Correct Answer

C

Plant conditions:

- Loss of Station Power occurred 10 minutes ago.
- EG-Y-1A/1B energized their respective buses.
- RCS That is 539°F indicated on PCL.
- RCS Tcold is 536°F indicated on PCL.
- RCS pressure is 993 psig indicated on PCL.
- Incore Thermocouple temperature is 543°F (average of five highest).
- RB pressure is 4.9 psig indicated on PCL.
- Subcooling Margin Meters indicate 10°F on PCL.
- Core cooldown rate indicates 113°F/hr (5 min. update).
- All required Automatic actions have occurred.
- Operators have completed REQUIRED Immediate Actions of ATPs 1210-1, Reactor Trip, and 1210-2, Loss of 25°F Subcooled Margin.

From the list below, identify the next required procedure to be entered based upon the above conditions:

- A. 1210-3, Excessive Primary to Secondary Heat Transfer
- B. 1210-4, Lack of Primary to Secondary Heat Transfer
- C. 1210-6, Small Break LOCA Cooldown
- D. 1202-2, Loss of Station Power

Technical Reference 1210-2, page 3.

Open Exam Reference Steam Tables.

Learning Objective V.E.02.06 Describe the conditions under which you exit 1210-2, Loss of 25F Subcooled Margin for 1210-6, Small Break LOCA Cooldown.

## Question Source

New

TMI Bank

TMI Question #

QR5E02-06-Q01

Modified TMI Bank

Parent Question #

## Question Cognitive Level

Memory or Fundamental Knowledge

Comprehension or Analysis

## 10 CFR Part 55 Content

55.41

55.43 .5

55.45 .13

## Discriminant Validity Statements

- A Plausible since cooldown rate is in excess of TS limits, however, cooldown rate is being controlled by RCS leak rate, not excessive feedwater or steaming rates. Procedural flowpath would not be justified for these conditions.
- B Plausible since there is an apparent lack of primary to secondary heat transfer due to loss of SCM, however, the criteria for transfer to 1210-4 requires a cooldown rate of less than 40°F/hr.
- C Correct answer.
- D Plausible since this procedure would be referred to due to loss of off siter power conditions, but does not meet the criteria of "go to" for procedure implementation. 1210-6 would be the controlling document.

Comments None.

## Examination Outline Cross-Reference

KA # AA2.2

Page 4.3-35

Tier #

1

RO/SRO Importance Rating 3.5 3.8

Group #

3

**Measurement** Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

C

Current plant conditions are:

- Plant has experienced a reactor trip and a loss of offsite power.
- EG-Y-1B failed to automatically START.

Investigation for the EG-Y-1B failure to start reveals the following conditions:

- The Exciter Auto Manual switch in the control room is in the Manual position.
- The Emergency Bypass selector switch at the EDG breaker cubicle is in the NORM position.
- The Unit/Parallel switch is in the Parallel position.
- 1B Diesel Auto-Standby/Manual Exercise switch in the control room is in the Manual Exercise position.

Which ONE action below would allow EG-Y-1B to start automatically?

Place the....

- A. Unit/Parallel switch in the Unit position.
- B. Exciter Auto Manual switch in the control room in the AUTO position.
- C. Auto-Standby/Manual Exercise switch in the control room in the AUTO position.
- D. Emergency Bypass selector switch at the EDG breaker cubicle in the EMERGENCY position.

**Technical Reference** 1107-3, Diesel generator, pages 30 - 33.

## Open Exam Reference

**Learning Objective** IV.G.08.14

Given a set of conditions applicable to the Emergency Diesel Generators, determine if the Emergency Diesel Generators are in ES Standby.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 .2 55.45 .5/.6

## Discriminant Validity Statements

- A Plausible with misconception of UNIT/PARALLEL switch function. Diesel would still auto-start in either position. This switch is checked for a failure to autostart/autoload the bus.
- B Plausible with misconception of function of exciter Auto/Manual switch. This switch is checked for a failure to autostart/autoload the bus.
- C Correct answer.
- D Plausible misconception for Emergency Bypass switch, which bypasses protective features of the EDG, but would not prevent auto start.

Comments None.

## Examination Outline Cross-Reference

KA # 2.4.16

Page 2-12

Tier #

1

RO/SRO Importance Rating 3.0 4.0

Group #

3

## Measurement

Knowledge of EOP implementation heirarchy and coordination with other support procedures.

## Proposed Question

RO

SRO

PRA Related

## Correct Answer

C

Sequence of events:

- 1202-32, Flood, has been implemented and actions are in progress.
- Current river water level is 302 feet at the Unit 1 River Water Intake
- A plant shutdown was commenced.
- An Alert has been declared.
- There are several alarms due to localized flooding.
- A Reactor Trip has just occurred during the shutdown.

Based on this sequence of events, which ONE of the following is the proper implementation heirarchy of procedure implementation?

(From highest to lowest priority)

- A. 1202-32, Flood  
ATP 1210-1, Reactor Trip  
Alarm Response Procedures  
Normal Operating Procedures
- B. 1202-32, Flood  
ATP 1210-1, Reactor Trip  
Normal Operating Procedures  
Alarm Response Procedures
- C. ATP 1210-1, Reactor Trip  
1202-32, Flood  
Alarm Response Procedures  
Normal Operating Procedures
- D. ATP 1210-1, Reactor Trip  
Alarm Response Procedures  
1202-32, Flood  
Normal Operating Procedures

## Technical Reference

Management expectations.

## Open Exam Reference

## Learning Objective

V.E.11.13 Given plant conditions, determine if ATP symptoms are present. If multiple conditions are present, state the order of priority to be used in addressing the conditions.

## Question Source

New

TMI Bank

TMI Question #

Modified TMI Bank

Parent Question #

## Question Cognitive Level

Memory or Fundamental Knowledge

Comprehension or Analysis

## 10 CFR Part 55 Content

55.41 .10

55.43 .5

55.45 .13

## Discriminant Validity Statements

A Plausible due to initiating sequence of events and a misunderstanding of proper heirarchy.

- B Plausible due to initiating sequence of events and a misunderstanding of proper heirarchy.
- C Correct answer.
- D Plausible due to initiating sequence of events and a misunderstanding of proper heirarchy.

**Comments**

Procedure implementation heirarchy and practice is a current issue at TMI as a result of recent INPO and WANO audits and Self Assessments.

## Examination Outline Cross-Reference

KA # AK1.3

Page 4.3-40

Tier #

1

RO/SRO Importance Rating 3.8 4.0

Group #

3

**Measurement:** Annunciators and conditions indicating signals, and remedial actions associated with the Refueling Canal Level Decrease.

## Proposed Question

RO

SRO

PRA Related

Correct Answer

B

The plant is currently in a refueling outage with core reload/shuffle in progress.

The following indications/conditions are present;

- RB Sump level increasing.
- Alarm PLB-4-9 (Fuel Transfer Canal Lo Level) has come in.
- Fuel Transfer Canal water level has been reported dropping at 7 inches per minute.
- The Main Fuel Handling Bridge is over the core.

The fuel assembly engaged and in the mast of the main fuel handling bridge shall be ...

- A. inserted between the plenum and the upender in the deep end of the fuel transfer canal.
- B. inserted into the nearest available core location.
- C. left in the full up position in the fuel mast.
- D. transferred to the spent fuel pool.

**Technical Reference:** 1203-43 Transfer Canal Seal Plate Gasket Failure/Level Loss, page 2.

## Open Exam Reference

**Learning Objective:** V.C.16.02 State the required Immediate Manual Actions for a failure of the fuel transfer canal seal plate per AP 1203-43.

## Question Source

New

TMI Bank

TMI Question #

Modified TMI Bank

Parent Question #

## Question Cognitive Level

Memory or Fundamental Knowledge

Comprehension or Analysis

## 10 CFR Part 55 Content

55.41 .8/.10

55.43 .7

55.45 .3

## Discriminanti Validity Statements

- A. Plausible, since this is one of the storage locations for loss of pool level based on rod location.
- B. Correct answer.
- C. Plausible if examinee fails to recognize that rate of level decrease requires stowing the assembly in a lowered position.
- D. Plausible, since this is one of the storage locations for loss of pool level based on rod location.

## Comments

None.

## Examination Outline Cross-Reference

KA # K2.02

Page 3.1-3

Tier #

2

RO/SRO Importance Rating 3.6 3.7

Group #

1

**Measurement** One-line diagram of power supplies to trip breakers.**Proposed Question** RO SRO PRA Related**Correct Answer** C

The plant is at 100% power.

The following plant conditions exist:

- Reactor Protection System surveillance in progress on "C" RPS cabinet.
- "C" RPS cabinet's associated CRD breakers/electronic trips were tripped
- An AO has manually reclosed "C" RPS cabinets associated DC breakers
- The Fault Reset pushbutton has NOT been pushed on the CRD Diamond panel

If a loss of Vital Bus "D" were to occur at this time, which ONE of the following would be the immediate effect?

- A. CRD Groups 1 and 3 would drop.
- B. CRD Groups 1, 2, 3 and 4 would drop.
- C. CRD Groups 5, 6 and 7 would drop.
- D. CRD Groups 1 through 7 would drop.

**Technical Reference**

OP 1105-9, Control Rod Drive System, page 48  
 OPM Section F-02, Reactor Protection System, page 116  
 OPM Section F-01, Control Rod Drive System, page 58

**Open Exam Reference****Learning Objective**

IV.E.13.07 Given a specific set of CRD breaker positions and electronic trip status, determine the positions of the control rods.

**Question Source** New  TMI Bank

TMI Question #

17 WAPLE  
RETAKE Modified TMI Bank

Parent Question #

**Question Cognitive Level** Memory or Fundamental Knowledge Comprehension or Analysis**10 CFR Part 55 Content** 55.41 .7 55.43 55.45**Discriminant Validity Statements**

- A Plausible with a misunderstanding that the DC supply to only half of the safety rods would be lost.
- B Plausible with a misunderstanding of which rods are powered from a DC supply and which are powered from an AC supply.
- C Correct answer. All power would be lost to the regulating rods.
- D Plausible with a misunderstanding that both the primary and secondary power supplies would be lost to all of the rods.

**Comments**

None.

## Examination Outline Cross-Reference

KA # A4.10

Page 3.1-10

Tier #

2

RO/SRO Importance Rating 3.5 3.9

Group #

1

Measurement Determination of an ECP.

## Proposed Question

 RO SRO PRA Related

Correct Answer

B

Calculate an Estimated Critical Rod Position (ECP) for the following plant conditions:

- 20 hours post trip
- Plant has been running at 100% power since initial cycle startup
- 400 EFPD
- 890 ppm Boron from RCS sample
- Boron correction factor of 0.98
- CRD Group 8 at 30%
- T-ave 532°F

Which ONE of the following rod tolerance bands is the most correct for this ECP?

- A. 72% on Group 5      55% on Group 7
- B. 11% on Group 6      73% on Group 7
- C. 29% on Group 6      47% on Group 7
- D. 30% on Group 7      100% on Group 7

Technical Reference OP 1103-15B, Estimated Critical Conditions, entire procedure.

Open Exam Reference 1103-15B, Estimated Critical Conditions, entire procedure.  
Calculator  
Ruler

Learning Objective V.B.11.05 Prior to startup, perform independent estimated critical rod position and estimated critical boron concentration calculations in accordance with OP 1103-15B.

## Question Source

 New  TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 55.45 .5 to .8

## Discriminant Validity Statements

- A Plausible, but uses incorrect rod worth curve.
- B Correct answer.
- C Plausible, but uses incorrect Xenon tolerance value.
- D Plausible, but uses peak Xenon value.

Comments None.

## Examination Outline Cross-Reference

KA # K6.05

Page 3.1-16

Tier #

2

RO/SRO Importance Rating 2.5 2.5

Group #

1

Measurement Sensors and detectors.

## Proposed Question

 RO SRO PRA Related

Correct Answer

A

The following initial plant conditions exist:

- All ICS stations are in AUTO
- pressurizer level is 220 inches and stable
- RCS pressure is 2155 psig and stable

The selected pressurizer temperature RTD develops a short circuit.

Which ONE of the following identifies the manner in which the temperature instrument fails AND the initial response of MU-V-17, Pressurizer Level Control Valve?

- A. low temperature, MU-V-17 Opens
- B. low temperature, MU-V-17 Closes
- C. high temperature, MU-V-17 Opens
- D. high temperature, MU-V-17 Closes

## Technical Reference

OPM Section N-11, Instrumentation and Control, page 56.  
EP 1202-29, Pressurizer System Failures, page 11.

## Open Exam Reference

## Learning Objective

IV.E.01.02 Describe the failure modes of the following instruments:  
a. RTD

## Question Source

 New  TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 55.45 .7

## Discriminant Validity Statements

- A Correct answer.
- B Plausible if examinee misunderstands compensating circuit.
- C Plausible if examinee misunderstands RTD response.
- D Plausible if examinee misunderstands compensating circuit.

## Comments

None.

## Examination Outline Cross-Reference

KA # A2.06

Page 3.2-26

Tier #

2

RO/SRO Importance Rating 3.7 4.0

Group #

1

Measurement Inadvertent ESFGAS actuation.

## Proposed Question

 RO SRO PRA Related

Correct Answer

D

The following sequence of events occurred:

- The plant was stable at 100% power.
- I&C was preparing for maintenance on the 'A' train MANUAL 1600 psig ESAS pushbutton when the pushbutton was accidentally depressed.

In response to this condition, the CRS directs the crew to:

- A. Reduce power to approximately 60%.
- B. Perform the IMAs of 1210-1, Reactor Trip.
- C. Commence a plant shutdown to Hot Shutdown.
- D. Defeat the 1600 psig Manual Actuation on the 'A' train.

Technical Reference OP 1105-3, Safeguards Actuation System, page 13.

## Open Exam Reference

Learning Objective IV.E.24.23 State the required actions for an inadvertent ESAS actuation.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .5 55.43 .5 55.45 .3,.13

## Discriminant Validity Statements

- A ESAS signal will borate the plant, requiring reduction in power to maintain TAVG, but plant will do this automatically and not to this degree.
- B Examinee may misconstrue what occurs on ES signal.
- C Not required, boration will cause some power excursion, but control of ES equipment will occur soon enough to not require shutdown.
- D Correct answer.

Comments None.

## Examination Outline Cross-Reference

KA # A3.01

Page 3.2-26

Tier #

2

RO/SRO Importance Rating 3.7 3.9

Group #

1

Measurement Input channels and logic.

## Proposed Question

 RO SRO PRA Related

Correct Answer

C

1600 psig ESAS channels RC2A AND RC3B TRIP.

Which ONE of the following will occur?

- A. 1600 psig A train will actuate.
- B. 1600 psig B train will actuate.
- C. Neither the A or B train will actuate.
- D. 1600 psig A AND B trains will actuate.

Technical Reference Drawing ESAS 3 from TMI Exam Bank

## Open Exam Reference

Learning Objective IV.E.24.05 Using the diagram provided by the instructor, describe how an actuation condition is generated from the sensor to the affected safeguard system component.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 55.45 .5

## Discriminant Validity Statements

- A Plausible with misconception of relay logic.
- B Plausible with misconception of relay logic.
- C Correct answer.
- D Plausible with misconception of relay logic.

Comments None.

## Examination Outline Cross-Reference

KA # K4.08

Page 3.7-6

Tier #

2

RO/SRO Importance Rating 3.4 3.7

Group #

1

**Measurement** Automatic rod motion on demand signals.**Proposed Question** RO SRO PFA Related**Correct Answer**

D

Plant conditions:

- Reactor power is 85% following a failure in ICS ULD.
- The SG/Rx Master is in HAND.
- All other stations, including the Diamond Rod Control Panel, are in AUTO.
- Control rod index is 275%.

The reactor operator inserts Group 8 rods from 30% to 20% to adjust core power imbalance. This action adds positive reactivity to the core and causes an increase in reactor power.

From the list below identify the ONE statement that describes Control Rod Group 7 response during the insertion of Group 8 rods under these conditions.

Control rod Group 7 will:

- A. Not move because neutron error will be zero (0).
- B. Not move because Group-8 is being inserted.
- C. Withdraw due to a positive ICS neutron error.
- D. Insert due to a negative ICS neutron error.

**Technical Reference**

OPM Section F-01, Control Rod Drive System, Page 87.  
OPM Section F-03, Integrated Control System, Page 46.

**Open Exam Reference****Learning Objective**

IV.E.27.60 Given a set of plant conditions, determine the correct ICS response and any actions that must be taken if the ICS response is incorrect.

**Question Source** New  TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

**Question Cognitive Level** Memory or Fundamental Knowledge Comprehension or Analysis**10 CFR Part 55 Content** 55.41 .7 55.43 55.45**Discriminant Validity Statements**

- A Plausible because SG Rx Master is in HAND, but Diamond remains in AUTO and still responds.
- B Misconception that Group 7 rods won't respond with GP 8 selected.
- C Plausible if examinee thinks inserting Group 8 adds negative reactivity.
- D Correct answer.

**Comments**

None.

## Examination Outline Cross-Reference

KA # A2.02

Page 3.7-7

Tier #

2

RO/SRO Importance Rating

3.5\*

Group #

1

**Measurement** Faulty or erratic operation of detectors or compensating signals.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

D

The plant is operating at 8% power, steady state.

BOTH Intermediate Range NI detectors fail LOW.

Which ONE statement below describes the minimum required action(s)?

- A. Continue power operation but limit power to 10%.
- B. Immediately take action to place the unit in hot shutdown within 12 hours.
- C. Take action within one hour to restore at least one IR channel to operable status or place the unit in HOT STANDBY within 6 hours.
- D. Take action within one hour to restore at least one IR channel to operable status or place the unit in HOT SHUTDOWN within 6 hours.

**Technical Reference** TS section 3.5.1, pages 3-29 and 3-30.

## Open Exam Reference

## Learning Objective

IV.E.11.14 Given the status of the power range Nuclear Instrument channels and Reactor Protection system channels, determine the NI/RPS degree of redundancy and identify if action is required per Tech Specs.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .5 55.43 .2 55.45 .3,.5

## Discriminant Validity Statements

- A Plausible misconception since one hour is allowed to restore the IR, but you cannot exceed 10% since PR instruments are not verified operable. Continued operation at power is not permitted.
- B Hot shutdown condition is correct, but allowed time frame is incorrect.
- C This action would be correct if T.S 3.0.1 were implemented. TS 3.0.1 is applicable for this if the LCO cannot be met, but the LCO is more restrictive, requiring Hot Shutdown
- D Correct answer.

## Comments

None.

## Examination Outline Cross-Reference

KA # K5.03

Page 3.7-11

Tier #

2

RO/SRO Importance Rating 3.7 4.1

Group #

1

Measurement Indication of superheating.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

C

Plant conditions:

- A loss of Off-site power occurred two hours ago.
- Neither Emergency Diesel Generator started at that time.
- Subcooling Margin was lost.
- EF-P-1 cannot be started

The follow-up actions of 1210-2 are in progress, and the following plant conditions are present:

- RCS pressure is 2000 psi and rising slowly
- Average of the five highest Incore Thermocouple temperatures is 700°F.
- Saturation Margin Meters indicate 0°F.
- OTSG levels indicate 10 inches and rising slowly.
- OTSG pressures indicate 100 psig.
- EG-Y-1A has been started and loaded.
- EF-P-2A has been started.
- MU-P-1A has been started and HPI flow verified.

Based on current plant conditions, the CRS must transition from 1210-2 to:

- A. 1210-4, Lack of Primary to Secondary Heat Transfer
- B. 1210-6, Small Break LOCA Cooldown
- C. 1210-8, RCS Superheated
- D. 1210-9, HPI Cooling, Recovery From Solid Operations.

Technical Reference 1210-8, RCS Superheated pages 2,3.

Open Exam Reference Steam Tables

Learning Objective V.E.08.10 Given plant conditions determine if entry into ATP 1210-8 (RCS Superheated) is required and what actions are to be taken.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .5 55.43 .5 55.45 .7

## Discriminant Validity Statements

- A Plausible due to loss of heat sink, but not the correct transition.
- B Plausible due to loss of heat sink, but not the correct transition.
- C Correct answer.
- D Plausible due to loss of heat sink, but not the correct transition.

Comments None.

## Examination Outline Cross-Reference

KA # K2.02

Page 3.5-10

Tier #

2

RO/SRO Importance Rating 2.7 2.9

Group #

1

## Measurement MOVs

## Proposed Question

 RO SRO PFA Related

## Correct Answer

 C

Which ONE of the following supplies power to BS-V-1A, Reactor Building Spray Pump Discharge valve?

- A. 1A 480V ES MCC from 1P 480V ES Bus
- B. 1A 480V ES MCC from 1S 480V ES Bus
- C. 1A 480V ES Valves from 1P 480V ES Bus
- D. 1A 480V ES Valves from 1S 480V ES Bus

Technical Reference OP 1107-4

## Open Exam Reference

## Learning Objective

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 55.45

## Discriminant Validity Statements

- A. Source flowpath may be confused.
- B. Source flowpath may be confused.
- C. Correct answer.
- D. Source flowpath may be confused.

## Comments

No TMI objective for this K/A.

## Examination Outline Cross-Reference

KA # A2.04

Page 3.4-39

Tier #

2

RO/SRO Importance Rating 4.3 4.2

Group #

1

## Measurement

Ability to predict the impacts of the following malfunctions or operations on the Condensate System; and based on those predictions, use procedures to correct, control or mitigate the consequences of those malfunctions or operations: Loss of condensate pumps

## Proposed Question

 RO SRO PFA Related

## Correct Answer

B

Initial plant conditions:

- Reactor power is 100%.
- CO-P-1A and CO-P-1B are running, CO-P-1C is in Normal-After-Stop.
- CO-P-2A and CO-P-2B are running, CO-P-2C is in Normal-After-Stop.
- CO-P-1B breaker trips on an electrical fault.
- After a period of two (2) seconds, CO-P-1C automatically starts.

From the list below, identify the ONE statement that describes the plant response for these conditions.

- A. One condensate booster pump will trip, both main feed pumps remain running, with an ICS runback.
- B. One condensate booster pump and one main feed pump will trip, with an ICS runback.
- C. One main feed pump will trip, both condensate booster pumps remain running, with an ICS runback.
- D. Both main feed pumps trip, one condensate booster pump trips and the reactor trips.

## Technical Reference

OPM Section G-01, Condensate System, Rev. 13 page 7

## Open Exam Reference

## Learning Objective

IV.C.02.10 State the interlocks associated with the condensate and condensate booster pumps.

## Question Source

 New  TMI Bank

TMI Question #

FEB 2000 CRO Exam

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .5 55.43 .5 55.45 .3, .13

## Discriminatory Validity Statements

- A Plausible misconception regarding extremely complicated condensate-condensate booster pump counting circuit.
- B Correct answer.
- C Plausible misconception regarding extremely complicated condensate-condensate booster pump counting circuit.
- D Plausible misconception regarding extremely complicated condensate-condensate booster pump counting circuit.

## Comments

None.

## Examination Outline Cross-Reference

KA # K4.08

Page 3.4-42

Tier #

2

RO/SRO Importance Rating 2.5 2.7

Group #

1

**Measurement** Feedwater regulatory valve operation (on basis of steam flow/feed flow mismatch).

## Proposed Question

 RO SRO PRA Related

## Correct Answer

A

## Plant Conditions:

- 100% Power
- Turbine in manual
- All other ICS stations in Auto

The feedwater temperature calculator (output of FW1.12) fails to 250°F.

This failure will:

- A. Increase the demand signal to the Feed Regulating Valves.
- B. Decrease the demand signal to the Feed Regulating signals.
- C. Have no effect since actual FW temp > 250°F.
- D. Have no effect since ICS is in tracking.

**Technical Reference** Drawing D553731, ICS Analog Logic Feedwater Control.

**Open Exam Reference** Blowup from drawing showing FW12.1 module.

**Learning Objective** IV.E.27.22 Predict the effect of a feedwater temperature change (increase or decrease) on the total feedwater demand signal.

## Question Source

 New TMI Bank

TMI Question # QR4E27-22-Q01

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 55.45

## Discriminant Validity Statements

- A Correct answer.
- B This would be the response if the examinee misinterprets the response of the system.
- C Temp is >250, however, it's the modified signal that is fed forward to control demand.
- D Examinee may choose this based on Turbine in Manual, which would not place ICS in track mode.

**Comments** None.

## Examination Outline Cross-Reference

KA # A1.03

Page 3.4-43

Tier #

2

RO/SRO Importance Rating 2.7 2.9

Group #

1

**Measurement** Power level restrictions for operations of MFW pumps and valves.**Proposed Question** RO SRO PRA Related**Correct Answer**

D

A plant power reduction is being performed in order to secure the "B" Main Feedwater Pump due to high vibration.

Which ONE of the following conditions would represent the HIGHEST power level acceptable for securing FW-P-1A WITHOUT exceeding an ICS High Load Limit?

- A. Unit Load Demand at 65%.
- B. Unit Load Demand at 45%.
- C. Total Main Feedwater flow at 7.8 Mlbm/hr.
- D. Total Main Feedwater flow at 6.2 Mlbm/hr.

**Technical Reference** ARP MAP H-1-1, ICS Runback, page 1**Open Exam Reference****Learning Objective** IV.E.27.60 Given a set of plant conditions, determine the correct ICS response and any actions that must be taken if the ICS response is incorrect.**Question Source** New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

**Question Cognitive Level** Memory or Fundamental Knowledge Comprehension or Analysis**10 CFR Part 55 Content** 55.41 .5 55.43 55.45 .5**Discriminant Validity Statements**

- A Plausible, may be mistaken to equate to reactor power being below the approximate 60% equivalent of the 585 Mwe ICS High Load Limit.
- B Plausible, equates to 450 Mwe which is below the 585 Mwe ICS High Load Limit.
- C Plausible because one of the limits for single MFW pump operation is 8 Mlbm/hr. However this equates to approximately 628 Mwe which is above the 585 Mwe ICS High Load Limit.
- D Correct answer. Equates to approximately 500 Mwe which is below the 585 Mwe ICS High Load Limit.

**Comments** None.



## Examination Outline Cross-Reference

KA # A1.05

Page 3.4-47

Tier #

2

RO/SRO Importance Rating 3.6 3.7

Group #

1

Measurement AFW flow/motor amps.

## Proposed Question

 RO SRO PRA Related

Correct Answer

D

The following sequence of events has occurred:

- A station blackout with a reactor trip.
- EFW actuated.
- EF-P-1 and EF-P-2B failed to start.
- EF-V-30A/B/C/D are in hand, maintaining EF-P-2A at its operating limit.
- OTSG levels are at 30% on the Operating Range and rising.

Assuming no other operator action, reducing Turbine Header Pressure setpoint to 800 psig will increase the:

- A. time it takes to establish natural circulation.
- B. time it takes to reach desired OTSG levels.
- C. OTSG tube temperatures.
- D. flow from EF-P-2A.

Technical Reference OPM Section N, page 119.

## Open Exam Reference

## Learning Objective

- IV.C.05.08/ State the design capacities of the Emergency Feedwater pumps.  
 IV.C.05.26 Given a set of plant conditions, determine whether the EFW system has responded correctly.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .5 55.43 55.45 .5

## Discriminant Validity Statements

- A OTSG will steam harder, resulting in reducing temperature which will aid in development of NC.
- B Flow will increase which reduces the time it takes to get to 75% level
- C OTSG tube temperatures will drop due to higher spray flow.
- D Correct answer.

## Comments

None.

## Examination Outline Cross-Reference

KA # K3.02

Page 3.6-6

Tier #

2

RO/SRO Importance Rating 3.5 3.7

Group #

1

Measurement Components using DC control power.

## Proposed Question

 RO SRO PRA Related

Correct Answer

A

Initial plant conditions:

- Reactor power was 100%.

Sequence of events:

- Loss of entire 1A 125-250 Volt DC Electrical Distribution System.
- Manual Reactor Trip due to Main Feedwater control problems.
- Loss of RCS Subcooled Margin.

From the list below, identify the ONE statement that describes how to secure the RCPs under these conditions.

- Trip ALL 4 RCPs using their associated extension controls (4) on Console Center.
- Trip RC-P-1A and RC-P-1C using extension controls on Console Center;  
Stop RC-P-1B and RC-P-1D by de-energizing 1B 6900 Volt Buses at Panel PR.
- Trip RC-P-1B and RC-P-1D using extension controls on Console Center;  
Stop RC-P-1A and RC-P-1C by de-energizing 1A 6900 Volt Buses at Panel PR.
- Stop ALL 4 RCPs by de-energizing 1A and 1B 6900 Volt Buses.

Technical Reference EP 1202-9A, Loss of A DC Distribution System, page 3.

## Open Exam Reference

## Learning Objective

V.E.02.02 State and explain the Immediate Action(s) of ATP 1210-2, Loss of 25f Subcooled Margin.

## Question Source

 New  TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 55.45 .6

## Discriminant Validity Statements

A Correct answer.

B Examinee must evaluate loss of 'A' DC. "A" DC supplies control power to the breakers for the 690KV busses. 'B' DC supplies control power to the breakers supplying the RCPs from the 6900KV busses.

C Examinee must evaluate loss of 'A' DC. "A" DC supplies control power to the breakers for the 690KV busses. 'B' DC supplies control power to the breakers supplying the RCPs from the 6900KV busses.

D Examinee must evaluate loss of 'A' DC. "A" DC supplies control power to the breakers for the 690KV busses. 'B' DC supplies control power to the breakers supplying the RCPs from the 6900KV busses.

Comments None.

## Examination Outline Cross-Reference

KA #	<u>A4.04</u>	Page	<u>3.9-4</u>	Tier #	<u>2</u>
RO/SRO Importance Rating	<u>3.8</u> <u>3.7</u>	Group #			<u>1</u>

Measurement Automatic isolation.

Proposed Question  RO  SRO  PRA Related Correct Answer  D

A release is in progress from Waste Evaporator Condensate Storage Tank (WECST) A to the effluent of the Mechanical Draft Cooling Tower. WDL-P14A is being used to pump through flow controller WDL-V-124.

Which ONE of the following conditions would result in an automatic termination of the release?

- A. NR-P-1A trips on overload.
- B. ALERT condition on RM-L-6.
- C. WECST A level reaches 0.5 feet (390 gallons).
- D. Pressure loader for WDL-V-124 fails to max pressure.

Technical Reference OPM Section E-02, Waste Disposal Liquid System, page 23.

## Open Exam Reference

Learning Objective IV.B.09.04 Describe how to perform an authorized release of a W.E.C.S.T. to the effluent of the MDCT. Include all interlocks and automatic protection associated with discharges to the environment.

Question Source  New  TMI Bank  Modified TMI Bank TMI Question # Parent Question #

Question Cognitive Level  Memory or Fundamental Knowledge  Comprehension or Analysis

10 CFR Part 55 Content  55.41 .7  55.43  55.45 .5 to .8

## Discriminant Validity Statements

- A No, standby river pump would immediately start, there would not be a drop in effluent flow rate to cause a trip.
- B No, HIGH alarm terminates release.
- C No, administrative limit for securing WDL-P14A.
- D Correct answer. This will fully open WDL-V-124 resulting in high release rate trip.

Comments None.

## Examination Outline Cross-Reference

KA # K1.06

Page 3.9-5

Tier #

2

RO/SRO Importance Rating 3.1 3.1

Group #

1

Measurement ARM and PRM systems.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

B

The RCDT is being pumped down when RM-G-20, (RC Drain Pump Discharge Monitor) High Alarm actuates.

Identify which ONE of the following automatic actions will occur as a result of this event.

- A. WDL-V-534 AND WD-L-535 CLOSE
- B. WDG-V-3 AND WDG-V-4 CLOSE
- C. CA-V-4B AND CA-V-5B CLOSE
- D. CA-V-2 AND CA-V-13 CLOSE

Technical Reference EP 1202-12, Excessive Radiation Levels, page 13.

## Open Exam Reference

## Learning Objective

IV.E.06.04 Given an RMS channel, state the interlocks associated with a channel in the Radiation Monitoring system.

## Question Source

 New TMI Bank

TMI Question # 2000 NRC

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .2 to .9 55.43 55.45 .7,8

## Discriminant Validity Statements

- A Plausible since this isolates the RB sump.
- B Correct answer.
- C Plausible since this isolates OTSG "B" sample lines.
- D Plausible since this isolates the RCS Sample line.

Comments None.

## Examination Outline Cross-Reference

KA # K5.04

Page 3.9-6

Tier #

2

RO/SRO Importance Rating 2.5 3.1

Group #

1

Measurement Relationship of hydrogen/oxygen concentration to flamability.

## Proposed Question

 RO SRO PRA Related

Correct Answer

A

Initial conditions:

- A plant shutdown is in progress.
- RCS degassing is in progress.
- WDG-T-1A is in service.

Currently, the Beckman Analyzer indicates the following vent header gas concentrations:

Oxygen = 4.5%      Hydrogen = 5.1%

Which ONE of the following describes the required action?

- A. Immediately stop RCS degassing.
- B. Without delay begin to reduce Oxygen concentration below 4%.
- C. Begin to reduce Oxygen concentration to less than 2% within 24 hours.
- D. Isolate WDG-T-1A and sample for Oxygen and Hydrogen concentration within 24 hours.

Technical Reference ODCM Section 2.2.2.5

## Open Exam Reference

Learning Objective IV.B.08.07 Explain the operator actions for the following Waste Gas Disposal system events:

- a. high hydrogen gas concentration
- b. high oxygen gas concentration

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .5 55.43 55.45 .7

## Discriminant Validity Statements

- A Correct answer.
- B Plausible, this would be almost correct for an Oxygen concentration between 2% and 4%, but the target is 2%.
- C Plausible, this would be almost correct for an Oxygen concentration between 2% and 4%, but the action must begin without delay.
- D Plausible that this action would be desirable.

Comments None.

## Examination Outline Cross-Reference

KA # 2.1.12

Page 2-2

Tier #

2

RO/SRO Importance Rating 2.9 4.0

Group #

1

Measurement Ability to apply technical specifications for a system.

## Proposed Question

 RO SRO PRA Related

Correct Answer

C

Plant Conditions:

- The reactor has been subcritical for 4 days.
- FUEL HANDLING in progress in the Containment and FH buildings
- RM-G-7 (RB AUX FH Bridge) FAILS LOW

For this condition, STOP ALL:

- A. Fuel AND Control Rod movement inside the RB AND Fuel Handling buildings until RM-G-7 is returned to operable status.
- B. Fuel movement (Control Rod movements MAY continue) until operability of RM-G-6 (R.B. MAIN FH Bridge) has been verified. Fuel movement may recommence once operability of RM-G-6 has been verified.
- C. Fuel AND Control Rod movement inside the RB until RM-G-7 is replaced with a portable survey instrument with appropriate range & sensitivity. Fuel handling operations MAY continue in the FH Building.
- D. Fuel movement (Control Rod movements MAY continue) inside the RB until RM-G-7 is replaced with a portable survey instrument with appropriate range & sensitivity. Fuel handling operations MAY continue in the FH Bldg.

Technical Reference TECH. SPECS. 3.8, page 3-44.

Open Exam Reference Tech. Specs.

Learning Objective IV.E.06.11 Given the condition/status of the RMS and the appropriate section of Tech Specs / ODCM, determine if operability requirements are met and what actions, if any, are required.

## Question Source

 New TMI Bank

TMI Question #

IV.E.06.10

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 55.43 .2,.5 55.45 .3

## Discriminant Validity Statements

- A Operation may continue inside the FH building.
- B Control rod movements constitute reactivity manipulation which is not permitted.
- C Correct answer. RM-G-7 monitors RB only, operation may continue inside the FH building.
- D Control rod movements constitute reactivity manipulation which is not permitted.

Comments None.

## Examination Outline Cross-Reference

KA # K5.10

Page 3.2-3

Tier #

2

RO/SRO Importance Rating 3.6 4.1

Group #

2

Measurement Relationship between reactor power and RCS differential temperature.

## Proposed Question

 RO SRO PRA Related

Correct Answer

D

RC-P-1A has been secured due to a #1 seal failure. It is desired to continue operating at 65% power.

Which ONE of the following is closest to the expected core delta-T for this power level?

- A. 22.4
- B. 29.9
- C. 34.5
- D. 39.9

Technical Reference OP 1102-2, Plant Startup, page 7.

## Open Exam Reference

## Learning Objective

V.1.07.12 Describe how operators could determine if a gross miscalibration of the NIs existed.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .5 55.43 55.45 .7

## Discriminant Validity Statements

- A Plausible answer calculated for 4 RCPs running and 75% power limit, then adjusted to 65% power.  
Calculation:  $46/100 = x/75$   $x = 34.5$   $x * 0.65 = 22.4$
- B Plausible answer calculated for 4 RCPs running.  
Calculation:  $46/100 = x/65$   $x = 29.9$
- C Plausible answer calculated for 4 RCPs running and 75% power limit.  
Calculation:  $46/100 = x/75$   $x = 34.5$
- D Correct answer.  
Ratio should be:  $46^{\circ}\text{F delta-T/RCP power limit} = \text{actual delta-T/actual power}$   
Calculation:  $46/75 = x/65$   $x = 39.9$

Comments None.

## Examination Outline Cross-Reference

KA # A4.01

Page 3.3-8

Tier #

2

RO/SRO Importance Rating 3.7 3.5

Group #

2

Measurement PZR Spray valve.

## Proposed Question

 RO SRO PRA Related

Correct Answer

C

The following plant conditions currently exist:

- RCS pressure is 2125 psig and decreasing at 21 psig per minute
- Pressurizer temperature is 644°F and decreasing at 2.5°F per minute
- The Pressurizer Spray Valve (RC-V-1) has NO indication
- The PORV (RC-RV-2) has a green demand indication
- There is no evidence of RCS leakage.
- No operator actions have been taken.

Which ONE of the following automatic OR manual actions is REQUIRED to prevent a low RCS pressure reactor trip?

- A. Pressurizer Heater Bank 4 energizing at 2120 psig will mitigate the event.
- B. Pressurizer Heater Bank 5 energizing at 2105 psig will mitigate the event.
- C. The operator MUST close the Pressurizer Spray Block Valve (RC-V-3).
- D. The operator MUST close the PORV Block Valve (RC-V-2).

Technical Reference EP 1202-29, Pressurizer System Failure, page 7.

Open Exam Reference Steam Tables

Learning Objective V.D.11.03 Given a list of symptoms, identify the event, determine what Immediate Automatic Actions will occur and what Immediate Manual Actions are required IAW EP 1202-29.

## Question Source

 New TMI Bank

TMI Question # 2000 NRC

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 55.45 .5 to .8

## Discriminant Validity Statements

- A Plausible because this is an automatic action and the examinee may predict that this will overcome the effects of pressurizer spray.
- B Plausible because this is an automatic action and the examinee may predict that this will overcome the effects of pressurizer spray.
- C Correct answer.
- D Plausible because this is the manual action required for a PORV failure.

Comments None.

## Examination Outline Cross-Reference

KA # K4.03

Page 3.3-7

Tier #

2

RO/SRO Importance Rating 3.8 4.1

Group #

2

Measurement Over pressure control.

## Proposed Question

 RO SRO PFA Related

Correct Answer

A

Plant conditions:

- Plant is in Cold Shutdown.
- PORV NDTT switch is in the AUTO position.

Which ONE of the following instrument sets control the PORV for RCS over pressure protection?

- A. PT3/3A, RCS Pressure Wide Range instrument  
TE2/2B, RCS T-Cold Wide Range instrument
- B. PT3/3B, RCS Pressure Wide Range instrument  
TE2/2A, RCS T-Cold Wide Range instrument
- C. PT/963A, RCS Pressure Wide Range Safety Grade instrument  
TE/961B, RCS T-Cold Wide Range Safety Grade instrument
- D. PT/949B, RCS Pressure Wide Range Safety Grade instrument  
TE/959A RCS T-Cold Wide Range Safety Grade instrument

Technical Reference OPM section F-05 pages 4 and 8.

## Open Exam Reference

## Learning Objective

- IV.A.01.08 State the following concerning the PORV:
- a. Setpoints both high and low pressure.
  - b. NDT switch operation and interlocks.
  - c. Indication available to the operator to determine PORV position.
  - d. Function/Purpose of the PORV.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 55.45

## Discriminant Validity Statements

- A Correct answer. Loop A WR pressure is the only pressure input to the PORV control.
- B B loop wide range pressure instrument does not provide input. All loop wide range cold range instruments provide input if selected.
- C This distracter is plausible since the examinee must know whether or not safety grade instrumentation provides control to the PORV. Safety grade instrumentation does not provide input to the PORV, even though RCS integrity may be challenged.
- D This distracter is plausible since the examinee must know whether or not safety grade instrumentation provides control to the PORV. Safety grade instrumentation does not provide input to the PORV, even though RCS integrity may be challenged.

## Comments

None.

## Examination Outline Cross-Reference

KA # A3.01

Page 3.7-10

Tier #

2

RO/SRO Importance Rating 2.9 2.9

Group #

2

**Measurement** Automatic selection of NNIS inputs to control systems.**Proposed Question** RO SRO PRA Related**Correct Answer****D**

Reactor power is at 100% when the controlling RCS pressure channel, RC3A-PT1, instantaneously fails low.

With NO operator action, which ONE statement describes the end consequence of this failure?

- A. 'A' SCM Meter indicates a loss of SCM.
- B. Loss of Diverse Scram System High Pressure trip capability.
- C. Pressurizer heaters energize from RC3A-PT1 RCS pressure channel.
- D. SASS shifts pressure control to RC3B-PT1 RCS pressure channel.

**Technical Reference** OPM F-05, Non-Nuclear Instrumentation, page 33.**Open Exam Reference****Learning Objective** IV.E.09.02 Given an NNI instrument and a failure mode, identify how the instrument will respond and what interlock(s) or control function(s) will be affected, including effects on system/component operation.**Question Source** New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

**Question Cognitive Level** Memory or Fundamental Knowledge Comprehension or Analysis**10 CFR Part 55 Content** 55.41 .7 55.43 55.45 .5**Discriminant Validity Statements**

- A Plausible misconception that this instrument provides input to the SCM meter.
- B Plausible, since loss of 1 pressure instrument would disable the high pressure function of DSS, but it comes from another pressure instrument.
- C Correct if SASS did not shift to the unaffected instrument. Not all NNIs are SASS protected. Examinee would have to demonstrate this knowledge as well to determine correct answer.
- D Correct answer.

**Comments** None.

## Examination Outline Cross-Reference

KA # K2-01

Page 3.7-2

Tier #

2

RO/SRO Importance Rating 3.3 3.7

Group #

2

Measurement RPS channels, components and interconnections.

## Proposed Question

 RO SRC PRA Related

Correct Answer

D

Initial Plant conditions:

- 40% power
- RC-P-1C is secured
- All four RPS cabinets are operable

A loss of which ONE of the following vital buses will cause a reactor trip?

- A. VBA
- B. VBB
- C. VBC
- D. VBD

Technical Reference OPM Section F-02, Reactor Protection System, pages 7, 12, 20.

## Open Exam Reference

## Learning Objective

- IV.E.14.25 Concerning RC Pump power monitors:
- a. Given the loss of a specific vital bus, describe its effect on the RC Pump Power Monitors and the RPS channels.
  - b. Given plant conditions, including RC Pumps operating status and RPS channel status, predict/describe the affect that loss of a vital bus will have on RPS and plant operation.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 55.45

## Discriminant Validity Statements

- A Plausible if vital bus distribution and RPS interrelationship is misunderstood.
- B Plausible if vital bus distribution and RPS interrelationship is misunderstood.
- C Plausible if vital bus distribution and RPS interrelationship is misunderstood.
- D Correct answer.

Comments None.

## Examination Outline Cross-Reference

KA #	<u>K3.03</u>	Page	<u>3.7-2</u>	Tier #	<u>2</u>
RO/SRO Importance Rating	<u>3.1</u> <u>3.3</u>	Group #			<u>2</u>

Measurement SDS

Proposed Question     RO     SRO     PRA Related    Correct Answer    **C**

Initial conditions:

Plant startup in progress.

ULD is at 13%.

Turbine Bypass valves are 6% open.

A fault occurs in the Reactor Protection System, resulting in a Reactor trip. All systems respond as expected.

Turbine Bypass Valves will control OTSG pressure at:

- A. 895 psig
- B. 960 psig
- C. 1010 psig
- D. 1026 psig

Technical Reference Drawing D553854

Open Exam Reference

Learning Objective IV.E.27.17 State the set point and biases for the turbine bypass valves and the bases for each bias.

Question Source     New     TMI Bank    TMI Question #  
 Modified TMI Bank    Parent Question #

Question Cognitive Level     Memory or Fundamental Knowledge  
 Comprehension or Analysis

10 CFR Part 55 Content     55.41 .7     55.43     55.45 .6

Discriminant Validity Statements

- A This would be the setpoint if examinee fails to recognize turbine trip occurred.
- B This is the normal setpoint, dependent on ICS status at low power. (see conditions on reference)
- C Correct answer.
- D Controlling pressure setpoint for the Atmospheric Dump Valves.

Comments None.

## Examination Outline Cross-Reference

KA # 2.1.32

Page 2-4

Tier #

2

RO/SRO Importance Rating 3.4 3.8

Group #

2

**Measurement** Ability to explain and apply all limits and precautions.**Proposed Question** RO SRO PRA Related**Correct Answer**

B

Plant conditions:

- Plant in refueling shutdown
- Core alterations in progress

Which ONE of the following is the consequence of a trip of AH-E-101, Kidney Filter System Fan?

- A. Loss of RB Purge due to interlock with AH-E-101.
- B. RB evacuation due to significant increase in RB iodine activity.
- C. Stoppage of refueling operations due to Technical Specification LCO entry.
- D. Fire hazard in charcoal filter bank due to radioactive decay and loss of cooling.

**Technical Reference** 1104-55, Reactor Building Atmosphere Cleanup System, page 4.**Open Exam Reference****Learning Objective** IV.F.02.02 State the functions of the Reactor Building Ventilation System.**Question Source** New TMI Bank**TMI Question #** Modified TMI Bank**Parent Question #****Question Cognitive Level** Memory or Fundamental Knowledge Comprehension or Analysis**10 CFR Part 55 Content** 55.41 .10 55.43 .4 55.45 .12**Discriminant Validity Statements**

- A. Plausible, but no such interlock.
- B. Correct answer.
- C. Plausible, but not required by Tech. Specs.
- D. Plausible since the system is supplied with a fire suppression system and radioactive decay will produce heat.

**Comments**

None.

## Examination Outline Cross-Reference

KA # K3.02Page 3.8-9

Tier #

2RO/SRO Importance Rating 2.8 3.2

Group #

2**Measurement** Area and ventilation radiation monitoring systems.

## Proposed Question

 RO SRO PRA Related

Correct Answer

**D**

The Spent Fuel Cooling System has just been placed in operation. A valve lineup error results in Spent Fuel Pool level dropping to elevation 334', which is approximately 10' below normal level. This will result in:

- A. An increase in Spent Fuel Pool temperature.
- B. A reduction of spent fuel pool boron concentration.
- C. A complete loss of NPSH to Spent Fuel cooling pumps.
- D. An increase in radiation levels as monitored on RM-G-9.

**Technical Reference** ARP C-1-1, High Radiation, page 32.

## Open Exam Reference

## Learning Objective

There is no direct TMI objective tied to this K/A statement

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 55.45 .6

## Discriminant Validity Statements

- A Cooling is maintained, level did not reduce cooling capability of the system.
- B Reduction in level during normal cooling operations does not reduce boron concentration.
- C Suction is not lost until level drops below approximately 323'-6".
- D Correct answer.

**Comments** None.



## Examination Outline Cross-Reference

KA #	Page	Tier #	RO	SRO
K5.01	3.4-15			
RO/SRO Importance Rating	3.4 3.9	Group #		
				2
				2

**Measurement** Effects of secondary parameters, pressure and temperature on reactivity.

**Proposed Question**  RO  SRO  PRA Related **Correct Answer** B

The following plant conditions exist:

- Reactor startup is in progress after a mid cycle outage.
- Safety groups 1 through 4 have been withdrawn.

A turbine bypass valve has just failed open.

Which ONE of the following is a possible consequence AND must receive the highest priority?

- A. MFW isolation on low steam generator pressure.
- B. Inadvertant criticality due to positive reactivity addition.
- C. Automatic actuation of EFW on low steam generator level.
- D. Exceeding pressure-temperature limits of the reactor vessel.

**Technical Reference** 1203-10, Unanticipated Criticality, page 2.  
AP 1085, TMI Reactivity Management Program, page 10.  
AP 1029, Conduct of Operations, page 30.

## Open Exam Reference

**Learning Objective** V.I.07.11 Describe the causes of uncontrolled reactivity additions which have occurred in the industry or may occur at TMI including:  
b. Uncontrolled heatups and cooldowns.

**Question Source**  New  TMI Bank **TMI Question #**  
 Modified TMI Bank **Parent Question #**

**Question Cognitive Level**  Memory or Fundamental Knowledge  
 Comprehension or Analysis

**10 CFR Part 55 Content**  55.41 .5  55.43  55.45 .7

## Discriminant Validity Statements

- A. True consequence, but not highest priority.
- B. Correct answer.
- C. OTSG inventory is challenged, however low OTSG level limits will prevent actuation.
- D. RCS P/T are affected, but not severe enough to challenge P/T limitations.

**Comments** None.

## Examination Outline Cross-Reference

KA # K4.01

Page 3.4-15

Tier #

2

RO/SRO Importance Rating 3.6 3.8

Group #

2

Measurement S/G level control.

## Proposed Question

 RO SRO PRA Related

Correct Answer

A

## Plant Conditions:

- A steam leak is raising Containment Building pressure
- Reactor was tripped 2 minutes ago
- Containment Building pressure is 2 psig
- OTSG 1A pressure is 550 psig
- OTSG 1B pressure is 650 psig
- OTSG 1A Startup Range level is 4 inches
- OTSG 1B Startup Range level is 38 inches
- HSPS train B LO-LO OTSG level DEFEATED

Which ONE of the following identify the correct HSPS response?

## EF-P-1 AND

- A. EF-P-2A START, EF-V-30A controls at 25 inches.
- B. EF-P-2B START, EF-V-30D controls at 25 inches.
- C. EF-P-2A START, EF-V-30D controls at 25 inches.
- D. EF-P-2B START, EF-V-30A controls at 25 inches.

Technical Reference OPM F-10, Heat Sink Protection System, page 5 and 13.

## Open Exam Reference

## Learning Objective

IV.E.05.04 Given a set of plant conditions and the status of the Emergency Feedwater system (EFW), determine if HSPS will actuate the EFW system, and what the response of the EFW system will be.

## Question Source

 New TMI Bank

TMI Question #

QR4E05-04-Q05

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 55.45

## Discriminant Validity Statements

- A Correct answer.
- B Plausible with the misconception of the components each train control.
- C Plausible with the misconception of the components each train control.
- D Plausible with the misconception of the components each train control.

Comments None.

## Examination Outline Cross-Reference

KA # 2.4.47

Page 2-16

Tier #

2

RO/SRO Importance Rating 3.4 3.7

Group #

2

**Measurement** Ability to diagnose trends in an accurate and timely manner utilizing the appropriate control room reference material.

## Proposed Question

RO

SRO

PFA Related

## Correct Answer

A

The following alarms/conditions exist:

- Plant is stable at 90% power.
- Five Circ Water pumps are in operation with CW-P-1E secured.
- N-1-6, MN COND VACUUM LOW
- K-2-5, MN TURBINE GLAND STM PRESS LOW
- Condenser vacuum on CO-PI-73/74/75 on CL is 8.8" HgA and rising slowly.

The Secondary AO has reported that there is a steam leak prior to the inlet of the pressure reducer supplying Gland Steam (GS).

The required action for this condition is to:

- A. Trip the reactor and perform 1210-1, Reactor Trip.
- B. Start CW-P-1E using 1104-9, Circulating Procedure.
- C. Commence a plant shutdown and perform 1203-24, Steam Leak.
- D. Bypass the GS pressure reducer using 1106-10, Turbine Gland Steam Supply.

**Technical Reference** ARP N-1-6, MN Condenser Vacuum LO, page 1 and 2.

## Open Exam Reference

**Learning Objective** IV.D.04.12 Describe operator actions in response to decreasing main or auxiliary condenser vacuum.

## Question Source

New

TMI Bank

TMI Question #

Modified TMI Bank

Parent Question #

## Question Cognitive Level

Memory or Fundamental Knowledge

Comprehension or Analysis

## 10 CFR Part 55 Content

55.41 .10

55.43 .5

55.45 .12

## Discriminant Validity Statements

- A Correct answer.
- B Plausible since this would address the low vacuum condition, but reactor trip is required and has higher priority.
- C Plausible since this would address the low vacuum condition, but reactor trip is required and has higher priority.
- D Plausible since this would address the low vacuum condition, but reactor trip is required and has higher priority.

**Comments** None.

## Examination Outline Cross-Reference

KA #	A3.06	Page	3.6-11	Tier #	2
RO/SRO Importance Rating	3.3      3.4	Group #			2

Measurement Start and stop.

Proposed Question     RO     SRO     PRA Related    Correct Answer     C

Plant conditions:

- 1600# ESAS actuated
- Loss of Offsite Power

Which ONE of the following conditions will trip or shutdown an Emergency Diesel Generator?

- A. Start Failure
- B. High Crankcase Pressure
- C. Low Lube Oil Pressure - Running
- D. Stop Pushbutton in Control Room

Technical Reference OPM F-03, Diesel Generator and Auxiliary Equipment, page 31.

## Open Exam Reference

Learning Objective IV.G.08.07 List interlocks and automatic functions of the diesels and auxiliary systems and state the reason for each, including shutdown features.

Question Source     New     TMI Bank    TMI Question #  
 Modified TMI Bank    Parent Question #

Question Cognitive Level     Memory or Fundamental Knowledge  
 Comprehension or Analysis

10 CFR Part 55 Content     55.41 .7     55.43     55.45 .5

## Discriminant Validity Statements

- A Plausible because it is a DG trip, but is bypassed on ES.
- B Plausible because it is a DG trip, but is bypassed on ES.
- C Correct answer.
- D Plausible because it will shutdown a DG, but is bypassed on ES.

Comments None.

## Examination Outline Cross-Reference

KA # A4.03

Page 3.7-16

Tier #

RO

SRO

RO/SRO Importance Rating 3.1 3.2

Group #

2

2

Measurement Check source for operability determination.

## Proposed Question

 RO SRO PFA Related

## Correct Answer

A

Which ONE of the following radiation monitors must have a current source check for operability at all times when in modes starting with Hot Standby up to Power Operations?

- A. RM-A-8, Auxiliary/Fuel Handling Building Exhaust
- B. RM-A-9, Reactor Building Purge Exhaust
- C. RM-A-14G, Engineered Safety Features Ventilation
- D. ALC-RMI-18, Chemical Cleaning Building Exhaust

Technical Reference 1301-1, Shift and Daily Checks

## Open Exam Reference

## Learning Objective

IV.E.06.07 State the Tech. Specs./ODCM associated with the Radiation Monitoring system.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 .1 55.45 .5 to .8

## Discriminant Validity Statements

- A Correct answer.
- B Plausible because it does require a source check, but only during an RB purge.
- C Plausible because it does require a source check, but only when ESF ventilation is in operation.
- D Plausible because it does require a source check, but only when CCB ventilation is operating.

Comments None.

## Examination Outline Cross-Reference

KA # K1.01

Page 3.8-14

Tier #

2

RO/SRO Importance Rating 2.5 2.5

Group #

2

Measurement SWS

Proposed Question

 RO SRO PRA Related

Correct Answer

B

Supplemental de-icing makeup to the Circulating Water Flume is provided by:

- A. Fire Service
- B. Nuclear River
- C. Secondary River
- D. Decay Heat River

Technical Reference

OPM section D-02, Nuclear Service River Water, page 4.

Open Exam Reference

Learning Objective

IV.C.07.09 State the system which provides supplemental "de-icing" makeup to the circulating water flume and explain how this makeup is controlled.

Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

10 CFR Part 55 Content

 55.41 .2 to .9 55.43 55.45 .7,.8

Discriminant Validity Statements

- A Fire service can be lined up, but not for deicing.
- B Correct answer.
- C Plausible, since this is the normal supply.
- D River water systems are used for deicing with the exception of DR.

Comments

None.

## Examination Outline Cross-Reference

KA #	K1.01	Page	3.8-21	Tier #	2
RO/SRO Importance Rating	3.0      3.1	Group #			2

Measurement IAS

Proposed Question     RO     SRO     PRA Related    Correct Answer    **A**

The following sequence of events has occurred:

- A rupture developed in the air header supplying MS-V-3s.
- IA-P-4 trips on overload.
- IA-P-1A/B and SA-P-1A/B are started successfully.
- Instrument air primary (PI-222) and secondary (PI-1403) pressure indicators on PL are tracking together and continue to decrease.

Which ONE of the following describes PI-222 and PI-1403 response on PL when IA-V-26 closes?

- A. PI-222 starts to increase AND PI-1403 continues to decrease.
- B. PI-222 starts to increase AND PI-1403 starts to increase.
- C. PI-222 continues to decrease AND PI-1403 starts to increase.
- D. PI-222 continues to decrease AND PI-1403 continues to decrease.

Technical Reference EP 1202-36

Open Exam Reference

Learning Objective V.D.17.03 Given a list of symptoms, identify the event, determine what Immediate Automatic Actions will occur and what Immediate Manual Actions are required IAW EP 1202-36.

Question Source     New     TMI Bank    TMI Question #  
 Modified TMI Bank    Parent Question #

Question Cognitive Level     Memory or Fundamental Knowledge  
 Comprehension or Analysis

ID CFR Part 55 Content     55.41 .2 to .9     55.43     55.45 .7, .8

Discriminant Validity Statements

- A. Correct answer.
- B. Plausible if location of air leak is misunderstood.
- C. Plausible if wrong setpoint is interpreted.
- D. Plausible if wrong setpoint is interpreted and location of air leak is misunderstood.

Comments None.

## Examination Outline Cross-Reference

KA # K4.01

Page 3.8-21

Tier #

2

RO/SRO Importance Rating 2.9 3.2

Group #

2

Measurement Cross connect with IAS

## Proposed Question

 RO SRO PRA Related

## Correct Answer

B

IA-V-2104A/B, Auto Isolation Valves, open automatically when Instrument Air header pressure drops to:

- A. 85 psig AND will automatically close when pressure is restored.
- B. 85 psig AND must be closed locally when pressure is restored.
- C. 80 psig AND will automatically close when pressure is restored.
- D. 80 psig AND must be closed locally when pressure is restored.

## Technical Reference

OPM Section M-02, Instrument and Control Air System, page 6.  
OP 1104-25, Instrument and Control Air System, page 26.

## Open Exam Reference

## Learning Objective

IV.D.14.03 State the interlocks and their setpoints for the following components:

d. IA-V-2104A/B

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 55.45

## Discriminant Validity Statements

- A. Correct setpoint, wrong response for closing.
- B. Correct answer.
- C. Incorrect setpoint and response for closing. 80 psig is a valid setpoint for other functions in instrument air.
- D. Incorrect setpoint. 80 psig is a valid setpoint for other functions in instrument air.

## Comments

None.

## Examination Outline Cross-Reference

KA # 2.4.47

Page 2-16

Tier #

2

RO/SRO Importance Rating 3.4 3.7

Group #

3

**Measurement** Ability to diagnose trends in an accurate and timely manner utilizing the appropriate control room reference material.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

A

The following plant conditions exist:

- Plant cooldown is in progress using RC-P-1C and DH-P-1A.
- Current RCS temperature is 210°F.
- Cooldown rate is maximized for these conditions.

Assuming that cooldown continues at the maximum rate for 2 hours, the maximum allowable RCS pressure band as directed by the CRS at the 2 hour point will be:

- A. 293 psig to 324 psig
- B. 293 psig to 332 psig
- C. 305 psig to 332 psig
- D. 305 psig to 318 psig

**Technical Reference** 110404, Decay Heat Removal System, page 66

**Open Exam Reference** 1104-4, Figure 2A page 66

**Learning Objective** IV.A.11.24 Given a set of plant conditions and appropriate curves, determine if DHR operating limits have been exceeded for:  
1. Simultaneous RCP operation

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .10 55.43 .1 55.45 .12

## Discriminant Validity Statements

- A Correct answer.
- B This response ignores Curve 7, surge line stratification limit.
- C This response applies the previous cooldown limit (10°F/hr).
- D This response applies the previous cooldown limit (10°F/hr) and applies the wrong curve.

## Comments

None.

## Examination Outline Cross-Reference

KA #	K6.03	Page	3.4-12	Tier #	2
RO/SRO Importance Rating	2.5      2.6	Group #			3

**Measurement** RHR heat exchanger.

**Proposed Question**     **RO**     **SRO**     **PRA Related**    **Correct Answer**    **D**

## Plant conditions:

- Reactor is at cold shutdown condition.
- Decay Heat Removal Train A is operating.
- Decay Heat Closed Cooling flow through the Decay Heat Removal cooler is throttled to maintain the RCS at 130° F.
- Total loss of Instrument Air (0 psig) occurred.

From the list below, identify the ONE statement that describes the response of the cooling system and subsequent effect on RCS temperature for this situation.

- A. Closure of DC-V-65A (Cooler bypass) AND DC-V-2A (Cooler inlet) results in RCS heatup.
- B. Opening of DC-V-65A (Cooler bypass) AND DC-V-2A (Cooler inlet) results in RCS cooldown.
- C. Closure of DC-V-2A (Cooler inlet) results in RCS heatup.
- D. Opening of DC-V-2A (Cooler inlet) results in RCS cooldown.

**Technical Reference** EP 1202-36, Loss of Instrument Air, page 6.

## Open Exam Reference

**Learning Objective** IV.B.01.13 Describe the Decay Closed Cooling Water system response to a loss of instrument air.

**Question Source**     New     **TMI Bank**    **TMI Question #**    80 FEB 2000 EXAM  
 **Modified TMI Bank**    **Parent Question #**

**Question Cognitive Level**     **Memory or Fundamental Knowledge**  
 **Comprehension or Analysis**

**10 CFR Part 55 Content**     55.41 .7     55.43     55.45 .7

## Discriminant Validity Statements

- A Plausible distracter since closure of both valves (incorrect response for loss of Instrument Air) will result in loss of cooling and therefore RCS heatup.
- B Plausible distracter since opening both valves (incorrect response for loss of Instrument Air) could possibly result in RCS cooldown.
- C Plausible distracter since closure of DC-V-2A (incorrect response for loss of Instrument Air) would result in RCS heatup.
- D Correct answer.

**Comments** None.

## Examination Outline Cross-Reference

KA # A3.04

Page 3.4-32

Tier #

2

RO/SRO Importance Rating 3.4 3.6

Group #

3

Measurement TG trip.

## Proposed Question

 RO SRO PRA Related

Correct Answer

B

## PLANT CONDITIONS:

- Power level at 60%
- ICS is in full auto
- No equipment OOS

A load rejection occurs.

Given the above conditions, which ONE of the following design features will prevent the Turbine tripping on overspeed?

- A. Main Steam Pressure Limiter
- B. Power Load Unbalance
- C. Intercept Valve Trigger
- D. Speed Error Signal

Technical Reference OPM section H-06, 32 and 33.

## Open Exam Reference

Learning Objective IV.E.03.10 Given a set of plant conditions, determine which EHC control feature is controlling the turbine control valves.

## Question Source

 New TMI Bank

TMI Question #

QR4E03-10-Q03

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 55.45 .5

## Discriminant Validity Statements

- A This feature is only used (normally) at low power conditions. The function is to close control valves on low pressure. Plausible if the examinee misinterprets turbine response to this event.
- B Correct answer.
- C Designed for over speed protection, but only capable of handling a 20% to 40% load rejection.
- D Speed error signal modifies rate of speed increase, not actual speed. Additionally, it is not designed as a fast acting control.

Comments None.

## Examination Outline Cross-Reference

KA # K2.01

Page 3.4-49

Tier #

2

RO/SRO Importance Rating 2.7 2.7

Group #

3

Measurement Service water.

## Proposed Question

 RO SRO PRA Related

Correct Answer

D

What is the power supply to SR-P-1B?

- A. 1C TP 480V Bus
- B. 1J TP 480V Bus
- C. 1S 480V ES Bus
- D. 1T 480V ES Bus

Technical Reference 1107-4, Electrical Distribution Listing, page 341.

## Open Exam Reference

Learning Objective IV.D.22.07 State the power supplies to SR-P-1A/B/C

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .7 55.43 55.45

## Discriminant Validity Statements

- A Plausible if examinee confuses river pump as supplied from BOP bus as service water.
- B Plausible if examinee confuses river pump as supplied from BOP bus as service water.
- C Plausible since the 1S bus is supplied by the E 4160V bus.
- D Correct answer.

Comments None.

## Examination Outline Cross-Reference

KA # 2.1.12

Page 2-2

Tier #

3

RO/SRO Importance Rating 2.9 4.0

Group #

1

Measurement Ability to apply technical specifications for a system.

## Proposed Question

 RO SRO PFA Related

## Correct Answer

C

## Plant Conditions:

- The plant is stable at 100% power.
- EF-P-2A is out of service for bearing replacement and can't be returned to service for at least 48 hours.
- 230KV Bus 8 is out for emergency service and can't be returned to service for at least 36 hours.
- EG-Y-1A is in operation supplying the power to the D 4160V Bus.

The Auxiliary Operator has just reported that he inadvertently stepped on the fuel supply line to EG-Y-1B, and that the line is broken off at the filter.

The minimum required action for this condition is to:

- A. Restore EG-Y-1B to operable status within 24 hours, or  
Place the unit in HOT Shutdown within 12 hours
- B. Place the unit in HOT Shutdown within 12 hours, and  
Restore EG-Y-1B to operable status within 24 hours, or  
Place the Plant in COLD SHUTDOWN within an additional 24 hours
- C. Take action within 1 hour to place the unit in:  
At least HOT STANDBY within the next 6 hours, and  
At least HOT SHUTDOWN within the following 6 hours, and  
At least COLD SHUTDOWN within the subsequent 24 hours.
- D. Operation is permitted for 7 days provided that:  
Immediately verify EG-Y-1A is operable, and  
Within 24 hours verify EG-Y-1A is not inoperable due to a common mode failure, and  
Within 24 hours test EG-Y-1A IAW Surveillance requirement 4.6.1.a.

Technical Reference Technical Specifications, page 3-1 and page 3-43.

## Open Exam Reference

Learning Objective IV.G.08.19 Given the condition/status applicable to the Emergency Diesel Generators and/or auxiliary equipment, and the appropriate sections of Tech Specs, determine if operability requirements are met and what actions, if any, are required.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .2 55.43 .2 55.45 .3

## Discriminant Validity Statements

- A Correct if only evaluating diesel.
- B This would be correct if both generators were declared inoperable.
- C Correct answer. TS 3.0.1 applies.

D This would be the correct response, however, with EF-P-2A out of service, TS 3.0.1 applies.

Comments None.

## Examination Outline Cross-Reference

KA # 2.1.14

Page 2-2

Tier #

3

RO/SRO Importance Rating 2.5 3.3

Group #

1

**Measurement** Knowledge of system status criteria which require notification of plant personnel.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

C

Plant power is stable at 68%.

RC-P-1C was tripped due to #1 RCP seal failure.

Continued operation at power must be authorized by (the):

- A. Director, Plant Engineering.
- B. Shift Operations Supervisor.
- C. Plant Operations Director.
- D. Shift Manager.

**Technical Reference** 1203-16, reactor Coolant Pump and Motor Malfunction, page 3.

## Open Exam Reference

## Learning Objective

V.B.02.10 Explain the difference between the tech spec requirements and the procedural requirements concerning RCP allowable combinations. (closest site objective for this K/A).

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 55.43 .3 55.45 .12

## Discriminant Validity Statements

- A Plant engineering concurrence is only required for long term RCP operation with degraded seal conditions.
- B Shift Ops Supervisor may be consulted for recommendations, but doesn't have approval authority.
- C Correct answer.
- D Shift manager may recommend this, but authority rests with the POD.

## Comments

Facility considers obtaining authorization as consistent with notification requirements.

## Examination Outline Cross-Reference

KA # 2.1.25

Page 2-3

Tier #

3

RO/SRO Importance Rating 2.8 3.1

Group #

1

**Measurement:** Ability to obtain and interpret station reference materials such as graphs, monographs, and tables which contain performance data.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

C

Plant conditions:

- Maximum Generation Emergency declared.
- Reactor power is 100%.
- Generator MVAR loading is 340 MVARs OUT.
- Main Generator Hydrogen pressure is 45 psig.

Refer to the attached Figure B-2B from OP 1106-1. From the list of values provided below, identify the MAXIMUM GENERATOR MEGAWATT OUTPUT CAPABILITY for these conditions.

- A. 580 MW.
- B. 640 MW.
- C. 800 MW.
- D. 870 MW.

**Technical Reference:** OP 1106-1, Turbine Generator page 57.

**Open Exam Reference:** OP 1106-1, page 57.

## Learning Objective

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .10 55.43 .1 55.45 .12

## Discriminant Validity Statements

- A Uses wrong curve.
- B 340 IN and wrong curve.
- C Correct answer.
- D This is rated load for the unit.

**Comments:** None.

**Examination Outline Cross Reference**

KA # 2.1.33

Page 2-4

Tier #

3

RO/SRO Importance Rating 3.4 4.0

Group #

1

**Measurement** Ability to recognize indications for system operating parameters which are entry level conditions for technical specifications.

**Proposed Question** RO SRO PRA Related**Correct Answer**

B

Plant Conditions:

- 100% Power
- All Systems in their normal configuration

Which ONE of the following would be an entry level condition for Technical Specifications?

- A. BWST temperature of 45°F
- B. RCS oxygen concentration of 0.2 ppm
- C. MS-V-3A and B, Turbine Bypass Valves, become inoperable
- D. RC-V-40A, "A" RCS Hot Leg High Point Vent Valve, becomes inoperable

**Technical Reference** Tech Specs, 3.1.5, page 3-10.

**Open Exam Reference**

**Learning Objective** III.G.30.01 State the limits for each of the following parameters sampled for in the RCS:  
d. Oxygen

**Question Source** New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

**Question Cognitive Level** Memory or Fundamental Knowledge Comprehension or Analysis**10 CFR Part 55 Content** 55.41 .2 55.43 .1 55.45 .3**Discriminam Validity Statements**

- A Plausible because there is an LCO on this item, but this does not exceed the limit.
- B Correct answer.
- C Plausible because there is an LCO on this item, but this does not exceed the limit.
- D Plausible because there is an LCO on this item, but this does not exceed the limit.

**Comments** None.

## Examination Outline Cross-Reference

KA # 2.2.13

Page 2-6

Tier #

3

RO/SRO Importance Rating 3.6 3.8

Group #

2

Measurement Knowledge of tagging and clearance procedures.

## Proposed Question



RO



SRO



PRA Related

## Correct Answer

C

In addition to the person having clearance, identify ONE specific person whose approval is required prior to changing the condition or position of Special Condition Tag tagged ES equipment (SINGLE manipulation).

- A. Duty Ops Coordinator.
- B. Director, Operations.
- C. Duty Shift Manager.
- D. Licensed Control Room Operator.

Technical Reference AP 1002, Clearance and Tagging, Rev. 92, Page 21.

## Open Exam Reference

Learning Objective V.A.01.02 State whose permission is required to change the position/condition of blue tagged equipment IAW AP 1002.

## Question Source



New



TMI Bank

TMI Question #



Modified TMI Bank

Parent Question #

## Question Cognitive Level



Memory or Fundamental Knowledge



Comprehension or Analysis

## 10 CFR Part 55 Content



55.41 .10



55.43



55.45 .13

## Discriminant Validity Statements

- A A plausible misconception as this is a work management position.
- B A plausible misconception as this is a senior management official.
- C Correct answer.
- D Plausible misconception since this individual is licensed by the NRC.

## Comments

None.

## Examination Outline Cross-Reference

KA # 2.2.22

Page 2-7

Tier #

3

RO/SRO Importance Rating 3.4 4.1

Group #

2

Measurement Knowledge of limiting conditions for operations.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

C

## Plant Conditions:

- Plant at 70% power
- 225 EFPD
- 3 RCP's operating
- Full Incore System is being used for tilt and imbalance calculations
- Indicated Tilt is now +7.96%

Which ONE of the below identify the maximum allowable power for the current plant conditions:

- A. 92 %
- B. 87 %
- C. 67 %
- D. 62 %

Technical Reference T.S. 3.5.2.4, COLR

Open Exam Reference Tech. Specs.

Learning Objective V.F.01.08 Given specific plant conditions and a copy of Tech. Specs., identify any Limiting Conditions for Operation (LCOs) which are challenged by such conditions, and determine remedial actions permitted or required by those LCOs.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 55.43 .1 55.45 .2

## Discriminant Validity Statements

- A Uses correct table for tilt limit, but reduces the allowable power from 100%.
- B Uses incorrect table for tilt limit, and reduces the allowable power from 100%.
- C Correct answer.
- D Uses incorrect table for tilt limit, but reduces from the proper RCP limit.

## Comments

7.96% Tilt - 4.12% (Tilt Limit) = 3.84% tilt in excess of tilt limit  
 3.84% X 2 = 7.68% is required reduction in thermal power  
 below the 75% limit (3 RCP's).  
 Maximum Power Limit is (75% - 7.68%) = 67.32%

## Examination Outline Cross-Reference

KA # 2.2.24

Page 2-7

Tier #

3

RO/SRO Importance Rating 2.6 3.8

Group #

2

**Measurement** Ability to analyze the affect of maintenance activities on LCO status.**Proposed Question** RO SRO PRA Related**Correct Answer**

A

Sequence of events:

- 1200 EF-P-2A removed from service for bearing replacement. Time for return to service is unknown.
- 1500 A trainee reports that they inadvertently tripped EF-P-1. Efforts are immediately initiated to reset EF-P-1.
- 1600 Efforts to reset EF-P-1 have failed.

The current time is 1800.

In order to satisfy facility license requirements, which ONE of the following identifies the required action for this condition AND the MAXIMUM allowable time to reach this condition?

- A. The plant must be in COLD SHUTDOWN within the next 16 hours.
- B. The plant must be in COLD SHUTDOWN within the next 15 hours.
- C. EF-P-1 must be returned to OPERABLE status within the next 69 hours.
- D. EF-P-2A must be returned to OPERABLE status within the next 66 hours.

**Technical Reference** Tech Spec 3.4.1.1.a (2)**Open Exam Reference** Tech Specs**Learning Objective** IV.B.06.10 Given plant conditions and access to technical specifications, determine Tech Spec operability requirements, required actions and applicable time clocks.**Question Source** New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

**Question Cognitive Level** Memory or Fundamental Knowledge Comprehension or Analysis**10 CFR Part 55 Content** 55.41 55.43 .2 55.45 .13**Discriminant Validity Statements**

- A Correct answer, 1 hour plus 6 hours plus 12 hours minus 3 hours.
- B Incorrect, 1 hour allowance to correct the inoperable pump is not accounted for.
- C Correct if considered independently, but not the most limiting condition.
- D Correct if considered independently, but not the most limiting condition.

**Comments** None.

## Examination Outline Cross-Reference

KA # 2.2.33

Page 2-8

Tier #

3

RO/SRO Importance Rating 2.5 2.9

Group #

2

Measurement Knowledge of control rod programming.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

C

Which ONE of the following describes the limitations for rod group overlap and the bases for the limitations?

- A. 25% +5% -0%, limits reactivity addition during a postulated rod ejection.
- B. 25% +5% -0%, allowed since the worth of a rod is lower at the top and bottom of the core.
- C. 25% +5% -5%, allowed since the worth of a rod is lower at the top and bottom of the core.
- D. 25% +5% -5%, limits reactivity addition during a postulated rod ejection.

Technical Reference Technical Specifications, Page 3-36.

## Open Exam Reference

Learning Objective III.B.10.09 State the reason for control rod overlap.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 55.43 .6 55.45

## Discriminant Validity Statements

- A The bases is for rod insertion limits.
- B Bases is correct, limit is wrong.
- C Correct answer.
- D The bases is for rod insertion limits.

Comments None.

## Examination Outline Cross-Reference

KA # 2.2.21

Page 2-7

Tier #

3

RO/SRO Importance Rating 2.8 3.2\*

Group #

2

**Measurement:** Knowledge of pre- and post- maintenance operability requirements.**Proposed Question** RO SRO PRA Related**Correct Answer**

C

Plant conditions:

- The plant is in HOT SHUTDOWN making preparations for startup scheduled 2 days from now.
- The impeller of a pump that is required to be operable for power operations was just replaced today.
- The pump section of the system Technical Specification Surveillance is required for post maintenance testing requirements.
- The normally scheduled Tech Spec Surveillance is 10 days from now.

Which ONE of the following identifies the MINIMUM requirements to satisfy AP 1001J, Technical Specification Testing Program?

- A. The entire Tech Spec Surveillance MUST be performed prior to criticality.
- B. The entire Tech Spec Surveillance MAY be completed following criticality on its normally scheduled date.
- C. The pump section of the Tech Spec Surveillance MUST be completed prior to criticality.
- D. The pump section of the Tech Spec Surveillance MAY be completed following criticality on its normally scheduled date.

**Technical Reference** AP 1001J.1 section 4.5.6, page 8.**Open Exam Reference****Learning Objective**

VII.B.01.15 Given a request to perform post-modification or post-maintenance testing, determine if the test can be conducted considering the potential adverse effects on plant conditions and personnel safety.

**Question Source** New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

**Question Cognitive Level** Memory or Fundamental Knowledge Comprehension or Analysis**10 CFR Part 55 Content** 55.41 55.43 .2 55.45**Discriminant Validity Statements**

- A No, only the pump section of the surveillance must be completed.
- B No, this would not satisfy the minimum requirement to perform the pump section following impeller replacement to prove operability. The entire surveillance may be completed on its scheduled date, but would not allow the pump to meet operability requirements prior to criticality.
- C Correct answer.
- D No, the pump section must be completed prior to criticality.

**Comments**

This knowledge is only related to an SRO responsibility.

## Examination Outline Cross-Reference

KA # 2.3.2

Page 2-9

Tier #

3

RO/SRO Importance Rating 2.5 2.9

Group #

3

Measurement Knowledge of the facility ALARA program.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

D

A job is to be performed in an area that has a general radiation dose rate of 60 mRem/hr. Installation of temporary shielding to reduce the dose rate to 10 mRem/hr will require a total dose of 30 mRem (for installation and removal).

From the list below, identify the ONE option that will meet ALARA expectations for the entire job process.

- A. 2 workers each taking 35 minutes to perform the job.
- B. 1 worker taking 60 minutes to perform the job.
- C. Utilize temporary shielding, 2 workers each taking 35 minutes to perform the job.
- D. Utilize temporary shielding, 1 worker takes 60 minutes to perform the job.

Technical Reference GET Radiation Worker Training Handout, Rev. 5, Page 14.

## Open Exam Reference

Learning Objective III.F.02.01 State the Federal and TMI-1 Administrative Limits on Radiation Exposure at TMI-1 for whole body, skin and extremities.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .12 55.43 .4 55.45 .9,.10

## Discriminant Validity Statements

- A 70 mRem total.
- B 60 mRem total.
- C  $30 + 11.6 = 41.6$  mRem total.
- D Correct answer ( $30 + 10 = 40$  mRem total).

Comments None.

## Examination Outline Cross-Reference

KA # 2.3.4

Page 2-9

Tier #

3

RO/SRO Importance Rating 2.5 3.1

Group #

3

**Measurement:** Knowledge of radiation exposure limits and contamination control, including permissible levels in excess of those authorized.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

A

Data contained on survey sheet:

- 2,500 DPM/100 cm<sup>2</sup> beta-gamma.
- 10 DPM/100 cm<sup>2</sup> alpha.
- 450 mRem/hr general area.
- 470 mRem/hr on the surface of a tank.
- Airborne activity < 10% of all DACs.

The MINIMUM required posting for this area is:

- A. Contaminated AND High Radiation Area.
- B. Contaminated AND Radiation Area.
- C. High Radiation Area.
- D. Airborne Radiation Area.

**Technical Reference:** Radiation Worker Training Manual, pages 37 and 38.

## Open Exam Reference

**Learning Objective:** IV.D.11.03

## Question Source

 New  TMI BankTMI Question # 62 98 SRO  
EXAM Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 55.43 55.45 .10

## Discriminant Validity Statements

- A. Correct answer.
- B. Plausible distracter since this is a Contaminated Area, but also a High Radiation Area.
- C. Plausible distracter due to misconception on contamination limits.
- D. Plausible distracter due to misconception on airborne limits or definition of DAC.

## Comments

None.

## Examination Outline Cross-Reference

KA # 2.3.10

Page 2-10

Tier #

3

RO/SRO Importance Rating 2.9 3.3

Group #

3

**Measurement:** Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

C

RM-L-1 HI alarm has actuated. High RCS activity has been verified.

Which ONE of the following is correct concerning operation of the letdown system?

- A. Reestablish letdown in order to initiate cleanup of the RCS.
- B. Reestablish letdown in order to provide RCS inventory control during shutdown.
- C. Maintain letdown isolated in order to minimize radiation levels in the Aux. Building.
- D. Maintain letdown isolated in order to minimize contamination of RCP seals.

**Technical Reference:** ARP C-1-1, RM-L-1 Primary Coolant Letdown, page 49.

## Open Exam Reference

**Learning Objective:** V.D.07.03 List the Immediate Manual Actions required for Excessive Radiation Levels per EP 1202-12.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 55.43 .4 55.45 .10

## Discriminant Validity Statements

- A Plausible since this will go through the demineralizers, but won't be successful.
- B Plausible since a shutdown would be required.
- C Correct answer.
- D Seals would be contaminated if letdown were restored, but this is not a concern.

**Comments:** None.

## Examination Outline Cross-Reference

KA # 2.3.11

Page 2-10

Tier #

3

RO/SRO Importance Rating 2.7 3.2

Group #

3

Measurement Ability to control radiation releases.

## Proposed Question

 RO SRO PFA Related

## Correct Answer

A

Plant conditions:

- OTSG 1A tube leak (300 gpm) shutdown in progress per ATP 1210-5.
- Reactor was manually tripped at 5% power 25 minutes ago.
- That is 510°F.
- RCS pressure is 980 psig.
- OTSG 1A/1B levels are both 25 inches.
- BWST level is 24 feet.
- Tech Support Center (TSC) is not staffed at this time.

The Radiological Assessment Coordinator (RAC) reports that projected off-site doses based on an 8-hour release duration are:

- 360 mrem Whole Body
- 2160 mrem Thyroid

From the list below, identify the ONE statement that describes required OTSG 1A isolation status, AND the basis for that status.

- A. OTSG 1A is required to be isolated due to high dose projections.
- B. OTSG 1A is required to be isolated due to high tube leak rate.
- C. OTSG 1A must NOT be isolated due to RCS temperature and pressure.
- D. OTSG 1A must NOT be isolated due to BWST level.

Technical Reference ATP 1210-5, OTSG Tube Leakage, page 2.

## Open Exam Reference

Learning Objective V.E.05.09 Given plant conditions, determine whether OTSG isolation is allowed or required in accordance with ATP 1210-5, OTSG Tube Leakage.

## Question Source

 New  TMI Bank

TMI Question # QR5E05-09-Q03

 Modified TMI Bank

Parent Question # QR5E05-09-Q03

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 55.43 .4 55.45 .9,.10

## Discriminant Validity Statements

- A. Correct answer.
- B. Leak rate is not adversely affecting plant control.
- C. RCS P and T are within the requirements for isolation.
- D. Current BSWT level does not require isolation

## Comments

This meets 55.43(b) 4 requirements for SRO level.

## Examination Outline Cross-Reference

KA # 2.4.19

Page 2-13

Tier #

3

RO/SRO Importance Rating 2.7 3.7

Group #

4

**Measurement** Knowledge of EOP layout, symbols and icons.**Proposed Question** RO SRO PRA Related**Correct Answer** C

The plant has just experienced a major transient and you as the Control Room Supervisor are navigating through the ATOG procedures.

You reach an IF AT ANY TIME/THEN step in the current ATOG procedure.

Which ONE of the following describes the correct treatment of this step?

- This step remains applicable throughout the remainder of your ATOG navigation. If you GO TO another ATOG procedure this step still applies.
- This step remains applicable throughout the remainder of the ATOG procedure that it is contained within. However, once the step is used, it is no longer applicable.
- This step remains applicable throughout the remainder of the ATOG procedure that it is contained within. If you GO TO another procedure, the step is no longer applicable.
- This step remains applicable throughout the remainder of the ATOG procedure that it is contained within. If you REFER TO another procedure, the step is no longer applicable.

**Technical Reference** OS-24**Open Exam Reference**

**Learning Objective** V.E.11.05 Explain the distinction between the use of the various procedure flow control conventions:

- "Go to"
- "Refer to"
- IF/THEN
- IF AT ANY TIME/THEN
- WHEN/THEN

**Question Source** New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

**Question Cognitive Level** Memory or Fundamental Knowledge Comprehension or Analysis**10 CFR Part 55 Content** 55.41 .10 55.43 55.45 .13**Discriminant Validity Statements**

- Plausible because the step is IF AT ANY TIME. But the applicability ends when you exit that procedure.
- Plausible because the first statement is correct. But the step may be used repeatedly.
- Correct answer.
- Plausible because the first statement is correct. But the step is still applicable even when referring to another procedure..

**Comments** None.

## Examination Outline Cross-Reference

KA # 2.4.24

Page 2-13

Tier #

3

RO/SRO Importance Rating 3.3 3.7

Group #

4

Measurement Knowledge of loss of cooling water procedures.

## Proposed Question

 RO SRO PRA Related

Correct Answer

B

Identify the ONE statement below that describes the signals that will actuate Line Break Isolation for the Intermediate Closed Cooling Water System.

- A. ES Actuation concurrent with low ICCW system flow.
- B. ES Actuation concurrent with low ICCW surge tank level.
- C. Reactor Trip Isolation concurrent with low ICCW system flow.
- D. Reactor Trip Isolation concurrent with low ICCW surge tank level.

Technical Reference OPM B-10 pages 6&amp;7

## Open Exam Reference

## Learning Objective

IV.B.03.07 Describe the effects of Line Break Isolation on the ICCW system to include:  
1. Actuation signal

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 .10 55.43 55.45 .13

## Discriminant Validity Statements

- A Plausible because ES signal is correct, but low flow is an auto pump start.
- B Correct answer.
- C RTI indications are on the ES status panel and may be associated with the actuation signals for line break isolation.
- D Plausible because low level is correct, but RTI is not the correct actuation signal.

## Comments

None.

## Examination Outline Cross Reference

KA # 2.4.29

Page 2-14

Tier #

3

RO/SRO Importance Rating 2.6 4.0

Group #

4

Measurement Knowledge of the emergency plan.

## Proposed Question

 RO SRO PRA Related

## Correct Answer

C

The following situation exists:

- A General Emergency has been declared.
- EPIP-TMI-.02. Emergency Direction, has been implemented.
- The TSC AND the EOF have been staffed and are performing their functions.
- The Emergency Director has delegated all decision authority allowed by EPIP-TMI-.02.

Under these conditions, who has the the authority to approve and direct a deviation from technical specifications (50.54x) under these conditions?

- A. Site Vice President
- B. Plant Manager
- C. Emergency Director
- D. Shift Manager

Technical Reference EPIP-TMI-.02, Emergency Direction, pages 3 and 4.

## Open Exam Reference

Learning Objective VII.A.01.05 For an adverse operational situation, discuss the authorization of a procedure deviation to protect public health and safety as allowed by administrative procedures 10 CFR 50.54.(x), and discuss the factors considered and the benefits and risks to making

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 55.43 .3,5 55.45 .11

## Discriminant Validity Statements

- A Plausible since it may be misconstrued that this is an upper management decision.
- B Plausible since it may be misconstrued that this is an upper management decision.
- C Correct answer.
- D Plausible since SM has an SRO license, however, EPIP-TMI-.02 permits only the ED to make 50.54x decisions, even if not licensed.

Comments None.

## Examination Outline Cross-Reference

KA # 2.4.50

Page 2-16

Tier #

3

RO/SRO Importance Rating 3.3 3.3

Group #

4

**Measurement** Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.

## Proposed Question

 RO SRO PRA Related

Correct Answer

C

A Small Break LOCA cooldown in progress.

Main annunciator panel alarm E-2-4, BWST LEVEL LO, actuates.

At what BWST level is the alarm expected AND what operator actions are required in response?

- A. 6 feet 4 inches  
Open DH-V-6A and B
- B. 6 feet 4 inches  
Close DH-V-5A and B
- C. 9 feet 6 inches  
Open DH-V-6A and B
- D. 9 feet 6 inches  
Close DH-V-5A and B

## Technical Reference

ARP E-2-4, BWST LEVEL LO, page 1.  
1210-6, Small Break LOCA Cooldown, page 6.

## Open Exam Reference

## Learning Objective

V.E.06.10 Given plant conditions determine if entry into ATP-1210-6, Small Break LOCA Cooldown, is required and what actions are to be taken.

## Question Source

 New TMI Bank

TMI Question #

 Modified TMI Bank

Parent Question #

## Question Cognitive Level

 Memory or Fundamental Knowledge Comprehension or Analysis

## 10 CFR Part 55 Content

 55.41 55.43 55.45 .3

## Discriminant Validity Statements

- A Incorrect setpoint, but action for LO-LO alarm.
- B Correct action for LO-LO alarm.
- C Correct answer.
- D Correct action, but setpoint for LO level.

**Comments** None.