Question 3 Parent

Question	ID: 1097642	Points: 1.00

Unit 1 is operating at 100% power, with the following:

- Div 4 DC bus is de-energized due to ground fault
- '1B' CRD Pump is in service
- No ECCS pumps are in service

A LOCA results in reactor level lowering to -150".

No operator action has been taken other than normal scram actions.

WHICH ONE of the following pumps will be running following the LOCA?

A. '1B' CRD

B. '1D' RHR

C. '0B' RHRSW

D. '1D' Core Spray

Answer	A

Answer Explanation

With Div 4 DC de-energized, 4KV breakers on the D14 Bus will lose control power. This will prevent the breakers from being operated remotely or automatically. Since the 1B CRD Pump breaker was already closed, it will remain closed after the LOCA since it will be unable to automatically trip. Any ECCS pumps powered from D14 (such as 0B RHRSW, 1D RHR, and 1D Core Spray), which would start on a LOCA signal, will be unable to start without breaker control power available.

Answer: 1B CRD, for the reasons above.

Distracters: 0B RHRSW, 1D RHR, 1D Core Spray are wrong for the reasons above.

Question Information

Topic	Predict impact of DC power loss on CRD pump during a LOCA				
User ID	MOD 2012 CERT-14			**System ID**	1097642
Project	LM-OPS				
Status	Active	**Point Value**	1.00	**Time (min)**	3

Open or Closed Reference	CLOSED	**Cognitive Level**	HIGH
Operator Discipline	LO-I	**Operator Type**	RO

Question 18 Parent

Question 1	ID: 1799237	Points: 1.00

Plant conditions are as follows:

- Unit 1 is at 100%.
- Unit 2 is in OPCON 5 with refueling activities in progress with secondary containment set on the refuel floor.
- All, "REFUEL FLOOR/RX ENCL CNTMT ISO INTERLOCK" switches are in "NORMAL"
- A fuel handling accident results in Refuel Floor ventilation radiation levels of 13 mR/hr

Regarding the reactor enclosure and the refuel floor, which of the following describes the Zones SBGT will maintain at a negative pressure and the reason for the initiation of SBGT?

	Zones SBGT will maintain negative	Reason for SBGT Initiation
A.	Refuel Floor ONLY	Limit iodine and particulate concentration in gases, prior to discharge
B.	Refuel Floor ONLY	Limit particulate concentration in gases ONLY, prior to discharge
C.	Unit 1 reactor enclosure and Refuel floor	Limit iodine and particulate concentration in gases, prior to discharge
D.	Unit 1 reactor enclosure and Refuel floor	Limit particulate concentration in gases ONLY, prior to discharge

Answer	A

Answer Explanation

A Correct Refuel HVAC isolates at 2.00 mr/h. Although refuel floor containment and Unit 1 Reactor Containment are set, only when Zones are crosstied will a refuel HVAC isolation also isolate the Reactor enclosure. The purpose of the SBGT filters per the Design basis document L-S-32 is The SGTS/RERS filters iodine and particulate concentrations in gases potentially present within the Secondary Containment prior to discharge to the environment via the North Stack.

B Incorrect Limit particulate only is incorrect but plausible to the examinee who does not recall the purpose of the charcoal filters

C incorrect plausible to the examinee who recognizes that the radiation levels are above the Reactor Enclosure setpoint, but either does not recall the crosstie logic or believe that hi refuel radiation will isolate the reactor enclosure as long as the zone is established

D incorrect plausible to the examinee who recognizes that the radiation levels are above the Reactor Enclosure setpoint, but either does not recall the crosstie logic or believe that hi refuel radiation will isolate the reactor enclosure as long as the zone is established and does not recall the purpose of the charcoal filters

Question 2 8 Parent

Examination Outline Cross–reference:	Level	RO	SRO
	Tier #	2	
	Group #	1	
	K/A #	203000 A4.09	
	Importance Rating	4.1	

A4.09 – Ability to manually operate and/or monitor in the control room: System flow (RHR/LPCI Injection Mode)

Proposed Question: Common 20

Unit 1 experienced a LOCA.

Current Unit 1 plant conditions are as follows:

Reactor level	–160 inches, down slow
Reactor pressure	240 psig, down slow
Drywell pressure	5.7 psig, up slow

One minute later, Unit 2 receives a spurious low–pressure ECCS initiation signal on low reactor level.

Current Unit 2 plant conditions are as follows:

Reactor level	+30 inches, stable, controlled with RCIC and HPCI
Reactor pressure	900 psig, up slow, controlled with SRVs
Drywell pressure	0.4 psig, stable

Which of the following describes the total approximate RHR system flow indicated on each unit?

	Unit 1	Unit 2
A.	40,000 gpm	2,000 gpm
B.	40,000 gpm	0 gpm
C.	20,000 gpm	2,000 gpm
D.	20,000 gpm	0 gpm

Proposed Answer: D

Explanation (Optional):

The preferred RHR Pumps for Unit 1 logic are 1A and 1B (one for each pumping loop) and for Unit 2 logic, the preferred RHR Pumps are 2C and 2D. Selecting one pump in each pumping loop in the RHR System ensure that, under the single failure criterion, at least one pump will be available for flooding the core. The "LOCA/False LOCA Preferred Pumps" interlock works in the following manner: Assume a LOCA signal is received for Unit 1 starting all four Unit 1 RHR Pumps. Subsequently, a LOCA signal is received on Unit 2, the 1C and 1D Unit 1 RHR Pumps would trip automatically, and only the 2C and 2D RHR Pumps on Unit 2 would auto start. On Unit 1 2 RHR pumps are running, injecting to the reactor at rated flow. Actual design flow per pump is 12,200 gpm and loop is 21,300 gpm.

On Unit 2 2 RHR pumps are running on min flow. Each pump discharge line connects to a common pumping loop minimum flow bypass line with a common minimum Flow Valve F007A/B. Each minimum flow line to the Suppression Pool is provided with flow restricting orifices to limit flow, and ensure the design minimum flow of 1,000 gpm per pump is maintained for pump cooling. The Min Flow Valves will close when flow is 3,000 gpm, but flow per pump is closer to 1,000 gpm. However, there is no minimum flow indication in the control room. The Control Room indication of total system flow is located in the system downstream of the min flow line. Therefore indicated flow would be "0" due to the location of the flow element in each loop.

A. Incorrect – ONLY 2 pumps would be operating on each unit. On Unit 1, 2 would be injecting at approx. 10000 gpm each. On Unit 2, 2 pumps would be operating on minimum flow. However, there is no minimum flow indication in the Control Room. Therefore indicated flow would be "0".

B. Incorrect – The flow is correct for Unit 2. On Unit 1 only 2 pumps are running and injecting .

C. Incorrect – The flow is correct for Unit 1. On Unit 2, 2 pumps would be operating on minimum flow. However, there is no minimum flow indication in the Control Room. Therefore indicated flow would be "0".

D. Correct – Unit 1 2 RHR pumps injecting to the reactor at ~20,000 gpm. Unit 2 2 RHR pumps running on minimum flow. However, there is no minimum flow indication in the Control Room. Therefore Unit 2 indicated flow would be "0".

Technical Reference(s): OP–149–001 Rev 42, Step 2.2.3 (Attach if not previously provided)

Proposed references to be provided to applicants during examination: NONE

Learning Objective: TM–OP–049 10493 (As available)

Question 44 Parent

Question 1	ID: 1798989	Points: 1.00

Unit 1 is operating at 100% Power when the following process radiation monitors momentarily spike to the indicated values due to an electrical transient:

RISH-26-1K609C, REACTOR BLDG VENTILATION MON: 1.4 mR/hr

and

RISH-26-1K609D, REACTOR BLDG VENTILATION MON: 1.7 mR/hr

WHICH ONE of the following identifies the status of the Standby Gas Treatment System (SGTS) for the above conditions:

	A SGTS Fan	B SGTS Fan
A.	NOT Running	NOT Running
B.	NOT Running	Running
C.	Running	NOT Running
D.	Running	Running

Answer	B

Answer Explanation

From the stem the candidate determines that both process radiation monitors malfunctions took them above the isolation set point of 1.35 mR/hr. Based on this information the candidate concludes that the B SGTS fan is now in service.

From LGSOPS0076 Lesson Plan:

REACTOR ENCLOSURE ISOLATION SIGNALS			
SIGNAL	DIVISION 1	DIVISION 2	SETPOINT
MANUAL	HS76-*78A	HS76-*78B	Arm & Depress
EXH. HI RAD	A and B Inst.	C and D Inst.	1.35mR/Hr
LOW RPV LEVEL/HIGH DW PRESSURE	A and B Inst.	C and D Inst.	-38", 1.68#
SGTS DAMPER OPEN	HV76-*96	HV76-*97	Not full closed
LOW ZONE DP	A	B	-0.1"H_2O for 50 minutes (still a vacuum, but not enough vacuum)
REFUEL FLOOR ISOLATION	Any Div 1 Isol.	Any Div 2 Isol.	*

A Wrong - Plausible to the candidate that recalls the incorrect isolation set point (2.0 mR/hr for refuel ventilation exhaust).
B Correct for the above reasons
C Wrong - Plausible to the candidate that recalls the incorrect Logic system association (i.e. they incorrectly recall that the 0A Fan is associated with an Div 2 isolation)
D Wrong - plausible to the candidate the confuses the isolation logic with that of the CREFAS system where an upscale condition in the C detector would start the A Fan and an upscale on the D detector would start the B Fan.

Question Information

Topic	SGTS - Response to Process Rad Monitor Spikes				
User ID	Q #12			**System ID**	1798989
Project	LM-OPS				
Status	Active	**Point Value**	1.00	**Time (min)**	3

Open or Closed Reference	CLOSED	**Cognitive Level**	HIGH
Operator Discipline	LO-ct	**Operator Type**	RO

References Provided	None
K/A Justification	
SRO-Only Justification	Not applicable
Additional Information	

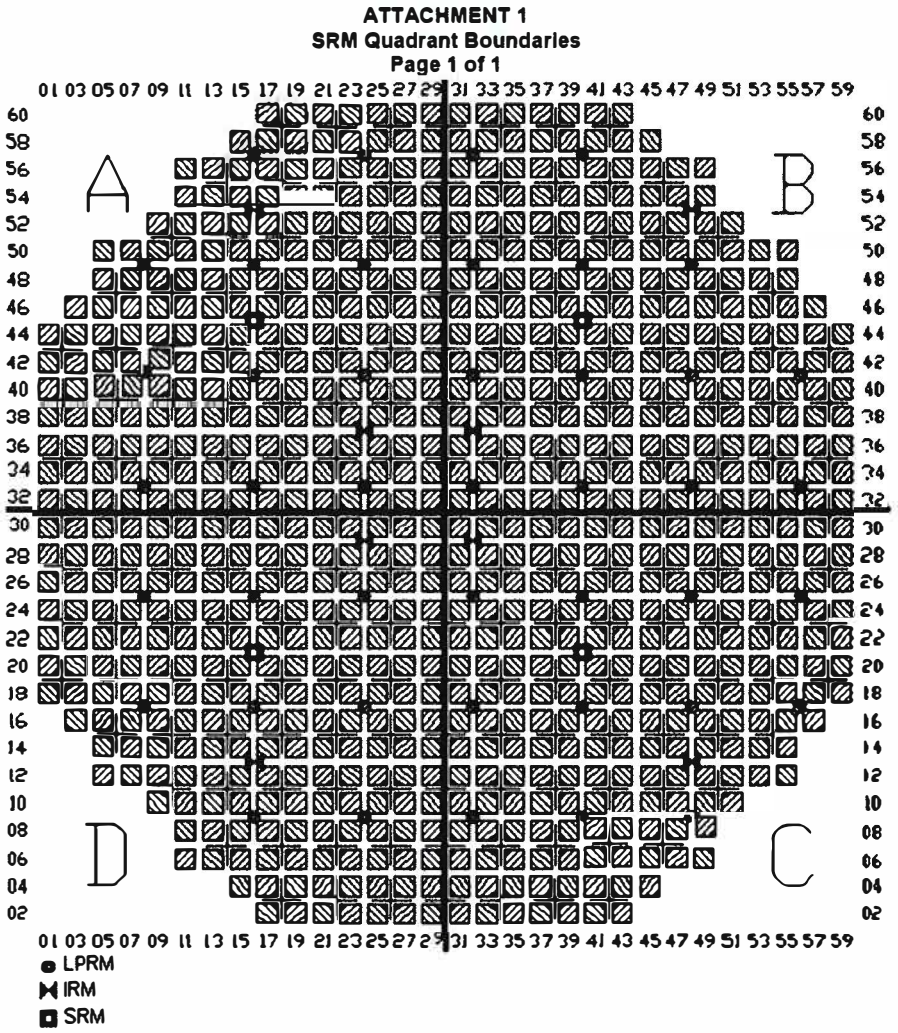
Question 67 Parent

Question 1 **ID: 1845800** **Points: 1.00**

Unit 2 is in OPCON 5 with Core Shuffle 2 in progress.

- The 2A SRM is bypassed
- The 2D SRM is INOP due to spiking

WHICH ONE of the following identifies a core location where a fuel assembly may be inserted, if any, for the above conditions?



A. 35-06

B. 27-56

C. 07-18

D. No locations

Answer	A

Answer Explanation

From the stem the candidate determines that the 2A and 2D SRMs are INOP. Using this information, attachment 1 from NF-LG-310-2000 provided, and their knowledge of Tech Spec LCO 3.9.2 they determine that core alterations can continue in the B and C quadrants. Only 35-06 is in a quadrant where core alterations can continue.

REFUELING OPERATIONS

3/4.9.2 INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.9.2 At least two source range monitor (SRM) channels* shall be OPERABLE and inserted to the normal operating level with:

a. Continuous visual indication in the control room,

b. At least one with audible alarm in the control room,

c. One of the required SRM detectors located in the quadrant where CORE ALTERATIONS are being performed and the other required SRM detector located in an adjacent quadrant, and

d. Unless adequate SHUTDOWN MARGIN has been demonstrated, the "shorting links" shall be removed from the RPS circuitry prior to and during the time any control rod is withdrawn.**

A Correct for the above reasons
B Wrong - plausible to the candidate that incorrectly uses attachment 1 (SRM Locations, Fuel Assembly coordinates, etc.)
C Wrong - plausible to the candidate that incorrectly uses attachment 1 (SRM Locations, Fuel Assembly coordinates, etc.)
D Wrong - plausible to the candidate the incorrectly applies Tech Spec 3.3.7.6.a where 3 SRMs are required to be operable for startup with IRMs on range 2 or below.

Question Information

Topic	Refueling Administrative requirements				
User ID	Q #67			**System ID**	1845800
Project	LM-OPS				
Status	Active	**Point Value**	1.00	**Time (min)**	3

Open or Closed Reference	CLOSED	**Cognitive Level**	HIGH
Operator Discipline	LO-ct	**Operator Type**	RO

References Provided	None
K/A Justification	

Question 81 Parent

Question 1	ID: 1150607	Points: 1.00

**********SRO ONLY**********

Unit 2 is in OPCON 3 shutting down for a scheduled refueling outage:

- Reactor pressure is 68 psig.
- 2A RHR is in Shutdown Cooling

The 2A RHR pump trips and cannot be restarted

- Reactor pressure is rising at 1 psig per minute
- The RO reports it will take 15 minutes to place 2B RHR in SDC

(1) If no operator action is taken what is the earliest that an inboard isolation will occur?
(2) What actions should the CRS direct to allow 2B RHR to be started in shutdown cooling?

A. (1) When **either** A or B reactor pressure transmitter exceeds 75 psig
(2) When reactor pressure exceeds 75 psig defeat the shutdown cooling isolation per ON-121 attachments 3 and 4

B. (1) When **both** A and B pressure transmitters exceeds 75 psig
(2) Maintain Reactor pressure within SDC limits using bypass valves per ON-121 attachment 5

C. (1) When **either** A or B reactor pressure transmitter exceeds 75 psig
(2) Maintain Reactor pressure within SDC limits using bypass valves per ON-121 attachment 5

D. (1) When **both** A and B reactor pressure transmitters exceeds 75 psig
(2) When reactor pressure exceeds 75 psig defeat the shutdown cooling isolation per ON-121 attachments 3 and 4

Answer	C

Answer Explanation

The NSSSS Group 2A isolation on reactor pressure is isolation signal V with a value of 75 psig. From GP-8.1 is can be seen that the closure of HV-51-2F009 is from channel A **or** B.

* * UNIT 2 ONLY * * V

V: REACTOR PRESSURE - HIGH (RHR VALVE PERMISSIVE) RESET - R1

Group IIA - RHR S/D Cooling (Other Signal: A)

EQUIPMENT	NAME	POSITION	CHANNEL	BYPASS
HV-51-2F009	"RHR S/D Clg Suction" (INBD)	Close	A or B	None
HV-51-2F008	"RHR S/D Clg Suction" (OUTBD)	Close	C or D	None
HV-51-2F050A(B)	"RHR S/D Clg Rtn Ck" (INBD CHECK)	Close	A or B	None
HV-51-251A(B)	"RHR S/D Clg Rtn Ck Equal" (TEST)	Close	A or B	None
HV-51-2F015A(B)	"RHR S/D Clg Rtn" (OUTBD)	Close	C or D	None

The correct ON-121 actions is to reduce Rx pressure to within the shutdown cooling pressure limits by performing Attachment 5. Attachment 5 has the operator lower RPV pressure using BPVs.

ON-121 Attachment 3 and Attachment 4 are for bypassing inadvertent Inboard and Outboard isolations, respectively. They are not for bypassing **VALID** isolations.

For the above reasons, C is correct.

A, B, and D are plausible if the student fails to recall that these isolations are single channel isolations (most NSSSS isolations require multi channels to provide an isolation signal) and/or fails to recall that bypassing the isolations is only if they are inadvertent.

Question Information

Topic	SRO action for loss of SDC				
User ID	LGSOPS0051.08C.01			**System ID**	1150607
Project	LM-OPS				
Status	Active	**Point Value**	1.00	**Time (min)**	3

Open or Closed Reference	CLOSED	**Cognitive Level**	HIGH
Operator Discipline	LO-R	**Operator Type**	SRO
10CFR55 Content	CFR: 43.5 Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.		

References Provided	None

Question 86 Parent

ID: S82						Points: 1.00
Difficulty:	0.00	Level of Knowledge:	High	Source:	NEW	

An ATWS has occurred and the Operating Shift is executing the EOPs. SLC Pump A was started at 12:15 with a SLC tank level of 72 inches. The P603 operator observes that RWCU Isolates as required and SLC Tank level is trending down normally.

Assuming that the SLC system continues operating normally at time 12:45 which of the following EOP actions would be directed?

A. Shutdown SLC pumps

B. Depressurize the RPV at < 90°F/hr

C. Keep RPV water level between -25 inches and 114 inches

D. Restore and keep RPV water level between 173 inches and 214 inches

Answer: D

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Answer Explanation:

SLC TANK is a 9 feet I.D. x 12 feet high vertical cylinder tank. Per DBD (4.2.1 pg 16)

$1ft^3 = 7.48052$ US gal

$V(tank) = \pi r^2 h \Rightarrow 3.1415(4.5\ ft)^2(1ft) = 63.61\ ft^3 = 475.83$ gal/ft ~ 40 Gal per inch in SLC TANK

The minimum design flow rate occurs at 1,215 psig and is 41.2 gpm for a SLC pump Per the DBD (4.2.3 on pg 17)

<45 inches SLC TANK LEVEL is HOT SHUTDOWN BORON WEIGHT per the EOP 29.100.01 SH 1A Table 15

72 INCHES STARTING LEVEL for the SLC TANK
30 Minutes at 42.2 gpm = 1236 gal
At 40 Gal per inch the level drop is 30.9 Inches
41.1 INCHES <-- Current Level

EOP FSL-OR2 directs restoring normal water level 173-214 inches on HOT SHUTDOWN BORON WEIGHT

Distracter Explanation:

A. EOP 29.100.01 SH 1A STEP FSQ-19 directs this when SLC Tank is empty, if the examinee calculates the tank as empty they would choose this answer
B. EOP 29.100.01 SH 1A STEP FSP-5 directs cooldown, however this is only with no boron injection or COLD S/D born weight, this answer is plausible if the examinee believes cold S/D born weight has been injected.
C. EOP 29.100.01 SH 1A STEP FSQ-OR1 provides for this however, the conditions are not met. The examinee would choose this answer if they assumed that Hot Shutdown Boron Weight or that Rx power <3% with boron injection allows for the exit of the power leg of SH 1A.

Reference Information:

EOP 29.100.01 SH 1A (yellow box - TABLE 15)
DBD C41-00 - SLC (pg 16 & 17)

Plant Procedures

29.100.01 SH 1A

NUREG 1123 KA Catalog Rev. 2

211000 K5.06 3/3.2 Tank level measurement

295037 EA2.03 4.3*/4.4* SBLC tank level

10CFR55 RO/SRO Written Exam Content

10 CFR 55.43(b) (5) Assessment of facility conditions and selection of appropriate procedures during normal, abnormal, and emergency situations.

NRC Exam Usage

ILO 2015 Exam

Question 92 Parent

Question 1	ID: 1845791	Points: 1.00

Unit 1 is performing a startup:

Reactor Power is 4%
Control Rod 34-27 is being withdrawn to position 48.

Alarm 108 REACTOR F-5, ROD OVERTRAVEL is received.

WHICH ONE of the following identifies what postulated UFSAR Chapter 15 transient is of concern in this situation and a component that mitigates the effect of this transient?

	UFSAR Chapter 15 transient	Component that minimizes the transient
A.	Control Rod Drop Accident	Velocity Limiter
B.	Control Rod Drop Accident	Collet Fingers
C.	Control Rod Withdrawal Error	Velocity Limiter
D.	Control Rod Withdrawal Error	Collet Fingers

Answer	A

Answer Explanation

From the stem the candidate determines that Control Rod 34-27 is not coupled to the Control Rod Drive (CRD) and the control rod position is unknown (it could be anywhere between position 00 and 48). This is the situation of the Control Rod Drop Accident with the worst case being the control rod stuck at position 00 and dropping uncontrollably from 00 to 48. The analysis described in UFSAR 15.4.9.3.3 results in the assumed failure of 1200 fuel rods. This would result in radiation level requiring entry into The Emergency Action Plan, at a minimum for Threshold RU3 - 2 (Specific coolant activity > 4.0 micro curies per gram.) The equipment credited in minimizing the impact of this accident are the Rod Worth Minimizer (which enforces a control rod sequence that minimizes local power peaks) and the velocity limiter (physical component on the Control Rod Blade that creates hydraulic drag to limit the speed of the control rod and the subsequent rate of reactivity insertion).

A Correct for the above reasons
B Wrong - plausible if the candidate confuses the components of the CRD with the Control Rod Blade. The Collet Fingers are a component designed to prevent the CRD from withdrawing without a command signal, not the Control Rod Blade
C Wrong - Plausible to the candidate that believes the Control Rod Withdrawal error transient is the concern in this situation due to the assumption that the control rod has not actually been withdrawn (due to it being uncoupled).

D Wrong - Plausible to the candidate that believes the Control Rod Withdrawal error transient is the concern in this situation due to the assumption that the control rod has not actually been withdrawn (due to it being uncoupled) and plausible if the candidate confuses the components of the CRD with the Control Rod Blade. The Collet Fingers are a component designed to prevent the CRD from withdrawing without a command signal, not the Control Rod Blade

Question Information

Topic	Reactivity Addition - Low Power Accident				
User ID	Q #64			**System ID**	1845791
Project	LM-OPS				
Status	Active	**Point Value**	1.00	**Time (min)**	2

Open or Closed Reference	CLOSED	**Cognitive Level**	HIGH
Operator Discipline	LO-ct	**Operator Type**	RO

References Provided	None
K/A Justification	
SRO-Only Justification	Not applicable
Additional Information	

General Data			
Level	RO		
Tier	1		
Group	2		
KA # and Rating	295014 G2.4.9 RO Importance 3.8		
KA Statement	295014 Inadvertent Reactivity Addition / 1 2.4.9 - Emergency Procedures / Plan: Knowledge of low power / shutdown implications in accident (e.g., loss of coolant accident or loss of residual heat removal) mitigation strategies.		
Cognitive level	High		
Safety Function	1 - Reactivity Control		
10 CFR 55	41.10		
Technical Reference with Revision No:	UFSAR 15.4 Tech Spec Bases 3/4.1.1	**Rev #:**	08
Justification for Non SRO CFR Link:	N/A		
Question History: (i.e. LGS NRC-05, OYS CERT-04)	New		
Question Source: (i.e. New, Bank, Modified)	New		
Low KA Justification (if required):	N/A		
Revision History: Revision History: (i.e. Modified distractor "b" to make plausible based on OTPS review)			
ILT			
Supplied Ref (If appropriate): (i.e. ABN-##)	None		
LORT			
PRA: (i.e. Yes or No or #)			
LORT Question Section: (i.e, A-Systems or B-Procedures)			
Comments			