TITLE	Movement of the Dumme	. Eval Dunalla in the C	
	wovement of the Dumm	/ Fuel Bunale in the a	Spent Fuel Pool

TASK PERFORMED BY:	_ EVALUATOR:
EVALUATOR SIGNATURE:	DATE:

DATE:

DIRECTIONS TO EVALUATOR:

NOTE: When used as an exam item for initial LSRO candidates, a qualified LSRO/DA and RPO are required on the bridge to ensure correct Double Verification. Initial LSRO candidates will be acting as platform operator during most of the exam, and as FHD when addressing the CCTAS revision. This exam exercise will require the candidate to perform the first check as the RPO, with the qualified Fuel Handling Director performing the second check. In addition, the second qualified operator will perform a double verification.

NRC examiners will generally limit themselves to observing and will not provide direction or cueing to the candidate because actual equipment will be manipulated. Pre-brief the qualified FHD that he or she is the accountable individual who is responsible for equipment safety, personal safety, and reactivity controls during operation by the candidate. The FHD is expected to maintain constant attention on bridge and mast operation such that intervention is possible prior to any misoperation or contact with obstructions. As a minimum, this includes (1) immediately stopping the bridge if a CCTAS error is committed or if unsafe bridge operation is taking place (2) restoring to starting conditions between each JPM, (3) collecting and returning the CCTAS signed final copies, and (4) shutting down the refueling platform after the exams. The qualified FHD will interact with the candidate in as realistic a fashion as practicable in an exam setting. The FHD will not provide cues other than specified, and should concur with all verifications up to the point just prior to a misoperation.

The qualified Operator should perform startup and checkout of the refueling platform and have on-hand the marked up copies of the procedures for review by the candidates. The actual CCTAS and bridge operating procedure in-use will be on the refuel platform.

The support of and coordination with the following is necessary to permit the conduct of the JPM:

- 1. NMD to schedule bridge availability and provide qualified operators
- 2. Operations for Refuel Floor Secondary Containment Integrity if required
- 3. Reactor Engineering for CCTAS generation
- 4. Health Physics for Refuel Floor and RWP support. The grappling and movement of components may require use of the refuel floor RWP in lieu of the work group standing RWP. Ensure a HP briefing is received prior to the exam.

**EVALUATION METHOD :** 

PERFORM

EVALUATION LOCATION: Refuel Platform

APPROXIMATE COMPLETION TIME:

Completion Time: 60 minutes

**IMPORTANCE RATING(S)**:

SYSTEM NUMBER(S):

3.5

2.2.28 Generic

1.1.1

**REFERENCES:** 

- 1. FH-106, Rev 24, CORE COMPONENT AND IRRADIATED ITEM MOVEMENT NO CORE TRANSFER
- 2. S97.0.M, Rev 12, OPERATION OF THE REFUELING PLATFORM
- 3. S97.1.A REV 12, ELECTRICAL, MECHANICAL, AND PNEUMATIC ALIGNMENT/CHECKOUT OF REFUELING PLATFORM, BRIDGE, TROLLEY, AND MAIN HOIST FOR OPERATION
- 4. RE-C-40, Rev 9, CORE COMPONENT TRANSFER AUTHORIZATION SHEET GENERATION AND ADMINISTRATION

TASK STANDARD(S):

Dummy fuel bundle transferred IAW the attached CCTAS and associated procedures

化化学 网络小麦油油

#### **TASK CONDITIONS:**

- 1. Secondary containment integrity is established
- 2. The Unit \_\_\_\_\_ refuel platform is ready for operation per S97.0.M and S97.1.A
- 3. FH-106 prerequisites are complete
- 4. Reactor Engineering has required a CCTAS for the movement of the dummy fuel bundle. The CCTAS has been provided to you.
- 5. Shift supervision permission has been obtained to operate the refueling platform

#### **INITIATING CUES:**

You are directed by shift supervision to transfer the dummy fuel bundle in the Unit \_\_\_\_\_spent fuel pool per the attached CCTAS. You are expected to perform the actions of the Platform Operator and to perform actual operation of the equipment, rather than a simulation.

Critical Element(s) indicated by "\*" in Performance Checklist.

**PERFORMANCE CHECKLIST:** 

1

The qualified LSRO will have completed portions of the following procedures to allow actual use of the refuel platform. These copies will be signed off and should remain on or near the refuel platform. The candidate may wish to review the signoffs.

- 1. FH-106, CORE COMPONENT AND IRRADIATED ITEM MOVEMENT NO CORE TRANSFER
- 2. S97.1.A, ELECTRICAL, MECHANICAL, AND PNEUMATIC ALIGNMENT/CHECKOUT OF REFUELING PLATFORM, BRIDGE, TROLLEY, AND MAIN HOIST FOR OPERATION

Ensure a blank copy of the approved CCTAS is on the FHD desk. Ensure S97.0.M is available in the binders located at the FHD desk.

STEP		STANDARD	SAT/UNSAT				
	Bundle Pickup per S97.0.M						
1.	*Position Refuel Platform Mast over the desired core component in accordance with the CCTAS Bridge, and Trolley controls manipulated until the mast is positioned over the dummy bundle						
	<b>`</b>	(Evaluator Note: Small adjustments in position may be required once the grapple is near the bundle)					
2.	Lower grapple until grapple is 6 to 12 inches above bail	Grapple 6 to 12 inches above DUMMY bundle bail handle.					
		Hoist encoder reads between following values:					
		Unit 1-178" and 186					
		Unit 2- 182" and 190"					
		*Critical value is at least 174, or grapple will not open in the next step					
3.	Ensure grapple is open	Grapple is open as indicated by <u>lack of</u> green backlighting on grapple control rocker switch (green=closed; out=open)					
4.	Rotate grapple as necessary to achieve grapple to bail alignment	Grapple is aligned with bail. Verify using mast camera.					

and the state

 ÷...

STEP	STANDARD	SAT/UNSAT
5. *Slowly lower grapple until SLACK CABLE light is lit	Grapple is lowered until red SLACK CABLE lamp is lit with grapple being seated on the dummy bundle bail handle	
6. Verify proper core component location and orientation Atthough this step is important, it is non- critical for this JPM because the bundle will already be aligned correctly. It would have been critical if this were an alternate path JPM with the bundle found rotated at this point.	Grapple is on the dummy bundle in the correct fuel pool location. The bundle channel fastener is oriented per the CCTAS (use mast video image and compass rose painted on refuel bridge deckplates. The mast image is of the corner of the bundle CLOSEST to the operator. (If you cannot see the channel fastener, then the bundle is oriented in the same compass direction as the operator is facing when holding the mast handles)	
<ol> <li>Verify the following then notify the FHD of grapple position:</li> </ol>	N/A	N/A
a. Grapple is centered over the bail handle	Grapple is landed and centered on the DUMMY bundle bail handle. Video image will be similar to the image below. When properly landed, only the corner of the bundle is visible, with a symmetric, even appearance	
	Image is looking almost straight down toward top of bundle. The shiny portion is the grapple and the dark portion is the grapple and	- · ·
	FHD is notified that grapple is centered on the bundle	

	STEP	STANDARD	SAT/UNSAT
	b. Hoist position agrees with values listed in Attachment 2	Hoist encoder (bottom LED display in front of RPO console) reads:	
	for item seated in the Fuel Storage Pool Rack	Unit 1: 190" to 192"	
		Unit 2 : 194" to 196"	
		HOIST	
		FHD is notified that the hoist position is correct	
	c. Grapple appears seated on	N/A	N/A
	bail handle using underwater camera for component seated in the cask	(Not in the cask)	•
8.	*When directed by the FHD, then engage the grapple and verify grapple	Grapple control switch actuated to ENGAGE	
EHD	CLIE: "Engage the grapple"	Green backlighting on grapple switch lit	į
9	*When directed by the FHD then	RAISE actuated on grapple console	
••	slowly raise load while ensuring	Red HOIST Loaded Jamp lit on hoist	
		console	
FHD	CUE: "Raise the bundle"		
10.	*Continue raising until grapple is fully raised then verify NORMAL UP lamp is lit	Green NORMAL UP lamp received on hoist console	
11.	Go to appropriate "Release Location" section of this procedure as directed by the FHD	Move to Section 4.5, "Release Location- Fuel Pool Storage Rack or Cask Pit"	
			I

한 영국 공간을 즐기는

STEP	STANDARD	SAT/UNSAT	
Bundle Drop-	-off Attempted per S97.0.M		
<ul> <li>12. *Position core component over desired location in accordance with the Core Component Transfer Authorization Sheet (CCTAS)</li> <li>FHD CUE: (After the bridge is driven to the drop-off location):</li> <li>"The fuel rack target location is obstructed by some plastic packing material and does not appear to allow bundle insertion"</li> </ul>	Operate bridge and trolley controls to position the mast over the target location on the CCTAS Stop component transfer when obstruction is cued		
Alternate Path – CCTAS Step C	annot be Completed (FH-106 and RE-C-4	0)	
Examiner Note:		·····	
CCTAS when a step cannot be performed. T by the RPO. The candidate will describe the cue from the qualified FHD, make the chang the CCTAS. The qualified RPO may take the at the desk. When finished, the candidate w	his is an LSRO task that will not normally process of pen and ink change verbally je, and the qualified FHD will initial the ac candidate's place in the cab while the ca ill resume examining in the RPO position	y be performed based on a tual change to indidate works	
13. *Contact Reactor Engineering and	Verbal answer:		
C-40 and CCTAS instructions	*Contact Reactor Engineering		
<ul> <li>Return the bundle to the original location</li> <li>Place the bundle in the approved alternate location on the CCATS cover sheet</li> </ul>	and place the dummy bundle in an approved alternate location or return to the original location		
FHD Cue: What are the actions to be taken for resolving the current CCTAS execution problem?			
FID Cue: The reactor engineer wants us to ret	urn the dummy bundle to the original pickup	location.	

	STEP	STANDARD	SAT/UNSAT
14. The pe the follo FHD Cue: CCTAS be FHD CUE: approved th concurs wit execution" The Reactor	n and ink change should follow owing format: i. Single line through item to be changed ii. Date and Initial of both Fuel Handling Director and Reactor Enginering group member How should the change to the made "Reactor Engineering has he change to the CCTAS and th continuation of CCTAS	Pen and ink change made to CCTAS per RE-C-40 by lining out the "MOVE TO" and "ORIENT" information on Move #1 and replacing it with the location and orientation from the pickup location :	
	Resumption of Co	mponent Transfers in S97.0.M	1,
15. *Positio desired the Con Authoriz	n core component over location in accordance with e Component Transfer zation Sheet (CCTAS)	Operate bridge and trolley controls to position the mast over the target location on the CCTAS	
16. *Rotate to achie	core component as necessary eve proper orientation	Mast rotated to orient the bundle in the direction called for in the CCTAS. The bundle channel fastener is oriented per the CCTAS (use mast video image and compass rose painted on refuel bridge deckplates. The mast image is of the corner of the bundle CLOSEST to the operator. (If you cannot see the channel fastener, then the bundle is oriented in the same compass direction as the operator is facing when holding the mast handles)	i 
proper orientati	couble verification to ensure core component location and on	Double verification performed	

STEP	STANDARD	SAT/UNSAT
18. *When directed by the FHD, then lower the hoist until core component is seated and SLACK CABLE is lit	Bundle lowered until red SLACK CABLE lamp is lit on hoist control console.	
FHD CUE: "Lower the hoist"		
19. Verify the following	N/A	N/A
a. Component elevation appears equivalent to other stored components in the rack Not critical because next step covers same thing	Elevation of the handle for the still- grappled dummy bundle is the same as the other bundles	
b. *Hoist position agrees with the value listed in Attachment 2 for	Hoist encoder (bottom LED display in front of RPO console) reads:	
item seated in Fuel Storage Rack	Unit 1: 190" to 192"	
	Unit 2 : 194" to 196"	
	<text></text>	
20then notify the FHD of grapple position	FHD notified of grapple position	
21. *When directed by the FHD, then release grapple	Grapple switch taken to RELEASE	
FHD CUE: ""Release the grapple"		
22. Verify grapple is open	Green backlighting out on the grapple control switch	
23. *Slowly raise grapple while verifying HOIST LOADED remains out and grapple remains free of bail handle	Grapple control taken to RAISE HOIST LOADED yellow lamp on left side of hoist control console remains out	

es de la compañía de

STEP	STANDARD	SAT/UNSAT
24. Record completion of component transfer in CCTAS	CCTAS updated with date, time, and RPO initials	
NRC CUE: You have reached the termination point for this JPM. You may stop here.	N/A	N/A

11

Comments:

Note: Any grade of UNSAT requires a comment.

JPM Overall Rating:

SAT/UNSAT

3.343

#### **TASK CONDITIONS:**

- 1. Secondary containment integrity is established
- 2. The Unit \_\_\_\_\_ refuel platform is ready for operation per S97.0.M and S97.1.A
- 3. FH-106 prerequisites are complete
- 4. Reactor Engineering has required a CCTAS for the movement of the dummy fuel bundle. The CCTAS has been provided to you.
- 5. Shift supervision permission has been obtained to operate the refueling platform

#### **INITIATING CUES:**

You are directed by shift supervision to transfer the dummy fuel bundle in the Unit \_\_\_\_\_spent fuel pool per the attached CCTAS. You are expected to perform the actions of the Platform Operator and to perform actual operation of the equipment, rather than a simulation.

# CANDIDATE

Exhibit RE-C-40-12 Page 1 of 1

Unit

Title

CCTAS Instruction/Approval Page

RE-C-40, Rev 9. Page 44 of 47

Core Component Transfer Authorization Sheet

LIMERICK 2

Page <u>1</u> of <u>2</u>

Date <u>04/03/2002</u>

Unit 2: \_Dummy Bundle\_Moves (CCTAS # 1)

(Rev. #) <u>0</u>

- 1. This CCTAS shall be used to move the dummy fuel bundle within the LGS Unit 2 Fuel Pool for training purposes.
- 2. If any step <u>cannot be completed</u>, contact reactor engineering and place the dummy bundle in an alternate location or return the bundle to its original location and annotate the CCTAS step appropriately. An approved alternate locations is JJ-70.
- 3. This CCTAS must be used in conjunction with appropriate maintenance procedures.
- 4. This CCTAS must be used in conjunction with appropriate fuel handling procedures. SECONDARY CONTAINMENT IS NOT REQUIRED.
- 5. All changes to this CCTAS must be made in accordance with procedure RE-C-40.
- 6. This CCTAS DOES NOT involve the transfer of Special Nuclear Material (SNM).
- 7. Return completed CCTAS (or a copy if original is contaminated) to Reactor Engineering.
- Beeper 1-800-672-2285 WORK Home\_ RE phone #'s 8. 3595 0228 (610)792-3580 Joe Rubinaccio 7540 3565 (610)369-3612 **Bob Potter** 3015 3566 (610)406-9148 Gary Snyder 3560 7154 (610)287-3160 **Dave Hamilton**

Prepared By: Reviewed By Authorized By:

Review of Completed CCTAS: \_\_\_\_\_/ \_\_\_\_ Date

RNDUMM	-	VERIFIED
.KNDUMM	-	

Written By: R.C. POTTER

Date <u>04/03/2002</u> Reviewed By: <u>D.B. HAMILTON</u>

Unit LIMERICK GENERATING STATION

. 8/88

TRANSFER

M-219967

DOCTYPE 116

"HORIZATION FOR FH-106

Unit LIMERICK GENERATING OTHERE									
Title Un	it 2: Dummy	<u>bundle Moves (CCTAS#</u>	)	Authorized By:	D.B.Ha				
[]						<b>5</b> 110	099	DATE	TIME
STEP NO.	COMPONENT SERIAL NO.	MOVE FROM	ORIENT	MOVE TO	ORIENT	FHD			
			SW	L2SPENT HH-44	NE			1	
1	DUMMY	L2SPENT F-11	5		 <del> </del>	 			
			1			1	1	 	
							1		
2	DUMMY	L2SPENT HH-44	NE		 <del> </del>	 			
 	 					1	1		
	1				i	1	J		

S97.1.A, Rev.12 Page 1 of 20 MDF/mrw

### Exelon Nuclear LIMERICK GENERATING STATION

## **S97.1.A** ELECTRICAL, MECHANICAL, AND PNEUMATIC ALIGNMENT/CHECKOUT OF REFUELING PLATFORM BRIDGE, TROLLEY, AND MAIN HOIST FOR OPERATION

#### 1.0 <u>PURPOSE</u>

- 1.1 To align Refuel Platform Bridge, Trolley, Auxiliary Hoist, and Main Hoist for operation. This procedure does <u>not</u> provide specific instructions for handling of fuel assemblies or other pieces of equipment. Those instructions are covered in other procedures.
- 1.2 To perform checkout of Refuel Platform prior to operation. It is recommended that this procedure be performed prior to operating the Refuel Platform each day.

#### 2.0 PREREQUISITES

- 2.1 Jamming buttons are installed on Auxiliary Hoist cables.
- 2.2 Reactor Select Switch set for desired operation.
- 2.3 Health Physics (HP) has made necessary surveys.

#### 3.0 PRECAUTIONS

- 3.1 <u>WHEN</u> not in use, <u>THEN</u> the Main Hoist should be in normal up position.
- 3.2 <u>WHEN</u> Auxiliary Hoists are in use for handling irradiated core components <u>THEN</u> jam block shall be set to ensure water coverage in accordance with Limerick Technical Specifications <u>OR</u> governing implementing procedure (e.g. jet pump servicing).
- 3.3 <u>WHEN</u> inspecting Refuel Platform, <u>THEN</u> special care must be taken to avoid dropping any objects into Fuel Pools <u>OR</u> Cavities.

S97.1.A, Rev.12 Page 2 of 20 MDF/mrw

- 3.4 Refuel Platform should pass all checks, inspections,
   <u>AND</u> verifications.
   <u>IF</u> this is <u>not</u> the case,
   <u>THEN</u> contact System Manager or Reactor Services Technical Staff for resolution.
  - 3.5 <u>IF</u> removing any items from Reactor Cavity <u>OR</u> Spent Fuel Pool (i.e. aux. hoist grapples), <u>THEN</u> HP must be contacted.

S97.1.A, Rev.12 Page 3 of 20 MDF/mrw

#### INITIALS

#### 4.0 <u>PROCEDURE</u>

NOTE

Conditional <u>IF...THEN</u> steps that are <u>not</u> applicable <u>AND</u> steps to be skipped per direction of the <u>IF...THEN</u> step shall be marked N/A <u>AND</u> initialed.

#### 4.1 REFUELING PLATFORM ELECTRICAL LINEUP

- 4.1.1 **ENSURE** Disconnect Switch \*0S380 is on.
- 4.1.2 **OPEN** main power <u>AND</u> communication cable service pit cover <u>AND</u> ENSURE service pit is dry <u>AND</u> main power cable is properly connected.
- 4.1.3 **CLOSE** service pit cover.

#### NOTE

The Refuel Bridge is equipped with cabinet heaters <u>AND</u> semiconductor coolers which remain energized at all times.

#### 4.2 BRIDGE END STRUCTURE ELECTRICAL PANEL LINEUP

- 4.2.1 **ENSURE** the following switches <u>AND</u> circuit breakers on:
  - 1. MAIN DISCONNECT switch
  - 2. MONO DISCONNECT switch
  - 3. AIR DRYER circuit breaker
  - 4. CIRCUIT BREAKERS for GFI outlets
  - 5. AIR DRYER switch

S97.1.A, Rev.12 Page 4 of 20 MDF/mrw

				INITIALS					
	4.2.2	ENSURE Compressor switch on.							
	4.2.3	ENS	ENSURE the following valves open:						
		1.	MAIN HOIST Pneumatic Shut-off Valve						
		2.	MONO HOIST Pneumatic Shut-off valve	<u></u>					
4.3	MAIN HO	DIST P	OWER CENTER CABINET LINEUP						
	4.3.1	ENS	URE Disconnect switch (located outside of cabinet) on.						
	4.3.2	OPEI <u>AND</u>	<b>N</b> hoist power center cabinet door <b>ENSURE</b> the following circuit breakers on:						
		1.	МСВ						
		2.	LCB2						
		3.	ОТСВ						
		4.	НТСВ	·					
		5.	GTCB	<u> </u>					
		6.	GFI-3						
		7.	CLCB						
		8.	ACCB						
		9.	GRCB						
	4.3.3	CLO	SE cabinet door.						
4.4	BRIDGE/	TROLL	EY CONTROL CABINET LINEUP						
	4.4.1	OPEI AND	N bridge/trolley control cabinet door E <b>NSURE</b> circuit breaker BTCB on.						

4.4.2 **CLOSE** cabinet door.

S97.1.A, Rev.12 Page 5 of 20 MDF/mrw

#### INITIALS

#### 4.5 BOUNDARY ZONE COMPUTER CABINET

4.5.1 **ENSURE** BOUNDARY ZONE COMPUTER COOLER switches on.

#### 4.6 OPERATOR CAB RIGHT HAND CONTROLLER CONSOLE CHECK

- 4.6.1 **ENSURE** PLATFORM variable speed control operator in "NEUTRAL."
- 4.6.2 **ENSURE** GRAPPLE variable speed control operator in "NEUTRAL."

#### 4.7 OPERATOR CAB LEFT HAND CONTROLLER CONSOLE CHECK

4.7.1 **ENSURE** TROLLEY variable speed control operator in "NEUTRAL."

#### NOTE

<u>WHEN</u> control circuits are energized, <u>THEN</u> STOP button will light indicating power on.

- 4.7.2 **PRESS** Traverse System "START" button to energize control circuits.
- 4.7.3 <u>IF</u> necessary to de-energize control circuit, <u>THEN</u> **PRESS** STOP button.

#### 4.8 ENCODER POWER SUPPLY CHECKS

- 4.8.1 **ENSURE** BRIDGE encoder power supply switch on.
- 4.8.2 **ENSURE** TROLLEY encoder power supply switch on.
- 4.8.3 **ENSURE** HOIST encoder power supply switch on.

S97.1.A, Rev.12 Page 6 of 20 MDF/mrw

#### INITIALS

#### 4.9 MISCELLANEOUS CHECKS

- 4.9.1 <u>IF</u> Core Alterations per FH-105, Core Component Movement - Core Transfer, are performed, <u>THEN</u> **ALIGN** direct communications from Refueling Platform to MCR.
- 4.9.2 **PLACE** Reactor Select Switch to appropriate position, on selected platform as follows:
  - 1. UNIT 1 PLATFORM ONLY
    - a. REACTOR #1 for UNIT 1 service.
    - b. REACTOR #2 for UNIT 2 service.
  - 2. UNIT 2 PLATFORM ONLY
    - a. REACTOR #1 for UNIT 1 service.
    - b. REACTOR #2 for UNIT 2 service.

#### 4.10 PRE-OPERATIONAL CHECKS

- 4.10.1 **READ** Attachment 1.
- 4.10.2 **COMPLETE** Attachment 2.

S97.1.A, Rev.12 Page 7 of 20 MDF/mrw

#### 5.0 <u>REFERENCES</u>

- 5.1 UFSAR Section 9.1.4
- 5.2 UFSAR Section 7.7
- 5.3 Operations and Maintenance Instructions, Refueling Platform GEK-75574 (M1-F21-E003 VOLS I, II) April 1982
- 5.4 E-45, Schematic Diagram MCC Load Tabulation 114C-R-A & 124C-R-A, Reactor Area MCC 440V-1 Unit.
- 5.5 E-65, Schematic Diagram MCC Load Tabulation 214C-R-A, Reactor Area MCC 440V-2 Unit.
- 5.6 MOD 6248, Mast Camera Installation for Refuel Platform
- 5.7 PIMS A/R A1250047, Eval. 01.
- 5.8 PEP Issue I0011758, Main Grapple Air Line entangled with other mast sections.
- 5.9 MOD P00925, Service Pole Caddy on Refueling Bridge
- 5.10 MOD P00950, Fuel Floor Auxiliary Platform

#### 6.0 TECHNICAL SPECIFICATIONS

- 6.1 3.9.1
- 6.2 3.9.5
- 6.3 3.9.6

#### 7.0 INTERFACING PROCEDURES

- 7.1 FH-105, Core Component Movement Core Transfer
- 7.2 FH-106, Core Component Movement Spent Fuel Pool ONLY

S97.1.A, Rev.12 Page 8 of 20 MDF/mrw

#### ATTACHMENT 1 Page 1 of 2

#### SUPPLEMENTAL NOTES

The main disconnect should remain ON following refuel platform operation. This provides power to the cabinet heaters to prevent premature failures of motors and control relays from moisture in the cabinets.

The boundary zone computer enforces the following refueling platform interlocks:

- The bridge will decelerate into jog mode at approximately 24 inches for Unit 1 and Unit 2 from any spent fuel pool wall
   <u>AND</u> engage the zone lockout at approximately 12 inches from the wall. Overriding the zone lockout will provide only jog speed in any direction.
- Similarly, the trolley will be decelerated into jog mode at approximately 12 inches from a wall
   <u>AND</u> the zone lockout will be engaged approximately 3 inches from the pipe
   <u>OR</u> approximately 12 inches from a wall. Override will provide only jog motion.
- 3. When any boundary is reached, the operator will be permitted to reverse direction without employing the override, unless the grapple has traveled beyond the physical limits of the refueling pool/reactor cavity/cask area.
- 4. The operator will not be permitted to lower the grapple in the cattle chute or the canal leading to the cask storage area.
- 5. Unless the grapple is raised to the full up position (< 1 inch down), the logic will not recognize the entrance to the cattle chute or the canal leading to the cask storage area.
- 6. At any point within the physical limits of the refueling pool, operation of the grapple will depend only on hoist position. If the bridge and trolley are moved close to a wall to remove or store a fuel bundle, the operator needs only to use the zone logic override; the grapple will operate normally.
- 7. In the core, when using the variable speed controller, the main hoist may stop just prior to the bundle seating. If this occurs, the operator shall use the jog down pushbutton to move the grapple the remaining distance to achieve a SLACK CABLE condition. The BZC enforces a lockout for main hoist lowering approximately 1.5 inches after bundle would be seated to prevent fuel grapple contact with the top guide. Continued lowering of the main hoist is provided by use of the BZC bypass pushbutton and will provide only jog down speed. The main hoist can always be raised with the variable speed controller.

S97:1.A, Rev.12 Page 9 of 20 MDF/mrw

### ATTACHMENT 1 Page 2 of 2

- 8. In the spent fuel pool, When using the variable speed controller, the main hoist may stop just prior to the bundle seating in the rack. If this occurs, the operator shall use the jog down pushbutton to move the grapple the remaining distance to achieve a SLACK CABLE condition. This jog zone remains in effect for 6 inches. The BZC then allows full speed lowering of the main hoist until the fuel grapple is approximately 6 inches from the fuel pool floor. The lowering exclusion zone is set at the fuel pool floor. This corresponds to elevation +370.00. The main hoist can always be raised with the variable speed controller.
- 9. The fuel grapple is permitted to open in the range of 16 inches above a fuel assembly bail to 2 inches below a fuel assembly bail when the assembly is seated in a fuel storage rack
  <u>OR</u> in the range of 10 inches above a fuel assembly bail to 2 inches below a fuel assembly bail when the assembly is seated in the core. OPERATION OF FUEL GRAPPLE AT ANY OTHER ELEVATION IS POSSIBLE ONLY THROUGH THE USE OF THE GRAPPLE LOCKOUT BYPASS PUSHBUTTON.
- 10. The Grapple Lockout Bypass push-button must be pushed to allow opening of the fuel grapple prior to engaging a fuel assembly in either fuel prep machine.

S97.1.A, Rev.12 Page 10 of 20 MDF/mrw

INITIALS

#### **ATTACHMENT 2**

#### **REFUELING PLATFORM PRE-OPERATIONAL CHECKOFF LIST**

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Unit: \_\_\_\_\_

Performed By:

#### <u>NOTES</u>

- 1. Mark all steps which do NOT apply "N/A".
- 2. <u>IF</u> a check cannot be completed, <u>THEN</u> the Fuel Handling Director (FHD) shall make the determination if Attachment 2 may be continued. Comments may be entered at the end of the checkoff list.
- 3. Subsections <u>AND</u> steps within Attachment 2 may be performed out of sequence <u>OR</u> in parallel to suit field conditions at the discretion of the FHD.
- Steps concerning the following equipment need <u>NOT</u> be performed if the equipment is <u>NOT</u> functional. This equipment is <u>NOT</u> required for safe operation of the Refueling Platform.
  - Mast camera control unit (CCU)
  - Mast camera monitors
  - Grapple headlights

#### 1.0 PLATFORM CHECKS

- 1.1 **ENSURE** Auxiliary Platform is located beyond anticipated travel of Refueling Platform during performance of this checkoff list. (Ref. 5.10)
- 1.2 **ENSURE** north <u>AND</u> south bridge rails are clear of obstructions <u>AND</u> debris.
- 1.3 **ENSURE** <u>NO</u> obstructions to platform travel on adjacent floor areas.
- 1.4 **ENSURE** that items hanging from the pool/cavity handrails \_\_\_\_\_\_ and platform (i.e, underwater lights, view boxes, underwater cameras, etc.) will <u>NOT</u> interfere with operation of the platform <u>OR</u> hoists.

#### ATTACHMENT 2 (Cont.)

S97.1.A, Rev.12 Page 11 of 20 MDF/mrw

#### INITIALS

- 1.5 **ENSURE** that channel handling boom, mounted near the fuel prep machines, will <u>NOT</u> interfere with motion of platform.
- 1.6 **ENSURE** main power <u>AND</u> communication cable service pit is dry.
- 1.7 ENSURE lower trolley rail on front of bridge structure is clear of obstructions AND debris.

#### NOTES

1. Refueling interlock track limit switches RS1 <u>AND</u> RS2 (over the core track switches) are located on north end truck.

2. Do <u>NOT</u> actuate limit switches.

- 1.8 ENSURE RS1 <u>AND</u> RS2 limit switch actuating arms are intact, pointing down towards floor <u>AND NOT</u> damaged. <u>IF</u> cover plates are installed (access to switches) <u>THEN</u> this step may be N/A'd per discretion of FHD.
- 1.9 **ENSURE** air compressor switch is "ON" with pressure approximately 80 to 120 psig.
- 1.10 **VERIFY** air compressor <u>AND</u> associated piping has <u>NO</u> indication of leakage.
- 1.11 **CHECK** bridge gearboxes for excessive leakage.
- 1.12 **PERFORM** general bridge inspection for foreign material (cleanliness <u>AND</u> loose hardware).
- 1.13 <u>IF</u> main hoist jib crane is <u>NOT</u> being used, <u>THEN</u> ENSURE properly stowed with jib hinge pin installed <u>AND</u> cable taut.

S97.1.A, Rev.12 Page 12 of 20 MDF/mrw

## ATTACHMENT 2 (Cont.)

1				
				INITIALS
	1.14	VERIFY <u>No</u> service pole <u>OR</u> hanging	service poles are sitting in chamfered seat of caddy guide slot from pole caddy hoist. (Ref. 5.9)	
	1.15	ENSURE the maintaining <u>OR</u> birdnest		
		1.15.1	Main power cable reel	
		1.15.2	Communications cable reel	
	1.16	<b>VERIFY</b> observable portions of the following cables are <u>NOT</u> damaged.		
		1.16.1	Main power	
×		1.16.2	Communications	<u> </u>
C	1.17	ENSURE tro AND monor AND debris.		
	1.18	CHECK trolle		
ł	1.19	ENSURE ma without bind		
	2.0	<u>OPERATOR</u>		
	2.1	ENSURE "T DISPLAY is	<u>.</u>	
	2.2	ENSURE bri motion.		
	2.3	ENSURE tro motion.	olley position indicator responds to trolley	
-				

S97.1.A, Rev.12 Page 13 of 20 MDF/mrw

### **ATTACHMENT 2 (Cont.)**

້

÷

	-		INITIALS
	2.4	<b>ENSURE</b> that the swing gate on the left front of the trolley cab next to the main hoist <u>AND</u> the main hoist retaining bar are closed <u>AND</u> secured.	<u> </u>
	2.5	<b>POSITION</b> trolley at approximately encoder position 31.00 <u>AND</u> <b>ENSURE</b> match marks line up between the trolley <u>AND</u> bridge decking.	
	3.0	MAIN HOIST GRAPPLE CHECKS	
	3.1	<u>IF</u> main hoist grapple will <u>NOT</u> be used, <u>THEN</u> <b>ENSURE</b> main hoist is in Normal Up position <u>AND</u> <b>MARK</b> remaining steps in Section 3.0 "N/A".	
	3.2	PLACE grapple light toggle switch to "ON" position.	
	3.3	PLACE mast camera <u>AND</u> associated monitors to "ON" position.	
	3.4	<b>VERIFY</b> observable portions of the hoist load cables do <u>NOT</u> have cracks, frayed ends, <u>OR</u> other signs of damage.	
	3.5	<b>VERIFY</b> observable portions of the hoist air hoses do <u>NOT</u> have cracks, leaks, <u>OR</u> other signs of damage.	
	3.6	ENSURE mast sections move freely with <u>NO</u> signs of uneven wear.	<u> </u>
	3.7	ENSURE hoist position indicator responds to hoist motion.	
	3.8	ENSURE hoist load indicator is operating properly.	
L	3.9	<b>ENSURE</b> hoist motor brake releases when an attempt is made to move the hoist <u>AND</u> engages when hoist movement is stopped.	

S97.1.A, Rev.12 Page 14 of 20 MDF/mrw

## ATTACHMENT 2 (Cont.)

J

			INITIALS
3.10	ENSURE ho made to mo <u>AND</u> engag is stopped.		
3.11	ENSURE no component is grappled		
3.12	ENSURE th mast sectio		
	3.12.1	Hoist strain relief's are properly connected to cables/hoses <u>AND</u> bulkhead.	
	3.12.2	Air hose strain relief fasteners are oriented inward <u>AND</u> will not interface with mast section motion.	
	3.12.3	Cables, hoses and associated strain relief's are centered in the 5 inch section <u>AND</u> are fastened to each other via tie-wraps <u>OR</u> equivalent.	
3.13	ENSURE ho near trolley <u>AND</u> trolley	ist strain relief's at top of 12 inch mast section upper deck are properly connected to cables structure.	

S97.1.A, Rev.12 Page 15 of 20 MDF/mrw

## ATTACHMENT 2 (Cont.)

C

ł

				INITIALS
	3.14	ENSURE th maintaining <u>OR</u> birdnes		
		3.14.1	Power cable reel	
		3.14.2	Air hose reel	
		3.14.3	Camera cable reel	<u> </u>
	3.15	ENSURE he		
	3.16	ENSURE pr just above <u>OR</u> if core available in <u>AND</u> ENSU	roper reel tension by lowering the hoist until fuel seated in core, is <u>NOT</u> accessible the lowest position in the fuel pool, I <b>RE</b> "SLACK CABLE" light remains OFF.	
	3.17	<b>ENSURE</b> m Up limit.	ast automatically stops raising at the Normal	
	3.18	18 ENSURE satisfactory mast camera operation.		- <u>.</u>
	4.0	BOUNDAR		
	4.1	<b>CHECK</b> Bou of bridge, t in spent fue additional in	undary Zone Computer for proper operation rolley, hoist and grapple motion enforcement el pool as follows: (See Attachment 1 for nformation.)	
	4.2	ENSURE Bo (located in	oundary Zone Computer override keylock switch operator cab) is in "NORMAL" position.	
r	4.3	ENSURE Bo in Boundary position.	oundary Zone Computer bypass switch (located y Zone Computer cabinet) is in "NORMAL"	

S97.1.A, Rev.12 Page 16 of 20 MDF/mrw

#### ATTACHMENT 2 (Cont.)

	<u>INITIALS</u>
4.4 <b>ENSURE</b> that a Boundary Zone Computer (BZC) cooling fan is operational. NOTE: There are two fans for the BZC. One fan is always operational. The second fan is controlled via a temperature switch.	
<ul> <li>4.5 ENSURE fuel grapple opens without use of the GRAPPLE LOCKOUT BYPASS pushbutton when grapple is within 16 inches above a fuel assembly bail handle when the fuel assembly is seated in a fuel storage rack.</li> </ul>	
CAUTION	
1. <u>IF</u> THE REFUEL BRIDGE IS OPERATED NEAR A BOUNDAY ZONE O BOUNDARY AT OTHER THAN JOG SPEED, <u>THEN</u> EXTENSIVE DAMAGE TO THE BRIDGE MAY RESULT. TO A EXTENSIVE PHYSICAL DAMAGE, JOG SPEED <u>ONLY</u> SHALL BE US APPROACH TO ANY WALL OR OBSTRUCTION.	OMPUTER VOID SED IN ANY
<ol> <li>IF THE REFUEL BRIDGE IS ALIGNED WITH EITHER THE CASK PIT THE REACTOR CAVITY GATE, <u>THEN</u> THE BOUNDARY ZONE COMPUTER WILL NOT RESTRICT M TOWARDS THESE GATES <u>AND</u> EXTENSIVE BRIDGE DAMAGE MAY RESULT. TO PREVENT I DAMAGE WHICH MAY RESULT FROM CONTACT WITH THESE G, <u>NOT</u> OPERATE THE BRIDGE NEAR THESE GATES.</li> </ol>	GATE OR OTION EXTENSIVE ATES, <u>DO</u>

4.6 **DRIVE** bridge east <u>AND</u> west to verify automatic boundary enforcement.

ł

4.7 **DRIVE** main trolley north AND south to verify automatic boundary enforcement.

S97.1.A, Rev.12 Page 17 of 20 MDF/mrw

#### ATTACHMENT 2 (Cont.)

#### INITIALS

#### 5.0 FRAME MOUNTED HOIST CHECKS

1

 5.1 <u>IF</u> frame mounted hoist will <u>NOT</u> be used, <u>THEN</u> ENSURE frame mounted hoist is full up on hoist override with tools removed <u>OR</u> tools/cables stored in a safe location for platform movement, <u>AND</u> MARK the remaining steps in Section 5.0 "N/A".

5.2 **ENSURE** frame hoist, trolley <u>AND</u> bridge can be operated using frame hoist control pendant.

5.3 **VERIFY** observable portions of the hoist load cable do <u>NOT</u> have cracks, frayed ends <u>OR</u> other signs of damage.

5.4 **VERIFY** observable portions of the hoist air hoses do <u>NOT</u> have cracks, leaks <u>OR</u> other signs of damage.

5.5 **ENSURE** air hose reel is operating properly, maintaining tension without binding <u>OR</u> birdnesting of hose on reel.

5.6 **ENSURE** hoist load cable properly wraps on cable drum without birdnesting.

5.7 <u>IF</u> current jam block setting permits, <u>THEN</u> ENSURE normal full up geared limit switch stops hoist raise motion <u>AND</u> pressing HOIST LIMIT OVERRIDE allows raise motion until the over hoist geared limit switch stops raise motion.

5.8 <u>IF</u> jam block is set in accordance with an implementing procedure, <u>THEN</u> ENSURE raise motion is stopped when whisker switch is actuated by the jam block.

S97.1.A, Rev.12 Page 18 of 20 MDF/mrw

## ATTACHMENT 2 (Cont.)

(		ATTACHMENT 2 (Cont.)			
			INITIALS		
	5.9	<b>ENSURE</b> hoist motor brake releases when an attempt is made to move the hoist <u>AND</u> engages when hoist movement is stopped.			
	5.10	<b>ENSURE</b> hoist safety brake releases when an attempt is made to move the hoist <u>AND</u> engages with a time delay after hoist movement is stopped.			
	5.11	ENSURE hoist load indicator is operating properly.			
	6.0	MONORAIL HOIST CHECKS			
6	6.1	<u>IF</u> monorail hoist will <u>NOT</u> be used, <u>THEN</u> <b>ENSURE</b> monorail hoist is full up on hoist override with tools removed <u>OR</u> tools/cables stored in a safe location for platform movement,			
		AND MARK the remaining steps in Section 6.0 "N/A".			
	6.2	<b>ENSURE</b> monorail hoist, monorail trolley <u>AND</u> bridge can be operated using monorail hoist control pendant.			
	6.3	<b>VERIFY</b> observable portions of the hoist load cable do <u>NOT</u> have cracks, frayed ends <u>OR</u> other signs of damage.			
	6.4	<b>VERIFY</b> observable portions of the hoist air hoses do <u>NOT</u> have cracks, leaks <u>OR</u> other signs of damage.			
·	6.5	ENSURE air hose reel is operating properly, maintaining tension without binding <u>OR</u> birdnesting of hose on reel.			
(	6.6	ENSURE hoist load cable properly wraps on cable drum without birdnesting.			

ł

C

#### ATTACHMENT 2 (Cont.)

S97.1.A, Rev.12 Page 19 of 20 MDF/mrw

#### INITIALS

- 6.7. <u>IF</u> current jam block setting permits, <u>THEN</u> ENSURE normal full up geared limit switch stops hoist raise motion <u>AND</u> pressing HOIST LIMIT OVERRIDE allows raise motion until the over hoist geared limit switch stops raise motion.
- 6.8 <u>IF</u> jam block is set in accordance with an implementing procedure, <u>THEN</u> ENSURE raise motion is stopped when whisker switch is actuated by the jam block.
- 6.9 ENSURE hoist motor brake releases when an attempt is made to move the hoist <u>AND</u> engages when hoist movement is stopped.
- 6.10 ENSURE hoist safety brake releases when an attempt is made to move the hoist <u>AND</u> engages when hoist movement is stopped.
- 6.11 **ENSURE** monorail trolley power track operates properly without binding.
- 6.12 **ENSURE** hoist load indicator is operating properly.

S97.1.A, Rev.12 Page 20 of 20 MDF/mrw

### ATTACHMENT 2 (Cont.)

COMMENTS: \_\_\_\_\_

S97.0.M, Rev. 12 Page 1 of 26 JAD/jad

### Exelon Nuclear LIMERICK GENERATING STATION

## S97.0.M <u>REFUELING PLATFORM OPERATION</u>

#### 1.0 PURPOSE

1.1 To provide instruction necessary to operate the Refuel platform main hoist for core component movements within the Fuel Pool, Cask Pit, and Reactor Core. This procedure shall be used in conjunction with Fuel Handling Procedure FH-105 "Core Component Movement - Core Transfers", or FH-106 "Core Component and Irradiated Item Movement - No Core Transfer" as appropriate.

#### 2.0 PREREQUISITES

- 2.1 <u>IF</u> performing component transfers in the Reactor, <u>THEN</u> all prerequisites included in Procedure FH-105, "Core Component Movement - Core Transfers" have been completed as appropriate.
- 2.2 <u>IF</u> performing component transfers in the Fuel Pool/Cask Pit only, <u>THEN</u> all prerequisites included in Procedure FH-106, "Core Component and Irradiated Item Movement - No Core Transfer", have been completed as appropriate.
  - 2.3 Applicable sections of the \$97.1 A "Electrical, Mechanical, and Pneumatic Alignment/Checkout of Refueing Platform Bridge, Trolley and Main Hoist for Operation" should be performed as necessary. Verification of the mast's ability to fully extend without binding should be performed over the reactor cavity soon after core is accessible with the mast.
  - 2.4 <u>IF</u> performing transfer of the dummy bundle over the Reactor Cavity, <u>THEN</u> secondary containment is required during movement over irradiated fuel per Ref. 5.13.
  - 2.5 <u>IF performing transfer of the dummy bundle in the spent fuel pool only,</u> <u>THEN</u> secondary containment is operable as required below:

**<u>IF</u>** greater than 46 days have elapsed since shutdown of unit just prior to the most recent discharge of fuel which is stored in the appropriate pool, **<u>THEN</u>** secondary containment is not required per Refs. 5.13 and 5.14. Previous transfer of fuel between fuel pools must be considered in making this determination,

<u>OTHERWISE</u>, secondary containment is required during movement of the dummy bundle over irradiated fuel per Ref. 5.13.

S97.0.M, Rev. 12 Page 2 of 26 JAD/jad

2.6 IF there is potential for contact with the Auxiliary Platform during performance of any section of this procedure
 <u>THEN</u> a dedicated Spotter shall be posted on the Refueling Platform to monitor platform separation
 <u>AND</u> alert the Fuel Handling crew to stop operations
 IF interference is imminent. (Ref. 5.18)

### 3.0 PRECAUTIONS

- 3.1 <u>IF</u> equipment performance is <u>not</u> as expected, <u>THEN</u> the equipment shall be placed in a safe condition <u>AND</u> Shift Management or Fuel Handling Director shall be notified immediately.
- 3.2 <u>IF</u> a core component is partially inserted into a location, <u>THEN</u> Refuel Platform bridge <u>OR</u> Trolley shall only be moved at JOG speed.
  - 3.3 Fuel bundles shall be seated using a consistent slow hoist speed while gently shaking the mast. Extreme slow speed and the absence of vibration increases the potential for improper bundle seating.
- 3.4 Double blade guide spacer buttons occasionally tend to hang-up on the top edge of the Unit 2 Spent Fuel Pool racks. Refuel Platform Operator may need to gently shake mast to eliminate interference and fully seat blade guide in rack.
  - 3.5 Bridge and trolley shall be operated at JOG speed when handling double guides with the mast below the reactor vessel flange (per SIL 594).
  - 3.6 Blade guides may be removed from the reactor core provided the associated control rod blade will be diagonally supported by fuel or other blade guide(s).
  - 3.7 To prevent impact or mast/fuel assembly damage:
    - 3.7.1 Trolley and Bridge shall always be accelerated slowly, avoiding sudden starts and stops.
    - 3.7.2 Travel paths shall be clear before moving core components.
    - 3.7.3 NORMAL UP light must be lit before moving through transfer canal.
    - 3.7.4 Double blade guides must be raised beyond NORMAL UP using Hoist Override to -4.0 inches as indicated by hoist encoder before moving through transfer canal.
    - 3.7.5 Main Hoist Grapple must be in full up position when <u>not</u> in use.
- 3.7.6 Push or pull mast assembly as required when fuel bundle is approaching fully seated position in core, sipping canister, or spent fuel pool rack to protect channel fastener. Observe channel fastener, if possible, as it enters core, rack or sipping canister to ensure channel fastener does <u>not</u> catch.
- 3.7.7 Operate main hoist slowly when grapple/component approaches fully seated position.
- 3.8 Mast camera may impact surrounding structures when manipulating core components in the Reactor Core periphery, Fuel Pool periphery or Fuel Preparation Machine. Exercise caution to avoid impact damage.
- 3.9 LPRM bender stand shall be removed before moving platform to equipment pool. When installed the LPRM bender stand will prevent refuel platform travel over equipment pool.

## NOTE

Attachment 1 provides a list of Refuel Platform interlocks, including initiating conditions and effects on the system.

## 3.10 IF during hoist operation:

ł

3.10.1 HOIST JAM light comes on,

<u>THEN</u> movement shall be stopped immediately <u>AND</u> lowered until HOIST JAM Light goes out, <u>THEN</u> the Fuel Handling Director shall be contacted for instruction.

- 3.10.2 HOIST LOADED Light goes out prematurely, OR load starts to lean,
  - 1. Hoist Lowering shall be stopped immediately.
  - 2. Grapple switch shall be verified to be in ENGAGED position
  - 3. Grapple engagement shall be verified.
  - 4. GRAPPLE ENGAGED light shall be verified lit.
  - 5. Hoist shall be raised slowly to regain the weight of the load.
  - 6. Fuel Handling Director shall be notified.

S97.0.M, Rev. 12 Page 4 of 26 JAD/jad

- 3.10.3 GRAPPLE ENGAGED Light goes out unexpectedly during operation, <u>THEN</u> movement shall be stopped immediately, <u>AND</u> FHD notified.
- 3.10.4 HOIST LOADED Light comes on unexpectedly while raising grapple:
  - 1. Hoist movement shall be stopped.

1

- 2. Hoist shall be slowly lowered until HOIST LOADED light goes out.
- 3. Fuel Handling Director shall be notified.
- 3.10.5 ROD BLOCK #1 and ROD BLOCK #2 light on interlock status display does not light when platform is over the core
   <u>AND</u> main hoist is fuel loaded,
   <u>THEN</u> refuel platform operation shall be stopped,
   <u>AND</u> FHD notified.
- 3.11 GRAPPLE LOCKOUT BYPASS and BOUNDARY ZONE COMPUTER BYPASS push button operations may be needed for handling components in the periphery of the Spent Fuel Pool, in a Bundle Sipping Canister, or in a Cask.
- -1 3.12 Fuel inspection and test equipment when installed in the fuel pools presents an entanglement hazard for the main mast or grappled fuel bundle.
  - 3.13 IF secondary containment becomes inoperable during transfer of the dummy bundle,
     <u>THEN</u> STOP movement of the dummy bundle over irradiated fuel
     <u>UNLESS</u> it was determined that secondary containment is not required (Ref. 5.13).
  - 3.14 Prior to component handling concurrent with use of unique equipment in the reactor cavity or fuel pool, a determination should be made regarding the level of monitoring necessary to prevent contact between the equipment and the refuel platform mast, mast camera or core components suspended from the grapple.

Examples of unique equipment include in-vessel inspection or repair equipment, particularly those with umbilical cables. Depending on the risk of interference, consideration shall be given to positioning an individual on the refuel platform assigned the responsibility to monitor the position of the equipment (and umbilical if applicable) and alert Fuel Handling crew to **STOP** if interference is imminent.

3.15 De-energizing the refuel platform while over the reactor cavity (track switches actuated) will generate a Rod Withdrawal Block in the Main Control Room. Notify Reactor Operator prior to de-energizing the refuel platform with the track switches actuated.

- 3.16 Peripheral fuel assemblies have the potential to miss their fuel support and seat low. Use extreme caution to maintain proper alignment while inserting assembly into the core. (Ref. 5.15).
- 3.17 Extra caution should be used when handling very old fuel bundles. Monitoring of bundle weight shall be performed during lifting to ensure gross failure of bundle is identified (Ref. 5.16). Also, bent channel fasteners and bent bail handles have been found on old bundles.
- 3.18 A gentle rotation of the mast in both directions should be used to ensure the fuel grapple is firmly engaged to the bail handle. Rapid or rough rotation during this check has led to fuel failure. (Ref. 5.16)
- 3.19 Use extreme caution and a slow hoist speed when handling unchanneled fuel bundles. Unchanneled fuel bundles are more susceptible to damage by twisting/rotation of mast. Finger springs on the lower tie plate and fuel rod spacers may catch during fuel bundle removal
   <u>OR</u> insertion into a spent fuel pool rack
   <u>OR</u> fuel preparation machine.
- 3.20 Three dimensional moves of Refueling Platform (e.g. using Bridge, Trolley and Hoist at same time) <u>AND</u> simultaneous operation of Service Pole Caddy Hoist is not permitted. (Ref. 5.17)
- 3.21 <u>IF</u> potential for contact exists, <u>THEN</u> slow speed shall be utilized when approaching the Auxiliary Platform. (Ref. 5.18)

ł

- 3.22 <u>IF</u> Refueling Platform <u>AND</u> Auxiliary Platform need to be brought together <u>THEN</u> PERFORM the following: (Ref. 5.18)
  - 3.22.1 **ENSURE** Auxiliary Platform is positioned where required.
  - 3.22.2 **DEENERGIZE** Refueling Platform per NMD Maintenance Supervisor **OR** FHD direction.
  - 3.22.3 MOVE Refueling Platform up to Auxiliary Platform using hand-crank.
- 3.23 IF a Control System malfunction occurs, <u>THEN</u> Refueling Platform can be stopped by pressing the STOP push-button on the Left Hand Controller <u>OR</u> by opening the MAIN DISCONNECT switch on the north end truck.
- 3.24 <u>IF</u> fuel moves must be suspended with an irradiated bundle hanging on the mast, <u>THEN</u> ENSURE bundle is not positioned near invessel remote operated cameras. This will prevent radiation damage to the cameras.

S97.0.M, Rev. 12 Page 6 of 26 JAD/jad

# 4.0 <u>PROCEDURE</u>

#### NOTE

- 1. The performance steps section of this procedure is separated into the following subsections:
  - 4.1, Pickup Location Fuel Pool Storage Rack or Cask Pit
  - 4.2, Pickup Location Reactor Core
  - 4.3, Pickup Location Fuel Preparation Machine
  - 4.4, Pickup Location Bundle Sipping Canister
  - 4.5, Release Location Fuel Pool Storage Rack or Cask Pit
  - 4.6, Release Location Reactor Core
  - 4.7, Release Location Fuel Preparation Machine
  - 4.8, Release Location Bundle Sipping Canister
  - 4.9, Determination of Hoist Position for Bundle Seated in Sipping Canister
  - 4.10. In-Process Adjustment of Bridge/Trolley Encoders.
- 2. Target Hoist Positions are listed in Attachment 2 which should be posted on the Refuel Platform mast.
- 3. Sequential steps which perform horizontal positioning of grapple/component (Bridge/Trolley) and vertical positioning of grapple/component (Hoist) may be performed in parallel as conditions permit.

## 4.1 Pickup Location - Fuel Pool Storage Rack or Cask Pit

#### NOTE

A CCTAS is **not** required for pickup of the dummy bundle.

- 4.1.1 **POSITION** Refuel Platform Mast over desired core component in accordance with Core Component Transfer Authorization Sheet (CCTAS).
- 4.1.2 **LOWER** grapple until grapple is 6 to 12 inches above bail.
- 4.1.3 **ENSURE** grapple is open.
- 4.1.4 **ROTATE** grapple as necessary to achieve grapple to bail alignment.
- 4.1.5 Slowly LOWER grapple until SLACK CABLE Light is lit.

S97.0.M, Rev. 12 Page 7 of 26 JAD/jad

### NOTE

Steps 4.1.6 through 4.1.10 shall be double verified by the Fuel Handling Director (FHD) <u>AND</u> Refuel Platform Operator (RPO) **OR** Spotter.

- 4.1.6 **VERIFY** proper core component location <u>AND</u> orientation.
- 4.1.7 **VERIFY** the following, <u>THEN</u> **NOTIFY** FHD of grapple position.
  - Grapple is centered over bail handle.
  - Hoist Position indication agrees with value listed in Attachment 2 for item seated in Fuel Pool Storage Rack.
  - Grapple appears seated on bail handle using underwater camera for component seated in cask.
- 4.1.8 <u>WHEN</u> directed by FHD, <u>THEN</u> ENGAGE grapple, <u>AND</u> VERIFY GRAPPLE ENGAGED Light is lit.
- 4.1.9 <u>WHEN</u> directed by FHD, <u>THEN</u> slowly **RAISE** load while ensuring HOIST LOADED Light is lit (fuel/dummy bundle only), <u>OR</u> for skeleton fuel bundle **VERIFY** component movement.
- 4.1.10 **CONTINUE** raising until grapple is fully raised, <u>THEN</u> **VERIFY** NORMAL UP Light is lit.
- 4.1.11 <u>IF</u> a double blade guide is being transferred through the cattle chute, <u>THEN</u> **RAISE** the grapple beyond NORMAL UP using the Hoist Override to -4.0 inches as indicated by Hoist Encoder.
- 4.1.12 **GO TO** appropriate "Release Location" section of this procedure as directed by FHD.

S97.0.M, Rev. 12 Page 8 of 26 JAD/jad

## 4.2 Pickup Location - Reactor Core

- 4.2.1 **POSITION** Refuel Platform Mast over desired core component in accordance with Core Component Transfer Authorization Sheet (CCTAS).
- 4.2.2 **LOWER** grapple until grapple is 6 to 12 inches above bail.
- 4.2.3 **ENSURE** grapple is open.
- 4.2.4 **ROTATE** grapple as necessary to achieve grapple to bail alignment.
- 4.2.5 Slowly **LOWER** grapple until SLACK CABLE Light is lit.

#### NOTE

Steps 4.2.6 through 4.2.10 shall be double verified by the Fuel Handling Director (FHD) AND Refuel Platform Operator (RPO)

OR Spotter.

l j

- 4.2.6 **VERIFY** proper core component location <u>AND</u> orientation.
- 4.2.7 **VERIFY** the following, <u>THEN</u> **NOTIFY** FHD of grapple position.
  - Grapple is centered over bail handle.
  - Hoist Position indication agrees with value listed in Attachment 2 for item seated in core.
- 4.2.8 <u>WHEN</u> directed by FHD, <u>THEN</u> ENGAGE grapple, <u>AND</u> VERIFY GRAPPLE ENGAGED Light is lit.

S97.0.M, Rev. 12 Page 9 of 26 JAD/jad

## NOTE

**<u>IF</u>** load is a Fuel Bundle, <u>THEN</u> FHD notifies Unit Reactor Operator of pending fuel removal from the core.

- 4.2.9 <u>WHEN</u> directed by FHD, <u>THEN</u> **RAISE** load <u>AND</u> **VERIFY** HOIST LOADED Light is lit (fuel/dummy bundle only).
- 4.2.10 **CONTINUE** raising until core component is clear of core.
  - 1. **VERIFY** HOIST Position indicates less than 355.0 inches.
  - 2. **VERIFY** item is clear of top guide.

# NOTE

IF load is a Fuel Bundle,

THEN FHD notifies Unit Reactor Operator that fuel bundle has cleared core.

- 4.2.11 <u>IF</u> load is to be transferred through transfer canal, <u>THEN</u> **CONTINUE** raising until grapple is fully raised <u>THEN</u> **VERIFY** NORMAL UP Light is lit.
  - <u>IF</u> load is a double blade guide, <u>THEN</u> RAISE the grapple beyond NORMAL UP using Hoist Override to -4.0 inches as indicated on Hoist Encoder.
- 4.2.12 **GO TO** appropriate "Release Location" section of this procedure as directed by FHD.

S97.0.M, Rev. 12 Page 10 of 26 JAD/jad

# 4.3 Pickup Location - Fuel Preparation Machine

## 4.3.1 **VERIFY** Fuel Prep Machine carriage is fully LOWERED.

## NOTE

A CCTAS is not required for pickup of the dummy bundle.

## CAUTION

Use extreme care to avoid entanglement of main mast or grappled fuel bundle with fuel inspection and test equipment located in the vicinity of the fuel prep machines.

- 4.3.2 Carefully **POSITION** Refuel Platform Mast over fuel prep machine in accordance with Core Component Transfer Authorization Sheet (CCTAS).
- 4.3.3 **LOWER** grapple until grapple is 6 to 12 inches above bail.
- 4.3.4 **DEPRESS** GRAPPLE LOCKOUT BYPASS push button.
- 4.3.5 **ENSURE** grapple is open.
- 4.3.6 **ROTATE** grapple as necessary to achieve grapple to bail alignment.
- 4.3.7 Slowly **LOWER** grapple until SLACK CABLE Light is lit.

## NOTE

Steps 4.3.8 through 4.3.13 shall be double verified by the Fuel Handling Director (FHD) and Refuel Platform Operator (RPO) or Spotter.

4.3.8 **VERIFY** proper core component location <u>AND</u> orientation.

S97.0.M, Rev. 12 Page 11 of 26 JAD/jad

# 4.3.9 **VERIFY** the following, <u>THEN</u> **NOTIFY** FHD of grapple position.

- Grapple is centered over bail handle
- Hoist Position indication agrees with value listed in Attachment 2 for item seated in fuel prep machine.
- 4.3.10 <u>WHEN</u> directed by FHD, <u>THEN</u> ENGAGE grapple, <u>AND</u> RELEASE GRAPPLE LOCKOUT BYPASS push button.
- 4.3.11 **VERIFY** GRAPPLE ENGAGED Light is lit.
- 4.3.12 <u>WHEN</u> directed by FHD, <u>THEN</u> slowly **RAISE** load <u>AND</u> VERIFY HOIST LOADED Light is lit (fuel/dummy bundle only), <u>OR</u> for skeleton fuel bundle visually VERIFY component movement.
- 4.3.13 **CONTINUE** raising until grapple is fully raised, <u>THEN VERIFY</u> NORMAL UP Light is lit.
- 4.3.14 **GO TO** appropriate "Release Location" section of this procedure as directed by FHD.

S97.0.M, Rev. 12 Page 12 of 26 JAD/jad

# 4.4 <u>Pickup Location - Bundle Sipping Canister</u>

4.4.1 **VERIFY** Bundle Sipping Canister lid is open.

#### NOTE

A CCTAS is not required for pickup of the dummy bundle.

- 4.4.2 **POSITION** Refuel Platform Mast over desired Bundle Sipping Canister in accordance with Core Component Transfer Authorization Sheet (CCTAS).
- 4.4.3 **LOWER** grapple until grapple is 6 to 12 inches above bail.
- 4.4.4 **ENSURE** grapple is open.
- 4.4.5 **ROTATE** grapple as necessary to achieve grapple to bail alignment.
- 4.4.6 Slowly **LOWER** grapple until SLACK CABLE Light is lit.

#### NOTE

- 1. Steps 4.4.7 through 4.4.11 shall be double verified by the Fuel Handling Director and Refuel Platform Operator or Spotter.
- 2. Expected hoist position indication is determined and posted on Attachment 2 using the dummy bundle in subsection 4.9.
  - 4.4.7 **VERIFY** proper core component location **AND** orientation.
  - 4.4.8 **VERIFY** the following, <u>THEN</u> **NOTIFY** FHD of grapple position.
    - Grapple is centered over bail handle
    - Hoist Position indication agrees with value posted on Attachment
       2 for item seated in Bundle Sipping Canister.

S97.0.M, Rev. 12 Page 13 of 26 JAD/jad

4.4.9 <u>WHEN</u> directed by FHD, <u>THEN</u> ENGAGE grapple <u>AND</u> VERIFY GRAPPLE ENGAGED Light is lit.

## CAUTION

Use extreme care to avoid collision of fuel bundle with open Sipping Canister lid.

- 4.4.10 <u>WHEN</u> directed by FHD, <u>THEN</u> slowly **RAISE** load while ensuring HOIST LOADED Light is lit (fuel/dummy bundle only).
- 4.4.11 **CONTINUE** raising until grapple is fully raised, <u>THEN</u> VERIFY NORMAL UP Light is lit.
- 4.4.12 **GO TO** appropriate "Release Location" section of this procedure as directed by FHD.
- 4.5 Release Location Fuel Pool Storage Rack or Cask Pit

## NOTE

A CCTAS is not required for pickup of the dummy bundle.

- 4.5.1 **POSITION** core component over desired location in accordance with Core Component Transfer Authorization Sheet (CCTAS).
- 4.5.2 **ROTATE** core component as necessary to achieve proper orientation.
- 4.5.3 **PERFORM** Double Verification to ensure proper core component location <u>AND</u> orientation.
- 4.5.4 <u>WHEN</u> directed by FHD, <u>THEN</u> LOWER hoist until core component is seated <u>AND</u> SLACK CABLE Light is lit.

S97.0.M, Rev. 12 Page 14 of 26 JAD/jad

## NOTE

Steps 4.5.5 through 4.5.8 shall be double verified by the Fuel Handling Director (FHD) <u>AND</u> Refuel Platform Operator (RPO) **OR** Spotter.

- 4.5.5 **VERIFY** the following, <u>THEN NOTIFY</u> FHD of grapple position.
  - Component elevation appears equivalent to other stored components in the rack.
  - Hoist Position indication agrees with value listed in Attachment 2 for item seated in Fuel Storage Rack,
     <u>OR</u> per M-053-006, subsection 5.4, for a bundle seated in a cask.
- 4.5.6 <u>WHEN</u> directed by FHD, <u>THEN</u> **RELEASE** grapple.
  - <u>IF</u> in cask, <u>THEN</u> DEPRESS Grapple Lockout Bypass push button.
- 4.5.7 **VERIFY** grapple is open.
- 4.5.8 Slowly **RAISE** grapple while verifying HOIST LOADED remains out, <u>AND</u> grapple remains free of bail handle.
- 4.5.9 **RECORD** completion of component transfer on CCTAS.
- 4.6 Release Location Reactor Core
  - 4.6.1 **POSITION** core component above desired location in accordance with Core Component Transfer Authorization Sheet (CCTAS).
  - 4.6.2 **LOWER** load until hoist position indicates approximately 355 inches, <u>THEN</u> **STOP** lowering.
  - 4.6.3 **ROTATE** core component as necessary to achieve proper orientation.
  - 4.6.4 **PERFORM** Double Verification to ensure proper core component location <u>AND</u> orientation.

S97.0.M, Rev. 12 Page 15 of 26 JAD/jad

## NOTE

**<u>IF</u>** Load is a Fuel Bundle, <u>**THEN**</u> FHD notifies Unit Reactor Operator of pending fuel insertion in core.

# 4.6.5 <u>WHEN</u> directed by FHD, <u>THEN</u> LOWER load until SLACK CABLE Light is lit.

#### NOTE

Steps 4.6.6 through 4.6.8 shall be double verified by the Fuel Handling Director (FHD) <u>AND</u> Refuel Platform Operator (RPO) <u>OR</u> Spotter.

4.6.6 **VERIFY** the following, <u>THEN NOTIFY</u> FHD of grapple position.

- Component elevation appears equivalent to other components in the Reactor Core.
- Hoist Position indication agrees with value listed in Attachment 2 for item fully seated in Reactor Core.
- 4.6.7 <u>WHEN</u> directed by FHD, <u>THEN</u> **RELEASE** grapple, <u>AND</u> **VERIFY** grapple is open.
- 4.6.8 Slowly RAISE grapple while verifying HOIST LOADED light remains out.
- 4.6.9 **RECORD** completion of component transfer on CCTAS.

PC

S97.0.M, Rev. 12 Page 16 of 26 JAD/jad

## NOTE

**IF** Load is a Fuel Bundle, **THEN** FHD notifies Unit Reactor Operator of completion of fuel insertion in core.

4.7 Release Location - Fuel Preparation Machine

ł

4.7.1 **ENSURE** Fuel Prep Machine carriage is fully lowered.

## NOTE

A CCTAS is <u>not</u> required for pickup of the dummy bundle.

# CAUTION

Use extreme care to avoid entanglement of main mast or grappled fuel bundle with fuel inspection and test equipment located in the vicinity of the fuel prep machines.

- 4.7.2 Carefully **POSITION** component over desired fuel prep machine in accordance with Core Component Transfer Authorization Sheet (CCTAS).
- 4.7.3 **ROTATE** component as necessary to achieve proper alignment.
- 4.7.4 **PERFORM** Double Verification to ensure proper core component location <u>AND</u> orientation.
- 4.7.5 <u>WHEN</u> directed by FHD, <u>THEN</u> LOWER load until SLACK CABLE Light is lit.

PC

S97.0.M, Rev. 12 Page 17 of 26 JAD/jad

## NOTE

Steps 4.7.6 through 4.7.9 shall be double verified by the Fuel Handling Director (FHD) <u>AND</u> Refuel Platform Operator (RPO) <u>OR</u> Spotter.

- 4.7.6 **VERIFY** Hoist Position indication agrees with value listed in Attachment 2 for item fully seated in fuel prep machine, <u>THEN NOTIFY</u> FHD of grapple position.
- 4.7.7 <u>WHEN</u> directed by FHD, <u>THEN</u> **RELEASE** grapple, <u>AND</u> **DEPRESS** GRAPPLE LOCKOUT BYPASS push button.
- 4.7.8 **VERIFY** grapple is open.
- 4.7.9 Slowly **RAISE** grapple while verifying HOIST LOADED light remains out, <u>AND</u> **VERIFY** grapple remains free of bail handle.
- 4.7.10 **RELEASE** GRAPPLE LOCKOUT BYPASS push button.
- 4.7.11 **RECORD** completion of component transfer on CCTAS.
- 4.8 Release Location Bundle Sipping Canister

## CAUTION

Use extreme care to avoid collision of fuel bundle with open Sipping Canister lid.

4.8.1 **VERIFY** Bundle Sipping Canister lid is open.

- 4.8.2 **POSITION** fuel bundle over desired Bundle Sipping Canister in accordance with Core Component Transfer Authorization Sheet (CCTAS).
- 4.8.3 **ROTATE** fuel bundle as necessary to achieve proper insertion alignment.

S97.0.M, Rev. 12 Page 18 of 26 JAD/jad

PC

- 4.8.4 **PERFORM** Double Verification to ensure proper core component location <u>AND</u> orientation.
- 4.8.5 <u>WHEN</u> directed by FHD, <u>THEN</u> LOWER load until SLACK CABLE light is lit.

#### NOTE

- 1. Steps 4.8.6 through 4.8.8 shall be double verified by the Fuel Handling Director (FHD) and Refuel Platform Operator (RPO) or Spotter.
- 2. Expected hoist position indication is determined and posted on Attachment 2 using the dummy bundle in subsection 4.9.
  - 4.8.6 **VERIFY** the following, <u>THEN</u> **NOTIFY** FHD of grapple position.
    - Fuel Bundle is fully seated in the Bundle Sipping Canister.
    - Hoist Position indication agrees with value posted on Attachment 2 for item seated in Bundle Sipping Canister.
  - 4.8.7 <u>WHEN</u> directed by FHD, <u>THEN</u> **RELEASE** grapple, <u>AND</u> **VERIFY** grapple is open.
  - 4.8.8 Slowly **RAISE** grapple while verifying HOIST LOADED light remains out.
  - 4.8.9 **RECORD** completion of component transfer on CCTAS.
- 4.9 Determination of Hoist Position for Bundle Seated in Sipping Canister

## NOTE

A CCTAS is <u>not</u> required for pickup of the DUMMY bundle.

- 4.9.1 **PICKUP** DUMMY Bundle in accordance with subsection 4.1.
- 4.9.2 **VERIFY** Bundle Sipping Canister lid is open.

S97.0.M, Rev. 12 Page 19 of 26 JAD/jad

PC

PC

- 4.9.3 **POSITION** DUMMY Bundle over Bundle Sipping Canister <u>AND</u> ROTATE DUMMY Bundle to achieve alignment.
- 4.9.4 <u>WHEN</u> directed by FHD, <u>THEN</u> slowly **LOWER** hoist until DUMMY Bundle is seated <u>AND</u> SLACK CABLE Light is lit.
- 4.9.5 **VERIFY** DUMMY Bundle is seated in Bundle Sipping Canister using underwater camera.

		NOTE	
The DIMEN Canister (re <u>AND</u> adding	SION (Target Hoist Positi fer to Attachment 2) is c g 0.5 inches to, the Hoist	ion) for a fuel bundle seated in a Bundle Sipping calculated by subtracting 1.5 inches from, t Position Indication obtained below.	
4.9.6 <b>RECORD</b> Hoist Position Indication <u>AND</u> CALCULATE the DIMENSION for each Bundle Sipping Canister below:		РС	
	CANISTER ID/	HOIST POSITION	

			DIMENSION
1.		<u></u>	
2.	·····		

- 4.9.7 <u>WHEN</u> directed by FHD, <u>THEN</u> slowly **RAISE** DUMMY Bundle while ensuring HOIST LOADED Light is lit.
- 4.9.8 **CONTINUE** raising until grapple is fully raised, <u>THEN VERIFY</u> NORMAL UP Light is lit.
- 4.9.9 **REPEAT** steps 4.9.2 through 4.9.8 for each additional Bundle Sipping Canister.
- 4.9.10 <u>WHEN</u> directed by the FHD, <u>THEN</u> **GO TO** appropriate subsection of this procedure, <u>AND</u> **RETURN** the DUMMY Bundle to its "As Found" location.

PC

PC

- 4.9.11 **RECORD** ID/ Location, Hoist Position Indication, and DIMENSION for each Bundle Sipping Canister in the FHD logbook.
- 4.9.12 **RECORD** the ID/ Location and DIMENSION for each Bundle Sipping Canister on the appropriate page of Attachment 2,

<u>AND</u> **POST** a copy of Attachment 2 on the associated Refuel Platform mast.

4.10 "In-Process" Adjustment of Bridge/Trolley Encoders

# CAUTION

DO NOT engage the grapple during performance of this section.

4.10.1 **POSITION** Refuel platform Mast over desired core component location.

4.10.2 **LOWER** grapple until grapple is 6 to 12 inches above bail.

4.10.3 **ENSURE** grapple is open.

4.10.4 **ROTATE** grapple as necessary to achieve grapple to bail alignment.

4.10.5 Slowly **LOWER** grapple until SLACK CABLE Light is lit.

## NOTE

Steps 4.10.6 through 4.10.12 shall be double verified by the Fuel Handling Director (FHD) <u>AND</u> Refuel Platform Operator (RPO) <u>OR</u> Spotter.

# 4.10.6 **VERIFY** proper core component location <u>AND</u> orientation.

- 4.10.7 **VERIFY** the following, <u>THEN</u> **NOTIFY** FHD of grapple position.
  - Grapple is centered over bail handle.
  - Hoist position indication agrees with value listed in Attachment 2 for item seated in core.

- 4.10.8 RECORD "As Found" encoder readout position indication
   <u>AND</u> Model 1200 Power Supply thumbwheel switch settings for Bridge Position (X)
   <u>AND</u> Trolley Position (Y) in the FHD logbook.
- 4.10.9 IF required,

1

<u>THEN</u> **ADJUST** thumbwheel switches on Model 1200 Readout Power Supply for Bridge Position (X)

**AND** Trolley Position (Y) to obtain desired core location as determined by encoder readout position indication.

4.10.10 **RECORD** "As Left" encoder readout position indication

<u>AND</u> Model 1200 Power Supply thumbwheel switch settings for Bridge Position (X)

AND Trolley Position (Y) in the FHD logbook.

- 4.10.11 **ENSURE** grapple is open.
- 4.10.12 WHEN directed by FHD,

<u>THEN</u> slowly **RAISE** grapple while verifying Hoist Loaded light remains out

AND grapple remains free of bail handle.

S97.0.M, Rev. 12 Page 22 of 26 JAD/jad

#### 5.0 REFERENCES

- 5.1 UFSAR Section 9.1.4.2.10.2
- 5.2 UFSAR Section 7.7.1.15.3
- 5.3 UFSAR Section 15.4.1
- 5.4 F21-E003-K006, Operation and Maintenance Instructions, Refueling Platform, Vol. I
- 5.5 F21-E003-K006, Operation and Maintenance Instructions, Refueling Platform, Vol. II
- 5.6 PBAPS memo J. F. Franz to Plant Superintendents, 02/01/91
- 5.7 EIR #92-04-19
- 5.8 MOD 6248, Refuel Platform Mast Mounted Underwater Camera System
- 5.9 Nuclear Emergency Plan
- 5.10 NSAC/164L, Guidelines for BWR Reactivity Control During Refueling
  - 5.11 A-C-300, Reactivity Management Program
  - 5.12 GE SIL 594, Refuel Platform Triangular Mast Drag Loading
  - 5.13 UFSAR Section 15.7.4 and 15.7.6 and PECO Calculation LM-033 "Methodology to Determine the Acceptability of Moving Loads over Irradiated Fuel Without Secondary Containment"
  - 5.14 AR A1081310, E01, Evaluation of decay time required for new fuel bundle or dummy bundle movement in Unit 2 SFP without secondary containment
  - 5.15 GE SIL No. 566 Supplement 1, Misaligned GE BWR fuel assemblies
  - 5.16 INPO OE7535, Failed Fuel Bundle at Oyster Creek
  - 5.17 MOD P00925, Service Pole Caddy on Refueling Bridge
  - 5.18 MOD P00950, Fuel Floor Auxiliary Platform

S97.0.M, Rev. 12 Page 23 of 26 JAD/jad

### 6.0 TECHNICAL SPECIFICATIONS

- 6.1 3.9.1
- 6.2 3.9.3
- 6.3 3.9.5
- 6.4 3.9.6
- 6.5 3.9.8

1

- 6.6 3.9.9
- 6.7 3.9.10

#### 7.0 INTERFACING PROCEDURES

- 7.1 FH-105, Core Component Movement Core Transfers
- 7.2 FH-106, Core Component and Irradiated Item Movement No Core Transfer
- 7.3 ON-120, Fuel Handling Problems
- 7.4 S97.1.A, Electrical, Mechanical, and Pneumatic Alignment/Checkout of Refueling Platform Bridge, Trolley and Main Hoist for Operation
- 7.5 ST-6-097-630-\*, Core Alteration Testing for Offloading, Shuffling, and Reloading the Core
- 7.6 M-097-046, Control of Fuel Inspection Activities
- 7.7 M-097-035, Vacuum Sipping Irradiated BWR Fuel Assemblies
- 7.8 S97.1.B, Fuel Floor Auxiliary Platform Start-up, Checkout, Operation and Shutdown

S97.0.M, Rev. 12 Page 24 of 26 JAD/jad

## ATTACHMENT 1 Page 1 of 1

# LIMERICK REFUEL PLATFORM FLOOR INTERLOCKS

ļ

,

INTERLOCK STATUS DISPLAY	INITIATING CONDITIONS	EFFECT ON OPERATIONS
ROD BLOCK #1	BRIDGE NEAR OR OVER CORE <u>AND</u> ANY HOIST FUEL LOADED	CONTROL ROD WITHDRAWAL BLOCK (RDCS), ROD OUT BLOCK ANNUNCIATOR - MCR
ROD BLOCK #2		· · · · · · · · · · · · · · · · · · ·
BRIDGE REVERSE STOP #1 ( <i>BRIDGE FORWARD STOP #1</i> , if reactor select switch in non-normal position)	BRIDGE NEAR OR OVER CORE <u>AND</u> ANY HOIST FUEL LOADED <u>AND</u> ANY ROD NOT FULL IN	NO BRIDGE MOTION IN INDICATED DIRECTION
BRIDGE REVERSE STOP #2 ( <i>BRIDGE FORWARD STOP #2,</i> if reactor select switch in non-normal position)	BRIDGE NEAR OR OVER CORE <u>AND</u> RX MODE SWITCH NOT IN REFUEL <u>OR</u> CONTROL ROD NOT SELECTED	NO BRIDGE MOTION IN INDICATED DIRECTION
FUEL HOIST INTERLOCK	BRIDGE NEAR OR OVER CORE <u>AND</u> MAIN HOIST FUEL LOADED (>550 LBS) <u>AND</u> ANY ROD NOT FULL IN	MAIN HOIST INOPERATIVE (HOIST WILL NOT RAISE OR LOWER)
MONO AUX HOIST INTERLOCK	BRIDGE NEAR OR OVER CORE <u>AND</u> AUX HOIST FUEL LOADED (>1500 LBS) <u>AND</u> ANY ROD NOT FULL IN	MONO AUX HOIST INOPERATIVE (HOIST WILL NOT RAISE OR LOWER)
TROLLEY AUX HOIST INTERLOCK		TROLLEY AUX HOIST INOPERATIVE (HOIST WILL NOT RAISE OR LOWER)
FAULT LOCKOUT	THERMAL OVERLOAD OPER CHECK TIMER MOTOR FIELD LOSS UNDERVOLTAGE MAIN HOIST OVERLOAD PHASE LOSS (BLOWN FUSE) INSTANTANEOUS OVERCURRENT TROLLEY DECK CABINET DOOR OPEN VARIABLE SPEED SWITCHES NOT NEUTRAL ON STARTUP	BRIDGE WILL NOT OPERATE TROLLEYS WILL NOT OPERATE HOISTS WILL NOT OPERATE AIR OPERATED GRAPPLES GO OR STAY CLOSED CONTROL ROD WITHDRAWAL BLOCK - MCR (OVER CORE ONLY)
TEST IN PROGRESS	TEST BOX CONNECTED	VARIABLE DEPENDS ON TEST SWITCH POSITIO

S97.0.M, Rev. 12 Page 25 of 26 JAD/jad

# ATTACHMENT 2 Page 1 of 2 U/1 MAIN HOIST POSITION INDICATIONS

NOTE: Position indications for single blade guides are the same as for bundles.

	DIMENSION
BUNDLE ENTERING RACK	15" - 17"
BUNDLE SEATED IN RACK	190" - 192"
BUNDLE ENTERING CORE	375" - 377"
BUNDLE SEATED IN CORE	549" - 551"
DBG ENTERING FUEL RACK	12" - 14"
DBG SEATED IN FUEL RACK	184" - 189"
DGB SEATED IN CRB RACK WITHOUT CRB SPACER	187″ - 189″
DGB SEATED IN CRB RACK WITH CRB SPACER	175.5″ - 177.5″
DBG ENTERING CORE	372" - 374"
DBG SEATED IN CORE	546" - 548"
DBG TRAVERSING CATTLE CHUTE	-4"4.5"
BUNDLE SEATED IN FUEL PREP. MACHINE	164" - 166"
BUNDLE SEATED IN FUEL PREP. MACHINE'S ROTATING INSPECTION FIXTURE	158" - 160"
BOTTOM OF FUEL POOL	approx. 372"
BOTTOM OF CASK PIT	approx. 422"
BUNDLE SEATED IN BUNDLE SIPPING	
ID/ LOCATION	
BUNDLE SEATED IN BUNDLE SIPPING CANISTER	·
ID/ LOCATION	

S97.0.M, Rev. 12 Page 26 of 26 JAD/jad

# ATTACHMENT 2 Page 2 of 2 U/2 MAIN HOIST POSITION INDICATIONS

NOTE:

Position indications for single blade guides are the same as for bundles.

	DIMENSION
BUNDLE ENTERING RACK	19" - 21"
BUNDLE SEATED IN RACK	194" - 196"
BUNDLE ENTERING CORE	375" - 377"
BUNDLE SEATED IN CORE	549" - 551"
DBG ENTERING FUEL RACK	16" - 18"
DBG SEATED IN FUEL RACK	191" - 193"
DGB SEATED IN CRB RACK WITHOUT CRB SPACER	187" - 189"
DGB SEATED IN CRB RACK WITH CRB SPACER	175.5″ - 177.5″
DBG ENTERING CORE	372" - 374"
DBG SEATED IN CORE	546" - 548"
DBG TRAVERSING CATTLE CHUTE	-4"4.5"
BUNDLE SEATED IN FUEL PREP. MACHINE	164" - 166"
BUNDLE SEATED IN FUEL PREP. MACHINE'S ROTATING INSPECTION FIXTURE	158" - 160"
BOTTOM OF FUEL POOL	approx. 372"
BOTTOM OF CASK PIT	approx. 422"
BUNDLE SEATED IN BUNDLE SIPPING CANISTER	
BUNDLE SEATED IN BUNDLE SIPPING CANISTER ID/ LOCATION	

RE-C-40, Rev. 9 Page 1 of 47 JWH:cms

C	YES NO NO YES
	YES
	NO YES YES

#### PECO Energy Company NUCLEAR GENERATION GROUP

#### CORE COMPONENT TRANSFER AUTHORIZATION SHEET GENERATION AND ADMINISTRATION

#### 1.0 **PURPOSE**

This procedure provides instructions for generation and administrative control of Core Component Transfer Authorization Sheets (CCTAS). (Ref. 3.1.4)

#### 2.0 <u>SCOPE</u>

This procedure applies to CCTAS generated for refueling, in-vessel maintenance, and non-refueling movement of core components.

This procedure replaced FH-605 (LGS) and RE-43 (PBAPS).

#### 3.0 SOURCES & REFERENCES

#### 3.1 SOURCE DOCUMENTS

- 3.1.1 LGS Event Investigation Reports, 92-04-27, 92-04-35 "Double Blade Guide Misposition" (A/R A0400493 eval 02)
- 3.1.2 EPRI NSAC 164L, "Guidelines for BWR Reactivity Control During Refueling", April 1992
- 3.1.3 PEP Issue I0000293
- 3.1.4 LGS UFSAR Section 13.5.1.20, (A/R A0411306 Eval 77)
- 3.1.5 LGS PORC Commitment #91-021
- 3.1.6 NCRS LG 92-00329, LG 92-000330
- 3.1.7 Nuclear Regulatory Commission, IE Circular 80-21
- 3.1.8 PEP Issue I0003697
- 3.1.9 PEP Issue I0005166
- 3.1.10 LGS EWR A0004257, Attachment A
- 3.1.11 LGS Unit 2 Licensing Report For Spent Fuel Storage Capacity Expansion (HOLTEC Calculation HI-931012 Section 9.4)

RE-C-40, Rev. 9 Page 2 of 47

- 3.1.12 CM-1, Source Document NRC URI 76-46/36; re: annotation of fuel transfer sheets for authenticity, (T01850)
  - 3.1.13 CM-2, PBAPS Event Investigation Report 3-91-201, (T02075)
  - 3.1.14 CM-3, PEP Issue I0000326, (T03250)
  - 3.1.15 CM-4, Letter to NRC 8/19/96; re: Unit 1 Fuel Pool Capacity Limitation to 2500, (T03881)
  - 3.1.16 CM-5, Letter to NRC 8/20/96; re: LGS Procedural Controls for Projected Spent Fuel Pool Heat Loads, (T03941)
  - 3.1.17 PEP Issue I0009435
  - 3.1.18 PEP Issue I0009589
  - 3.1.19 ECR PB 98-02407, MOD P00758 Refueling Platform Controls Upgrade
  - 3.1.20 PEP Issue I0010012
  - 3.1.21 PEP Issue I0010407
  - 3.1.22 PEP Issue I0011047
  - 3.1.23 PEP Issue I0011130
    - 3.2 CROSS REFERENCES
    - 3.2.1 Procedure FM-C-4, "Generation of Core Component Transfer Authorization Sheets using SHUFFLEWORKS".
    - 3.2.2 Procedure RE-C-44, "Accountability and Control of SNM".
    - 3.2.3 ShuffleWorks User's Manual, Combustion Engineering Inc.
    - 3.2.4 Procedure ST-R-002-930-2(3), "Refueling SDM Verification" (PBAPS Only).
    - 3.2.5 Procedure FM-UG-423, "Determination of SRM/WRNM Count Rates"
    - 3.2.6 Procedure SF-300, "TN-68 Cask Spent Fuel Assemblies Storage Selection and Document Requirements" (PBAPS only)

#### 4.0 **DEFINITIONS**

- 4.1 CCTAS, CORE COMPONENT TRANSFER AUTHORIZATION SHEET: An approved sequence specifying the movement of core components which include a paper copy and at PBAPS may include an electronic copy on disk for loading into the Refueling Platform computer.
- 4.2 ICA, ITEM CONTROL AREA: Area designated in ShuffleWorks

allowed to contain SNM, i.e. fuel prep machine, fuel pool, reactor cores and casks.

C 4.3

CORE COMPONENT: A component which is or was an integral part of the reactor core. This includes fuel pins or assemblies (excluding "Dummy" bundles and individual fuel channels), control blades, local power range monitors, wide range neutron monitors, blade guides, fuel support pieces and startup sources. IRM/SRM/WRNM replacements above vessel are controlled by this procedure. Under vessel replacement of Nuclear Instruments (NIs) are controlled by reference 3.2.2.

- 4.4 SPECIAL NUCLEAR MATERIAL (SNM): Any material containing plutonium, U-233, or uranium enriched in U-233 or U-235. SNM is controlled by reference 3.2.2.
- 4.5 REFERENCE LOADING PATTERN: The specific core loading arrangement of the nuclear fuel for the next operating cycle. This arrangement of fuel is used for reload licensing analysis and is obtained from the associated Core Design Report.
- 4.6 SHUTDOWN MARGIN (SDM): Amount of reactivity by which the reactor is subcritical assuming all control rods are fully inserted except for the single control rod of highest reactivity worth which is assumed to be fully withdrawn and the reactor is in shutdown condition; cold (68 °F) and xenon free. CM-3, (Ref. 3.1.2).
  - 4.7 SHUFFLEWORKS: Computer software which is used to generate fuel/core component sequences.
  - 5.0 **RESPONSIBILITY AND AUTHORITY**
  - 5.1 REACTOR ENGINEERING BRANCH MANAGER: CM-3
  - 5.1.1 Assign a member(s) of staff to perform this procedure and generate CCTAS.
  - 5.1.2 Authorize CCTAS generation and performance.
  - 5.1.3 Designate individuals qualified to evaluate and authorize changes to CCTAS in accordance with section 8.4.
  - 5.2 **STAFF MEMBER**(s) assigned to perform this procedure shall:
  - 5.2.1 Maintain current data files for SHUFFLEWORKS.
  - 5.2.2 Generate and review the CCTAS in accordance with section 8.0.
- 5.3 **CCTAS USERS** shall:
  - 5.3.1 Ensure CCTAS is appropriate for the task to be performed.

- 5.3.2 Ensure the CCTAS step completion is documented appropriately.
  - 5.3.3 Return completed CCTAS to Reactor Engineering Branch.
  - 5.3.4 Initiate CCTAS changes as required in accordance with section 8.4.

#### 6.0 **PREREQUISITES**

- 6.1 Appropriate SDM model <u>AND</u> Once Burnt Bundle constraint have been identified by Nuclear Fuel Management (NFM) (applicable to refueling activities only).
- 6.2 Reference loading pattern is available (applicable to refueling activities only).
- 6.3 K-infinities, SDM criteria and radial weighting factors have been loaded into ShuffleWorks. (Fuel moves in reactor vessel only) **CM-3**.
- 6.4 <u>IF CCTAS involves steps in the core,</u> <u>THEN</u> determine neutron monitoring instrumentation (SRM or WRNM) applicable to CCTAS being generated. See Exhibit RE-C-40-11.
- 6.5 Information required for other CCTAS applications such as fuel pool reconfiguration, new fuel receipt, CRB exchanges and cask loading.
  - 6.6 ICA files with current and accurate information.
  - 6.7 Any fuel pool locations that are inaccessible or deemed to be unusable have been designated as "UNUSABLE" in the ShuffleWorks computer program. See Exhibits RE-C-40-9 & 10.
  - 6.8 Any core components that are deemed unusable/not moveable (e.g., damaged blade guide, leaking fuel assembly, etc.) have been designated as "UNUSABLE" in the shuffleWorks program. See Exhibits RE-C-40-9 & 10.
  - 6.9 For a reload sequence, FSD has provided the predicted SRM/WRNM (as appropriate) count rates for the first four bundles surrounding each SRM or WRNM in accordance with Ref. 3.2.5.
  - 6.10 For cask loading, an acceptable cask loading pattern has been developed in accordance with SF-300. (PBAPS only)

RE-C-40, Rev. 9 Page 5 of 47

#### 7.0 PRECAUTIONS AND LIMITATIONS

- 7.1 When moving fuel in the reactor, sequences must meet the SRM or WRNM connectivity constraint as described in Exhibit RE-C-40-13.
- 7.2 Do not generate a CCTAS step which places fuel into a cell which has its associated control rod withdrawn.
- 7.3 Do not generate a CCTAS step which withdraws a fuel assembly or blade guide unless the control rod in the cell is supported diagonally by blade guides or fuel.
- 7.4 Do not place irradiated fuel with less than 5 year decay time within 3 feet of fuel pool gates (actual or storage locations). Refer to Exhibit RE-C-40-15 for impacted locations. (Ref. 3.1.10) (LGS ONLY)
- 7.5 Fuel assemblies discharged prior to 1R04 located in the Unit 1 spent fuel pool <u>must</u> be inspected or evaluated for debris prior to use in core. (Ref. 3.1.5) (LGS ONLY)
- 7.6 The spent fuel pool capacity is limited to 2500 fuel assemblies, and a nominal 6.625 inches center-to-center spacing between fuel assemblies shall apply, until the completion of the high density re-racking of the spent fuel pool. (LGS Unit 1 ONLY) CM-4
- 7.7 Single blade guides must be oriented such that their channel spacers are adjacent to the control rod. Place a note stating such requirement prior to CCTAS step which uses a single blade guide in the reactor core.
- 7.8 During complete offload/reload or core shuffle with SRM operable, bundles in the cells on the A/D, A/B, B/C, and C/D quadrant boundaries should be considered to be monitored by the D, B, C and C SRM respectively. Connectivity to these SRMs should be verified. See Exhibit RE-C-40-11.
- 7.9 CCTAS columns which are not applicable to the specific application should have N/A placed in the column which does not apply.
- 7.10 SHUFFLEWORKS shall be used to generate CCTAS when it is available and recognizes all the components to be moved. CM-2

RE-C-40, Rev. 9 Page 6 of 47

#### NOTE

All open cells of a given fuel rack should be inspected when any of the cells of that rack are planned to be used (Ref. 3.1.22).

- 7.11 Prior to CCTAS use, NMD is to verify empty cells that will be used do not contain foreign material. Foreign material is not permitted in the component location.**CM-2**
- 7.12 CCTAS changes shall be made in accordance with Section 8.4 of this procedure. (Ref. 3.1.2)
- 7.13 For reload sequence, load four bundles around each SRM/WRNM prior to any other steps. (Ref. 3.1.2) Place a note on the CCTAS stating the predicted count rate for the first four bundles surrounding each SRM or WRNM.

7.14 <u>IF</u> peripheral core locations listed in Exhibit RE-C-40-10 are being used in the sequence, <u>THEN</u> verify a note is added prior to the step which states: "Caution: Mast camera may interfere with core shroud" (PBAPS Only).

#### NOTE (LGS ONLY)

The objective of performing RT-1-053-310-\* is to confirm that adequate heat removal capacity is present in the target fuel pool. Performance of a new RT is not required if the results of a previous performance of the RT bounds the anticipated fuel pool configuration.

- 7.15 Before distributing a CCTAS which moves spent fuel into a Fuel Pool, RT-1-053-310-\* must be or have been performed to ensure that adequate heat removal capacity is available in the Fuel Pool (LGS ONLY). CM-5
- 7.16 Movement of bundles into Fuel Pool rows "A" or "B" is difficult, because the spotter can <u>NOT</u> view the specified rows from the bridge. <u>IF</u> practical, <u>THEN</u> avoid rows "A" and "B" during outage work (LGS Unit 1 ONLY).
- 7.17 During a refueling outage, the CCTAS should not discharge fuel to locations within two feet of the spent fuel pool walls as this causes the refuel platform to move at slow speeds and causes unnecessary delays.

RE-C-40, Rev. 9 Page 7 of 47

- 7.18 Ensure that fuel is stored next to the fuel pool coupons. For Unit 1, the coupons are located next to the cells noted in Exhibit RE-C-40-9. For Unit 2, the coupon tree may be moved such that it is surrounded by freshly discharged fuel assemblies. A refuel outage discharge plan should leave a space available for this requirement. If a bundle surrounding the Unit 2 coupon tree is moved, another freshly discharged bundle shall be moved to replace it. (LGS ONLY)
  - 7.19 In order to avoid obstruction of the RHR and FPC discharge piping flow path to support natural circulation operation, Do Not load rack cells directly under and within two cells of this piping in the LGS 2 spent fuel pool. (LGS ONLY)
- 7.20 <u>WHEN</u> preparing CCTASs for new CRB receipt or CRB exchange where the combined CRB/FSP grapple may be used, <u>THEN</u> verify that locations for the new CRBs as well as locations planned for the discharge or temporarily stored CRBs have CRB spacers installed prior to using the locations either by documentation or direct observation. (LGS Only)
- 7.21 Sipping canisters may only be used in CRB rack cells that do not contain CRB spacers. (LGS only)
- 7.22 Fresh discharged fuel shall not be placed in the eastern most rows to prevent high exposure to personnel. (Ref. 3.1.11)(LGS Unit 2 ONLY)
  - 7.23 When generating a CCTAS to allow for the removal/reinstallation of a CRB/fuel support piece, it is desirable that at least one of the bundles face adjacent to the north-west quadrant (at LGS) or south-west quadrant (at PBAPS) of the fuel support piece is off-loaded, provided that SRM or WRNM connectivity constraint is met as described in exhibit RE-C-40-13. This is in order to allow camera access for verification of plunger engagement.
  - 7.24 When preparing a CCTAS that includes re-channeling of fuel bundle(s), include a note prior to each step (as appropriate) which provides the expected channel serial number and requires the fuel handlers to check that the correct channel is being used. (Ref. 3.1.17)

RE-C-40, Rev. 9 Page 8 of 47

- 7.25 For items stored in locations designated in Exhibits RE-C-40-9 & 10, the location may be made usable and the item may be moved provided:
  - 7.25.1 If the item is listed under Bad Fuel, the move is noted in the CCTAS to facilitate resolution of ARM alarms, AND
  - 7.25.2 The item is not used in the core without, after being apprised of the item's status in Shuffleworks, specific FSD and Reactor Engineering Branch Manger approval is obtained, AND
  - 7.25.3 Other constraints on the location (such as bundles next to Coupons) are met or the move is specifically approved by the System Manager or Reactor Engineering Branch Manager, AND
- 7.25.4 The new storage location is made unusable (unless the location is in-core) and a PPIS issued against the appropriate exhibit following item movement.
- 7.26 If it is determined that a bundle should not be used in-core (due to debris, failure, future inspections, etc.), then SHUFFLEWORKS shall be updated such that the bundle's storage location is made unusable and a note added to the bundle which describes the issue. If the bundle cannot be used in-core permanently, a PPIS to update Exhibits RE-C-40-9/10 should be created. (Ref. 3.1.18)
- 7.27 Spent Fuel Assemblies that are being transferred to a cask may be loaded into the cask in any orientation unless a specific orientation is desired, such as cask hold-down ring interference with the channel fasteners.
- 7.28 <u>IF</u> very old fuel is being moved, <u>THEN</u> ensure the CCTAS includes a note identifying this and that the following precautions should be taken: (Ref. 3.1.20)
  - 1. Carefully monitor hoist load during lifting to promptly identify bundle tie rod failure.
  - 2. Channel fasteners and bail handles have been found bent on old bundles which can make seating or releasing difficult.
  - 3. Older style channel fasteners protrude further making it easier for fastener to catch when seating.
- 7.29 FOR CCTAS preparation in support of unit outage (Reference 3.1.21):
- 7.29.1 Ensure no current outage discharge fuel is placed in rack rows 25-48 between rack columns A-H, inclusive (at LGS Unit 1), in rack rows 32-54 between rack columns TT-AB, inclusive (at LGS Unit 2) OR in rack rows A-G between rack columns 25-48, inclusive (at PBAPS). (Ref. 3.1.21).

- 7.29.2 Uninspected cells should be made unusable once pre-outage inspections are complete (Ref. 3.1.22).
  - 7.30 For non-outage CCTAS preparation, add requirements to perform the following CCTAS steps, as applicable:
  - 7.30.1 Following placement of spent fuel within 8 rows of spent fuel pool/reactor cavity gates or fuel pool/cask pit gates (LGS Only), contact HP to perform dose measurement at fuel pool gates at reactor cavity or fuel pool side.
  - 7.30.2 Ensure general area dose rate reading at fuel pool gates at reactor cavity/ cask pit (LGS Only) or fuel pool side is acceptable per HP.
- 7.30.3 IF dose rate is unacceptable, return fuel bundle to original location or other location as designated by Reactor Engineering.
  - 7.31 Ensure all four fuel assemblies off-loaded around each LPRM that will be replaced during the Maintenance window. <u>IF</u> this is <u>not</u> possible due to other constraints, <u>THEN</u> plan a mini-shuffle between the CRB/CRD <u>AND</u> LPRM maintenance windows.
- 7.32 Do not insert single blade guides to take the place of double blade guides in cells with the control rod withdrawn. The single blade guide may damage the control rod during insertion or "kick out" to adjacent cells.
  - 7.33 When moving core components between Spent Fuel Pools, the CCTAS cover sheet should contain a note reminding the FHD to contact HP to have the Reactor Buildings' 313' elevation properly posted for core component movement (LGS Only).
  - 7.34 When moving LPRMS, ensure LPRM hanger number/rigging tag number is recorded on CCTAS via note associated with respective CCTAS movement step.
  - 8.0 **PROCEDURE SECTIONS**

)

- 8.1 CCTAS GENERATION WITH SHUFFLEWORKS
- 8.1.1 Complete Exhibit RE-C-40-1, "CCTAS Information/Verification Sheet" with information that is applicable for the particular evolution.
- 8.1.2 Execute the SHUFFLEWORKS computer program in accordance with Exhibit RE-C-40-8.
- 8.1.3 <u>IF</u> the CCTAS are being generated automatically, <u>THEN</u> perform the following steps, Otherwise the following steps are N/A.

- 1. Ensure the following constraints are turned on in SHUFFLEWORKS:
  - a. Shutdown Margin model specified by NFM in step 6.1.
  - b. SRM or WRNM Connection Path (consistent with neutron) instrumentation determined in step 6.4)
  - c. SRM or WRNM Count Rate (consistent with neutron instrumentation determined in step 6.4)
  - d. Fuel Movement Device Mast Orientation
  - e. Control Rod Blade Support
  - f. Fuel Movement Device Unusable locations
  - g. Once Burnt Bundle constraint specified by NFN in step 6.1.
- 2. Enter the SHUFFLE menu, select automatic shuffle planning.
  - a. Supply information as requested by the SHUFFLEWORKS program (maintenance locations, discharge and temporary storage locations, bundles to be sipped/inspected).
  - b. Generate and save the sequence.
  - c. **PBAPS ONLY:** <u>IF</u> sequence is required to be loaded into Refueling Platform Computer "Fuel Machine Sequence" (.fms) format, <u>THEN</u> perform the following:
    - Select Reports/Create fuel machine sequence
    - Select appropriate sequence source and planning sequence
    - Save the sequence to file (converts from .seq to .fms output)
    - Select "WRITE SEQUENCE TO A DISK FILE"
    - Enter "SHUFFLE" for output file name
    - Verify "SHUFFLE.FMS" file was created

RE-C-40, Rev. 9 Page 11 of 47

- Copy this file to a disk and label disk with CCTAS title
- CCTAS preparer shall initial and date the disk label.
- Ensure SDM log values are above the cycle specific SDM 3. specified by NFM and all applicable constraints are met. CM-3.
  - Confirm SDM limit is correct in а. appropriate SDM Model.
  - Verify the sequence with SHUFFLEWORKS. b.
  - Perform ST-R-002-930-2(3) for с. CCTASs containing steps which insert positive reactivity into the core. (PBAPS Only).
  - d. IF the SDM log values are below the cycle specific SDM value specified by NFM, THEN send the sequence to NFM for SDM evaluation. See FM-C-4.
- Print the shuffle sequence and applicable ICA maps (if 4. desired) via the Reports window and proceed to section 8.3 of this procedure.
- IF the CCTAS are being generated interactively, THEN perform 8.1.4 the following steps, Otherwise the following steps are N/A.
  - Ensure the following constraints are turned on in 1. SHUFFLEWORKS:
    - Shutdown Margin model а. specified by NFM in step 6.1.
    - SRM or WRNM Connection Path b. (consistent with neutron instrumentation determined in step 6.4)
    - SRM or WRNM Count Rate c. (consistent with neutron instrumentation determined in step 6.4)
    - Fuel Movement Device Mast d. Orientation
    - Control Rod Blade Support e.
    - Fuel Movement Device Unusable f. locations

}

1

1

- g. Once Burnt Bundle constraint specified by NFM in step 6.1.
- 2. Enter the SHUFFLE menu, select interactive shuffle planning.
  - a. Move the desired component(s) from the initial ICA location to the desired ICA location.
- 3. Ensure all applicable constraints are met.
  - a. Verify and save the sequence with SHUFFLEWORKS.
  - b. PBAPS ONLY: <u>IF</u> sequence is required to be loaded into Refueling Platform Computer "Fuel Machine Sequence" (.fms) format, <u>THEN</u> perform the following:

Select Reports/Create fuel machine sequence

- Select appropriate sequence source and planning sequence
- Save the sequence to file (converts from .seq to .fms output)
- Select "WRITE SEQUENCE TO A DISK FILE"
- Enter "SHUFFLE" for output file name
- Verify "SHUFFLE FMS" file was created
- Copy this file to a disk and label disk with CCTAS title
- CCTAS preparer shall initial and date the disk label.
- c. <u>IF</u> sequence involves moves in the core, <u>THEN</u> ensure SDM log values are above the cycle specific SDM specified by NFM. **CM-3** 
  - 1. Confirm SDM Limit is correct in appropriate SDM Model.
  - Perform ST-R-002-930-2(3) for CCTASs containing step which insert positive reactivity into the core. (PBAPS Only)
  - 3. <u>IF</u> the SDM log values are below the cycle specific SDM value specified by NFM, <u>THEN</u> send the sequence to NFM for SDM evaluation. See FM-C-4.
- 4. Print the shuffle sequence and applicable ICA maps (if
RE-C-40, Rev. 9 Page 13 of 47

desired) via the Reports window <u>AND</u> proceed to section 8.3 of this procedure.

8.1.5

1

<u>IF</u> the CCTAS are being generated for core <u>OR</u> bundle offload/reload, <u>THEN</u> perform the following steps, Otherwise, the following steps are N/A.

- 1. Ensure the following constraints are turned on in SHUFFLEWORKS:
  - a. SRM or WRNM Connection Path (consistent with neutron instrumentation determined in step 6.4)
  - b. SRM or WRNM Count Rate (consistent with neutron instrumentation determined in step 6.4)
  - c. Fuel Movement Device Mast Orientation
  - d. Control Rod Blade Support
  - e. Fuel Movement Device unusable locations
  - f. Once Burnt Bundle constraint specified by FSD in step 6.1.
- 2. Enter the SHUFFLE menu, select interactive shuffle planning.
  - a. Determine the required positioning of blade guides to support planned in-vessel maintenance activities.
  - b. For each quadrant, move bundles from core to spent fuel pool using the following guidelines:
    - 1. <u>IF</u> SRMs were selected in step 6.4, <u>THEN</u> from core periphery, spiral toward the SRM leaving 4 fuel bundles around the SRM.

<u>IF</u> WRNMs were selected in step 6.4, <u>THEN</u> from core periphery, spiral toward the WRNM detector leaving 4 fuel bundles around each WRNM.

- 2. Remove fuel bundles from diagonally adjacent fuel cell locations in a cell where a double blade quide is to be located.
- 3. Install a double blade guide where fuel was removed.

- 4. Remove remaining two bundles from the cell.
- 5. Perform steps 1 through 4 for all other core cells.
- 6. <u>WHEN</u> all other fuel has been offloaded, <u>THEN</u> remove last 16 bundles around the SRMs <u>OR</u> remove last 32 bundles around the WRNMs.
- c. For each quadrant, move bundles from the spent fuel pool to the final core locations using the following guidelines: (Ref. 3.1.2)
  - 1. Load 4 bundles around each SRM (<u>IF</u> SRMs were selected in step 6.4) <u>OR</u> each WRNM (<u>IF</u> WRNMs were selected in step 6.4). Place a note on the CCTAS prior to each step or group of steps stating the predicted count rates for the first four bundles surrounding each SRM or WRNM.
  - 2. From the SRM <u>OR</u> WRNM, spiral towards core periphery
  - 3. Load 2 fuel bundles in vacant locations
  - 4. <u>WHEN</u> two fuel bundles are installed in a cell THEN remove blade guide.
  - 5. Place fuel in vacant locations created by blade guide removal.
- 3. Verify AND save the sequences with SHUFFLEWORKS.
- 4. **PBAPS ONLY:** <u>IF</u> sequence is required to be loaded into Refueling Platform Computer "Fuel Machine Sequence" (.fms) format, <u>THEN</u> PERFORM the following:
  - Select Reports/Create fuel machine sequence
  - Select appropriate sequence source and planning sequence
  - Save the sequence to file (converts from .seq to .fms output)
  - Select "WRITE SEQUENCE TO A DISK FILE"
  - Enter "RELOAD" OR "OFFLOAD" for output file name, as appropriate.
  - Verify the appropriate FMS file was created
  - Copy this file to a disk and label disk

RE-C-40, Rev. 9 Page 15 of 47

#### with CCTAS title

CCTAS preparer shall initial and date the disk label.

- 5. Print the offload/reload sequence <u>AND</u> applicable ICA maps (if desired) via the Reports window <u>AND</u> proceed to section 8.3 of this procedure.
- 8.1.6 During CCTAS execution, update CCTAS status log sheet (see Exhibit RE-C-40-2).

#### 8.2 CCTAS GENERATION WITHOUT SHUFFLEWORKS

- 8.2.1 Generate CCTAS using a word processor.
  - 1. The CCTAS shall contain the following information:
    - Title

ł

I

- Page #/total # of pages
- Written, reviewed, and authorized spaces
- Date
- Step #
- Component Serial #
- Orientation (when applicable)
- From location
- To location
- FHD signoff
- RPO signoff
- CRO signoff (when applicable)
- SRM/WRNM count rate columns consistent with neutron instrumentation determined in step 6.4 (when applicable).
- Date/Time for each step

8.2.2

<u>IF</u> generating CCTAS for LPRM replacement <u>THEN</u> perform the following steps, Otherwise, the following steps are N/A.

- 1. Use Exhibit RE-C-40-3A or RE-C-40-3B as a format/info guide (Separate CCTASs may be generated for batch removal/bending and for installation of LPRMs).
- 2. Identify LPRM to be replaced
- 3. Ensure blade guide does not interfere with LPRM
- 4. Specify LPRM removal and storage locations. Storage locations to avoid due to area radiation monitors are:
  - a. LGS North Walls
  - b. PBAPS Unit 2 North Wall
  - c. PBAPS Unit 3 South Wall
- 5. Use LPRM serial number as core component ID

<u>IF</u> generating CCTAS for control rod withdrawal, <u>THEN</u> perform the following steps. Otherwise, the following steps are N/A.

- 1. Use Exhibit RE-C-40-4A or RE-C-40-4B as a format/info guide.
- 2. Identify control rods to be withdrawn
- 3. Verify cell is offloaded
- 4. Select control rod in offloaded cell
- 5. Withdraw control rod in offloaded cell
- 6. Uncouple control rod in offloaded cell

#### NOTE

Fuel Support Pieces and Guide Tubes must be returned to the same core cells they were removed from unless specifically noted in the CCTAS and agreed upon by NMD.

- 8.2.4 <u>IF</u> generating the CCTAS for control rod replacement, <u>THEN</u> perform the following steps. Otherwise, the following steps are N/A.
  - 1. Use Exhibit RE-C-40-5A or RE-C-40-5B as a format/info guide
  - 2. Identify control rod(s) to be replaced

8.2.3

- 3. Verify control rod is uncoupled
- Remove blade guide from target cell 4.
- 5. Remove fuel support piece from target cell
- 6. Remove spent control rod from cell to storage location
- 7. IF Guide Tube removal is required, THEN provide steps to:
  - Place Blade Guide and Fuel Support Piece in a. storage locations.
  - Remove Guide Tube and place in storage location b. (if required).
  - Return Guide Tube to core cell. с.
  - Pick up Fuel Support Piece and Blade Guide from d. storage locations.
- Move new control rod from storage location to core cell 8.
- 9. Replace fuel support piece in target cell
- Replace blade guide in target cell 10.
- IF the NMD combined Blade/Fuel Support Piece grapple is 11. to be used, THEN add appropriate notes stating that steps 5 and 6, and steps 8 and 9 above may be performed concurrently.
- 8.2.5 IF generating CCTAS for non-core transfer OR spent fuel assemblies transfer to/from cask, THEN perform the following steps. Otherwise, the following steps are N/A.
  - Use Exhibit RE-C-40-6A or RE-C-40-6B as a format/info 1. quide
  - Identify core component to be transferred 2.
  - 3. Specify the starting and resting location of the core component.
- 8.2.6 IF SHUFFLEWORKS is unavailable AND CCTAS for offload/reload fuel moves as described in step 8.1.5 are required, THEN perform the following step. Otherwise, the following steps are N/A.
  - Use Exhibit RE-C-40-7A or RE-C-40-7B as a format/info 1. quide

2. Perform Steps 8.1.5.2.a through 8.1.5.2.c.

1

- 8.2.7 Proceed to the section 8.3 of this procedure.
- 8.2.8 During CCTAS execution, update CCTAS status log sheet (see Exhibit RE-C-40-2).

#### 8.3 CCTAS REVIEW/APPROVAL/DISTRIBUTION

- 8.3.1 The CCTAS preparer shall perform the following steps:
  - 1. Ensure no unexplained/unexpected constraint violations exist. (Ref. 3.1.2)
  - 2. Ensure component identification numbers, orientations and locations are correct. (Ref. 3.1.2)
  - 3. Ensure moves containing known/suspected fuel failures are noted in CCTAS to facilitate HP monitoring/resolution of ARM alarms.
  - 4. Annotate steps which insert or remove a bundle from next to an SRM/WRNM (if time allows).
  - 5. Ensure accuracy and legibility. (Ref. 3.1.3)
  - 6. Ensure the prepared by, reviewed by, <u>AND</u> authorized by names are printed on each sheet. **CM-1**
  - 7. **PBAPS ONLY:** <u>IF</u> the shuffleworks file is to be loaded into the Refueling Platform computer, <u>THEN</u> ensure the prepared by, reviewed by <u>AND</u> authorized by names are printed on the electronic disk copy label.
  - For control blade <u>AND</u> LPRM replacements, ensure specific item types are placed in required locations. (Ref. 3.1.8)
  - 9. Fill out appropriate information on CCTAS status log sheet (see Exhibit RE-C-40-2).
  - 10. Generate <u>AND</u> sign the CCTAS Instruction/Approval sheet. (Exhibit RE-C-40-12) **CM-1**.
  - 11. **PBAPS ONLY:** <u>IF</u> the shuffleworks file is to be loaded into the Refueling Platform Computer, <u>THEN</u> initial and date the electronic disk copy label.
  - 12. Ensure Fuel Pool decay heat removal capacity has been demonstrated in accordance with RT-1-053-310-\* for any increased heat load on Fuel Pool (LGS Only). CM-5

- 13. **PBAPS ONLY:** IF CCTAS moves the fuel to the final configuration, THEN perform the following:
  - a. Step to the end of the sequence using SHUFFLEWORKS.
  - b. Print "Current" core map <u>AND</u> spent fuel pool map.
  - c. Verify "Current" core map matches Core Design Report (reference loading pattern).
  - d. Complete Exhibit RE-C-40-14 <u>AND</u> attach to spent fuel pool map.
- 14. Complete Exhibit RE-C-40-1, "CCTAS Information / Verification Sheet"
- 8.3.2 The CCTAS reviewer shall perform the following:

)

- 1. Ensure no unexpected/unexplained constraint violations exist. (Ref. 3.1.2)
- 2. Ensure component identification numbers, orientations and locations are correct. (Ref. 3.1.2)
- 3. Ensure moves containing known/suspected fuel failures are noted in CCTAS to facilitate HP monitoring/resolution of ARM alarms.
- 4. Ensure steps which insert or remove a bundle from next to an SRM/WRNM are correctly annotated (if performed by preparer).
- 5. Ensure accuracy and legibility. (Ref. 3.1.3)
- Ensure the preparer and authorized names are printed on each sheet. CM-1
- 7. **PBAPS ONLY:** <u>IF</u> the shuffleworks file is to be loaded into the Refueling Platform computer, <u>THEN</u> ensure the preparer and authorized names are printed on the electronic disk copy label.
- For control blade <u>AND</u> LPRM replacement CCTAS, ensure specific item types are placed in required locations. (Ref. 3.1.8)
- 9. Ensure maximum heat load/temperature of SFP is within limits in accordance with RT-1-053-310-\* for any increased heat load on Fuel Pool (LGS Only). CM-5

- Complete Exhibit RE-C-40-1, "CCTAS Information / 10. Verification Sheet"
- Sign the CCTAS Instruction/Approval sheet. 11. (Exhibit RE-C-40-12) CM-1
- **PBAPS ONLY:** IF the shuffleworks file is to be loaded 12. into the Refueling Platform Computer, THEN initial and date the electronic disk copy label.
- PBAPS ONLY: IF CCTAS moves the fuel to the final 13. configuration, THEN perform the following:
  - Step to the end of the sequence using a. SHUFFLEWORKS.
  - Print "Current" core map <u>AND</u> spent fuel map. b.
  - Verify "Current" core map matches Core Design c. Report (reference loading pattern).
  - d. . Complete Exhibit RE-C-40-14.
- The CCTAS authorizer shall: 8.3.3
  - Sign the CCTAS info Instruction/Approval sheet 1. (RE-C-40-12) sheet indicating authorization to execute the steps. CM-1.
  - PBAPS ONLY: IF the shuffleworks file is to be loaded 2. into the Refueling Platform Computer, THEN initial and date the electronic disk copy label.
- 8.3.4 Distribute copies of approved CCTAS to the following locations.
  - Control Room (when performing in-core moves or as 1. requested for information only).
  - Refuel platform (2 copies plus electronic disk copy if 2. required)
  - Other locations as deemed necessary by the 3. evolution. (e.g., Fuel Floor Coordinator info only copy)
  - Cognizant personnel from Nuclear Fuel Management 4. (Control Blade replacement CCTASs only) (Ref. 3.1.8)
  - 5. Dry Cask Storage Campaign Personnel (For cask loading/unloading only)

RE-C-40, Rev. 9 Page 21 of 47

#### 8.4

L

CCTAS CHANGE PROCESS AFTER REVIEW/APPROVAL

#### NOTE

**PBAPS ONLY:** A pen and ink change made to the paper copy CCTAS does NOT require a change to the electronic copy CCTAS loaded in the Refueling Platform computer. Refueling Platform may be operated in the Manual Mode to execute the affected steps using the paper CCTAS. Full Automatic Mode operation using the electronic copy CCTAS loaded in the Refueling Platform computer may resume after completion of the pen and ink changed steps.

- 8.4.1 <u>IF</u> it is deemed necessary to change the CCTAS to support unanticipated conditions on the fuel floor, <u>THEN</u> perform the following steps. (Ref. 3.1.2)
  - 1. Suspend CCTAS execution prior to execution of CCTAS step requiring change.
  - 2. Contact a member of Reactor Engineering who is authorized to make changes as listed on the CCTAS instruction sheet, Exhibit RE-C-40-12.
  - 3. Describe the reason for the change and a proposed revision
  - 8.4.2 The Reactor Engineering group member contacted shall perform the following steps based on the information provided. (Ref. 3.1.3)
    - 1. Evaluate the effect of the change on the remainder of the CCTAS sequence <u>AND</u> all other previously approved CCTAS's (including completed and partially completed sequences) <u>AND</u> make appropriate changes to maintain congruency of sequence.

RE-C-40, Rev. 9 Page 22 of 47

- 2. <u>IF</u> all the changes involve one of the situations listed below, <u>THEN</u> the changes do not affect SDM <u>AND</u> can be processed as a pen & ink change.
  - a. Blade guides
  - b. LPRMs
  - c. WRNMs

1

- d. Fuel in or being moved to the spent fuel pool
- e. Control rod blade changes in defueled cells or in the spent fuel pool
- f. Fuel in or being moved to or from a storage cask
- g. All of the bundles currently in the core are in their final configuration <u>AND</u> the fuel bundle(s) of interest are being moved to their final core configuration (final core reload pattern remains the same)
- 3. <u>IF</u> any of the changes involve a fuel assembly with a change in core configuration, <u>THEN</u> use SHUFFLEWORKS to ensure SDM is met in accordance with Section 8.1 and follow approval process in Section 8.3. **CM-3**
- 4. <u>IF</u> the changes do not adversely affect SDM, <u>THEN</u> perform the following:
  - a. The Fuel Handling Director (or Designated Alternate) or Reactor Engineer shall perform pen & ink change on Refuel Floor copies.
  - b. The Reactor Engineering group member shall perform pen & ink change on the original CCTAS <u>AND</u> troubleshooting guides when applicable. Updates pen & ink change log if used.
  - c. The Reactor Engineering group member, Fuel Handling Director (or Designated Alternate) <u>OR</u> CRO shall perform the Pen & Ink change on the control room copy of the CCTAS (if applicable).
  - d. The Reactor Engineering group member <u>OR</u> CCTAS Lead shall make the change to the sequence Saved in SHUFFLEWORKS.

- e. The pen & ink change should follow the following format.
  - Single line through item to be changed
  - Date <u>AND</u> initials of both Fuel Handling Director (or Designated Alternate) <u>AND</u> Reactor Engineering group member
- 5. <u>IF</u> the change is believed to have a significant effect on decay heat calculations, <u>THEN</u> consider reperforming RT-1-053-310-\* <u>AND</u> follow approval process in Section 8.3 (LGS Only). **CM-5**

#### 8.5 CCTAS TROUBLESHOOTING GUIDE DEVELOPMENT

8.5.1 <u>IF</u> desired,

THEN develop CCTAS troubleshooting guide so any changes can be evaluated appropriately.

- 1. The quide should contain the following information:
  - a. Appropriate CCTAS sequences
  - b. Maps at key milestones/configurations such as: (Ref. 3.1.2)
    - LPRM's/WRNM's to be replaced
    - CRD's requiring maintenance
    - Control blades requiring replacement
    - Core maintenance configuration
  - c. List of bundle K-infinity for fuel moved during refueling
  - d. Copy of RE-C-40
  - e. CCTAS Info sheet
  - f. Pen & Ink Change/CCTAS Revision Status Log.
  - g. Lists/maps of maintenance control blades and drives and LPRMS.
  - h. Lists/maps of previously inspected fuel pool locations suitable for item storage.
  - i. Copies of/support information for RE sign offs in any applicable FH procedures.
- 2. Provide troubleshooting guide to Reactor Engineering group members authorized to approve changes.

#### 9.0 DOCUMENTATION

- 9.1 Completed CCTAS sheets <u>AND</u> electronic disk copy <u>OR</u> copies of contaminated sheets shall be returned to Reactor Engineering by the CCTAS users.
  - 9.1.1 <u>IF</u> copies of contaminated CCTASs are received, <u>THEN</u> cover sheet should be annotated "Copy - Original Contaminated", initialed, and dated.
  - 9.2 <u>IF</u> the CCTAS become contaminated, <u>AND</u> copies cannot be made, <u>THEN</u> the CCTAS originals can be used to document the completion of the CCTAS steps.
  - 9.2.1 Note on the original CCTAS that field copies were contaminated and were executed between days X and Y.
  - 9.3 Reactor Engineering shall periodically send completed CCTAS OR copies of appropriate CCTAS if contaminated, to NRMS and NFM (if required).
- 9.4 Update SHUFFLEWORKS files upon completion of the CCTAS. Every implemented CCTAS shall be incorporated in SHUFFLEWORKS regardless of whether or not the CCTAS appears to change the location/orientation of any fuel bundle. (Ref. 3.1.9)
- 9.5 Update SNM records in accordance with RE-C-044, Accountability and Control of SNM. If re-channeling has been performed, ensure channel serial number's are appropriately updated on the Fuel History Sheets.
  - 9.6 Backup SHUFFLEWORKS files appropriately.
  - 9.7 Provide copies of completed blade replacement CCTASs to FSD.
  - 9.8 Provide copies of SHUFFLEWORKS sequence files (or copy of controlled CCTAS if not created with SHUFFLEWORKS) for all completed fuel moves to NFM for updating of SNM records/isotopic reports.
  - 10.0 **EXHIBITS**
  - 10.1 RE-C-40-1 CCTAS Info Sheet
  - 10.2 RE-C-40-2 CCTAS Status Log
  - 10.3 RE-C-40-3A Example CCTAS for LPRM Replacement (SRM only)
- 10.4 RE-C-40-3B Example CCTAS for LPRM Replacement (WRNM only)
- 10.5 RE-C-40-4A Example CCTAS for Blade Withdrawal (SRM Only)
- ~ 10.6 RE-C-40-4B Example CCTAS for Blade Withdrawal (WRNM Only)
  - 10.7 RE-C-40-5A Example CCTAS for Blade Replacement (SRM Only)

RE-C-40, Rev. 9 Page 25 of 47

•	10.8	RE-C-40-5B Example CCTAS for Blade Replacement (WRNM Only)
	10.9	RE-C-40-6A Example CCTAS for Non Core Transfers
	10.10	RE-C-40-6B Example CCTAS for Spent Fuel Assemblies Transfers
	10.11	RE-C-40-7A Example CCTAS for Core Transfers (SRM Only)
	10.12	RE-C-40-7B Example CCTAS for Core Transfers (WRNM Only)
	10.13	RE-C-40-8 Executing SHUFFLEWORKS
)	10.14	RE-C-40-9 LGS Unusable/Inaccessible Spent Fuel Pool Locations
	10.15	RE-C-40-10 PBAPS Unusable/Inaccessible/Restricted Locations
)	10.16	RE-C-40-11 Core Map
	10.17	RE-C-40-12 CCTAS Instruction/Approval Sheet
ł	10.18	RE-C-40-13 SRM/WRNM Connectivity Constraint
)	10.19	RE-C-40-14 Final Configuration Map Checklist
	10.20	RE-C-40-15 LGS Fuel Pool Cells Within Three (3) Feet Of Gate Seals

Exhibit RE-C-40-1 Page 1 of 1

Þ

1

ļ.

RE-C-40, Rev. 9 Page 26 of 47

#### CCTAS INFORMATION/VERIFICATION SHEET

							~			Duc	c	
File Name:				Di	rect	ory:			<u> </u>			
Description o	f CCTAS:											
						·		·				
· · · · · · · · · · · · · · · · · · ·		······································										
Location/file	name of Dis	scharge Loca	tions:	<u></u>								
Location/file	name of Ter	morary Stor	age:			•						
		aporary soor										
NI's to be re	placed:						•					
Control Blade	es to be rep	laced/swappe	d:			·					•	
											· · · · · · ·	
Control Dod 7	Drimos to b-	worked									,	
Control Rod I	Jrives to be	worked:		· · · · · · · · · · · · · · · · · · ·				······	· · ·			
Bundles to be	e Inspected/	Sipped/Recha	nneled.	/Rese	ated	:						
					<u>-</u>				· ,	·		
Constraints:	(Circle/pro	vide value c	or N/A	if no	t ap	plica	able)			•		
										(	- %)	N/
	SDM Limit:	•										
	SDM Limit: SDM Model:	· .	·					ST	ROD2	STR	OD3	N/
	SDM Limit: SDM Model: Neighborhoo	od Size:				1	5	5T 9	ROD2 25	STR Full	OD3 Core	N/
	SDM Limit: SDM Model: Neighborhod Exposed Ass	od Size: semblies aro	und eac	ch SRN	1	1	5	5T 9	ROD2 25 1	STR Full 2	OD3 Core 3	N/ N/ N/
	SDM Limit: SDM Model: Neighborhoo Exposed Ass Once Burneo	od Size: semblies aro d Assemblies	und eac around	ch SRN 1 a Co	1 ontro	1 ol Bl	5 ade	5T 9	ROD2 25 1 2	STR Full 2 3	OD3 Core 3 4	N/. N/. N/.
	SDM Limit: SDM Model: Neighborhoo Exposed Ass Once Burneo Once Burneo	od Size: semblies aron d Assemblies d Face Adjace	und eac around ent All	ch SRN d a Co Lowed	1 ontro	1 >1 Bl	5 ade		ROD2 25 1 2 2	STR Full 2 3 3	OD3 Core 3 4 4	N/. N/. N/. N/.
	SDM Limit: SDM Model: Neighborhoo Exposed Ass Once Burneo Once Burneo Minimum k-1	od Size: semblies aron d Assemblies d Face Adjace infinity Valu	und eac around ent All ue for	ch SRM d a Co Lowed Once	1 ontro Burr	1 Dl Bl ned A	5 ade .ssemi	ST 9 1 1 blies:	ROD2 25 1 2 2	STR Full 2 3 3	OD3 Core 3 4 4	N/. N/. N/. N/. N/.
	SDM Limit: SDM Model: Neighborhoo Exposed Ass Once Burned Once Burned Minimum k-J Connectivit	od Size: semblies arou d Assemblies d Face Adjace infinity Valu ty Path:	und eac around ent All ue for	ch SRN d a Co Lowed Once	1 ontro Burr	l ol Bl ned A	5 ade .ssemi	ST 9 1 1 blies: SRM	ROD2 25 1 2 2	STR Full 2 3 3 WRNM	OD3 Core 3 4 4	N/. N/. N/. N/. N/. N/.
	SDM Limit: SDM Model: Neighborhoo Exposed Ass Once Burneo Once Burneo Minimum k- Connectivit Control Roo	od Size: semblies arou d Assemblies d Face Adjace infinity Valu ty Path: d Blade Supp	und eac around ent All ue for ort	ch SRN d a Co Lowed Once	1 ontro Burr	l ol Bl ned A	5 ade .ssem U	I 1 blies: SRM _Core	ROD2 25 1 2 2 2 U	STR Full 2 3 3 WRNM Core	OD3 Core 3 4 4 4 None	N/. N/. N/. N/. N/. N/.
	SDM Limit: SDM Model: Neighborhoo Exposed Ass Once Burned Once Burned Minimum k-i Connectivit Control Roo Unusable Lo	od Size: semblies aron d Assemblies d Face Adjace infinity Valu ty Path: d Blade Supp ocations:	und eac around ent All ue for ort U	ch SRN d a Co Lowed Once _SFP	4 ontro Burr U	1 ol Bl ned A _SFP	5 ade .ssem U U	I ST J Dlies: SRM _Core _Core	ROD2 25 1 2 2 U U	STR Full 2 3 3 WRNM Core Core	OD3 Core 3 4 4 None None	N/2 N/2 N/2 N/2 N/2 N/2 N/2 N/2 N/2
	SDM Limit: SDM Model: Neighborhoo Exposed Ass Once Burned Once Burned Minimum k-J Connectivit Control Roo Unusable Lo Item Type D	od Size: semblies arou d Assemblies d Face Adjace infinity Valu- ty Path: d Blade Supp ocations: Locations:	und eac around ent All ue for ort U U	ch SRN d a Co Lowed Once _SFP _SFP	4 Dontro Burr U U	l Ded A _SFP _SFP	5 ade .ssem U U U	I 1 blies: SRM _Core _Core _Core _Core	ROD2 25 1 2 2 2 U U U	STR Full 2 3 3 WRNM Core Core Core	OD3 Core 3 4 4 None None None	N/. N/. N/. N/. N/. N/. N/. N/.
	SDM Limit: SDM Model: Neighborhoo Exposed Ass Once Burned Once Burned Minimum k-J Connectivit Control Roo Unusable Lo Item Type J Fuel Moveme Mast Orient	od Size: semblies arou d Assemblies d Face Adjace infinity Valu- ty Path: d Blade Supp ocations: Locations: ent Device tation:	und eac around ent All ue for ort U U U	ch SRN d a Co Lowed Once _SFP _SFP _SFP	4 Dontro Burr U U U	l ned A _SFP _SFP _SFP	5 ade .ssem U U U U	ST 9 1 blies: SRM _Core _Core _Core _Core	ROD2 25 1 2 2 2 U U U U	STR Full 2 3 3 WRNM Core Core Core	OD3 Core 3 4 4 None None None None	N/. N/. N/. N/. N/. N/. N/. N/. N/.
	SDM Limit: SDM Model: Neighborhoo Exposed Ass Once Burned Once Burned Minimum k- Connectivit Control Roo Unusable Lo Item Type I Fuel Moveme Mast Orient Date/WO of	od Size: semblies arou d Assemblies d Face Adjace infinity Valu- ty Path: d Blade Supp ocations: Locations: ent Device tation: RT-1-053-31	und eac around ent All ue for ort U U 0-* (LC	ch SRN d a Co Lowed Once _SFP _SFP _SFP GS On	4 Dontro Burr U U Ly):_	1 ned A _SFP _SFP _SFP	5 ade .ssem U U U	ST 9 1 5 SRM _Core _Core _Core _Core	ROD2 25 1 2 2 2 U U U U	STR Full 2 3 3 WRNM Core Core Core	OD3 Core 3 4 4 None None None None	N// N// N// N// N// N// N// N//
	SDM Limit: SDM Model: Neighborhoo Exposed Ass Once Burned Once Burned Minimum k-J Connectivit Control Roo Unusable Lo Item Type J Fuel Moveme Mast Orient Date/WO of	od Size: semblies aron d Assemblies d Face Adjace infinity Value ty Path: d Blade Supp ocations: Locations: ent Device tation: RT-1-053-31 Cask (PBAPS	und eac around ent All ue for ort U 0-* (LC ONLY):	ch SRN d a Co Lowed Once _SFP _SFP _SFP _SFP _SFP _SFP _SFP _SFP	4 Dontro Burr U U Ly):	l ned A _SFP _SFP _SFP	5 ade .ssem U U U U	ST 9 1 blies: SRM _Core _Core _Core _Core	ROD2 25 1 2 2 U U U U	STR Full 2 3 WRNM Core Core Core Core	OD3 Core 3 4 4 None None None None	N/. N/. N/. N/. N/. N/. N/. N/.
	SDM Limit: SDM Model: Neighborhoo Exposed Ass Once Burned Once Burned Minimum k-f Connectivit Control Roo Unusable Lo Item Type I Fuel Moveme Mast Orient Date/WO of Spent Fuel Other Preca Section 7.0	od Size: semblies aron d Assemblies d Face Adjace infinity Value ty Path: d Blade Supp ocations: Locations: ent Device tation: RT-1-053-31 Cask (PBAPS autions and 0 met:	und eac around ent All ue for ort U U 0-* (LC ONLY): Limitat	ch SRN d a Co Lowed Once _SFP _SFP _SFP GS On : S/N tions	4 Burr U U U ly):	1 ned A _SFP _SFP _SFP _SFP	5 ade .ssem U U U U 40	I 1 blies: SRM Core Core Core Core Yes	ROD2 25 1 2 2 U U U U U No (	STR Full 2 3 3 WRNM Core Core Core Core	OD3 Core 3 4 4 None None None None	N/. N/. N/. N/. N/. N/. N/. N/. N/. N/.
	SDM Limit: SDM Model: Neighborhoo Exposed Ass Once Burned Once Burned Minimum k-J Connectivit Control Roo Unusable Lo Item Type J Fuel Moveme Mast Orient Date/WO of Spent Fuel Other Preca Section 7.0	od Size: semblies arou d Assemblies d Face Adjace infinity Valu- ty Path: d Blade Supp ocations: Locations: ent Device tation: RT-1-053-31 Cask (PBAPS autions and 0 met:	und eac around ent All ue for Ort U U 0-* (LC ONLY): Limitat	ch SRN d a Co Lowed Once _SFP _SFP _SFP GS On : S/N tions	4 Burr U U U ly):_ of 1	1 ned A _SFP _SFP _SFP _SFP	5 ade .ssem U U U 40	ST 9 1 1 Dlies: SRM _Core _Core _Core _Core _Core	ROD2 25 1 2 2 U U U U No (	STR Full 2 3 WRNM Core Core Core Core	OD3 Core 3 4 4 None None None None	N/ N/ N/ N/ N/ N/ N/ N/ N/
	SDM Limit: SDM Model: Neighborhoo Exposed Ass Once Burned Once Burned Minimum k-i Connectivit Control Roo Unusable Lo Item Type D Fuel Moveme Mast Orient Date/WO of Spent Fuel Other Preca Section 7.0	od Size: semblies aron d Assemblies d Face Adjace infinity Valu- ty Path: d Blade Supp ocations: Locations: ent Device tation: RT-1-053-31 Cask (PBAPS autions and 0 met:	und eac around ent All ue for ort U 0-* (LC ONLY): Limitat	ch SRN i a Co Lowed Once _SFP _SFP _SFP _SFP _SFP _SFP _SFP _SFP	4 Dontro Burr U U U ly): of 1	1 ned A _SFP _SFP _SFP 	5 ade .ssem U U U U 40	ST 9 1 1 blies: SRM _Core _Core _Core _Core _Core _Core	ROD2 25 1 2 2 U U U U No (	STR Full 2 3 3 WRNM Core Core Core Core Except	OD3 Core 3 4 4 None None None None	N/. N/. N/. N/. N/. N/. N/. N/. N/. N/.
Signature co specified <u>AN</u> have been do	SDM Limit: SDM Model: Neighborhod Exposed Ass Once Burned Once Burned Minimum k-J Connectivit Control Rod Unusable Lo Item Type J Fuel Moveme Mast Orient Date/WO of Spent Fuel Other Preca Section 7.0 	od Size: semblies aron d Assemblies d Face Adjace infinity Valu- ty Path: d Blade Supp ocations: Locations: ent Device tation: RT-1-053-31 Cask (PBAPS autions and 0 met: constraints verification	und eac around ent All ue for ort U U 0-* (LC ONLY): Limitat	ch SRN d a Co Lowed Once _SFP _SFP _SFP _SFP GS On tions	U U U U U U ly):_ of 1 aled a in 5	1 Ded A _SFP _SFP _SFP _SFP  RE-C- RE-C-	5 ade .ssem U U U 40 are on 8	ST 9 1 1 5 1 5 RM Core Core Core Core Core Yes S Corre 3.1/8	ROD2 25 1 2 2 UU U U U U No ( .3.2	STR Full 2 3 3 WRNM Core Core Core Core Except Ad app (as ap	OD3 Core 3 4 4 None None None None	N/2 N/2 N/2 N/2 N/2 N/2 N/2 N/2 N/2 N/2
Signature co specified <u>AN</u> have been do Prepared By:	SDM Limit: SDM Model: Neighborhoo Exposed Ass Once Burned Once Burned Minimum k-J Connectivit Control Roo Unusable Lo Item Type J Fuel Moveme Mast Orient Date/WO of Spent Fuel Other Preca Section 7.0 Ithat all v ne:	od Size: semblies aron d Assemblies d Face Adjace infinity Valu- ty Path: d Blade Supp- ocations: Locations: ent Device tation: RT-1-053-31 Cask (PBAPS autions and 0 met: constraints verification	und eac around ent All ue for ort U U 0-* (LC ONLY): Limitat	ch SRN d a Co Lowed Once _SFP _SFP _SFP _SFP _SFP _SFP _SFP _SFP	4 Durr U U U U ly): ded a in s	l ned A _SFP _SFP _SFP _SFP _RE-C-	5 ade .ssem U U U 40 .are on 8	ST 9 1 1 blies: SRM Core Core Core Core Yes corre .3.1/8	ROD2 25 1 2 2 U U U U U No (	STR Full 2 3 3 WRNM Core Core Core Core Except A app (as ap	OD3 Core 3 4 4 None None None None None	N/: N/: N/: N/: N/: N/: N/: N/: N/: List



.



CCTAS STATUS LOG:

TAB		CCTAS		Steps	DATE/TIME P	ORIGINA	LS RETR	IEVED**	Updated In		
#	CCTAS TITLE	REV #	STATUS*	Performed	START	END	FHD	RPO	CRO	S/Works	SNM
	······································										
					· · · · · · · · · · · · · · · · · · ·						
			··		-						
							<b> </b>				
									<u> </u>		<b> </b>
											<b></b>
		[									
			·····								
											ļ
		1									
											<u> </u>
											<u> </u>
		1					]				
					-						
		ļ			<b>_</b>			<u> </u>			
							.	<u> </u>		<b></b>	<u> </u>
						1					<u> </u>
		1									
		<b> </b>	<u> </u>					1	1		
				<u> </u>			<u> </u>				+
		1									
											,
		<u> </u>		<u> </u>	f original	I Or "Con	// if o	l rigina	lwas	contamir	l nated

Exhibit RE-C-40-3A Page 1 of 1 SRM ONLY

RE-C-40, Rev. 9 Page 28 of 47

Written By: \_\_\_\_\_ Reviewed By: \_\_\_\_\_

Unit \_\_\_\_\_\_
Title EXAMPLE CCTAS FOR LPRM REPLACEMENT

Authorized By: \_\_\_\_\_

.

A



Exhibit RE-C-40-3B Page 1 of 1

WRNM ONLY

#### RE-C-40, Rev. 9 Page 29 of 47

Written By: \_\_\_\_\_

Reviewed By: \_\_\_\_\_

Authorized By: \_\_\_\_\_

Title EXAMPLE CCTAS FOR LPRM/WRNM REPLACEMENT

Unit

STEP	COMPONENT SERIAL NO	MOVE FROM	ORIENT	MOVE TO	ORIENT	FHD	RPO	CRO			WR	NM CO	UNTR	ATE			DATE	TIME
									A	в	С	D	Е	F	G	н		
1	LPRM/WRNM X,YYY,ZZZ	XX-YY	NONE	BENDER	NONE				NA	NA	NA	NA	NA	NA	NA	NA		
2	LPRM/WRNM X,YYY,ZZZ	BENDER	NONE	UNIT 2 SPENT FUEL POOL WALL	NONE				NA	NA	NA	NA	NA	NA	NA	NA		
	Above LPRM/WR	RNM hung on Tag #		_														
3	LPRM/WRNM X,YYY,ZZZ	FUEL FLOOR	NONE	XX-YY	NONE				NA	NA	NA	NA	NA	NA	NA	NA		
		· · · · · · · · · · · · · · · · · · ·					[											
						1												
							<u> </u>											
			-															
	·				1		1	<u> </u>										
								<u> </u>		<u> </u>								
			-	· · · · · · · · · · · · · · · · · · ·			†	<u> </u>			-							
						1		<u> </u>						1				
						1								<u> </u>		1		



Exhibit RE-C-40-4A Page 1 of 1

Unit

SRM ONLY

#### RE-C-40, Rev. 9 Page 30 of 47

Written By: \_\_\_\_\_

Reviewed By:

Title EXAMPLE CCTAS FOR BLADE WITHDRAWAL

Authorized By: \_\_\_\_\_

STEP	COMPONENT SERIAL NO	MOVE FROM	ORIENT	MOVE TO	ORIENT	FHD	RPO	CRO	SR	M COL	INTRA	TE	DATE	TIME
110.	GENIAE NO.								Α	В	С	D		
	Step 1 for each ro	od may be performed anytime after	fuel moveme	nt has ceased for maintenance										
1	VERIFY CONTR	DL CELL 02-43 IS OFFLOADED						NA	NA	NA	NA	NA		
-	The CRD/CRB C	coordinator may sign as FHD for ste	eps 2, 3, and 4		-									
2	SELECT CONTR	OL ROD 02-43	· · · ·				NA .							
	WARNING: II POSITION 00	ANY SRM COUNTRATE D	OUBLES IN	ISERT CONTROL ROD TO	· · ·									
	· · · · · · · · · · · · · · · · · · ·													
3	WITHDRAW CO	NTROL ROD 02-43 TO POSITION	48	· · · · · · · · · · · · · · · · · · ·		·	NA			•				
					1						•			
4	UNCOUPLE CO	NTROL ROD 02-43 PER M-C-747-	011 OR M-C-7	/41-301			NA		NA	NA	NA	NA		
		· · · ·												
		······································												
				· · ·	······································									
									-					
				<u> </u>										
			· ·····											

Exhibit RE-C-40-4B Page 1 of 1 WRNM ONLY

#### RE-C-40, Rev. 9 Page 31 of 47

Authorized By: \_\_\_\_\_

Written By: \_\_\_\_\_

Reviewed By: \_\_\_\_\_

Unit \_\_\_\_\_

Title EXAMPLE CCTAS FOR BLADE WITHDRAWAL

STEP NO.	COMPONENT SERIAL NO.	MOVE FROM	ORIENT	MOVE TO	ORIENT	FHD	RPO	CRO			WR		UNTRA	ATE			DATE	TIME
									Α	В	С	D	E	F	G	н		
	Step 1 for each ro	od may be performed anytime after	fuel moverne	nt has ceased for maintenance														
1	VERIFY CONTRO	OL CELL 02-43 IS OFFLOADED						NA	NA	NA	NA	NA	NA	NA	NA	NA		
	The CRD/CRB C	oordinator may sign as FHD for ste	ps 2, 3, and 4															
2	SELECT CONTR	OL ROD 02-43					NA											
	WARNING: IF POSITION 00	ANY WRNM COUNTRATE	DOUBLES	INSERT CONTROL ROD 1	ю													
3	WITHDRAW CO	NTROL ROD 02-43 TO POSITION	48				NA											
4	UNCOUPLE CON	NTROL ROD 02-43 PER M-C-747-	011 OR M-C-7	/41-301	<u> </u>		NA		NA	NA	NA	NA	NA	NA	NA	NA		
												-	:					
		· · · · · · · · · · · · · · · · · · ·																
		· · · · · · · · · · · · · · · · · · ·																

 $\mathbf{C}$ 

Exhibit RE-C-40-5A Page 1 of 2

SRM ONLY

RE-C-40, Rev. 9 Page 32 of 47

|--|

Reviewed By: \_\_\_\_\_

Authorized By: \_\_\_\_\_

Title EXAMPLE CCTAS FOR BLADE REPLACEMENT

Unit

TIME SRM COUNTRATE DATE CRO ORIENT FHD RPO ORIENT MOVE TO MOVE FROM STEP COMPONENT SERIAL NO. NO. В С D Α NA NA NA NA NA VERIFY CONTROL ROD 30-47 IS UNCOUPLED 1 NA NA NA NA NONE NONE HANG MN HOIST 31-48/29-46 2 DBL B/G NA NA NA NA NONE HANG HOIST NW 30-47 3 SUP PC NA NA NA NA NA NA NA IF CRD EXCHANGE IN PROGRESS, THEN PERFORM STEPS 4A, 4B, & 4C, OTHERWISE, N/A STEPS 4A, 4B, & 4C 4 NA NA NA NA NA NA INFORM UNDERVESSEL TEAM OF INTENT TO REMOVE CRB 4A NA NA NA NA NA 4B RAISE CRB 30-47 APPROXIMATELY 12 INCHES NA NA NA NA NĂ NA RECEIVE CONFIRMATION FROM UNDERVESSEL TO CONTINUE 4C NA NA NA NA NONE CBRCK 5N-1 30-47 NONE 5 CRB NA NA NA NA NONE 30-47 NONE **CRB H605** 6 CBRCK 6N-4 NA NA NA NA NW 30-47 7 SUP PB HANG HOIST NONE

# C

-

---

-

SRM ONLY

#### RE-C-40, Rev. 9 Page 33 of 47

Written By: \_\_\_\_\_

Reviewed By: \_\_\_\_\_

Authorized By: \_\_\_\_\_

DATE TIME SRM COUNTRATE CRO FHD RPO ORIENT ORIENT MOVE TO COMPONENT **MOVE FROM** STEP NO. SERIAL NO. Ċ В D A NA NA NA NA NA NOTIFY HOU/CRD COORDINATOR CRB 30-47 FULLY SEATED 8 NA NA NA NA NONE NONE 31-48/29-46 HANG MN HOIST 9 DBL B/G NA NA NA NA NA CHECK SEATING OF DBL B/G WITH CAMERA 10

.

Exhibit RE-C-40-5A Page 2 of 2

Unit \_\_\_\_\_

Title EXAMPLE CCTAS FOR BLADE REPLACEMENT

### Exhibit RE-C-40-5B Page 1 of 2

WRNM ONLY

#### RE-C-40, Rev. 9 Page 34 of 47

Reviewed By: \_\_\_\_\_

Written By: \_\_\_\_\_

#### Unit

## Authorized By: \_\_\_\_\_

Title EXAMPLE CCTAS FOR BLADE REPLACEMENT

STEP		MOVE FROM	ORIENT	MOVE TO	ORIENT	FHD	RPO	CRO						DATE	TIME			
NU.	SERIAL NO.								A	в	С	D	Е	F	G	н		
1	VERIFY CONTRO	DL ROD 30-47 IS UNCOUPLED	I	· ·	1 <u></u>		ŃA		NA	NA	NA	NA	NA	NA	NA	NA		
		· · · · · · · · · · · · · · · · · · ·																
2	DBL B/G	31-48/29-46	NONE	HANG MN HOIST	NONE				NA	NA	NA	NA	NA	NA	NA	NA		
3	SUP PC	30-47	NW	HANG HOIST	NONE				NA	NA	NA	NA	NA	NA	NA	NA		
4	IF CRD EXCHAN	IGE IN PROGRESS, M STEPS 4A, 4B, & 4C, <u>OTHERI</u>	<u>NISE,</u> N/A STE	EPS 4A,4B, & 4C		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
4A	INFORM UNDER	VESSEL TEAM OF INTENT TO F	EMOVE CRB		•		· NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
4B	RAISE CRB 30-4	7 APPROXIMATELY 12 INCHES						NA	NA	NA	NA	NA	NA	NA	NA	NA		
4C	RECEIVE CONFI	IRMATION FROM UNDERVESSE	L TO CONTIN	UE			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
												·						
5	CRB	30-47	NONE	SFP	NONE				NA	NA	NA	NA	NA	NA	NA	NA		
6	CRB H605	CBRCK 6N-4	NONE	30-47	NONE				NA	NA	NA	NA	NA	NA	NA	NA		
<u> </u>			1			· ·												
7	SUP PB	HANG HOIST	NONE	30-47	NW				NA	NA	NA	NA	NA	NA	NA	NA		·
														<u> </u>				

WRNM ONLY

#### RE-C-40, Rev. 9 Page 35 of 47

Written By: \_\_\_\_\_

Reviewed By: \_\_\_\_\_

Authorized By: \_\_\_\_\_

Exhibit RE-C-40-5B Page 2 of 2

Title EXAMPLE CCTAS FOR BLADE REPLACEMENT

Unit \_\_\_\_\_

STEP	COMPONENT	MOVE FROM	ORIENT	MOVE TO	ORIENT	FHD	RPO	CRO			WR	NM CO	UNTRA	TE			DATE	TIME
NO.	SERIAL NO.								A	в	с	D	E	F	G	н		
8	NOTIFY HCU/CR	D COORDINATOR CRB 30-47 FU	LLY SEATED				NA		NA	NA	NA	NA	NA	NA	NA	NA		
9	DBL B/G	HANG MN HOIST	NONE	31-48/29-46	NONE				NA	NA	NA	NA	NA	NA	NA	NA		
10	CHECK SEATING	G OF DBL B/G WITH CAMERA		······································				NA	NA	NA	NA	NA	NA	NA	NA	NA		
		· · · · · · · · · · · · · · · · · · ·																
				······································														
	·																	
				· · · · · · · · · · · · · · · · · · ·														
						· ·												
				· · · · · · · · · · · · · · · · · · ·														
		· · · · · · · · · · · · · · · · · · ·																
							+			<u> </u>			1		1			
					+													
			<u> </u>									+			<u> </u>			
							<u> </u>		┼──									
			<u> </u>		ļ	<u> </u>				<b> </b>							<u> </u>	
							ļ							<u> </u>				<u> </u>
				<u> </u>					<u> </u>			<u> </u>	<u> </u>		l RF-	 -C-4	0, R	l ev. 9

Exhibit RE-C-40-6A

C

#### Page 1 of 1

Written By: \_\_\_\_\_

Reviewed By: \_\_\_\_\_

Title EXAMPLE CCTAS FOR NON CORE TRANSFERS

Authorized By: \_\_\_\_\_

STEP NO.	COMPONENT SERIAL NO.	MOVE FROM	ORIENT	MOVE TO	ORIENT	FHD	RPO	DATE	TIME
1	LY8487	L2SPENT KK-158	SW	L1SPENT T-58	sw				
				•					
2	LY8488	L2SPENT KK156	SW	L1SPENT U-57	SW				
		· · · · · · · · · · · · · · · · · · ·							
3	LY8811	L2SPENT KK-154	SW	L1SPENT U-56	SW				
		· · · · · · · · · · · · · · · · · · ·							
4	LYN091	L2SPENT KK-152	SW	L1SPENT V-58	SW				
5	LY8812	L2SPENT KK-150	SW	L1SPENT V-56	SW				
6	LY8813	L2SPENT KK148	SW	L1SPENT W-58	SW				
7	LYN104	L2SPENT KK146	SW	L1SPENT W-57	SW				
				· · · · · · · · · · · · · · · · · · ·					
		<u> </u>							
			-						

Unit \_\_\_\_\_

Exhibit RE-C-40-6B Page 1 of 1

RE-C-40, Rev. 9 Page 37 of 47

Written By: \_\_\_\_\_

Reviewed By: \_\_\_\_\_

Unit \_\_\_\_\_

Title EXAMPLE CCTAS FOR SPENT FUEL ASSEMBLIES TRANSFERS

Authorized By: \_\_\_\_\_

STEP NO.	COMPONENT SERIAL NO.	MOVE FROM	ORIENT	MOVETO	0	ORIENT	FHD	RPO	DATE	TIME
1	PYN521	P2SPENT C-22	N/A	CASK S/N	A-1	N/A				
2	PYG651	P2SPENT N-46	N/A	CASK S/N	G-1	N/A				
3	PYN463	P2SPENT C-21	N/A	CASK S/N	C-6	N/A				
4	PYG764	P2SPENT P-46	N/A	CASK S/N	F-5	N/A				
5	PJ1407	P2SPENT C-20	N/A	CASK S/N	A-7	N/A				
								<u> </u>		

NOTE: See RE-C-44 Figure 10 for cask alphanumeric layout

Exhibit RE-C-40-7A Page 1 of 1

SRM ONLY

## RE-C-40, Rev. 9 Page 38 of 47

Unit

Title EXAMPLE CCTAS FOR CORE TRANSFERS

DATE SRM COUNTRATE TIME ORIENT FHD RPO CRO MOVE TO ORIENT STEP COMPONENT MOVE FROM NO. SERIAL NO. D В С Α L1SPENT C-22 NW 1 LYN521 L1CORE 01-44 SE SW 2 NW L1SPENT N-46 LYG651 L1CORE 03-42 L1CORE 01-44/03-42 NONE 3 NONE DBL B/G L1SPENT B-31/C-32 SW 4 LYN463 L1CORE 01-42 NE L1SPENT C-21 SW SW L1SPENT P-46 5 LYG764 L1CORE 03-44 L1SPENT C-20 SW 6 YJ1407 L1CORE 19-52 SW SW NE L1SPENT C-18 7 YJ1447 L1CORE 17-50 .

-

<del>.</del>

-

Authorized By:

Written By:

Reviewed By:

· ---

Exhibit RE-C-40-7B Page 1 of 1

WRNM ONLY

#### RE-C-40, Rev. 9 Page 39 of 47

Written By: \_\_\_\_\_

Reviewed By: \_\_\_\_\_

Authorized By: \_\_\_\_\_

Title EXAMPLE CCTAS FOR CORE TRANSFERS

Unit

STEP	COMPONENT	MOVE FROM	ORIENT	MOVE TO	ORIENT	FHD	RPO	CRO	O WRNM COUNTR/		RATE DA			DATE	TIME			
NO.	SERIAL NO.								A	В	С	D	E	F	G	Н		 
1	PYN521	P2CORE 01-44	SE	P2SPENT C-22	NW													
									L									
2	PYG651	P2CORE 03-42	NW	P2SPENT N-46	sw			ļ	<b> </b>									
										ļ								
3	DBL B/G	P2SPENT B-31/C-32	NONE	P2CORE 01-44/03-42	NONE						 							
											ļ		ļ					
4	PYN463	P2CORE 01-42	NE	P2SPENT C-21	SW							L		ļ		. 		
·										ĺ								
5	PYG764	P2CORE 03-44	SW	P2SPENT P-46	SW													ļ
6	P.I1407	P2CORE 19-52	SW	P2SPENT C-20	SW													
			-															
	D 11 4 47	P2CORE 17-50	NE	P2SPENT C-18	SW	1	1											
<u> </u>	FJ1447					1	<u> </u>											
								1	1									
		· · · · · · · · · · · · · · · · · · ·											1					
							+		+				+	1	$\square$	1	1	
			<u> </u>		-		+	+		+		<del> </del>		+	<u> </u>			

.

Exhibit RE-C-40-8 Page 1 of 1

#### EXECUTING SHUFFLEWORKS

- 1. Log on to LAN on SHUFFLEWORKS-loaded Computer. If SHUFFLEWORKS is running directly off of the PC desktop, then verify with NFM that the correct version of shuffleworks is being run.
- 2. Double-click on SHUFFLEWORKS icon.
- 3. Change data directory using the "set-up" menu option.
- 4. Load appropriate plant information using the "set-up" window option.
- 5. Follow program prompts/pull-down menu options in order to execute the desired SHUFFLEWORKS functions.

Exhibit RE-C-40-9 Page 1 of 1

.

×	LGS UN	USABLE/INA	CCESSIBLE	SPENT FUEL POOL LOCATIONS						
	UN	IT 1		UNIT 2						
BINDING:				COVERED BY LABELS						
A-11 R-14 Z-18 JJ-23			B-2 thru B-18, A-19 thru A-66, B-73 thru B-84							
A-35 T-18 AA-69		KK-16	R-2 thru $R-84$							
G-21 U-19 EE-47		EE-47	SS-23	LL-72 thru LL-85, U-79 thru KK-79						
P-20 $X-22$ FF-70		FF-70	SS-35	AB-19 thru AB-						
0-19 X-34 GG-23 VV-22			A-1 thru T-1.	U-5 thr	u ZZ-5	······································				
$Q^{-13}$ $X^{-34}$ $GG^{-23}$ $VV^{-22}$ $Q^{-21}$ $Y^{-15}$ $JJ^{-11}$ $X^{-42}$			X-42	A-85 thru T-85						
CC-43 HH-38 S-52 T-51			U-56 thru 77-56							
T-52 $T-53$ $U-52$			U-21 thru ZZ-21							
1 02	OBST		E-44 thru 49							
<u>a-77</u>			E-67 thru 71							
<u> </u>										
KK-77 thr	ough TT-77			OBSTRUCTED BY GATE BRACKETS						
LL-88 thi	ougn 55-88	¥11 773 7		AB-53 thru AB-59, AB-49 thru AB-51						
D 14	BAD			AB-26 thru AB-33, AB-36						
B-14			rougn JJ-22							
D-12		KK-18								
J-31		KK-20		OBSTRUCT	ED	OBSTRU	CTED BY CLIPS			
K-32		KK-22		A-1 thru A-3,	A-50	S-3	V-20			
L-23		KK-23		A-82 thru A-8.	5	S-17	KK-20			
M-24 LL-3				B-1 thru B-3		S-20	<u>NN-20</u>			
CC-21		LL-17		B43, B50, and	and B73 S-35					
DD-16 through DD-22 LL-19				B-82 thru B-8	5	S-38				
EE-16 LL-43				C-1 thru C-4		s-53	V-55			
EE-18 the	ough EE-22	RR-20		C50 and C73		S-56	KK-55			
-16 th	ough FF-23			C-82 thru C-8	5	S-70	NN-55			
-16		RR-51		D-1 thru D-4		S-73	YY-55			
GG-18 th	cough GG-22	UU-18		D-82 thru D-8	5	S-83				
HH-16 th	cough HH-22	<u>UU-22</u>	· · · · · · · · · · · · · · · · · · ·	E-1 thru E-5		A-3				
JJ-16				E-82 thru E-8	5	A-17				
				F-1 thru F-6		A-74				
TEST COUL	PONS ADJACENT	TO THE FOLL	OWING CELLS	F-82 thru F-8	5	A-83				
P-58	BB-70	Z-70	Q-58	G-1 thru G-6		V-4				
T-58	DD-70	EE-70	R-58	H-1 thru H-3		KK-4				
CC-70		Y-70		J-1 thru J-3		NN-4				
				K-1 thru K-3		YY-4				
	0	THER		ZZ-1 thru ZZ-	3	V-80				
FF-63				AB-1 thru AB-	4	JJ-80				
NN-36				BAD FUEL						
K-23				K-15						
X-1					0	THER				
V-1				L-83 T-9 T	-11 U-5	52 FF-6	9 FF-70 ZZ-2			
HH-47	· · · · · · · · · · · · · · · · · · ·									
00-36		<u></u>	INACCESSIBLE DUE TO LEVEL SWITCH							
SS-36				N-84	P-84	2-84 Q-84				
SS-39			N-85	P-85		0-85				
	······································	-, . =	<u> </u>		<u> </u>		×			
				INACCESSIBI		REFIRT	BRIDGE ACCESS			
				All of Pows 1 2 and 85						
				ALL OL KOWS 1, 2, ANA 85						
				8 Bundles around coupon tree						
	· · · · · · · · · · · · · · · · · · ·			o bundies aro	unu cour	Jon cree				

} Ţ

Exhibit RE-C-40-10 Page 1 of 1

Exhibit RE-C-40-	U PBAPS UNUSABLE	/INACCESSIBLE SPENT FUEL POOL LOCATIONS					
POTENTIAL MAST CA	MERA INTERFERENCE	E PERIPHERAL CORE LOCATIONS (Both Units)					
01-18	11-06						
01-44	11-56						
05-12	17-02	49-06 59-18					
05-50	17-60						
UNIT 2							
Covered by rack	markers:	2 17 MUDU LI 17 VV 10 thru UUU_10					
A-25 thru WW-25,		A-17 THRO LL-17, 11-18 thru HH-18,					
XX-21 thru XX-55	Tothe	LL-1 thru $LL-20$ , MM-20 thru $XX-20$ ,					
Fuel Pool Gate Heav	Y Load Path:	Evol Dool Gato Morry Load Dath.					
A-21 thru A-55		Puer Foor Gate neavy Load Fath:					
Boraflex Liner	Damage:	FPM Mounting Concerns:					
JJ-30, MM-30		HULL 2 thrus UNU-5 UNU-10 thrus HUH-22					
Borailex Co	upon:	nnn-2 thru nnn-3, nnn-19 thru nnn-22					
$2^{-1}$ , $5^{-1}$		Borafley Coupon:					
Damaged D		CCC-71					
Failed Fuel	Pin:	Dechanneled Bundle:					
		Z-51					
Debris	· · ·	Bowed Bundles:					
'LL-30, LLL-33		X-54, EE-57					
Other:	· · ·	Other:					
GGG-2, GGG-3		S-72 thru XX-72					
EEE-66 thru KKK-66		II-45, JJ-46, GGG-2, HHH-2					
EEE-67 thru EEE-71		GGG-66 ("skeleton" bundle)					
S-72 thru XX-72		· · · · · · · · · · · · · · · · · · ·					
JJ-22							
Unusable Fuel I	ocations:	Unusable Fuel Locations:					
BB-18, BB-19, BBB-25, BBE	-3,	AA-39, AAA-14, AAA-7, BB-36,					
BBB-4, CC-13, CC-15, CC-1	6,	BBB-13, BBB-15, BBB-19, BBB-20,					
CCC-6, DD-13, DD-16, DD-1	7, DD-18,	BBB-21, BBB-3, BBB-61, BBB-63,					
DD-19, DD-20, DD-21, DD-2	2, DD-23,	BBB-64, CCC-2, D-22, DD-26, DD-58, E					
DD-24, EEE-5, F-18, F-21,	FFF-3	EE-37, EE-5, EE-6, F-17,					
GG-21, HHH-17, JJ-12, KK-	12, LL-12,	HH-12, HH-18, HH-4, HH-56, HH-62,					
NN-7, P-19, PP-51, PP-55,	PP-7,	НН-64, НН-7, ННН-11, ННН-14,					
PP-8, QQ-8, RR-10, T-55,	U-18, U-19,	HHH-17, II-10, II-19, II-61, JJ-8,					
V-18, WW-67, YY-65, YY-7,	ZZ-2,	K-41, KK-55, L-31, L-41, LL-15, LL-20,					
ZZ-3, ZZ-4, ZZ-5		LL-54, LLL-32, M-6, MM-9, N-40,					
		NN-16, O-40, OO-54, PP-17, PP-5,					
		PP-53, PP-7, QQ-53, QQ-54, QQ-62,					
		QQ-68, QQ-8, SS-53, SS-54, SS-55,					
		SS-6, T-13, TT-13, TT-54, U-38, U-9,					
		VV-16, VV-17, W-13, W-38, W-39,					
		W-7, X-37, X-54, Y-36, YY-67, YY-8,					
		7-39, 7-51, 7-68, ZZ-67, ZZ-68					

RE-C-40, Rev. 9 Page 43 of 47







Exhibit RE-C-40-12 Page 1 of 1

1

Ì

ł,

Ŧ

CCTAS Instruction/Approval Page
( <u>Sample Sheet Only</u> )
Core Component Transfer Authorization Sheet Page of
Data
Title (Rev. #)
1. This CCTAS provides the moves necessary to
2. This CCTAS assumes that SRM A, B, C, D (or WRNM A through H) are in service.
3. (Guidance on placement of a fuel bundle which cannot be placed in original target location, e.g. SRMs/WRNM inoperable or in an emergency)
4. This CCTAS must be used in conjunction with appropriate maintenance procedures.
5. This CCTAS must be used in conjunction with appropriate fuel handling procedures.
6. This CCTAS must be used in conjunction with appropriate spent fuel procedures.
7. All changes to this CCTAS must be made in accordance with procedure RE-C-40.
8. This CCTAS involves the transfer of Special Nuclear Material (SNM). SNM transfers shall be controlled in accordance with procedure RE-C-44.
9. Return completed CCTAS (or a copy if original is contaminated) to Reactor Engineering.
10. (RE contacts and phone numbers)
(etc.)
Dronorod But

Prepared By: Reviewed By: Authorized By:\_\_\_\_\_ Exhibit RE-C-40-13 Page 1 of 1

#### SRM/WRNM CONNECTIVITY CONSTRAINT

The SRM or WRNM connectivity constraint consistent with the neutron instrumentation determined in step 6.4 is to be used for in-core shuffles and will also be applied to offload/reload.

Face Adjacent Rules:

- 1. A continuous face adjacent path must exist between each bundle and an operable SRM <u>OR</u> between each bundle and at least one operable WRNM.
- 2. The only exceptions to rule #1 are bundles that fulfill the diagonal coupling rules.

#### Diagonal Coupling Rules:

ł

1

- 1. It is permissible for single fuel bundles ONLY to be diagonally connected to an array of face adjacent fuel bundles. No other fuel bundles can be connected to the single diagonally adjacent fuel bundle except per rule #2.
- 2. In addition to the diagonally adjacent connection path allowed by rule #1, two fuel bundles diagonally adjacent within the same control cell are considered connected.

Exhibit RE-C-40-14 Page 1 of 1

1

Ŀ

l

)

#### RE-C-40, Rev. 9 Page 46 of 47

#### FINAL CONFIGURATION MAP CHECKLIST

		Preparer	Reviewer
1.	"Current" Final Configuration core map matches Core Design Report.		
2.	Discharge fuel bundles identified on spent fuel pool map.		
3.	New fuel/reinsert bundle empty locations identified on spent fuel pool map.		
4.	Reload bundle (temporary) empty locations identified on spent fuel pool map.		
5.	Discharge bundles and empty locations on preparer's map matched reviewer's map.		
6.	Previously completed Exhibit RE-C-40-14 AND spent fuel pool map discarded.		
			•

Exhibit RE-C-40-15 Page 1 of 1

b

ł

RE-C-40, Rev. 9 Page 47 of 47

#### LGS FUEL POOL CELLS WITHIN THREE (3) FEET OF GATE SEALS

Per AT EWR A0004257, irradiated fuel which has decayed for less than 5 years cannot be stored within three (3) feet of the fuel pool gate seals. This is to support justification for extending the seal lifetime from 5 to 10 years. This constraint is conservatively assumed to include gate storage locations as well as gate locations in place.

UNIT 1 SPENT FUEL POOL	UNIT 2 SPENT FUEL POOL
Cattle Chute Gate Storage:	Cattle Chute Gate Storage:
(North Side)	(North Side)
E-77 through BB-77	VV-44 through VV-64
E-88 through BB-88	WW-43 through WW-65
E-1 through BB-1	XX-43 through XX-65
E-2 through $BB-2$	YY-43 through YY-65
E-3 through BB-3	ZZ-43 through ZZ-65
F-4 through AA-4	AB-43 through AB-65
(South Side)	(South Side)
V = 64 through $V = 70$	VV-22 through VV-42
W = 64 through $W = 70$	WW-21 through WW-43
X = 64 through $X = 70$	XX-21 through XX-43
Y = 64 through $Y = 70$	YY-21 through YY-43
7-64 through $7-70$	77-21 through ZZ-43
AA = 65  through  AA = 70	AB-21 through AB-43
BB = 66 through $BB = 70$	
DB 00 Chrough DB 70	
Cattle Chute Gate In Place:	Cattle Chute Gate In Place:
$\lambda_{-25}$ through $\lambda_{-46}$	VV-33 through $VV-53$
B=25 through $B=46$	WW-32 through WW-54
C=25 through $C=46$	XX-32 through $XX-54$
D=25 through $D=16$	YY-32 through $YY-54$
E = 25 through $E = 16$	77 - 32 through $77 - 54$
E = 25 through $E = 45$	AB-32 through $AB-54$
r-26 through r-45	
Cack Dit Cate In Place.	Cask Pit Gate In Place:
$\frac{\text{Cask Fit Gate III Fiace.}}{\text{DD} = 77  \text{DD} = 98  \text{DD} = 1 \text{ through } \text{BR} = 16$	A-1 through $A-20$
RR = 77, $RR = 60$ , $RR = 611000$ $RR = 10$	B-1 through $B-20$
mm 77 mm 99 mm 1 through $TT = 16$	C-1 through $C-20$
$\frac{11-77}{11-20}, \frac{11-1}{11-10}$	$D_{-1}$ through $D_{-20}$
00-77, 00-88, 00-1 Lintough 00-10	$F_{-1}$ through $F_{-20}$
vv - ii, $vv - 88$ , $vv - 1$ through $vv - 10$	

F-1 through F-19

EXELON NUCLEAR

TITLE: LPRM Removal

TASK PERFORMED BY:

\_\_\_\_ EVALUATOR: \_\_

EVALUATOR SIGNATURE:

DATE:

and the second second

DIRECTIONS TO EVALUATOR:

There is a mockup of a small portion of top guide and core plate on the refuel floor; usually near the East end of the Unit 2 fuel pool. It contains a LPRM mockup. Examiners may wish to allow the candidate to demonstrate the process of LPRM removal using the mockup and included pictures of the tool.

**EVALUATION METHOD :** 

SIMULATE

**EVALUATION LOCATION:** 

**REFUEL PLATFORM** 

**APPROXIMATE COMPLETION TIME:** 

Completion Time: 30 min

**IMPORTANCE RATING(S)**:

SYSTEM NUMBER(S):

3.5

2.2.27

**REFERENCES:** 

M-C-774-010, LPRM/SRM, IRM, WRNM DRY TUBE REPLACEMENT

TASK STANDARD(S):

LPRM removed and transported per the CCTAS and M-C-774-010
#### **TASK CONDITIONS:**

- 1. LPRM Replacement per M-C-774-010 is in progress
- 2. A copy of M-C-774-010 with section 5.4 ready to execute has been provided
- 3. A CCTAS has been provided
- 4. The 4 bundles around the LPRM are removed
- 5. The instrument handling tool is installed on the monorail aux hoist
- 6. Undervessel personnel have installed and tested the seal tube and flush fixture to LPRM 24-25

#### **INITIATING CUES:**

Shift supervision has directed you to execute the CCTAS for removal of LPRM 24-25 per M-C-774-010 Section 5.4

5

a de la participación de la contractiva de la consecuencia de la consecuencia de la consecuencia de la consecue

 $|\mathcal{Z}_{1}| \leq 1$ 

Critical Element(s) indicated by "\*" in Performance Checklist.

## PERFORMANCE CHECKLIST:

STEP	STANDARD	SAT/UNSAT
1. Verify the four core locations surrounding each instrument to be replaced are vacant	Bundles verified removed	
2. Ensure the proper operation of the instrument handling tool by actuatin tool and observing that both the up roller stop and lower slide move fee	Recognize tool is cycling correctly. Both the lower slide and the upper roller are extending and retracting	
CUE: While actuating the tool, it responds per the figures provided ( <b>Provide attache</b> <b>photos of the tool for JPM Step 2</b> )	ed	
3. *Press ENGAGE on hoist pendant place tool roller stop in the extende position	to ENGAGE depressed d	
CUE: ENGAGE has been depressed and roller stop has extended	the	
<ol> <li>Ensure refuel platform hoist mechanical stop (jam block) is set such that the tool lower slide is at least 5 feet 6 inches below the surfa of the water. Record on Attachmen</li> </ol>	Jam block setting verified	
CUE: "You set the jam blocks earlier to 5 f six and one half inches"	eet	
<ol> <li>*Per CCTAS, verify proper core location, then lower tool onto top guide with tool oriented such that th roller stop and slide point toward instrument to be removed</li> </ol>	Tool lowered onto top guide and pointing toward 24-25 e	
CUE: The tool is lowered and is resting or the top guide.		

en en en sterne de terret de la sterne de la seconda d

STEP	STANDARD	SAT/UNSAT
6. Request undervessel personnel perform Step 5.4.6	Undervessel personnel requested to perform Step 5.4.6 to install and test the	
CUE: Step 5.4.6 has been performed	flush fixture	
7. Using camera, ensure the tool is seated on the top guide and the slide in oriented toward instrument	Recognize correct seating and continue	
CUE: The tool appears as per the picture provided. (Provide camera view photo for JPM Step 7)		
<ol> <li>*Ensure hoist cable is taut by bumping hoist up to remove all slack or by performing safety bend</li> </ol>	Bump hoist up OR use safety bend on cable	
CUE: Cable is taut using (hoist / safety bend)		
9. *Press RELEASE on hoist pendant	Depress RELEASE on hoist pendant	
CUE: RELEASE is depressed		
10. Using camera, verify tool slide has extended and straddles instrument plunger	Ensure tool slide straddles instrument plunger	
CUE: The tool slide has extended and straddles the instrument plunger		L
11. *Lower tool using hoist or by releasing safety bend	Lower tool by lowering hoist or releasing safety bend	
CUE: Tool has been lowered		
12. Using camera, verify tool has depressed plunger out from top guide socket	Plunger verified to be free of the top guide socket	
CUE: The plunger has come down with the tool and is free of the top guide socket		
<ol> <li>*Press ENGAGE on hoist pendant and verify tool slide retracts instrument plunger into tool</li> </ol>	ENGAGE depressed. Tool slide verified to retract plunger into	
CUE: Engage is depressed and the tool slide has retracted the plunger into the tool		

۹ 4	STEP	STANDARD	SAT/UNSAT
14.	*Ensure access to upper elevations of drywell have been restricted as required by Health Physics prior to removing irradiated instruments	Contact drywell control point and notify that irradiated component movement is about to commence.	
CUE report of the	: Health Physics drywell control point ts that access to the upper elevations e drywell is restricted		
15.	Request undervessel personnel to backflush instrument housing per Step 5.4.16	Request undervessel crew commence backflush Step 5.4.16	
CUE comr	Backflush of LPRM 24-25 has nenced		
16.	WARNING: Health Physics shall monitor dose rates during raising, bending, and transport of the instrument. Raising of the instrument shall stop if radiation levels exceed 30 mr/hr at water surface with instrument 1 foot below water	Ensure Health Physics Technician is monitoring dose rates	
CUE: rates monit rates not ex	Health Physics is monitoring dose (if requested for updates later, simulate oring by providing slowly rising dose corresponding to raising the LPRM. Do cceed 15 mr/hr)		
17.	*When notified that flush has commenced, Raise instrument from core until it clears the core top guide	RAISE depressed on pendant controller	
18.	CUE: The LPRM is clear of the core top guide	Stop raising the LPRM	
19.	CUE: You have reached the termination point of the JPM. You may stop here.		

#### Comments:

10

Note: Any grade of UNSAT requires a comment.

SAT/UNSAT

JPM Overall Rating: \_\_\_\_

A. 30

المديقية وألا

#### **TASK CONDITIONS:**

- 1. LPRM Replacement per M-C-774-010 is in progress
- 2. A copy of M-C-774-010 with section 5.4 ready to execute has been provided
- 3. A CCTAS has been provided
- 4. The 4 bundles around the LPRM are removed
- 5. The instrument handling tool is installed on the monorail aux hoist
- 6. Undervessel personnel have installed and tested the seal tube and flush fixture to LPRM 24-25

## **INITIATING CUES:**

Shift supervision has directed you to execute the CCTAS for removal of LPRM 24-25 per M-C-774-010 Section 5.4

# CANDIDATE

# Instrument Handling Tool While Actuating Tool JPM Step 2

**EXELON NUCLEAR** 



# EXELON NUCLEAR Camera View for Step 5.4.7 JPM Step 7

# CANDIDATE

TRANSFEL . JTHORIZATION FOR FH-106 M-219966 Rev. 1/89 DOCTYPE 113

#### Page 1 of \_\_\_

#### SRM ONLY

·~ .

## Unit LIMERICK GENERATING STATION Date 6/3/02

#### Title TRAINING CCTAS

# Written By: <u>TRAINING USE ONLY</u>

Reviewed By: TRAINING USE ONLY

Authorized By: TRAINING USE ONLY

STEP NO.	COMPONENT SERIAL NO.	MOVE FROM	ORIENT	MOVE TO	ORIENT	FHD	RPO	CRO	SF	SRM COUNTRATE		DATE	TIME	
		-							A	в	Ċ	D		
118	LPRM L,123,XYZ	24-25	NONE	BENDER	NONE				NA	NA	NA	NA		
119	LPRM L,123,XYZ	BENDER	NONE	UNIT 1 SPENT FUEL POOL WALL	NONE				NA	NA	NA	NA		
	Above LPRM hung or	n Tag#			L									tê a
120	LPRM L,OU812	FUEL FLOOR	NONE	24-25	NONE				NA	NA	NA	NA		
			_											

JPM 2 CCTAS for Unit 1

CANDIDATE

TRANSFEL . JTHORIZATION FOR FH-106 M-219966 Rev. 1/89 DOCTYPE 113

SRM ONLY

## Unit LIMERICK GENERATING STATION Date 6/3/02

#### Title TRAINING CCTAS

Written By: TRAINING USE ONLY

Reviewed By: TRAINING USE ONLY

## Authorized By: TRAINING USE ONLY

STEP NO.	COMPONENT SERIAL NO.	MOVE FROM	ORIENT	MOVE TO	ORIENT	FHD	RPO	CRO	SI	RM CO	UNTRA	TE	DATE	TIME
									A	в	c	D		
118	LPRM L,123,XYZ	24-25	NÓNE	BENDER	NONE				NA	NA	NA	NA		
119	LPRM L,123,XYZ	BENDER	NONE	UNIT 2 SPENT FUEL POOL WALL	NONE				NA	NA	NA	NA		
	Above LPRM hung on	a Tag#												
120	LPRM L,OU812	FUEL FLOOR	NONE	24-25	NONE				NA	NA	NA	NA		

JPM 2 CCTAS for Unit 2

# CANDIDATE

Page 1 of .

Effective Date:

M-C-774-010 Rev 16 Page 1 of 61 JAD:jad

	LGS	PB
S/R	YES	YES
EQ	NO	NO
50.59	YES	YES

# FOR TRAINING FURPOSES ONLY

# **Exelon Nuclear**

LPRM / SRM, IRM, WRNM DRY TUBE REPLACEMENT

#### 1.0 **PURPOSE**

1.1 This procedure provides instructions for replacement of LPRMs <u>AND</u> replacement of SRM/IRM/WRNM dry tubes following disconnection <u>AND</u> preparation of the dry tube undervessel. This procedure also provides instruction for the replacement of the metal O-ring between an LPRM flange <u>AND</u> the mating incore housing flange (undervessel), <u>IF</u> required at Peach Bottom.

# 1.2 Section 5.0 of this procedure has been divided into the following subsections:

- 5.1 Preparation
- 5.2 Disconnection and Preparation of Instrument Undervessel
- 5.3 Transport of Bender to Reactor Cavity
- 5.4 Removal, Bending and Storage of Instrument
- 5.5 Removal of Bender from Reactor Cavity
- 5.6 Replacement of Metal O-Ring in LPRM Flange at Peach Bottom
- 5.7 Staging of New Instruments in Reactor Cavity
- 5.8 Installation of New Instruments
- 5.9 Assembly of Hardware Undervessel
- 5.10 Reseating of Leaking Instrument
- 5.11 Contingency Instrument Removal with Crow's Foot Tool
- 5.12 Contingency Instrument Removal with Bowing Tool
- 5.13 LPRM/Dry Tube Removal Tool Operating Instructions (PBAPS)

#### 2.0 APPARATUS AND SPECIAL EQUIPMENT

- **<u>NOTE:</u>** The following list of tools <u>AND</u> equipment are recommended for use in the performance of this procedure <u>AND</u> may be substituted with equivalent items, except as noted.
- 2.1 <u>Tools and Equipment</u>
- **NOTE:** The following are above vessel tools.
- 2.1.1 Instrument handling tool

- 2.1.2 Multiple LPRM strongback
- 2.1.3 Single LPRM strongback for LPRM Gamma Thermometer assemblies.
  - 2.1.4 LPRM bending tool with dedicated, approximately 20 ft long, wire rope sling
  - 2.1.5 Underwater camera system
  - 2.1.6 Light weight handling pole(s), as required
  - 2.1.7 Certified storage hooks <u>AND</u> cable, for each Instrument removed, overall length hook saddle to hook saddle 14.5 feet to 16 feet, with tags for vibra-etching (or equivalent) instrument S/N and Core Location (ref. 7.2.2).
  - 2.1.8 Certified slings <u>AND</u> rigging, as required (ref. 3.2.4).
  - 2.1.9 1 Ton hand chain hoist with approximate 20ft hand chain; only required <u>IF</u> up-ending of Bender is required.
  - 2.1.10 Fuel support covers, as required.
  - 2.1.11 Crow's foot for LPRM plunger, as required.
- 2.1.12 Bowing Tool, as required.
- 2.1.13 Hydraulic grippers, as required.
  - 2.1.14 Air ratchet/drill with variable speed <u>AND</u> in-line air shutoff valve (ball valve <u>OR</u> similar)for elevator operation (optional)
  - 2.1.15 LPRM/Dry Tube Removal Tool (PBAPS only, as required)
  - 2.1.16 Hardware to lock stored instruments, as required.
  - 2.1.17 Load binder to retain instruments in strongback.
  - 2.1.18 In-Core Guide Tube Seal (required <u>IF</u> replacement of metal oring in LPRM flange is planned).
  - 2.1.19 Air line controller with positive feature to prevent inadvertent operation. (Aux. platform only)
  - 2.1.20 Small buoyancy device(s) to maintain bender hose bundle nearly vertical (i.e. prevent it from interfering with vessel studs or entangling with other tools)(optional).

**<u>NOTE:</u>** The following are below vessel tools.

- 2.1.21 LPRM teflon seal wrenches, 6 inch AND 36 inch
- 2.1.22 LPRM nut runner

- 2.1.23 LPRM torque tube
- 2.1.24 Calibrated torque wrenches; range to torque 30 ft-lb; range to torque 95 ft-lb.
  - 2.1.25 Schedule 80 LPRM seal tubes <u>OR</u> other seal tubes approved through engineering analysis.
  - 2.1.26 Gamma Thermometer Seal Tube GE P/N 131C9362 (LGS only)
  - 2.1.27 Drain hose/filter unit
  - 2.1.28 Flush fixture
  - 2.1.29 LPRM nose pieces
  - 2.1.30 Socket wrenches, with 2-1/8 inch sockets, 2 inch sockets <u>AND</u> 36 inch extension
  - 2.1.31 Mini-cask AND liner, for hot filter removal
  - **<u>NOTE:</u>** Except as noted, materials may be substituted with approved equivalent items as approved by Reactor Services Technical Staff (RSTS).
  - 2.2 <u>Materials</u>
  - 2.2.1 Blank Information Tag (for hoist pendent)
  - 2.2.2 Lubricant, Nickel Never-Seeze, Nuclear Grade
  - 2.2.3 Solvent, Acetone
  - 2.2.4 Clean lint-free nylon gloves
  - 2.2.5 Clean lint-free cloths
  - 2.2.6 Tygon tubing (for drain hose)
  - 2.2.7 Drain filters
  - 2.2.8 Safety can for solvent-soaked wiping cloths
  - 2.2.9 Black <u>AND</u> White plastic Capture devices, one per Dry tube to be removed, <u>WHEN</u> using the LPRM/Dry tube removal tool(PBAPS).
  - 2.2.10 Nylon braided rope, approximately 160 ft.
  - 2.2.11 Source of Regulated Helium
- **NOTE:** Replacement parts that are <u>NOT</u> "Identical Items" shall be approved <u>AND</u> documented by Engineering prior to installation.

#### 2.3 <u>Replacement Parts</u>

- -2.3.1 KEL-F Seal (tip tubing adapter to calibration tube), as required
  - 2.3.2 LPRM Drip Skirts, as required
  - 2.3.3 TIP Tubing Adapters, as required
  - 2.3.4 Metallic O-ring for LPRM flange (required <u>IF</u> replacement of metal o-ring in LPRM flange is planned).
  - 2.3.5 For specific replacement parts associated with LPRM Gamma Thermometer assemblies, refer to ECR LG-94-10498.

#### 3.0 PRECAUTIONS AND LIMITATIONS

- 3.1 <u>Precautions</u>
- 3.1.1 Instruments removed from reactor core are highly radioactive.
- 3.1.2 A radiological survey shall be performed <u>WHEN</u> removing any item from the Fuel Pool <u>OR</u> Reactor Cavity.
- 3.1.3 Tooling <u>OR</u> equipment must be rinsed with demineralized water as it is removed from Fuel Pool <u>OR</u> Reactor Cavity.
  - 3.1.4 <u>WHEN</u> removing Instruments, the jamming block on the appropriate refueling platform hoist shall be set such that the Instrument handling tool slide will remain at least 5 foot 6 inches below water surface.
  - 3.1.5 Never use more than one swivel adapter on the hoist cables. The upper female thread is <u>NOT</u> the same size as the lower male thread <u>AND</u> therefore <u>NOT</u> compatible.
  - 3.1.6 Use extreme caution <u>WHEN</u> working undervessel so as to <u>NOT</u> bump <u>OR</u> damage instruments <u>OR</u> tip tubes. Bumping instrument while seal tube and instrument nut is removed could cause a burst of highly contaminated water to discharge from housing flange (ref. 7.4.14).
  - 3.1.7 Debris <u>OR</u> foreign material introduced into reactor cavity has the potential to become a future radiological hazard <u>OR</u> cause equipment <u>OR</u> fuel damage. Extreme care shall be exercised in maintaining cleanliness <u>AND</u> foreign material exclusion.
  - 3.1.8 <u>WHEN NOT</u> in use, main fuel grapple must be FULL UP <u>AND</u> auxiliary hoists positioned to prevent damaging hoist cables <u>OR</u> attached tools.

M-C-774-010 Rev. 16 Page 5 of 61

- 3.1.9 Whenever moving a tool into <u>OR</u> out of top guide, monitor air hose so that it does <u>NOT</u> slacken <u>AND</u> jam between top guide <u>AND</u> tool.
  - 3.1.10 New Instruments must be handled with clean gloves at all times to safeguard against hand print smears.
  - 3.1.11 Limerick assemblies 20-S400-32-49 <u>AND</u> 20-S400-40-41 are LPRM Gamma Thermometers which are different than other LPRM assemblies. Voltage is provided to the thermometer via panel 20L106, breaker #22 which should be blocked prior to working on these assemblies. Refer to ECR LG 94-10498.
  - 3.1.12 Ball shut-off valve <u>OR</u> similar air shut-off valve must be installed near air ratchet, <u>IF</u> used, for emergency stop of elevator.
  - 3.1.13 <u>WHEN</u> using air drive tool to raise elevator, raise elevator at very slow speed only. Remain alert <u>AND</u> cease raising should elevator bind on guide pole.
  - 3.1.14 <u>IF</u> in-vessel inspection/repair equipment is used in the reactor vessel concurrent with performance of this procedure, <u>THEN</u> use extreme caution to avoid interference between components being handled.

3.1.15

LIMERICK

Step 3.1.15 does NOT apply.

#### PEACH BOTTOM

WHEN using the LPRM/Dry tube removal tool, <u>THEN</u> the capture devices must be installed with the smaller diameter opening facing up. <u>IF</u> installed incorrectly, <u>THEN</u> fragmentation of the capture device is possible.

M-C-774-010 Rev. 16 Page 6 of 61

#### 3.2 Lim<u>itations</u>

- 3.2.1 Load handling over irradiated fuel shall be suspended upon the loss of fuel floor secondary containment. In lieu of operable secondary containment, the acceptability of load handing operations (without secondary containment) may be evaluated <u>AND</u> documented in accordance with PECO Calculation LM-033 <u>OR</u> other engineering approved evaluation.
- 3.2.2 IF systems <u>OR</u> equipment required to be operable per FH-105 (LGS) <u>OR</u> FH-6C (PBAPS) for core component transfers <u>OR</u> load handling over irradiated fuel becomes inoperable, <u>THEN</u> as required by FH-105 <u>OR</u> FH-6C discontinue instrument handling <u>AND</u> handling of loads over irradiated fuel.
- 3.2.3 Handling of the LPRM Strongback <u>AND</u> Bender shall be conducted at the lowest height practicable. At no time shall strongback be moved over the reactor cavity with the strongback pivot point higher than 55'' above the Fuel Floor. Note that this correlates to approximately 6'' between top of cavity handrails and strongback (ref. 7.4.9).
- 3.2.4 Rigging hardware, except for dedicated 20 ft long wire rope sling, used for handling bender <u>OR</u> multiple strongback over fuel shall be rated for 1 Ton minimum.
- 3.2.5 Spent instruments shall be stored in accordance with requirements of A-C-132 `Spent Fuel Pool Material Storage/Inventory <u>AND</u> Housekeeping''.
  - 3.2.6 Movement of Instruments shall be documented on the CCTAS provided by the Reactor Engineer.
  - 3.2.7 All hardware <u>AND</u> fasteners must be positively secured with lockwire, tack welds, cotter pins <u>OR</u> other approved method to prevent any part from dropping into Fuel Pool, Reactor Cavity, <u>OR</u> Equipment Pool.
  - 3.2.8 During movement of Overhead Crane, designated rigger <u>AND</u> crane operator shall be in voice contact using wireless communication whenever line of sight communication is <u>NOT</u> possible.
  - 3.2.9 Verification Points have been established <u>AND</u> shall be implemented in accordance with A-C-33.
  - 3.2.10 Maintenance Supervision <u>AND</u> Reactor Engineering, as appropriate, shall be notified immediately of abnormal conditions. Abnormal conditions <u>AND</u> corrective actions taken shall be documented in the Remarks Section of this procedure.
- 3.2.11 In-Vessel work activities shall be supervised by qualified Fuel Handling Directors (ref. 7.2.7).

M-C-774-010 Rev. 16 Page 7 of 61

- 3.2.12 Steps of this procedure performed per CCTAS shall be double verified by the Refuel Platform Operator <u>AND</u> Fuel Handling Director <u>AND</u> documented on the CCTAS.
- 3.2.13 <u>WHEN</u> using a torque wrench where the exact target torque value is <u>NOT</u> achievable <u>AND</u> <u>NO</u> range is given, the final torque value shall be the next setting <u>OR</u> the closest increment marking above the target value.
- 3.2.14 LPRM/Dry Tube Removal Tool may be used as primary tool, i.e. it is <u>NOT</u> a requirement of this procedure to first attempt instrument removal with Instrument Handling Tool.
- 3.2.15 Sections 5.2 through 5.13 may be performed out of sequence <u>OR</u> in parallel to suit field conditions per the discretion of the Lead Maintenance Technician (LMT).
- 3.2.16 The Auxiliary Platform may be used to install non-irradiated nuclear instrumentation (LPRM's, Wide Range Nuclear Monitors OR SRM/IRM Dry Tubes) (Reference 7.4.11 and 7.4.13).
- 3.2.17 All verifications require initials <u>AND</u> date.
- 4.0 **PREREQUISITES**
- 4.1 **RECORD** Work Order number.

**<u>NOTE:</u>** Prerequisites do <u>NOT</u> apply to Sections 5.1 <u>AND</u> 5.2.

4.2

LIMERICK VERIFY Prerequisites of FH-105 are complete.

PEACH BOTTOM

**VERIFY** Prerequisites are complete for FH-6C.

WV

4.3 <u>IF</u> Dry tube to be replaced is an SRM/IRM, <u>THEN</u> **VERIFY** via documentation review that detector is disconnected <u>AND</u> secured in fully inserted position <u>OR</u> has been removed from dry tube.

M-C-774-010 Rev. 16 Page 8 of 61

4.4 **NOTIFY** Shift Supervision that this procedure is to be performed.

Loe Thesro Person Contacted

- 4.5 **ENSURE** communications are established between Control Room, Refueling Platform or Auxiliary Platform, <u>AND</u> Undervessel.
- 4.6 **ENSURE** ALARA briefing has been performed prior to performing work undervessel.
- 4.7 <u>IF</u> LPRM housing flange metallic O-ring replacement is planned at Peach Bottom, <u>THEN</u> CONSIDER performing Mock-up training with qualified FHD <u>AND</u> craft personnel for planned activities.
- 4.8 Prerequisites complete, precautions <u>AND</u> limitations understood.

M-C-774-010 Rev. 16 Page 9 of 61

#### 5.0 PROCEDURE

- 5.1 <u>Preparation</u>

Subsection Required: YES  $\nearrow$  NO\_\_\_\_

- **<u>NOTE:</u>** The term "Instrument" refers to either the LPRM <u>OR</u> the IRM/SRM/WRNM dry tube assembly.
- 5.1.1 **NOTIFY** Reactor Engineering that procedure is to be performed <u>AND</u> request the preparation of Special Nuclear Material (SNM) accounting sheets <u>AND</u> a Core Component Transfer Authorization Sheet (CCTAS).

Bill There Person Contacted

5.1.2

LIMERICK

<u>IF</u> work is to be performed on LGS LPRM Gamma Thermometer assemblies, 20-S400-32-49 <u>OR</u> 20-S400-40-41, **ENSURE** breaker #22 in 20L106 is blocked OPEN.

NA

PEACH BOTTOM

Step 5.1.2 does <u>NOT</u> apply.

5.1.3 <u>IF</u> replacing LPRMs, **ENSURE** LPRM signal cables are disconnected in main control room (PB) <u>OR</u> LPRM detector power supply is disconnected in Aux Equipment Room (LGS) for LPRMs being replaced. <u>IF</u> assembly to be removed is a gamma thermometer, <u>THEN</u> inform I&C <u>AND</u> refer them to ECR LG-94-10498 for details. <u>IF</u> replacing WRNMs, <u>THEN</u> **ENSURE** WRNM high voltage cable is disconnected in main control room <u>OR</u> in pre-amp panel.

5.1.4 **ENSURE** that new LPRMs/WRNMs are examined in accordance with procedure M-C-774-008.

Thinspector

M-C-774-010 Rev. 16 Page 10 of 61

5.1.5 ENSURE new LPRMs/WRNMs have been tested by I&C as required by station I&C procedures.

- **<u>NOTE:</u>** Seal tubes for LPRM Gamma Thermometer assemblies are longer than standard LPRM seal tubes. GE P/N 131C9362 should be used for Gamma Thermometer LPRMs.
- 5.1.6 **ENSURE** seal tubes have been visually inspected, especially the threaded area, <u>AND</u> leak tested by holding station demineralized water pressure for ten minutes with no leaks.

- 5.1.7 **ENSURE** bending tool has been assembled, inspected <u>AND</u> functionally tested per M-C-797-110 <u>OR</u> an approved work order activity.
- 5.1.8 <u>IF</u> air drive tool will be used for elevator operation <u>THEN</u> ENSURE air shut-off valve (ball valve <u>OR</u> similar) is installed in air line near drive tool.
- 5.1.9 **ENSURE** bending tool has been set-up as follows:
  - 1. ENSURE hydraulic hoses are bundled together.
  - 2. POSITION pump station at cavity curb to minimize interference with other equipment and activities. "7 O'Clock" position <u>WHEN</u> looking down on cavity with Fuel Pool at "12 O'Clock" is recommended.
  - 3. **ENSURE** pump reservoir water level is 1-3 inches below top of reservoir.
  - 4. **CONNECT** station service air to pump <u>AND</u> ensure regulator is set at approximately 45 psi air pressure.
  - 5. CONNECT hydraulic lines using color coded indicators.
  - 6. <u>IF</u> desired, <u>THEN</u> **ATTACH** small buoyancy device to hose bundle approximately 25 - 30 ft from bender mechanism (this will maintain hose nearly vertical to avoid snagging on studs or other service tools).

M-C-774-010 Rev. 16 Page 11 of 61

#### 5.1.10 **INSTALL** Instrument handling tool as follows:

- 1. Using a single swivel adapter, **THREAD** adapter into grapple stud past view port in grapple stud.
- 2. TORQUE swivel adapter jam nut to 25-30 ft.lbs.

MV WV

- 3. PLACE roller stop pin in storage position.
- 5.1.11 **ENSURE** demineralized water hose has been routed to undervessel area.
- 5.1.12 **NOTIFY** Health Physics that this procedure is to be performed <u>AND</u> **REQUEST** preparations be made to restrict access to upper elevations of the drywell.

Fred Theradter Person Contacted

- 5.1.13 **ENSURE** Health Physics has performed a smear survey of each LPRM in accordance with ST-O-107-494-0 (LGS) within 30 days prior to LPRM installation.
  - 5.1.14 **ENSURE** required number of storage hooks/cables are available with tags indicating instrument S/N <u>AND</u> Core Location per the CCTAS.

<u>//</u>

5.1.15 **VERIFY** instrument storage area in pool <u>AND</u> travel path for storage of instruments is clear of obstructions.

5.1.16 **VERIFY** Health Physics has locks <u>AND</u> keys as required to lock stored instruments.

TODAN INITIAL AND DATE indicating subsection complete. 5.1.17

M-C-774-010 Rev. 16 Page 12 of 61

5.2 <u>Disconnection and Preparation of Instrument Undervessel</u>

Subsection Required: YES  $\nearrow$  NO\_\_\_\_

#### CAUTION

Use extreme care while moving <u>AND</u> working undervessel to avoid bumping <u>AND</u> damaging instrumentation <u>OR</u> TIP tubing.

#### DOUBLE VERIFICATION

5.2.1 **VERIFY** correct core location using tagging on Instrument (<u>IF</u> present) <u>AND</u> labeling on adjacent support steel <u>AND</u> components. **RECORD** on Attachment 6.

**NOTES:** Steps 5.2.2 through 5.2.6 apply to LPRM only.

LPRM Gamma Thermometer TIP Tube adapters do <u>NOT</u> have wrench flats on LPRM end.

5.2.2 ENSURE TIP tube adapter is removed <u>AND</u> stored.

M-C-774-010 Rev. 16 Page 13 of 61



Figure 1

#### CAUTION

Cutting of any cables <u>EXCEPT</u> those protruding directly from LPRM to be replaced will lead to extensive rework <u>AND</u> dose exposure. Ensure cut is performed on reactor vessel side of connector.

#### DOUBLE VERIFICATION

- 5.2.3 **CUT** cables protruding from LPRM flush with bottom of LPRM per Figure 1 <u>AND</u> leave "stub piece" connected to signal cable to protect connector. **RECORD** on Attachment 6. (Ref. 7.4.15)
- 5.2.4 **REMOVE** sleeve <u>AND</u> drip skirt <u>AND</u> store.

# **NOTE:** A 2-1/8 inch socket wrench may be required instead of a 2-inch socket wrench for removal of the nut.

5.2.5 **REMOVE** AND **STORE** the following:

- 1. Teflon seal
- 2. Nut
- 3. Washer
- NOTE: GE P/N 131C9362 should be used for Gamma Thermometer assemblies.
- 5.2.6 <u>IF</u> LPRM Gamma Thermometer is being installed <u>OR</u> removed, <u>THEN</u> ENSURE longer seal tube is installed.
- 5.2.7 **INSPECT** threads on seal tube <u>AND</u> Instrument housing flange. **REWORK** threads <u>OR</u> **REPLACE** seal tube as required.
- 5.2.8 **APPLY** thread sealant on seal tube threads <u>AND</u> **INSTALL** tube onto housing flange.
- 5.2.9 Securely **TIGHTEN** seal tube to housing flange.
- 5.2.10 CLOSE seal tube valve.

5.2.11

LIMERICK

Step 5.2.11 does NOT apply.

#### PEACH BOTTOM

**ENSURE** filter is installed for drywell sump <u>AND</u> water level is sufficient in sump. <u>IF</u> water level is <u>NOT</u> sufficient, <u>THEN</u> **NOTIFY** Reactor Operator <u>AND</u> **ADD** demineralized water.

INITIAL AND DATE indicating subsection complete.2 5.2.12

M-C-774-010 Rev. 16 Page 15 of 61

#### 5.3 Transport of Bender to Reactor Cavity

Subsection Required: YES <u>NO</u>

NOTES: All rigging hardware, except for the dedicated 20 ft wire rope sling, called for in this section shall be certified <u>AND</u> rated for a minimum of 1 Ton. The dedicated 20 ft wire rope sling has a safe working load of 1250 lbs.

Only one of the following three steps is required for transport of bender to cavity.

- 5.3.1 <u>IF</u> LPRM Bender is assembled <u>AND</u> staged in bender stand, <u>THEN</u> **PERFORM** the following:
  - 1. **ENSURE** Bender elevator is lowered at least 3 feet from its full up position.
  - 2. ENSURE dedicated wire rope sling is attached to Bender lifting bail.
  - 3. ATTACH dedicated sling to overhead crane hook.
- **NOTE:** Depending on storage location, the dedicated LPRM bender sling may <u>NOT</u> permit raising the Bender to a height sufficient for transport to the reactor vessel. A shorter sling may be used with the other crane hook for transport to the reactor vessel.
  - 4. <u>IF</u> necessary, **ATTACH** a certified 12 foot (<u>OR</u> shorter) sling <u>AND</u> shackles (<u>IF</u> required) to Bender lifting bail <u>AND</u> to other overhead crane hook.

#### CAUTION

<u>IF</u> bender is raised excessively while in stand, elevator will come in contact with bottom surface of stand. At PBAPS, clearance between bender winch square drive <u>AND</u> handrail is small; use extreme caution to avoid contact with handrail.

- 5. Using crane hook with shorter sling (<u>IF</u> used), **RAISE** Bender approximately 1 foot, <u>THEN</u> **TRAVERSE** Bender away from stand.
- 6. **RAISE** bender approximately 10 feet, <u>THEN</u> MOVE bender to position over reactor vessel.
- 7. IF necessary, **RAISE** crane hook with dedicated sling <u>AND/OR</u> LOWER crane hook with shorter sling as required to transfer bender to longer dedicated sling.

5.3.1 (cont)

- IF necessary, **DISCONNECT** AND **REMOVE** shorter sling from 8. Bender.
- IF LPRM Bender is to be moved to cavity with lower guide 5.3.2 pole NOT attached to upper guide pole, THEN PERFORM the following:
  - ENSURE bender elevator is at full up position. 1.
  - Using certified rigging, MOVE upper portion of bender 2. into vertical position over reactor cavity.
  - ATTACH rope lanyard to lower pole section AND carefully 3. manually **POSITION** pole section in cavity below bender.
  - ATTACH lower half of guide pole AND ENSURE grooves in 4. pole sections align with each other.
  - ENSURE lock mechanism AND/OR alignment pin are secure 5. to lock pole sections.
  - ENSURE dedicated sling is used to support bender AND 6. crane hook is raised near upper limit.
- IF LPRM Bender is to be moved to cavity from Fuel Floor 5.3.3 while fully assembled, THEN PERFORM the following:

#### CAUTION

Extreme care must be used WHEN handling Bender. Bending of Guide pole will render tool inoperable.

- ENSURE bending tool elevator is at full up position. 1.
- ENSURE dedicated wire rope sling is attached to Bender 2. lifting bail.
- ATTACH dedicated sling to overhead crane hook using a 3. sling AND shackle (IF required).

#### CAUTION

Do NOT attach sling directly to bail since this may induce excessive side pull on bail during lift.

ATTACH a certified sling 6-10 foot long, with shackles 4. (IF required), between top of Bender AND the same overhead crane hook as dedicated sling was attached to.

#### 5.3.3 (cont)

- -<u>NOTE:</u> Positioning of up-ending sling in the following step minimizes stresses induced on the guide pole splice connection.
  - 5. **ATTACH** ``up-ending'' nylon sling, approximately 10-15 feet long in a choker hitch, to bender guide pole approximately 2 feet below pole splice connection.
  - 6. **ATTACH** up-ending sling to <u>other</u> overhead crane hook using hand chain hoist, slings <u>AND</u> shackles. **PAY OUT** approximately 10-20 feet of load chain to keep crane hook up high.
  - 7. **RAISE** Bender in horizontal configuration, <u>THEN</u> **MOVE** lower end of bender over reactor cavity handrail.
  - 8. Using chain hoist, LOWER bottom of Bender into reactor cavity <u>UNTIL</u> Bender is in vertical position.
  - 9. **RAISE** bender as required <u>AND</u> **REMOVE** up-ending sling from bender.
  - 10. **ATTACH** Bender bail to free crane hook using slings <u>AND</u> shackles as required, <u>THEN</u> **TRANSFER** weight to this crane hook.
  - 11. **DISCONNECT** 6-10 foot sling from crane hook with dedicated sling.
  - 12. **RAISE** crane hook with dedicated sling <u>AND/OR</u> LOWER Bender to transfer Bender weight to dedicated sling.
  - 13. **REMOVE** rigging <u>NOT</u> in use <u>OR</u> **SECURE** rigging as required for Bender removal.
  - 5.3.4 INITIAL AND DATE indicating subsection complete.
  - 5.4 Removal, Bending and Storage of Instrument

Subsection Required: YES  $\chi$  NO

**NOTES:** This subsection <u>AND</u> all following subsections of this procedure apply to SRM/IRM/WRNM dry tubes <u>AND</u> LPRMs <u>EXCEPT</u> as indicated.

Performance of this section requires undervessel workers to backflush Instrument housing <u>WHEN</u> Instrument is removed.

5.4.1 **VERIFY** the four core locations surrounding each instrument to be replaced are vacant.

M-C-774-010 Rev. 16 Page'18 of 61

- 5.4.2 **ENSURE** proper operation of Instrument handling tool by actuating tool <u>AND</u> observing that both the upper roller stop AND the lower slide move freely.
  - 5.4.3 **PRESS ENGAGE** on hoist pendent to place tool roller stop in the extended position.

#### DOUBLE VERIFICATION

- 5.4.4 **ENSURE** refuel platform hoist mechanical stop (Jam Block) is set such that tool lower slide is at least 5 feet 6 inches below surface of water. **RECORD** on Attachment 6.
- 5.4.5 Per CCTAS, **VERIFY** proper core location, <u>THEN</u> LOWER tool onto top guide with tool oriented such that roller stop <u>AND</u> slide point toward Instrument to be removed.
- **NOTE:** Step 5.4.6 may proceed in parallel with subsequent fuel floor steps.
- 5.4.6 **REQUEST** Undervessel personnel to **INSTALL** <u>AND</u> **TEST** flush fixture as follows:
  - 1. **CONNECT** flush fixture to seal tube <u>AND</u> **ENSURE** demineralized water supply hose is attached.
  - 2. CLOSE flush fixture drain valve.
  - 3. **OPEN** seal tube valve.
  - 4. **OPEN** demineralized water supply valve to check for leaks. <u>IF</u> excessive leakage is noted <u>THEN</u> **CLOSE** seal tube valve <u>AND</u> demin water supply valve <u>AND</u> **REWORK** as required prior to continuing.
  - 5. **CLOSE** demin water supply valve.
  - 6. CLOSE seal tube valve.
  - 7. MOVE to low dose area until fuel floor is ready to flush instrument housing <u>AND</u> NOTIFY Fuel Floor crew step is complete.
- 5.4.7 Using camera, ENSURE tool is seated on top guide <u>AND</u> tool slide is oriented toward Instrument.
- 5.4.8 **ENSURE** hoist cable is taut by bumping hoist up to remove all slack <u>OR</u> by performing safety bend.
- 5.4.9 **PRESS** RELEASE on hoist pendent.
- 5.4.10 Using camera, **VERIFY** tool slide has extended <u>AND</u> straddles instrument plunger.

M-C-774-010 Rev. 16 Page 19 of 61

- NOTE: During the following step, the tool should lower approximately 1-1/2 inches as tool depresses Instrument plunger.
  - 5.4.11 LOWER tool using hoist <u>OR</u> by releasing safety bend.
  - 5.4.12 Using camera, **VERIFY** tool has depressed plunger out from top quide socket.
  - 5.4.13 <u>IF</u> plunger is stuck <u>THEN</u> **PROCEED** to Sections 5.11, 5.12 <u>OR</u> 5.13.
  - 5.4.14 **PRESS** ENGAGE on hoist pendant <u>AND</u> **VERIFY** tool slide retracts Instrument plunger into tool.
  - 5.4.15 **ENSURE** access to upper elevations of drywell have been restricted as required by Health Physics prior to removing irradiated Instruments.
  - **NOTE:** As soon as backflush is started, Fuel Floor crew should proceed with performance of Step 5.4.17. <u>IF</u> housing flange O-Ring replacement is planned flush time should be increased from 3 minutes to 5 minutes.
  - 5.4.16 **REQUEST** Undervessel personnel to **BACKFLUSH** instrument housing as follows:
    - 1. **VERIFY** flush fixture drain valve closed.
    - 2. OPEN seal tube valve.

ł

1

- 3. OPEN Demin water supply valve.
- 4. NOTIFY Fuel Floor personnel flush is started.
- 5. FLUSH for minimum of 3 minutes, <u>THEN</u> CLOSE demin water supply valve.
- 6. **CLOSE** seal tube valve.
- 7. **OPEN** flush fixture drain valve, <u>THEN</u> **REMOVE** flush fixture from seal tube, <u>IF</u> required.

M-C-774-010 Rev. 16 Page'20 of 61

#### CAUTION

While raising Instrument, care must be taken to prevent boss rings <u>OR</u> bottom portion of Instrument from catching on core Top Guide.

#### WARNING

Health Physics shall monitor dose rates during raising, bending, <u>AND</u> transport of the Instrument. Raising of the Instrument shall stop <u>IF</u> radiation levels exceed 30 mr/hr at water surface with Instrument 1 foot below water.

- 5.4.17 <u>WHEN</u> notified that flush has commenced, **RAISE** Instrument from core <u>UNTIL</u> it clears core top guide.
- 5.4.18 **MOVE** Instrument <u>AND</u> bending tool adjacent to vessel wall closest to the transfer canal <u>OR</u> other vessel wall area clear of obstructions.

#### WARNING

Elevator of bending tool must be lowered to the full down position in order to bend the Instrument approximately in the middle. Failure to bend the Instrument in the middle will result in reduced water coverage over hot end of Instrument <u>AND</u> possible high radiation levels during raising AND transport of Instrument to fuel pool.

Air shut-off valve must be installed in-line to air drive tool, <u>IF</u> used, for emergency stop of elevator in case of air drive tool malfunction.

#### DOUBLE VERIFICATION

- 5.4.19 LOWER bending tool elevator to full down position <u>AND</u> visually VERIFY elevator is full DOWN as follows. RECORD completion on Attachment 6.
  - 1. **VERIFY** winch cable is slack.
  - 2. Using camera, **VERIFY** scribe mark on inner tube is visible above elevator.
  - 3. <u>IF</u> present, <u>THEN</u> **VERIFY** existing tape mark on winch cable is next to cable guide roller.

M-C-774-010 Rev. 16 Page 21 of 61

- 5.4.20 <u>IF</u> this is the first of several bending operations, <u>THEN</u> MARK hoist cable with a piece of tape next to cable guide roller.
  - 5.4.21 **MOVE** Instrument into clamp on bending tool, between mandrel AND roller.
  - 5.4.22 **MOVE** Instrument vertically as required to align top of Instrument with red bands on bender guide tube.
  - 5.4.23 **CLAMP** Instrument in bender by moving clamp cylinder control valve to ON position <u>UNTIL</u> pump stalls, <u>THEN</u> **RETURN** valve to STOP position.
  - 5.4.24 **VERIFY** engagement of instrument relative to clamp <u>AND</u> mandrel (i.e. in the ``saddle'') using underwater camera at multiple angles <u>AND</u> views as required (ref. 7.4.12).

#### CAUTION

<u>IF</u> instrument is bent an excessive amount, plunger of Instrument may break off <u>OR</u> damage to Instrument handling tool may occur.

- 5.4.25 **BEND** Instrument a slight amount by moving bending cylinder control valve to BEND position <u>UNTIL</u> bend starts, <u>THEN</u> **STOP** bending by moving valve to STOP position.
  - 5.4.26 **PRESS** RELEASE on hoist pendant control to release Instrument handling tool from Instrument.

#### CAUTION

<u>IF</u> instrument is bent excessively during the initial bend, it will hit the vessel flange <u>AND</u> possibly cause damage <u>OR</u> Instrument plunger to break off.

Do  $\underline{\text{NOT}}$  exceed 1150 psig hydraulic pressure (pressure relief valve is set for 1200 psi).

- 5.4.27 **BEND** Instrument approximately 90 degrees by moving bending cylinder control valve to ``BEND'' position, <u>THEN</u> **RETURN** valve to STOP position.
  - <u>IF</u> tool stalls <u>OR</u> bends instrument very sluggishly, <u>THEN</u> **INCREASE** air pressure regulator, as required, to a maximum <u>hydraulic</u> pressure of 1150 psi.

M-C-774-010 Rev. 16 Page 22 of 61

#### CAUTION

<u>WHEN</u> using air drive tool to raise elevator, raise elevator at very slow speed only. Remain alert <u>AND</u> cease raising should elevator bind during operation.

- 5.4.28 <u>WHILE</u> monitoring motion of elevator, slowly **RAISE** elevator while concurrently completing bend of Instrument to approximately 180 degrees.
- 5.4.29 **RAISE** elevator <u>UNTIL</u> bent portion of instrument is just below water surface.
- **NOTE:** During ``RETRACT'' operation in the following step it is <u>NOT</u> necessary to run pump <u>UNTIL</u> it stops (stalls). Doing so unnecessarily applies high forces <u>AND</u> pressure on tool components.
- 5.4.30 **RETRACT** bending roller by moving the bending cylinder control valve to the RETRACT position <u>UNTIL</u> roller is fully retracted, <u>THEN</u> **MOVE** valve to ``STOP'' position.
- 5.4.31 <u>IF</u> using air drive ratchet to operate bender, <u>THEN</u> **ENSURE** air hose is positioned to allow refuel platform travel to the spent fuel pool.
- 5.4.32 **ENGAGE** Instrument with J-hook as approved by the Fuel Handling Director.
  - **<u>NOTE:</u>** During unclamping operation in the following step it is <u>NOT</u> necessary to run pump UNTIL it stops running (stalls).

#### CAUTION

The following step will release the Instrument from the bender. Securely hold onto rigging assembly. Instrument weight is approximately 75 lbs.

- 5.4.33 <u>WHILE</u> maintaining an upward pull on Instrument, **RELEASE** clamp by moving clamp cylinder control valve to ``OFF'' position <u>UNTIL</u> pump begins to stall, <u>THEN</u> **MOVE** valve to ``STOP'' position.
- 5.4.34 Slowly MOVE Instrument away from bender.
- 5.4.35 **ENGAGE** Instrument with safety latched fuel pool storage hook assembly.

M-C-774-010 Rev. 16 Page 23 of 61

#### CAUTION

Plunger at top of Instrument may be brittle <u>AND</u> susceptible to breaking. Use care <u>WHEN</u> traversing cattle chute <u>AND</u> transfer canal to keep the Instrument plunger from dragging.

5.4.36 **MOVE** Instrument to fuel pool <u>AND</u> **STORE** in accordance with CCTAS <u>AND</u> A-C-132, **X** Spent Fuel Pool Material Storage/Inventory <u>AND</u> Housekeeping''.

5.4.37 INITIAL AND DATE indicating subsection complete.\_\_\_

WV

5.5 Removal of Bender from Reactor Cavity

Subsection Required: YES\_\_\_\_ NO\_\_\_\_

WV

**NOTES:** All rigging hardware called for in this section shall be certified <u>AND</u> rated for a minimum of 1 Ton.

Only one of the following three steps is required for transport of bender from the reactor cavity.

- 5.5.1 IF LPRM Bender will be transferred to bender stand, THEN **PERFORM** the following:
  - **NOTE:** Depending on storage location, the dedicated LPRM bender sling may <u>NOT</u> permit raising the Bender to a height sufficient for transport to the bender stand. A shorter sling may be used with the other crane hook for transport to the bender stand.
    - 1. **ENSURE** bending tool elevator is lowered at least 3 feet from its full up position.
    - 2. <u>IF</u> necessary, **ATTACH** a certified 12 foot <u>OR</u> shorter sling, with shackles (<u>IF</u> required), to Bender lifting bail <u>AND</u> to <u>other</u> overhead crane hook.

#### 5.5.1 (cont)

#### CAUTION

Bender must be raised approximately 6 ft. above vessel flange to clear ledge to equipment pool (LGS). Bender must also be at proper height to enter stand otherwise it will come in contact with bottom surface of stand. At PBAPS, clearance between bender winch square drive AND handrail is small. Use extreme caution to avoid contact with handrail.

- RAISE bender such that bottom end of guide pole will 3. clear obstructions THEN MOVE bender adjacent to stand.
- LOWER Bender to enter stand, THEN MOVE bender into 4. stand AND LOWER load.
- DISCONNECT rigging from Bender. 5.
- IF LPRM bender is to be moved to Fuel Floor by disassembling 5.5.2 lower guide pole, THEN **PERFORM** the following:
  - ENSURE bender is at full up position. 1.
  - ATTACH a short certified rigging sling between bender 2. AND other overhead crane hook.
  - 3. With Health Physics support, RINSE bender with water AND RAISE bender as required to access pole splice connection.
  - ATTACH rope lanyard to lower guide pole section. 4.
  - DISASSEMBLE AND/OR UNLOCK mechanism securing pole 5. sections.
  - Carefully **DISCONNECT** lower guide pole <u>AND</u> **STORE**. 6.
  - **REMOVE** bender from cavity <u>AND</u> carefully **STORE**. 7.

M-C-774-010 Rev. 16 Page 25 of 61

- 5.5.3 <u>IF</u> LPRM Bender is to be moved to Fuel Floor fully assembled, <u>THEN</u> **PERFORM** the following:
  - 1. ENSURE bending tool elevator is at full up position.

**NOTE:** The next step will permit raising the bender high enough to traverse away from reactor vessel <u>AND</u> permit attachment of a sling to up-end the bender.

#### CAUTION

Do <u>NOT</u> attach sling directly to bail since this may induce excessive side pull on bail during lift.

- LOWER other crane hook, <u>THEN</u> ATTACH 6-10 foot sling, with shackles (<u>IF</u> required), between top of Bender <u>AND</u> the crane hook.
- 3. **RAISE** bender above vessel, <u>THEN</u> **MOVE** bender away from vessel.
- 4. **REMOVE** dedicated 20 ft wire rope sling from crane hook <u>AND</u> SECURE to Bender.
- <u>NOTE:</u> Positioning the up-ending sling in the following step minimizes stresses induced on the guide pole splice connection.

1

#### CAUTION

Extreme care must be used <u>WHEN</u> handling Bender. Bending of Guide pole will render tool inoperable.

- 5. ATTACH ``up-ending nylon sling, approximately 10-15 feet long, in a choker hitch to bender guide pole approximately 2 feet below pole splice connection.
- ATTACH up-ending sling <u>AND</u> hand chain hoist to <u>other</u> overhead crane hook using, slings <u>AND</u> shackles as required.
- 7. **RAISE** Bender into horizontal configuration, <u>THEN</u> **MOVE** bender over cavity handrail to fuel floor storage location.
- 8. **DISCONNECT** rigging from Bender.

5.5.4 **INITIAL** AND DATE indicating subsection complete.

M-C-774-010 Rev. 16 Page 26 of 61

#### 5.6 <u>Replacement of Metal O-Ring in LPRM Flange at Peach Bottom</u>

Subsection Required: YES\_\_\_\_NO\_\_\_

WV

**NOTES:** This section is approved for PBAPS only. This work is <u>NOT</u> considered OPDRV work as defined in GP-6 (less than 1.5 inch opening), since the minimum diameter of the incore housing (6280-M-1-B-58-4) is 1.38<sup>(\*)</sup>.

Reference Attachments 9 <u>AND</u> 10 for information about the Incore guide tube seal. The top of the seal engages the Top Guide but does <u>NOT</u> rest on the top guide. <u>WHEN</u> fully installed, the round bar protruding from the sides of the seal rests on the core plate. The round bar is attached to the bottom end of the rubber seal <u>AND</u> the body of the tool is effectively attached to the top of the rubber seal. <u>WHEN</u> the weight of the tool is transferred to the round bar, the seal is compressed <u>AND</u> expands.

Sign-offs are to be performed on Attachment 7.

- 5.6.1 **VERIFY** seal is free of foreign material <u>AND</u> that seal parts move freely (round bar should be able to move up slot without binding as seal is compressed).
- 5.6.2 Using a Jet Pump grapple <u>OR</u> rope, **LOWER** the seal into target location in core plate <u>UNTIL</u> tool engages Top Guide <u>AND</u> round bar rests on core plate <u>AND</u> hoist cable begins to go slack.
  - 5.6.3 While camera views round bar at core plate elevation, **PERFORM** gentle safety bends <u>AND</u> **VERIFY** round bar moves freely up slot as bar contacts core plate.
  - 5.6.4 **RELEASE** Jet Pump grapple from seal <u>OR</u> **SECURE** rope to cavity handrail.
  - 5.6.5 **INFORM** Maintenance Supervisor that guide tube seal is installed <u>AND</u> **RECORD** completion of seal installation on Attachment 7.
  - **NOTE:** The following steps are performed undervessel.
  - 5.6.6 ATTACH a drain line to the LPRM seal tube.
M-C-774-010 Rev. 16 Page 27 of 61

**NOTE:** Drainage of housing may take a considerable amount of time since volume being drained is a closed volume. Air will need to back fill through drain line to permit complete drainage.

#### CAUTION

As water drains from in-core housing, a potential exists for increased radiation from the flange area. Radiation levels must be monitored continuously <u>AND</u> draining shall be suspended <u>IF</u> dose rates exceed predetermined level.

5.6.7 Slowly **DRAIN** all water from housing.

### HP HOLD

- 5.6.8 **REMOVE** drain line <u>AND</u> Seal Tube <u>AND</u> immediately **PERFORM** a radiation survey of opening in housing flange. **RECORD** completion on Attachment 7.
- 5.6.9 **REMOVE** flange. **BAG** AND **TAG** bolts.
- 5.6.10 **REMOVE** old o-ring carefully so that as-found condition of oring is preserved.
- 5.6.11 **INSPECT** O-ring <u>AND</u> sealing surfaces of both flanges for defects <u>AND</u> abnormalities. Also **INSPECT** LPRM seating surface inside removed flange <u>AND</u> **RECORD** results in Remarks Section of this procedure.
  - **<u>NOTE:</u>** The following step is intended to verify that potential sources of foreign material are eliminated.
  - 5.6.12 **CLEAN** bolt holes in LPRM housing flange <u>AND</u> **WIPE** top surface of LPRM housing flange <u>AND</u> adjacent CRD housing flanges with a clean, lint free rag.

#### CAUTION

Repairs of sealing surface shall only be performed as authorized via separate Engineering approved documentation.

5.6.13 **CLEAN** O-ring sealing surface on both flanges <u>AND</u> seating surface for LPRM (inside removed flange).

M-C-774-010 Rev. 16 Page 28 of 61

- **NOTE:** Repair <u>OR</u> replacement of bolts <u>OR</u> flange requires a Repair/Replacement plan per A-C-80. Step 5.6.14 can be performed at any time prior to use of the parts.
  - 5.6.14 **ENSURE** inspection of any replacement parts has been performed by a Certified NDE Examiner.
  - 5.6.15 **ENSURE** bolts are inspected, cleaned <u>AND</u> lubricated. **ENSURE** four washers are clean <u>AND</u> free of defects.
  - 5.6.16 **VERIFY** new replacement O-ring is clean <u>AND</u> free of defects.
  - 5.6.17 **INSTALL** new O-ring in recess in flange.
  - 5.6.18 While carefully aligning flanges, **RAISE** flange into position against housing flange <u>AND</u> **INSTALL** bolts (with washers) hand tight.
  - 5.6.19 Using a star pattern <u>AND</u> multiple passes, **SNUG UP** bolts with wrench.

#### DOUBLE VERIFICATION

5.6.20 **TORQUE** bolts using standard torquing pattern for all four passes. **RECORD** completion on Attachment 7.

1st pass: 25 ft-lbs
2nd pass: 50 ft-lbs
3rd pass: 75 ft-lbs
4th pass: 75 ft-lbs

- 5.6.21 APPLY thread sealant on seal tube threads <u>AND</u> INSTALL tube onto housing flange.
- 5.6.22 Securely **TIGHTEN** seal tube to housing flange.
- 5.6.23 CLOSE seal tube valve.
- 5.6.24 IF Leak Test will be performed, <u>THEN</u> **PERFORM** the following:
  - 1. <u>IF</u> more than approximately 1 hour has elapsed since seal tube was installed, <u>THEN</u> CONNECT a drain hose to seal tube <u>AND</u> VERIFY seal tube is drained of water, OTHERWISE CONTINUE.
  - 2. ENSURE regulator on air supply is ``backed-off& so that no pressure is delivered to supply hose.
  - 3. **CONNECT** regulated source of air to seal tube

M-C-774-010 Rev. 16 Page 29 of 61

## 5.6.24 (cont)

ł

4. **ESTABLISH** direct communication with Refuel Platform or Auxiliary Platform personnel <u>AND</u> **REQUEST** personnel on fuel floor to monitor seal with underwater camera at core plate elevation.

#### CAUTION

Over-pressurization of housing will cause the incore guide tube seal to be ejected.

- 5. **OPEN** seal tube valve AND air supply valve as required to align air supply with LPRM housing.
- 6. Slowly **INCREASE** air pressure delivered to LPRM housing to a maximum pressure of 15 psig.
- 7. **VERIFY** no leakage through O-ring by use of Snoop leak detector. **RECORD** results on Attachment 7.

#### WARNING

Air inside Instrument housing may contain high levels of air borne contamination. Do <u>NOT</u> vent air to sub-pile room.

- 8. CLOSE seal tube valve AND ISOLATE air supply.
- 9. **REDUCE** air supply pressure to 0 psig <u>AND</u> **DISCONNECT** air hose.
- **NOTE:** The following steps will backfill the LPRM guide tube which will decrease differential pressure across the guide tube seal <u>AND</u> aid in removal of the In-Core guide tube seal from above vessel.
- 5.6.25 Backfill the LPRM guide tube as follows:
  - 1. CONNECT a Demin water supply hose to the seal tube.
  - 2. **OPEN** Demin water supply valve to backfill the LPRM guide tube.
  - 3. **CLOSE** Demin water supply valve.
  - 4. **OPEN** seal tube drain valve to partially drain LPRM guide tube, <u>THEN</u> quickly **CLOSE** seal tube drain valve to isolate the seal tube.

M-C-774-010 Rev. 16 Page 30 of 61

**NOTES:** The following steps are performed above vessel. Air will bubble up out of housing as seal is removed. Air should stop within about 1 minute.

#### INDEPENDENT VERIFICATION

- 5.6.26 **VERIFY** LPRM flange is installed with all bolts torqued <u>AND</u> seal tube is installed with valves in the closed position. **RECORD** completion on Attachment 7.
- 5.6.27 **ENGAGE** In-core Guide Tube seal with a Jet Pump grapple <u>OR</u> rope.
- 5.6.28 **PERFORM** Safety Bend to free seal.
- 5.6.29 **VERIFY** no gross leakage undervessel. **RECORD** completion on Attachment 7.
- 5.6.30 **RAISE** seal out of vessel. **RECORD** completion of guide tube seal removal on Attachment 7.
- 5.6.31 INITIAL AND DATE indicating subsection complete.\_\_

WV

5.7 Staging of New Instruments in Reactor Cavity

Subsection Required: YES NO

WV

NOTES: Use clean lint-free nylon gloves <u>WHEN</u> handling Instruments.

Single LPRM Strongback should be used to install LPRM gamma thermometer assemblies.

Steps to load instruments in strongback may be performed pre-outage.

#### CAUTION

Instrument can be bent <u>IF NOT</u> properly handled. A minimum of 6 persons should be used <u>WHEN</u> handling an in core Instrument.

- 5.7.1 <u>IF</u> required, **WIPE** down Instrument with clean lint free cloths dampened with solvent, <u>THEN</u> **ALLOW** solvent to dry.
- 5.7.2 <u>IF</u> instruments were cleaned with solvent, <u>THEN</u> **WIPE** down Instrument with demineralized water.

- 5.7.3 IF multiple strongback is used:
  - 1. LOAD Instruments into strongback.
  - 2. CLOSE AND LOCK access doors at top of strongback.
  - 5.7.4 IF single strongback is used:

- 1. LOAD Instrument into strongback.
- 2. CLOSE AND PIN handle at top of strongback.
- 3. **ENSURE** LPRM bosses are captured by strongback clamps to prevent LPRM from sliding <u>WHEN</u> strongback is lifted vertically.
- 5.7.5 <u>IF</u> multiple strongback is used, **ENSURE** bosses on each instrument are captured by fingers of strongback.
- 5.7.6 **ATTACH** tag lines (approximately 80 ft long) at both ends of strongback.
- 5.7.7 **ROUTE** tag line attached to lower end of strongback over crane hook.
- **NOTE:** Weight of fully loaded multiple LPRM strongback is approximately 1000 pounds.
- 5.7.8 <u>IF</u> required, **REMOVE** swivel hook/sling <u>AND</u> use the sister hook <u>WHEN</u> transitioning from bender to LPRM strongback.
- 5.7.9 **ATTACH** strongback to overhead crane using 1/2 inch nominal shackle <u>AND</u> sling rated for 1 ton minimum.
- 5.7.10 **INSTALL** a load binder approximately 10 foot from the upper end of the instrument strongback.

#### CAUTION

Drop of a fully loaded strongback onto the reactor core from a height above the specified limit (below) has a potential to cause more severe consequences than analyzed in the UFSAR (ref. 7.4.9).

- 5.7.11 <u>WHILE</u> ensuring strongback pivot point is maintained less than 55'' above the fuel floor, **TRANSFER** the loaded strongback over the reactor cavity so that the lower end of the strongback is approximately over the center of the reactor vessel.
- 5.7.12 <u>WHILE</u> wetting the strongback with demineralized water, **UP-END**, <u>AND</u> **LOWER** strongback into reactor vessel into a vertical position.

M-C-774-010 Rev. 16 Page 32 of 61

## 5.7.13 **REMOVE** the load binder previously installed.

5.7.14 **POSITION** lifting arm (multiple strongback) <u>OR</u> rigging cable (single strongback) inside retaining lugs at top of strongback <u>AND</u> LOCK with retaining pin.

- 5.7.15 SECURE guide ropes to crane hook.
- 5.7.16 INITIAL AND DATE indicating subsection complete.

WV

5.8 Installation of New Instruments

Subsection Required: YES NO

WV

NOTE: IF the metal O-Ring (159A2816P004) between any LPRM flanges AND Incore Housing Flange (undervessel) are being replaced, Section 5.6 is completed prior to performing this section for those locations.

Performance of this section requires workers undervessel to backflush in-core guide tube housing while Instrument is lowered in housing.

#### WARNING

Instrument handling tool may be highly contaminated. Exercise caution <u>WHEN</u> handling tool <u>AND</u> minimize time handling tool.

- 5.8.1 IF using Refuel Platform hoist, **ADJUST** jam block to allow Instrument handling tool to be raised out of water.
- 5.8.2 **PRESS** hoist pendent RELEASE for refuel platform <u>OR</u> RELEASE via air line controller (Aux. Platform only), <u>THEN</u> **INSTALL** Instrument handling tool slide lock pin to lock roller in retracted position.
- 5.8.3 **RECORD** instrument serial number on CCTAS.

M-C-774-010 Rev. 16 Page 33 of 61

#### CAUTION

Use extreme caution to prevent contact between overhead crane AND monorail hoist structure.

IF multiple strongback is used, GRAPPLE LPRM as follows: 5.8.4

- MOVE top of selected Instrument outside strongback 1. cover by carefully opening cover <u>OR</u> by depressing instrument plunger. CLOSE AND LOCK strongback cover IF required.
- CAPTURE Instrument in tool by placing tool slide over 2. middle boss on Instrument plunger, THEN PRESS ENGAGE on hoist pendent for refuel platform <u>OR</u> ENGAGE via air line controller (Aux. platform only).
- Carefully **REMOVE** Instrument from strongback, lifting by з. hand OR by slowly lowering strongback approximately six inches.
- IF single strongback is used, GRAPPLE LPRM as follows: 5.8.5
  - CAPTURE Instrument in tool by placing tool slide over 1. middle boss on Instrument plunger, THEN PRESS ENGAGE on hoist pendent for refuel platform OR ENGAGE via air line controller (Aux. platform only).
  - RAISE hoist on refueling platform OR Aux. platform (IF 2. used) to pick up weight of Instrument handling tool on LPRM assembly.
  - **RELEASE** strongback latches by pulling latch operating 3. handle release pin AND rotating handle.
- MOVE strongback clear of Instrument several feet. 5.8.6

## CAUTION

Use extreme care WHEN lowering Instrument so that it does NOT get caught on the top guide nor move rapidly into contact with the core plate. Instruments are quite fragile AND can be bent AND damaged beyond repair.

Per CCTAS, POSITION Instrument over desired core location. 5.8.7

1

- 5.8.8 Using underwater camera, slowly **LOWER** Instrument <u>UNTIL</u> it is just above the core plate (approximately even with the top of adjacent fuel support castings).
- 5.8.9 <u>IF</u> this is the first Instrument installation, <u>THEN</u> MARK hoist cable with a piece of tape level with the refuel platform hand rail <u>OR</u> Aux. platform hand rail (<u>IF</u> used) to serve as an aid for remaining Instrument installations.
- 5.8.10 **MANEUVER** Instrument to enter Instrument housing opening in core plate, <u>THEN</u> **STOP**.
- 5.8.11 **REQUEST** Undervessel personnel to backflush Instrument housing as follows:
  - 1. **CONNECT** flush fixture to seal tube <u>AND</u> **ENSURE** demineralized water supply hose is attached.
  - 2. **VERIFY** flush fixture drain valve **CLOSED**.
  - 3. **OPEN** seal tube valve.

ŀ

- 4. **OPEN** demineralized water supply valve.
- 5. NOTIFY Fuel Floor personnel flush is started.
- 5.8.12 <u>WHEN</u> notified that flush has commenced, **LOWER** Instrument handling tool <u>UNTIL</u> it seats on top guide.
  - 5.8.13 **REQUEST** Undervessel personnel to test for proper seating as follows:
    - 1. **CLOSE** demin water supply valve fully.
    - 2. **OPEN** flush fixture drain valve to check for seat leakage.
    - 3. **VERIFY** Instrument is properly seated by observing little <u>OR</u> no leakage from drain line.
    - 4. NOTIFY Fuel Floor personnel of results.
  - 5.8.14 <u>IF</u> excessive flow is noted, <u>THEN</u> manually **LIFT** Instrument handling tool a couple inches <u>AND</u> **RESEAT** Instrument, **REPEAT** as necessary.
  - 5.8.15 **VERIFY** Instrument is properly seated by observing little <u>OR</u> no leakage from drain line, <u>AND</u> **NOTIFY** Fuel Floor personnel of results.

- 5.8.16 IF excessive flow is noted, THEN REQUEST Undervessel personnel to backflush Instrument housing as follows, OTHERWISE proceed to step 5.8.22:
  - 1. CLOSE flush fixture drain valve.
  - 2. **OPEN** demineralized water supply valve.
  - 3. NOTIFY Fuel Floor personnel flush is started.
  - 5.8.17 <u>WHEN</u> notified that flush has commenced, manually LIFT instrument handling tool a couple inches <u>AND</u> RESEAT Instrument.
  - 5.8.18 **REQUEST** Undervessel personnel to test for proper seating as follows:
    - 1. CLOSE demin water supply valve fully.
    - 2. **OPEN** flush fixture drain valve to check for seat leakage.
    - 3. **VERIFY** Instrument is properly seated by observing little <u>OR</u> no leakage from drain line.
    - 4. NOTIFY Fuel Floor personnel of results.
- 5.8.19 IF excessive flow is noted, THEN manually LIFT Instrument handling tool a couple inches <u>AND</u> RESEAT Instrument, REPEAT as necessary.
  - 5.8.20 **VERIFY** Instrument is properly seated by observing little <u>OR</u> no leakage from drain line, <u>AND</u> **NOTIFY** Fuel Floor personnel of results.
  - 5.8.21 **REPEAT** steps 5.8.16 through 5.8.20 as necessary.
  - **NOTE:** Any remaining leakage will be addressed in subsection 5.9.
  - 5.8.22 **PRESS** RELEASE on hoist pendent for refuel platform <u>OR</u> RELEASE via air line controller (Aux. platform only) <u>AND</u> . using a safety bend, **RAISE** tool by hand <u>UNTIL</u> slide contacts underside of top guide, <u>THEN</u> **HOLD** tool in raised position.
  - 5.8.23 **PRESS** ENGAGE on hoist pendent <u>OR</u> ENGAGE via air line controller (Aux. platform only) <u>AND</u> **RAISE** tool clear of top guide.

## DOUBLE VERIFICATION

1

5.8.24 **VERIFY** engagement of Instrument with top guide by checking that the wide portion of plunger is contained within the notch <u>AND</u> does <u>NOT</u> extend below the top guide. **RECORD** on Attachment 6.

M-C-774-010 Rev. 16 Page 36 of 61

5.8.25 **REQUEST** Undervessel personnel to **CLOSE** seal tube valve, <u>THEN</u> **REMOVE** flush fixture from seal tube.

## CAUTION

Handle the LPRM strongback at the lowest height practicable during movement over the reactor vessel. At no time shall strongback pivot point be moved over vessel with pivot point raised higher than 5 ft. above fuel floor.

- 5.8.26 **REMOVE** strongback from cavity as follows:
  - 1. **REMOVE** tag lines from overhead crane hook.
  - 2. <u>WHILE</u> maintaining tension on tag line running over crane hook, **REMOVE** lock pin from top end of strongback.
  - 3. <u>WHILE</u> raising strongback, **ROTATE** strongback to horizontal position.
  - 4. MOVE strongback to storage location on Fuel Floor.
- 5.8.27 INITIAL AND DATE indicating subsection complete.
  - 5.9 Assembly of Hardware Undervessel

Subsection Required: YES\_\_\_\_NO\_\_\_

WV

WV

## CAUTION

Highly contaminated water can be expected to drain from seal tube during removal.

- 5.9.1 **CONNECT** flush fixture <u>OR</u> any other suitable drain line to bottom of seal tube <u>AND</u> **DIRECT** hose to floor sump.
- 5.9.2 <u>IF</u> required, <u>THEN</u> **OPEN** seal tube valve <u>AND</u> flush fixture drain valve to verify seal tube is drained <u>AND</u> that Instrument seat is effectively sealing.
- 5.9.3 <u>IF</u> excessive flow is noted, <u>THEN</u> **RESEAT** Instrument per subsection 5.10 beginning with step 5.10.3.
- 5.9.4 **REMOVE** seal tube <u>AND</u> any excess pipe thread sealant from housing flange.
- 5.9.5 **LUBRICATE** threads of Instrument, nut, <u>AND</u> washer.

5.9.6 <u>IF</u> installing an LPRM gamma thermometer assembly, <u>THEN</u> **REMOVE** bullet nose piece.

#### CAUTION

Washer is larger than Instrument <u>AND</u> care must be taken to center washer over raised face of nut.

5.9.7 **INSTALL** washer next to flange, <u>THEN</u> **INSTALL** nut with raised face toward washer ensuring washer is centered over raised face of nut.

## DOUBLE VERIFICATION

5.9.8 For LPRMs <u>AND</u> SRM/IRM dry tubes, **TORQUE** nut to 95 ft-lbs <u>AND</u> **VERIFY** that there is no leakage. **RECORD** on Attachment 6.

#### DOUBLE VERIFICATION

- 5.9.9 For WRNM dry tubes, torque nut to 50 ft-lbs <u>AND</u> verify that there is no leakage. **RECORD** on Attachment 6. (<u>IF</u> during hydro, WRNM dry tube leaks, nut can be torqued up to but <u>NOT</u> greater than 100 ft-lbs).
- 5.9.10 <u>IF</u> leakage continues, <u>THEN</u> **RESEAT** Instrument per Subsection 5.10.
- 5.9.11 THREAD seal into bottom of nut, THEN snug TIGHTEN.
- **NOTES:** Steps 5.9.12 through 5.9.14 apply only to LPRMs.

Steps 5.9.12 <u>AND</u> 5.9.13 may be skipped <u>IF</u> scheduled undervessel decontamination work may introduce moisture into instrument. <u>IF NOT</u> performed, these steps will be performed during I&C connection of signal cables <u>AND</u> during tip tube installation.

- 5.9.12 IF required, THEN REMOVE nose piece.
- **<u>NOTE:</u>** LPRM gamma thermometer assembly TIP tube adapters do <u>NOT</u> have wrench flats on LPRM end.
- 5.9.13 IF required, THEN INSTALL TIP tube adapter.
- **NOTE:** Stainless Steel tie wraps <u>AND/OR</u> hose clamps may be used as necessary to secure clamshell (sleeve) on LPRMS per ECR 98-01124.
- 5.9.14 INSTALL drip skirt AND sleeve.
- 5.9.15 **INITIAL** <u>AND</u> **DATE** indicating subsection complete.

M-C-774-010 Rev. 16 Page 38 of 61

#### 5.10 Reseating of Leaking Instrument

Subsection Required: YES NO

ŴV

- 5.10.1 **PREPARE** Instrument as follows:
  - 1. **REMOVE** nut <u>AND</u> washer.
  - 2. <u>IF</u> work is being performed on LPRM gamma thermometer, **INSTALL** nose piece.
  - 3. **INSPECT** threads on seal tube <u>AND</u> Instrument housing flange. **REWORK** threads <u>OR</u> **REPLACE** seal tube as required.
  - 4. APPLY thread sealant to seal tube threads, <u>THEN</u> INSTALL seal tube onto housing flange.

5. LIMERICK Step 5.10.1.5 does NOT apply. PEACH BOTTOM

**ENSURE** filter is installed for drywell sump <u>AND</u> water level is sufficient in sump as determined by radiological engineering.

- 5.10.2 **INSTALL** flush fixture to seal tube.
- 5.10.3 **ENSURE** demineralized water supply valve <u>AND</u> flush fixture drain valve are closed.
- 5.10.4 OPEN seal tube valve.
- 5.10.5 **OPEN** demineralized water supply valve to flush Instrument seating surface for approximately 1 minute.
- 5.10.6 **CLOSE** demineralized water supply valve fully.
- 5.10.7 **OPEN** flush fixture drain valve to check for seat leakage.
- 5.10.8 **ENSURE** Instrument is properly seated by observing little <u>OR</u> no leakage from drain line.

5.10.9 **REPEAT** steps 5.10.3 through 5.10.8 as necessary.

- 5.10.10 **REMOVE** flush fixture from seal tube.
- 5.10.11 **REMOVE** seal tube, <u>THEN</u> **REMOVE** any excess pipe thread sealant from housing flange.
  - 5.10.12 <u>IF</u> work is being on LPRM gamma thermometer, **REMOVE** nose piece.
  - 5.10.13 LUBRICATE threads of Instrument, washer, AND threads of nut.

## CAUTION

Washer is larger than Instrument <u>AND</u> care must be taken to center washer over raised face of nut.

5.10.14 **INSTALL** washer next to flange, <u>THEN</u> **INSTALL** nut with raised face toward washer ensuring washer is centered over raised face of nut.

## DOUBLE VERIFICATION

5.10.15 For LPRMs <u>AND</u> SRM/IRM dry tubes, **TORQUE** nut to 95 ft-lbs <u>AND</u> **RECORD** new leakage rate on Attachment 6.

## DOUBLE VERIFICATION

- 5.10.16 For WRNM dry tubes, **TORQUE** nut to 50 ft-lbs. <u>IF</u> during hydro, WRNM dry tube leaks, <u>nut</u> can be torqued up to but <u>NOT</u> greater than 100 ft-lbs. **RECORD** new leakage rate on Attachment 6.
- 5.10.17 <u>IF</u> leakage exists, <u>THEN</u> **CONTACT** Maintenance Supervision <u>AND</u> RSTS prior to continuing.
- 5.10.18 THREAD seal into bottom of nut, THEN snug TIGHTEN.
- NOTES: Steps 5.10.19 through 5.10.21 apply only to LPRMs.

Steps 5.10.19 <u>AND</u> 5.10.20 may be skipped <u>IF</u> scheduled undervessel decontamination work may introduce moisture into instrument. <u>IF NOT</u> performed, these steps will be performed during I&C connection of signal cables <u>AND</u> during tip tube installation.

- 5.10.19 IF required, THEN REMOVE nose piece.
- 5.10.20 IF required, THEN INSTALL TIP tube adapter.
- 5.10.21 INSTALL drip skirt AND sleeve.
- 5.10.22 INITIAL AND DATE indicating subsection complete.

M-C-774-010 Rev. 16 Page 40 of 61

5.11 Contingency Instrument Removal with Crow's Foot Tool

Subsection Required: YES NO\_\_\_\_

WV

5.11.1 IF required, **REPOSITION** double blade guides per CCTAS.

5.11.2 INSTALL fuel support piece covers in adjacent cells.

5.11.3 INSTALL Crow's Foot tool onto handling poles.

- 5.11.4 LOWER Crow's Foot onto top side of boss of LPRM plunger.
- 5.11.5 **RAISE** <u>AND</u> LOWER Crow's foot as necessary to free stuck plunger.
- 5.11.6 IF plunger will <u>NOT</u> free, <u>THEN</u> **PROCEED** to Section 5.12.
- 5.11.7 <u>IF</u> plunger becomes free, <u>THEN</u>, <u>IF</u> possible, **PLACE** plunger in top guide socket <u>AND</u> **RESTART** Instrument removal per Subsection 5.4

#### CAUTION

<u>WHEN</u> using cable mounted crows foot the jamming block on appropriate refueling platform hoist shall be set such that the cable mounted crows foot will remain at least 5 foot 6 inches below water surface.

DO <u>NOT</u> RAISE Grappled Instrument until flush is commenced per step 5.4.16. Otherwise, sudden change in radiological condition under vessel may result.

- 5.11.8 <u>IF</u> plunger does become free <u>AND</u> cannot be returned to position in top guide, <u>THEN</u> **GRAPPLE** the free instrument with the Instrument Handling tool, hydraulic grippers, air operated pliers <u>OR</u> cable mounted crow's foot.
- 5.11.9 BACKFLUSH instrument per Step 5.4.16.
- 5.11.10 **REMOVE, BEND** <u>AND</u> **STORE** Instrument following guidance provided in Subsection 5.4
- 5.11.11 **REMOVE** fuel support covers, <u>IF</u> required.
- 5.11.12 INITIAL AND DATE indicating subsection complete.\_\_\_\_

WV

5.12 <u>Contingency Instrument Removal with Bowing Tool</u>

Subsection Required: YES NO

WV

5.12.1 IF required, **REPOSITION** double blade guides per CCTAS

5.12.2 **INSTALL** fuel support piece covers in adjacent cells.

5.12.3 INSTALL Bowing tool onto ITI handling poles.

#### CAUTION

<u>IF</u> using the over head crane to support ITI poles all raising <u>AND</u> lowering of the pole must be performed using a chain fall to prevent damage to reactor internals.

- 5.12.4 <u>IF</u> using overhead crane <u>THEN</u> **INSTALL** a chain fall inline with the rigging to the ITI poles
- 5.12.5 LOWER bowing tool AND ENGAGE to mid section of stuck LPRM.
- 5.12.6 Slowly **TWIST** LPRM <u>UNTIL</u> the plunger is free of the top guide.
  - 5.12.7 **INSPECT** LPRM plunger <u>AND</u> **VERIFY** plunger is intact.
  - 5.12.8 <u>IF</u> required, **RETRIEVE** loose plunger using air <u>OR</u> electric operated pliers <u>AND</u> store per approved procedures.

## CAUTION

WHEN using cable mounted crows foot the jamming block on appropriate refueling platform hoist shall be set such that the cable mounted crows foot will remain at least 5 foot 6 inches below water surface.

DO NOT RAISE Grappled Instrument until flush is commenced per step 5.4.16. <u>OTHERWISE</u> sudden change in radiological condition under vessel may result.

- 5.12.9 **GRAPPLE** the free LPRM with the Instrument Handling tool, hydraulic grippers, air operated pliers, cable mounted crow's foot <u>OR</u> safety clamp.
- 5.12.10 BACKFLUSH instrument per Step 5.4.16.
- 5.12.11 **REMOVE, BEND <u>AND</u> STORE** Instrument following guidance provided in Subsection 5.4.
  - 5.12.12 **REMOVE** fuel support covers, <u>IF</u> required.

M-C-774-010 Rev. 16 Page 42 of 61

WV

5.12.13 INITIAL AND DATE indicating subsection complete.

5.13 LPRM/Dry Tube Removal Tool Operating Instructions (PBAPS)

Subsection Required: YES NO\_\_\_

- 5.13.1 **ENSURE** applicable steps of sections 5.1 <u>AND</u> 5.2 of this procedure are performed for the preparation for removal of a LPRM/Dry tube.
- 5.13.2 **ENSURE** the following steps are accomplished prior to using the Stuck LPRM/Dry tube removal tool.
  - 1. SET Stuck LPRM/Dry tube removal tool lead-in to position 1. REFER to Attachment8.
  - 2. **INSTALL** Hydraulic station on Refueling platform handrail <u>AND</u> **CONNECT** to station service air supply.
- **<u>NOTE:</u>** The 1/2 inch OD hose attaches to the clamp (the lower cylinder)
  - 3. **ENSURE** all air has been bled from the system <u>AND</u> hydraulic hoses connected to the Hydraulic station <u>AND</u> the tool.
  - 4. **TEST** operation of the tool by actuating (pressurizing) both cylinders <u>AND</u> ensuring no interference exist.
  - 5. For stuck LPRM removal only, Jaws are used instead of capture device clamp <u>AND</u> capture devices. Be sure to **INSTALL** LPRM Jaws instead of capture device clamp <u>AND</u> lock wire bolts.

NOTES: Steps 5.10.3 through 5.13.4 apply only to Dry tube removal.

The LPRM/Dry tube removal tool is sensitive to which side the capture device halves (black <u>AND</u> white) are located on the Clamp.

- 5.13.3 **INSTALL** one each black (on left) <u>AND</u> white (on right) capture device onto the Clamp halves <u>AND</u> maneuver the safety clip to capture devices.
- 5.13.4 **VERIFY** the capture devices are secured prior to submerging the tool into the Reactor cavity.
- 5.13.5 **VERIFY** the four core locations surrounding each instrument to be replaced are vacant.

#### 5.13.6

- 3.6 **INSTALL** the Stuck LPRM/Dry tube removal tool as follows:
  - 1. Using a single swivel adapter, **THREAD** adapter into jet pump grapple stud past view port in grapple stud.
  - 2. TORQUE swivel adapter jam nut to 25-30 ft.lbs.

WV

- 3. **INSTALL** shackle into eyebolt on top of tool <u>AND</u> CONNECT jet pump grapple to shackle.
- <u>NOTES:</u> Cell covers can be installed using ropes attached directly to cell covers <u>OR</u> a rope <u>AND</u> hook <u>OR</u> hook <u>AND</u> poles.

Cell cover installation can occur any time access is available to the instrument to be removed.

5.13.7 **INSTALL** 4 cell covers into exposed cells surrounding the instrument to be removed.

## DOUBLE VERIFICATION

- 5.13.8 **ENSURE** refuel platform hoist mechanical stop (Jam Block) is set such that the middle of the upper hydraulic cylinder while in the retracted position is at least 5 feet 6 inches below surface of water. **RECORD** on Attachment 6.
- **NOTE:** The following step may proceed in parallel with subsequent fuel floor steps.
- 5.13.9 **REQUEST** Undervessel personnel to **INSTALL** <u>AND</u> **TEST** flush fixture as follows:
  - 1. **CONNECT** flush fixture to seal tube <u>AND</u> **ENSURE** demineralized water supply hose is attached.
  - 2. **CLOSE** flush fixture drain valve.
  - 3. **OPEN** seal tube valve.
  - 4. **OPEN** demineralized water supply valve to check for leaks. <u>IF</u> excessive leakage is noted <u>THEN</u> **CLOSE** seal tube valve <u>AND</u> demin water supply valve <u>AND</u> **REWORK** as required prior to continuing.
  - 5. **CLOSE** demin water supply valve.
  - 6. **CLOSE** seal tube valve.
  - 7. **MOVE** to low dose area until fuel floor is ready to flush instrument housing <u>AND</u> **NOTIFY** Fuel Floor crew step is complete.

M-C-774-010 Rev. 16 Page 44 of 61

- 5.13.10 Per CCTAS, **VERIFY** proper core location, <u>THEN</u> LOWER the tool into the Reactor cavity until just above the top guide <u>AND</u> **POSITION** the tool over the LPRM/Dry tube to be removed.
- **NOTE:** The final resting position for the tool is where the sides of the tool are touching the side of the top guide <u>AND</u> the clamping jaws are on opposite sides of the Dry tube.
- 5.13.11 **CONTINUE** to lower the tool through the top guide, making sure to align the tool so the top lead-in rests on the top guide's ``cross'' section <u>AND</u> the capture devices are surrounding the Dry tube.
- 5.13.12 IF required, THEN MOVE the hoist cable AND/OR the bridge to adjust the tool into final position.
- 5.13.13 **VERIFY** using the underwater camera, the tools final position. **ENSURE** that the smaller I.D. at the top of the capture device will <u>NOT</u> clamp around the larger diameter section of the dry tube. <u>IF</u> necessary, **REMOVE** tool <u>AND</u> ADJUST capture devices.
- 5.13.14 **EXTEND** the Clamp at the hydraulic station to a minimum of 2000 psig, <u>NOT</u> to exceed 3000 psig <u>AND</u> **VERIFY** the capture device has closed completely around the Dry tube <u>AND</u> the inserts are clamped together at least one notch.
- 5.13.15 **EXTEND** the Press at the hydraulic station to a maximum of 400 psig. Continue to observe the Press as it moves through full stroke (approx. 4 inches) <u>AND</u> compressed the plunger.
  - 5.13.16 <u>IF</u> the Press did <u>NOT</u> over come the plungers resistance, <u>THEN</u> INCREASE the Press pressure <u>NOT</u> to exceed 550 psig.
  - 5.13.17 Once the Press has traveled full stroke <u>OR</u> the plunger is retracted from the top guide, <u>THEN</u> **RETRACT** the Press at the hydraulic station.
  - 5.13.18 **VERIFY** the plunger is released from the top guide. The plunger may release after the Press is retracted.
  - 5.13.19 **VERIFY** a minimum of 2000 psig pressure exists on the Clamp at the hydraulic station.
  - 5.13.20 **ENSURE** access to upper elevations of drywell have been restricted as required by Health Physics prior to removing irradiated Instruments.

- NOTE: As soon as backflush is started, Fuel Floor crew should proceed with performance of Step 5.13.22.
  - 5.13.21 **REQUEST** Undervessel personnel to **BACKFLUSH** instrument housing as follows:
    - 1. VERIFY flush Fixture drain valve CLOSED.
    - 2. OPEN seal tube valve.
    - 3. OPEN Demin water supply valve.
    - 4. NOTIFY Fuel Floor personnel flush is started.
    - 5. WAIT 3 minutes, THEN CLOSE demin water supply valve.
    - 6. CLOSE seal tube valve.
    - 7. **OPEN** flush fixture drain valve, <u>THEN</u> **REMOVE** flush fixture from seal tube, <u>IF</u> required.

#### CAUTION

While raising Instrument, care must be taken to prevent boss rings <u>OR</u> bottom portion of Instrument from catching on core Top Guide.

## WARNING

Health Physics shall monitor dose rates during raising, bending, <u>AND</u> transport of the Instrument. Raising of the Instrument shall stop <u>IF</u> radiation levels exceed 30 mr/hr at water surface with Instrument 1 foot below water.

- 5.13.22 **USE** a ``Safety Kink'' to verify the tool is free to move, <u>THEN</u> **BEGIN** removal of the tool <u>AND</u> dry tube by moving the tool as far away from the cross section as possible.
- 5.13.23 Slowly **RAISE** the tool <u>AND</u> dry tube up through the top guide while watching with the under water camera to prevent any item from ``hanging up'' on the top guide.
- 5.13.24 **PERFORM** steps 5.4.18 through 5.4.25 of this procedure, <u>THEN</u> **RETURN** to step 5.13.25.
- 5.13.25 **RELEASE** the dry tube from the Clamp by placing the Clamp lever in the ``RETRACT'' position at the hydraulic station. One side of the capture device should come out of the Clamp.

- 5.13.26 **RELEASE** the other half of the capture device <u>AND</u> the Dry tube Assembly from the tool using a `J'' <u>OR</u> `L'' hook on an underwater handling pole <u>IF</u> required.
- 5.13.27 <u>IF NOT</u> already done, <u>THEN</u> **RELEASE** the hydraulic pressure from the Clamp <u>AND</u> Press.
- 5.13.28 **PERFORM** steps 5.4.27 through 5.4.36 of this procedure <u>AND</u> **RETURN** to step 5.13.29.
- 5.13.29 <u>IF</u> the Stuck LPRM/Dry tube removal tool is to be used again, <u>THEN</u> **RAISE** the tool out of the water <u>AND</u> **REPEAT** steps as necessary for the remaining LPRM/Dry tube assemblies. Otherwise, **RETURN** the Stuck LPRM/Dry tube removal tool <u>AND</u> associated support equipment to the designated storage location.
- 5.13.30 Prior to cell cover removal, VACUUM/RETRIEVE debris as required.
- 5.13.31 **REMOVE** cell covers as required.
- 6.0 RETURN TO NORMAL
- 6.1 **ENSURE** the following:
  - Tools <u>AND</u> equipment are returned to designated storage location AND work area is clean.
  - M&TE numbers, date used, <u>AND</u> out of cal dates are recorded in WO.
  - Name <u>AND</u> initials of each person who initialed procedure steps is entered on last page of this procedure.
  - Attachment 6 has been completed with all appropriate signature blocks accounted for.
  - Procedure is complete <u>AND</u> attached to WO.

WV

- 6.2 <u>IF</u> it is anticipated that LPRM bender(s) will be exposed to very low temperatures, e.g. will be shipped to another site or stored outdoors during winter months, <u>THEN</u> **CONSIDER** taking one of the following actions to preclude damage to tool due to freezing:
  - 1. DRAIN reservoir, hoses, hydraulic cylinders and control station.
  - 2. **REQUEST** Planner to revise or create a work order activity to perform draining and layup of bender tool.

M-C-774-010 Rev. 16 Page 47 of 61

WV

- 7.0 **REFERENCES**
- 7.1 Vendor/Technical Manuals
- 7.1.1 M-1-JJ-170 (PBAPS), B11-D193-K-001 (LGS), General Electric GEK 97055, Local Power Range Monitor
- 7.1.2 F20-E007-K-001 (LGS), General Electric GEK 33143, Instrument Handling Tool
- 7.1.3 NE-203-200 (PBAPS), Operation and Maintenance Instructions for WRNM Detector
- 7.1.4 F14-00084-01, Operation and Maintenance Instructions for Dry Tube Removal Tool 177D2032
- 7.2 <u>Plant Procedures/Drawings</u>
- 7.2.1 A-C-33, Nuclear Generation Group Process for Verification of Quality
- 7.2.2 A-C-132, Spent Fuel Pool Material Storage/Inventory and Housekeeping
  - 7.2.3 M-C-774-008, Preparation of New Local Power Range Monitors (LPRMs)
  - 7.2.4 ST-O-107-494-0 (LGS), Non-Routine By-Product Material Leakage Test
  - 7.2.5 ST-H-099-820-2, Sealed Source Accountability & Leak Test
  - 7.2.6 IC-11-00482, Checkout and Troubleshooting of LPRM Detectors
  - 7.2.7 OP-AA-101-111, Roles and Responsibilities of On-Shift Personnel
  - 7.2.8 RE-C-040, Core Component Transfer Authorization Sheet Generation and Administration
  - 7.2.9 Drawing 6280-M1-JJ-106-3
  - 7.2.10 MAG-CG-301, Control of Bolting/Torquing/Tensioning

# 7.3 UFSAR/Technical Specifications

7.3.1 LGS UFSAR Sections 15.7.4 and 15.7.6 and PECO Calculation LM-033, Methodology to Determine the Acceptability of Moving Loads Over Irradiated Fuel Without Secondary Containment.

- 7.4 <u>Miscellaneous</u>
  - 7.4.1 SSES Significant Operating Occurrence Report 93-326
  - 7.4.2 RSAI A0675443-05
  - 7.4.3 CAR Q0002436
  - 7.4.4 I0001540, Swivel Adapter
  - 7.4.5 LGS REIF/EIR 92-04-29; AR# A0403672, CA-2
  - 7.4.6 SIL 082, Rev. 1, Supplement 1
  - 7.4.7 Limerick ECR LG 94-10498 for LPRM gamma thermometer assemblies.
  - 7.4.8 MOD P00271, (PBAPS) Startup Range Neutron Monitoring System Improvements
  - 7.4.9 A1143608 E02, E03, A0849919 E21, Evaluation of Loaded LPRM Strongback and LPRM Bender Handling.
  - 7.4.10 ECR 98-01124 Rev. 0, Missing Ears on LPRM Clamshells.
- 7.4.11 ECR 98-02056 Rev. 0, Revision to UFSAR ``Plant Refueling Outage'' and ``In Vessel Servicing Equipment'' to eliminate the strict use of instrument handling tool.
  - 7.4.12 PEP I0011081, LPRM Came Out of Clamp During Bending.
  - 7.4.13 ECR 01-00038, LGS Fuel Floor Auxiliary Platform
  - 7.4.14 OE 12238, Multiple Personnel Contaminations during LPRM Work
  - 7.4.15 CR 77040, LPRM Signal Cables Cut in Wrong Location During Maintenance
  - 8.0 ATTACHMENTS
  - 8.1 Attachment 1, Core Map
  - 8.2 Attachment 2, LPRM Assembly
  - 8.3 Attachment 3, Instrument Plunger Detail
  - 8.4 Attachment 4, Instrument Handling Tool
  - 8.5 Attachment 5, Top Guide Detail
  - 8.6 Attachment 6, Multiple Sign-Off Sheet

M-C-774-010 Rev. 16 Page 49 of 61

<b>.</b>	8.7	Attachment 7, Multiple Sign-Off Sheet for Subsection 5.6
	8.8	Attachment 8, Stuck LPRM/Dry Tube Removal Tool Lead-In Setup
	8.9	Attachment 9, In-Core Housing Guide Tube Seal
	8.10	Attachment 10, In-Core Housing Guide Tube Seal Installation Position

M-C-774-010 Rev. 16 Page 50 of 61



Note 1: IRM at LGS; WRNM at PBAPS.

Note 2: SRM at LGS; spare WRNM Dry Tube at PBAPS.

CORE MAP

Attachment 1 Page 1 of 1

M-C-774-010 Rev. 16 Page 51 of 61



ı

LPRM ASSEMBLY

Attachment 2 Page 1 of 1

M-C-774-010 Rev. 16 Page 52 of 61



NOTE: ALL DIMENSIONS ARE IN INCHES.

## INSTRUMENT PLUNGER DETAIL

Attachment 3 Page 1 of 1

M-C-774-010 Rev. 16 Page 53 of 61



C

ı

C

C



INSTRUMENT HANDLING TOOL

Attachment 4 Page 1 of 1



1

ł

C

## TOP GUIDE DETAIL

Attachment 5 Page 1 of 1

CORE LOCATION	5.2.1 LOCATION U.V.	5.2.3 PROPER CUT LOCATION	5.4.4 <u>OR</u> 5.13.8 JAM BLOCK SET	5.4.19 ELEVATOR FULL DOWN	5.8.24 ENGAGEMENT IN TOP GUIDE	5.9.8 <u>OR</u> 5.9.9 NUT TORQUED	5.10.15 <u>OR</u> 5.10.16 NUT TORQUED; LEAK RATE (DPM)
	DV	DV	DV	 DV	  DV	DV	DV
	 DV	 DV	 DV	  DV	DV	DV	 DV DPM
	  DV	 DV	DV	  DV	DV	DV	DV
			  DV	 	DV	 DV	 DV DPM

# MULTIPLE SIGN-OFF SHEET

Attachment 6 Page 1 of 2

MULTIPLE SIGN-OFF SHEET

Attachment 6 Page 2 of 2

CORE LOCATION	5.2.1 LOCATION U.V.	5.2.3 PROPER CUT LOCATION	5.4.4 <u>OR</u> 5.13.8 JAM BLOCK SET	5.4.19 ELEVATOR FULL DOWN	5.8.24 ENGAGEMENT IN TOP GUIDE	5.9.8 <u>OR</u> 5.9.9 NUT TORQUED	5.10.15 <u>OR</u> 5.10.16 NUT TORQUED; LEAK RATE (DPM)
	DV	DV	DV	DV	 DV	DV	 DV DPM
	  	  DV	DV	 	  DV	 DV	  DPM
	 DV	DV	DV	DV	DV	DV	 DV DPM
	DV	DV	DV	  DV	DV	DV	DV DPM

M-C v. 16 Page 56 of 61

 $\overline{\phantom{a}}$ 

 $\bigcirc$ 



CORE LOCATION	5.6.5 Guide Tube Seal Installed	5.6.8 HP Survey	5.6.20 Flange Bolts Torqued	5.6.24.7 No Leakage	5.6.26 Flange/ Seal Tube Installed	5.6.29 No Gross Leakage Undervessel	5.6.30 Guide Tube Seal Removed	Comments
	 WV	HP	DV	WV	IV	WV	 WV	
	 WV	HP	  DV	 WV	IV	WV		
	 WV	 HP	  DV	 WV	IV	WV	 	
		 HP	 		I.A.		 WV	

\_

MULTIPLE SIGN-OFF SHEET FOR SUBSECTION 5.6

Attachment 7 Page 1 of 1

M-C-774-010 Rev. 16 Page 58 of 61



View A-A

ł

[]

# STUCK LPRM/DRY TUBE REMOVAL TOOL LEAD-IN SETUP

Attachment 8 Page 1 of 1

M-C-774-010 Rev. 16 Page 59 of 61



C

i

Ł

ſ

C

In-Core Housing Guide Tube Seal

Attachment 9 Page 1 of 1

M-C-774-010 Rev. 16 Page 60 of 61



NOTE:

C

ł

1

Similar to Instrument Handling Tool, rotational orientation with respect to target instrument is <u>NOT</u> critical.

In-Core Housing Guide Tube Seal Installation Position

Attachment 10 Page 1 of 1

M-C-774-010 Rev. 16 Page 61 of 61

RINTED NAME	SIGNATURE			2
			<u> </u>	
	·	. <u> </u>	· ···· ·	
		<u> </u>	······································	
	· · · · · · · · · · · · · · · · · · ·	<u></u>		
·····				
			<u></u>	
	·····			
				·····
			······································	
		<u> </u>		
			· · · · · · · · · · · · · · · · · · ·	
REMARKS	······································			
REMARKS				
XEMARKS	· · · · · · · · · · · · · · · · · · ·			
XEMARKS	· · · · · · · · · · · · · · · · · · ·			
XEMARKS				
XEMARKS	· · · · · · · · · · · · · · · · · · ·			
XEMARKS		· · · · · · · · · · · · · · · · · · ·		
XEMARKS	· · · · · · · · · · · · · · · · · · ·			
XEMARKS				

ł

ł

ſ					
L	EXELON NUCLEAR				
TITLE: Movement of fuel from the fuel prep machine (Alternate Path)					
TASK PERFORMED BY:	EVALUATOR:				
EVALUATOR SIGNATURE:	DATE:				
DIRECTIONS TO EVALUATOR:					
EVALUATION METHOD :	```				
SIMULATE					
EVALUATION LOCATION:					
<b>REFUELING PLATFORM</b>					
APPROXIMATE COMPLETION TIME:					
Completion Time: 30 min					
IMPORTANCE RATING(S):	SYSTEM NUMBER(S):				
3.5	2.2.28				
REFERENCES:					
FH-106, CORE COMPONENT ANI S97.0.M, REFUELING PLATFORM	D IRRADIATED ITEM MOVEMENT - NO CORE TRANSFER I OPERATION				

TASK STANDARD(S):

Fuel moved to target location per CCTAS, with response to unexpected slack cable warning per S97.0.M

÷
### **TASK CONDITIONS:**

- 1. A fuel bundle is ready for pickup in the Unit \_\_\_\_\_North fuel prep machine and release in the spent fuel pool
- 2. All prerequisites are complete, with FH-106 and S97.0.M in progress
- 3. The refueling platform is in operation and positioned over the spent fuel pool

### **INITIATING CUES:**

You are directed to perform the fuel transfer listed in the attached CCTAS

1000

 $M_{\rm M} \simeq 2$ 

Construction of the second second of the second The second se

Critical Element(s) indicated by "\*" in Performance Checklist.

## PERFORMANCE CHECKLIST:

STEP	STANDARD	SAT/UNSAT
Section 4 of S97.0.M,	Pickup Location- Fuel Prep Machine	
1. Verify fuel prep machine is fully	Verify fuel prep machine is fully lowered	
CUE: The fuel prep machine is fully lowered	(Note: Normally performed by NMD, not the LSRO)	
Caution: Use extreme care to avoid entanglement of main mast or grappled fuel bundle with fuel inspection and test equipment located in the vicinity of the fuel prep machines	N/A	N/A
2. *Carefully position the refuel platform mast over the fuel prep machine in accordance with the CCTAS	Bridge and trolley controls operated to position the bridge over the fuel prep machine	
CUE:The bridge is positioned over the fuel prep machine.		
<ol> <li>*Lower grapple until the grapple is 6 to 12 inches above the bail</li> </ol>	Hoist lowered until the grapple is 6 to 12 inches above the bail handle	
CUE: The grapple encoder reads 157 inches		i
4. *Depress the GRAPPLE LOCKOUT BYPASS pushbutton	GRAPPLE LOCKOUT BYPASS pushbutton depresse	
CUE: GRAPPLE LOCKOUT BYPASS pushbutton is depressed and held		
5. Ensure the grapple is open	Ensure the grapple is open	
CUE: The grapple switch is in RELEASE with no backlight		
<ol> <li>*Rotate grapple as necessary to achieve grapple to bail alignment</li> </ol>	Rotate grapple until the grapple end is oriented the same as the bail handle	
CUE: The grapple head is aligned the same as the bail handle		

	STEP	STANDARD	SAT/UNSAT
7.	*Slowly lower grapple until SLACK CABLE light is lit	Grapple controls taken to LOWER until SLACK CABLE is lit	
CUE	: The red SLACK CABLE lamp is lit		
Steps Oper	s 4.3.8 through 4.3.13 shall be double ver ator or Spotter	ified by the Fuel Handling Director and the I	Refuel Platform
CUE:	The Fuel Handling Director is performing	double verification	
8.	Verify proper core component location and orientation	Bundle location and orientation verified	
CUE: the ch	Bundle is in the fuel prep machine and nannel fastener is northeast		
9.	Verify the following then notify FHD of grapple position	N/A	N/A
	a. Grapple is centered over bail handle	Grapple verified to be centered over the bail handle	
CUE: handle	Grapple is centered over the bail		
	<ul> <li>b. Hoist position indication agrees with value listed in Attachment 2 for item seated in the fuel prep machine</li> </ul>	Hoist position verified	i
CUE:	Hoist position indicates 165 inches		
10.	*When directed by FHD, then engage the grapple and release the grapple lockout pushbutton	Grapple control switch taken to ENGAGE	
CUE: positi releas	Grapple control switch is in ENGAGE on. GRAPPLE LOCKOUT BYPASS is sed	GRAPPLE LOCKOUT BYPASS pushbutton released	
11. CUE: backli	Verify GRAPPLE ENGAGED light is lit The grapple control switch is now t green	Grapple control switch verified to have green backlight lit	
			N

L.	STEP	STANDARD	SAT/UNSAT
12.	*When directed by FHD, then raise load and verify HOIST LOADED light is lit (fuel/dummy bundle only) or for skeleton fuel bundle visually verify component movement	Hoist controls taken to RAISE HOIST LOADED lamp verified to be lit	
CUE is co	: HOIST LOADED light is lit and bundle ming up		
13.	*Continue raising until grapple is fully raised then verify NORMAL UP lamp is lit	Raise bundle until NORMAL UP lamp is lit, then release controls	
CUE NOR	: (Wait about 10 seconds, then "The MAL UP" lamp is lit"		
14.	Go to appropriate RELEASE LOCATION section of this procedure as directed by FHD	N/A	N/A
	Section 4.5 of S97.0.M	Release Location in Spent Fuel Pool	
15.	*Position core component over desired location in accordance with the Core Component Transfer Authorization Sheet (CCTAS)	Operate bridge and trolley controls to position the mast over the target location on the CCTAS	
CUE: in the	The mast is over the fuel rack location CCTAS		
16.	*Rotate core component as necessary to achieve proper orientation	Verify CCTAS orientation and rotate mast to properly orient the bundle	
CUE:	The channel fastener is southwest		
17.	Perform double verification to ensure proper core component location and orientation	Verify bundle location and orientation	
CUE: Spotte orient	"The Fuel Handling Director and er have double verified location and ation"		

STEP	STANDARD	SAT/UNSAT
18. *When directed by the FHD, then lower the hoist until core component is seated and SLACK CABLE is lit	Bundle lowered until red SLACK CABLE lamp is lit on hoist control console.	
CUE: The Fuel Handling Director has directed you to lower the bundle into the rack	Recognize SLACK CABLE is being received early and the bundle is not seated (seated is 195")	
wait 10 seconds		
CUE: "The slack cable lamp is lit with the hoist position 20 inches. The bundle is pivoting on the nosepiece and leaning over		
Response to Unexpected	Slack Cable Warning (Precaution 3.10)	L
19. If HOIST LOADED light goes out prematurely or load starts to lean	N/A	
a. *Hoist lowering shall be stopped immediately	Stop lowering	
CUE: Hoist motion has stopped	· · · · · · · · · · · · · · · · · · ·	
<ul> <li>b. Grapple switch shall be</li> <li>verified to be in ENGAGED</li> <li>position</li> </ul>	Grapple verified engaged	
CUE: Grapple switch shows ENGAGED		
c. Grapple engagement shall be verified	Grapple engagement verified	
CUE: Mast camera still shows the bundle to be grappled		
d. GRAPPLE ENGAGED light shall be verified lit	Green backlighting verified on grapple control switch	
CUE: The grapple control switch is backlit green		
e. *Hoist shall be raised slowly to regain the weight	Hoist raised to regain the weight	
CUE: The hoist indicates 30 inches and HOIST LOADED lamp is lit		
		1

				<u> </u>
H	STEP	STANDARD	SAT/UNSAT	1
	f. Fuel Handling Director shall be notified	FHD notified		
CUE: notifie	Fuel Handling Director has been ed.			
20.	CUE: You have reached the	N/A		
	may stop here.			

 $\{ x \in X : x \}$ 

### Comments:

Note: Any grade of UNSAT requires a comment.

JPM Overall Rating:

SAT/UNSAT

## **TASK CONDITIONS:**

- 1. A fuel bundle is ready for pickup in the Unit \_\_\_\_North fuel prep machine and release in the spent fuel pool
- 2. All prerequisites are complete, with FH-106 and S97.0.M in progress
- 3. The refueling platform is in operation and positioned over the spent fuel pool

### **INITIATING CUES:**

You are directed to perform the fuel transfer listed in the attached CCTAS

# CANDIDATE

# Unit LIMERICK GENERATING STATION Date 6/3/02

### Title TRAINING CCTAS

Written By: TRAINING USE ONLY

Reviewed By: TRAINING USE ONLY

Authorized By: TRAINING USE ONLY

STEP NO.	COMPONENT SERIAL NO.	MOVE FROM	ORIENT	MOVE TO	ORIENT	FHD	RPO	CRO	DATE	TIME
7	LYN521	NFPM	NE	L1SPENT C-21	sw					
		1	_							
				: ۲۰						
			_							
				*						

JPM 3 CCTAS for Unit 1

CANDIDATE

P٤

1 of

# Written By: TRAINING USE ONLY

## Unit LIMERICK GENERATING STATION Date 6/3/02

### Title TRAINING CCTAS

Reviewed By: TRAINING USE ONLY

Authorized By: TRAINING USE ONLY

STEP NO.	COMPONENT SERIAL NO.	MOVE FROM	ORIENT	MOVE TO	ORIENT	FHD	RPO	CRO	DATE	TIME
7	LYN521	NFPM	NE	L2SPENT C-21	sw			<u> </u>		
							<u> </u>			
									:	· · ·
						•				
										· · · · ·
				•						

JPM 3 CCTAS for Unit 2

CANDIDATE

#### FH-106 Rev. 24 Page 1 bf 21 JAD/jad FOR TRAINING PURPOSES ONLY Exelon Nuclear Limerick Generating Station NFPM -> SFP MOVE NEW BUNDLE CORE COMPONENT AND IRRADIATED ITEM MOVEMENT - NO CORE FH-106 TRANSFER 1.0 PURPOSE This procedure provides instructions and requirements for the performance of core component and irradiated item movement when the core is not accessible from the fuel floor. This procedure establishes: a. the necessary initial conditions for core component and Irradiated Item Movement - No Core Transfer. b. accounting guidelines for Special Nuclear Material (SNM) as per RE-C-44. 2.0 REFERENCES 2.1 RE-C-44, Procedure for Accountability and Control of SNM 2.2 TQ-AA-210, Procedure for Management of Training 2.3 RE-C-40, Core Component Transfer Authorization Sheet Generation and Administration 2.4 S97.0.M, Refueling Platform Operation 2.5 LGS UFSAR Section 13.5.1.20. 2.6 EIR #92-04-19 2.7 NSAC/164L, Guidelines for BWR Reactivity Control During Refueling A-C-300, Reactivity Management Program 2.8 2.9 NOM-L-8.4, Unavailable Equipment/Equipment Release 2.10 OP-AA-108-106, Equipment Return to Service 2.11 NRC Information Notice 95-56, Shielding Deficiency in Spent Fuel Transfer Canal at BWR's 2.12 ON-120, Fuel Handling Problems

FH-106, Rev. 24 Page 2 of 21 JAD/jad

- 2.13 UFSAR Section 15.7.4 AND 15.7.6 AND PECO Calculation LM-033 "Methodology to Determine the Acceptability of Moving Loads over Irradiated Fuel without Secondary Containment Integrity."
  - LGS Tech Specs 3.6.5.1.2, 3.6.5.2.2 AND 3.6.5.3.
  - 2.15 AR Al158987, Al159331, Response to INPO IE8834 "Problems associated with irradiated fuel inspection activities"
  - 2.16 AR A1081310e01, Evaluation of decay time required for new fuel bundle or dummy bundle movement in Unit 2 SFP without secondary containment.
  - 2.17 LGS UFSAR Section 9.1.1.3 New Fuel Storage Safety Evaluation.
  - 2.18 S97.0.L, Manual Operation of Refuel Platform Hoist
  - 2.19 PEP Issue I0009814, Fuel Bundle contacted fuel in core during hoist lowering.
  - 2.20 PEP Issue I0010407, High Rad levels detected by HP during cavity drain down.
- 2.21 ECR LG 01-00282, Calculation for movement of light loads over irradiated fuel without Secondary Containment
- 2.22 AR A1308847 eval 04, Clarification on use of light weight handling poles over irradiated fuel per ECR LG 01-00282
  - 3.0 RESPONSIBILITIES
  - 3.1 The Reactor Engineer shall be responsible to:
    - 3.1.1 Determine the proper prerequisites.
    - 3.1.2 Ensure fuel handling procedures and Special Nuclear Material Accounting documents required to perform the core component and irradiated item movements are available.
    - 3.1.3 Inspect core component transfer and fuel accountability documents during the handling operation and initiate any appropriate additions or changes.
    - 3.1.4 Prepare the Core Component Transfer Authorization Sheet (CCTAS) as per RE-C-40 prior to implementation of the procedure.
    - 3.1.5 Collect, distribute and file documentation associated with this procedure.
    - 3.1.6 Review all future revisions to this procedure.

FH-106, Rev. 24 Page 3 of 21 JAD/iad 3.2 The Maintenance Supervisor shall be responsible to: 3.2.1 Perform required maintenance and tests of equipment following the release of refueling bridge equipment by Shift Management/LSRO. 3.2.2 Inform shift supervision of core component and irradiated item transfer progress. 3.2.3 Notify Fuel Handling Director and supervision of abnormalities or malfunctions of equipment. (Ref. 2.8) 3.3 The Fuel Handling Director shall be responsible to: 3.3.1 Ensure completion of applicable procedures, data sheets and forms, and when necessary, obtain any required document changes. 3.3.2 Ensure compliance with the appropriate prerequisites as determined by the Reactor Engineer. 3.3.3 Ensure all core components and irradiated items are moved in accordance with the CCTAS. This includes DOUBLE VERIFICATION with the refuel platform operator of correct mast position prior to grappling, prior to placing the bundle in the

> designated location, AND documentation of the move on the CCTAS to ensure safe and accurate placement in the fuel pool and cask handling pit. (Ref. 2.8)

- 3.3.4 Initiate necessary changes to the CCTAS as per RE-C-40. (Ref. 2.7)
- 3.3.5 Direct and supervise the actions of refueling platform operators and other NMD personnel involved in core component transfers.
- 3.3.6 Ensure that the refueling bridge operator and spotter (if used) are qualified as refueling bridge operators.
- 3.3.7 Be positioned on the refueling bridge during transfer of core components.
- 3.3.8 Consider consequences of, and if appropriate, authorize release and return of refueling bridge equipment to/from an operable status in accordance with Operations Manual. (LSRO ONLY) (Ref. 2.9 and 2.10)

FH-106, Rev. 24 Page 4 of 21 JAD/jad

- 3.3.9 IF REFUELING FLOOR SECONDARY CONTAINMENT INTEGRITY is not maintained THEN Cease movement of irradiated fuel AND of objects over irradiated fuel in accordance with Ref. 2.14 Tech Specs UNLESS objects are analyzed per References 2.13 and 2.21 (See Tables 1 and 2).
- 3.3.10 Overlap during a turnover for at least one (1) move OR until comfortable with the situation prior to the relieved individual leaving. Turnover shall not take place in the middle of a move involving transfer of a fuel bundle or blade guide, unless warranted by extraordinary circumstances (Ref. 2.19).
- The Refueling Platform Operators shall be responsible to:
  - 3.4.1 Perform core component and irradiated item movement in accordance with the applicable system procedures and the CCTAS.
  - 3.4.2 Participate in the DOUBLE VERIFICATION of all core component AND irradiated item transfers.
  - 3.4.3 Be qualified to operate the Refueling Platform.
  - 3.4.4 Overlap during a turnover for at least one (1) move OR until comfortable with the situation prior to the relieved individual leaving. Turnover shall not take place in the middle of a move involving transfer of a fuel bundle or blade guide, unless warranted by extraordinary circumstances (Ref. 2.19).
- Health Physics personnel shall be responsible to:
  - 3.5.1 Designate controlled access areas.
  - 3.5.2 Provide personnel monitoring.
  - 3.5.3 Provide and maintain safe and orderly decontamination areas.
  - 3.5.4 Follow the guidelines specified in the applicable HP procedure.
  - 3.5.5 Be present on the Refuel floor during fuel movements.

3.4

3.5

FH-106, Rev. 24 Page 5 of 21 JAD/jad

- 3.5.6 Determine the radiological effects of moving/storing irradiated components in the Spent Fuel Pool, Cask Pit and Transfer Canal and recommend ALARA controls as necessary.
- 3.6 The Training Department, Limerick Generating Station, shall be responsible to:
  - 3.6.1 Ensure that personnel involved with core component movement are familiar with fuel handling and radiological safety requirements.
  - 3.6.2 Maintain and update certification records of Fuel Handling Directors per TQ-AA-210.
  - The Training Department, Peach Bottom Atomic Power Station, shall be responsible to:
    - 3.7.1 Ensure that personnel involved with core component movement are familiar with fuel handling and radiological safety requirements.
    - 3.7.2 Maintain and update certification records of Refueling Platform Operators per TQ-AA-210.

The Control Room Operator (RO/SRO) shall:

3.8.1

Contact the Fuel Handling Director to suspend movement of irradiated fuel OR movement of objects over irradiated fuel <u>IF</u> REFUELING FLOOR SECONDARY CONTAINMENT INTEGRITY is not maintained, in accordance with Ref. 2.14 Tech Specs. <u>unless</u> items are confirmed to have been analyzed per Refs. 2.13 and 2.21.

3.8

3.7

FH-106, Rev. 24 Page 6 of 21 JAD/jad

#### 4.0 <u>PREREQUISITES</u>

#### NOTE

- 1. The following prerequisites may be considered unique to Core Component and Irradiated Item Movement with no core transfer.
- 2. The prerequisites may be signed-off in any order.
- 3. Step 9.1.4 provides guidance if it is desired to expand the scope of work to be performed under this procedure after all prerequisite signoffs are completed (e.g., addition of fuel inspections in the fuel prep machines).

#### CAUTION

Secondary Containment Integrity is required:

- 1. During all movement of irradiated fuel (Ref.2.14) AND
- 2. During the movement of objects over irradiated fuel unless analyzed per References 2.13 and 2.21.
- 4.1 Complete these prerequisites regardless of the type of irradiated item to be moved.
  - 4.1.1 Check Unit(s) which Core Component <u>AND</u> Irradiated Item Movement with no core transfer is to be performed.

Unit 1 Unit 2

- 4.1.2 Label top of cover page with scope of work to be performed under this procedure.
- 4.1.3 Permission is granted by Shift Supervision to perform this procedure.

FH-106, Rev. 24 Page 7 of 21 JAD/jad

- 4.1.4 Health Physics has been informed of the activity AND all necessary surveys AND ALARA Planning are complete. IF an RWP is required, THEN verify it is active.
- 4.1.5 The following Fuel Handling procedure for refueling platform operational checkout over the fuel pool is complete:

M-C-797-005

4.1.6

IF fuel preparation machines are to be used THEN they are to be checked out per M-C-797-008 Otherwise mark signoff N/A.

Unit 1 NFPM:

Unit 1 SFPM:

Unit 2 NFPM:

Unit 2 SFPM:

- 4.1.7 The CCTAS required to begin the scope of work labeled on the cover page is prepared, reviewed, approved and distributed as per RE-C-40.
- 4.1.8 All Fuel Handling procedures, Special Nuclear Material accountability forms, <u>AND</u> data sheets required to perform the task of core component and irradiated item movement are available.

4/4/0Z HP Supv Date

Rad Eng.

N(A / Initials Date

NA / Initials Date

FH-106, Rev. 24 Page 8 of 21 JAD/jad

- 4.1.9 Refuel floor fire hose stations and extinguishers are unobstructed.
- 4.1.10 Adequate lighting AND Water clarity exists in the Fuel Pool(s) OR Cask Pit Area, as applicable, to perform Core Component AND Irradiated Item Movement. (Ref. 2.6)
- 4.1.11 IF portable demin system is installed in the Fuel Pool OR Cask Pit Area THEN ensure pump AND hose locations do not interfere with component/refuel platform movements. IF NOT, N/A this step.
- 4.1.12 Ensure no current outage discharge fuel is placed within 8 rack rows of spent fuel pool/reactor cavity gates as defined per RE-C-40. (Ref.2.20)
- 4.1.13 Reactor Cavity flooded to > 481.5 inches (Shutdown or Upset Range) OR STOP LOG 15 installed prior to movement of any irradiated fuel OR irradiated core components in the spent fuel pool. (Ref. 2.20)

Date

16/4/02

FH-106, Rev. 24 Page 9 of 21 JAD/jad

#### NOTE

ST's must be verified in surveillance.

Complete the following prerequisites if fuel assemblies are stored in the fuel pool.

> All requisite fuel floor Radiation Monitors are operable (TS 3.3.7.1): 4.2.1

> > Stm. Separator Area: ST-2-026-413-\* ST-2-026-613-\* Fuel Pool

> > Criticality: ST-2-026-428-\* ST-2-026-614-\*

> > Plug Laydown: ST-2-026-444-\* ST-2-026-628-\*

> > Temporary ARM ST-0-027-640-\* (if required)

4.2.2

The fuel floor reactor enclosure crane boundary zone control is operable: (N/A if crane will not be used during this evolution)

ST-4-098-320-0

4.3 IF irradiated fuel assemblies are stored in the fuel pool THEN verify at least 22 feet of water is maintained above the top of fuel seated in the spent fuel pool storage racks by reviewing the current ST-6-107-594-\*. Otherwise, mark N/A for this step.

Initials Date

Initials Date

ials

4.2

FH-106, Rev. 24 Page 10 of 21 JAD/jad

NOTE

Tables 1 and 2 list some of the items currently analyzed per Refs. 2.13 and 2.21. Contact Reactor Engineering to determine if items not listed have been analyzed. <u>IF</u> item meets design limits <u>AND</u> fuel decay times as listed in Table 1 <u>OR</u> limitations listed in Table 2, <u>THEN</u> secondary containment is <u>not</u> required.

IF secondary containment is required (if irradiated fuel assemblies are to be handled in the reactor enclosure, fuel floor OR objects will be moved over irradiated fuel that are not analyzed per Refs. 2.13 and 2.21) THEN Complete the following prerequisites. Otherwise, mark these steps N/A:

4.4

4.4.1 IF either unit is in OPCON 1, 2, 3, 4 OR 5 THEN the applicable Daily Log (ST-6-107-590-\* or ST-6-107-591-\*) is being performed to reflect irradiated fuel handling.

Initials Date

4.4.2 The Control Room normal fresh air radiation monitors are operable:

ST-2-026-421-0 ST-2-026-422-0 ST-2-026-423-0 ST-2-026-424-0 ST-2-026-607-0 ST-2-026-608-0

Initials Date

FH-106, Rev. 24 Page 11 of 21 JAD/jad

#### NOTE

Refuel Floor Ventilation Exhaust Rad Monitor surveillance for both units may be necessary. Check both units operability as required by current OR expected plant HVAC conditions and lineups.

4.4.3

The Refuel Floor high radiation isolation monitors are operable:

ST-2-026-430-\*ST-2-026-622-\*ST-2-026-431-\*ST-2-026-623-\*ST-2-026-432-\*ST-2-026-624-\*ST-2-026-433-\*ST-2-026-625-\*

4.4.4 The outside atmosphere to refueling area low Delta P isolation instrumentation is operable:

> RT-2-076-402-0 RT-2-076-403-0

4.4.5

The Refuel floor isolation logic and standby gas treatment system initiation logic is operable:

ST-2-072-106-0 ST-2-072-106-\* ST-2-072-107-0 ST-2-072-107-\*

4.4.6 The Refuel floor isolation valves are operable:

ST-6-076-200-\*.

4.4.7 Refuel floor secondary containment integrity is demonstrated:

ST-6-076-310-0 ST-6-076-360-0

als Date

Initials Date

FH-106, Rev. 24 Page 12 of 21 JAD/jad

4.4.8 The Standby Gas Treatment System Filter trains are operable:

ST-4-076-321-0ST-4-076-801-0ST-4-076-322-0ST-4-076-802-0

ST-6-076-250-\* ST-6-076-380-0

NIA

4.4.9 Verify SGD-076-206-3 is locked open.

)

Date

#### NOTE

The Reactor Enclosure Slide Gate damper may be reopened to facilitate testing with Reactor Enclosure Secondary Containment <u>not</u> being established. The Flow Balance Damper in the duct from Reactor Enclosure Secondary Containment to Standby Gas Treatment System (SGTS) is balanced AND tested to ensure adequate Fan capacity to the other zones.

4.4.10	IF Reactor Enclosure secondary containment is not
	established,
	THEN verify SGD-076-206-1 for
	Unit 1 only, SGD-076-506-2 for
	Unit 2 only, is locked closed.
	Otherwise mark N/A.

4.4.11 Verify the following systems meet the requirements of their Technical Specification, as required for the planned evolution.

Date

ESWTS 3.7.1.2Ultimate Heat SinkTS 3.7.1.3CREFASTS 3.7.2AC SourcesTS 3.8.1.2DC SourcesTS 3.8.2.2Electrical DistributionTS 3.8.3.2

Initials Date

FH-106, Rev. 24 Page 13 of 21 JAD/jad

4.5

4.7

The Control Room Shift Supervisor shall review this procedure's prerequisites <u>AND</u> determine if all equipment required by Tech Specs to be operable for the planned evolution is operable by reviewing the following:

> TPA log Clearances Regulatory Actions log Outstanding A/R's

1/4/02 Initials Date

Initials Dat

Initials Da

4.6 The Surveillance Test Coordinator is aware of this activity AND appropriate Surveillance Tests are being performed.

> IF Pool to Pool moves are anticipated THEN ensure personnel barrier AND safety postings are in place along north and south refuel platform rails on the peninsulas between the fuel pools to limit personnel entry into the area inside the bridge rails, Otherwise, N/A this step.

4.8 Ensure signed off original up to this step of the procedure is returned to the Reactor Engineer AND a signed off copy is issued to the Fuel Handling Director.

5.0 SPECIAL EQUIPMENT

NONE.

- 6.0 FUEL/SNM ACCOUNTABILITY
- 6.1 CCTAS NO CORE TRANSFER

Upon completion of a step in the CCTAS, the verifying person must fill in the date AND time of transfer and initial the indicated space.

6.2 FUEL LOCATION HISTORY SHEETS

Each fuel assembly has an associated Fuel Location History Sheet. This sheet must be updated within three months of the completion of any activity in which the assembly changes residence locations OR is physically altered.

FH-106, Rev. 24 Page 14 of 21 JAD/jad

#### 6.3 FUEL INVENTORY SUMMARY SHEET

At the end of the core component and irradiated item movement operation OR at any point the Reactor Engineer determines necessary, this sheet shall be updated by entering a new row of information concerning the location of all fuel. (if changes are required)

6.4 FUEL POOL INVENTORY LOG

This log is updated within three months of the end of the core component and irradiated item movement operations per RE-C-44.

- NON-FUEL SPECIAL NUCLEAR MATERIAL (SNM)
- 6.5 FISSION CHAMBER INVENTORY SUMMARY SHEET

At the end of operations involving fission chamber movement OR at any point the Reactor Engineer determines necessary, this sheet shall be updated by entering a new row of information concerning the location of all fission chambers.

6.6 FISSION CHAMBER TRANSFER AUTHORIZATION SHEET (FCTAS)

Upon completion of a step in the FCTAS, the verifying person must fill in the date of transfer AND initial the indicated space.

6.7 FISSION CHAMBER LOCATION HISTORY SHEETS

Each fission chamber has an associated Fission Chamber Location History Sheet. This sheet shall be updated whenever the fission chamber changes residence locations.

7.0 PRECAUTIONS

- 7.1 Fuel shall only be moved to locations specified in the CCTAS.
- 7.2 Observe precautions AND instructions in S97.0.M when moving fuel.
- 7.3 Observe precautions AND instructions specified in the RWP.

FH-106, Rev. 24 Page 15 of 21 JAD/jad

#### 7.4 IF any of the following symptoms occur, THEN perform actions required by ON-120:

- Fuel Floor Area radiation monitor alarms
- Fuel Bundle dropped or damaged
- Unanticipated reduction of Reactor Cavity OR Spent Fuel Pool Water Level
- 7.5 Ensure that no loads greater than 1200 lbs are carried over fuel in the spent fuel pool.
- 7.6 New fuel shall <u>not</u> be stored in the new fuel storage vault (Ref. 2.17).
- 7.7 When using auxiliary hoists to handle irradiated components, ensure jam blocks are set to provide required water coverage per the implementing procedure.

#### 8.0 LIMITATIONS AND ACTIONS

- 8.1 Difficulties in handling fuel shall be treated as described in S97.0.M (Ref. 2.4). Manual operation of refuel platform hoist, when necessary to maintain refuel platform in a safe condition, shall be performed in accordance with Operating Procedure S97.0.L (Ref. 2.18).
- 8.2 IF any core component or irradiated item is dropped OR damaged during a transfer operation, THEN work under this procedure AND associated Fuel Handling procedures shall be suspended until the exact nature and cause of the incident is determined. Permission to continue fuel handling operations shall be obtained from the Operations Senior Manager.
- 8.3 IF REFUELING FLOOR SECONDARY CONTAINMENT INTEGRITY is not maintained, <u>THEN</u> suspend handling of irradiated fuel in accordance with Reference 2.14 <u>AND</u> suspend movement of items over irradiated fuel <u>UNLESS</u> items are analyzed per References 2.13 and 2.21. (See Tables 1 and 2)
- 8.4 Table 2 provides requirements and limitations for handling light loads over irradiated fuel without secondary containment or other systems/equipment required to mitigate the fuel handling design basis accident (i.e., prerequisites 4.3 and 4.4). These requirements and limitations are based on an engineering analysis documented in References 2.21 and 2.22.

FH-106, Rev. 24 Page 16 of 21 JAD/jad 8.5 "The Emergency Plan" should be implemented (Ref. ERP-101) if the following conditions exist:

> 8.5.1 Unexpected Increase in Plant Radiation or Airborne Concentration. (UNUSUAL EVENT)

> 8.5.2 Major Damage to Irradiated Fuel, or Loss of Water Level that Has or Will Result in the Uncovering of Irradiated Fuel Outside the Reactor Vessel.(ALERT)

IF it becomes necessary to deviate from the CCTAS, THEN Fuel Handling Director shall halt core component moves prior to performing the step requiring deviation AND initiate a revision to the CCTAS as per RE-C-40. (Ref. 2.7)

8.7 Regarding use of the Fuel Preparation Machine(s):

8.6

- a) IF work is temporarily suspended, e.g. stop for a lunch break, with a fuel bundle containing irradiated components in a fuel prep machine, THEN prep machine shall be lowered to its lower stop AND the air supply shall be disconnected.
- b) Fuel Preparation Machines are NOT for storage of irradiated fuel assemblies. Therefore, prior to completing work activities for the day,
   OR whenever an extended delay in work is anticipated, fuel bundle(s) containing irradiated fuel rods shall be placed back into the fuel storage racks (Ref. 2.15).
- 8.8 Revisions to this procedure shall require the review of Reactor Engineering.
- 8.9 <u>IF</u> failure of a Double Verification is discovered, <u>THEN</u> Core Component movement shall be terminated <u>AND</u> Shift Management, NMD Management, and Reactor Engineering shall be notified immediately. (Ref. 2.7)
  - 8.9.1 A CR shall be initiated per LS-AA-125 for failure of a DV. Challenges of the DV process (e.g., one of the verifiers accepts a discrepant condition which is caught by the other verifier) should be monitored. CR initiation should be considered for cases of multiple DV challenges.

FH-106, Rev. 24 Page 17 of 21 JAD/jad

#### PROCEDURE

#### NOTE

The procedure section describes the methods by which other procedures are used to accomplish the "physical work" of core component and irradiated item movement. This section also describes how work may change from being under the purview of FH-106 to that of FH-105 and back again. Finally, tasks that are to be done after completion of core component and irradiated item movement operations are delineated.

9.1	PRIOR TO	CORE COMPONENT AND IRRADIATED ITEM MOVEMENT
•	9.1.1	The Reactor Engineer or Fuel Handling Director may require that the prerequisites for this procedure be re-established prior to movement operations.
		a. The Reactor Engineer will inform the Fuel Handling Director of this requirement if needed.
	9.1.2	Maintenance Supervisor <u>OR</u> Fuel Handling Director shall notify the Fuel Floor Health Physics Supervisor, Radiological Engineer <u>OR</u> Designee prior to starting evolutions involving moving/storing irradiated components in the Spent Fuel Pool, Cask Pit <u>OR</u> Transfer Canal.

#### NOTE

WHEN performing the following evaluation, THEN the potential radiological effects in Reactor Enclosure elevation 313' shall be considered, IF the irradiated component is dropped.

> 9.1.3 The Fuel Floor Radiological Engineer OR Health Physics Supervisor shall determine the radiological effects of moving/storing irradiated components in the Spent Fuel Pool, Cask Pit OR Transfer Canal AND recommend ALARA controls as necessary.

9.0

FH-106, Rev. 24 Page 18 of 21 JAD/jad 9.1.4 If it is desired to expand the scope of work to be performed under this procedure after all prerequisite signoffs are complete (e.g., addition of fuel inspections in the fuel prep machines), then the following may be performed with concurrence from the Control Room Shift Supervisor: Verify that the prerequisites a. applicable to the new scope are satisfied.

- b. For prerequisites previously marked N/A that are now applicable to the new scope - line out, initial and date "N/As" signifying prerequisite is satisfied.
- c. Have the Control Room Shift Supervisor re-perform prerequisite 4.5 for the expanded scope, and document the review by reinitialing prerequisite 4.5.
- 9.2 CORE COMPONENT AND IRRADIATED ITEM MOVEMENT

i

- 9.2.1 The handling of fuel or other core components shall be governed by this procedure, S97.0.M, other applicable maintenance procedures (as required) AND the CCTAS. (Ref. 2.3)
- 9.2.2 At the end of a shift that core component or irradiated item movement will not carry over into the next shift, the following should be done:
  - a. Place all refuel platform hoist and grapple loads in a safe storage location.
  - b. De-energize the Refueling Platform control circuitry by pressing the STOP button on the left hand controller.
  - c. Turn off the air compressor by taking the COMPRESSOR switch to the OFF position on the north bridge end structure.
  - d. Ensure cabinet heaters remain on by leaving MAIN and MONO switches in the ON position on the north bridge end structure.

FH-106, Rev. 24 Page 19 of 21 JAD/jad

#### 9.3 CHANGING GOVERNING PROCEDURES

9.4

9.4.2

- 9.3.1 The Reactor Engineer may decide (or circumstances may dictate) that core components and irradiated items shall be moved under FH-105.
  - a. When changing from FH-106 to FH-105 a new CCTAS may be required. The Reactor Engineer shall determine if a new CCTAS issue is required or if the current CCTAS may be revised.
  - b. When entering this procedure from FH-105, the Reactor Engineer should issue an explanation establishing the necessary criteria of this procedure prior to core component or irradiated item moves using this procedure.

#### COMPLETION OF CORE COMPONENT AND IRRADIATED ITEM MOVEMENT

9.4.1 Upon completion of activities governed by this procedure, the Reactor Engineer shall assemble all documentation concerned AND ensure all forms, data

AND ensure all forms, data sheets and check-out sheets have been completed.

Initials Date

The SNM Coordinator or approved alternate shall initiate the update of all SNM accounting documents affected by the completion of this procedure.

9.4.3 The Reactor Engineer or Fuel Handling Director has informed the Surveillance Test Coordinator of the completion of this activity.

Initials Date

Initials Date



#### TABLE 1

Required Decay Times For Transport Of Certain Items In The Spent Fuel Pool Over Irradiated Fuel Without Secondary Containment (Refs. 2.13 and 2.16)

		DESIGN LI			
ITEM TO BE MOVED	ASSUMED WEIGHT (1)	ASSUMED LENGTH (1)	ASSUMED LIFTING DEVICE (1)	DECAY TIME (2 TRANSPORT I <u>SECONDARY</u> (	) REQUIRED TO TEM WITHOUT CONTAINMENT
				UNIT 1	UNIT 2
LPRM (12'Section)	14 lbs	12'	Inst. Handling Tool	32 days	**
Fuel Support Piece	62 lbs	0.85'	Fuel Support Piece Grapple	41 days	**
Double Blade Guide	180 lbs	14.91'	Main Grapple	46 days	**
Single Blade Guide	90 lbs	14.91'	Main Grapple	42 days	**
Control Rod Blade	200 lbs	11.92'	CRB Grapple	32 days	**
New Fuel Assembly OR Dummy Bundles	700 lbs	14.68'	Main Grapple	46 days	54 days

\*\* = items not analyzed
 for current racks,
 secondary
 containment required

(1) IF actual weight is greater OR length is less than assumed values OR lifting device is different than assumed THEN secondary containment is required unless decay time is verified using Ref. 2.13.

(2) Decay time is time since shutdown of unit just prior to most recent discharge of fuel which is stored in appropriate fuel pool. Previous transfer of fuel between fuel pools must be considered in making this determination.

FH-1 Rev. 24 Pag\_ 21 of 21 JAD/jad

#### TABLE 2

### ALLOWABLE LIGHT LOADS OVER IRRADIATED FUEL WITHOUT SECONDARY CONTAINMENT

This table provides a listing of light loads allowed to be handled over irradiated fuel without secondary containment or other systems/equipment required to mitigate the fuel handling design basis accident. These requirements and limitations are based on an engineering analysis documented in References 2.21 and 2.22.

Object	Limitations *
Any object 5 lbs. or less	None
Any object 10 lbs. or less	Object has drag and buoyancy properties less severe than either a 10 lb 1 inch dia. steel rod OR a 10 lb solid steel cube
TriNuc cartridge filter	10 lbs. or less (approx. 6" O.D. x 30" long)
Teletector survey instrument	10 lbs. or less
Black & White Camera/Light Assembly	10 lbs. or less (approx. 1.25" dia. with 3" x 4.5" light assembly)
Color Camera/Light Assembly	15 lbs. or less (approx. 5" x 5" x 10")
Guide Tube Vacuum Head	15 lbs. or less (approx. 10" dia.)
Color Camera/Light Assembly attached to lightweight handling poles (LWHP)	15 lbs. or less (approx. 5" x 5" x 10") LWHPs - any length, but no more than 10' above pole handler
Guide Tube Vacuum Head attached to LWHP	15 lbs. or less (approx. 10" dia.) LWHPs - any length, but no more than 10' above pole handler
LWHPs w/ no attachments	Maximum length = 20' OR Maximum length = 70' if bottom of assembly is within 4' of fuel <sup>#</sup>

- \* For all objects, reactor cavity/spent fuel pool water level must be at least 350' 4" (2' below curb)
- # Poles must be assembled in an area clear of fuel (e.g., over cask pit)

S97.0.M, Rev. 12 Page 1 of 26 JAD/jad

## Exelon Nuclear LIMERICK GENERATING STATION

# S97.0.M REFUELING PLATFORM OPERATION

### 1.0 PURPOSE

1.1 To provide instruction necessary to operate the Refuel platform main hoist for core component movements within the Fuel Pool, Cask Pit, and Reactor Core. This procedure shall be used in conjunction with Fuel Handling Procedure FH-105 "Core Component Movement - Core Transfers", or FH-106 "Core Component and Irradiated Item Movement - No Core Transfer" as appropriate.

### 2.0 PREREQUISITES

- 2.1 <u>IF</u> performing component transfers in the Reactor, <u>THEN</u> all prerequisites included in Procedure FH-105, "Core Component Movement - Core Transfers" have been completed as appropriate.
- 2.2 IF performing component transfers in the Fuel Pool/Cask Pit only, <u>THEN</u> all prerequisites included in Procedure FH-106, "Core Component and Irradiated Item Movement - No Core Transfer", have been completed as appropriate.
  - 2.3 Applicable sections of the \$97.1 A "Electrical, Mechanical, and Pneumatic Alignment/Checkout of Refueing Platform Bridge, Trolley and Main Hoist for Operation" should be performed as necessary. Verification of the mast's ability to fully extend without binding should be performed over the reactor cavity soon after core is accessible with the mast.
  - 2.4 <u>IF</u> performing transfer of the dummy bundle over the Reactor Cavity, <u>THEN</u> secondary containment is required during movement over irradiated fuel per Ref. 5.13.
  - 2.5 <u>IF performing transfer of the dummy bundle in the spent fuel pool only,</u> <u>THEN</u> secondary containment is operable as required below:

**<u>IF</u>** greater than 46 days have elapsed since shutdown of unit just prior to the most recent discharge of fuel which is stored in the appropriate pool, **<u>THEN</u>** secondary containment is not required per Refs. 5.13 and 5.14. Previous transfer of fuel between fuel pools must be considered in making this determination,

<u>OTHERWISE</u>, secondary containment is required during movement of the dummy bundle over irradiated fuel per Ref. 5.13.

S97.0.M, Rev. 12 Page 2 of 26 JAD/jad

- 2.6 <u>IF</u> there is potential for contact with the Auxiliary Platform during performance of any section of this procedure <u>THEN</u> a dedicated Spotter shall be posted on the Refueling Platform to monitor platform separation <u>AND</u> alert the Fuel Handling crew to stop operations <u>IF</u> interference is imminent. (Ref. 5.18)
  - 3.0 PRECAUTIONS
  - 3.1 <u>IF</u> equipment performance is <u>not</u> as expected,
     <u>THEN</u> the equipment shall be placed in a safe condition
     <u>AND</u> Shift Management or Fuel Handling Director shall be notified immediately.
  - 3.2 <u>IF</u> a core component is partially inserted into a location, <u>THEN</u> Refuel Platform bridge <u>OR</u> Trolley shall only be moved at JOG speed.
    - 3.3 Fuel bundles shall be seated using a consistent slow hoist speed while gently shaking the mast. Extreme slow speed and the absence of vibration increases the potential for improper bundle seating.
  - 3.4 Double blade guide spacer buttons occasionally tend to hang-up on the top edge of the Unit 2 Spent Fuel Pool racks. Refuel Platform Operator may need to gently shake mast to eliminate interference and fully seat blade guide in rack.
    - 3.5 Bridge and trolley shall be operated at JOG speed when handling double guides with the mast below the reactor vessel flange (per SIL 594).
    - 3.6 Blade guides may be removed from the reactor core provided the associated control rod blade will be diagonally supported by fuel or other blade guide(s).
    - 3.7 To prevent impact or mast/fuel assembly damage:
      - 3.7.1 Trolley and Bridge shall always be accelerated slowly, avoiding sudden starts and stops.
      - 3.7.2 Travel paths shall be clear before moving core components.
      - 3.7.3 NORMAL UP light must be lit before moving through transfer canal.
      - 3.7.4 Double blade guides must be raised beyond NORMAL UP using Hoist Override to -4.0 inches as indicated by hoist encoder before moving through transfer canal.
      - 3.7.5 Main Hoist Grapple must be in full up position when not in use.

- 3.7.6 Push or pull mast assembly as required when fuel bundle is approaching fully seated position in core, sipping canister, or spent fuel pool rack to protect channel fastener. Observe channel fastener, if possible, as it enters core, rack or sipping canister to ensure channel fastener does <u>not</u> catch.
- 3.7.7 Operate main hoist slowly when grapple/component approaches fully seated position.
- 3.8 Mast camera may impact surrounding structures when manipulating core components in the Reactor Core periphery, Fuel Pool periphery or Fuel Preparation Machine. Exercise caution to avoid impact damage.
- 3.9 LPRM bender stand shall be removed before moving platform to equipment pool. When installed the LPRM bender stand will prevent refuel platform travel over equipment pool.

### NOTE

Attachment 1 provides a list of Refuel Platform interlocks, including initiating conditions and effects on the system.

#### 3.10 **IF** during hoist operation:

- 3.10.1 HOIST JAM light comes on, <u>THEN</u> movement shall be stopped immediately <u>AND</u> lowered until HOIST JAM Light goes out, <u>THEN</u> the Fuel Handling Director shall be contacted for instruction.
- 3.10.2 HOIST LOADED Light goes out prematurely, OR load starts to lean,
  - 1. Hoist Lowering shall be stopped immediately.
  - 2. Grapple switch shall be verified to be in ENGAGED position
  - 3. Grapple engagement shall be verified.
  - 4. GRAPPLE ENGAGED light shall be verified lit.
  - 5. Hoist shall be raised slowly to regain the weight of the load.
  - 6. Fuel Handling Director shall be notified.

- 3.10.3 GRAPPLE ENGAGED Light goes out unexpectedly during operation, <u>THEN</u> movement shall be stopped immediately, <u>AND</u> FHD notified.
- 3.10.4 HOIST LOADED Light comes on unexpectedly while raising grapple:
  - 1. Hoist movement shall be stopped.
  - 2. Hoist shall be slowly lowered until HOIST LOADED light goes out.
  - 3. Fuel Handling Director shall be notified.
- 3.10.5 ROD BLOCK #1 and ROD BLOCK #2 light on interlock status display does not light when platform is over the core
   <u>AND</u> main hoist is fuel loaded,
   <u>THEN</u> refuel platform operation shall be stopped,
   <u>AND</u> FHD notified.
- 3.11 GRAPPLE LOCKOUT BYPASS and BOUNDARY ZONE COMPUTER BYPASS push button operations may be needed for handling components in the periphery of the Spent Fuel Pool, in a Bundle Sipping Canister, or in a Cask.
- 3.12 Fuel inspection and test equipment when installed in the fuel pools presents an entanglement hazard for the main mast or grappled fuel bundle.
- 3.13 **IF** secondary containment becomes inoperable during transfer of the dummy bundle,

<u>THEN</u> **STOP** movement of the dummy bundle over irradiated fuel <u>UNLESS</u> it was determined that secondary containment is not required (Ref. 5.13).

3.14 Prior to component handling concurrent with use of unique equipment in the reactor cavity or fuel pool, a determination should be made regarding the level of monitoring necessary to prevent contact between the equipment and the refuel platform mast, mast camera or core components suspended from the grapple.

Examples of unique equipment include in-vessel inspection or repair equipment, particularly those with umbilical cables. Depending on the risk of interference, consideration shall be given to positioning an individual on the refuel platform assigned the responsibility to monitor the position of the equipment (and umbilical if applicable) and alert Fuel Handling crew to **STOP** if interference is imminent.

3.15 De-energizing the refuel platform while over the reactor cavity (track switches actuated) will generate a Rod Withdrawal Block in the Main Control Room. Notify Reactor Operator prior to de-energizing the refuel platform with the track switches actuated.

- 3.16 Peripheral fuel assemblies have the potential to miss their fuel support and seat low. Use extreme caution to maintain proper alignment while inserting assembly into the core. (Ref. 5.15).
- 3.17 Extra caution should be used when handling very old fuel bundles. Monitoring of bundle weight shall be performed during lifting to ensure gross failure of bundle is identified (Ref. 5.16). Also, bent channel fasteners and bent bail handles have been found on old bundles.
- 3.18 A gentle rotation of the mast in both directions should be used to ensure the fuel grapple is firmly engaged to the bail handle. Rapid or rough rotation during this check has led to fuel failure. (Ref. 5.16)
- 3.19 Use extreme caution and a slow hoist speed when handling unchanneled fuel bundles. Unchanneled fuel bundles are more susceptible to damage by twisting/rotation of mast. Finger springs on the lower tie plate and fuel rod spacers may catch during fuel bundle removal
   <u>OR</u> insertion into a spent fuel pool rack
   <u>OR</u> fuel preparation machine.
- 3.20 Three dimensional moves of Refueling Platform (e.g. using Bridge, Trolley and Hoist at same time) <u>AND</u> simultaneous operation of Service Pole Caddy Hoist is not permitted. (Ref. 5.17)
- 3.21 <u>IF</u> potential for contact exists, <u>THEN</u> slow speed shall be utilized when approaching the Auxiliary Platform. (Ref. 5.18)

## 3.22 <u>IF</u> Refueling Platform <u>AND</u> Auxiliary Platform need to be brought together <u>THEN</u> PERFORM the following: (Ref. 5.18)

- 3.22.1 **ENSURE** Auxiliary Platform is positioned where required.
- 3.22.2 **DEENERGIZE** Refueling Platform per NMD Maintenance Supervisor **OR** FHD direction.
- 3.22.3 MOVE Refueling Platform up to Auxiliary Platform using hand-crank.
- 3.23 <u>IF</u> a Control System malfunction occurs, <u>THEN</u> Refueling Platform can be stopped by pressing the STOP push-button on the Left Hand Controller <u>OR</u> by opening the MAIN DISCONNECT switch on the north end truck.
- 3.24 <u>IF</u> fuel moves must be suspended with an irradiated bundle hanging on the mast, <u>THEN</u> ENSURE bundle is not positioned near invessel remote operated cameras. This will prevent radiation damage to the cameras.
## 4.0 <u>PROCEDURE</u>

#### NOTE

- 1. The performance steps section of this procedure is separated into the following subsections:
  - 4.1, Pickup Location Fuel Pool Storage Rack or Cask Pit
  - 4.2, Pickup Location Reactor Core
  - 4.3, Pickup Location Fuel Preparation Machine
  - 4.4, Pickup Location Bundle Sipping Canister
  - 4.5, Release Location Fuel Pool Storage Rack or Cask Pit
  - 4.6, Release Location Reactor Core
  - 4.7, Release Location Fuel Preparation Machine
  - 4.8, Release Location Bundle Sipping Canister
  - 4.9, Determination of Hoist Position for Bundle Seated in Sipping Canister
  - 4.10. In-Process Adjustment of Bridge/Trolley Encoders.
- 2. Target Hoist Positions are listed in Attachment 2 which should be posted on the Refuel Platform mast.
- 3. Sequential steps which perform horizontal positioning of grapple/component (Bridge/Trolley) and vertical positioning of grapple/component (Hoist) may be performed in parallel as conditions permit.

## 4.1 Pickup Location - Fuel Pool Storage Rack or Cask Pit

#### NOTE

A CCTAS is not required for pickup of the dummy bundle.

- 4.1.1 **POSITION** Refuel Platform Mast over desired core component in accordance with Core Component Transfer Authorization Sheet (CCTAS).
- 4.1.2 **LOWER** grapple until grapple is 6 to 12 inches above bail.
- 4.1.3 **ENSURE** grapple is open.
- 4.1.4 **ROTATE** grapple as necessary to achieve grapple to bail alignment.
- 4.1.5 Slowly **LOWER** grapple until SLACK CABLE Light is lit.

S97.0.M, Rev. 12 Page 7 of 26 JAD/jad

## NOTE

Steps 4.1.6 through 4.1.10 shall be double verified by the Fuel Handling Director (FHD) <u>AND</u> Refuel Platform Operator (RPO) <u>OR</u> Spotter.

- 4.1.6 **VERIFY** proper core component location <u>AND</u> orientation.
- 4.1.7 **VERIFY** the following, <u>THEN</u> **NOTIFY** FHD of grapple position.
  - Grapple is centered over bail handle.
  - Hoist Position indication agrees with value listed in Attachment 2 for item seated in Fuel Pool Storage Rack.
  - Grapple appears seated on bail handle using underwater camera for component seated in cask.
- 4.1.8 <u>WHEN</u> directed by FHD, <u>THEN</u> ENGAGE grapple, <u>AND</u> VERIFY GRAPPLE ENGAGED Light is lit.
- 4.1.9 <u>WHEN</u> directed by FHD, <u>THEN</u> slowly **RAISE** load while ensuring HOIST LOADED Light is lit (fuel/dummy bundle only), <u>OR</u> for skeleton fuel bundle **VERIFY** component movement.
- 4.1.10 **CONTINUE** raising until grapple is fully raised, <u>THEN VERIFY</u> NORMAL UP Light is lit.
- 4.1.11 <u>IF</u> a double blade guide is being transferred through the cattle chute, <u>THEN</u> **RAISE** the grapple beyond NORMAL UP using the Hoist Override to -4.0 inches as indicated by Hoist Encoder.
- 4.1.12 **GO TO** appropriate "Release Location" section of this procedure as directed by FHD.

S97.0.M, Rev. 12 Page 8 of 26 JAD/jad

## 4.2 Pickup Location - Reactor Core

- 4.2.1 **POSITION** Refuel Platform Mast over desired core component in accordance with Core Component Transfer Authorization Sheet (CCTAS).
- 4.2.2 LOWER grapple until grapple is 6 to 12 inches above bail.
- 4.2.3 ENSURE grapple is open.
- 4.2.4 **ROTATE** grapple as necessary to achieve grapple to bail alignment.
- 4.2.5 Slowly LOWER grapple until SLACK CABLE Light is lit.

#### NOTE

Steps 4.2.6 through 4.2.10 shall be double verified by the Fuel Handling Director (FHD) AND Refuel Platform Operator (RPO)

<u>OR</u> Spotter.

- 4.2.6 **VERIFY** proper core component location <u>AND</u> orientation.
- 4.2.7 **VERIFY** the following, <u>THEN</u> **NOTIFY** FHD of grapple position.
  - Grapple is centered over bail handle.
  - Hoist Position indication agrees with value listed in Attachment 2 for item seated in core.
- 4.2.8 <u>WHEN</u> directed by FHD, <u>THEN</u> ENGAGE grapple, <u>AND</u> VERIFY GRAPPLE ENGAGED Light is lit.

S97.0.M, Rev. 12 Page 9 of 26 JAD/jad

## NOTE

**<u>IF</u>** load is a Fuel Bundle, <u>THEN</u> FHD notifies Unit Reactor Operator of pending fuel removal from the core.

4.2.9 <u>WHEN</u> directed by FHD, <u>THEN</u> **RAISE** load <u>AND</u> **VERIFY** HOIST LOADED Light is lit (fuel/dummy bundle only).

4.2.10 **CONTINUE** raising until core component is clear of core.

- 1. **VERIFY** HOIST Position indicates less than 355.0 inches.
- 2. **VERIFY** item is clear of top guide.

1

## NOTE

**IF** load is a Fuel Bundle, **THEN** FHD notifies Unit Reactor Operator that fuel bundle has cleared core.

- 4.2.11 <u>IF</u> load is to be transferred through transfer canal, <u>THEN</u> **CONTINUE** raising until grapple is fully raised <u>THEN</u> **VERIFY** NORMAL UP Light is lit.
  - <u>IF</u> load is a double blade guide, <u>THEN</u> **RAISE** the grapple beyond NORMAL UP using Hoist Override to -4.0 inches as indicated on Hoist Encoder.
- 4.2.12 **GO TO** appropriate "Release Location" section of this procedure as directed by FHD.

S97.0.M, Rev. 12 Page 10 of 26 JAD/jad

## 4.3 Pickup Location - Fuel Preparation Machine

4.3.1 **VERIFY** Fuel Prep Machine carriage is fully LOWERED.

#### NOTE

A CCTAS is not required for pickup of the dummy bundle.

## CAUTION

Use extreme care to avoid entanglement of main mast or grappled fuel bundle with fuel inspection and test equipment located in the vicinity of the fuel prep machines.

- 4.3.2 Carefully **POSITION** Refuel Platform Mast over fuel prep machine in accordance with Core Component Transfer Authorization Sheet (CCTAS).
- 4.3.3 LOWER grapple until grapple is 6 to 12 inches above bail.
- 4.3.4 **DEPRESS** GRAPPLE LOCKOUT BYPASS push button.
- 4.3.5 **ENSURE** grapple is open.
- 4.3.6 **ROTATE** grapple as necessary to achieve grapple to bail alignment.
- 4.3.7 Slowly LOWER grapple until SLACK CABLE Light is lit.

#### NOTE

Steps 4.3.8 through 4.3.13 shall be double verified by the Fuel Handling Director (FHD) and Refuel Platform Operator (RPO) or Spotter.

4.3.8 **VERIFY** proper core component location <u>AND</u> orientation.

S97.0.M, Rev. 12 Page 11 of 26 JAD/jad

## 4.3.9 **VERIFY** the following, <u>THEN</u> **NOTIFY** FHD of grapple position.

- Grapple is centered over bail handle
- Hoist Position indication agrees with value listed in Attachment 2 for item seated in fuel prep machine.
- 4.3.10 <u>WHEN</u> directed by FHD, <u>THEN</u> ENGAGE grapple, <u>AND</u> RELEASE GRAPPLE LOCKOUT BYPASS push button.
- 4.3.11 VERIFY GRAPPLE ENGAGED Light is lit.
- 4.3.12 <u>WHEN</u> directed by FHD, <u>THEN</u> slowly **RAISE** load <u>AND</u> VERIFY HOIST LOADED Light is lit (fuel/dummy bundle only), <u>OR</u> for skeleton fuel bundle visually VERIFY component movement.
- 4.3.13 **CONTINUE** raising until grapple is fully raised, <u>THEN VERIFY</u> NORMAL UP Light is lit.
- 4.3.14 **GO TO** appropriate "Release Location" section of this procedure as directed by FHD.

S97.0.M, Rev. 12 Page 12 of 26 JAD/jad

## 4.4 Pickup Location - Bundle Sipping Canister

4.4.1 **VERIFY** Bundle Sipping Canister lid is open.

#### NOTE

A CCTAS is not required for pickup of the dummy bundle.

- 4.4.2 **POSITION** Refuel Platform Mast over desired Bundle Sipping Canister in accordance with Core Component Transfer Authorization Sheet (CCTAS).
- 4.4.3 **LOWER** grapple until grapple is 6 to 12 inches above bail.
- 4.4.4 **ENSURE** grapple is open.
- 4.4.5 **ROTATE** grapple as necessary to achieve grapple to bail alignment.
- 4.4.6 Slowly LOWER grapple until SLACK CABLE Light is lit.

#### NOTE

- 1. Steps 4.4.7 through 4.4.11 shall be double verified by the Fuel Handling Director and Refuel Platform Operator or Spotter.
- 2. Expected hoist position indication is determined and posted on Attachment 2 using the dummy bundle in subsection 4.9.
  - 4.4.7 **VERIFY** proper core component location <u>AND</u> orientation.
  - 4.4.8 **VERIFY** the following, <u>THEN</u> **NOTIFY** FHD of grapple position.
    - Grapple is centered over bail handle
    - Hoist Position indication agrees with value posted on Attachment
      2 for item seated in Bundle Sipping Canister.

S97.0.M, Rev. 12 Page 13 of 26 JAD/jad

## 4.4.9 <u>WHEN</u> directed by FHD, <u>THEN</u> ENGAGE grapple <u>AND</u> VERIFY GRAPPLE ENGAGED Light is lit.

## CAUTION

Use extreme care to avoid collision of fuel bundle with open Sipping Canister lid.

- 4.4.10 <u>WHEN</u> directed by FHD, <u>THEN</u> slowly **RAISE** load while ensuring HOIST LOADED Light is lit (fuel/dummy bundle only).
- 4.4.11 **CONTINUE** raising until grapple is fully raised, <u>THEN</u> VERIFY NORMAL UP Light is lit.
- 4.4.12 **GO TO** appropriate "Release Location" section of this procedure as directed by FHD.
- 4.5 Release Location Fuel Pool Storage Rack or Cask Pit

#### NOTE

A CCTAS is not required for pickup of the dummy bundle.

- 4.5.1 **POSITION** core component over desired location in accordance with Core Component Transfer Authorization Sheet (CCTAS).
- 4.5.2 **ROTATE** core component as necessary to achieve proper orientation.
- 4.5.3 **PERFORM** Double Verification to ensure proper core component location <u>AND</u> orientation.
- 4.5.4 <u>WHEN</u> directed by FHD, <u>THEN</u> LOWER hoist until core component is seated <u>AND</u> SLACK CABLE Light is lit.

S97.0.M, Rev. 12 Page 14 of 26 JAD/jad

## NOTE

Steps 4.5.5 through 4.5.8 shall be double verified by the Fuel Handling Director (FHD) <u>AND</u> Refuel Platform Operator (RPO) **OR** Spotter.

- 4.5.5 **VERIFY** the following, <u>THEN NOTIFY</u> FHD of grapple position.
  - Component elevation appears equivalent to other stored components in the rack.

Hoist Position indication agrees with value listed in Attachment 2 for item seated in Fuel Storage Rack, <u>OR</u> per M-053-006, subsection 5.4, for a bundle seated in a cask.

- 4.5.6 <u>WHEN</u> directed by FHD, <u>THEN</u> **RELEASE** grapple.
  - 1. <u>IF</u> in cask, <u>THEN DEPRESS</u> Grapple Lockout Bypass push button.
- 4.5.7 **VERIFY** grapple is open.
- 4.5.8 Slowly **RAISE** grapple while verifying HOIST LOADED remains out, <u>AND</u> grapple remains free of bail handle.
- 4.5.9 **RECORD** completion of component transfer on CCTAS.

#### 4.6 <u>Release Location - Reactor Core</u>

- 4.6.1 **POSITION** core component above desired location in accordance with Core Component Transfer Authorization Sheet (CCTAS).
- 4.6.2 **LOWER** load until hoist position indicates approximately 355 inches, <u>THEN</u> **STOP** lowering.
- 4.6.3 **ROTATE** core component as necessary to achieve proper orientation.
- 4.6.4 **PERFORM** Double Verification to ensure proper core component location <u>AND</u> orientation.

S97.0.M, Rev. 12 Page 15 of 26 JAD/jad

#### NOTE

IF Load is a Fuel Bundle,

THEN FHD notifies Unit Reactor Operator of pending fuel insertion in core.

## 4.6.5 <u>WHEN</u> directed by FHD, <u>THEN</u> LOWER load until SLACK CABLE Light is lit.

#### NOTE

Steps 4.6.6 through 4.6.8 shall be double verified by the Fuel Handling Director (FHD) <u>AND</u> Refuel Platform Operator (RPO) <u>OR</u> Spotter.

4.6.6 **VERIFY** the following, <u>THEN</u> **NOTIFY** FHD of grapple position.

- Component elevation appears equivalent to other components in the Reactor Core.
- Hoist Position indication agrees with value listed in Attachment 2 for item fully seated in Reactor Core.
- 4.6.7 <u>WHEN</u> directed by FHD, <u>THEN</u> **RELEASE** grapple, <u>AND</u> **VERIFY** grapple is open.
- 4.6.8 Slowly RAISE grapple while verifying HOIST LOADED light remains out.
- 4.6.9 **RECORD** completion of component transfer on CCTAS.

PC

S97.0.M, Rev. 12 Page 16 of 26 JAD/jad

### NOTE

**<u>IF</u>** Load is a Fuel Bundle, <u>THEN</u> FHD notifies Unit Reactor Operator of completion of fuel insertion in core.

4.7 <u>Release Location - Fuel Preparation Machine</u>

1

4.7.1 **ENSURE** Fuel Prep Machine carriage is fully lowered.

NOTE

A CCTAS is not required for pickup of the dummy bundle.

## CAUTION

Use extreme care to avoid entanglement of main mast or grappled fuel bundle with fuel inspection and test equipment located in the vicinity of the fuel prep machines.

- 4.7.2 Carefully **POSITION** component over desired fuel prep machine in accordance with Core Component Transfer Authorization Sheet (CCTAS).
- 4.7.3 **ROTATE** component as necessary to achieve proper alignment.
- 4.7.4 **PERFORM** Double Verification to ensure proper core component location <u>AND</u> orientation.
- 4.7.5 <u>WHEN</u> directed by FHD, <u>THEN</u> LOWER load until SLACK CABLE Light is lit.

PC

S97.0.M, Rev. 12 Page 17 of 26 JAD/jad

## NOTE

Steps 4.7.6 through 4.7.9 shall be double verified by the Fuel Handling Director (FHD) <u>AND</u> Refuel Platform Operator (RPO) <u>OR</u> Spotter.

- 4.7.6 **VERIFY** Hoist Position indication agrees with value listed in Attachment 2 for item fully seated in fuel prep machine, <u>THEN</u> **NOTIFY** FHD of grapple position.
- 4.7.7 <u>WHEN</u> directed by FHD, <u>THEN</u> **RELEASE** grapple, <u>AND</u> **DEPRESS** GRAPPLE LOCKOUT BYPASS push button.
- 4.7.8 **VERIFY** grapple is open.

ł

- 4.7.9 Slowly **RAISE** grapple while verifying HOIST LOADED light remains out, <u>AND</u> **VERIFY** grapple remains free of bail handle.
- 4.7.10 **RELEASE** GRAPPLE LOCKOUT BYPASS push button.
- 4.7.11 **RECORD** completion of component transfer on CCTAS.
- 4.8 Release Location Bundle Sipping Canister

## CAUTION

Use extreme care to avoid collision of fuel bundle with open Sipping Canister lid.

- 4.8.1 **VERIFY** Bundle Sipping Canister lid is open.
- 4.8.2 **POSITION** fuel bundle over desired Bundle Sipping Canister in accordance with Core Component Transfer Authorization Sheet (CCTAS).
- 4.8.3 **ROTATE** fuel bundle as necessary to achieve proper insertion alignment.

S97.0.M, Rev. 12 Page 18 of 26 JAD/jad

- 4.8.4 **PERFORM** Double Verification to ensure proper core component location <u>AND</u> orientation.
- 4.8.5 <u>WHEN</u> directed by FHD, <u>THEN</u> LOWER load until SLACK CABLE light is lit.

PC

## NOTE

- 1. Steps 4.8.6 through 4.8.8 shall be double verified by the Fuel Handling Director (FHD) and Refuel Platform Operator (RPO) or Spotter.
- 2. Expected hoist position indication is determined and posted on Attachment 2 using the dummy bundle in subsection 4.9.

4.8.6 **VERIFY** the following, <u>THEN</u> **NOTIFY** FHD of grapple position.

- Fuel Bundle is fully seated in the Bundle Sipping Canister.
- Hoist Position indication agrees with value posted on Attachment 2 for item seated in Bundle Sipping Canister.
- 4.8.7 <u>WHEN</u> directed by FHD, <u>THEN</u> **RELEASE** grapple, <u>AND</u> **VERIFY** grapple is open.
- 4.8.8 Slowly **RAISE** grapple while verifying HOIST LOADED light remains out.
- 4.8.9 **RECORD** completion of component transfer on CCTAS.
- 4.9 Determination of Hoist Position for Bundle Seated in Sipping Canister

#### NOTE

A CCTAS is <u>not</u> required for pickup of the DUMMY bundle.

- 4.9.1 **PICKUP** DUMMY Bundle in accordance with subsection 4.1.
- 4.9.2 **VERIFY** Bundle Sipping Canister lid is open.

## S97.0.M, Rev. 12 Page 19 of 26 JAD/jad

- 4.9.3 **POSITION** DUMMY Bundle over Bundle Sipping Canister <u>AND</u> **ROTATE** DUMMY Bundle to achieve alignment.
- 4.9.4 <u>WHEN</u> directed by FHD, <u>THEN</u> slowly **LOWER** hoist until DUMMY Bundle is seated <u>AND</u> SLACK CABLE Light is lit.
- 4.9.5 **VERIFY** DUMMY Bundle is seated in Bundle Sipping Canister using underwater camera.

## PC

PC

#### NOTE

The DIMENSION (Target Hoist Position) for a fuel bundle seated in a Bundle Sipping Canister (refer to Attachment 2) is calculated by subtracting 1.5 inches from, <u>AND</u> adding 0.5 inches to, the Hoist Position Indication obtained below.

4.9.6 **RECORD** Hoist Position Indication <u>AND</u> **CALCULATE** the DIMENSION for each Bundle Sipping Canister below:

	CANISTER ID/ LOCATION	HOIST POSITION INDICATION	DIMENSION
1.	<u></u>		=
2.			_

- 4.9.7 <u>WHEN</u> directed by FHD, <u>THEN</u> slowly **RAISE** DUMMY Bundle while ensuring HOIST LOADED Light is lit.
- 4.9.8 **CONTINUE** raising until grapple is fully raised, <u>THEN</u> **VERIFY** NORMAL UP Light is lit.
- 4.9.9 **REPEAT** steps 4.9.2 through 4.9.8 for each additional Bundle Sipping Canister.

## 4.9.10 <u>WHEN</u> directed by the FHD, <u>THEN GO TO</u> appropriate subsection of this procedure, <u>AND RETURN</u> the DUMMY Bundle to its "As Found" location.

PC

S97.0.M, Rev. 12 Page 20 of 26 JAD/jad

- 4.9.11 **RECORD** ID/ Location, Hoist Position Indication, and DIMENSION for each Bundle Sipping Canister in the FHD logbook.
- 4.9.12 **RECORD** the ID/ Location and DIMENSION for each Bundle Sipping Canister on the appropriate page of Attachment 2, <u>AND</u> **POST** a copy of Attachment 2 on the associated Refuel Platform mast.
- 4.10 "In-Process" Adjustment of Bridge/Trolley Encoders

## CAUTION

DO NOT engage the grapple during performance of this section.

4.10.1 **POSITION** Refuel platform Mast over desired core component location.

4.10.2 **LOWER** grapple until grapple is 6 to 12 inches above bail.

4.10.3 ENSURE grapple is open.

4.10.4 **ROTATE** grapple as necessary to achieve grapple to bail alignment.

4.10.5 Slowly LOWER grapple until SLACK CABLE Light is lit.

#### NOTE

Steps 4.10.6 through 4.10.12 shall be double verified by the Fuel Handling Director (FHD) <u>AND</u> Refuel Platform Operator (RPO) <u>OR</u> Spotter.

4.10.6 **VERIFY** proper core component location <u>AND</u> orientation.

- 4.10.7 **VERIFY** the following, THEN NOTIFY FHD of grapple position.
  - Grapple is centered over bail handle.
  - Hoist position indication agrees with value listed in Attachment 2 for item seated in core.

PC

- 4.10.8 RECORD "As Found" encoder readout position indication <u>AND</u> Model 1200 Power Supply thumbwheel switch settings for Bridge Position (X) <u>AND</u> Trolley Position (Y) in the FHD logbook.
- 4.10.9 IF required,

1

1

<u>THEN</u> **ADJUST** thumbwheel switches on Model 1200 Readout Power Supply for Bridge Position (X)

**AND** Trolley Position (Y) to obtain desired core location as determined by encoder readout position indication.

## 4.10.10 RECORD "As Left" encoder readout position indication

<u>AND</u> Model 1200 Power Supply thumbwheel switch settings for Bridge Position (X)

AND Trolley Position (Y) in the FHD logbook.

- 4.10.11 ENSURE grapple is open.
- 4.10.12 WHEN directed by FHD,

THEN slowly RAISE grapple while verifying Hoist Loaded light remains out

AND grapple remains free of bail handle.

S97.0.M, Rev. 12 Page 22 of 26 JAD/jad

## 5.0 <u>REFERENCES</u>

- 5.1 UFSAR Section 9.1.4.2.10.2
- 5.2 UFSAR Section 7.7.1.15.3
- 5.3 UFSAR Section 15.4.1
- 5.4 F21-E003-K006, Operation and Maintenance Instructions, Refueling Platform, Vol. I
- 5.5 F21-E003-K006, Operation and Maintenance Instructions, Refueling Platform, Vol. II
- 5.6 PBAPS memo J. F. Franz to Plant Superintendents, 02/01/91
- 5.7 EIR #92-04-19

1

- 5.8 MOD 6248, Refuel Platform Mast Mounted Underwater Camera System
- 5.9 Nuclear Emergency Plan
- 5.10 NSAC/164L, Guidelines for BWR Reactivity Control During Refueling
- 5.11 A-C-300, Reactivity Management Program
- 5.12 GE SIL 594, Refuel Platform Triangular Mast Drag Loading
- 5.13 UFSAR Section 15.7.4 and 15.7.6 and PECO Calculation LM-033 "Methodology to Determine the Acceptability of Moving Loads over Irradiated Fuel Without Secondary Containment"
- 5.14 AR A1081310, E01, Evaluation of decay time required for new fuel bundle or dummy bundle movement in Unit 2 SFP without secondary containment
- 5.15 GE SIL No. 566 Supplement 1, Misaligned GE BWR fuel assemblies
- 5.16 INPO OE7535, Failed Fuel Bundle at Oyster Creek
- 5.17 MOD P00925, Service Pole Caddy on Refueling Bridge
- 5.18 MOD P00950, Fuel Floor Auxiliary Platform

S97.0.M, Rev. 12 Page 23 of 26 JAD/jad

#### 6.0 TECHNICAL SPECIFICATIONS

- 6.1 3.9.1
- 6.2 3.9.3
- 6.3 3.9.5
- 6.4 3.9.6

6.5 3.9.8

ł

- 6.6 3.9.9
- 6.7 3.9.10

#### 7.0 INTERFACING PROCEDURES

- 7.1 FH-105, Core Component Movement Core Transfers
- 7.2 FH-106, Core Component and Irradiated Item Movement No Core Transfer
  - 7.3 ON-120, Fuel Handling Problems
  - 7.4 S97.1.A, Electrical, Mechanical, and Pneumatic Alignment/Checkout of Refueling Platform Bridge, Trolley and Main Hoist for Operation
  - 7.5 ST-6-097-630-\*, Core Alteration Testing for Offloading, Shuffling, and Reloading the Core
  - 7.6 M-097-046, Control of Fuel Inspection Activities
  - 7.7 M-097-035, Vacuum Sipping Irradiated BWR Fuel Assemblies
  - 7.8 S97.1.B, Fuel Floor Auxiliary Platform Start-up, Checkout, Operation and Shutdown

S97.0.M, Rev. 12 Page 24 of 26 JAD/jad

## ATTACHMENT 1 Page 1 of 1

## LIMERICK REFUEL PLATFORM FLOOR INTERLOCKS

r					
	INTERLOCK STATUS DISPLAY	INITIATING CONDITIONS	EFFECT ON OPERATIONS		
	ROD BLOCK #1	BRIDGE NEAR OR OVER CORE <u>AND</u> ANY HOIST FUEL LOADED	CONTROL ROD WITHDRAWAL BLOCK (RDCS), ROD OUT BLOCK ANNUNCIATOR - MCR		
	ROD BLOCK #2				
	BRIDGE REVERSE STOP #1 ( <i>BRIDGE FORWARD STOP #1</i> , if reactor select switch in non-normal position)	BRIDGE NEAR OR OVER CORE <u>AND</u> ANY HOIST FUEL LOADED <u>AND</u> ANY ROD NOT FULL IN	NO BRIDGE MOTION IN INDICATED DIRECTION		
C	BRIDGE REVERSE STOP #2 ( <i>BRIDGE FORWARD STOP #2,</i> if reactor select switch in non-normal position)	BRIDGE NEAR OR OVER CORE <u>AND</u> RX MODE SWITCH NOT IN REFUEL <u>OR</u> CONTROL ROD NOT SELECTED	NO BRIDGE MOTION IN INDICATED DIRECTION		
	FUEL HOIST INTERLOCK	BRIDGE NEAR OR OVER CORE <u>AND</u> MAIN HOIST FUEL LOADED (>550 LBS) <u>AND</u> ANY ROD NOT FULL IN	MAIN HOIST INOPERATIVE (HOIST WILL NOT RAISE OR LOWER)		
	MONO AUX HOIST INTERLOCK	BRIDGE NEAR OR OVER CORE AND	MONO AUX HOIST INOPERATIVE		
		AUX HOIST FUEL LOADED (>1500 LBS) <u>AND</u> ANY ROD NOT FULL IN	(HOIST WILL NOT RAISE OR LOWER)		
	TROLLEY AUX HOIST INTERLOCK		TROLLEY AUX HOIST INOPERATIVE		
	· · · · · · · · · · · · · · · · · · ·		(HOIST WILL NOT RAISE OR LOWER)		
		THERMAL OVERLOAD	BRIDGE WILL NOT OPERATE		
		MOTOR FIELD LOSS	TROLLEYS WILL NOT OPERATE		
	FAULT LOCKOUT	MAIN HOIST OVERLOAD	HOISTS WILL NOT OPERATE		
		INSTANTANEOUS OVERCURRENT TROLLEY DECK CABINET DOOR OPEN VARIABLE SPEED SWITCHES NOT NEUTRAL ON STARTUP	AIR OPERATED GRAPPLES GO OR STAY CLOSED		
c			CONTROL ROD WITHDRAWAL BLOCK - MCR (OVER CORE ONLY)		
$\smile$	TEST IN PROGRESS	TEST BOX CONNECTED	VARIABLE DEPENDS ON TEST SWITCH POSITION		

S97.0.M, Rev. 12 Page 25 of 26 JAD/jad

## ATTACHMENT 2 Page 1 of 2 U/1 MAIN HOIST POSITION INDICATIONS

NOTE:

Position indications for single blade guides are the same as for bundles.

	DIMENSION
BUNDLE ENTERING RACK	15" - 17"
BUNDLE SEATED IN RACK	190" - 192"
BUNDLE ENTERING CORE	375" - 377"
BUNDLE SEATED IN CORE	549" - 551"
DBG ENTERING FUEL RACK	12" - 14"
DBG SEATED IN FUEL RACK	184" - 189"
DGB SEATED IN CRB RACK WITHOUT CRB SPACER	187" - 189″
DGB SEATED IN CRB RACK WITH CRB SPACER	175.5″ - 177.5″
DBG ENTERING CORE	372" - 374"
DBG SEATED IN CORE	546" - 548"
DBG TRAVERSING CATTLE CHUTE	-4"4.5"
BUNDLE SEATED IN FUEL PREP. MACHINE	164" - 166"
BUNDLE SEATED IN FUEL PREP. MACHINE'S ROTATING INSPECTION FIXTURE	158" - 160"
BOTTOM OF FUEL POOL	approx. 372"
BOTTOM OF CASK PIT	approx. 422"
BUNDLE SEATED IN BUNDLE SIPPING CANISTER	
ID/ LOCATION	
BUNDLE SEATED IN BUNDLE SIPPING CANISTER	
ID/ LOCATION	

S97.0.M, Rev. 12 Page 26 of 26 JAD/jad

## ATTACHMENT 2 Page 2 of 2 U/2 MAIN HOIST POSITION INDICATIONS

NOTE:

1

1

Position indications for single blade guides are the same as for bundles.

	DIMENSION
BUNDLE ENTERING RACK	19" - 21"
BUNDLE SEATED IN RACK	194" - 196"
BUNDLE ENTERING CORE	375" - 377"
BUNDLE SEATED IN CORE	549" - 551"
DBG ENTERING FUEL RACK	16" - 18"
DBG SEATED IN FUEL RACK	191" - 193"
DGB SEATED IN CRB RACK WITHOUT CRB SPACER	187" - 189"
DGB SEATED IN CRB RACK WITH CRB SPACER	175.5″ - 177.5
DBG ENTERING CORE	372" - 374"
DBG SEATED IN CORE	546" - 548"
DBG TRAVERSING CATTLE CHUTE	-4"4.5"
BUNDLE SEATED IN FUEL PREP. MACHINE	164" - 166"
BUNDLE SEATED IN FUEL PREP. MACHINE'S ROTATING INSPECTION FIXTURE	158" - 160"
BOTTOM OF FUEL POOL	approx. 372"
BOTTOM OF CASK PIT	approx. 422"
BUNDLE SEATED IN BUNDLE SIPPING	
ID/ LOCATION	
BUNDLE SEATED IN BUNDLE SIPPING CANISTER	-

**ID/ LOCATION** 

	EXELON NUCLEAR	an a
TITLE: <u>Response to Loss of Air to Cav</u>	vity Seals	
TASK PERFORMED BY:	EVALUATOR:	
EVALUATOR SIGNATURE:	DATE:	
DIRECTIONS TO EVALUATOR:		•
EVALUATION METHOD :		
Simulate		
EVALUATION LOCATION:		
Refuel Floor		
APPROXIMATE COMPLETION TIME:		
20 min.		
MPORTANCE RATING(S):	SYSTEM NUMBER(S)	,
3.2	233000A2.11	
REFERENCES:		
ON-120, FUEL HANDLING PROE S53.0.A, NORMAL MAKEUP/RES REACTOR WELL ARC-BOP-*0C222, BALANCE OF S15.3.C, RESPONSE TO LOSS C	3LEMS SPONSE TO LOW LEVEL IN FUEL STORAGE PO F PLANT PANEL *0C222 ANNUNCIATOR RESPO OF SERVICE AIR TO REFUEL FLOOR INFLATAE	DOL OR INSE CARDS BLE SEALS

TASK STANDARD(S):

Backup bottle aligned to spent fuel pool seals per S15.3.C

## **TASK CONDITIONS:**

- 1. Fuel movement in the spent fuel pool is in progress
- 2. The reactor cavity gates are installed and the reactor well is drained
- 3. A loss of service air on Unit \_\_\_\_ has occurred
- 4. Alarm D-1, SEAL NO. 7 REACTOR WELL / SPENT FUEL POOL STOP LOG (SOUTH SEAL) has been received on \_\_0C222

### **INITIATING CUES:**

You have been directed by the CRS to respond to \_\_0C222 alarms and backup refuel floor inflatable seals using backup bottles. Additional operators are being dispatched to the refuel floor.

Critical Element(s) indicated by "\*" in Performance Checklist.

## PERFORMANCE CHECKLIST:

STEP	STANDARD	SAT/UNSAT
ARC	A.,	
1. Reference ARC for *0C222 D-1	ARC D-1 referenced	
2. Verify integrity of Seal No. 10 (the redundant seal)	Verify Seal 10 pressure	
CUE: Seal 10 pressure is 46 psig and slowly dropping	/	
(Examiner Note: Pressure on all seals will eventually drop because service air was lost The JPM only examines backing up one seal. All seals would eventually need the same steps performed)	L -	
3. Refer to S15.3.C	S15.3.C obtained and referenced	
4. If Seal 7 is functioning as secondary containment then refer to Technical Specifications section 3.6.5	N/A With the shield plugs removed, the seals are not part of secondary containment	
5. Investigate and contain any leakage per S53.0.A	N/A	
CUE: No leakage is detected yet		
S15.3.0	Assessment Actions	
6. Check *0C222 for any annunciators indicating low seal air pressure	N/A Task condition	·
CUE: D-1 is still in alarm		

.

61 Q. J.

 $(a_i,a_i) \in \{a_i\}$ 

	STEP	OTANGARR	
-		STANDARD	SAT/UNSAT
7.	If service air is still available as evidenced by observing pressure gauge PI-015-*44(A-K) then adjust service air pressure to the seal per S15.3.E	N/A – Regulator adjustment will not work with the air supply failing	
CUI psig repo baci tripp	E: PI-015-*44A through K indicate 45 and dropping slowly. The control room orts that the service air compressor and kup service air compressor are both bed		
8.	If service air pressure is dropping noticeably or gone evidenced by observing pressure gauge PI-015- *44(A-K), then proceed to step 4.2 and attach secondary backup bottles	Proceed to Section 4.2 for backup bottle attachment	
CUE psig	: PI-015-*44A through K indicate 43 and dropping slowly		
	Backup Air Bottle Insta	Illation to Seal 7 per S15.3.C Rev 12	
9.	Obtain cart containing two backup bottles with regulators, hose, and appropriate quick disconnect fittings	Locate backup bottle equipment. Examiner Note: ( <i>The hoses and</i> .	
CUE have	(after, locating boxes and bottles): You the backup bottle and equipment	North wall of Refuel Floor equipped with breakable locks. The bottles are in various locations. The last location was at the East wall) The candidate should show the bottles and the location of the box. He or she need not open the box	
10.	*Position cart near seal station and connect one bottle to quick disconnect attached to calibration part of PL 045	Indicate location of Seal Station "G" where bottle would be placed	
	*49A (B-K), Seal Supply Press Indicator and	Indicate location of quick disconnect fitting	
CUE: discor port o	Bottle cart is positioned and quick nnect fitting is attached to calibration f PI-01549G		
			12

a da ser a ser

.

		OTED			
-		51EP		STANDARD	SAT/UNSAT
11.	*Cle and K).( mai	ose 15-*411A(B- I "Root Valve" for (Both valves loca nifold)	K) "Supply Valve" PI-015-*49A(B- ted in pit next to	Close supply valve and root valve for PI- 015-*49G	
CUE are c	: The losed	supply valve and	d the root valve		
12.	<u>UNI</u>	T 2 ONLY	- <del>11 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7</del>	Unit 2: Plug valve closed	
	Ens 249 on r	ure "Plug Valve" A(B-K) closed. P nanifold	for PI-015- lug valve located	Unit 1: N/A	
CUE il is clos	f perfo ed"	orming on Unit 2	only: "Plug valve		
The pl vertica discon	ug va Il sect nect	lve is a bar stock tion of tubing just fitting	< valve on the under the		
13.	*Ope regu appli	en bottle valve ar llator for pressure icable seal as fol	nd adjust e setting on lows:	Open bottle valve and adjust regulator to between 42 and 48 psig	
SE	AL	PREFERRED REGULATOR SETTING (psig)	ACCEPTABLE REGULATOR PRESSURE RANGE		1 . ·
			(psig)		
A,B,	G,K	47	42 to 48		
C,I	D	56.5	52.5 to 57.5		
E,F,I	H,J	41.5	37 to 42.5		
CUE: I adjusta	Bottle	valve is open ar the pressure you	nd regulator is I specified		
14.	*UNI	T 2 ONLY		Unit 2: Plug valve is open	
Open "	'Plug	Valve" for PI-015	5-249A(B-K)	Unit 1: N/A	
CUE if is oper	perfo "	orming on Unit 2	only: "Plug valve		•

est en and an

 $\mathbb{Z}_{0}^{i}$ 

[	OTED		한 방법이 있는 것을 알았는 것을 것 같아.
	SIEP	STANDARD	SAT/UNSAT
15.	*Open root valve for PI-015-*49A(B-K) and ensure it indicates accordingly	Root valve for PI-015-*49G opened	
CUE indica	: Root valve is open. Seal pressure ates 47 psig		
16.	CUE: You have reached the termination point for the JPM. You may stop here		

## Comments:

Note: Any grade of UNSAT requires a comment.

JPM Overall Rating:

SAT/UNSAT

## **TASK CONDITIONS:**

- 1. Fuel movement in the spent fuel pool is in progress
- 2. The reactor cavity gates are installed and the reactor well is drained
- 3. A loss of service air on Unit \_\_\_\_ has occurred
- 4. Alarm D-1, SEAL NO. 7 REACTOR WELL / SPENT FUEL POOL STOP LOG (SOUTH SEAL) has been received on \_\_0C222

#### **INITIATING CUES:**

You have been directed by the CRS to respond to \_\_0C222 alarms and backup refuel floor inflatable seals using backup bottles. Additional operators are being dispatched to the refuel floor.

# CANDIDATE

ARC-BOP-20C222, Rev. 3 (32 Pages) WEF/JFP/JMO/DJS:eer

## \*\* UNIT 2 ONLY \*\*

PECO ENERGY COMPANY LIMERICK GENERATING STATION

ARC-BOP-20C222 <u>BALANCE OF PLANT PANEL 20C222</u> <u>ANNUNCIATOR RESPONSE CARDS (ARC)</u>

ł

#### PURPOSE

To provide the automatic actuations of and the operational responses for the annunciators on Balance of Plant (BOP) Panel 20C222. Any alarm on this panel alarms a common FUEL POOL COOLING & CLEAN-UP SYSTEM TROUBLE alarm in the Main Control Room on Panel 212, Window J-5. ARC-BOP-20C222, REV. 3

1

1

February 9, 2000

Windows that have been changed: TABLE OF CONTENTS ADDED WITH THIS REVISION  $$B\mathcal{B-3}$$ 

## TABLE OF CONTENTS Page 1 of 1

ARC-BOP-20C222, REV. 3

WINDOW TITLE NUMBER

ł

Rev.

	COVERSHEET
A-1	SEAL NO. 1 DRYER & SEPARATOR STOP LOG (SOUTH SEAL) 3
A-2	SEAL NO. 2 DRYER & SEPARATOR STOP LOG (NORTH SEAL) 3
A-3	SPARE
A-4	SPARE
B-1	SEAL NO. 3 REACTOR WELL (TOP SEAL)
B-2	SEAL NO. 4 REACTOR WELL (BOTTOM SEAL)
B-3	2BT208 SKIMMER SURGE TANK HI-LEVEL 3
B-4	2BT208 SKIMMER SURGE TANK LO-LEVEL
C-1	SEAL NO. 5 SPENT FUEL POOL/CASK WASHDOWN GATE (EAST) 3
C-2	SEAL NO. 6 SPENT FUEL POOL/CASK WASHDOWN GATE (WEST) 3
C-3	SPARE
C-4	FUEL POOL GATE DRAIN HI FLOW
D-1	SEAL NO. 7 REACTOR WELL/SPENT FUEL STOP LOG (SOUTH SEAL)
D-2	SEAL NO. 8 REACTOR WELL/SPENT FUEL GATE (EAST)
D-3	REACTOR WELL SEAL RUPTURE DRAIN HI FLOW
D-4	REFUELING BELLOWS LEAK DETECT HI FLOW
E-1	SEAL NO. 9 REACTOR WELL/SPENT FUEL POOL GATE (WEST)
E-2	SEAL NO. 10 REACTOR WELL/SPENT FUEL POOL STOP LOG
F-3	SDARE
E-4	HORN RELAY
~ .	

200	222							-	20C222						·
		1		·····											
1	*											ALARM	WORD:	ING:	
2												SEAL	NO. 1		
3										· .		DRYI SEPAI	ER & RATOR		
						•						STOP (SOUTH	LOG SEAL	, )	
4									· -		·			• · ·	
	A	В	С	D	E										
	A	UTOM	ATIC	ACT	IONS	1	. · .				· .				
	1	i .	FUE 212	L PO CLE	OL CO	OOLING	& CLE	AN-UP	SYSTEM 7	FROUBL	E ala	rms at			
	c	PERA	TOR	ACTI	ONS :										
	1		Ref	er t	o S15	5.3.C.				. ·	•	•			
	2		Ver IF	ify Seal	integ No.	grity 1 is	of Sea functi	l No.	2. as secor	ndary.	conta	inmont	•		
			THE	N re drve	fer t	o Tec	h Spec	3.6.5	i.	looded	conca.				
	Δ							AGE DC	ווא דו	rooaea	, THE	N			
	4	•	inv	esti	gate	AND C	ontain	any 1	eakage p	per S5	3.0.A	•	•		
	4		inv	esti	gate	AND C	ontain	any 1	eakage r	per S5	3.0.A	•	• •		
	4 C	AUSE	inv s:	esti	gate	AND C	ontain	any 1	eakage r	per S5	3.0.A	•			
	4 	AUSE	inv s: Low	pre	ssure	AND c	eal No	any 1	th Servi	per S5 ice Ai	3.0.A r Sup	ply			
	4  C 1	AUSE	inv s: Low 15-	pre 2413	gate ssure A NOT	AND c	eal No ull ve	. 1 wi nt pos	th Servi	per S5	3.0.A	ply		1	
	4  1 	AUSE	S: Low 15-	pre 2413. OR#:	gate ssure A NOT	AND c e in S f in f	eal No ull ve	o. 1 wi nt pos	th Servi	ice Ai	3.0.A	ply			. · ·
	4 	AUSE	Inv inv S: Low 15- CIAT	pre 2413. OR#: -15-:	ssure A NOT	e in S	eal No ull ve	o. 1 wi nt pos	th Servi	ice Ai	3.0.A r Sup	ply		1	
· · ·	4 C 1 A	NNUN	Inv S: Low 15- CIAT PAL INT:	pre 2413. OR#: -15-:	gate ssure A NOT	e in S	eal No ull ve	. 1 wint pos	th Servi	ice Ai	3.0.A r Sup	ply			
· · · ·	4 	'AUSE NNUN ETPO	Inv S: Low 15- CIAT PAL INT: 43	pre 2413. OR#: -15-:	ssure A NOT	arato AND c	eal No ull ve	. 1 wi nt pos	th Servi	ice Ai	3.0.A r Sup	ply			
· · · · · · · · · · · · · · · · · · ·	4 	NNUN	inv S: Low 15- CIAT PAL INT: 43	pre 2413 OR#: -15-:	ssure A NOT	e in S	eal No ull ve	o. 1 wi	th Servi	ice Ai	3.0.A r Sup	ply			
	4 	NNUN ETPO EVIC	Inv S: Low 15- CIAT PAL INT: 43 1 E(S)	pre 2413 OR#: -15-: psig	ssure A NOT	e in S in f	eal No ull ve	. 1 wint pos	th Servi	ice Ai	3.0.A r Sup	ply			
	4 C 1 A	NNUN ETPO EVIC	Inv S: Low 15- CIAT PAL INT: 43 1 E(S) PSL ZS-	pre 2413. OR#: -15-: psig : -15-:	ssure A NOT 245A 249A 45A	e in S	eal No ull ve	. 1 wi	th Servi	ice Ai	3.0.A r Sup	ply			
	4 C 1 A	NNUN ETPO	Inv S: Low 15- CIAT PAL INT: 43 E(S) PSL ZS-	pre 2413. OR#: -15-: psig : -15-:	249A 245A	e in S	eal No ull ve	. 1 wi	th Servi	ice Ai	3.0.A r Sup	ply			
	4 	NNUN ETPO	Inv S: Low 15- CIAT PAL INT: 43 E(S) PSL ZS-	pre 2413. OR#: -15-: psig : -15-:24	gate ssure A NOT 245A 249A 45A	arato AND c e in S f in f	eal No ull ve	o. 1 wi nt pos	th Servi	ice Ai	3.0.A r Sup	ply			
	4 	NNUN ETPO	Inv S: Low 15- CIAT PAL 43 E(S) PSL ZS-	pre 2413. OR#: -15-: psig : -15-:	gate ssure A NOT 245A 249A 45A	arato AND c	eal No ull ve	o. 1 wi o. 1 wi	th Servi	ice Ai	3.0.A r Sup	ply			
	4 	AUSE NNUN ETPO	Inv S: Low 15- CIAT PAL INT: 43 1 E(S) PSL ZS-	pre. 2413. 0R#: -15-: psig : -15-:	gate ssure A NOT 245A 249A 45A	arato AND c	eal No ull ve	. 1 wint pos	th Servi	ice Ai	3.0.A r Sup	ply			
	4 	NNUN ETPO	Inv S: Low 15- CIAT PAL INT: 43 E(S) PSL ZS-	pre 2413. OR#: -15-: psig : -15-:24	gate ssure A NOT 245A 249A 45A	e in S in f	eal No ull ve	o. 1 wint pos	th Servi	ice Ai	3.0.A r Sup	ply			
	4 	NNUN ETPO	Inv S: Low 15- CIAT PAL 43 E(S) PSL ZS-	pre 2413. OR#: -15-: psig : -15-:24	gate ssure A NOT 245A 249A 45A	arato AND c e in S f in f	eal No ull ve	o. 1 wi nt pos	th Servi	ice Ai	3.0.A r Sup	ply			
	4 	AUSE NNUN ETPO	Inv S: Low 15- CIAT PAL INT: 43 1 E(S) PSL ZS-	pre 2413. OR#: -15-: psig : -15-:	gate ssure A NOT 245A 249A 45A	arato AND c e in S f in f	eal No ull ve	. 1 wint pos	th Servi	ice Ai	3.0.A r Sup	ply			

)

ł

ł

2	0	C2	2	2
-	v	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	-	4

ł

1

**REFERENCES:** 

E-643 M-15 M-600

M-53

1. 2. 3.

4.

ARC-BOP-20C222, REV. 3 PAGE 2 OF 32



REFERENCE	:S:					<u> </u>	
1. E-6 2. M-1 3. M-5 4. M-6	43 5 3 00	а					
						• •	
					•		
		· · ·					-
•							
			7	ARC-BOP-2 PAGE 4 OF	0C222, 732	REV. 3	
<u> </u>							

ł

ł

ļ






	20C222	20C222	]	B-1 05
/	REFERENCES :	an a		<u> </u>
	1. E-643 2. M-15 3. M-600 4. M-53			
				•
			ARC-BOP-20C222, REV. 3 PAGE 8 OF 32	. <u> </u>



20C222

1

E

ł

.

#### **REFERENCES:**

1. 2. 3. 4.	E-643 M-15 M-600 M-53
4.	M-53

ARC-BOP-20C222, REV. 3 PAGE 10 OF 32



2	0	C	2	2	2
-	~	~	~	~	

)

**REFERENCES:** 

1. 2.

з.

E-53

M-643

M-600

20C222

ARC-BOP-20C222, REV. 3 PAGE 12 OF 32

	22					20C222	]
1							ALARM WORDING:
2							2BT208 Skimmer
3							SURGE TANK LO-LEVEL
4	*						
P	А В	C	D	E			
	AUTOM	ATIC	ACTI	ONS :	<b>:</b>		
	1.	FUE	L POC	DL CC	OOLING & CLEAN	-UP SYSTEM TROU	UBLE alarms at
<u></u>	OPERA	TOR	ACTIC	NS:	- <u></u>	· · · · ·	<u></u>
	1.	Res	tore	Skin	mer Surge Tan	k level per S5	3.3.A.
	۷.	Inv	estig	Jace	AND contain a	ny system leaka	age per S53.0.A
	CAUSE	:S :					·····
	1.	Low	leve	el in	Skimmer Surg	e Tank 2BT208 d	due to system
	1.	Low lea	' leve kage	l in OR f	a Skimmer Surg ailure of mak	e Tank 2BT208 d eup valve HV-53	due to system 3-207.
	1.	Low lea	leve kage OR#:	el in OR f	a Skimmer Surg ailure of mak	e Tank 2BT208 d eup valve HV-53	due to system 3-207.
	1. ANNUN	Low lea CIAT	OR#:	OR f	1 Skimmer Surg ailure of mak	e Tank 2BT208 d eup valve HV-53	due to system 3-207.
	1. ANNUN • SETPO	Low lea CIAT LAL	OR#:	OR f	1 Skimmer Surg ailure of mak	e Tank 2BT208 d eup valve HV-53	due to system 3-207.
	l. ANNUN SETPO	Low lea CIAT LAL	0 <b>R#:</b> 0"	OR f	n Skimmer Surg ailure of mak	e Tank 2BT208 d eup valve HV-53	due to system 3-207.
	1. ANNUN • • • • DEVIC	Low lea CIAT LAL INT: 6' E(S)	0 <b>R#:</b> 0":	OR f	n Skimmer Surg ailure of mak	e Tank 2BT208 d eup valve HV-53	due to system 3-207.
	1. ANNUN SETPO DEVIC	Low lea CIAT LAL OINT: 6' E(S) LSL	0 <b>R#:</b> -15-2 0" :	OR f	a Skimmer Surg ailure of mak	e Tank 2BT208 d eup valve HV-53	due to system 3-207.
	1. ANNUN SETPO DEVIC	Low lea CIAT LAL OINT: 6' E(S) LSL	leve kage OR#: -15-2 0" : -53-2	OR f	a Skimmer Surg ailure of mak	e Tank 2BT208 d eup valve HV-53	due to system 3-207.
	1. ANNUN • • DEVIC • REFER	Low lea CIAT LAL INT: 6' E(S) LSL	0R#: -15-2 0" : -53-2 S:	OR f	a Skimmer Surg	e Tank 2BT208 d eup valve HV-5	due to system 3-207.
	1. ANNUN • SETPO • DEVIC • REFER 1.	Low lea CIAT LAL (INT: 6' E(S) LSL ENCE E-6'	<pre>leve kage OR#: -15-2 0" : -53-2 S: 43</pre>	OR f	a Skimmer Surg	e Tank 2BT208 d eup valve HV-5:	due to system 3-207.
	1. ANNUN • SETPO • DEVIC • REFER 1. 2. 3.	Low lea CIAT LAL (INT: 6' E(S) LSL ENCE E-6' E-5' M-5:	OR#: -15-2 0" : -53-2 S: 43 77 3	OR f	a Skimmer Surg	e Tank 2BT208 d eup valve HV-5:	due to system 3-207.
	1. ANNUN • SETPO • DEVIC • REFER 1. 2. 3. 4.	Low lea CIAT LAL (INT: 6' E(S) LSL ENCE E-6' E-5' M-5' M-6'	OR#: -15-2 0" : -53-2 S: 43 77 3 00	OR f	a Skimmer Surg	e Tank 2BT208 d eup valve HV-5:	due to system 3-207.
	1. ANNUN SETPO DEVIC REFER 1. 2. 3. 4.	Low lea CIAT LAL (INT: 6' E(S) LSL ENCE E-6 E-5 M-5 M-6	<pre>&gt; leve kage OR#: -15-2 0" : -53-2 S: 43 77 3 00</pre>	OR f	a Skimmer Surg	e Tank 2BT208 d eup valve HV-5:	due to system 3-207.
	1. ANNUN • SETPO • DEVIC • REFER 1. 2. 3. 4.	Low lea CIAT LAL EAL E (S) LSL ENCE E-6: E-5: M-5: M-6:	leve kage OR#: -15-2 0" : -53-2 S: 43 77 3 00	OR f	a Skimmer Surg	e Tank 2BT208 d eup valve HV-5:	due to system 3-207.
	1. ANNUN • SETPO • DEVIC • REFER 1. 2. 3. 4.	Low lea CIAT LAL OINT: 6' E (S) LSL ENCE E-6' E-5' M-5' M-6'	OR#: -15-2 0" : -53-2 S: 43 77 3 00	OR f	a Skimmer Surg	e Tank 2BT208 d eup valve HV-5:	ARC-BOP-20C222, REV. 3

) |



20C222	20C222	C-1 09
REFERENCES :		
1. E-643 2. M-15 3. M-600 4. M-53		
		н -
		:
	ARC-BOP-20C222, PAGE 15 OF 32	REV. 3



200222
--------

ł

C-2 10

#### **REFERENCES:**

1.	E-643
2.	M-15
2	

3. M-600 4. M-53

> ARC-BOP-20C222, REV. 3 PAGE 17 OF 32





20C222

#### 20C222

C-4 12

## l. M-53 2. E-643 3. M-600

**REFERENCES:** 

ARC-BOP-20C222, REV. 3 PAGE 20 OF 32



20C222

1

**REFERENCES:** 

E-643 M-15

M-600

M-53

1.

2.

3. 4. 20C222

ARC-BOP-20C222, REV. 3 PAGE 22 OF 32

200	222							20C2	22							
								,								
1												ALARI	M WOR	DING	:	
2				*								SEA Ri	L NO EACTO	. 8 R		
3												FU	EL PO GATE	ent OL		
4												(	EAST	)		
	A	в	С.	D	E											
	A	UTOM	ATIC	ACT	IONS	:		<u> </u>			·					
	1	•	FUE 212	L PO CLE	OL CO	OOLING &	CLEAN-U	UP SYSTE	M TROU	JBLE a	larm	ıs at				
													-			
								v	· · · · · · · · · · · · · · · · · · ·							<u> </u>
	0	PERA	TOR	ACTI	ons :											
	0 1 2	PERA	<b>TOR</b> Ref Ver	ACTI er t ifv	ONS:	5.3.C.	Seal No									
	0 1 2 3	PERA	TOR Ref Ver Inv	ACTI er t ify esti	ONS: o S1 integ gate	5.3.C. grity of AND cont	Seal No cain any	o. 9. Y leakag	ge from	1 Sper	it Fu	lel				
	0 1 2 3 4	PERA	TOR Ref Ver Inv Poo Ref	ACTI er t ify esti l pe ill	ONS: o S1 integ gate r S5 pool	5.3.C. grity of AND cont 3.0.A. as requi	Seal No cain any ired per	o. 9. 7 leakac 7 S53.0.	ge from A.	1 Sper	it Fu	lel				
	0 1 2 3 4	PERA	TOR Ref Ver Inv Poo Ref	ACTI ify esti l pe ill	ONS: o S1 integ gate r S5 pool	5.3.C. grity of AND cont 3.0.A. as requi	Seal No tain any tred per	o. 9. Y leakac r S53.0.	ge from A.	1 Sper	it Fu	lel				
	0 1 2 3 4 4	PERA AUSE	TOR Ref Ver Inv Poo Ref	ACTI er t ify esti l pe ill	ONS: o S1 integ gate r S5 pool	5.3.C. grity of AND cont 3.0.A. as requi	Seal No tain any tred per	o. 9. Y leakag r S53.0.	ge from A.	1 Sper	it Fu	lel				
	0 1 2 3 4 4 <b>C</b> 1	PERA AUSE	TOR Ref Ver Inv Poo Ref S: Low	ACTI er t ify esti l pe ill pre	ONS: o S1: integ gate r S5: pool	5.3.C. grity of AND cont 3.0.A. as requi e in Seal	Seal No cain any lred per	o. 9. y leakag r S53.0. with Se	ge from A. ervice	Air Sper	ut Fu	lel .Y				
	0 1 2 3 4 4 <b>C</b> 1	PERA AUSE	TOR Ref Ver Inv Poo Ref S: Low	ACTI er t ify esti l pe ill pre 2413	ONS: o S1 integ gate r S5 pool ssure	5.3.C. grity of AND cont 3.0.A. as requi e in Seal T in full	Seal No ain any red per No. 8 vent p	o. 9. y leakag r S53.0. with Se position	ge from A. ervice	Air S	ut Fu	lel Y	· ·			
	0 1 2 3 4 4 <b>C</b> 1	PERA	TOR Ref Ver Inv Poo Ref S: Low 15-	ACTI er t ify esti l pe ill pre 2413 OR#:	ONS: o S1 integ gate r S5 pool ssure	5.3.C. grity of AND cont 3.0.A. as requi e in Seal T in full	Seal No ain any red per No. 8 vent p	o. 9. Y leakag r S53.0. with Se position	ge from A. ervice	Air S	ut Fu	iel Y				
	0 1 2 3 4 2 1 2 3 1 2 1 1 2 1 2 3 4 1 2 3 4 1 2 3 4 4 1 2 3 4 4 	PERA	TOR Ref Ver Inv Poo Ref S: Low 15-	ACTI er t ify esti l pe ill pre 2413 OR#:	ONS: o S1 integ gate r S5 pool ssure H NO	5.3.C. grity of AND cont 3.0.A. as requi e in Seal T in full	Seal No tred per No. 8 vent p	o. 9. y leakage r S53.0. with Se position	ge from A. ervice	Air S	uppl	lel Y				
	0 1 2 3 4 0 1 1 <b>A</b> • 5	PERA AUSE NNUN	TOR Ref Ver Inv Poo Ref S: Low 15- CIAT PAL INT:	ACTI er t ify esti l pe ill pre 2413 OR#: -15-	ONS: o S1 integ gate r S5 pool ssure H NO	5.3.C. grity of AND cont 3.0.A. as requi e in Seal T in full	Seal No tain any tred per No. 8 vent p	o. 9. y leakage r S53.0 with Se position	ge from A. ervice 1.	Air S	uppl	uel .y				
	0 1 2 3 4 2 1 2 3 4 2 1 2 3 4 2 1 2 3 4 2 3 4 2 3 4 2 3 4 2 3 4 2 3 4 2 3 4 2 3 4 2 5 4 5 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5	PERA	TOR Ref Ver Inv Poo Ref S: Low 15- CIAT PAL INT: 38.	ACTI er t ify esti l pe ill pre 2413 OR#: -15-	ONS: o S1 integ gate r S5 pool ssure H NO?	5.3.C. grity of AND cont 3.0.A. as requi e in Seal T in full	Seal No cain any ired per No. 8 vent p	y leakage s S53.0 with Seposition	ge from A. ervice	Air S	uppl	vel Y				
	0 1 2 3 4 0 1 1	PERA	TOR Ref Ver Inv Poo Ref S: Low 15- CIAT PAL INT: 38. E(S)	ACTI er t ify esti l pe ill pre 2413 OR#: -15- 5 ps:	ONS: o S1 integ gate r S5: pool ssurc H NO	5.3.C. grity of AND cont 3.0.A. as requi e in Seal T in full	Seal No ain any ired per No. 8 vent r	o. 9. y leakag r S53.0 with Se position	ge from A. ervice	Air S	ut Fu	vel Y				
	0 1 2 3 4 0 1 1	PERA AUSE NNUN ETPO	TOR Ref Ver Inv Poo Ref S: Low 15- CIAT PAL INT: 38. E(S)	ACTI er t ify esti l pe ill 2413 OR#: -15- 5 ps :	ons: o S1 integ gate r S5: pool ssure H NO	5.3.C. grity of AND cont 3.0.A. as requi e in Seal T in full	Seal No ain any red per No. 8 vent p	o. 9. y leakage r S53.0 with Se position	ge from A. ervice	Air S	uppl	lel γ				
	0 1 2 3 4 0 1 1	PERA AUSE NNUN ETPO	TOR Ref Ver Inv Poo Ref S: Low 15- CIAT PAL INT: 38. E(S) PSL ZS-	ACTI er t ify esti l pe ill pre 2413 OR#: -15- 5 ps : -15-2	ONS: o S1 integ gate r S5 pool ssure H NO 245H ig	5.3.C. grity of AND cont 3.0.A. as requi e in Seal T in full	Seal No ain any red per No. 8 vent p	o. 9. y leakage r S53.0. with Se position	ge from A. ervice	Air S	uppl	lel γ				
	0 1 2 3 4 0 1 1	PERA AUSE NNUN ETPO	TOR Ref Ver Inv Poo Ref S: Low 15- CIAT PAL INT: 38. E(S) PSL ZS-	ACTI er t ify esti l pe ill pre 2413 OR#: -15- 5 ps : -15-2	ONS: o S1 integ gate r S5 pool ssure H NO 245H ig	5.3.C. grity of AND cont 3.0.A. as requi e in Seal T in full	Seal No ain any red per No. 8 vent p	o. 9. y leakage r S53.0. with Se position	ge from A. ervice	Air S	uppl	lel У				
	0 1 2 3 4 0 1 1	PERA AUSE NNUN ETPO	TOR Ref Ver Inv Poo Ref S: Low 15- CIAT PAL INT: 38. E(S) PSL ZS-	ACTI er t ify esti l pe ill pre 2413 OR#: -15- 5 ps : -15-24	ONS: o S11 integ gate r S5: pool ssure H NO? 245H ig	5.3.C. grity of AND cont 3.0.A. as requi e in Seal T in full	Seal No ain any red per No. 8 vent p	o. 9. y leakage r S53.0. with Se position	ge from A. ervice	Air S	uppl	lel γ				
	0 1 2 3 4 0 1 1 3 4 0 1 1 3 5	PERA AUSE NNUN ETPO	TOR Ref Ver Inv Poo Ref S: Low 15- CIAT PAL INT: 38. E(S) PSL ZS-	ACTI er t ify esti l pe ill pre 2413 OR#: -15- 5 ps : -15-2	ONS: o S1 integ gate r S5 pool ssure H NO 245H ig	5.3.C. grity of AND cont 3.0.A. as requi e in Seal T in full	Seal No ain any red per No. 8 vent p	o. 9. y leakage r S53.0. with Se position	ge from A. ervice	Air S	uppl	lel γ				

400466	2	0	C2	2	2
--------	---	---	----	---	---

1.

2.

3.

4.

**REFERENCES:** 

E-643

M-15

M-600

M-53

D-2 14

.

ARC-BOP-20C222, REV. 3 PAGE 24 OF 32





	*	ALARM WORDING: SEAL NO. 9 REACTOR WELL/SPENT FUEL POOL GATE (WEST)
1.	FUEL POOL COOLING & CLEAN-UP SY 212 CLEANUP.	STEM TROUBLE alarms at
3.	Investigate AND contain any leal per S53.0.A.	kage from Reactor Well
4. <b>CAU</b> 1.	SES: Low pressure in Seal No. 9 with 15-2413J NOT in full vent positi	3.0.A. Service Air Supply ion.
4. CAU 1.	SES: Low pressure in Seal No. 9 with 15-2413J NOT in full vent positi	3.0.A. Service Air Supply ion.
4. CAU 1. ANNI	SES: Low pressure in Seal No. 9 with 15-2413J NOT in full vent positi UNCIATOR#: PAL-15-245J	3.0.A. Service Air Supply ion.
CAU 1. ANNI • SETI	Refiff well as necessary per S53 SES: Low pressure in Seal No. 9 with 15-2413J NOT in full vent positi UNCIATOR#: PAL-15-245J POINT:	3.0.A. Service Air Supply ion.
L. CAU 1. ANN SETI	Refiff well as necessary per S53 SES: Low pressure in Seal No. 9 with 15-2413J NOT in full vent positi UNCIATOR#: PAL-15-245J POINT: 38.5 psig	Service Air Supply ion.
Levi	Refiff Well as necessary per S53 SES: Low pressure in Seal No. 9 with 15-2413J NOT in full vent positi UNCIATOR#: PAL-15-245J POINT: 38.5 psig ICE(S):	Service Air Supply ion.
CAU 1. ANNI • SETI • DEVJ	Refiff Well as necessary per S53 SES: Low pressure in Seal No. 9 with 15-2413J NOT in full vent positi UNCIATOR#: PAL-15-245J POINT: 38.5 psig ICE(S): PSL-15-249J ZS-15-245J	Service Air Supply ion.
ANNI CAU 1. ANNI SETI DEVI	Refill Well as necessary per S53 SES: Low pressure in Seal No. 9 with 15-2413J NOT in full vent positi UNCIATOR#: PAL-15-245J POINT: 38.5 psig ICE(S): PSL-15-249J ZS-15-245J	Service Air Supply ion.
ANNI CAU 1. ANNI SETI DEVJ	Refill Well as necessary per S53 SES: Low pressure in Seal No. 9 with 15-2413J NOT in full vent positi UNCIATOR#: PAL-15-245J POINT: 38.5 psig ICE(S): PSL-15-249J ZS-15-245J	Service Air Supply ion.
4. CAU 1. ANN SETI • DEVI •	Refill Well as necessary per S53 SES: Low pressure in Seal No. 9 with 15-2413J NOT in full vent positi UNCIATOR#: PAL-15-245J POINT: 38.5 psig ICE(S): PSL-15-249J ZS-15-245J	Service Air Supply ion.

2	^	~ ~	22	
4	υ	<u> </u>	44	

I

I

**REFERENCES:** 

1. 2.

3. 4. E-643

M-15 M-600 M-53

## 20C222

E-1 17

ARC-BOP-20C222, REV. 3 PAGE 28 OF 32

20	C222		<u> </u>	<u></u>	-,-, <u></u> ,			200	222		-				1
1												AT A DM	WORD		
2					*						2	BEAL N REAC	NORL NO. 1 STOR	0	
3 4						•						WELL/ FUEL STOP	SPENI POOL LOG	С 	
	A	В	c	D	E					L			56AL	رد 	
	<b>A</b> 1	UTOM	FUE	L PO CLE	OL C	: OOLING	& CLEAN	I-UP SYS	TEM TRO	DUBLE a	larms	at		·	
						<u>.</u>	······································								_
	2	•	Ver	ify Seal	o SI inte	5.3.C. grity o	f Seal	No. 7.					•		
	1 2 3 4 <b>C</b>	AUSE	Ver IF THE Inv	ify Seal N re estig	o SI inte No. fer gate	5.3.C. grity o 10 is to Tech AND co	f Seal functio Spec 3 ntain a	No. 7. ning as .6.5. ny leaka	second ge per	lary con 553.0	itain A.	nent,		•	
	1 2 3 4 <b>C</b> 1	AUSE	Ver IF THE Inv S: Low	pres 24131	o SI inte No. fer gate ssure K NO	5.3.C. grity of 10 is to Tech AND con AND con e in Sea f in ful	f Seal functio Spec 3 ntain a  al No. 11 vent	No. 7. ning as .6.5. ny leaka 10 with positic	second ge per Servic	lary con S53.0 e Air S	A.	nent,			
	1 2 3 4 <b>C</b> 1	AUSE	Ver IF THE Inv S: Low 15-:	pres 24131	o SI inte No. fer gate ssure	5.3.C. grity of 10 is to Tech AND con AND con	f Seal functio Spec 3 ntain a al No. 11 vent	No. 7. ning as .6.5. ny leaka 10 with positic	second ge per Servic	lary con 553.0 e Air S	A.	nent,			
· · · · · · · · · · · · · · · · · · ·	1 2 3 4 0 1 1	AUSE	Rel Ver IF THE Inv S: Low 15-: CIATO PAL-	pres 24131 DR#:	o SI inte No. fer gate ssure K NO	5.3.C. grity of 10 is to Tech AND con AND con	f Seal functio Spec 3 ntain a al No. 11 vent	No. 7. ning as .6.5. ny leaka 10 with positic	second ge per Servic	lary con S53.0 e Air S	A.	nent,			
	1 2 3 4 C. 1 1 AI SJ	AUSE	Ver IF THE Inv S: Low 15-: CIATO PAL- INT: 43 F	pres 24131 DR#: -15-2	o SI inte No. fer gate ssur K NO	5.3.C. grity of 10 is to Tech AND con	f Seal functio Spec 3 ntain a al No. 11 vent	No. 7. ning as .6.5. ny leaka	second ge per Servic	lary con S53.0	atain A. Supply	nent,			
	1 2 3 4 C. 1 1	AUSE: NNUNG ETPOJ	Ver IF THE Inv S: Low 15-: CIATO PAL- CIATO PAL- UNT: 43 F S(S):	pres 24131 DR#: -15-2	o SI inte No. fer gate ssur K NO	5.3.C. grity of 10 is to Tech AND con	f Seal functio Spec 3 ntain a al No. 11 vent	No. 7. ning as .6.5. ny leaka 10 with positic	second ge per Servic	lary con S53.0	atain A. Supply	nent,			
	1 2 3 4 C. 1 1	AUSE: NNUNG ETPOJ	Ver IF THE Inv S: Low 15-: CIATO PAL- CIATO PAL- S: 43 F S(S): PSL- ZS-1	24131 -15-2 0sig 15-2	o SI inte No. fer gate ssur K NO 245K	5.3.C. grity o 10 is to Tech AND con	f Seal functio Spec 3 ntain a al No. ll vent	No. 7. ning as .6.5. ny leaka 10 with positic	second ge per Servic	lary con S53.0	A.	nent,			
	1 2 3 4 C. 1	AUSE	Ver IF THE Inv S: Low 15-: CIATO PAL- CIATO PAL- CIATO PAL- CIATO PAL- ZS-1	24131 DR#: -15-2 0sig	o SI inte No. fer gate ssure K NO 245K	5.3.C. grity of 10 is to Tech AND con e in Sea f in ful	f Seal functio Spec 3 ntain a al No. 11 vent	No. 7. ning as .6.5. ny leaka 10 with positic	second ge per Servic	lary con S53.0	atain A. Supply	nent,			

ļ

20C222	20C222	E-2 18
REFERENCES:	<u></u>	 
1. E-643 2. M-15 3. M-600 4. M-53		





S15.3.C, Rev. 12 Page 1 of 10 ALC/LBM:eer/jml

## EXELON NUCLEAR LIMERICK GENERATING STATION

# **S15.3.C** RESPONSE TO LOSS OF SERVICE AIR FOR REFUEL FLOOR INFLATABLE SEALS

## 1.0 PURPOSE

To maintain integrity of inflatable seals during a loss of Service Air or during planned maintenance activities.

## 2.0 PREREQUISITES

2.1 One of the following is established:

Secondary Containment Integrity per Tech Spec 3.6.5.1.2

### <u>OR</u>

Spent Fuel Pool flooded

### <u>OR</u>

- Reactor Well flooded
- 2.2 Emergency Backup Air Bottle Carts are available.
- 2.3 Air bottles for planned maintenance have been obtained.

## 3.0 PRECAUTIONS

- 3.1 Loss of Service Air has potential to vent inflatable seals installed on Refuel Floor.
- 3.2 <u>WHEN</u> an alarm annunciates from seal station indicating potential loss of Secondary Containment Integrity
   <u>OR</u> potential loss of water inventory in Spent Fuel Pool/Reactor Cavity
   <u>THEN</u> all fuel handling activities
   <u>AND</u> any activity with potential of draining Reactor Vessel while there is still fuel in vessel must be suspended.

S15.3.C, Rev. 12 Page 2 of 10 ALC/LBM:eer/jml

3.3 The latest performance of ST-6-076-360-\*, RX ENCL SEC CNTMT INTEGRITY VERIFICATION, should be referred to when determining which seals are required to maintain secondary containment.

S15.3.C, Rev. 12 Page 3 of 10 ALC/LBM:eer/jml

#### 4.0 PROCEDURE

#### NOTE

- 1. Attachment 1 shows the relationship between the letter and number designators for an inflatable seal.
- 2. Attachment 2 shows locations of Seal Air Supply Stations.
  - These seals are in place to provide Secondary Containment during handling of spent fuel
     <u>AND</u> also to maintain water inventory of Reactor Well/Spent Fuel Pool during flooded conditions.
  - Procedure should be performed on seals alarming on \*0C222 first.
- 3. <u>IF procedure is being performed for planned work,</u> <u>THEN</u> Section 4.1 is <u>not</u> required.

### 4.1 SEAL AND SERVICE AIR ASSESSMENT

4.1.1 **CHECK** \*0C222 for any annunciators indicating low seal air pressure.

#### NOTE

- 1. Seal alarms may come in periodically due to the need for a small adjustment in the pressure regulator setting. This is particularly true for seals which have a narrow operating pressure range.
- 2. The MCR should be kept informed about actions taken on the seals due to their affect on Secondary Containment or Pool water levels.
  - 4.1.2 <u>IF</u> Service Air is still available as evidenced by observing pressure gauge PI-015-\*44(A-K).
     <u>THEN</u> ADJUST service air pressure to the seal per S15.3.E
     <u>AND</u> EXIT this procedure.
  - 4.1.3 <u>IF</u> Service Air pressure is dropping noticeably or gone evidenced by observing pressure gauge PI-015-\*44(A-K),
     <u>THEN</u> **PROCEED** to step **4.2** and attach Secondary Back up Bottles.

S15.3.C, Rev. 12 Page 4 of 10 ALC/LBM:eer/jml

## 4.2 INSTALLATION OF SECONDARY BACKUP BOTTLES TO INFLATABLE SEALS

NOTE	
------	--

- Backup air bottles are maintained on the Refuel Floor
   <u>AND</u> are readily accessible for use as secondary backup air for inflatable seals.

   Bottles are labeled denoting their function.
- 2. Primary location for backup air bottles is along the North Side of the Refuel Floor. Bottles may be located in other refuel floor locations due to refuel floor activities.
- Hoses
   <u>AND</u> regulators are stored in toolbox along north wall of Refuel Floor.
  - 4.2.1 **IF** backup air is being used for a planned maintenance activity, **THEN USE** air bottles obtained for maintenance activity **AND GO TO** step 4.2.3.
  - 4.2.2 **OBTAIN** cart containing two backup air bottles with regulators, hose <u>AND</u> appropriate quick disconnect fittings.

## WARNING

To prevent possible personnel injury <u>OR</u> Equipment Damage, Air Bottles shall be secured in place.

4.2.3 **POSITION** cart/air bottle near seal station <u>AND</u> **CONNECT** one bottle to quick disconnect attached to calibration port of PI-015-\*49A(B,C,D,E,F,G,H,J,K), "Seal Supply Press Indicator."

S15.3.C, Rev. 12 Page 5 of 10 ALC/LBM:eer/jml

- 4.2.4 **CLOSE** 15-\*411A(B,C,D,E,F,G,H,J,K), "Supply Valve," <u>AND</u> "Root Valve" for PI-015-\*49A(B,C,D,E,F,G,H,J,K). (Both valves located in PIT next to manifolds.)
- 4.2.5 <u>UNIT 2 ONLY</u> **ENSURE** "Plug Valve" for PI-015-249A(B,C,D,E,F,G,H,J,K) closed. (Plug valve located on manifold.)



# 4.2.6 **OPEN** bottle valve

AND ADJUST regulator for pressure setting on applicable seal as follows:

SEAL	PREFERRED REGULATOR SETTING (psig)	ACCEPTABLE REGULATOR PRESSURE RANGE (psig)
A,B,G,K	47	42 to 48
C,D	56.5	52.5 to 57.5
E,F,H,J	41.5	37 to 42.5

# 4.2.7 UNIT 2 ONLY

**OPEN** "Plug Valve" for PI-015-249A(B,C,D,E,F,G,H,J,K).

4.2.8 **OPEN** "Root Valve" for PI-015-\*49A(B,C,D,E,F,G,H,J,K) <u>AND</u> **ENSURE** it indicates accordingly.

S15.3.C, Rev. 12 Page 6 of 10 ALC/LBM:eer/jml

## 4.3 RETURN TO NORMAL

#### NOTE

<u>WHEN</u> determined by SSV that system can be returned to normal <u>OR</u> all maintenance activities are complete, <u>THEN</u> section **4.3** can be performed.

#### WARNING

<u>IF</u> any seal is inflated past its specified pressure, <u>THEN</u> serious personnel <u>OR</u> equipment damage may result.

4.3.1 **OPEN** 15-\*411(A-K).

<u>UNIT 2 ONLY</u>

- 4.3.2 **CLOSE** "Plug Valve" for PI-015-249(A-K).
- 4.3.3 **ENSURE** PI-015-\*44 (A-K) is indicating air pressure to seals.
- 4.3.4 **REDUCE** pressure regulator setting <u>AND</u> **CLOSE** bottle valve.
- 4.3.5 **OBSERVE** air pressure at PI-015-\*44(A-K) within range of table below

AND ADJUST per S15.3.E if necessary.

SEAL	PREFERRED REGULATOR SETTING (psig)	ACCEPTABLE REGULATOR PRESSURE RANGE (psig)
A,B,G,K	47	42 to 48
C,D	56.5	52.5 to 57.5
E,F,H,J	41.5	37 to 42.5

4.3.6 <u>IF</u> backup nitrogen bottle is < 500# <u>THEN</u> **REPLACE** per S15.6.F.

S15.3.C, Rev. 12 Page 7 of 10 ALC/LBM:eer/jml

- 4.3.7 <u>IF</u> "Emergency Air" bottle was used <u>THEN</u> **REPLACE** bottle if < 1000#.
- 4.3.8 **RETURN** all equipment to storage locations <u>AND</u> **ENSURE** bottles are secured.

S15.3.C, Rev. 12 Page 8 of 10 ALC/LBM:eer/jml

## 5.0 <u>REFERENCES</u>

NONE

## 6.0 TECHNICAL SPECIFICATIONS

6.1 3.6.5.1.2

# 7.0 INTERFACING PROCEDURES

- 7.1 E-1, Loss Of All AC Power (Station Blackout)
- 7.2 E-10/20, Loss Of Offsite Power
- 7.3 ST-6-076-360-\*, RX ENCL SEC CNTMT Integrity Verification
- 7.4 S15.3.E, Adjustment to operating pressure for Reactor Well, Fuel Pool Gate, Fuel Pool Stop Log, Cask Handling Pit Gate, and Equipment Pool Stop Log Seals.
- 7.5 S15.3.A, Inflation of Reactor Well, Fuel Pool Gate, Fuel Pool Stop Log #15, Cask Handling Pit Gate and Steam Dryer and Separator Stop Log Seals
- 7.6 S15.6.F, Swapping Backup Nitrogen Bottle For Refuel Floor Inflatable Seals
S15.3.C, Rev. 12 Page 9 of 10 ALC/LBM:eer/jml

## Page 1 of 1

## SEAL TO VALVE ASSIGNMENTS

	<u>Seal #</u>	Description	Valve <u>Suffix Letter</u>	
	1	Steam Dryer & Separator Stop Log (South)	А	
	2	Steam Dryer & Separator Stop Log (North)	В	
	3	Reactor Well (Top)	С	
	4	Reactor Well (Bottom)	D	
	5	Cask Washdown Gate (U/1: East, U/2: West)	E	
	6	Cask Washdown Gate (U/1: West, U/2: East)	F	
	7	Spent Fuel Pool/Reactor Well Stop Log (South)	G	
	8	Spent Fuel Pool Gate (U/1: East, U/2: West)	Н	
	9	Spent Fuel Pool Gate (U/1: West, U/2: East)	J	
	10	Spent Fuel Pool/Reactor Well Stop Log (North)	К	
These suffix apply to the following for each seal:				
	1.	15-*411 - Service Air Supply Valve		
:	2.	* F285 - Service Air Supply Air Filter		
	3.	PCV-15-*44 - Service Air Supply Pressure Contr	ol Valve	
4	4.	PI-15-*44 - Service Air Supply Pressure Indicato	r	
Ę	5.	15-*412 - Service Air Supply Check Valve		
6	5.	PCV-15-*46 - Backup N2 Bottle Supply Pressure	Control Valve	
7	7.	15-*706 - Backup N2 Bottle Supply Valve		
8	3.	PSV-15-*49 - Seal Supply Pressure Relief Valve		
9	).	15-*413 - Seal Supply 3-Way Valve		
1	0.	ZS-15-*45 - Seal Supply 3-Way Valve Position Switch		
1	1.	PSL-15-*49 - Seal Supply Pressure Switch Low		
1	2.	PI-15-*49 - Seal Supply Pressure Indicator		

S15.3.C, Rev. 12 Page 10 of 10 ALC/LBM:eer/jml

## ATTACHMENT 2 Page 1 of 1

## LOCATIONS OF SEAL AIR SUPPLY STATIONS

Unit 1/2, Elev. 352'



	ELON NUCLEAF	<b>?</b>		
TITLE: Defeat Unit 1 and Unit 2 Refu	el Floor HVAC High F	Rad Isolation Sign	als	
TASK PERFORMED BY:		_ EVALUATOR:	•	
EVALUATOR SIGNATURE:		DATE:		
DIRECTIONS TO EVALUATOR:				
N/A	•			
EVALUATION METHOD :				
Simulate				
EVALUATION LOCATION:	· .			
Plant				
APPROXIMATE COMPLETION TIME:	,	·		
20 min.		14		
IMPORTANCE RATING(S): 3.7	SYSTEM NUM	IBER(S): 234000A	3.02	
REFERENCES:				L 
1. M-041-200 Rev. 14; Reactor Press	sure Vessel Disassem	ıbiy		
TASK STANDARD(S):		-		

1. Jumpers installed per M-041-200 Attachment 2

292

## TASK CONDITIONS:

• Defeat of the Hi Rad Isolations from Refuel Floor HVAC is required to support Steam Dryer/Separator movement on Unit 1

- The CRS and Unit 1 RO have given permission to perform the procedure
- Core alterations and OPDRVs are suspended

## **INITIATING CUES:**

You have been directed to defeat the Unit 1 and Unit 2 Refuel Floor HVAC Hi Rad isolation signals, and Unit 1 Primary Containment Isolation signals per M-041-200, Attachment 2.

Critical Element(s) indicated by "\*" in Performance Checklist.

## PERFORMANCE CHECKLIST:

STEP	STANDARD	SAT/UNSAT
Equ	ipment Status Tags	1
<ol> <li>CUE: You have been provided with an equipment status tag. Please fill out the tag as if it is to be installed with the first jumper. The second tag on the sheet is a spare blank copy</li> <li>Provide the candidate with the EST sheet</li> <li>After the candidate has completed filling out one tag: "You are in possession of tags filled out in the same manner for the remaining steps"</li> </ol>	Equipment Status tag filled in. Use the attachment as an evaluation guide. MINIMUM information to pass this step includes: 1. Procedure and Step# M-041-200 Attachment 2 Step 2.1	
Ju	mper Installation	
2. PERFORM installation of the following jumpers, with Blue Equipment Status Tag(s), referencing this procedure <u>AND</u> applicable steps	N/A -	<b>N/A</b>
<ol> <li>* INSTALL a jumper from EEE6-2 to EEE6-3 <u>AND</u> Blue Equipment Status Tag(s) at panel 10C606 (Bay A)</li> </ol>	Jumper and EST installed from EEE6-2 to EEE6-3 in panel 10C606 Bay A	
CUE: Jumper and tag are installed		
<ol> <li>* INSTALL a jumper from FFF8-3 to FFF8-4 <u>AND</u> Blue Equipment Status Tag(s) at panel 10C606 (Bay A)</li> </ol>	Jumper and EST installed from FFF8-3 to FFF8-4 in panel 10C606 Bay	
CUE: Jumper and tag are installed		
<ul> <li>* INSTALL a jumper from EEE6-2 to EEE6-3 <u>AND</u> Blue Equipment Status Tag(s) at panel 20C606 (Bay A)</li> </ul>	Jumper and EST installed from EEE6-2 to EEE6-3 in panel 20C606 Bay A.	
UE: Jumper and tag are installed		

121.00

÷.

STEP	STANDARD	SAT/UNSAT
6. * INSTALL a jumper from FFF8-3 to FFF8-4 <u>AND</u> Blue Equipment Status Tag(s) at panel 20C606 (Bay A)	Jumper and EST installed from FFF8-3 to FFF8-4 in panel 20C606 Bay A.	
CUE: Jumper and tag are installed		
<ol> <li>PERFORM installation of the following jumpers, with Blue Equipment Status Tag(s) referencing this procedure <u>AND</u> applicable steps.</li> </ol>	N/A	N/A
8. * At panel *0C606 (Bay A) INSTALL a jumper from C51A-Z2A TB7-10 to C51A- Z2A TB7-11 <u>AND</u> Blue Equipment Status Tag	Jumper and EST installed from C51A- Z2A TB7-10 to C51A-Z2A TB7-11 in panel 10C606 Bay A.	
CUE: Jumper and tag are installed		
9. * At panel *0C606 (Bay B) INSTALL a jumper from C51A-Z2C TB7-10 to C51A- Z2C TB7-11 <u>AND</u> Blue Equipment Status Tag	Jumper and EST installed from C51A- Z2C TB7-10 to C51A-Z2C TB7-11 in panel 10C606 Bay B	
CUE: Jumper and tag are installed		
10. * At panel *0C633 (Bay A) INSTALL a jumper from C51A-Z2B TB7-10 to C51A- Z2B TB7-11 <u>AND</u> Blue Equipment Status Tag	Jumper and EST installed from C51A- Z2B TB7-10 to C51A-Z2B TB7-11 in panel 10C633 Bay A	
CUE: Jumper and tag are installed		
11. * At panel 10C633 (Bay B) INSTALL a jumper from C51A-Z2D TB7-10 to C51A- Z2D TB7-11 <u>AND</u> Blue Equipment Status Tag	Jumper and EST installed from C51A- Z2D TB7-10 to C51A-Z2D TB7-11 in panel 10C633 Bay B	
CUE: Jumper and tag are installed		
CUE: You have reached the termination point for the JPM. You may stop here	N/A	
	· · · · ·	

## Comments:

Note: Any grade of UNSAT requires a comment.

JPM Overall Rating:

SAT/UNSAT

## TASK CONDITIONS:

- Defeat of the Hi Rad Isolations from Refuel Floor HVAC is required to support Steam Dryer/Separator movement on Unit 1
- The CRS and Unit 1 RO have given permission to perform the procedure
- Core alterations and OPDRVs are suspended

的现在分词

## **INITIATING CUES:**

You have been directed to defeat the Unit 1 and Unit 2 Refuel Floor HVAC Hi Rad isolation signals, and Unit 1 Primary Containment Isolation signals per M-041-200, Attachment 2.

## CANDIDATE

## Attachment Equipment Status Tag Grading Guide

			<u> </u>
1465		STATISTICS OF THE	
			77 ( ) 
1. S. M. S. M. S. M. S.			а. С
			с. С
EQUIPMENT STATU	STAG	12796	
EQUIPMENT A UMPE	8		
OCCOG BAY A	11E 1	AR ALA	
ESEG 20 STELL	6-3	<u> </u>	
SYSTEM UNIT		DATE	
0.76		DATE	
POSITIONCONDITION		HUNC BY	<u> </u>
JUMPER INSTALLE	0	INIT	
AUTHORIZED BY		TACILOCATION	
UNITIRO		INCON	
RESPONSIBLE EO		DEADON	
CONTRACTOR OF A		A State of the second second	3.57
REACTOR U/1 (2)			$\sim$
	March	-700 4-7	
TURBINE UN (3)	SIEP	<b>Z.</b> 1	
ne C	A CALLER OF THE OWNER		
			<u> 78</u>
HADWASTE (1)			
DUTSIDE - (8) - 🖸	and the second second		
		the second s	

Minimum Entries are circled

# **ANSWER KEY**



# Equipment Status Tag

LGO		198-400-80(1253	<b>F</b>
EQUIPMENT STAT	US TAG	Nº 12796	
		EITHAARI	
SYSTEM UNIT		DATE	
POSITION/CONDITION		HINGBY	
AUTHORIZED BY		TAG LOCATION	
RESPONSIBLE EO		REASON	
U <b>RBINE</b> U/1 (3)			
U/2 (7)	1		
ISIDE (4) 🗋			े. जन्म जन्म
UTSIDE (8)			

Spare Sample Tag

## CANDIDATE

M-041-200 Rev. 14 Page 110 of 121

## REFUEL FLOOR HVAC HI-RAD JUMPER INSTALLATION/ARM REMOVAL FROM SERVICE

**NOTE:** Refueling Area Secondary Containment will be made inoperable during the time the jumpers are installed. Handling of irradiated fuel, core alterations, operations with a potential for draining the reactor vessel and load handling over fuel (unless previously approved by Engineering) must be suspended while the jumpers are installed.

This activity defeats Unit 1 and Unit 2 Refuel Floor HVAC High Radiation Isolation Signals, Refuel Floor High Radiation Primary Containment Isolations, Barrier Block and Vent Actuation to permit removal and transport of Steam Dryer and Steam Separator. Activity also removes three (3) fuel floor ARMs from service (2 of which are Criticality Monitors).

Depending on conditions verified by GP-6.1, this Attachment may be used only to remove the ARMs from service (Steps 4.0 through 9.0). Enter N/A for other steps.

## FOR TRAINING PURPOSES ONLY

Attachment 2 Page 1 of 5

M-041-200 Rev. 14 Page 111 of 121

## REFUEL FLOOR HVAC HI-RAD JUMPER INSTALLATION/ARM REMOVAL FROM SERVICE

1.0 **DIRECT** Fuel Floor Coordinator to **SUSPEND** any Fuel Handling, Core Alterations, Operations with a potential for draining the reactor vessel and any load handling over fuel.

Person Contacted

DV

**<u>NOTE:</u>** The following steps bypass the Unit 1 <u>AND</u> Unit 2 High Rad Isolation Signals to the Refuel Floor HVAC and Standby Gas Treatment System.

2.0 **PERFORM** installation of the following jumpers, with Blue Equipment Status Tag(s) referencing this procedure <u>AND</u> applicable steps.

#### DOUBLE VERIFICATION

2.1 At panel 10C606 (Bay A) **INSTALL** a jumper from EEE6-2 to EEE6-3 AND Blue Equipment Status Tag.

### DOUBLE VERIFICATION

2.2 At Panel 10C606 (Bay A) INSTALL a jumper from FFF8-3 to FFF8-4 AND Blue Equipment Status Tag.

WV DV

WV

## DOUBLE VERIFICATION

2.3 At Panel 20C606 (Bay A) INSTALL a jumper from EEE6-2 to EEE6-3 AND Blue Equipment Status Tag.

WV DV

## DOUBLE VERIFICATION

2.4 At Panel 20C606(Bay A) INSTALL a jumper from FFF8-3 to FFF8-4 AND Blue Equipment Status Tag.

WV DV

Attachment 2 Page 2 of 5

M-041-200 Rev. 14 Page 112 of 121

## REFUEL FLOOR HVAC HI-RAD JUMPER INSTALLATION/ARM REMOVAL FROM SERVICE

NOTE: The following step defeats Refuel Outage Unit \* Refuel Floor High Radiation Primary Containment isolation (H<sub>2</sub>/O<sub>2</sub> Analyzers, Hydrogen Recombiners, <u>AND</u> Containment Leak Detector) <u>AND</u> the Barrier Block <u>AND</u> Vent actuation to permit Steam Dryer/Separator removal.

These isolations are <u>NOT</u> required in OPCON 5 (TS 3.3.2).

3.0 **PERFORM** installation of the following jumpers, with Blue Equipment Status Tag(s) referencing this procedure <u>AND</u> applicable steps.

### DOUBLE VERIFICATION

3.1 At panel \*0C606 (Bay A) **INSTALL** a jumper from C51A-Z2A TB7-10 to C51A-Z2A TB7-11 <u>AND</u> Blue Equipment Status Tag.

WV DV

#### DOUBLE VERIFICATION

3.2 At panel \*0C606 (Bay B) **INSTALL** a jumper from C51A-Z2C TB7-10 to C51A-Z2C TB7-11 <u>AND</u> Blue Equipment Status Tag.

WV \_\_\_\_\_

#### DV

#### DOUBLE VERIFICATION

3.3 At panel \*0C633 (Bay A) **INSTALL** a jumper from C51A-Z2B TB7-10 to C51A-Z2B TB7-11 AND Blue Equipment Status Tag.

WV DV

### DOUBLE VERIFICATION

3.4 At panel \*0C633 (Bay B) **INSTALL** a jumper from C51A-Z2D TB7-10 to C51A-Z2D TB7-11 <u>AND</u> Blue Equipment Status Tag.

WV

DV

Attachment 2 Page 3 of 5

M-041-200 Rev. 14 Page 113 of 121

REFUEL FLOOR HVAC HI-RAD JUMPER INSTALLATION/ARM REMOVAL FROM SERVICE

- The following step ensures the requirements of Tech Spec NOTE: (T.S.) 3.3.7.1 are met.
- ENSURE Radiation Protection is performing ST-0-027-640-\*, INOP 4.0 Fuel Floor criticality Area Radiation Monitors.

#### Person Contacted

WV

DV

The following steps removes Refuel Outage Unit ARM RIS30-M1-NOTE: \*K600, Steam Separator Area El 352, ARM RIS33-M1-\*K600, Pool Plug Laydown Area El 352, AND ARM RIS29-M1-\*K600, D/W Head Laydown Area El 352 from service AND requires entry into TS LCO 3.3.7.1.

#### DOUBLE VERIFICATION

At Auxiliary Equipment Room Panel \*0C605 PLACE mode switch for 5.0 ARM RIS30-M1-\*K600, Steam Separator Area El 352, to "ZERO" position AND INSTALL Blue Equipment Status Tag referencing this

procedure AND applicable step.

DOUBLE VERIFICATION

At Auxiliary Equipment Room Panel \*0C605 PLACE mode switch for 6.0 ARM RIS33-M1-\*K600, Pool Plug Laydown Area El 352, to "ZERO" position AND INSTALL Blue Equipment Status Tag referencing this procedure and applicable steps.

> WV DV

ŴV

### DOUBLE VERIFICATION

7.0 At Auxiliary Equipment Room Panel \*0C605 PLACE mode switch for ARM RIS29-M1-\*K600, D/W Head Laydown Area El 352, to "ZERO" position AND Blue Equipment Status Tag referencing this procedure and

applicable steps.

WV	DV

Attachment 2 Page 4 of 5

M-041-200 Rev. 14 Page 114 of 121

REFUEL FLOOR HVAC HI-RAD JUMPER INSTALLATION/ARM REMOVAL FROM SERVICE

- 8.0 As applicable, **INFORM** Shift Management that the following actions are complete:
  - 1. Refuel Floor HVAC High Radiation Isolation <u>AND</u> Refuel Floor High Radiation Primary Containment Isolation <u>AND</u> the Barrier Block <u>AND</u> Vent Actuation has been defeated.
  - 2. ARM RIS30-M1-\*K600, Steam Separator Area El 352, AND ARM RIS33-M1-\*K600, Pool Plug Laydown Area El 352, AND ARM RIS29-M1-\*K600, D/W Head Laydown Area El 352 are removed from service.
  - 3. Radiation Protection is performing ST-0-027-640-\*, INOP Fuel Floor Criticality Area Radiation Monitors.

Person Contacted

WV

9.0 **INFORM** Refuel Floor Coordinator High-Rad Jumpers are installed <u>AND/OR</u> ARMs are removed from service.

Person Contacted

wv

## Attachment Equipment Status Tag Grading Guide

	196-00040(12/90)
EQUIPMENT STATUS TAG	12796
EQUIPMENT JUMPER	NIA
SYSTEM & UNIT	DATE
POSITION/CONDITION	HUNGBY
AUTHORIZED BY	TAGLOCATION
RESPONSIBLE EC	REABON
REACTOR U/1 (2)	
UR 10 1 11-09/-2	00 ATT 2
	<u>2. I</u>
02 (7)	Anna an
NSIDE (4)	

Minimum Entries are circled

## **ANSWER KEY**

	S100-0000 (200)
	40700
EQUIPMENT STATUS TAG	NO TSURD
EQUIPMENT	
	ITP(A/R)
SYSTEM	DATE
POSITIONCONDITION	HUNG BY
AUTHORIZED BY	
AFROMINE F CO	
	REASON
U/2 (6)	
-	
U2 m 🖸 🔜	
CARLAGE GAV T	
	最多15年7月第 <b>日接触</b> 感忆。
OUTSIDE (8)	

CANDIDATE

## **Equipment Status Tag**



Spare Sample Tag