

Facility: <u>LGS 1 and 2</u> Scenario No. <u>1</u> Op-Test Number: _____			
Examiners: _____		Operators: _____	
_____		_____	
_____		_____	
Initial Conditions: Shuffle Part 1 is in progress on Unit 1			
Turnover: A fuel bundle is in transit from the core to the spent fuel pool			
Event No.	Malfunction No.	Event Type*	Event Description
1.	N/A	C	Minor leakage reported from drywell upper seal plate into the drywell requires temporary suspension of fuel movement to allow access to upper drywell area for inspection.
2.	N/A	M	A fuel bundle is dropped onto spent fuel pool with significant fuel damage.

\* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Op-Test No.      LG IPO      Scenario No.   1   Event No.:   1   Page 1 of 1

**Event Description:**

Minor leakage reported from drywell upper seal plate into the drywell requires temporary suspension of fuel movement to allow access to upper drywell area for inspection.

**Examiner Cue:**

*With a fuel bundle in transit from the core to the spent fuel pool, the drywell control point contacts you and informs you that a water leak in the vicinity of the drywell upper seal plate has been detected. Access to the drywell is needed to the 313' elevation for inspection and repair in the next 5 minutes.*

Time	Position	Applicant's Actions or Behavior
	FHD *	Direct the completion of the current CCTAS step (the bundle is currently in the cattle chute and needs to be moved, as this is one of the least desirable locations to leave the bundle if drywell access is a concern ).
	FHD *	Suspend core alterations  (The requirement for access controls to the upper elevations of the drywell appears in several places: NOM-L-4.1, FHD Turnover Checklist, FH-105, and HP-300. The candidate may reference any or direct the suspension of core alterations from memory)
	FHD	Post a sign in front of the controls of the grapple controls to remind personnel to verify access controls re-established prior to resuming irradiated core component handling
	FHD	Contact the Health Physics Drywell Control Point and report: <ul style="list-style-type: none"> <li>• irradiated core component transfers have been halted</li> <li>• access to the drywell upper elevations may be unrestricted</li> <li>• the fuel grapple controls have been posted to re-verify access controls prior to resuming [irradiated core] component handling</li> </ul> <p style="text-align: right;">Ref: FH-105 Step 9.1.2</p>

**Examiner Cue:**

*After about 30 minutes, the Drywell Control Point contacts you and informs you that the water leak was from a demin water hose. Access restrictions to the upper elevation of the drywell have been put back in-place and the area is clear. The control room has made the announcement in the drywell, and irradiated component movements may resume.*

*You have commenced the next CCTAS step, and have grappled a bundle over the core and are transporting it to the spent fuel pool.*

\* Critique tasks

Op-Test No. LG IPO Scenario No. 1 Event No.: 2 Page 1 of 1

## Event Description:

A fuel bundle is dropped onto spent fuel pool with significant fuel damage

## Examiner Cue:

*A bundle is hanging from the main hoist, and the bridge is moving toward the target cell location in front of the North Fuel Prep Machine. Sudden stoppage of the bridge causes the bundle to swing into the prep machine. The bundle caught on the fuel prep machine and as the mast swung away, the bail handle failed and the bundle fell onto the spent fuel below.*

*The bundle is now lying partly on spent fuel and partly on the fuel pool floor. Bubbles and cloudy water can be seen rising toward the surface.*

*(Wait about 30 seconds then provide the cue) "The PRO has contacted the bridge and reported that the refuel floor has automatically isolated due to high exhaust rad level" The refuel bridge area rad monitor is now alarming.*

Time	Position	Applicant's Actions or Behavior
	FHD	Enter ON-120, FUEL HANDLING PROBLEMS per Symptom 1.3 (Fuel Bundle Dropped or Damaged)
	FHD *	Evacuate the refuel floor per ON-120
	FHD	Contact SSV and request disposition of damaged bundle <i>CUE: The SSV directs you to leave the bundle in the current location, ensure the refuel floor is evacuated, and come to the main control room</i>
	FHD	Verify normal refuel floor HVAC is isolated and SGTS is started <i>CUE: The PRO reports that the refuel floor has automatically isolated and standby gas treatment is running</i>
		<i>CUE: You have reached the termination point for the scenario</i>

---

LSRO INTEGRATED PLANT SCENARIO TURNOVER CONDITIONS

---

LGS Scenario 1

Fuel Handling Director

Unit 1

OPCON 5

Core Shuffle Part 1 in progress

All prerequisites for core alterations are met and a bundle is in-transit from the core to the spent fuel pool. The mast is mid-way through the cattle chute.

**CANDIDATE**

Facility: LGS 1 and 2 Scenario No. 2 Op-Test Number: \_\_\_\_\_

Examiners: \_\_\_\_\_ Operators: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Initial Conditions: In-vessel maintenance is in progress on Unit 2

Turnover: The bridge is over the core and moving toward the fuel pool with a double blade guide hanging from the main hoist and a control rod/fuel support piece on the combined grapple hanging from the monorail aux hoist.

Event No.	Malf No.	Event Type*	Event Description
1.	N/A	I	Receipt of unexpected rod block over core due to load cell failure
2.	N/A	M	Significant leakage from CRD Mechanism Housing requires installation of the Emergency Guide Tube Seal

\* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Op-Test No. LG IPO Scenario No. 2 Event No.: 1 Page 1 of 1

## Event Description:

Receipt of unexpected rod block over core due to load cell failure

## Examiner Cue:

*The NES combined grapple, the fuel support, and the control rod blade are clear of the top guide and coming up per Step 5. 8.19*

Time	Position	Applicant's Actions or Behavior
	FHD	<p>Raise NES combined grapple until it stops when the jam block actuates the whisker switch</p> <p><i>CUE: The aux hoist is full up</i></p> <p><i>CUE: The Reactor Operator has just received a ROD OUT BLOCK alarm.</i></p> <p><i>The Refuel Platform Operator has received ROD BLOCK #1 and ROD BLOCK #2 lamps and has 908 lb indicated on the main hoist</i></p> <p><i>Note: The candidate should recognize this as erroneous enforcement of a refueling interlock (hoist loaded over core). A failure of the load cell on the main hoist in the hi direction would cause this (See S97.0.M Attachment 1 ). The RPO would also see weight indication jump.</i></p>
	FHD *	<p>Place the components in a safe location due to equipment exhibiting unexpected behavior</p> <p style="text-align: right;">Ref: S97.0.M Step 3.1</p> <p><i>NOTE: The candidate must address placing the loads in a safe location, keeping in mind that the main grapple will not attempt to release if the load is 908 lb. Examples of ways to meet this step could include (1) CRB in blade rack with FSP seated on rack, (2) hanging from the hoist as low as possible in the fuel pool, or (3) in a location specified by reactor engineers. The load should not normally be left hanging over the core.</i></p>
	FHD	<p>Suspend core alterations and CRB exchanges due to inoperable refueling interlocks</p> <p style="text-align: right;">Ref: LCO 3.9.6 FH-105 Step 4.27</p> <p><i>Note: CRB exchanges are done in de-fueled cell. This is not a core alteration; however, the failed load cell will still prevent performing CRB exchanges because the blade guides will not release.</i></p>
	FHD	<p>Initiate notifications to troubleshoot and repair the main hoist load cell.</p>

Op-Test No. LG IPO Scenario No. 2 Event No.: 2 Page 1 of 1

**Event Description:**

Significant leakage from CRD Mechanism Housing requires installation of the emergency guide tube seal

**Examiner Cue:**

*While waiting for the system manager to come to the refueling bridge, you hear a report from undervessel that a severe leak occurred when CRD mechanism 30-39 was lowered using the NES machine. The lift cylinder has jammed and the CRD cannot be raised back into position. All undervessel crews are evacuating the drywell*

*The control room supervisor has directed you to install the emergency guide tube seal to 30-39*

Time	Position	Applicant's Actions or Behavior
	FHD	<p>Attach CRB grapple or jet pump grapple as required to frame mounted or monorail aux hoist</p> <p><i>CUE: The grapple cabinet is currently obstructed by a piece of heavy equipment</i></p> <p style="text-align: right;">Ref: M-C-741-301 Section 5.7</p>
	FHD	<p>Use a rope to handle the guide tube seal as an emergency measure</p> <p><i>CUE: A 100 foot piece of nylon rope is now attached to the guide tube seal. The seal has been carried to the bridge</i></p> <p><i>NOTE: The guide tube seal is stored on a horizontal rack on the Southwest corner of the Refuel Floor. The rope is already staged and attached.</i></p>
	FHD	<p>Position the bridge and trolley over 30-39</p> <p><i>CUE: The cab is over 30-39</i></p>
	FHD	<p>Direct the guide tube seal lowered over the rail into the guide tube for 30-39</p> <p><i>CUE: The rope is wrapped around the railing and the seal is in the water. The seal has been lowered through the top guide and has seated in 30-39. Leakage is stopped as verified by undervessel inspection.</i></p>
		<p><i>CUE: You have reached the termination point for the scenario.</i></p>

---

LSRO INTEGRATED PLANT SCENARIO TURNOVER CONDITIONS

---

LGS Scenario 2

Fuel Handling Director

Unit 2

Mode 5

In-vessel maintenance is in progress on Unit 2 per M-C-741-301

All prerequisites for core alterations are met and all rods indicate full in (dummy PIPs are installed on uncoupled rods)

Control rod blade exchange in cell 30-39 is in progress. The double blade guide is hanging from the main hoist with weight indicating 385 lb.

The FSP and CRB are being raised through the top guide on the NES combined grapple on the monorail aux hoist with weight indicating 460 lb and all flags in full-down position (this value agrees with Attachment 12 expected value)

**CANDIDATE**



Facility: <u>PBAPS 2 and 3</u> Scenario No. <u>1</u> Op-Test Number: _____			
Examiners: _____		Operators: _____	
_____		_____	
_____		_____	
Initial Conditions: Core alterations are in progress on Unit 3			
Turnover: A bundle is being raised from the core.			
Event No.	Malf No.	Event Type*	Event Description
1.	N/A	C	Hoist jam condition while moving fuel
2.	N/A	M	Unexpected fuel floor area radiation monitor alarm

\* ( N )ormal, ( R )eactivity, ( I )nstrument, ( C )omponent, ( M )ajor

Op-Test No.  PB IPO  Scenario No.  1  Event No.:  1  Page 1 of 1

Event Description:

Hoist jam condition while moving fuel

Examiner Cue:

*Bundle 17-30 is grappled and being raised. The hoist is at 530 inches and is coming up with the bundle oriented Northwest.*

*The Refuel Platform Operator has just called out a hoist jam condition with about half the bundle above the top guide*

Time	Position	Applicant's Actions or Behavior
	FHD	Direct the RPO to stop hoist operation  Ref: SO18.1.A-3
	FHD	Direct the bundle to be lowered until the hoist jam goes out <i>CUE: The RPO has lowered the bundle several inches. The HOIST JAM lamp is out and the grapple controls are released</i> <i>The RPO reports that the bundle channel appears bowed by visual observation.</i>
	FHD	The FHD may at this point direct the RPO to attempt to raise the bundle again. <i>CUE: The RPO has attempted to raise the bundle again using gentle rotation of the mast. The bundle is now clear of the core and is over the spent fuel pool on the way to X-54</i>

Op-Test No.  PB IPO  Scenario No.  1  Event No.:  2  Page 1 of 1

Event Description:

Unexpected Fuel Floor Area Radiation Alarm

Examiner Cue:

*The bundle from 17-30 is now about to be lowered into the spent fuel pool. The location and orientation of the bundle has been double-verified and the mast encoder indicates 12 inches*

Time	Position	Applicant's Actions or Behavior
	FHD	Direct the RPO to lower the bundle until a slack cable warning is received  <i>CUE: The bundle is going down</i> <i>Wait 20 seconds</i> <i>CUE: The fuel storage pool ARM is now alarming</i>
	FHD	Enter ON-124, FUEL FLOOR AND FUEL HANDLING PROBLEMS -PROCEDURE
	FHD	Recognize that the alarm is not due simply to a bundle positioned near a monitor because the alarm would have been received prior to lowering the bundle  Ref: ON-124 Section 2.2
	FHD	Direct the bundle to be raised until it clears the fuel racks  <i>CUE: The RPO has begun to raise the bundle, then reports that the hoist has stopped and a FAULT DETECTED alarm is received for unknown reasons. The bundle is still about halfway into the fuel rack</i>
	FHD	Recognize the bundle will not raise or lower
	FHD	Inform Health Physics of the condition
	FHD	Notify the Main Control Room crew  <i>CUE: You can now hear the Fuel Floor Area Rad Monitor alarming</i>
	FHD	Direct the crew to evacuate to the Turbine Building elevation 165'
		<i>CUE: You have reached the termination point for the scenario. You may stop here</i>

---

LSRO INTEGRATED PLANT SCENARIO TURNOVER CONDITIONS

---

PBAPS Scenario 1

Fuel Handling Director

Unit 3

Mode 5

Core Shuffle Part 2 in progress

All prerequisites for core alterations are met and a bundle is being raised from the core

**CANDIDATE**

Facility: <u>PBAPS 2 and 3</u> Scenario No. <u>2</u>		Op-Test Number: _____	
Examiners: _____		Operators: _____	
_____		_____	
_____		_____	
Initial Conditions: Core shuffle part 2 is in progress.			
Turnover: A bundle is in transit from the fuel pool to the core.			
Event No.	Malf No.	Event Type*	Event Description
1.	N/A	I	Wide Range Nuclear Monitoring (WRNM) Instrument failure requires suspension of core alterations
2.	N/A	M	Loss of cavity level and emergency makeup

\* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Op-Test No.     PB IPO     Scenario No.   2   Event No.:   1   Page 1 of 1

**Event Description:**

Wide Range Nuclear Monitoring instrument failure requires suspension of core alterations

**Examiner Cue:**

*With the refuel platform entering the refuel slot, the Reactor Operator contacts the bridge crew and reports the "2B" Wide Range NI just failed because the cable was accidentally un-plugged from under the vessel.*

Time	Position	Applicant's Actions or Behavior
	FHD	<p>Direct the RPO to stop auto motion due to failure to meet required operable nuclear instruments</p> <p style="text-align: right;">Ref: T.S. Surv. Req. 3.3.1.2.2 NOM-L-4.1 FH-6C Step 5.6</p> <p>Examiner Note: The candidate need only simulate that the bundle is not inserted into the core. He or she may elect to complete the transit of the refuel slot to minimize dose rate in the drywell</p> <p>The candidate may either direct the RPO to stop the bridge, or he or she may simulate supervisory action from the FHD console by stopping the move. The move may be terminated by performing any of the following:</p> <ul style="list-style-type: none"> <li>• Touching AUTO STOP</li> <li>• Deflecting a manual motion joystick</li> <li>• Depressing STOP pushbutton</li> <li>• Depressing TRAVEL OVERRIDE</li> </ul> <p><i>CUE: The RPO has stopped the bridge (You have stopped the bridge)</i></p>
	FHD	<p>Notify Reactor Engineering that core alterations have been suspended</p> <p style="text-align: right;">Ref: FH-6C Step 10.2.4</p> <p><i>CUE: Reactor engineering directs you to return the bundle to the "safe setdown" location until the WRNM is restored</i></p>
	FHD	<p>Return the bundle to the safe setdown location in the fuel pool in semi-auto or manual mode</p> <p><i>CUE: The bundle is in-transit to the location you selected</i></p>

Op-Test No.     PB IPO     Scenario No.     2     Event No.:     2     Page 1 of 2

## Event Description:

Loss of reactor cavity level and emergency makeup

## CUE:

*While waiting in a low dose area for the WRNM to be restored, you hear the drywell control point reporting that everyone just came running out of the drywell because there is a huge leak coming from some big pipe. You can also see cavity level dropping rapidly, and the fuel pool cooling weirs just became uncovered. You have been directed to respond to the cavity level drop from the fuel floor because the only available ECCS has failed to inject from the control room.*

Time	Position	Applicant's Actions or Behavior
	FHD	Enter ON-124, FUEL FLOOR AND FUEL HANDLING PROBLEMS – PROCEDURE
	FHD *	<p>Ensure all irradiated components are lowered to a safe location</p> <ul style="list-style-type: none"> <li>- Complete the fuel move in progress, either to the original location or to the nearest fuel pool location (<i>the rapid level drop given in the cue may cause the candidate to abandon the move to the original location and simply get the bundle down immediately. This is also an acceptable response per the procedure</i>)</li> <li>- Ensure the fuel prep machines are fully lowered if fuel loaded</li> <li>- All other irradiated components hanging from any hoist or cable is lowered</li> </ul> <p><i>CUE: All fuel and irradiated materials are fully lowered</i></p> <p style="text-align: right;">Ref: ON-124 Section 2.6</p>
	FHD	<p>Notify Health Physics to continue to evaluate fuel floor conditions</p> <p><i>CUE: HP is on the fuel floor and providing continuous coverage</i></p>
	FHD	<p>Evaluate whether the fuel is uncovered in the fuel pool for the purpose of EP classification</p> <p><i>CUE: The fuel is still covered by approximately 20 feet of water</i></p>
	FHD	<p>Evacuate non-essential personnel to the Turbine Building</p> <p><i>CUE: The Shift manager has directed you to remain on the fuel floor and direct the response until Health Physics directs you to evacuate.</i></p>

Op-Test No.  PB IPO  Scenario No.  2  Event No.:  2  Page 2 of 2

**Event Description:**

Loss of reactor cavity level and emergency makeup

**CUE:**

*While waiting in a low dose area for the WRNM to be restored, you hear the drywell control point reporting that everyone just came running out of the drywell because there is a huge leak coming from some big pipe. You can also see cavity level dropping rapidly, and the fuel pool cooling weirs just became uncovered. You have been directed to respond to the cavity level drop from the fuel floor because the only available ECCS has failed to inject from the control room.*

	FHD	Enter FH-74, "Actions in Response to an Unexpected Loss of Fuel Pool, Reactor Cavity, or Equipment Storage Pool Water Inventory"
	FHD	Inspect the fuel pool rails, racks, fuel prep machines, and cask laydown area for any irradiated material above the top of the fuel storage racks  <i>CUE: All materials are below the top of the racks</i>  Ref: FH-74 Step 8.4.2 (Note- There are several steps in FH-74 that have already been taken in ON-124. The candidate may spend a few moments locating the next step that needs to be performed)
	FHD	Turn off power to the refueling platform
	FHD	Exit the area using proper HP procedures  <i>CUE: While exiting, the control room supervisor calls and directs you to add water to the cavity per FH-74. Health Physics is present and states that radiological conditions permit the performance of the steps on the refuel floor</i>
	FHD	Attach hoses to any condensate and demin water connections and route to the cavity and add water
	FHD	Roll out any fire hose attached to a water supply and route to the cavity and add water
		<i>CUE: You have reached the termination point for the scenario</i>



---

## LSRO INTEGRATED PLANT SCENARIO TURNOVER CONDITIONS

---

PBAPS Scenario 2

Fuel Handling Director

Unit 2

Mode 5

Core Shuffle Part 2 in progress

Unit 2 Refuel Platform is in full automatic X, Y, Z mode

"A", "B", "G", and "H" WRNMs are the only operable Nuclear Instruments

The CCTAS step in progress is bundle PYN463 from P2SPENT CC-18 (NW) to 51-34 (SW)

The CCTAS lists P2SPENT YY39 as the safe setdown location

All prerequisites for core alterations are met and the bridge is in motion toward the refueling slot

**CANDIDATE**