OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: HOPE CREEK

SYSTEM: 215004 Source Range Monitor

TASK: SRM/IRM Rod Block Bypassing during refueling operations IAW HC.OP-SO.SE-0001 Section 5.4. Perform independent verification of installed jumpers.

TASK NUMBER: 215004 A1.04

JPM NUMBER: 2003-NRC-LSRO-S1

ALTERNATE PATH: [ ]

APPLICABILITY: EO [ ] RO [X] SRO [X] LSRO [X]

	K/A NUMBER:	233000	A2.02
	IMPORTANCE FACTOR:	3.1	3.3
		RO	SRO

EVALUATION SETTING/METHOD: REACTOR BUILDING/ SIMULATE

REFERENCES: HC.OP-SO.SE-0001 Rev 10

TOOLS AND EQUIPMENT: Flashlight

VALIDATED JPM COMPLETION TIME: 5 min.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A min.

APPROVED:

N/A		
BARGAINING UNIT REPRESENTATIVE	TRAINING SUPERVISOR	OPERATIONS MANAGER or Designee

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission from the OS or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: _____ min.

ACTUAL TIME CRITICAL COMPLETION TIME: N/A min.

JPM PERFORMED BY: _____ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: _____ **DATE:** _____

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____

DATE: _____

SYSTEM: 215004 Source Range Monitor

TASK: SRM/IRM Rod Block Bypassing during refueling operations IAW HC.OP-SO.SE-0001 Section 5.4. Perform independent verification of installed jumpers

TASK 215004 A1.04

INITIAL CONDITIONS:

- You are the Refueling SRO.
- The plant is in Operational Condition 5.
- All fuel has been moved to the Fuel Pool.
- The CRS has directed I&C to bypass the SRM/IRM Rod Blocks IAW HC.OP-SO.SE-0001 Section 5.4.
- I&C has performed step 5.4.3 of HC.OP-SO.SE-0001.

INITIATING CUE: Perform the Independent Verification requirements of steps 5.4.4 and 5.4.6 following I&C jumper installation IAW HC.OP-SO.SE-0001.

Successful Completion Criteria:
1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: 215004 Source Range Monitor

TASK: SRM/IRM Rod Block Bypassing during refueling operations IAW HC.OP-SO.SE-0001 Section 5.4. Perform independent verification of installed jumpers.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*	5.4.4	START TIME: _____ PERFORM an independent verification of the installed jumper from Step 5.4.3. INITIAL Attachment 1.	Operator proceeds to panel 10C635, opens the Cabinet door and locates terminal strip DD. Operator locates terminals DD-19 and DD-20. **Examiner Cue: What do you expect to see?** Operator states a wire jumper should be installed between terminals DD-19 and DD-20. **Examiner Cue: A jumper is installed on the terminals indicated.** **Examiner Note: Initialing Attachment 1 is not critical.** Operator initials Attachment 1 as independent verifier.		

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: 215004 Source Range Monitor

TASK: SRM/IRM Rod Block Bypassing during refueling operations IAW HC.OP-SO.SE-0001 Section 5.4. Perform independent verification of installed jumpers.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
	5.4.5	INSTALL a jumper in Panel 10C636 from AA35 to AA36. INITIAL Attachment 1.	**Examiner Cue: "The I&C technician has completed step 5.4.5"**		
*	5.4.6	PERFORM an independent verification of the installed jumper from Step 5.4.5. INITIAL Attachment 1.	Operator proceeds to panel 10C636, opens the Cabinet door and locates terminal strip AA. Operator locates terminals AA-35 and AA-36. **Examiner Cue: What do you expect to see?** Operator states a wire jumper should be installed between terminals AA-35 and AA-36. **Examiner Cue: A jumper is installed on the terminals indicated.** Operator initials Attachment 1 as independent verifier.		

OPERATOR TRAINING PROGRAM **NAME:** _____

JOB PERFORMANCE MEASURE **DATE:** _____

SYSTEM: 215004 Source Range Monitor

TASK: SRM/IRM Rod Block Bypassing during refueling operations IAW HC.OP-SO.SE-0001 Section 5.4. Perform independent verification of installed jumpers.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
		STOP TIME: _____	Operator notifies Control Room that independent verification is complete. **Terminating Cue: This JPM is complete.**		

INITIAL CONDITIONS:

- You are the Refueling SRO.
- The plant is in Operational Condition 5.
- All fuel has been moved to the Fuel Pool.
- The CRS has directed I&C to bypass the SRM/IRM Rod Blocks IAW HC.OP-SO.SE-0001 Section 5.4.
- I&C has performed step 5.4.3 of HC.OP-SO.SE-0001.

INITIATING CUE: Perform the Independent Verification requirements of steps 5.4.4 and 5.4.6 following I&C jumper installation IAW HC.OP-SO.SE-0001.

5.3.7 To bypass (trip disable) an OPRM,
PERFORM the following: _____

A. **PLACE** OPRM MANUAL BYPASS/AUTO/OPRM MANUAL ENABLED Switch (S4) to the OPRM MANUAL BYPASS position. (10C608) _____

B. **OBSERVE** Annunciator Window Box C3-F3 - TRIP BYP/INOP/TRBL is illuminated. _____

C. WHEN OPRM MANUAL BYPASS is not required, **PLACE** MANUAL BYPASS/AUTO/OPRM MANUAL ENABLED Switch (S4) to the AUTO position. (10C608) _____

D. **OBSERVE** Annunciator Window Box C3-F3 - TRIP BYP/INOP/TRBL is extinguished. _____

5.4 SRM/IRM Rod Block Bypassing during Refueling Operations.

NOTE 5.4

A. All steps in this Section are to be completed in sequence.

B. Installation and removal of jumpers should be performed by a qualified I&C Technician.

5.4.1 **ENSURE** all prerequisites are satisfied IAW Section 2.4. JOB

5.4.2 **LOG** bypassing of SRM/IRM Control Rod Blocks in the Tech Spec Action Statement Log. JOB

5.4.3 **INSTALL** a jumper in Panel 10C635 from DD19 to DD20.
INITIAL Attachment 1. JOB

5.4.4 **PERFORM** an independent verification of the installed jumper from Step 5.4.3.
INITIAL Attachment 1. _____

5.4.5 **INSTALL** a jumper in Panel 10C636 from AA35 to AA36.
INITIAL Attachment 1. _____

5.4.6 **PERFORM** an independent verification of the installed jumper from Step 5.4.5.
INITIAL Attachment 1. _____

5.4.7 SRM/IRM Rod Blocks are now bypassed. Control Rod withdrawal should be permitted. _____

5.4.8 WHEN the SRM/IRM refueling Rod Block bypass is no longer desired.
REMOVE the jumper in Panel 10C635 from DD19 to DD20.
INITIAL Attachment 1. _____

5.4.9 **PERFORM** an independent verification of the removed jumper from Step 5.4.8.
INITIAL Attachment 1. _____

5.4.10 **REMOVE** the jumper in Panel 10C636 from AA35 to AA36.
INITIAL Attachment 1. _____

5.4.11 **PERFORM** an independent verification of the removed jumper from step 5.4.10.
INITIAL Attachment 1. _____

5.4.12 **VERIFY** SRM/IRM rod blocks are functioning
AND **CLEAR** the action statement log. _____

ATTACHMENT 1
(Page 1 of 1)
Installation and Removal of Jumpers for SRM/IRM Rod Blocks

STEP	NOMENCLATURE	PERFORMER	VERIFIER
5.4.3 & 5.4.4	JUMPER INSTALLED PANEL 10C635 DD19 TO DD20	JOB I&C	
5.4.5 & 5.4.6	JUMPER INSTALLED PANEL 10C636 AA35 TO AA36	I&C	
5.4.8 & 5.4.9	JUMPER REMOVED PANEL 10C635 DD19 TO DD20	I&C	
5.4.10 & 5.4.11	JUMPER REMOVED PANEL 10C636 AA35 TO AA36	I&C	

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: HOPE CREEK

SYSTEM: 204000 RWCU System

TASK: Align RWCU for Alternate Decay Heat Removal IAW Section F of HC.OP-AB.RPV-0009

TASK NUMBER: 295021AA104

JPM NUMBER: 2003-NRC-LSRO-S2

ALTERNATE PATH: [X]

	K/A NUMBER:	295021	AA1.04
APPLICABILITY: EO [ ] RO [ ] SRO [X] LSRO [X]	**IMPORTANCE FACTOR:**	3.7 RO	3.7 SRO

EVALUATION SETTING/METHOD: REACTOR BUILDING – SIMULATE

REFERENCES: HC.OP-AB.RPV-0009(Q) Rev 0; HC.OP-SO.BG-0001(Q) Rev 33

TOOLS AND EQUIPMENT: Survey map of Room 4506

VALIDATED JPM COMPLETION TIME: 20 min.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A min.

APPROVED:

N/A		
BARGAINING UNIT REPRESENTATIVE	**TRAINING SUPERVISOR**	**OPERATIONS MANAGER or Designee**

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission from the OS or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: _____ min.

ACTUAL TIME CRITICAL COMPLETION TIME: N/A min.

JPM PERFORMED BY: _____ **GRADE:** [ ] **SAT** [ ] **UNSAT**

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: _____ **DATE:** _____

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____

DATE: _____

SYSTEM: 204000 RWCU System

TASK: Align RWCU for Alternate Decay Heat Removal IAW Section F of HC.OP-AB.RPV-0009

TASK NUMBER: 295021AA1.04

INITIAL CONDITIONS:

- The plant is in Operational Condition 4
- Reactor Recirc Pumps are not available
- SDC Common Suction header has isolated
- RWCU is in service in a normal line-up
- Reactor coolant temperature is rising slowly
- RWCU is required for Alternate Decay Heat Removal IAW Condition F of HC.OP-AB.RPV-0009

INITIATING CUE:

Perform the required actions for Condition F of HC.OP-AB.RPV-0009.

Successful Completion Criteria:
1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: 204000 RWCU System
TASK: 295021AA1.04 Align RWCU for Alternate Decay Heat Removal IAW Section F of HC.OP-AB.RPV-0009

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
		Operator obtains procedure HC.OP-AB.RPV-0009.	Operator obtains the correct procedure. Examiner Note: Once operator locates correct procedure, provide copy of HC.OP-AB.RPV-0009 procedure to operator for markup as necessary.		
		Operator reviews AB-RPV-0009 List of Conditions.	Operator determines Section F of HC.OP-AB.RPV-0009 is applicable.		
		Operator determines beginning step of the procedure	Operator determines correct beginning step to be F.1		
	F. F.1	**RWCU is required for Alternate Decay Heat Removal** Ensure RWCU is in service	Operator reads steps F.1, F.2, and F.3. Operator verifies RWCU is in service from Cue sheet. **Examiner Note:** **Initialing steps is not critical.**		

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: 204000 RWCU System
TASK: 295021AA1.04 Align RWCU for Alternate Decay Heat Removal IAW Section F of HC.OP-AB.RPV-0009

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*	F.2	**FULLY OPEN** ED-V035. START TIME _____	Operator determines valve location from page 10 of HC.OP-AB.RPV-0009. Operator enters Reactor Building and locates ED-V035 in room 4504E (145 ft elev. Corridor outside RWCU Regen & Non-Regen HX Room along wall) *Operator simulates opening ED-V035 fully by rotating the valve handle Clock-Wise (as viewed from the corridor) until the pointer shows 100 percent open. **Examiner Cue: The valve operator indicated has been rotated in the direction indicated and has come to the position indicated.**		
	F.3	If necessary, THEN Bypass the Regenerative heat exchanger to maximize decay heat removal.	Operator asks if Bypassing the Regenerative Heat Exchanger is necessary. **Examiner Cue: Ten minutes has passed. RPV temperatures are still increasing.**		

OPERATOR TRAINING PROGRAM NAME: _____

JOB PERFORMANCE MEASURE DATE: _____

SYSTEM: 204000 RWCU System

TASK: 295021AA1.04 Align RWCU for Alternate Decay Heat Removal IAW Section F of HC.OP-AB.RPV-0009

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
			Operator determines Bypassing the Regenerative Heat Exchanger is necessary.		
		Operator obtains procedure HC.OP-SO.BG-0001.	Operator obtains the correct procedure. **Examiner Note**: Once operator locates correct procedure, provide copy of HC.OP-SO.BG-0001 procedure to operator for markup as necessary.		
		Operator reviews precautions and limitations.	Operator reviews precautions and limitations. **Examiner Cue: If excessive time is taken reviewing precautions and limitations, inform operator that all are satisfied.**		
	5.9	**Bypassing the Regenerative Heat Exchangers**	Operator determines correct beginning step to be 5.9.1		

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: 204000 RWCU System

TASK: 295021AA1.04 Align RWCU for Alternate Decay Heat Removal IAW Section F of HC.OP-AB.RPV-0009

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
	5.9.1	**ENSURE** all prerequisites of Section 2.9 are satisfied.	Operator asks for permission to open the Regen HX Bypass line. **Examiner Cue: OS/CRS permission has been obtained to open the Regen Hx bypass line. Reactor Coolant temperature is less than 200 degrees F.** If Operator asks if Full or Partial Bypass is required, **Cue: Full bypass.**		
	5.9.2	IF bypass of the Regenerative Heat Exchangers is required, THEN **PERFORM** the following:	**Examiner Note:** The following valves are located inside the Regen & Non-Regen HX room, which is a high radiation, contaminated area. Once the operator determines the following valves are inside the RWCU HX Room, provide the operator with room map. Valve 1BG-V233 is visible through the viewing window. **Examiner Cue:** Simulate the following steps from outside the HX Room.		

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: 204000 RWCU System
TASK: 295021AA1.04 Align RWCU for Alternate Decay Heat Removal IAW Section F of HC.OP-AB.RPV-0009

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*	5.9.2.A	**UNLOCK** AND **OPEN** V231, Bypass Valve.	Operator simulates removal of locking device and rotates V231 handwheel in the Counter-Clock-Wise direction until the handwheel stops in the full open position. **Examiner Cue: The valve stated is in the position stated.**		
*	5.9.2.B	**UNLOCK** AND **OPEN** V233, Bypass Valve.	Operator simulates removal of locking device and rotates V233 handwheel in the Counter-Clock-Wise direction until the handwheel stops in the full open position. **Examiner Cue: The valve stated is in the position stated.**		
*	5.9.2.C	**CLOSE** V230, Hx Outlet Valve.	Operator simulates rotating the V230 handwheel in the Clock-Wise direction until the handwheel stops in the full closed position. **Examiner Cue: The valve stated is in the position stated.**		

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: 204000 RWCU System

TASK: 295021AA1.04 Align RWCU for Alternate Decay Heat Removal IAW Section F of HC.OP-AB.RPV-0009

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
	5.9.2.D	**ADJUST** system flowrate (for 2 pump operation) to approx. 300- 320 gpm. (flow rate may change due to the difference in system resistance due to heat exchanger being removed from service. Flow adjustments should be made using HV-F042.)	Operator should request the Control Room to adjust flow IAW 5.9.2.D **Examiner Cue: The Control Room crew will complete this step.**		
		STOP TIME _____	**Examiner Cue: This JPM is complete.**		

INITIAL CONDITIONS:

- The plant is in Operational Condition 4
- Reactor Recirc Pumps are not available
- SDC Common Suction header has isolated
- RWCU is in service in a normal line-up
- Reactor coolant temperature is rising slowly
- RWCU is required for Alternate Decay Heat Removal IAW Condition F of HC.OP-AB.RPV-0009

INITIATING CUE:

Perform the required actions for Condition F of HC.OP-AB.RPV-0009.

MAP # 4506 AREA DESCRIPTION RX 145' EL REGEN HEAT EXCHANGER ROOM

PURPOSE OF SURVEY: [illegible] Valves

RWP / SRWP #: 12 AIR SAMPLE REPORT #: N/A DATE / TIME: [illegible] / 1130

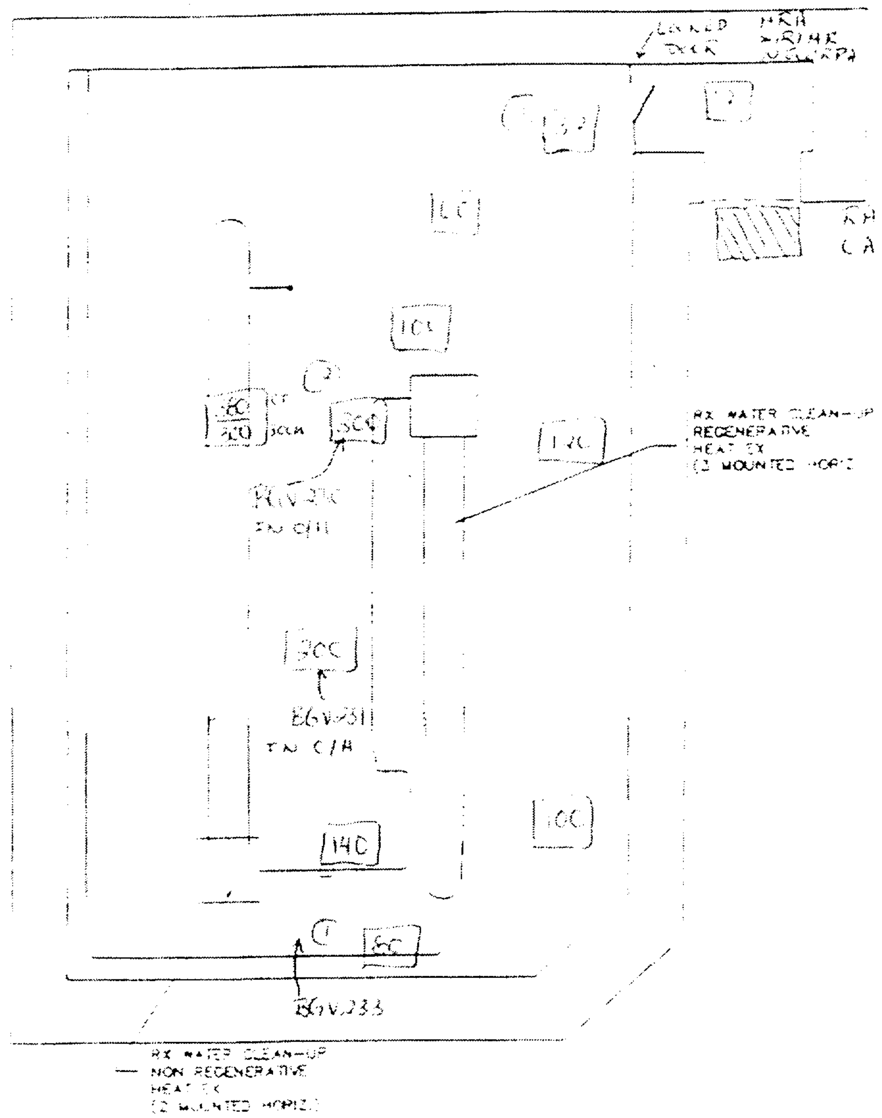
SURVEY INST(S): [illegible] / RM14 / N/A / N/A / N/A / N/A

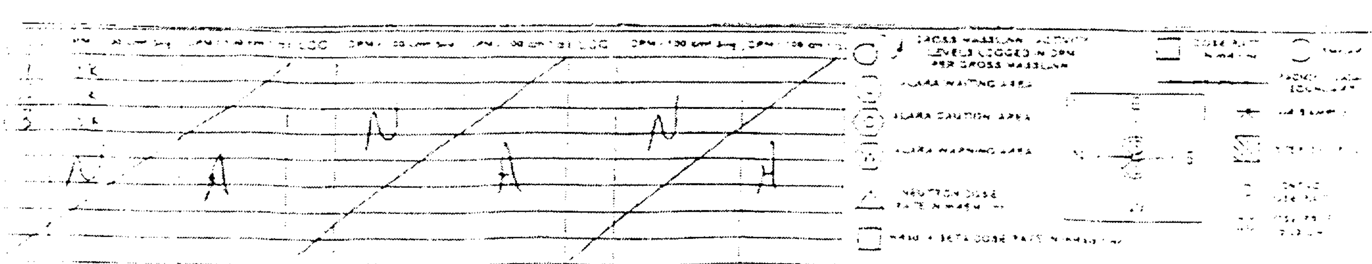
INST ID #: [illegible]

REMARKS:

AIR SAMPLE RESULTS: N/A uCi/cc RX POWER: REC [illegible] % HWC: [illegible]

SURVEYED BY / SIGNATURE: [illegible] / [illegible] SUPERVISOR REVIEW: [illegible]





ALL ACTIVE ON-THE-SPOT CHANGES MUST BE ATTACHED FOR FIELD USE
20030122

PSEG Internal Use Only

PSEG NUCLEAR L.L.C.

HOPE CREEK GENERATING STATION

HC.OP-SO.BG-0001(Q) - Rev. 33

REACTOR WATER CLEANUP SYSTEM OPERATION

USE CATEGORY: II

A. Biennial Review performed Yes ___ No ✓ N/A ___

B. Change Package(s) and Affected Document Number(s) incorporated into this revision.

- CP No. _____ CP Rev. No. ___ AD No. _____ AD Rev. No. ___ or None ✓

C. OTSC(s) incorporated into this revision:

- OTSC No(s) _____ or None ✓

REVISION SUMMARY

1. Based on request made under **Order 80037826 (T/S Amendment 140)** prerequisite 2.8.3, and Notes 5.2.3.I and 5.2.4.F were revised to change reference from T/S 3/4.4.4 to a reference to UFSAR section 5.2.3.2.2.2 (where the T/S direction was moved to). Editorial Change IAW NC.DM-AP.ZZ-0001(Q) allowances.

IMPLEMENTATION REQUIREMENTS Effective date 11/15/02

Implementation of T/S Amendment 140

APPROVED: _____ 11/7/02
Manager - Hope Creek Operations Date

REACTOR WATER CLEANUP SYSTEM OPERATION

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REACTOR WATER CLEANUP SYSTEM OPERATION

1.0 PURPOSE

This procedure outlines the steps necessary for System Fill and Vent, Warm-up, Startup, Shutdown, Blowdown, Hot Standby, and Refueling Operation of the Reactor Water Cleanup (RWCU) System.

2.0 PREREQUISITES

2.1 System Fill and Vent

2.1.1 RWCU System Valves are aligned IAW applicable SAP/WCM operational mode. _____

2.1.2 RWCU Major Component Electrical lineup is complete IAW applicable SAP/WCM operational mode. _____

2.1.3 BB-HV-F023A, Reactor Recirc Pumps Suction Valve, and/or BB-HV-F023B, Reactor Recirc Pumps Suction Valve, are open. _____

2.1.4 Radiation Protection should be contacted prior to performing venting and/or draining in this procedure. The individual(s) performing the venting and/or draining should obtain instructions AND approval from the Radiation Protection Shift Technician OR Radiation Protection Supervisor. _____

2.2 Placing RWCU System in Service

2.2.1 RWCU System is filled AND vented IAW Section 5.1 of this procedure. _____

2.2.2 An idle RWCU Recirc pump shall be warmed up IAW Section 5.3, IF the temperature difference between the pump casing AND Reactor Vessel water is > 150°F AND Reactor water temperature is > 212°F. **[CD-886X]** _____

2.2.3 RWCU System Valves are aligned IAW applicable SAP/WCM operational mode. _____

2.2.4 RWCU Major Component Electrical lineup is complete IAW applicable SAP/WCM operational mode. _____

2.2.5 Chemistry Technician is available
AND at least one RWCU Filter/Demin is ready for service
(IF desired to place Filter/Demin in-service immediately upon placing the system in-service). _____

2.2.6 Reactor Auxiliaries Cooling Water (RACS) is in-service supplying water to the RWCU Heat Exchangers and Pumps. _____

2.2.7 Instrument Air System is in-service supplying air to air operated valves. _____

2.2.8 BB-HV-F023A , Reactor Recirc Pump Suction Valve,
and/or BB-HV-F023B, Reactor Recirc Pump Suction Valve,
are open. _____

2.2.9 AE-HV-F011A, Feedwater Inlet Valve,
and/or AE-HV-F011B, Feedwater Inlet Valve, are open. _____

2.2.10 AE-HV-F074A, Feedwater Outboard Isolation Check Valve,
and/or AE-HV-F074B, Feedwater Outboard Isolation
Check Valve, actuator open. _____

2.2.11 WHEN both RWCU Pumps have been idle,
THEN I&C should be notified to vent the delta flow transmitters
FT-N041A(D), FT-N036A(D),
AND FT-N012A(D). _____

2.3 **Warm-up of RWCU Recirc Pumps**

2.3.1 RWCU System Valves are aligned IAW applicable SAP/WCM operational mode (except for individual RWCU Pump(s). _____

2.3.2 RWCU Major Component Electrical lineup is complete
IAW applicable SAP/WCM operational mode. _____

2.3.3 Condensate Storage and Transfer System is in-service. _____

2.3.4 RWCU Recirc Pump (s) oil level at "oil level" mark
AND oiler cup full. _____

2.3.5 Instrument Air System in-service. _____

2.3.6 BB-HV-F023A, Reactor Recirc Pump Suction Valve,
and/or BB- HV-F023B, Reactor Recirc Pump Suction Valve,
are open. _____

2.3.7 Reactor Auxiliaries Cooling Water (RACS) is in-service to supply cooling water to RWCU Recirc Pumps. _____

2.3.8 NUMAC's 1SKXR-11497 and 1SKXR-11499 RWCU differential flow displays have been checked AND
IF DP "WC/(MA) column Channel "A" does not agree with Channel "D" (should read 3.0 to 4.0 MA with no RWCU flow)
THEN **NOTIFY** I&C to fill and vent Delta flow transmitters. _____

2.4 Blowdown Operation

2.4.1 RWCU System is in-service IAW Section 5.2 of this procedure. _____

2.4.2 At least one of the following systems is in-service:

- Radwaste Equipment Drain (Waste Collection Tanks) _____
- Main Condenser _____

2.5 Hot Standby Operation Without Reactor Recirc Flow - Maximizing Bottom Head Drain Flow

2.5.1 RWCU System is in-service IAW Section 5.2 of this procedure. _____

2.5.2 Reactor is in Hot Standby condition, with both Recirc Pumps out of service. _____

2.6 Blowdown During Refueling Operation

2.6.1 RWCU System is in-service IAW Section 5.2 of this procedure. _____

2.6.2 Reactor is shutdown for refueling. _____

2.6.3 At least one of the following systems is in-service: _____

- Radwaste Equipment Drain (Waste Collector Tanks) _____
- Main Condenser _____

2.7 Reducing Flow through or Bypassing the Filter/Demins

RWCU System is in-service IAW Section 5.2 of this procedure. _____

2.8 **Removing RWCU Pump/System from Service**

2.8.1 RWCU System is in-service IAW Section 5.2 of this procedure. _____

2.8.2 Chemistry Technician is available to remove Filter Demins from service. _____

2.8.3 Chemistry Technician is cognizant of OR has been notified of the following: _____

- Sampling requirements of UFSAR section 5.2.3.2.2.2 (IF applicable) _____
- Required pH analysis once per 72 hours, per UFSAR section 5.2.3.2.2.2, when RWCU is taken out-of-service OR flow to pH analyzer is interrupted. _____

2.9 **Bypassing the Regenerative Heat Exchangers**

OS/CRS permission has been obtained to open the Regen Hx bypass line. _____

2.10 **Placing the Regenerative Heat Exchangers in Service**

None _____

2.11 **Flushing a RWCU Pump prior to Maintenance.**

2.11.1 Radwaste has been notified that pump flushing is to start. _____

2.11.2 RWCU Pump to be flushed has been secured. _____

2.11.3 Rad Protection standing by to survey RWCU Pump. _____

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Precautions

3.1.1 Improper operation of RWCU Pumps can cause cavitation, improper pressurization of idle pumps, and internal thermal shock, which can lead to premature seal failures. **[CD-445D]** _____

3.1.2 Following a trip, it is recommended to start RWCU Pump immediately, if possible, to avoid thermal stresses to piping and associated components. An idle RWCU Recirc Pump shall be warmed up if the temperature difference between pump casing and Reactor Vessel water is > 150°F and Reactor water temperature is > 212°F. **[CD-886X]** _____

3.1.3 To avoid thermal stress to the Feedwater nozzles, the maximum RWCU flow should be maintained when a low flow condition exists. **[CD-786D]** _____

3.1.4 HV-F102, RECIRC LOOP SUCT HDR, should NOT be closed to the point where the RWCU Recirc Pump(s) start to cavitate on low suction pressure. This corresponds to approximately 135 gpm on computer point B2058 REAC BOTTOM HEAD DRAIN (Ambient conditions AND normal RPV level). _____

3.1.5 The rate of RWCU Pump warm-up shall NOT exceed 25°F per minute to prevent pump damage. _____

3.1.6 Loss of a RWCU Pump, when in two pump operation, can cause pump runout. Flow must be reduced immediately by closing HV-F044, FILTER DEMIN BYPASS, (if open) OR throttling HV-F042, REGEN HX RTN ISLN, UNTIL Chemistry can remove a Filter/Demin from service. _____

3.1.7 To prevent a containment isolation of the BG-HV-F001 AND BG-HV- F004 valves while venting RWCU delta transmitters (2.2.11). The following guidance should be taken: _____

A. All the transmitters in one channel should be vented first before venting the transmitters in the other channel. _____

AND

B. The associated breaker should be open for the channel being venting IAW Tech Spec 3.6.3 prior to venting. _____

3.1.8 Chemistry should isolate CAVS System prior to removing RWCU from service
AND when securing the RWCU System for leak isolation. _____

3.1.9 The RWCU System contains potentially radioactive contaminated fluid. _____

3.1.10 A gross failure of a differential pressure transmitter 1SKXR-11497 OR 1SKXR-11499 (10C609, 10C611), does NOT cause an automatic RWCU isolation for the associated inbd/otbd isol vlv (transmitter input > 21 ma OR < 1 ma as sensed by the monitor). In this condition, a RWCU System differential flow between influent AND effluent outside Containment ≥ 56 gpm for 45 seconds (time delay) isolation function will NOT occur if a high flow condition exists. Tech Spec Action Statement 3.3.2, Isolation Actuation Instrumentation, shall be entered. (The same logic is programmed into the monitors for the case of a failed thermocouple unit, i.e.., NO isolation occurs, AND is intended to minimize isolations due to sensor failures). _____

3.1.11 Increasing blowdown flow beyond 215 gpm (CRIDS A2947) will cause the delta flow transmitters FT-N012A(D) differential pressure range to be exceeded (output clamped at a maximum value of 215 gpm, up arrows indicated at the NUMAC). While NO additional increase in blowdown flow will be indicated in gpm, ma indication will increase until a gross failure occurs (reference Precaution 3.1.10), AND feedwater return flow will continue to indicate a decrease. _____

3.1.12 Unless a substitute value of 0.0 is installed for Process Computer point A196 RWCU FLOW (WCU), the Process Computer heat balance will use the last "good" value sensed AND calculate a negative value for power loss in the Cleanup Demineralizer System (QCU), whenever the system is removed from service while at power. _____

3.1.13 Following a RWCU automatic isolation, OR manually isolating sections of the RWCU System for >1 hr, "Cleanup Filter Demin Inlet" sample must be isolated by Chemistry to maintain RWCU System pressure AND unnecessary venting of RWCU Δ flow transmitters. **[PR 970803103]** _____

3.2 **Limitations**

3.2.1 Dumping unfiltered water into the Main Condenser should be avoided unless absolutely necessary as this can introduce water-borne radioactive contaminants into Condensate System. _____

3.2.2 IF the valve OR electrical lineup CANNOT be completed as required, THEN the OS/CRS will determine whether the system should NOT be placed in-service OR standby, as required. _____

3.2.3 During blowdown operations, HV-F034, RWCU Discharge to Main Condenser, AND HV-F035, RWCU Discharge Drain to Waste Collector Tank, should NOT be simultaneously opened
WHEN Condenser is under vacuum. Main Condenser vacuum can be lost through Radwaste piping. _____

3.2.4 Before opening HV-F034, RWCU to the Main Condenser, 1-RC-V005, Three-way Diverting Valve, from Sample Panel 10C251 to the Condenser OR CRW System, (located on the 132' EL in the Reactor Bldg. outside of Room 4402) should be turned 90° manually to the closed position to divert flow to the CRW System. This evolution is performed to reduce the risk of loosing Main Condenser vacuum during sample sink operation. _____

3.2.5 Non-Regenerative HX maximum outlet temperature is limited to 130°F for Hot Standby OR Startup conditions. However, for normal operation the temperature is limited to 120°F. _____

3.2.6 Non-Regenerative Heat Exchanger maximum coolant (RACS) outlet temperature is limited to 180°F for Hot Standby, Startup, OR Blowdown conditions. _____

3.2.7 RWCU Pump Cooling Water (RACS) inlet temperature must NOT exceed 110°F. _____

3.2.8 WHEN in Hot Standby Operation without Recirc Flow - Maximizing Bottom Head Drain Flow,
THEN Cleanup System Outlet Temp must be maintained $\leq$ 434°F to prevent thermal shock to the feedwater nozzles.
[CD-389E] _____

3.2.9 During Normal operation the Filter Demins will both be in-service at approximately 148 to 150 gpm each, except as necessary to Backwash/Precoat the Filter Demins. _____

3.2.10 WHEN it becomes necessary to operate the RWCU System with 1 pump operation,
THEN the system flow should be maintained IAW direction in Section 5.2 for single pump operation. _____

3.2.11 The Regen Heat Exchanger bypass shall only be used during Cold Shutdown, OR Refueling Modes OR Start-up Mode (Condition 2) to maintain temperature < 200°F. During Normal operation, the bypass valves will be locked closed. _____

3.2.12 DO NOT exceed 200 gpm of blowdown flow (CRIDS A2947) unless operating under emergency conditions. (Administrative limit based on conditions described in 3.1.11) _____

3.2.13 Manually operated gate valves 1-AE-V188
AND 1-AE-V189, on the RWCU Return Headers to the A
AND B Feedwater Loops, when closed, allows for continued operation of the RWCU System with return flow to either the A OR B Feedwater Headers isolated. These alignments shall ONLY be used during outages in support of LLRT testing. _____

3.3 **Interlocks**

3.3.1 The RWCU System will be automatically isolated with the closure of HV-F001, Inboard Isolation Valve,
AND HV-F004, Outboard Isolation Valve, under any of the following conditions: _____

A. Reactor water level < -38 inches (Level 2) _____

B. Non-Regenerative Heat Exchanger outlet temperature > 140°F (HV-F004 only) _____

C. Plant Leak Detection System actuation upon RWCU Pipe Chase Room 4402 (>160°F)
OR RWCU Pipe Chase Room 4505 (>135°F)
OR RWCU Pump Rooms
AND Heat Exchangers Rooms (>140°F) _____

D. Standby Liquid Control System actuation: _____

- System A isolates HV-F001 _____
- System B isolates HV-F004 _____

Continued next page

3.3.1 (continued)

E. Nuclear Steam Supply Shutoff System Isolation _____

F. RWCU System differential flow between influent AND effluent outside Containment ≥ 56 gpm for 45 seconds (time delay). _____

G. RRCS Standby Liquid Control actuation:

Channel A or B RRCS Standby Liquid Control actuation isolates both the HV-F001 and HV-F004. _____

3.3.2 The following conditions will trip the RWCU Recirculation Pumps: _____

A. Pump suction flow < 70 gpm (after pump start time delay of 15 minutes). This trip will only occur if the common pump suction flowpath is < 70 gpm. _____

B. HV-F001, Containment Inboard Isolation Valve, AND HV-F004, Containment Inboard Isolation Valve, NOT fully opened (time delayed 11 sec for F/D to go into Hold). _____

3.3.3 HV-F033 valve auto closes on upstream pressure ≤ 5 psig OR downstream pressure ≥ 140 psig. _____

4.0 EQUIPMENT REQUIRED

- Pyrometer - 0 to 600°F or equivalent _____
- Magnetic Thermocouple (Ensure compatibility between probe and box) _____

NOTE 5.0

All operations are performed from Panel 10C651C unless otherwise noted.

5.0 PROCEDURE

5.1 System Fill and Vent

5.1.1 **ENSURE** all prerequisites of Section 2.1 are satisfied. _____

A. IF the system is aligned for service or inservice IAW Section 5.2 THEN **GO TO** Step 5.1.4. _____

B. IF the system is removed from service AND is not isolated IAW Section 5.8, THEN **GO TO** Step 5.1.3. _____

C. IF the system is removed from service and is isolated IAW Section 5.8, THEN **GO TO** Step 5.1.2 _____

5.1.2 **ESTABLISH** a make-up water supply path from the Condensate Storage and Transfer as follows: _____

A. **ENSURE** BG-HV-F001 and BG-HV-F004 are CLOSED. _____

B. **CLOSE** 1-BG-V024(1-BG-V030), A(B) RWCU Recirc Pmp Csg Drn Vlv. _____

C. **OPEN** the following valves: _____

1. 1-BG-V022 (1-BG-V028), A(B) RWCU Recirc Pmp Csg Drn Vlv. _____

2. 1-BG-V023 (1-BG-V029), A(B) RWCU Recirc Pmp Csg Drn Vlv. _____

Continued next page

5.1.2 (continued)

NOTE 5.1.2.D

The fill rate of the Pump Seal Cavity should NOT exceed 2.5 gpm.

D. **THROTTLE OPEN** 1-AP-V142(1-AP-V143), Condensate and Storage Transfer to RWCU Recirc Pmp A(B) Seal Fill Isln Vlv. _____

5.1.3 **ESTABLISH** the vent and fill flow path as follows: _____

A. **OPEN** 1-BG-V004, A RWCU Recirc Pmp Suction Vlv AND 1-BG-V008, B RWCU Recirc Pmp Suction Vlv. _____

B. **OPEN** 1-BG-V200, A RWCU Recirc Pmp Dsch Byp Vlv AND 1-BG-V210, B RWCU Recirc Pmp Dsch Byp Vlv. _____

C. **THROTTLE OPEN** HV-F044, Fltr Demin Byp Vlv as necessary to allow make-up water flow to the down stream piping while venting. _____

NOTE 5.1.4

The action verb VENT is defined as "To open a vent valve until a solid stream of water issues, then return the vent valve to the closed position."

5.1.4 **VENT** using the following valves until a solid stream of water issues as seen at FG-1077(1076), A(B) RWCU Recirc Pump A(B) Vent sight glass (local): _____

A. 1-BG-V026, RWCU Recirc Pmp A Seal Flush Vent Vlv, AND 1-BG-V027, RWCU Recirc Pmp A Seal Flush Vent Vlv _____

B. 1-BG-V073, RWCU Recirc Pmp B Seal Flush Vent Vlv, AND 1-BG-V074, RWCU Recirc Pmp B Seal Flush Vent Vlv _____

5.1.5 **VENT** using the following valves until piping is vented (Local): _____

A. 1-BG-V173, RWCU Pmp Suct Hdr Vent, (RM 4505)
AND 1-BG-V174, RWCU Pmp Suct Hdr Vent, (RM 4504D). _____

B. 1-BG-V032, RHX Tube Side Inlet Hdr Vent, (RM 4508B)
AND 1-BG-V033, RHX Tube Side Inlet Hdr Vent (RM 4506B). _____

C. 1-BG-V037, RHX BE207 Tube Side Vent, (RM 4506B)
AND 1-BG-V038, RHX BE207 Tube Side Vent, (RM 4506B). _____

D. 1-BG-V041, RHX AE207 Tube Side Vent, (RM 4506B)
AND 1-BG-V042, RHX AE207 Tube Side Vent, (RM 4506B). _____

E. 1-BG-V049, Non-RHX AE208 Tube Side Vent, (RM 4506B)
AND 1-BG-V050, Non-RHX AE208 Tube Side
Vent (RM 4506B). _____

F. 1-BG-V054, Non-RHX Outlet Hdr Vent, (RM 4506C)
AND 1-BG-V055, Non-RHX Outlet Hdr Vent, (RM 4506C). _____

G. 1-BG-V057, RHX AE207 Shell Side Vent, (RM 4506C)
AND 1-BG-V058, RHX AE207 Shell Side Vent, (RM 4506C). _____

H. 1-BG-V062, RHX BE207 Shell Side Vent, (RM 4506B)
AND 1-BG-V063, RHX BE207 Shell Side Vent, (RM 4506B). _____

NOTE 5.1.5.I

Additional throttling of HV-F044, Fltr Demin Byp Vlv may be required to ensure adequate make-up water flow to the down stream piping while venting.

I. 1-BG-V066, RHX Shell Side Outlet Hdr Vent, (RM 4506A)
AND 1-BG-V067, RHX Shell Side Outlet Hdr Vent, (RM 4508B). _____

5.1.6 IF opened in Step 5.1.3,
THEN: _____

A. **CLOSE** 1-BG-V004, A RWCU Recirc Pmp Suction Vlv
AND 1-BG-V008, B RWCU Recirc Pmp Suction Vlv. _____

B. **CLOSE** 1-BG-V200, A RWCU Recirc Pmp Dsch Byp Vlv
AND 1-BG-V210, B RWCU Recirc Pmp Dsch Byp Vlv. _____

C. **CLOSE** HV-F044, Fltr Demin Byp Vlv. _____

5.1.7 IF Condensate Storage and Transfer Tank was used to fill in Step 5.1.2,
RESTORE the system as follows: _____

A. **CLOSE** the following valves: _____

1. 1-AP-V142(1-AP-V143), Condensate and Storage Transfer to RWCU Recirc Pmp A(B) Seal Fill Isln Vlv. _____

2. 1-BG-V022(1-BG-V028), A(B) RWCU Recirc Pmp Csg Drn Vlv. _____

3. 1-BG-V023(1-BG-V029), A(B) RWCU Recirc Pmp Csg Drn Vlv. _____

B. **OPEN** 1-BG-V024(1-BG-V030), A(B) RWCU Recirc Pmp Csg Drn Vlv. _____

5.1.8 **OPEN** BG-HV-F001 and BG-HV-F004. _____

NOTE 5.2

A. CRIDS points B2081 and A2856, OR NUMAC Drawers 1SKXR-11497 OR 1SKXR-11499 (10C609, 10C611) may be used to obtain temperature compensated flows.

B. In the event HV-F044, FLTR DEMIN BYPASS, is unavailable or inoperable, the operator may use HV-F104, CLEANUP BYPASS, to throttle open/closed in order to place RWCU Pumps & Demins in-service.

CAUTION 5.2

A. Following a trip, it is recommended to start RWCU Pump immediately, if possible, to avoid thermal stresses to piping AND associated components.

B. To avoid thermal stress to the Feedwater nozzles, the maximum RWCU flow should be maintained when a low flow condition exists. [CD-786D]

5.2 **Placing RWCU System in Service** **[CD-937B]**

5.2.1 **ENSURE** all prerequisites of Section 2.2 are satisfied. _____

NOTE 5.2.2

Reactor Engineering may be contacted as necessary for assistance with the restoration of the Restore to Scan function.

5.2.2 IF the Process Computer heat balance (OD-3d) value for power loss in the Cleanup Demineralizer System (QCU), had a substitute value of 0.0 inserted for Computer Point A196 RWCU FLOW (WCU), when the system was removed from service, THEN **RETURN** Computer Point A196 to AUTOMATIC using Attachment 3 - Computer Point A196 Substitute Value Instructions. _____

5.2.3 IF in two pump operation,
THEN **PERFORM** the following: _____

A. **CLOSE** HV-F044, FLTR DEMIN BYPASS, by pressing the DECREASE push-button until CLOSE lamp is illuminated. _____

CAUTION 5.2.3.B

RWCU Recirc Pumps trip on low flow < 70 gpm (after pump start time delay of 15 minutes). This trip will only occur if the common pump suction flowpath is < 70 gpm.

B. **START** A(B)P221, A(B) RWCU PUMP. _____

C. **THROTTLE OPEN** HV-F044 FLTR DEMIN BYPASS UNTIL Computer point A2856 RWCU OUTLET FLOW indicates approximately 140 to 160 gpm. _____

CAUTION 5.2.3.D

Loss of a RWCU Pump, when in two-pump operation, can cause pump runout. Flow must be reduced immediately by closing HV-F044, FILTER DEMIN BYPASS, (if open) OR throttling HV-F042, REGEN HX RTN ISLN, until Chemistry can remove a Filter/Demin from service.

D. **START** B(A)P221, B(A) RWCU PUMP. _____

E. **THROTTLE OPEN** HV-F044, FLTR DEMIN BYPASS, UNTIL Computer Point A2856 RWCU OUTLET FLOW indicates approximately 300 to 320 gpm. _____

F. WHEN the first Filter/Demin is to be placed in-service,
THEN **CONTACT** Chemistry Department to place A(B) Filter/Demin in-service
AND slowly raise flow. _____

Continued next page

5.2.3 (continued)

G. **MONITOR** Computer Point A2856 RWCU OUTLET FLOW AND **MAINTAIN** flow at or below maximum RWCU return to feedwater flow value determined using Attachment 1 by throttling closed on HV-F044, FLTR DEMIN BYPASS, UNTIL Computer Point B2951 (B2952) FILTER DEMIN A(B) EFL FLOW indicates a maximum of 150 gpm AND has stabilized. **[PR 980515086]** _____

H. WHEN the second Filter/Demin is to be placed in-service, THEN **PERFORM** the following: _____

1. **REQUEST** Chemistry Department to place B(A) Filter/Demin in-service AND slowly raise flow. _____

2. **MONITOR** Computer Point A2856 RWCU OUTLET FLOW AND **MAINTAIN** flow at or below maximum RWCU return to feedwater flow value determined using Attachment 1 by throttling closed on HV-F044 FLTR DEMIN BYPASS until Computer Point B2952 (B2951) FILTER DEMIN B(A) EFL FLOW indicates a maximum of 150 gpm AND has stabilized. **[PR 980515086]** _____

NOTE 5.2.3.I

Compliance with UFSAR section 5.2.3.2.2.2 is required.

I. **MONITOR** the following CLEANUP FILTER DEMINERALIZERS (10C650): _____

1. CR-R601-G33, INLET //CONDUCTIVITY, <1.0 MMHO/cm _____

2. CR-R603(Red), DEMINERALIZER A OUT CONDUCTIVITY, < 0.1 MMHO/.cm _____

3. CR-R603(Blue), DEMINERALIZER B OUT CONDUCTIVITY, < 0.1 MMHO/cm _____

Continued next page

5.2.3 (continued)

J. **MONITOR** the following parameters as required: _____

Table BG-001		
Computer Point Name	**INST #**	**Computer Point**
CLEANUP SYSTEM INLET TEMP	TE-N004	A214
CLEANUP SYSTEM OUTLET TEMP	TE-N015	A215
RWCU REGEN HX OUTLET TEMP	TE-N006	A2945
RWCU N-REGEN HX OUTLET TEMP	TE-N019	A2944
RWCU REAC SUCT FLOW	FT-N036A	B2081
RWCU SYSTEM OUTLET FLOW TO FDW	FT-N041A	A2856

5.2.4 IF in single pump operation,
THEN **PERFORM** the following: _____

A. **CLOSE** HV-F044 FLTR DEMIN BYPASS by pressing the DECREASE push-button until the CLOSE lamp is illuminated. _____

CAUTION 5.2.4.B

RWCU Recirc Pumps trip on low flow <70 gpm (after pump start time delay of 15 minutes).

B. **START** A(B)P221, A(B) RWCU PUMP. _____

C. **THROTTLE OPEN** HV-F044, FLTR DEMIN BYPASS,
UNTIL Computer Point A2856 RWCU OUTLET FLOW indicates approximately 140 to 160 gpm. _____

D. WHEN RWCU OUTLET FLOW is between 140 and 160 gpm,
THEN **REQUEST** Chemistry Department to place either one OR both Filter/Demin in-service
AND slowly raise flow. _____

Continued next page

5.2.4 (continued)

CAUTION 5.2.4.E

During system operation with flow from the Reactor Bottom Head Drain ONLY, System flow should be maintained LESS THAN 135 GPM to preclude pump cavitation.

E. **MONITOR** Computer Point A2856 RWCU OUTLET FLOW AND **MAINTAIN** flow at or below maximum RWCU return to feedwater flow value determined using Attachment 2 by throttling closed on HV-F044 FLTR DEMIN BYPASS UNTIL Computer Point B2951 (B2952) FILTER DEMIN A(B) EFL FLOW indicates a maximum of 150 gpm and has stabilized. _____

NOTE 5.2.4.F

Compliance with UFSAR section 5.2.3.2.2.2 is required.

F. **MONITOR** the following CLEANUP FILTER DEMINERALIZERS (10C650): _____

1. CR-R601-G33, INLET //CONDUCTIVITY, <1.0 MMHO/cm _____

2. CR-R603(Red), DEMINERALIZER A OUT CONDUCTIVITY, < 0.1 MMHO/.cm _____

3. CR-R603(Blue), DEMINERALIZER B OUT CONDUCTIVITY, < 0.1 MMHO/cm _____

Continued next page

5.2.4 continued

G. **MONITOR** the following parameters as required: _____

Table BG-001		
Computer Point Name	**INST #**	**Computer Point**
CLEANUP SYSTEM INLET TEMP	TE-N004	A214
CLEANUP SYSTEM OUTLET TEMP	TE-N015	A215
RWCU REGEN HX OUTLET TEMP	TE-N006	A2945
RWCU N-REGEN HX OUTLET TEMP	TE-N019	A2944
RWCU REAC SUCT FLOW	FT-N036A	B2081
RWCU SYSTEM OUTLET FLOW TO FDW	FT-N041A	A2856

NOTE 5.3

A. An idle RWCU Recirc Pump shall be warmed up IAW this procedure if temperature difference between pump casing and Reactor Vessel water is > 150°F and Reactor water temperature is > 212°F. **[CD-886X]**

B. All operations are performed locally unless noted otherwise.

CAUTION 5.3

The rate of RWCU Pump warm-up shall NOT exceed 25°F per minute to prevent pump damage

5.3 **Warm-up of RWCU Recirc Pumps**
[CD-937B, CD-445D]

5.3.1 **ENSURE** all prerequisites of Section 2.3 are satisfied. _____

5.3.2 IF fill and vent of A(B)P221, RWCU Pump, is necessary, THEN **PERFORM** the following: _____

A. **ENSURE** the following valves are CLOSED: _____

1. 1-BG-V004 (V008), A(B) RWCU Recirc Pmp Suction Vlv _____
2. 1-BG-V006 (V010), A(B) RWCU Recirc Pmp Dsch Vlv _____
3. 1-BG-V200 (V210), A(B) RWCU Recirc Pmp Dsch Byp Vlv _____
4. 1-BG-V024 (V030), RWCU Recirc Pmp A(B) Csg Drn Vlv _____

B. **OPEN** the following valves: _____

1. 1-BG-V022 (V028), A(B) RWCU Recirc Pmp Csg Drn Vlv _____
2. 1-BG-V023 (V029), A(B) RWCU Recirc Pmp Csg Drn Vlv _____

NOTE 5.3.2.C

The fill rate of the Pump Seal Cavity should NOT exceed 2.5 gpm.

C. **THROTTLE OPEN** 1-AP-V142 (V143) Cond Stor & Xfr to RWCU Recirc Pmp A(B) Seal Fill Isln Vlv. _____

Continued next page

5.3.2 (continued)

NOTE 5.3.2.D

The action verb VENT is defined as "To open a vent valve until a solid stream of water issues, then return the vent valve to the closed position."

D. **VENT** using the following valves UNTIL a solid stream of water issues from FG- V1077 (1076) A(B) RWCU Recirc Pmp A(B) Vent sight glass: _____

- 1-BG-V026 (V073), A(B) RWCU Recirc Pmp Seal Flush Vent Vlv _____
- 1-BG-V027 (V074), A(B) RWCU Recirc Pmp Seal Flush Vent Vlv _____

E. **CLOSE** the following valves: _____

1. 1-AP-V142 (V143), Cond Stor and Xfr to A(B) RWCU Recirc Pmp Seal Fill Isln Vlv _____
2. 1-BG-V022 (V028), A(B) RWCU Recirc Pmp Csg Drn Vlv _____
3. 1-BG-V023 (V029), A(B) RWCU Recirc Pmp Csg Drn Vlv _____

F. **OPEN** 1-BG-V024 (V030), RWCU Recirc Pmp A(B) Csg Drn Vlv. _____

5.3.3 **PERFORM** the following to warm-up the first RWCU Pump: **[CD-886X, CD-937B]** _____

A. **ENSURE** 1-BG-V003 (1-BG-V007), A(B) RWCU Recirc Pmp Outbd Suction Vlv, is OPEN. _____

B. Slowly **OPEN** 1-BG-V004 (1-BG-V008), A(B) RWCU Recirc Pmp Suction Vlv. _____

Continued next page

5.3.3 (continued)

C. WHEN fully open,
THEN **LOCK** 1-BG-V004 (1-BG-V008),
A(B) RWCU Recirc Pmp Suction Vlv. _____

D. **ENSURE** the following valves are CLOSED: [PR 970803103] _____

- HV-F042 _____
- HV-F044 _____
- HV-F104 _____

E. IF desired,
THEN **INSTALL** a magnetic thermocouple on RWCU Recirc Pump Casing by placing the magnetic probe on the inlet side of the pump casing approximately midway between the inlet flange and the outlet flange. _____

F. **READ** the initial temperature on RWCU Recirc Pump A(B) casing using a Pyrometer
OR the installed Magnetic thermocouple. _____

NOTE 5.3.3.G

The following steps will slowly heat up the pump casing so as NOT to thermally shock the pump. The intent of the following steps is to allow a gradual heatup without the 15 minute low flow timer initiating. Maximum heatup rate will be attained after cracking open DISCH Bypass Valve then tapers off sharply.

CAUTION 5.3.3.G

RWCU Recirc Pump(s) trip on a low flow < 70 gpm if the common pump suction flowpath is < 70 gpm after pump start time delay of 15 minutes. The time should be marked AND computer point B2081 RWCU REAC SUCT FLOW should be monitored so as to establish adequate flow prior to the 15 minute timer initiation for the first pump going into service.

G. **START** A(B)P221, A(B) RWCU Recirc Pump. _____

Continued next page

5.3.3 (continued)

H. IF RWCU diff flow isolation signals alarm for >10 sec, in the following steps
THEN **THROTTLE** back on HV-F044, HV-F104
OR 1BG-V200 (1-BG-V210). **[PR 970803103]** _____

I. WHEN A(B)P221, A(B) RWCU Recirc Pump, has operated approximately 10 seconds at a shutoff head,
THEN slowly **CRACK OPEN** 1-BG-V200 (1-BG-V210), (~ 0-4 turns) RWCU A(B) DISCH BYPASS VALVE, to pressurize system to F104 and F044. **[PR 970803103]** _____

NOTE 5.3.3.J

When opening HV-F044 use 10 seconds opening time initially, then 1 second intervals.

J. **MONITOR** Comp Point A2950 AND
WHEN pressure equals Rx pressure
OR local pump discharge pressure,
THEN **PERFORM** ONE of the following until system parameters change, indicating system pressurization or flow. **[PR 970803103]** _____

1. Slowly **THROTTLE OPEN** HV-F104 _____

OR

2. Slowly **THROTTLE OPEN** HV-F044
AND HV-F042 _____

K. **THROTTLE OPEN** 1-BG-V200 (1-BG-V210) RWCU "A" (B) DISCH Bypass Valve and/or HV-F044 as necessary to establish a 25°F/min. heat-up rate using pyrometer
OR magnetic thermocouple. **[PR 970803103]** _____

L. Slowly **OPEN** 1-BG-V006 (1-BG-V010), RWCU Pump A(B) Discharge Valve. _____

M. **CLOSE** 1-BG-V200 (1-BG-V210), RWCU Recirc Pump A(B) Dsch Byp Vlv. _____

Continued next page

5.3.3 (continued)

NOTE 5.3.3.N

A. If the HV-F044 is unavailable in the following step, HV-F104 may be opened to provide a flowpath.

B. RWCU outlet flow may be throttled to a reduced value in the following step in support of Startup or Shutdown flow restrictions to prevent flashing in the suction venturi as specified in HC.OP-IO.ZZ-0003(Q), and/or HC.OP-IO.ZZ-0004(Q).

N. **THROTTLE OPEN** HV-F044, FLTR DEMIN BYPASS, UNTIL Computer Point A2856 RWCU OUTLET FLOW indicates ~ 140 to 160 gpm. _____

O. IF desired to place a RWCU F/D in-service, THEN **GO TO** Step 5.2.4.D. _____

5.3.4 **PERFORM** the following to warm-up the second RWCU Pump: **[CD-886X]** _____

A. **ENSURE** 1-BG-V003 (1-BG-V007), A(B) RWCU Recirc Pmp Outbd Suction Vlv, is OPEN. _____

B. **PERFORM** one of the following: _____

1. **READ** the initial temperature on the RWCU Recirc Pump A(B) Casing using a Pyrometer OR by installing a magnetic thermocouple on RWCU Recirc Pump Casing by placing the magnetic probe on the inlet side of the pump casing approximately midway between the inlet flange AND the outlet flange. _____

OR

2. **USE** the following equation to calculate a warm up time based on the use of the bypass valve only with NO monitoring of the pump casing (ALARA): _____

$$\frac{\text{Rx Recirc Loop Temperature} - (100°F + \text{Ambient Rm Temp})}{10°/\text{min}} = \text{Warm up Time}$$

Continued next page

5.3.4 (continued)

CAUTION 5.3.4.C

The RWCU Pump must be running to cool the shaft seal for that portion of the warm-up above 200°F at the pump.

C. Slowly **OPEN** 1-BG-V004 (1-BG-V008), A(B) RWCU Recirc Pmp Suction Vlv. _____

D. WHEN fully open,
THEN **LOCK** 1-BG-V004 (1-BG-V008), A(B) RWCU Recirc Pmp Suction Vlv. _____

E. **START** A(B)P221, A(B) RWCU Recirc Pump. _____

NOTE 5.3.4.F

The following steps will slowly heat up the pump casing so as to NOT thermally shock the pump. Maximum heatup rate will be attained after cracking open DISCH Bypass Valve then tapers off sharply.

F. WHEN A(B)P221, A(B) RWCU Recirc Pump, has run at shutoff head for approximately 10 seconds,
THEN **SLOWLY OPEN** 1-BG-V200 (1-BG-V210), RWCU A(B) Disch Bypass Valve, to establish a heat up rate of less than 25°F per minute. **[PR 970803103]** _____

Continued next page

5.3.4 (continued)

NOTE 5.3.4.G

Minimum pump to RWCU inlet differential temperature should be <100°F to complete warm-up.

G. WHEN casing temperature (as monitored using pyrometer OR thermocouple) is within 100°F of Rx temperature, OR WHEN warm-up time (as calculated in step 5.3.4.B.2) is up, THEN **SLOWLY OPEN** 1-BG-V006 (1-BG-V010), RWCU Pump A(B) Discharge Valve, while monitoring Computer Point A2856 RWCU OUTLET FLOW AND maintaining between 300 to 320 gpm by throttling open on HV-F044, FLTR DEMIN BYPASS. _____

H. **CLOSE** 1-BG-V200 (1-BG-V210), RWCU Recirc Pmp A(B) Dsch Byp Vlv. _____

I. IF a first OR second Filter/Demin is to be placed in-service, THEN **GO TO** Step 5.2.3.F OR 5.2.3.H. _____

NOTE 5.4

CRIDS points B2081 and A2856, OR NUMAC Drawers 1SKXR-11497 OR 1SKXR-11499 (10C609, 10C611) may be used to obtain temperature compensated flows.

CAUTION 5.4

Loss of a RWCU Pump, when in two pump operation, can cause pump runout. Flow must be reduced immediately by closing HV-F044, FILTER DEMIN BYPASS, (if open) OR throttling HV-F042, REGEN HX RTN ISLN, until Chemistry can remove a Filter/Demin from service.

5.4 **Blowdown Operation**

5.4.1 **ENSURE** all prerequisites of Section 2.4 are satisfied. _____

CAUTION 5.4.2

Before opening HV-F034 (RWCU to the Main Condenser), 1-RC- V005, Three Way Diverting Valve, from Sample Panel 10C251 to the Condenser or CRW System, (located on the 132' EL in the Reactor Bldg. outside of Room 4402) should be turned 90° manually to the vertical position to divert flow to the CRW System. This evolution is performed to reduce the risk of loosing Main Condenser vacuum during sample sink operation.

5.4.2 **ENSURE** that 1-RC-V005, Three Way Diverting Valve, is in the VERTICAL position. _____

NOTE 5.4.3

This mode of operation is used to maintain Reactor water level when operating at low power levels due to CRD input AND Reactor coolant expansion during heatup.

CAUTION 5.4.3

A. **Non-Regenerative Hx outlet temperature is limited to < 130°F and must be observed during blowdown due to low Regenerative Hx coolant flow.**

B. **Blowdown valves HV-F034 AND HV-F035 should NOT be simultaneously opened when Condenser is under a vacuum as Main Condenser vacuum can be lost through Radwaste piping.**

C. **HV-F033 valve auto closes on upstream pressure ≤ 5 psig OR on downstream pressure ≥ 140 psig.**

D. **The system trips on RWCU Differential Flow ≥ 56 gpm for 45 seconds (time delay).**

E. **A gross failure of a differential pressure transmitter 1SKXR-11497 OR 1SKXR-11499 (10C609, 10C611), does NOT cause an automatic RWCU isolation for the associated inbd/otbd isol vlv (transmitter input > 21 ma OR < 1 ma as sensed by the monitor). In this condition, a RWCU System differential flow between influent AND effluent outside Containment ≥ 56 gpm for 45 seconds (time delay) isolation function will NOT occur if a high flow condition exists. Tech Spec Action Statement 3.3.2, Isolation Actuation Instrumentation, shall be entered. (The same logic is programmed into the monitors for the case of a failed thermocouple unit, i.e.., NO isolation occurs, AND is intended to minimize isolations due to sensor failures).**

5.4.3 **PERFORM** the following to establish a flow path for blowdown: _____

A. IF blowdown to Main Condenser is required,
THEN **OPEN** HV-F034, RWCU RTN TO CNDSR. _____

B. IF blowdown into Waste Collector Tanks is required,
THEN **OPEN** HV-F035, RWCU TO EQPT DRN. _____

5.4.4 **OPEN** HV-F033, HIC-R606 DRAIN FLOW CONTROL, by pressing INCREASE push-button until Computer Point A2947 RWCU DISCH to COND AND EQUIP DRAIN FLOW indicates desired flow. _____

5.4.5 **CHECK** that RWCU DIFFERENTIAL FLOW at 1SKXR-11499 AND 1SKXR-11497 indicates < 56 gpm (10C611, 10C609). _____

5.4.6 **MONITOR** A2944, RWCU N-REGEN HX OUTLET TEMP, for < 130°F. _____

5.4.7 IF increased blowdown rate is desired, THEN **PRESS** the INCREASE push-button for HV-F031, DRN FL ORF BYPASS. _____

5.4.8 IF NRHX outlet temperature approaches 130°F, THEN **THROTTLE** closed on HV-F033 HIC-R606 DRAIN FLOW CONTROL to reduce flow rate. (This drop in flow will lower NRHX outlet temperatures.) _____

5.4.9 WHEN blowdown operation is complete, THEN **CLOSE** the HV-F031, DRN FL ORF BYPASS. _____

5.4.10 **CLOSE** HV-F033, HIC-R606 DRAIN FLOW CONTROL VALVE. _____

5.4.11 **CLOSE** HV-F034, RWCU RTN TO CNDSR, OR HV-F035, RWCU TO EQPT DRN. _____

5.4.12 IF flow to the Main Condenser is required, THEN **RETURN** 1-RC-V005, Three Way Diverting Valve, to the horizontal position. _____

NOTE 5.5

CRIDS points B2081 and A2856,
OR NUMAC Drawers 1SKXR-11497 OR 1SKXR-11499 (10C609, 10C611)
may be used to obtain temperature compensated flows.

CAUTION 5.5

Loss of a RWCU Pump, when in two pump operation, can cause pump runout. Flow must be reduced immediately by closing HV-F044, FILTER DEMIN BYPASS, (If open) OR throttling HV-F042, REGEN HX RTN ISLN, or throttling HV-F104, CLEANUP BYPASS.

5.5 **Hot Standby Operation Without Reactor Recirc Flow - Maximizing Bottom Head Drain Flow**

5.5.1 **ENSURE** all prerequisites of Section 2.5 are satisfied. _____

5.5.2 **REMOVE** both Filter Demins from service IAW Section 5.7 of this procedure. _____

NOTE 5.5.3

A. HV-F102, RECIRC LOOP SUCT HDR, valve is throttled to maintain uniform Reactor Vessel temperature during Hot Standby.

B. Steps 5.5.3 AND 5.5.4 should be performed concurrently.

5.5.3 **PERFORM** the following to establish RWCU recirculation flow, bypassing Regenerative and Non-Regenerative HXs: _____

A. **ENSURE** HV-F101, SUCT FROM RPV BOT DRN, is open. _____

Continued next page

5.5.3 (continued)

CAUTION 5.5.3.B

HV-F102, RECIRC LOOP SUCT HDR VALVE, should NOT be closed to the point where the RWCU Recirc Pump(s) start to cavitate on low suction pressure. This corresponds to approximately 135 gpm on computer point B2058 REAC BOTTOM HEAD DRAIN (ambient conditions AND normal RPV level).

B. **THROTTLE CLOSED** HV-F102, RECIRC LOOP SUCT HDR, until Computer Point B2058 REAC BOTTOM HEAD DRAIN flow increases to between 115 and 125 gpm. _____

CAUTION 5.5.4

CLEANUP SYSTEM OUTLET TEMP must be maintained ≤ 434°F to prevent thermal shock to the feedwater nozzles. [CD-389E]

5.5.4 **PERFORM** the following to establish RWCU recirculation flow, bypassing Regenerative and Non-Regenerative HXs: _____

A. **THROTTLE CLOSE** HV-F042 REGEN HX RTN ISLN by pressing the DECREASE push-button until RWCU OUTLET FLOW (Computer Point A2856) is approximately 250 gpm. _____

B. **THROTTLE OPEN** HV-F104 CLEANUP BYPASS by pressing the INCREASE push-button until RWCU OUTLET FLOW (Computer Point A2856) is approximately 300 gpm. _____

C. **ADJUST** the positions of HV-F042 AND HV-F104, such that RWCU OUTLET FLOW (Computer Point A2856)is approximately 300 to 320 gpm AND CLEANUP SYSTEM OTLT TEMP (Computer Point A215) is ≤434°F. **[CD-389E]** _____

Continued next page

5.5.4 (continued)

D. WHEN CLEANUP SYSTEM OTLT TEMP (Computer Point A215) can be maintained ≤ 434°F
WITH HV-F042 fully closed,
THEN **PERFORM** the following: _____

1. **CLOSE** HV-F042, REGEN HX RTN ISLN. _____

AND

2. **THROTTLE** HV-F104, CLEANUP BYPASS, until RWCU OUTLET FLOW (Computer Point A2856) is approximately 300 to 320 gpm. _____

NOTE 5.6

CRIDS points B2081 and A2856,
OR NUMAC Drawers 1SKXR-11497 OR 1SKXR-11499 (10C609, 10C611)
may be used to obtain temperature compensated flows.

CAUTION 5.6

Loss of a RWCU Pump, when in two pump operation, can cause pump runout. Flow must be reduced immediately by closing HV-F044, FILTER DEMIN BYPASS, (if open) OR throttling HV-F042, REGEN HX RTN ISLN, until Chemistry can remove a Filter/Demin from service.

5.6 **Blowdown During Refueling Operation**

5.6.1 **ENSURE** all prerequisites of Section 2.6 are satisfied. _____

5.6.2 **ENSURE** that 1-RC-V005, Three Way Diverting Valve, is in the VERTICAL position. _____

5.6.3 IF blowdown required during Refueling,
THEN **PERFORM** the following: _____

CAUTION 5.6.3.A & B

HV-F033, DRAIN FLOW CONTROL, valve auto closes on upstream pressure ≤ 5 psig OR on downstream pressure ≥ 140 psig.

A. IF desired
AND the Main Condenser is available,
THEN **OPEN** HV-F034, RWCU RTN TO CNDSR. _____

B. IF the Main Condenser is NOT available,
THEN, AFTER notifying Radwaste of pending input,
OPEN HV-F035, RWCU TO EQPT DRN. _____

C. **OPEN** HV-F031, DRN FL ORF BYPASS. _____

D. **THROTTLE CLOSED** HV-F042, REGEN HX RTN ISLN,
by pressing the DECREASE push-button
AND **THROTTLE OPEN** HV-F033, HIC R606 DR FL COND,
by pressing INCREASE push-button until Computer Point A2947
RWCU DISCH to COND
AND EQUIP DRAIN FLOW indicates desired flow. _____

5.6.4 WHEN blowdown operation is complete,
THEN **THROTTLE OPEN** HV-F042, REGEN HX RTN ISLN,
AND **THROTTLE CLOSED** HV-F033, HIC R606 DR FL COND. _____

5.6.5 **ENSURE** the following valves are closed: _____

- HV-F034, RWCU RTN TO CNDSR _____
- HV-F035, RWCU TO EQPT DRN _____
- HV-F031, DRN FL ORF BYPASS _____

NOTE 5.6.6

If 1-RC-V005, Three Way Diverting Valve, is to be left in the vertical position, then SAP/WCM should be updated to show the valve in an "off-normal" OR "tagged for CRS" position.

5.6.6 IF NO additional blowdowns are anticipated,
THEN **RETURN** 1-RC-V005, Three Way Diverting Valve,
to the horizontal position, for flow to Main Condenser. _____

CAUTION 5.7

Loss of a RWCU Pump, when in two pump operation, can cause pump runout. Flow must be reduced immediately by closing HV-F044, FILTER DEMIN BYPASS, (if open) OR throttling HV-F042 REGEN HX RTN ISLN until Chemistry can remove a Filter/Demin from service OR the flow is reduced through the two I/S Demineralizers.

5.7 **Reducing Flow through or Bypassing the Filter/Demins**

5.7.1 **ENSURE** all prerequisites of Section 2.7 are satisfied.
[CD-937B, CD-445D] _____

5.7.2 IF it is desired to reduce flow through the RWCU Demineralizers,
THEN **PERFORM** one or both of the following: _____

NOTE 5.7.3 and 5.7.4

In the event HV-F044, FLTR DEMIN BYPASS, is unavailable or inoperable, the operator may use HV-F104, CLEANUP BYPASS, AND Computer Point A2081 to throttle open/closed in order to bypass OR restore flow to Filter/Demins.

A. **THROTTLE** BG-HV-F042, REGEN HX RTN ISLN,
until system flow is limited to the desired value. _____

B. **DIRECT** Chemistry to reduce flow through the in service
Demineralizer(s) until flow is limited to the desired value. _____

5.7.3 WHEN flow is no longer required to be limited
THEN **THROTTLE** BG-HV-F042, REGEN HX RTN ISLN
to restore desired system flow and/or
DIRECT Chemistry to return the Demineralizer(s) flow controllers
to their normal settings. _____

5.7.4 IF it is desired to remove a RWCU Filter/Demineralizer from service
THEN **PERFORM** the following: _____

A. **DIRECT** Chemistry to slowly reduce flow on the affected Filter/Demineralizer
AND remove it from service. _____

B. **MONITOR** Computer Point A2856 (or equivalent)
AND **THROTTLE OPEN** on HV-F044 as necessary to maintain flow at or below maximum RWCU return to feedwater flow value determined using Attachment 1 for 2 pump operation
OR Attachment 2 for 1 pump operation. _____

5.7.5 WHEN it is desired to restore flow through a RWCU Filter/Demineralizer
THEN **PERFORM** the following: _____

A. **DIRECT** Chemistry to place the Filter/Demineralizer in service
AND **SLOWLY RAISE** flow. _____

B. **MONITOR** Computer Point A2856 (or equivalent)
AND **THROTTLE CLOSED** on HV-F044 as necessary to maintain flow at or below maximum RWCU return to feedwater flow value determined using Attachment 1 for 2 pump operation
OR Attachment 2 for 1 pump operation. _____

5.8 **Removing RWCU Pump/System from Service [CD-937B]**

5.8.1 **ENSURE** all prerequisites of Section 2.8 are satisfied. _____

5.8.2 **REQUEST** Chemistry isolate the CAVS System prior to removing RWCU System from service. _____

NOTE 5.8.3

System flow should be maintained as indicated by Computer Point A2856 ± 20 gpm.

5.8.3 IF 2 RWCU Filter Demins (F/D) are in-service,
THEN **REQUEST** Chemistry to remove 1 F/D from service
OR reduce flow to maintain both Demins in-service
AND flow between 140 - 160 gpm. _____

5.8.4 **THROTTLE** closed HV-F044, FLTR DEMIN BYPASS, push-button until Computer Point A2856 indicates approximately 140 to 160 gpm. _____

5.8.5 IF both RWCU Pumps are running,
THEN **STOP** A(B)P221, A(B) RWCU PUMP.**[CD-937B]** _____

5.8.6 IF Reactor Vessel water temperature is > 212°F
AND the pump is to be out-of-service for more than approximately 15 min,
THEN **PERFORM** the following to isolate the pump:**[CD-937B]** _____

A. **CLOSE** 1-BG-V006 (1-BG-V010), A(B) RWCU Recirc Pmp Dsch Vlv. _____

B. **ENSURE** 1-BG-V200 (1-BG-V210), A(B) RWCU Recirc Pmp Dsch Byp Vlv is closed. _____

C. **CLOSE** 1-BG-V004 (1-BG-V008), A(B) RWCU Recirc Pmp Suction Vlv. _____

NOTE 5.8.7

A. If only one RWCU Pump and F/D are to be removed from service, then the remaining steps are NOT required.

B. System flow should be maintained as indicated by Computer Point A2856 +/- 20 gpm to prevent pump trip on low flow.

5.8.7 IF a second RWCU Pump is to be removed from service,
THEN **DIRECT** Chemistry Department to perform the following: _____

A. **REMOVE** the remaining F/D from service. _____

B. **ISOLATE** the following**[PR 970803103]**: _____

- CLEAN UP DEMIN FILTER INLET. _____
- CLEAN UP FILTER DEMIN. 'A' DISCH _____
- CLEAN UP FILTER DEMIN. 'B' DISCH _____

5.8.8 **STOP** B(A)P221, B(A) RWCU PUMP. **[CD-937B]** _____

5.8.9 IF Reactor Vessel water temperature is > 212°F
AND the pump is to be out-of-service for more than approximately 15 min,
THEN **PERFORM** the following to isolate the pump: **[CD-937B]** _____

A. **CLOSE** 1-BG-V010 (1-BG-V006), B(A) RWCU Recirc Pmp Dsch Vlv. _____

B. **ENSURE** 1-BG-V210 (1-BG-V200), B(A) RWCU Recirc Pmp Dsch Byp Vlv is closed. _____

C. **CLOSE** 1-BG-V008 (1-BG-V004), B(A) RWCU Recirc Pmp Suction Vlv. _____

5.8.10 **CLOSE** HV-F044, FLTR DEMIN BYPASS. _____

NOTE 5.8.11

The following step need only be completed if RWCU System must be isolated.

5.8.11 IF RWCU System must be isolated,
THEN **CLOSE** the following valves: _____

A. HV-F001, PMP SUCT CONT INBD ISOLATION VALVE _____

B. HV-F004, PUMP SUCT CONT OUTBD ISOLATION VALVE _____

C. HV-F039, RWCU RTN TO RPV ISOLATION VALVE _____

NOTE 5.8.12

If a negative value for power loss is observed in Step 5.8.12, then a substitute value of 0.0 for Computer Point A196 RWCU FLOW (WCU) (Insert Value Function) will correct the heat balance discrepancy.

5.8.12 **OBSERVE** the Process Computer heat balance (OD-3d) value for power loss in the Cleanup Demineralizer System (QCU)
AND, as necessary,
PLACE Computer Point A196 in MANUAL with a substitute value of 0.0 using Attachment 3 - Computer Point A196 Substitute Value Instructions, to correct the heat balance discrepancy. _____

NOTE 5.9

The Regenerative Heat Exchangers can only be bypassed in CONDITION 4, OR 5, OR Condition 2 when maintaining temperature < 200°F.

5.9 **Bypassing the Regenerative Heat Exchangers**

5.9.1 **ENSURE** all prerequisites of Section 2.9 are satisfied. _____

5.9.2 IF bypass of the Regenerative Heat Exchangers is required, THEN **PERFORM** the following: _____

A. **UNLOCK AND OPEN** V231, Bypass Valve. _____

NOTE 5.9.1.B

System flow may have to be adjusted as V233 is opened.

B. **UNLOCK AND OPEN** V233, Bypass Valve. _____

C. **CLOSE** V230, Hx Outlet Valve. _____

D. **ADJUST** system flowrate (for 2 pump operation) to approx. 300- 320 gpm. (flow rate may change due to the difference in system resistance due to heat exchanger being removed from service. Flow adjustments should be made using HV-F042.) _____

Continued next page

5.9 (continued)

5.9.3 IF partially bypass of the Regenerative Heat Exchangers is required, THEN **PERFORM** the following: _____

A. **UNLOCK** AND **OPEN** V233, Bypass Valve. _____

NOTE 5.9.3.B

System flow may have to be adjusted as V231, Bypass Valve, is opened.

B. **UNLOCK** AND **THROTTLE OPEN** V231, Bypass Valve, as necessary to maintain desired RWCU temperature. _____

C. **ADJUST** system flowrate (for 2 pmp operation) to approx. 300 to 320 gpm. (flow rate may change due to difference in system resistance due to Heat Exchanger being bypassed. Flow adjustments should be made using HV-F042). _____

Continued next page

5.9 (continued)

NOTE 5.9.4

The following step is intended to be used during the performance HC.OP-IS.ZZ-0001(Q), Inservice System Leakage Test of the Reactor Coolant Pressure Boundary, as a temperature control method.

5.9.4 To control RWCU system outlet temperature,
USE any combination of the following: _____

- **THROTTLE** BG-HV-F104, CLEANUP BYPASS -

  OPEN to raise RWCU System outlet temperature (CRIDS A215)
  OR
  CLOSED to lower RWCU System outlet temperature. _____

- **THROTTLE** BG-HV-F042, HX RETURN TO VESSEL,
  as necessary, to maintain RWCU OUTLET FLOW (CRIDS A2856)
  between 300 - 320 gpm. _____

- **THROTTLE** 1-ED-V035 RWCU NRHx RACS RTN VLV -

  OPEN to lower RWCU System outlet temperature (CRIDS A215)
  OR
  CLOSED to raise RWCU System outlet temperature

5.9.5 WHEN RWCU system outlet temperature control is no longer required
THEN **PERFORM** the following: _____

A. **CLOSE** BG-HV-F104, CLEANUP BYPASS _____

B. **OPEN** BG-HV-F042, Hx Return to Vessel. _____

C. **THROTTLE** 1-ED-V035 RWCU NRHx RACS RTN VLV
to 43 degrees OPEN
(IAW SAP WCM Blocking Point Information Page) _____

5.9.6 **PERFORM** the following to secure bypassing the Regenerative Heat Exchangers: _____

A. IF Regenerative Heat Exchanger was drained, THEN **VERIFY** Heat Exchanger is filled and vented. _____

B. **ENSURE** V232, Hx Inlet Valve, open. _____

C. **OPEN** V230, Hx Outlet Valve. _____

D. **CLOSE AND LOCK** V231, Bypass Valve. _____

E. **CLOSE AND LOCK** V233, Bypass Valve. _____

F. **ADJUST** system flowrate as required (flow rate may change due to the difference in system resistance due to securing bypassing the heat exchanger). _____

5.10 Placing the Regenerative Heat Exchangers in Service

CAUTION 5.10.1

Fill and vent Heat Exchangers slowly to avoid a RWCU Isolation.

5.10.1 IF the Regenerative Heat Exchanger is to be placed in-service, THEN **PERFORM** the following: _____

A. **PERFORM** the following to ensure Heat Exchangers are filled and vented: _____

1. **THROTTLE OPEN** BG-HV-F104 to maintain flow through the RWCU Pumps while closing BG-HV-F042, Hx Return to Vessel. _____

2. **CLOSE** BG-HV-F042, Hx Return to Vessel. _____

3. **OPEN** V230, Hx Outlet Valve. _____

4. **CLOSE**
AND **LOCK** V231, Hx Bypass Valve,
AND V233, Hx Bypass Valve. _____

5. **OPEN** V232, Hx Inlet Valve. _____

6. **VENT** using V066, Hx High Point Vent Valve,
AND V067, Hx High Point Vent Valve. _____

B. **OPEN** BG-HV-F042, HX Return To Vessel. _____

C. **CLOSE** BG-HV-F104. _____

D. **ADJUST** system flow to approximately 300 gpm. _____

NOTE 5.11

A. The following steps can be used to flush a RWCU Pump prior to maintenance for the purpose of reducing Rad Levels. Rad Pro should be contacted to survey the pump after a 20 minute flush OR as otherwise directed by the OS/CRS.

B. If the desired Rad levels are NOT achieved, then the following steps should be repeated until a sufficient dose reduction is achieved

5.11 **Flushing a RWCU Pump prior to Maintenance**

5.11.1 **ENSURE** all prerequisites of Section 2.11 are satisfied. _____

CAUTION 5.11.2

RWCU Pump cooldown should be limited to 25°F/min.

5.11.2 IF flush of A RWCU Pump is required,
THEN **PERFORM** the following:

A. **CLOSE** 1-BG-V006, A RWCU Recirc Pmp Dsch Vlv. _____

B. **CLOSE** 1-BG-V200, A RWCU Recirc Pmp Dsch Byp Vlv. _____

C. **CLOSE** 1-BG-V004, A RWCU Recirc Pmp Suction Vlv. _____

D. **OPEN** 1-BG-V026, Seal Flush Vent,
AND 1-BG-V027, Seal Flush Vent. _____

E. **OPEN** 1-BG-V194, Discharge Line Drain,
AND 1-BG-V195, Discharge Line Drain. _____

F. **CLOSE** 1-BG-V024, Casing Drain Isolation Valve. _____

G. **OPEN** 1-BG-V022, Casing Drain Vlv,
AND 1-BG-V023, Casing Drain Vlv. _____

Continued next page

5.11.2 (continued)

H. **OPEN** 1-AP-V142, Condensate Transfer Isolation Valve. _____

I. WHEN the pump has flushed for approximately 20 minutes, THEN **CLOSE** 1-AP-V142, Condensate Transfer Isolation Valve. _____

J. **NOTIFY** Radiation Protection to survey the RWCU Pump as necessary. _____

K. IF the desired rad levels have NOT been achieved, THEN **REPEAT** Steps 5.11.2 H through 5.11.2.J as necessary until desired rad levels are achieved. _____

5.11.3 WHEN flushing is complete, THEN **PERFORM** the following: _____

A. **CLOSE** 1-AP-V142, Condensate Transfer Isolation Valve. _____

B. **CLOSE** 1-BG-V022, Casing Drain Vlv, AND 1-BG-V023 Casing Drain Vlv. _____

C. **OPEN** 1-BG-V024, Casing Drain Isolation Valve. _____

D. **CLOSE** 1-BG-V194, Discharge Line Drain, AND 1-BG-V195, Discharge Line Drain. _____

E. **CLOSE** 1-BG-V026, Seal Flush Vent, AND 1-BG-V027, Seal Flush Vent. _____

5.11.4 IF flush of the B RWCU Pump is required, THEN **PERFORM** the following: _____

A. **CLOSE** 1-BG-V010, B RWCU Recirc Pmp Dsch Vlv. _____

B. **CLOSE** 1-BG-V210, B RWCU Recirc Pmp Dsch Byp Vlv. _____

Continued next page

5.11.4 (continued)

C. **CLOSE** 1-BG-V008, B RWCU Recirc Pmp Suction Vlv. _____

D. **OPEN** 1-BG-V073, Seal Flush Vent,
AND 1-BG-V074 Seal Flush Vent. _____

E. **CLOSE** 1-BG-V030, Casing Drain Isolation Valve. _____

F. **OPEN** 1-BG-V028, Casing Drain Vlv,
AND 1-BG-V029, Casing Drain Vlv. _____

G. **OPEN** 1-AP-V143, Condensate Transfer Isolation Valve. _____

H. WHEN the pump has flushed for approximately 20 minutes,
THEN **CLOSE** 1-AP-V143, Condensate Transfer Isolation Valve. _____

I. **NOTIFY** Radiation Protection to survey the RWCU Pump. _____

J. IF the desired rad levels have NOT been achieved,
THEN **REPEAT** Steps 5.11.4. G through 5.11.4.I
as necessary until desired rad levels are achieved. _____

5.11.5 WHEN flushing is complete,
THEN **PERFORM** the following: _____

A. **CLOSE** 1-AP-V143, Condensate Transfer Isolation Valve. _____

B. **CLOSE** 1-BG-V028, Casing Drain Vlv,
AND 1-BG-V029, Casing Drain Vlv. _____

C. **OPEN** 1-BG-V030, Casing Drain Isolation Valve. _____

D. **CLOSE** 1-BG-V073, Seal Flush Vent,
AND 1-BG-V074 Seal Flush Vent. _____

6.0 REFERENCES

6.1 P&ID's

M-25-1
M-44-1
M-45-1
M-43-1, Sht. 1
M-101

6.2 Logic Diagrams

J-44-0 Sht. 1, 2, 3, 4, 5, 6, 7, 8

6.3 Electrical Drawings

E-0021-1 Sht. 1, 5
E-0031-1
E- 0032-1

6.4 Vendor Manuals

NI-G33-386 & 387 Ecodyne Corporation - RWCU F/D
NI-G33-429-2 Union Pump Co. - RWCU Recirc Pumps
N1-A41-0045 (1) RWCU System

6.5 Panel Drawings

J-0650-1 Sht. 9
J-0651-1 Sht. 6

6.6 DITS

D3.31
D5.14

6.7 GE Documents

GEK 90300 Volume VI, Part 1
23A1860, RWCU Pump Instructions
G.E. Drawing 166B8227

6.8 **Commitment Documents**

CD-886X	(Q210.24)
CD-937B	(AID 25-80)
CD-786D	(AID 48-78)
CD-445D	(SIL 258 SUPP 2)
CD-389E	(SIL 436)

6.9 **Other**

DEF # DEH-92-00081

6.10 **Cross References**

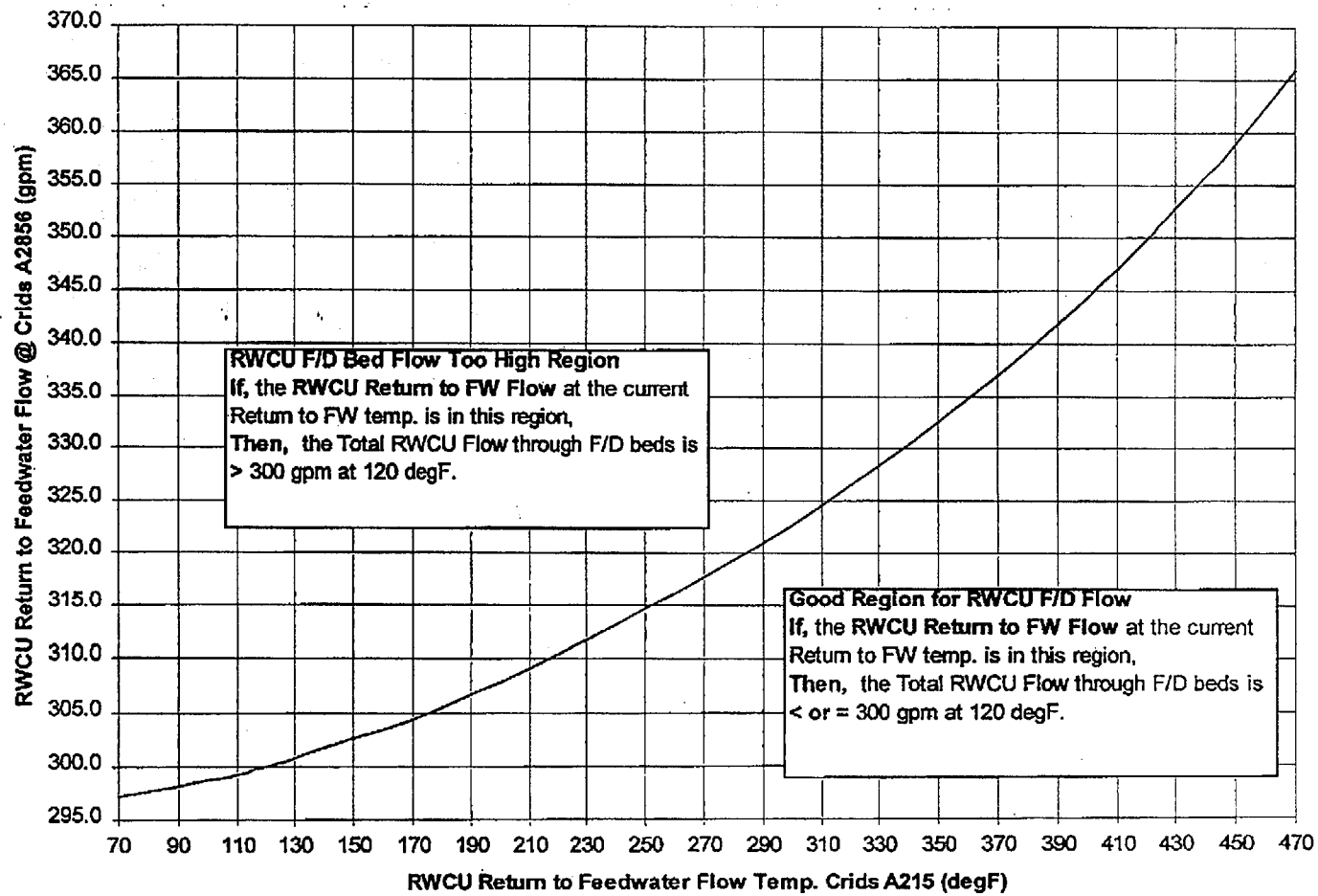
HC.RE-SO.RJ-0010(Q), Process Computer Program Operating Instructions

6.11 **Corrective Actions**

PR 970803103
PR 980515086
PR 980709244
CR971127121 RWCU Differential Flow setpoint
20004666
TS990418149
20018965
80007129 DCP 4EC-3192

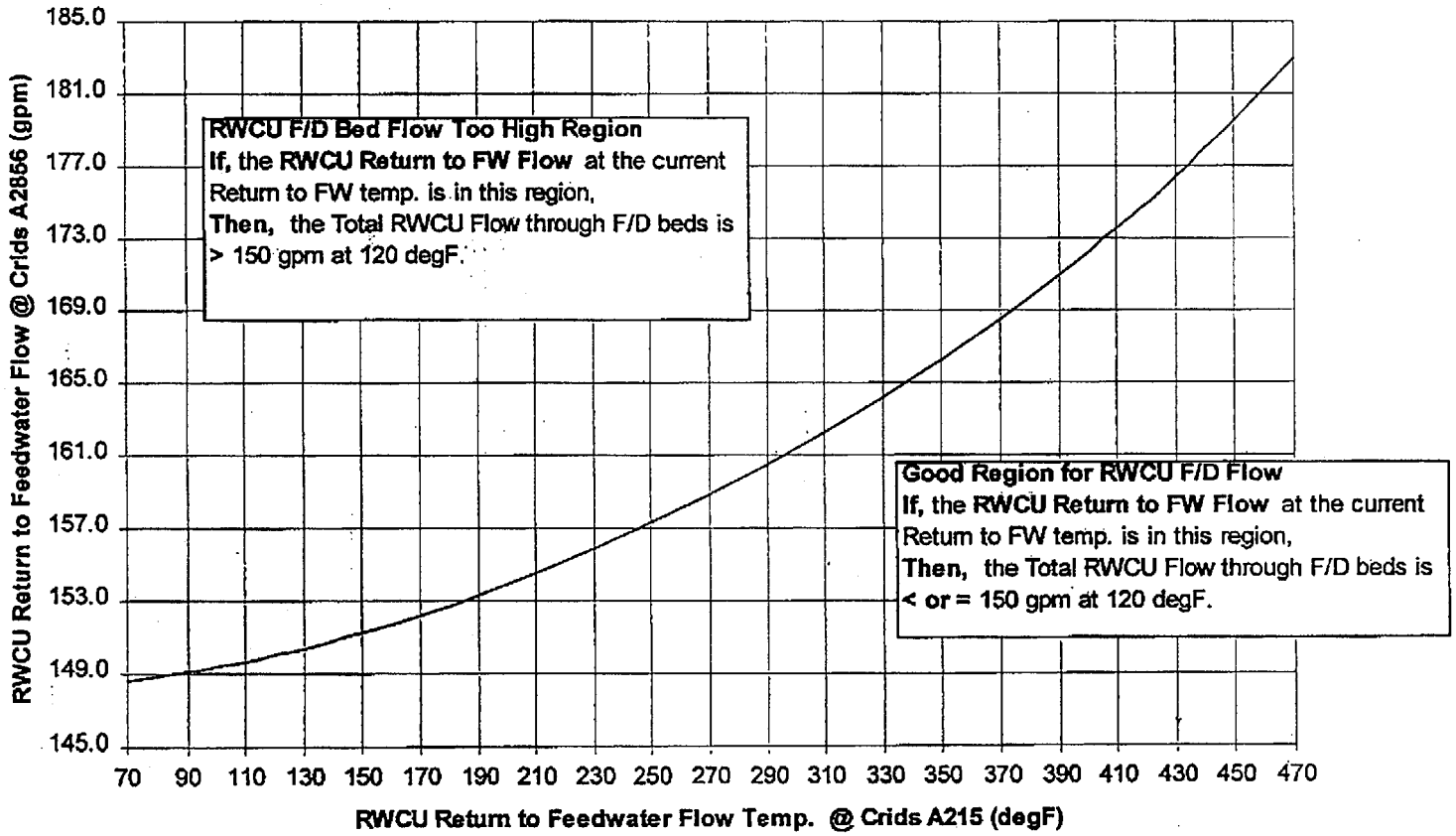
ATTACHMENT 1
MAXIMUM RWCU RETURN TO FEEDWATER FLOW - 2 PUMP OPERATION

Maximum RWCU Return to Feed Water Flow equivalent to Total RWCU F/D Bed Flow of 300 gpm @ 120°F with 2 pumps running



ATTACHMENT 2
MAXIMUM RWCU RETURN TO FEEDWATER FLOW - 1 PUMP OPERATION

Maximum RWCU Return to Feed Water Flow equivalent to Total RWCU F/D Bed Flow of 150 gpm @ 120°F with one pump running



ATTACHMENT 3
COMPUTER POINT A196 SUBSTITUTE VALUE INSTRUCTIONS
(Page 1 of 2)

NOTE

A196 (Cleanup System Flow) is placed in MANUAL with a value of "0.0" when taking RWCU out of service.

A196 (Cleanup System Flow) is placed in AUTOMATIC when returning RWCU to service.

AUTOMATIC	The value of the computer point is updated based on field inputs and/or computer algorithims.
MANUAL	The value of the computer point is frozen at the current value unless a different value is manually entered.

1.0 To swap computer point A196 between a) AUTOMATIC and b) MANUAL (with a value of 0.0) **PERFORM** the following: _____

1.1 **SELECT** "SYS" on top menu bar. _____

1.2 **SELECT** "Change_Env" on pull down menu. _____

1.3 **SELECT** "Maint_Env" on second pull down menu. _____

1.4 **ENTER** password "HCNSSS" using keypad
THEN **PRESS** "ENTER" key. _____

1.5 **SELECT** "SELECT" on top menu bar. _____

1.6 **ENSURE** that an "*"is in the "CP NAMES SEARCH" blue box. _____

1.7 **SELECT** "AINMISC" on left of screen.
(It may be necessary to repeat Steps 1.5 and 1.6 to have the list of choices displayed.)_____

1.8 **SELECT** "A196" on right of screen. _____

1.9 **VERIFY** the expected "A" or "M" appears next to "MEAS" on right of screen.
("A" = AUTOMATIC, "M" = MANUAL)
IF already is desired state
THEN **PROCEED** to step 1.13. _____

Continued Next Page

Effective Date 4/8/02

APPROVED: _____ 040402
Manager - Hope Creek Operations **Date**

CATEGORY II

SHUTDOWN COOLING

ALARMS

• RHR LOGIC A OUT OF SERVICE	**A6 – A1**
• RHR LOGIC B OUT OF SERVICE	**A7 – A1**
• RHR LOOP A TROUBLE	**A6 – B1**
• RHR LOOP B TROUBLE	**A7 – B1**
• RHR HX CLG WTR OUTLET TEMP HI	**A6 – D5**
• COMPUTER PT IN ALARM	**A4 – F5**
• APRM/RBM FLOW REF OFF NORMAL	**C6 – E1**

INDICATIONS

- Trip of RHR pump in Shutdown Cooling
- Isolation of Shutdown Cooling Flowpath
- Reduced or stopped RHR Shutdown Cooling flow to the Jet Pumps
- Lowering Core flow
- Rising Reactor coolant temperature/pressure
- Rising Recirc pump loop flow

ADDITIONAL INFORMATION:

Procedures:

- HC.OP-GP.SM-0001(Q) DEFEATING NSSSS ISOLATIONS FOR SHUTDOWN COOLING

Valves:

- BC-HV-F008 SHUTDOWN COOLING OUTBD ISOLATION
- BC-HV-F009 SHUTDOWN COOLING INBD ISOLATION
- BC-HV-F015A RHR LOOP A RET TO RECIRC
- BC-HV-F015B RHR LOOP B RET TO RECIRC
- BC-HV-F022 RHR LOOP B HEAD SPRAY INBD ISOLATION
- BC-HV-F023 RHR LOOP B HEAD SPRAY OUTBD ISOLATION
- BC-HV-F006A RHR PMP A SUCT FROM RECIRC
- BC-HV-F006B RHR PMP B SUCT FROM RECIRC

IMMEDIATE OPERATOR ACTIONS

NONE

AUTOMATIC ACTIONS

IF	THEN
Reactor Pressure > 82 psig	The following valves cannot be opened from the Control Room OR their Remote Shutdown controls: • HV-F008 • HV-F009 • HV-F015A • HV-F015B • HV-F022 • HV-F023
Reactor Pressure > 82 psig OR Reactor Level < 12.5" OR Loss of EITHER RPS Bus AND RSP Takeover Switches in NORMAL	The following valves will isolate: • HV-F008* • HV-F009* • HV-F015A* • HV-F015B* • HV-F022 • HV-F023
RHR Pump in Shutdown Cooling AND Closure of ANY of the following: • HV-F008 • HV-F009 • Associated HV-F006	RHR pump trips.

*If GP.SM-0001 has been performed, these isolations are bypassed.

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LIST OF CONDITIONS

A. Loss of the RHR system providing Shutdown Cooling 7

B. Alternate Loop of RHR is required to restore Shutdown Cooling 7

C. RHR S/D Cooling CANNOT be established within 1 hour. 7

D. Loss of S/D Cooling AND RCS temp. < 200°F AND RCS temp. is anticipated to reach ≥ 200°F. ... 9

E. Forced Circulation CANNOT be established using preferred RHR loops or Reactor Recirculation. 11

F. RWCU is required for Alternate Decay Heat Removal. 11

G. Condensate Transfer is required for S/D cooling. 13

H. RPV Temperature and Pressure CANNOT be maintained using Normal OR Alternate Decay Heat Removal 17

ADDITIONAL INFORMATION:

Procedures:

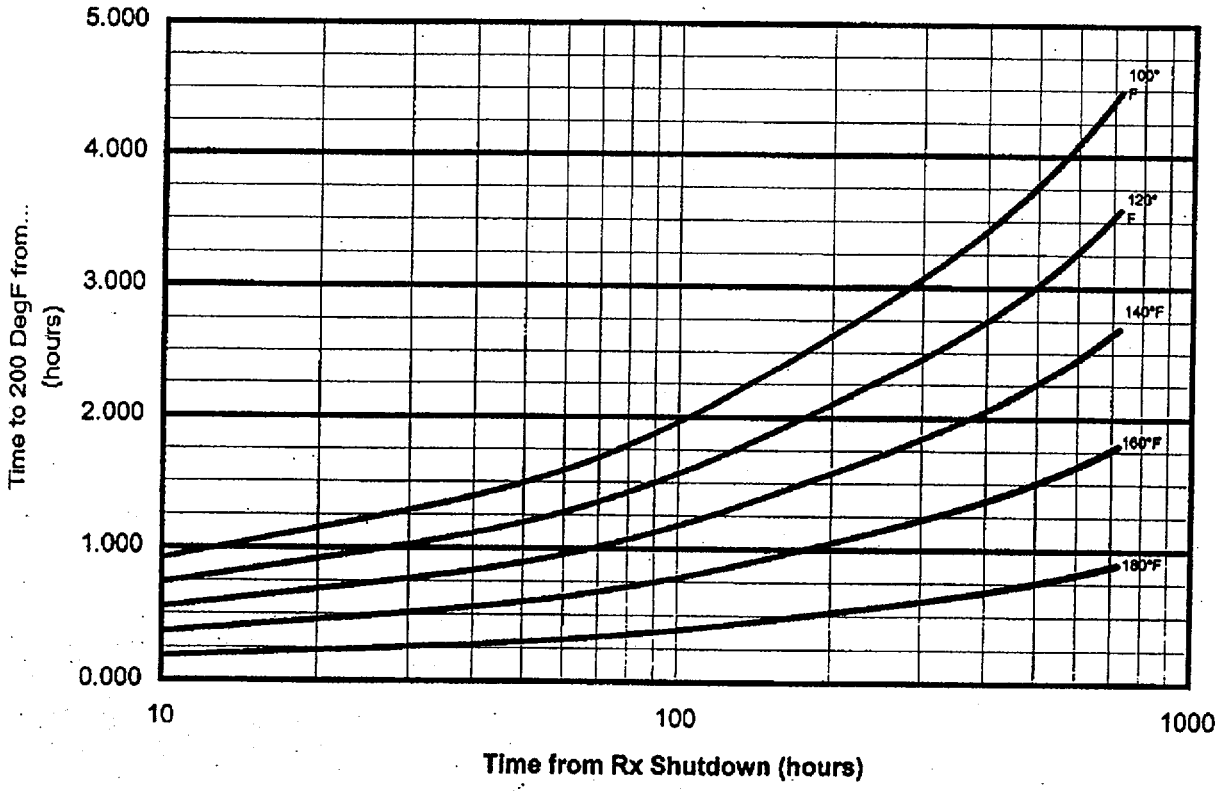
- HC.OP-SO.BC-0002 DECAY HEAT REMOVAL OPERATION.
- HC.OP-SO.BB-0002 REACTOR RECIRCULATION SYSTEM OPERATION.

Valves:

- BC-HV-F015A RHR LOOP A RET TO RECIRC
- BC-HV-F015B RHR LOOP B RET TO RECIRC
- BC-HV-F008 SHUTDOWN COOLING OUTBD ISOLATION
- BC-HV-F009 SHUTDOWN COOLING INBD ISOLATION

FIGURE 1

Total Loss of Heat Removal from Rx Vessel
1000 EFPD of Operations



SUBSEQUENT OPERATOR ACTIONS

CONDITION	ACTION
A. Loss of the RHR system providing Shutdown Cooling Time: _____ Estimated time RCS will reach 200°F: _____	☐ A.1 IF below 200°F, THEN **PERFORM** the following: ☐ a. **ESTIMATE** time to reach 200°F IAW Figure 1. ☐ b. IF RCS temperature is expected to rise above 200°F, THEN **IMPLEMENT** Condition D. ☐ A.2 IF the Shutdown Cooling suction line was isolated, THEN **PERFORM** the following: ☐ • PRIOR to establishing the suction flow path from the vessel, **FILL & VENT** the suction line IAW SO.BC-0002. **[CD-891D]** ☐ • **EVALUATE** the need to implement Condition C (Suction line venting may take more than one hour). ☐ A.3 IF necessary, dispatch operators to manually open HV-F008 and/or HV-F009. **[CD-065X]** A.4 Restore the tripped RHR pump as follows: ☐ a. **CLOSE** F015A(B). ☐ b. **RESTART** RHR Pump A(B). ☐ c. IMMEDIATELY **THROTTLE OPEN** F015A(B) to establish Shutdown Cooling flow between 3000 gpm and 10,000 gpm.
B. Alternate Loop of RHR is required to restore Shutdown Cooling Time: _____	☐ B.1 **PLACE** RHR loop A(B) in Shutdown Cooling IAW SO.BC-0002.
C. RHR S/D Cooling CANNOT be established within 1 hour. **[T/S 3.4.9.1, 3.4.9.2]** **[T/S 3.9.11.1, 3.9.11.2]** Time: _____	☐ C.1 **MONITOR** Reactor Coolant temperature and pressure at least once per hour. **[3.4.9.1.b, 3.4.9.2.b]** ☐ C.2 **ENSURE** forced circulation in the core utilizing Reactor Recirc IAW SO.BB-0002 OR an alternate method.

ADDITIONAL INFORMATION:

Valves:

- BB-HV-F001 REACTOR HEAD VENT DRW INBD ISLN
- BB-HV-F002 REACTOR HEAD VENT DRW OUTBD ISLN

TABLE D.2 - REDUNDANT REACTOR VESSEL PRESSURE INDICATIONS		
NOMENCLATURE	**RANGE**	**DESCRIPTION**
CONTROL ROOM PANEL 10-C-650		
PI-5824A	0 - 50	LOW RANGE REACTOR PRESS
PI-5824B	0 - 50	LOW RANGE REACTOR PRESS
PI-R605-C32	0 - 1200	REACTOR PRESSURE
PR-R623A-B21	0 - 1500	PAMS
PR-R623B-B21	0 - 1500	PAMS
PI-3684A	0 - 1500	PAMS
PI-3684B	0 - 1500	PAMS
LOWER RELAY ROOM PANEL 10-C-617		
1FDPISL-N658A-E41	0 - 200	HPCI TRIP UNIT
1FDPISL-N658E-E41	0 - 200	HPCI TRIP UNIT
LOWER RELAY ROOM PANEL 10-C-641		
1FDPISL-N658C-E41	0 - 200	HPCI TRIP UNIT
1FDPISL-N658G-E41	0 - 200	HPCI TRIP UNIT
LOWER RELAY ROOM PANEL 10-C-618		
1FCPISL-N658B-E51	0 - 200	RCIC TRIP UNIT
1FCPISL-N658F-E51	0 - 200	RCIC TRIP UNIT
LOWER RELAY ROOM PANEL 10-C-631		
1FCPISL-N658D-E51	0 - 200	RCIC TRIP UNIT
1FCPISL-N658H-E51	0 - 200	RCIC TRIP UNIT

SUBSEQUENT OPERATOR ACTIONS

CONDITION	ACTION
D. Loss of S/D Cooling AND RCS temp. < 200°F AND RCS temp. is anticipated to reach ≥ 200°F. **[T/S 3.6.1.1, 3.6.5.1]** Time: _____	❑ D.1 **EVALUATE** the need to establish Primary AND Secondary Containment. ❑ D.2 **EVALUATE** the following for indications of entry into OPCON 3: ❑ • An increase in steam dome pressure could be indicative that boiling, to some degree, is occurring in the Reactor Core. This parameter should be monitored using the redundant Reactor pressure indications given in Table D.2, particularly those with the lowest ranges such as Reactor Low Range Pressure (0 – 50 psig on Panel 10C650A) or, the HPCI and RCIC trip units. ❑ • An increase in Reactor Head Vent temperature could be indicative of the onset or verification of the presence of boiling in the vessel. This temperature is monitored by TE-N064 (when BB-HV-F001 and BB-HV-F002 are open), and can be read on the Control Room recorder B21-TRR614 point 24, Reactor Head Vent. ❑ • An unexplained increase in Drywell leakage could be indicative of the presence of steam flow out of the vessel head and into the Drywell. This parameter is monitored at RMS and includes primarily the Drywell Equipment Drain flow, however, steaming into the Equipment Drain Sump could also be indicated by total Drywell leakage and Drywell Cooler condensate flow, therefore, all of these points should be monitored for unexplained increases.

CAUTIONS:

1. **Apply temperature compensation as necessary. Main Steam Line flooding occurs at 118 inches.**

NOTES:

1. IF in IO-0004, IO-0005, or IO-0009, the associated attachment for "PLACING THE PLANT IN ALTERNATE DECAY HEAT REMOVAL MODE OF OPERATION" MAY identify an effective mode of Alternate Decay Heat Removal.

ADDITIONAL INFORMATION:

Procedures:

- HC.OP-IO.ZZ-0004(Q) SHUTDOWN FROM RATED POWER TO COLD SHUTDOWN
- HC.OP-IO.ZZ-0005(Q) COLD SHUTDOWN TO REFUELING
- HC.OP-IO.ZZ-0009(Q) REFUELING OPERATION
- HC.OP-DL.ZZ-0026(Q) SURVEILLANCE LOG
- HC.OP-SO.EC-0001(Q) FUEL POOL COOLING AND CLEANUP SYSTEM
- HC.OP-SO.BG-0001(Q) REACTOR WATER CLEANUP SYSTEM OPERATION

Valves:

- 1-ED-V035 RWCU NRHX RACS RTN PLUG. (Rm 4504E).

SUBSEQUENT OPERATOR ACTIONS (continued)

CONDITION	ACTION
E. Forced Circulation CANNOT be established using preferred RHR loops or Reactor Recirculation. **[CD-693A, CD-178A, CD-973B, CD-100A, CD-076B, CD-065X]** Time: _____	❑ **** NOTE 1**** ❑ E.1 **MONITOR** temperatures IAW DL-0026 Attachment 3s. ❑ ✯ **CAUTION 1** ✯ ❑ E.2 **MAINTAIN** RPV LVL ≥ 80 inches, BUT < 90 inches. ❑ E.3 IF RPV LVL reaches 90 inches, THEN **CLOSE** the MSIV's. ❑ E.4 **ENSURE** T.S. cool down limits are not exceeded. **[T/S 3.4.6.1.b]** E.5 **EVALUATE** the following systems for alternate decay heat removal: ❑ • RWCU (Subsequent F) **[CD-900E]** ❑ • "C" RHR (Attachment 1) ❑ • "D" RHR (Attachment 2) ❑ • CONDENSATE TRANSFER (Subsequent G) ❑ E.6 IF the vessel head is removed, AND the Reactor Cavity is flooded, THEN maximize Fuel Pool Cooling: ❑ • **ENSURE** two Fuel Pool Cooling pumps are in service. (EC) ❑ • **ENSURE** SACS flow aligned through BOTH Fuel Pool Cooling heat exchangers.
F. RWCU is required for Alternate Decay Heat Removal. **[CD-900E]** Time: _____	❑ F.1 **ENSURE** RWCU is in service. (BG) ❑ F.2 **FULLY OPEN** ED-V035. ❑ F.3 IF necessary, THEN Bypass the Regenerative heat exchanger to maximize decay heat removal. (BG)

ADDITIONAL INFORMATION:

Procedures:

- HC.OP-SO.AP-0001(Q) CONDENSATE TRANSFER SYSTEM OPERATION
- HC.OP-SO.BG-0001(Q) REACTOR WATER CLEANUP SYSTEM OPERATION

Valves:

TABLE G: Condensate Transfer Injection Flowpaths			
SYSTEM	**CS XFR DISCH ISLN**	**OUTBD ISOL VLV**	**INJECTION VALVE**
'A' RHR	1-AP-V044 (Rm. 4328)	N/A	BC-HV-F017A
'C' RHR	1-AP-V047 (Rm. 4328)	N/A	BC-HV-F017C
'B' RHR	1-AP-V056 (Rm 4322B)	N/A	BE-HV-F017B
'D' RHR	1-AP-V059 (Rm. 4322B)	N/A	BE-HV-F017D
'A' CORE SPRAY	1-AP-V041 (Rm. 4331)	BE-HV-F004A	BE-HV-F005A
'B' CORE SPRAY	1-AP-V062 (Rm. 4322B)	BE-HV-F004B	BE-HV-F005B
HPCI	1-AP-V038 (Rm. 4331)	N/A	BJ-HV-8278
RCIC	1-AP-V052 (Rm. 4315)	N/A	BD-HV-F013

SUBSEQUENT OPERATOR ACTIONS (continued)

CONDITION	ACTION
G. Condensate Transfer is required for S/D cooling. Time: _____ ***** Continued on Page 15 *****	☐ G.1 **ENSURE** Condensate Transfer is in-service. (AP) ☐ G.2 **ENSURE** RWCU is in-service. (BG) ☐ G.3 **REFER** to Table G and align one of the following flowpaths to feed the vessel from condensate transfer as follows: ☐ G.4 IF an RHR injection line will be used, THEN **PERFORM** the following: ☐ a. **OPEN** the desired loops INJECTION VALVE listed in Table G. ☐ b. **THROTTLE** OPEN the associated CS XFR DISCH ISLN listed in Table G to obtain the desired injection rate. ☐ G.5 IF a Core Spray injection line will be used, THEN **PERFORM** the following: ☐ a. **CLOSE** the desired loops OUTBD ISOL VLV listed in Table G. ☐ b. **OPEN** the associated INJECTION VALVE listed in Table G. ☐ c. **RE-OPEN** the OUTBD ISOL VLV. ☐ d. **THROTTLE** OPEN the associated CS XFR DISCH ISLN listed in Table G to obtain the desired injection rate. ☐ ***** Continued on Page 15 *****

NOTES:

2. Reactor pressure must be below the Low Pressure Isolation setpoint for the system to prevent auto-closure of the injection valve.

ADDITIONAL INFORMATION:

Procedures:

- HC.OP-SO.BG-0001(Q) REACTOR WATER CLEANUP SYSTEM OPERATION

Valves:

- AE-HV-F032A FW INLET CHECK VALVE
- AE-HV-F032B FW INLET CHECK VALVE

TABLE G: Condensate Transfer Injection Flowpaths

SYSTEM	CS XFR DISCH ISLN	OUTBD ISOL VLV	INJECTION VALVE
'A' RHR	1-AP-V044 (Rm. 4328)	N/A	BC-HV-F017A
'C' RHR	1-AP-V047 (Rm. 4328)	N/A	BC-HV-F017C
'B' RHR	1-AP-V056 (Rm 4322B)	N/A	BE-HV-F017B
'D' RHR	1-AP-V059 (Rm. 4322B)	N/A	BE-HV-F017D
'A' CORE SPRAY	1-AP-V041 (Rm. 4331)	BE-HV-F004A	BE-HV-F005A
'B' CORE SPRAY	1-AP-V062 (Rm. 4322B)	BE-HV-F004B	BE-HV-F005B
HPCI	1-AP-V038 (Rm. 4331)	N/A	BJ-HV-8278
RCIC	1-AP-V052 (Rm. 4315)	N/A	BD-HV-F013

SUBSEQUENT OPERATOR ACTIONS (continued)

CONDITION	ACTION
***** Continued from Page 13 *****	❑ ***** Continued from Page 13 *****
G. Condensate Transfer is required for S/D cooling.	❑ G.6 IF the RCIC injection line will be used, THEN **PERFORM** the following:
	❑ **** NOTE 2****
	❑ a. **VERIFY** reactor pressure < 64 psig
	❑ b. **ENSURE** the HV-F032B is open.
	❑ c. **PLACE** the NORM/BYPASS keylock switch for the HV-F013 in BYPASS.
	❑ d. **OPEN** the HV-F013.
	❑ e. **THROTTLE** OPEN the 1-AP-V052 to obtain the desired injection rate.
	❑ G.7 IF the HPCI injection line will be used, THEN **PERFORM** the following:
	❑ **** NOTE 2****
	❑ a. **VERIFY** reactor pressure < 100 psig
	❑ b. **ENSURE** the HV-F032A is open.
	❑ c. **PLACE** the NORM/BYPASS keylock switch for the HV-8278 in BYPASS.
	❑ d. **OPEN** the HV-8278.
	❑ e. **THROTTLE** OPEN the 1-AP-V038 to obtain the desired injection rate.
	❑ G.8 **MAINTAIN** RPV LVL using RWCU Blowdown. (BG)

NOTES:

3. The goal of the following steps is to establish water flow through two SRV's with at least a 50# d/p. It is desirable to maintain less than a 160# d/p across the SRV's to ensure a single LPCI or Core Spray pump can deliver sufficient flow to remove decay heat. Any injection source may be used to flood the vessel, but it is desirable to use the torus as a suction source for recirculation of water through the vessel and SRVs. This will prevent unnecessary water addition to the torus from outside sources.

ADDITIONAL INFORMATION:

Procedures:

- HC.OP-AB.ZZ-0001(Q) TRANSIENT PLANT CONDITIONS.

Valves:

- BB-HV-F001 REACTOR HEAD VENT DRW INBD ISLN
- BB-HV-F002 REACTOR HEAD VENT DRW OUTBD ISLN
- BB-HV-F005 REACTOR HEAD VENT STM LINE A

- AB-HV-F016 CTMT INBD STM LINE DRAIN HDR ISLN OUTBOARD MOV
- AB-HV-F019 CTMT INBD STM LINE DRAIN HDR ISLN INBOARD MOV

- FD-HV-F002 HPCI STM INBD ISLN VLV
- FD-HV-F003 HPCI STM OUTBD ISLN VLV
- FD-HV-F100 HPCI STM WARMUP VLV

- FC-HV-F007 RCIC STM INBD ISLN VLV
- FC-HV-F008 RCIC STM OUTBD ISLN VLV
- FC-HV-F076 RCIC STM WARMUP VLV

SUBSEQUENT OPERATOR ACTIONS (continued)

CONDITION	ACTION
H. RPV Temperature and Pressure CANNOT be maintained using Normal OR Alternate Decay Heat Removal. **[CD-973B, CD-110E, CD-950B]** ***** Continued on Page 19 ***** Time: _____	❑ **** NOTE 3**** ❑ H.1 **INITIATE** Suppression Pool Cooling IAW AB-0001. ❑ H.2 **ENSURE** the following Valves are closed. ❑ • RPV Head Vents. ❑ • MSIV's. ❑ • Main Steam Line Drain valves. ❑ • HPCI Steam Isolations. ❑ • RCIC Steam Isolations. ❑ H.3 **PLACE** the control switches for two SRV's to OPEN (SRVs will not open until a 50# d/p is established). ❑ H.4 **SLOWLY RAISE** RPV water level to establish a flow path through the OPEN SRV's. ❑ H.5 **SECURE** all injection into the RPV except from CRD. ❑ H.6 **START** one Core Spray Subsystem or one LPCI Pump with suction from the Suppression Pool. ❑ H.7 **RAISE** Core Spray OR LPCI injection into the RPV to maximum. ❑ H.8 IF RPV pressure does not stabilize at least 50 psig above suppression chamber pressure, OR two SRVs are NOT open, THEN **START** and additional Core Spray Subsystem or LPCI pump AND continue to **RAISE** injection flow to establish stated conditions. ❑ H.9 IF RPV pressure stabilizes at more than 160 psig above Suppression Chamber pressure, THEN **OPEN** another SRV. ❑ ***** Continued on page 19 *****

CAUTIONS:

2. **Maintain at least 50 psig above Suppression Chamber pressure with at least two SRV's open.**

SUBSEQUENT OPERATOR ACTIONS

CONDITION	ACTION
***** Continued from Page 17 *****	❑ ***** Continued from Page 17 *****
	❑ ★ **CAUTION 2** ★
H. RPV Temperature and Pressure CANNOT be maintained using Normal OR Alternate Decay Heat Removal.	❑ H.10 IF the cooldown rate exceeds 90°F/hr, THEN **REDUCE** Core Spray or LPCI injection into the RPV until EITHER of the following occurs:
	❑ • The cooldown rate drops below 90°F/hr.
	❑ • RPV pressure decreases to within 50 psig of Suppression Chamber pressure.
	❑ H.11 **CONTROL** Suppression Pool temperature to maintain RPV water temperature above 79°F. **[T/S 3.4.6.1.d]**

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ATTACHMENT 1
ALTERNATE DECAY HEAT REMOVAL USING C TO A CROSS-TIE
(Page 1 of 6)

NOTE 1.0

Operation of the C to A Cross-Tie is restricted to conditions when reactor coolant temperature is < 300°F (67 psia). **[PR 970602179, PR 960927120]**

1.0 **Establishing Alternate Decay Heat Removal Using the C to A Cross-tie [CD-609G]**

1.1 **ENSURE** the AP System is available providing keepfill for all A Loop ECCS Systems required for operability. (1-AP-V041, CS Xfr to A Core Spray Dsch (Rm. 4331) _____

1.2 **ENSURE** that the Jockey Pump CP228 is secured AND tagged IAW NC.NA-AP.ZZ-0015(Q); Safety Tagging Program. (Breaker 52-232074) _____

1.3 **CLOSE** 1BC-V203 ECCS Jock Pmp C Suct Vlv (Rm. 4114C) AND **TAG** IAW NC.NA-AP.ZZ-0015(Q). _____

1.4 **CLOSE** the following valves: _____

- HV-F004A RHR PMP A SUPP POOL SUCT MOV _____
- HV-F004C RHR PMP C SUPP POOL SUCT MOV _____

1.5 **TAG** the following IAW NC.NA-AP.ZZ-0015(Q): _____

- HV-F004A RHR PMP A SUPP POOL SUCT MOV (52-212031) _____
- HV-F004C RHR PMP C SUPP POOL SUCT MOV (52-232031) _____

CAUTION 1.6

Manual or automatic opening of HV-F007 A(C) RHR PMP A(C) MIN FL MOV will drain the Reactor Vessel to the Suppression Pool.

1.6 **ENSURE** the following valves are closed: _____

- HV-F007A RHR PMP A MIN FL VLV _____
- HV-F007C RHR PMP C MIN FL VLV. _____

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ATTACHMENT 1
ALTERNATE DECAY HEAT REMOVAL USING C TO A CROSS-TIE
(Page 2 of 6)

1.7 **VERIFY** the following LPCI Injection Valves are closed, THEN **DE-ENERGIZE** AND **TAG** their power sources to ensure these valves do not open if a LPCI signal is received during cross-tie operating mode: _____

- HV-F017A RHR LOOP A LPCI INJ MOV (52-212052) _____
- HV-F017C RHR LOOP C LPCI INJ MOV (52-232052) _____

1.8 **CLOSE** AND **TAG** the following valves: _____

- HV-F010A RHR LOOP C TEST RET MOV (52-232044) _____
- HV-F024A RHR LOOP A TEST RET MOV (52-212192) _____
- HV-F021A RHR LOOP A SPRAY ISLN MOV (52-451062) _____
- HV-F027A RHR LOOP A SUPP CHAMBER SPRAY HDR ISLN MOV (52-212083) _____

1.9 Fully **OPEN** 1BC-V133 RHR Pmp C Suct Frm Recir Loop B (Rm 4227E) AND **TAG** in the open position IAW NC.NA-AP.ZZ-0015(Q). _____

1.10 **ENSURE** F077 RECIRC LOOP B TO RHR SUP MAN VLV is open. _____

1.11 IF the Shutdown Cooling suction line was isolated, THEN **PERFORM** a fill and vent IAW HC.OP-SO.BC-0002(Q), Decay Heat Removal Operation. _____

1.12 **ENSURE** the following valves are open: _____

- HV-F008 SHUTDOWN COOLING OUTBD ISLN MOV _____
- HV-F009 SHUTDOWN COOLING INBD ISLN MOV. _____

1.13 **UNLOCK** AND **OPEN** 1BC-V571 RHR Cross-Tie Isolation Valve for C Loop BC-HV-11673. (Rm 4114A) _____

1.14 **OPEN** the following valves until a solid stream of water issues, THEN **CLOSE** (Local): _____

- 1BC-V578 AND 1BC-V579 RHR Vent Valves (Rm. 4113A) _____
- 1BC-V580 AND 1BC-V581 RHR Vent Valves (Rm. 4114A) _____

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ATTACHMENT 1
ALTERNATE DECAY HEAT REMOVAL USING C TO A CROSS-TIE
(Page 3 of 6)

1.15 **OPEN** 1BC-V570 RHR Cross-Tie Isolation Valve for A Loop (Rm. 4113A)

NOTE 1.16

A. The interlock override will allow C RHR Pump to operate when the pump is aligned to the alternate suction from the RPV, when and if required.

B. In the cross-tie mode, C RHR Pump will not be automatically protected against the loss of suction from the RPV.

1.16 **OBTAIN** key for the 1-BC-HS-11496 Keylock Switch from Work Control key cabinet. _____

1.17 At Panel 10C641 perform the following: _____

A. **INSERT** the key in the 1-BC-HS-11496 Keylock Switch. _____

B. **OVERRIDE** the HV-F004C Valve/Pump C Interlock using the 1-BC-HS-11496 Keylock Switch. _____

C. **LOG** in CRS Log the position of the Keylock Switch. _____

1.18 IF during the cross-tie operation mode, the HV-F008 or HV-F009 close (e.g., on RPV Low Level 3 signal), then immediately **STOP** the C RHR Pump AND **TAKE** corrective action. _____

1.19 IF HV-F015A RHR LOOP A RET TO RECIRC LOOP A ISLN MOV does NOT open immediately to establish flow, THEN **SECURE** the RHR Pump. _____

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ATTACHMENT 1
ALTERNATE DECAY HEAT REMOVAL USING C TO A CROSS-TIE
(Page 4 of 6)

CAUTION 1.20

Manual or automatic opening of HV-F007A(C) RHR PMP A(C) MIN FL MOV will drain the Reactor Vessel to the Suppression Pool.

1.20 **START** RHR PUMP CP202 and
immediately **THROTTLE OPEN** HV-F015A RHR LOOP A RET TO RECIRC LOOP A ISLN MOV until FI-R603C LOOP C FLOW indicates 3000 gpm. _____

- **OBSERVE** AI-6358C PUMP C MOT AMPS. _____
- **MAINTAIN** flow of 3000 gpm for at least 10 minutes. _____

1.21 **OPEN** HV-F015A RHR LOOP A RET TO RECIRC LOOP A ISLN MOV until FI-R603C LOOP C FLOW indicates 10,000 gpm. _____

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ATTACHMENT 1
ALTERNATE DECAY HEAT REMOVAL USING C TO A CROSS-TIE
(Page 5 of 6)

2.0 **Securing Alternate Decay Heat Removal When C to A Cross-tie was used.**

2.1 **CLOSE** HV-F015A RHR LOOP A RET TO RECIRC LOOP A ISLN MOV. _____

2.2 WHEN the HV-F015A RHR LOOP A RET TO RECIRC LOOP A ISLN MOV is closed,
THEN **STOP** the C RHR Pump CP202. _____

2.3 **REMOVE** 1-BC-HS-11496 Keylock Switch from the OVERRIDE position. _____

A. **REMOVE** the key from 1-BC-HS-11496 Keylock Switch AND **RETURN** the key to the Work Control key cabinet. _____

B. **LOG** in CRS Log the position of the keylock switch. _____

2.4 **CLOSE** 1BC-V570 RHR Cross-Tie Isolation Valve for A Loop (Rm. 4113A). _____

2.5 **CLOSE AND LOCK** 1BC-V571 RHR Cross-Tie Isolation Valve for C Loop BC-HV-11673. (Rm 4114A) _____

2.6 **RELEASE** tags from 1BC-V203 ECCS Jock Pmp C Suct Vlv (Rm. 4114C) AND **OPEN** valve. _____

2.7 **RELEASE** tags from Jockey Pump CP228. _____

2.8 **RELEASE** tags from 1BC-V133 RHR Pmp C Suc Frm Recir Loop B (Rm 4227E) _____

2.9 **CLOSE AND LOCK** 1BC-V133 RHR Pmp C Suc Frm Recir Loop B (Rm 4227E) _____

2.10 **CLOSE** the following valves: _____

- HV-F008 SHUTDOWN COOLING OUTBD ISLN MOV _____
- HV-F009 SHUTDOWN COOLING INBD ISLN MOV _____

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ATTACHMENT 1
ALTERNATE DECAY HEAT REMOVAL USING C TO A CROSS-TIE
(Page 6 of 6)

2.11 **RELEASE** the tags from the following valves: _____

- HV-F017A RHR LOOP A LPCI INJ MOV _____
- HV-F017C RHR LOOP C LPCI INJ MOV _____
- HV-F010A RHR LOOP C TEST RET MOV _____
- HV-F024A RHR LOOP A TEST RET MOV _____
- HV-F021A RHR LOOP A SPRAY ISLN MOV _____
- HV-F027A RHR LOOP A SUPP CHAMBER SPRAY HDR ISLN MOV _____

2.12 **RELEASE** tags from HV-F004A
AND HV-F004C RHR PMP SUPP POOL SUCT MOVs. _____

2.13 **ALIGN** system as plant conditions require. _____

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ATTACHMENT 2
ALTERNATE DECAY HEAT REMOVAL USING D TO B CROSS-TIE
(Page 1 of 7)

NOTE 1.0

Operation of the D to B Cross-Tie is restricted to conditions when reactor coolant temperature is < 300°F (67 psia). **[PR 970602179, PR 960927120]**

1.0 **Establishing Alternate Decay Heat Removal Using the D to B Cross-tie [CD-609G]**

1.1 **ENSURE** the AP System is available providing keepfill for all B Loop ECCS Systems required for operability. (1-AP-V062 CS Xfr to B Core Spray Dsch Isln [Rm. 4322B]) _____

1.2 **ENSURE** that the Jockey Pump DP228 is secured AND tagged IAW NC.NA-AP.ZZ-0015(Q); Safety Tagging Program. (Breaker 52-242074) _____

1.3 **CLOSE** 1BC-V261 ECCS Jockey Pump D Suction Valve AND **TAG** IAW NC.NA-AP.ZZ-0015(Q). _____

1.4 **CLOSE** the following valves: _____

- HV-F004B RHR PMP B SUPP POOL SUCT MOV _____
- HV-F004D RHR PMP D SUPP POOL SUCT MOV _____

1.5 **TAG** the following IAW NC.NA-AP.ZZ-0015(Q): _____

- HV-F004B RHR PMP B SUPP POOL SUCT MOV Breaker 52-222031 _____
- HV-F004D RHR PMP D SUPP POOL SUCT MOV Breaker 52-242031 _____

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ATTACHMENT 2
ALTERNATE DECAY HEAT REMOVAL USING D TO B CROSS-TIE
(Page 2 of 7)

CAUTION 1.6

Manual or automatic opening of HV-F007B(D) RHR PMP B(D) MIN FL MOV will drain the Reactor Vessel to the Suppression Pool.

1.6 **ENSURE** the following valves are closed: _____

- HV-F007B RHR PUMP B MIN FLOW VLV _____
- HV-F007D RHR PUMP D MIN FLOW VLV. _____

1.7 **VERIFY** the following LPCI Injection Valves are closed,
THEN **DE-ENERGIZE** AND **TAG** their power sources to ensure these valves do not open if a LPCI signal is received during cross-tie operating mode: _____

- HV-F017B RHR LOOP B LPCI INJ MOV (52-222052) _____
- HV-F017D RHR LOOP D LPCI INJ MOV (52-242052) _____

1.8 **CLOSE** AND **TAG** the following valves: _____

- HV-F010B RHR LOOP D TEST RET MOV (52-242044) _____
- HV-F024B RHR LOOP B TEST RET MOV (52-222063) _____
- HV-F021B RHR LOOP B SPRAY ISLN MOV (52-222062) _____
- HV-F027B RHR LOOP B SUPP CHAMBER SPRAY HDR ISLN MOV (52-222083) _____

1.9 FULLY **OPEN** 1BC-V043 RHR Pmp D Suc Frm Recir Loop B (Rm. 4227D; Az 150 above catwalk)
AND **TAG** in the open position IAW NC.NA-AP.ZZ-0015(Q). _____

1.10 **ENSURE** F077 RECIRC LOOP B TO RHR SUP MAN VLV is open. _____

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ATTACHMENT 2
ALTERNATE DECAY HEAT REMOVAL USING D TO B CROSS-TIE
(Page 3 of 7)

1.11 IF the Shutdown Cooling suction line was isolated,
THEN **PERFORM** a fill and vent IAW HC.OP-SO.BC-0002(Q),
Decay Heat Removal Operation. _____

1.12 **ENSURE** the following valves are open: _____

- HV-F008 SHUTDOWN COOLING OUTBD ISLN MOV _____
- HV-F009 SHUTDOWN COOLING INBD ISLN MOV. _____

1.13 **UNLOCK AND OPEN** 1BC-V601 RHR Crosstie Iso Vlv B LOOP
BC-HV-11680 MOV (Rm. 4107A) _____

1.14 **OPEN** the following valves until a solid stream of water issues,
THEN **CLOSE** (Local). _____

- 1BC-V610 and 1BC-V611 RHR B&D Loop X-Tie Vent Vlvs
(Rm. 4107A) _____
- 1BC-V608 and 1BC-V609 RHR B&D Loop X-Tie Vent Vlvs
(Rm. 4107A) _____

1.15 **CRACK OPEN** 1BC-V600 RHR X-Tie Iso Vlv Loops B&D. (Rm. 4107A) _____

1.16 **OPEN** 1BC-V608 and 1BC-V609
RHR B&D Loop X-Tie Vent Vlvs until a solid stream of water issues,
THEN **CLOSE** (Rm. 4107A) _____

1.17 **OPEN** 1BC-V600 RHR X-Tie Iso Vlv Loops B&D. (Rm. 4107A) _____

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ATTACHMENT 2
ALTERNATE DECAY HEAT REMOVAL USING D TO B CROSS-TIE
(Page 4 of 7)

NOTE 1.18

A. The interlock override will allow D RHR Pump to operate when the pump is aligned to the alternate suction from the RPV, when and if required.

B. In the cross-tie mode, D RHR Pump will not be automatically protected against the loss of suction from the RPV.

1.18 **OBTAIN** key to the 1-BC-HS-11682 Keylock Switch from Work Control key cabinet. _____

1.19 **PERFORM** the following at Panel 10C640: _____

A. **INSERT** the key in the 1-BC-HS-11682 Keylock Switch. _____

B. **OVERRIDE** the HV-F004D Valve/Pump D Interlock using the 1-BC-HS-11682 Keylock Switch. _____

C. **LOG** in CRS Log the position of the Keylock Switch. _____

1.20 IF during the cross-tie operation mode, the HV-F008 or HV-F009 close (e.g., on RPV Low Level 3 signal), then immediately **STOP** the D RHR Pump AND **TAKE** corrective action. _____

1.21 IF HV-F015B RHR LOOP B RET TO RECIRC LOOP B ISLN MOV does not open immediately to establish flow, THEN **SECURE** the RHR Pump. _____

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ATTACHMENT 2
ALTERNATE DECAY HEAT REMOVAL USING D TO B CROSS-TIE
(Page 5 of 7)

CAUTION 1.22

Manual or automatic opening of HV-F007B(D) RHR PMP B(D) MIN FL MOV will drain the Reactor Vessel to the Suppression Pool.

1.22 **START** RHR PUMP DP202 and
immediately **THROTTLE OPEN** HV-F015B RHR LOOP B RET TO RECIRC LOOP B ISLN MOV
UNTIL FI-R603D LOOP D FLOW indicates 3000 GPM. _____

- **OBSERVE** AI-6358D PUMP D MOT AMPS. _____
- **MAINTAIN** flow of 3000 gpm for at least 10 minutes. _____

1.23 **OPEN** HV-F015B RHR LOOP B RET TO RECIRC LOOP B ISLN MOV
UNTIL FI-R603D LOOP D FLOW indicates 10,000 gpm. _____

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ATTACHMENT 2
ALTERNATE DECAY HEAT REMOVAL USING D TO B CROSS-TIE
(Page 7 of 7)

2.11 **RELEASE** the tags from the following valves:

- HV-F017B RHR LOOP B LPCI INJ MOV
- HV-F017D RHR LOOP D LPCI INJ MOV
- HV-F010B RHR LOOP D TEST RET MOV
- HV-F024B RHR LOOP B TEST RET MOV
- HV-F021B RHR LOOP B SPRAY ISLN MOV
- HV-F027B RHR LOOP B SUPP CHAMBER SPRAY HDR ISLN MOV

2.12 **RELEASE** tags from HV-F004B
AND HV-F004D RHR PMP SUPP POOL SUCT MOV.

2.13 **ALIGN** system as plant conditions require.

REVISION SUMMARY
Rev. 0

This procedure has been re-formatted into a two-column format as part of the Hope Creek Abnormal Operating Procedure upgrade project. This procedure supercedes HC.OP-AB.ZZ-0142(Q). The sequence of steps have been re-arranged to provide better flow of the steps. The information previously contained in the discussion section has been moved to the Bases Document for this procedure. Revision bars have been omitted from this revision due to the number of changes that have been made.

The following list of Editorial changes has been made to this procedure:

1. Added new Alarms and Indications which are indicative of an RHR pump trip, shutdown cooling suction line isolation, and shutdown cooling flow bypass event.
2. Added Automatic Actions for Shutdown Cooling valves.
3. Incorporated former Attachment 1 into the body of the procedure.
4. Deleted former Note 4.8. The intent of this note is satisfied by the Condition statement for this section.
5. Reworded sub-steps of former step 4.8 and added a note for clarity.**(80023233)**
6. Changed "Alternate Shutdown Cooling" in Attachments 1 and 2 to "Alternate Decay Heat Removal" IAW SQR Reviewer comments.

The following list of Non-Editorial changes has been made to this procedure:

1. Changed former Note 4.0 to indicate the respective Integrating Operating procedure may identify which mode of Alternate Decay Heat Removal would be effective as determined by Engineering. Reference to HC.OP-SO.BC-0002(Q) was deleted. The abnormal action steps direct the operators to this procedure at the appropriate times.
2. Deleted former step 4.1. The CRS will determine when conditions are appropriate for exiting the abnormal.
3. Former step 4.4 was expanded to specific corrective actions throughout the abnormal.
4. Former step 4.5 was modified to include a one hour time limit. This is consistent with T/S 3.9.11.1 action b.
5. Added guidance to bypass the regenerative heat exchanger IAW SOP if necessary to provide additional decay heat removal.
6. Expanded guidance on using Condensate Transfer for feed and bleed cooling. Existing guidance was inadequate and required entry into High Radiation areas to manually throttle MOVs.
7. Deleted former step 4.7.c to use head spray. For Hope Creek, head spray operation depends on having an RHR pump in Shutdown Cooling. If I have an RHR pump operating in Shutdown Cooling, I would not be in this abnormal. Additionally, head spray injects into the steam dome. Hope Creek Core Spray and RHR inject inside the core shroud, which is more effective at providing core circulation and cooling.
8. Former step 4.8.12 was deleted.
9. Based on 50.59 reviewer input, the maximum RPV to torus d/p when performing Alternate Shutdown Cooling IAW Condition 'H' was raised from 140 to 160 psi.

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: HOPE CREEK

SYSTEM: 234000 Fuel Handling Equipment

TASK: Bent Mast IAW HC.OP-SO.KE-0001(Q) Attachment 2 (Alternate Path)

TASK NUMBER: N2340040104

JPM NUMBER: 2003-NRC-S3

ALTERNATE PATH: [X]

	K/A NUMBER:	234000	A2.03
APPLICABILITY:	IMPORTANCE FACTOR:	2.8	3.1
EO [ ] RO [ ] SRO [X] LSRO [X]		RO	SRO

EVALUATION SETTING/METHOD: REFUELING PLATFORM – PERFORM / SIMULATE

REFERENCES: HC.OP-SO.KE-0001 Rev. ~~29~~ 30 as of, HC.RE-FR.ZZ-0001 Attachment 1

TOOLS AND EQUIPMENT: Refueling Platform, Dummy Bundle, Move Sheet

VALIDATED JPM COMPLETION 10 min.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A

APPROVED:

N/A		
BARGAINING UNIT REPRESENTATIVE	TRAINING SUPERVISOR	OPERATIONS MANAGER or Designee

CAUTION: No plant equipment shall be operated during the performance of a JPM without the following:
1. Permission from the OS or Unit CRS;
2. Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).
3. Verification of the "as left" condition by a qualified individual.

ACTUAL JPM COMPLETION TIME: _____ min.

ACTUAL TIME CRITICAL COMPLETION TIME: N/A min.

JPM PERFORMED BY: _____ GRADE: [ ] SAT [ ] UNSAT

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: _____ DATE: _____

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____

DATE: _____

SYSTEM: 234000 Fuel Handling Equipment

TASK: Bent Mast IAW HC.OP-SO.KE-0001(Q) Attachment 2
(Alternate Path)

TASK N2340040104

INITIAL CONDITIONS:

- You are the Refueling Bridge operator.
- The Reactor is in Operational Condition 4 preparing for refueling.
- The Refuel Platform is in a standby lineup, powered up, and warmed up > ½ hour.
- A Spotter and Refueling SRO are standing by.
- The Dummy bundle is being used to simulate an irradiated fuel bundle.
- The Dummy bundle is full up on the Main Hoist being moved IAW Move Sheet Step #02.
- You are to continue HC.OP-SO.KE-0001 at step 5.8.16.

INITIATING CUE:

Place the bundle in its designated storage location IAW the move sheet step #2.

Successful Completion Criteria:
1. **All critical steps completed.**
2. **All sequential steps completed in order.**
3. **All time-critical steps completed within allotted time.**
4. **JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made (and NRC concurrence is obtained).**

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: 234000 Fuel Handling Equipment

TASK: Bent Mast IAW HC.OP-SO.KE-0001(Q) Attachment 2 (Alternate Path)

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
		Operator obtains procedure HC.OP-SO.KE-0001.	Operator obtains the correct procedure.		
		Operator reviews prerequisites, precautions and limitations.	Operator reviews prerequisites, precautions and limitations. **Examiner Cue: If excessive time is taken reviewing prerequisites, precautions and limitations, inform operator that all are satisfied.**		
		Operator determines beginning step of the procedure.	Operator determines correct beginning step to be 5.8.16 of HC.OP-SO.KE-0001(Q)		

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: 234000 Fuel Handling Equipment

TASK: Bent Mast IAW HC.OP-SO.KE-0001(Q) Attachment 2 (Alternate Path)

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
	5.8	Fuel/Blade Guide Movement – Within Spent Fuel Storage Pool (other than Refuel Mode) in Manual,	**Examiner Note:** All operations for this JPM are performed on the Refueling Platform. Initialing steps is not critical A generic Fuel Movement sheet is provided where MOVE Step #1 is the DUMMY BUNDLE from the normal storage location to an empty spare Fuel Pool location. Move Step #2 is from the spare location back to the normal storage location. Examiners Cues proceeded by a **$** are given ONLY if the evolution is SIMULATED. The operator may log on to the Refuel Platform Computer but it is not necessary when operating in Manual Mode.		

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: 234000 Fuel Handling Equipment
TASK: Bent Mast IAW HC.OP-SO.KE-0001(Q) Attachment 2 (Alternate Path)

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*	5.8.16	START TIME: _____ USE the Refuel Platform AND Trolley Position Controls AND Position Indicating System to maneuver the Fuel Grapple to the target location listed on the Fuel Movement Sheet(s).	Operator uses the PLATFORM AND TROLLEY control operators to maneuver the Fuel Grapple using position indication cameras so that it is positioned over Fuel Pool location **AD-28** in accordance to the fuel movement sheet. **$ Examiner Cue: "The controls respond to the directions stated."** **$ Examiner Cue: "The grapple is positioned over the location stated."**		
	5.8.17	ENSURE the Fuel Grapple is at the correct Core OR Fuel Pool Coordinates. (REFER TO Note 5.8)	Operator ensures the grapple is positioned over Fuel Pool location **AD-28** in accordance to the fuel movement sheet. **$ Examiner Cue: "The grapple is positioned over the location stated."**		
*	5.8.18	ROTATE the Fuel Grapple AND attached fuel assembly/blade guide to attain direct alignment AND orientation with the target location. [CD-396Y]	Operator rotates the Fuel Grapple and attached fuel assembly to attain direct alignment and orientation with the target location. **$ Examiner Cue: "The grapple and fuel assembly are oriented and aligned over the location stated."**		

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: 234000 Fuel Handling Equipment
TASK: Bent Mast IAW HC.OP-SO.KE-0001(Q) Attachment 2 (Alternate Path)

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*	5.8.19	Slowly **LOWER** the fuel assembly/blade guide into the target location using the Fuel Grapple hoist position control in the LOWER position.	* Operator lowers the Fuel Grapple and Dummy bundle using the Fuel Grapple Hoist control in the LOWER position. **$ Examiner Cue: "The grapple is lowering; the GRAPPLE NORMAL UP light is off."** **SRO / Examiner Cue:** *Wait 5 seconds or until Z reading of 30 and cue…* **"Stop Hoist Travel"** * The operator stops hoist movement. **Examiner Cue:** After the hoist is stopped… **"The grapple has stopped suddenly. The SLACK CABLE light is lit with the hoist at Z Position 39. The load cell is reading 25 pounds. The spotter saw the cable go slack and it remains slack."**		

OPERATOR TRAINING PROGRAM NAME: _____

JOB PERFORMANCE MEASURE DATE: _____

SYSTEM: 234000 Fuel Handling Equipment

TASK: Bent Mast IAW HC.OP-SO.KE-0001(Q) Attachment 2 (Alternate Path)

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*			Operator notifies Refueling SRO or CRS/OS. * Operator determines the mast is bent or binding by the valid SLACK CABLE light on with the grapple loaded and not in contact with any structure. **Examiner Note:** Allow the operator reasonable time to determine cause.		
	HC.OP-SO.KE-0001 Attach-ment 2		Operator determines correct procedure is HC.OP-SO.KE-0001 Attachment 2 beginning step to be 2.0 Bent Mast.		
	2.0	**Bent Mast (or Precaution 3.1.7)**	**Examiner Note:** Operator may use Precaution 3.1.7 which provides the same guidance. The action taken would also be the same.		
	Note 2.0	DO NOT attempt to lower or release the bundle without SRO approval if a bent Mast is encountered.	Operator reads Note 2.0		

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: 234000 Fuel Handling Equipment
TASK: Bent Mast IAW HC.OP-SO.KE-0001(Q) Attachment 2 (Alternate Path)

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
			Operator reads step 2.0		
*		... IF while lowering the mast, an unexpected slack cable or pre-mature weight transfer occurs, stop lowering, raise the load to clear the slack cable (if one exists), and notify the cognizant Refuel SRO or OS/CRS before attempting any corrective action.	**Examiner Note:** If permission is requested to raise the hoist, then **Cue: "Permission is given."** Operator raises main fuel hoist to clear SLACK CABLE light using the Fuel Grapple Hoist control in the RAISE position. **Examiner Cue: SLACK CABLE light is off.**		
			Operator notifies Refueling SRO and/or CRS/OS to initiate a Notification. **Examiner Cue: Acknowledge the request for corrective action.**		
		STOP TIME: _____	**Termination Cue: This JPM is complete. A different refueling crew will troubleshoot the Mast problem.**		

INITIAL CONDITIONS:

- You are the Refueling Bridge operator.
- The Reactor is in Operational Condition 4 preparing for refueling.
- The Refuel Platform is in a standby lineup, powered up, and warmed up > ½ hour.
- A Spotter and Refueling SRO are standing by.
- The Dummy bundle is being used to simulate an irradiated fuel bundle.
- The Dummy bundle is full up on the Main Hoist being moved IAW Move Sheet Step #2.
- You are to continue HC.OP-SO.KE-0001 at step 5.8.16.

INITIATING CUE:

Place the bundle in its designated storage location IAW the move sheet step #2.

ATTACHMENT 1
FUEL MOVEMENT SHEET

REFUEL NO. N/A SHEET NO. 1

CONTINUED ON SHEET N/A

Step Number	I.D. Number	FROM Location	Orientation	Time / Date	TO Location	Orientation	Time / Date	Operator Initials	Verified By Initials
01	DUMMY	SFP AD - 28	ANY		SFP AH - 50	NE			
02	DUMMY	SFP AH - 50	NE		SFP AD - 28	NW			

Prepared By — Date: 2/13/03

CARL LOSQUE DAHL PER TELCON — Independently Verified By — Date: 2/13/03

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: HOPE CREEK

SYSTEM: Refueling Platform

JPM NUMBER: 2003-NRC-S4

TASK: Perform the Monorail Auxiliary Hoist Controls Functional Test

TASK NUMBER: N2340010204

ALTERNATE PATH: [N/A]

K/A NUMBER: 234000 A3.01

IMPORTANCE FACTOR: 2.6 (RO) 3.6 (SRO)

APPLICABILITY: EO [ ] RO [ ] STA [ ] SRO [X] LSRO [X]

EVALUATION SETTING/METHOD: Walkthrough/Simulate (Perform)

REFERENCES: HC.OP-FT.KE-0001(Q), Rev. 16

TOOLS AND EQUIPMENT: Refueling Platform/None

VALIDATED JPM COMPLETION TIME: 20 Min.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A Min.

APPROVAL: N/A — BARGAINING UNIT REPRESENTATIVE; Archie E. Tillman — TRAINING SUPERVISOR; D.S. Boyle — OPERATIONS MANAGER or Designee

CAUTION: **No plant equipment shall be operated during the performance of a JPM without the following:**

1. **Permission from the OS or Unit CRS;**
2. **Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions).**
3. **Verification of the "as left" condition by a qualified individual.**

ACTUAL JPM COMPLETION TIME: _____ Min.

ACTUAL TIME CRITICAL COMPLETION TIME: N/A Min.

JPM PERFORMED BY: _____ **GRADE:** [ ] SAT [ ] UNSAT

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: _____ **DATE:** _____

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____

DATE: _____

SYSTEM: Refueling Platform

JPM NUMBER: 2003-NRC-S4

TASK: Perform the Monorail Auxiliary Hoist Controls Functional Test

TASK NUMBER: N2340010204

INITIAL CONDITIONS:

- **HC.OP-FT.KE-0001 is in progress.**

INITIATING CUE:

Perform the Monorail Auxiliary Hoist Controls Functional Test IAW HC.OP-FT.KE-0001.

Successful Completion Criteria:

All critical steps completed.

All sequential steps completed in order.

All time-critical steps completed within allotted time.

JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

JPM NUMBER: 2003-NRC-S4 OPERATOR TRAINING PROGRAM NAME: _____

JOB PERFORMANCE MEASURE DATE: _____

SYSTEM: Refueling Platform

TASK: Perform the Monorail Auxiliary Hoist Controls Functional Test IAW HC.OP-FT.KE-0001.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
			Examiner Note: Provide operator with marked up copy of HC.OP-FT.KE-0001. The operator may log onto the Refuel Bridge Computer. This is not required for Monorail Hoist operation. **Examiners Cues proceeded by a $ are given ONLY if the evolution is SIMULATED.**		
		Operator reviews precautions and limitations	Operator reviews precautions and limitations. **Examiner Cue:** If excessive time is taken reviewing precautions and limitations, inform operator that all are satisfied.		
		Operator determines beginning step of procedure	The operator determines the correct beginning step of the procedure to be 5.4.1.		

JPM NUMBER: 2003-NRC-S4

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform

TASK: Perform the Monorail Auxiliary Hoist Controls Functional Test IAW HC.OP-FT.KE-0001.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
		NOTE 5.4. IF defective or inoperative equipment is discovered while conducting this test, a Notification should be generated which directs equipment repair.	Operator reads Note.		
		CAUTION 5.4 During movement of the Refuel Platform ensure that the Fuel Grapple is not damaged by impact with the Fuel Pool walls or underwater obstructions.	Operator reads Caution.		
*	5.4.1	START TIME _____ At the Start/Stop Station, TURN the CONSOLE SELECT switch to MONO.	**Examiner Note:** Initialing Attachment 2 in the following steps is not critical. Operator turns the Start/ Stop Station CONSOLE SELECT switch to MONO. **$ Examiner Cue: The switch that you indicated is in the position stated.**		
*	5.4.2	On the Monorail Pendant, **PRESS** the BRIDGE FORWARD joystick. VERIFY the following AND INITIAL Attachment 2.	Operator moves the Monorail Pendant BRIDGE joystick to the FORWARD position to maneuver the Refueling Platform. **$ Examiner Cues: The control indicated is in the position stated.**		

JPM NUMBER: 2003-NRC-S4

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform

TASK: Perform the Monorail Auxiliary Hoist Controls Functional Test IAW HC.OP-FT.KE-0001.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*		A. Refuel Platform moves North	**Refuel Platform moves in direction indicated.**		
		B. Speed control is smooth and continuous.	**Speed control is smooth and continuous.**		
		C. Refuel Platform movement alarm is sounding AND the warning beacon is illuminated.	**Refuel Platform movement alarm is sounding and the indicating beacon is illuminated.**		
		D. VERIFY Bridge motion from only this station.	**Operator observes other control stations are not in use.**		
*	5.4.3	RELEASE the BRIDGE FORWARD joystick., VERIFY the following AND INITIAL Attachment 2.	Operator releases BRIDGE joystick. **$ Examiner Cues:**		
		A. Refuel Platform movement stops.	**Bridge stops.**		
		B. Refuel Platform movement alarm is silent and warning beacon is extinguished.	**Alarm is quiet and warning beacon is extinguished.**		
*	5.4.4	PRESS the BRIDGE REVERSE joystick VERIFY the following AND INITIAL Attachment 2.	Operator moves the Monorail Pendant BRIDGE joystick to the REVERSE position. **$ Examiner Cues: The control indicated is in the position stated.**		

JPM NUMBER: 2003-NRC-S4 OPERATOR TRAINING PROGRAM NAME: _____
JOB PERFORMANCE MEASURE DATE: _____

SYSTEM: Refueling Platform
TASK: Perform the Monorail Auxiliary Hoist Controls Functional Test IAW HC.OP-FT.KE-0001.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*		A. Refuel Platform moves south.	**Refuel Platform moves in direction indicated.**		
		B. Speed control is smooth and continuous.	**Speed control is smooth and continuous.**		
		C. Refuel Platform movement alarm is sounding AND the warning beacon is illuminated.	**Refuel Platform movement alarm is sounding and the warning beacon is illuminated.**		
*	5.4.5	RELEASE the BRIDGE REVERSE joystick. VERIFY the following AND INITIAL Attachment 2.	Operator releases the BRIDGE joystick. **$ Examiner Cues: The control indicated is in the position stated.**		
		A. Refuel Platform motion stops.	**Refuel Platform motion stops.**		
		B. Refuel Platform movement alarm is silent and warning beacon is extinguished.	**Refuel Platform movement alarm is silent warning beacon is extinguished.**		
*	5.4.6	PRESS the TROLLEY RIGHT pushbutton, VERIFY the following AND INITIAL Attachment 2.	Operator presses the TROLLEY RIGHT pushbutton. **$ Examiner Cues: The pushbutton indicated is in the position stated.**		
*		A. Trolley moves west.	**Monorail Trolley moves in direction indicated.**		
		B. Speed control is smooth and continuous.	**Speed control is smooth and continuous.**		

JPM NUMBER: 2003-NRC-S4 OPERATOR TRAINING PROGRAM NAME: _____
JOB PERFORMANCE MEASURE DATE: _____

SYSTEM: Refueling Platform
TASK: Perform the Monorail Auxiliary Hoist Controls Functional Test IAW HC.OP-FT.KE-0001.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*	5.4.7	RELEASE the TROLLEY RIGHT pushbutton, VERIFY the Trolley motion stops AND INITIAL Attachment 2.	Operator releases the TROLLEY RIGHT pushbutton. **$ Examiner Cue:** **Trolley motion stops.**		
*	5.4.8	PRESS the TROLLEY LEFT pushbutton, VERIFY the following AND INITIAL Attachment 2.	Operator presses the TROLLEY LEFT pushbutton. **$ Examiner Cues: The pushbutton indicated is in the position stated.**		
*		A. Trolley moves east.	**Monorail Trolley moves in direction indicated.**		
		B. Speed control is smooth and continuous.	**Speed control is smooth and continuous.**		
*	5.4.9	RELEASE the TROLLEY LEFT pushbutton, VERIFY the Trolley motion stops AND INITIAL Attachment 2.	Operator releases the TROLLEY LEFT pushbutton. **$ Examiner Cue: Trolley motion stops**		

JPM NUMBER: 2003-NRC-S4 OPERATOR TRAINING PROGRAM NAME: _____
JOB PERFORMANCE MEASURE DATE: _____

SYSTEM: Refueling Platform

TASK: Perform the Monorail Auxiliary Hoist Controls Functional Test IAW HC.OP-FT.KE-0001.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*	5.4.10	PRESS the HOIST LOWER pushbutton, AND LOWER the grapple to greater than 7 feet below the surface of the water to clear the hoist override. VERIFY the following AND INITIAL Attachment 2	**Examiner Cue: Simulate remaining Hoist steps.** Operator presses the HOIST LOWER pushbutton. The hoist cable moves downward at least 6 inches below the Normal Up stop. **$ Examiner Cues: The pushbutton indicated is in the position stated.**		
*		A. Monorail Hoist cable moves downward.	**Monorail Hoist cable moves in the direction indicated.**		
		B. Speed control has high and low speed and is smooth and continuous.	**Speed control has high and low speed and is smooth and continuous.**		
		• A slight depression on the pushbutton will produce a slow speed.	**Hoist runs slow.**		
		• A full depression on the pushbutton will produce a slow speed for a short period of time then switch to fast speed.	**Hoist runs slow then fast.**		

JPM NUMBER: 2003-NRC-S4 OPERATOR TRAINING PROGRAM NAME: _____
JOB PERFORMANCE MEASURE DATE: _____

SYSTEM: Refueling Platform
TASK: Perform the Monorail Auxiliary Hoist Controls Functional Test IAW HC.OP-FT.KE-0001.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*	5.4.11	RELEASE the HOIST LOWER pushbutton, VERIFY the hoist cable motion stops AND INITIAL Attachment 2.	Operator releases HOIST LOWER pushbutton. **$ Examiner Cue:** **Hoist cable motion stops.**		
*	5.4.12	PRESS the HOIST RAISE pushbutton, VERIFY the following AND INITIAL Attachment 2.	Operator presses HOIST RAISE pushbutton. **$ Examiner Cues: The pushbutton indicated is in the position stated.**		
*		A. Monorail Hoist cable moves upward.	**Monorail Hoist cable moves in direction indicated.**		
		B. Speed control has high and low speed and is smooth and continuous	**Speed control has high and low speed and is smooth and continuous.**		
		• A slight depression on the pushbutton will produce a slow speed.	**Hoist moves at a slow speed.**		
		• A full depression on the pushbutton will produce a slow speed for a short period of time then switch to fast speed.	**Hoist moves at a slow speed for a short period of time then switch to fast speed.**		

JPM NUMBER: 2003-NRC-S4 OPERATOR TRAINING PROGRAM NAME: _____

JOB PERFORMANCE MEASURE DATE: _____

SYSTEM: Refueling Platform

TASK: Perform the Monorail Auxiliary Hoist Controls Functional Test IAW HC.OP-FT.KE-0001.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
	5.4.13	RELEASE the HOIST RAISE pushbutton before it reaches the Normal Up Rotary electrical stop, VERIFY the hoist cable motion stops AND INITIAL Attachment 2.	Operator releases HOIST RAISE pushbutton before the hoist reaches the Normal Up stop. **$ Examiner Cue:** **Hoist cable motion stops below the Normal Up stop.**		
*	5.4.14	PRESS the HOIST RAISE pushbutton to raise the hoist cable to the Normal Up Rotary electrical stop. VERIFY the hoist cable motion automatically stops AND INITIAL Attachment 2.	Operator presses HOIST RAISE pushbutton until hoist automatically stops. **$ Examiner Cue: The pushbutton indicated is in the position stated.** **Hoist cable rises until automatically stops.**		

JPM NUMBER: 2003-NRC-S4 OPERATOR TRAINING PROGRAM NAME: _____
JOB PERFORMANCE MEASURE DATE: _____

SYSTEM: Refueling Platform
TASK: Perform the Monorail Auxiliary Hoist Controls Functional Test IAW HC.OP-FT.KE-0001.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
		NOTE 5.4.15 The Mechanical Jam Stop may be moved down on the cable to check the MAX UP ROTARY Switch. HC.OP-SO.KE-0001(Q) should be referred to for stop setup.	Operator reads Note. **Examiner Cue: Moving the Mechanical Jam Stop is not required.** **Examiner Note: Depending where the Mechanical Jam Stop is positioned, simulation of step 5.4.15 may be required.**		
*	5.4.15	Simultaneously PRESS the HOIST LIMIT OVERRIDE AND HOIST RAISE pushbuttons. VERIFY the Monorail Hoist cable moves upward AND automatically stop at the Maximum Up Rotary limit switch cut-out AND INITIAL Attachment 2.	Operator simultaneously presses the HOIST LIMIT OVERRIDE and HOIST RAISE pushbutton until hoist automatically stops. **$ Examiner Cue: The pushbutton indicated is in the position stated. The Hoist cable rises until automatically stops.** **Examiner Cue:** **Another refueling crew will finish the remaining steps of the procedure.**		

JPM NUMBER: 2003-NRC-S4

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform

TASK: Perform the Monorail Auxiliary Hoist Controls Functional Test IAW HC.OP-FT.KE-0001.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
		STOP TIME: _____	**Terminating Cue:** Repeat back message from the operator on the status of the JPM, and then state "**This JPM is complete**".		

JOB PERFORMANCE MEASURE
STUDENT INFO SHEET

INITIAL CONDITIONS:

- HC.OP-FT.KE-0001 is in progress.

INITIATING CUE:

Perform the Monorail Auxiliary Hoist Controls Functional Test IAW HC.OP-FT.KE-0001.

PSEG NUCLEAR L.L.C.

HOPE CREEK GENERATING STATION

HC.OP-FT.KE-0001(Q) - Rev. 17

CONTROL COPY# 0702

REFUELING PLATFORM AND FUEL GRAPPLE OPERABILITY TEST - REFUELING

USE CATEGORY: I

A. Biennial Review performed Yes ___ No ___ N/A ✓

B. Change Package(s) and Affected Document Number(s) incorporated into this revision.

- CP No. _____ CP Rev. No. ___ AD No. _____ AD Rev. No. ___ or None ✓

C. OTSC(s) incorporated into this revision:

- OTSC No(s) _____ or None ✓

REVISION SUMMARY

1. The following changes have been incorporated based on **DCP 80047191**:

   - 5.1.7 has been revised to indicate the verification performed is visual.
   - Steps 5.2.1.D - **TOUCH** the SELECT MANUAL on the Touch Screen has been deleted, function does not exist..
   - Steps 5.2.1.E - **ENSURE** the MANUAL OPERATION ACTIVE button is being displayed has been deleted, function does not exist..
   - Step 5.2.2.D.5 and 5.2.2.F.5 - have been revised to indicate the readout increases in the negative direction.
   - Step 5.2.2.H.3 has been revised to replace " increases in negative numbers"
   - Step 5.2.2.J.3 has been revised to replace " decreases in negative numbers"
   - Step 5.2.3.M and 5.2.3.R have been revised to correct step referenced.
   - Step 5.2.3.U hasd been revised to indicate the TRAVEL OVERRIDE PB is also required to be pressed.

IMPLEMENTATION REQUIREMENTS

Effective date 3-25-03

APPROVED: _____ 3/25/03

Manager - Hope Creek Operations **Date**

REFUEL PLATFORM AND FUEL GRAPPLE OPERABILITY TEST - REFUELING

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REFUEL PLATFORM AND FUEL GRAPPLE OPERABILITY TEST - REFUELING

1.0 PURPOSE

This procedure provides detailed instructions for insuring the operational readiness of the Refuel Platform and Fuel Grapple. This procedure should be performed after Refuel Platform and Fuel Grapple related maintenance has been completed and prior to the refueling outage. **[CD-182C, CD-281C]**

2.0 PREREQUISITES

2.1 Permission to perform this procedure has been obtained from the OS/CRS as indicating by a signature on Attachment 1 of this procedure. Q

2.2 No testing, maintenance or other activity is in progress on the Refuel Platform or in the Spent Fuel Pool, New Fuel Vault or Shipping Cask Pit which would impede the movement of the Refuel Platform is in progress. Q

2.3 **ENSURE** that AC power is available to the Refuel Platform by verifying that Breaker 52-254061 closed. Breaker 52-254061 should be closed to ensure adequate warm up prior to performing this procedure (the minimum warm up time is ½ hour). The Control Panels have heaters that require power to prevent condensation between periods of use (outages). Q

2.4 **OBTAIN** the Fuel Pool Storage location for the Dummy Bundle from Reactor Engineering. Q

2.5 **VERIFY** the Fuel Grapple Mast Stowage Clamp has been removed prior to moving the Fuel Grapple. Q

2.6 HC.MD-PM.KE-0003(Q); Refueling Platform Operational Check and HC.OP-ST.KE-0001(Q), Refuel Interlock Operability Functional Test - Section 5.4 have been completed. Q

2.7 **INITIAL** Attachment 2 signifying all prerequisites listed above are satisfied. Q

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Precautions

3.1.1 NO fuel assemblies are to be grappled OR moved while conducting this procedure. _____

3.1.2 Prior to moving the Refuel Platform, Fuel Grapple OR Monorail Hoist: _____

A. **IDENTIFY** OR **REPOSITION** underwater obstructions _____

B. **REMOVE** all hoses, ropes, electrical cables OR other equipment from the Refuel Platform tracks _____

C. **ENSURE** all hoses, ropes, electrical cables OR other equipment are not secured to the Refuel Platform in a manner that would restrict Refuel Platform (Bridge), Trolley OR Monorail Hoist movement. _____

D. **ENSURE** the Jib Cranes AND Fuel Channeling Boom are positioned so they will not interfere with Refuel Platform (Bridge) OR Trolley motion. _____

3.1.3 The Spent Fuel Pool and portions of the Refuel Platform are contaminated with radioactive material. **OBTAIN** AND **FOLLOW** the requirements listed on the Radiation Work Permit. _____

3.1.4 To prevent damage to underwater lamps **ENSURE** that the lamps remain fully submerged while they are energized. _____

3.1.5 Operation of the Refuel Platform (Bridge), Trolley OR Fuel Grapple with the variable speed control operators should be accomplished by gradual accelerations and decelerations, rather than full on and full off deflections of the operators. This will produce less wear on the equipment and better operator control. _____

3.1.6 The Refueling Platform should NEVER be left unattended with the "POWER ON" (as indicated by the STOP light on the Start/Stop Station). An electrical failure could cause the platform to move on its own accord. Turning off the power for short durations while the operator leaves the platform should be a standard practice. _____

3.1.7 Abnormalities that may occur during operation, such as spurious high load readings OR audible indications should not be ignored. Such occurrences must be investigated AND the cause ascertained to prevent possible subsequent damage to the platform or handled fuel. _____

3.1.8 Should an emergency stop occur during lowering of auxiliary OR monorail hoists, the safety brake of that hoist will set without delay AND take the hoist load on its ratchet-pawl arrangement. _____

Prior to attempting to releasing the brake, the cause of the emergency stop should be understood. IF possible, the grapple should be moved away from irradiated fuel prior to performing the release. _____

In the case where a full load is being lowered at the time of the stop, this load may prevent the safety brake from immediately releasing on a subsequent hoist operation, unless the hoist is commanded to raise as an initial operation, thereby taking the load off the safety brake. _____

IF the brake does not release because of a lowering command, it will emit a loud chattering noise, alerting the operator to raise the load. In most cases, no harm will occur as the result of an operator not following this procedure. The only consequence is that the safety brake will prevent the hoist from lowering. _____

3.1.9 Should an emergency stop occur during the lowering of the Main Hoist, the hoist safety brake will set without delay and take the hoist load. _____

Prior to attempting to release the brake, the cause of the emergency stop should be understood. IF possible, the grapple should be moved away from irradiated fuel prior to performing the release. _____

In the case where a full load is being loaded at the time of the stop, this load may prevent the safety brake from immediately releasing on a subsequent hoist operation, unless the hoist is commanded to raise as an initial operation, thereby taking the load off the safety brake. _____

In most cases, IF the brake does not release because of a lowering command, no harm will occur as the result of an operator not following this procedure. The only consequence is that the safety brake will prevent the hoist from lowering. _____

3.2 **Limitations**

3.2.1 During movement of the Refuel Platform (Bridge), Trolley and Fuel Grapple **ENSURE** that the Fuel Grapple is not damaged by impact WITH the Spent Fuel Pool walls or underwater obstructions. _____

3.2.2 While slowly removing submerged tools OR equipment from the Spent Fuel Pool water, **MONITOR** radiation levels to assure personnel safety and radiation exposure is minimized. **[CD-217B]** _____

3.2.3 **USE** established procedures to prevent the spread of radioactive materials WHEN removing contaminated equipment from the Spent Fuel Pool water. ____

3.2.4 A designated "spotter" is required for all bridge activities which require any grapple to be loaded. _____

3.2.5 NO individual should perform bridge activities for greater than six consecutive hours. _____

4.0 EQUIPMENT REQUIRED

- Underwater flood lamp
- Dummy bundle
- Clipboard and pencil with rope tethers
- Binoculars
- Plexiglass viewing aid with rope tethers
- Jet Pump Grapple and/or General Purpose Grapple
- Actuating Poles with General Purpose Grapple Manipulator
- Test Weight - (located at V-47 and is 550 lbs including Refuel Mast).

5.0 PROCEDURE

5.1 Refuel Platform General Visual Inspection [CD-444X]

NOTE 5.1

IF defective or inoperative equipment is discovered while conducting this inspection, a Notification should be generated which directs equipment repair

5.1.1 Visually **INSPECT** the Refuel Bridge for the following AND **INITIAL** Attachment 2:

N/A

- Excessive leaking oil or grease from gearboxes or couplings drips pans are in place (as required).

CAUTION

Fuel Grapple, Auxiliary Frame and Monorail Hoists are contaminated with radioactive materials. Implement established Radiological Protection procedure to prevent personnel contamination.

N/A

- All pneumatic hoses for integrity.
- Integrity of all electrical cable.
- Integrity of all hoist lifting cables.
- Security of all fasteners using either safety wire, lock tight or tack welded.
- Security of all coupling and fasteners.
- Foreign material exclusion requirements
- Damage or deterioration of any part or sub-assembly.
- Fuel Grapple gimbal pins are properly installed and show no visible deterioration. **[CD-950A]**

5.1.2 At the West end of the Refuel Platform
VERIFY the following
AND **INITIAL** Attachment 2. N/A

A. Main Power Disconnect Switch is in the CLOSED position.

B. Monorail Hoist Disconnect Switch is in the CLOSED position.

C. Air Compressor Disconnect Switch is in the CLOSED position.

5.1.3 At the West end of the Refuel Platform (Bridge),
VERIFY the Main Hoist Air Isolation Valve
AND Monorail Hoist Air Isolation Valve are full OPEN
AND **INITIAL** Attachment 2.

5.1.4 At the Refuel Platform Air Compressor Receiver,
VERIFY the following
AND **INITIAL** Attachment 2.

A. Air Compressor stops automatically
WHEN the receiver pressure is equal to 110 psig (105 - 115 psig).

B. Air Receiver Relief Valve is not leaking.

5.1.5 **OPEN** the Air Receiver Drain Valve
AND **VERIFY** the Air Compressor automatically starts
before Receiver air pressure decreases to 70 psig
AND **INITIAL** Attachment 2.

5.1.6 **CLOSE** the Air Receiver Drain Valve.

5.1.7 Visually **VERIFY** the Refuel Platform (Bridge)
AND Trolley Position Indication System cog wheels
are placed correctly in the tracking rack
AND **INITIAL** Attachment 2.

5.2 Fuel Grapple Controls and Grapple Hoist Functional Test

NOTE 5.2

IF defective or inoperable equipment or indications are discovered while conducting this test, a Notification should be generated which directs equipment repair.

NOTE 5.2.1

The computer takes approximately one minute to load all the files required for operation.

N/A

5.2.1 **PERFORM** the following to activate AND log on to the Refuel Bridge Computer:

A. **TURN** all circuit breakers for the Control System to the ON position. [Located on top of Bridge]

B. **PRESS** the START PB on the START/STOP Station mounted in the Main Trolley Cab.
AND the following will occur.
INITIAL Attachment 2.

- STOP PB illuminates
- Heater circuits to the motors and cabinets are automatically disconnected when power is turned on.

C. **PERFORM** the following to log on to the system:

1. **VERIFY** the Log On Screen is on.
2. **SELECT** LOG ON icon, on the Touch Screen, AND **VERIFY** that the Keypad screen is visible.
3. **TYPE** your name
THEN **TOUCH** the ENTER icon.
4. IF incorrect name was entered,
TOUCH the CHANGE NAME icon
THEN **TYPE** your name
THEN **TOUCH** the ENTER icon.

Continued next page

5.1.2.C (continued)

5. **TOUCH** the ENTER PASSWORD icon. N/A

6. **TYPE** password
THEN **TOUCH** the ENTER icon.

7. **SELECT** LIGHT TEST icon on the Touch Screen.

NOTE 5.2.1.C.8

The Computer Override Light will not illuminate unless the keyswitch for Computer Override is used.

8. **VERIFY** all lamps on the Status Display Panel
AND on the right and left hand controllers are illuminated. N/A

9. **SELECT** LIGHT TEST icon on the Touch Screen
to end the lamp test.

10. **OBSERVE** the "IS CASK GATE INSTALLED?"
prompt on the screen,
AND **ANSWER** by pressing YES or NO on the Touch Screen.

11. **OBSERVE** the "IS REACTOR GATE INSTALLED?"
prompt on the screen,
AND **ANSWER** by pressing YES or NO on the Touch Screen.

12. **VERIFY** that the Log On Screen reappears.

13. **TOUCH** the PRESS FOR OPERATION icon
to begin operation of the system.

N/A

5.2.2 Fuel Grapple Controls Functional Test

A. **CHECK** the PLATFORM, TROLLEY
AND GRAPPLE Control Operators are in the NEUTRAL position
AND the Control SELECT Switch is placed to the CONSOLE position. ____

B. **PRESS** the STOP PB on the Start/Stop Station.
VERIFY the Red STOP pushbutton light is off
AND **INITIAL** Attachment 2. ____

C. **PRESS** the START PB on the Start/Stop Station to
restart Refuel Platform electrical equipment. ____

CAUTION 5.2.2.D thru 5.2.2.N

A. During movement of the Refuel Platform (Bridge), Trolley and Fuel Grapple ensure that the Fuel Grapple is not damaged by impact with the Fuel Pool walls or underwater obstructions.

B. Operation of the Refuel Platform (Bridge), Trolley or Fuel Grapple with the variable speed controllers should be accomplished by gradual accelerations and decelerations, rather than full on and full off deflection of the controls.

D. **PLACE** the PLATFORM Control Operator to the FORWARD position,
VERIFY the following
AND **INITIAL** Attachment 2.

N/A

1. Refuel Platform moves North (away from the Core). ____
2. Speed Control is variable, continuous and smooth. ____
3. Platform is not "crabbing" (moving unsteadily) down the rails. ____
4. Bridge motion warning alarm
AND the warning beacon are operating. ____
5. Bridge Readout increases in the negative direction. ____

Continued on next page

5.2.2 (continued)

E. **RETURN** the PLATFORM Control Operator to the NEUTRAL position, **VERIFY** the following AND **INITIAL** Attachment 2. N/A

1. Refuel Platform motion stops.

2. Bridge motion warning alarm AND the warning beacon stops.

F. **PLACE** the PLATFORM Control Operator to the REVERSE position, **VERIFY** the following AND **INITIAL** Attachment 2.

1. Refuel Platform moves South. (towards the Core)

2. Speed control is variable, continuous and smooth.

3. Platform is NOT "crabbing" (moving unsteadily) down the rails.

4. Bridge motion warning alarm AND the warning beacon are operating.

5. Bridge Readout will decrease in the negative direction (becomes a smaller negative number).

G. **RETURN** the PLATFORM Control Operator to the NEUTRAL position, **VERIFY** the following AND **INITIAL** Attachment 2.

1. Refuel Platform motion stops.

2. Bridge motion warnings alarm AND the warning beacon are stop.

Continued on next page

5.2.2 (continued)

H. **PLACE** the TROLLEY Control Operator to the RIGHT position, **VERIFY** the following AND **INITIAL** Attachment 2. N/A

1. Trolley moves East. (as the operator faces the Mast) ____

2. Speed control is variable, continuous and smooth. ____

3. Trolley Readout numbers increase. ____

I. **RETURN** the TROLLEY Control Operator to the NEUTRAL position, **VERIFY** that Trolley motion stops AND **INITIAL** Attachment 2. ____

J. **PLACE** the TROLLEY Control Operator to the LEFT position, **VERIFY** the following AND **INITIAL** Attachment 2. ____

1. Trolley moves West. (as the operator faces the Mast) ____

2. Speed control is variable, continuous and smooth. ____

3. Trolley Readout numbers decrease. ____

K. **RETURN** the TROLLEY Control Operator to the NEUTRAL position, **VERIFY** that Trolley motion stops AND **INITIAL** Attachment 2. ____

L. **PLACE** the GRAPPLE Control Operator to the LOWER position, **VERIFY** the following AND **INITIAL** Attachment 2. ____

1. GRAPPLE NORMAL UP light goes out. ____

2. Fuel Grapple Telescopic Mast extends without binding as the Fuel Grapple is lowered. ____

Continued on next page

5.2.2 (continued)

M. **PLACE** the GRAPPLE Control Operator to the RAISE position, **VERIFY** the following AND **INITIAL** Attachment 2. N/A

1. Fuel Grapple Mast Telescopes inward without binding as the Fuel Grapple is raised.

2. Fuel Grapple automatically stops WHEN it reaches the full up position.

3. Green GRAPPLE NORMAL UP light is on.

N. IF required, **POSITION** the Plexiglass Viewing Aid so that the Fuel Grapple hooks can be observed.

O. **VERIFY** grapple camera AND monitor are functioning.

P. **VERIFY** that the protective cover over the GRAPPLE ENGAGE/RELEASE Switch on the Right Hand Controller is in place AND **INITIAL** Attachment 2. **[CD-978A, CD-736D]**

Q. **UTILIZE** the grapple monitor and/or binoculars and IF required, the Plexiglass Viewing Aid to facilitate observation of the Fuel Grapple hooks

Continued on next page

5.2.2 (continued)

NOTE 5.2.2.R and 5.2.2.S

Fuel Grapple hooks should actuate in approximately one second. Sluggish hook operation is indicative of binding operating cylinders or water filled air lines.

R. **PLACE** the GRAPPLE ENGAGE/RELEASE Switch on the Right Hand Controller to the ENGAGE position, **VERIFY** the following AND **INITIAL** Attachment 2. N/A

1. Fuel Grapple hooks move to the ENGAGED position.
2. Grapple ENGAGE light is on.
3. No air bubbles escape from the air hoses OR hook operating cylinder.

S. **PLACE** the GRAPPLE ENGAGE/RELEASE Switch on the Right Hand Controller to the RELEASE position, **VERIFY** the following AND **INITIAL** Attachment 2.

1. Fuel Grapple hooks move to the RELEASED position.
2. Grapple ENGAGE light is off.
3. No air bubbles escape from the air hoses or hook operating cylinder.

T. **PERFORM** the following to check the fail safe position of the grapple hook AND **INITIAL** Attachment 2 **[CD-986F]**.

1. **PLACE** the GRAPPLE ENGAGE/RELEASE Switch on the Right Hand Controller in the RELEASE position to open the grapple hooks.
2. **CUT** power to the Bridge by pressing the STOP PB on the Start/Stop Station.

Continued on next page

5.2.2.T (continued)

3. Visually **VERIFY** the Grapple hooks CLOSE automatically. N/A

4. **RESTORE** power by pressing the START PB on the Start/Stop Station.

NOTE 5.2.3

A. During movement of the Refuel Platform (Bridge), Trolley and Fuel Grapple ensure that the Fuel Grapple is not damaged by impact with the fuel pool walls or underwater obstructions.

B Operation of the Refuel Platform (Bridge), Trolley or Fuel Grapple with the variable speed controllers should be accomplished by gradual accelerations and decelerations, rather than full on and full off deflection of the controls.

5.2.3 Fuel Grapple Hoist Functional Test **[CD-736D]** N/A

A. Using the PLATFORM AND TROLLEY Control Operators, **MANEUVER** the Fuel Grapple so that it is positioned approximately over the Dummy Bundle.

CAUTION 5.2.3.B

To prevent damage to underwater lamps ensure that the lamps remain fully submerged while they are energized. [CD-673D]

B. **SUBMERGE, POSITION** AND **ENERGIZE** an underwater lamp to illuminate the lifting handle of the Dummy Bundle. N/A

C. **POSITION** the Fuel Grapple directly over the Dummy Bundle by using the Refuel Platform Traverse Toggle (fine positioning, 4-way) control switch. **VERIFY** the Traverse Toggle FORWARD and REVERSE and LEFT and RIGHT Position Controls function successfully AND **INITIAL** Attachment 2.

Continued on next page

5.2.3 (continued)

D. Using the GRAPPLE control operator,
LOWER the Fuel Grapple UNTIL it is approximately one foot above the handle of the Dummy Bundle. N/A

E. **ROTATE** the Fuel Grapple into alignment WITH the Dummy Bundle handle.

F. **PLACE** the GRAPPLE ENGAGE/RELEASE Switch to the RELEASE position to ensure the Fuel Grapple hooks are open.
OBSERVE the grapple ENGAGE light off.

G. Using the GRAPPLE Control Operator,
slowly **LOWER** the Fuel Grapple onto the Dummy Bundle.

H. WHEN the Fuel Grapple is fully lowered on the Dummy Bundle,
VERIFY the following
AND **INITIAL** Attachment 2.

1. Fuel Grapple downward motion automatically stops.

2. SLACK CABLE light is on.

CAUTION 5.2.3.I

No fuel assemblies are to be grappled or moved while conducting this procedure.

I. **PLACE** the GRAPPLE ENGAGE/RELEASE Switch to the ENGAGE position.
CHECK the grapple ENGAGED light is on. N/A

J. **RECORD** the initial Refuel Platform (Bridge), Trolley AND Fuel Grapple values from the digital position indicators on Attachment 2.

Continued on next page

5.2.3 (continued)

K. **RAISE** the Fuel Grapple with attached Dummy Bundle using the GRAPPLE Control Operator in the RAISE position, UNTIL the Fuel Grapple is fully raised.
VERIFY the following
AND **INITIAL** Attachment 2.

N/A

1. Fuel Grapple automatically stops without driving into its Overtravel Limit Switch.

2. GRAPPLE NORMAL UP light is on.

CAUTION 5.2.3.L

To prevent damage to the Dummy Bundle or other submerged equipment, avoid collisions with the loaded Fuel Grapple and the Spent Fuel Pool walls or submerged equipment.

L. Using the PLATFORM AND TROLLEY Control Operators, **MANEUVER** the loaded Fuel Grapple to a Spent Fuel Pool location away from the Dummy Bundle storage location.

N/A

M. Using the PLATFORM AND TROLLEY Control Operators, **MANEUVER** the loaded Fuel Grapple to the coordinates listed in procedure Step 5.2.3.J.

N. **ROTATE** the Fuel Grapple to align the Dummy Bundle WITH its storage location.

O. Slowly **LOWER** the Dummy Bundle by using the GRAPPLE Control Operator in the LOWER position.
ADJUST Refuel Platform position with the Traverse Toggle Control Switch to fine tune alignment IF required.
VERIFY the GRAPPLE NORMAL UP light is off AND **INITIAL** Attachment 2.

Continued on next page

5.2.3 (continued)

P. WHEN the Dummy Bundle is fully seated in its storage location, **VERIFY** the following AND **INITIAL** Attachment 2. N/A

1. Fuel Grapple automatically stops lowering.
2. SLACK CABLE light is on.
3. Load cell indicates less than 50 pounds.

Q. **RECORD** the final Refuel Platform (Bridge), Trolley AND Fuel Grapple values from the digital position indicators on Attachment 2.

R. **VERIFY** the position indication values obtained in procedure Steps 5.2.3.J and 5.2.3.Q are within ± 0.50 AND **INITIAL** Attachment 2.

S. **PLACE** the GRAPPLE ENGAGE/RELEASE Switch to the RELEASE position.

T. **RAISE** the Fuel Grapple UNTIL the GRAPPLE NORMAL UP light is on AND the upward motion automatically stops.

U. Simultaneously **PRESS** the HOIST OVERRIDE pushbutton AND TRAVEL OVERRIDE pushbutton AND **PLACE** the GRAPPLE Control Operator to the RAISE position. Slowly **RAISE** the Grapple until the BACK UP HOIST LIMIT light is illuminated on the Interlock Status Display Module. **VERIFY** the Hoisting motion automatically stops AND the hoist can NOT be raised above this point. **INITIAL** Attachment 2. **[CD-124B]**

V. **RETURN** the Fuel Grapple to the GRAPPLE NORMAL UP position by using the GRAPPLE Control Operator. **VERIFY** the BACK UP HOIST LIMIT light is off.

Continued on next page

5.2.3 (continued)

CAUTION 5.2.3.W

To prevent damage to underwater lamps, ensure that the lamps remain fully submerged while they are energized.

W. Using the CONSOLE LIGHTS Toggle Switch,
TURN on the Fuel Grapple lamps.
VERIFY both lamps are operable
AND **INITIAL** Attachment 2. N/A

X. **TURN** off the Fuel Grapple lights. ↓

5.3 Frame Auxiliary Hoist Controls Functional Test

NOTE 5.3

IF defective or inoperative equipment is discovered while conducting this test, a Notification should be generated which directs equipment repair.

CAUTION 5.3

During movement of the Refuel Platform (Bridge) or Trolley ensure that the Fuel Grapple is not damaged by impact with the Spent Fuel Pool walls or underwater obstructions.

5.3.1 At the Start/Stop Station,
TURN the CONSOLE SELECT Switch to FRAME. N/A

NOTE 5.3.2 through 5.3.29

All remaining steps for the Auxiliary Hoist Functional Test are performed using the Auxiliary Hoist (Frame) pendant controls.

5.3.2 On the Frame Pendant,
PRESS the BRIDGE FORWARD joystick,
VERIFY the following
AND **INITIAL** Attachment 2. N/A

A. Refuel Platform moves North.

B. Speed control is smooth and continuous.

C. Refuel Platform movement alarm is sounding AND the warning beacon is illuminated.

D. **VERIFY** Bridge motion from only this station.

N/A

5.3.3 **RELEASE** the BRIDGE FORWARD joystick, **VERIFY** the following AND **INITIAL** Attachment 2.

A. Refuel Platform movement stops.

B. Refuel Platform movement alarm is silent AND the warning beacon is off.

5.3.4 **PRESS** the BRIDGE REVERSE joystick, **VERIFY** the following AND INITIAL Attachment 2.

A. Refuel Platform moves south.

B. Speed control is smooth and continuous.

C. Refuel Platform movement alarm is sounding AND the warning beacon is illuminated.

5.3.5 **RELEASE** the BRIDGE REVERSE joystick, **VERIFY** the following AND **INITIAL** Attachment 2.

A. Refuel Platform motion stops.

B. Refuel Platform movement alarm is silent AND the warning beacon is off.

5.3.6 **PRESS** the TROLLEY RIGHT pushbutton, **VERIFY** the following AND **INITIAL** Attachment 2.

A. Trolley moves east.

B. Speed control is smooth and continuous.

5.3.7 **RELEASE** the TROLLEY RIGHT pushbutton, **VERIFY** the Trolley motion stops AND **INITIAL** Attachment 2.

5.3.8 **PRESS** the TROLLEY LEFT pushbutton,
VERIFY the following
AND **INITIAL** Attachment 2. N/A

A. Trolley moves west.

B. Speed control is smooth and continuous.

5.3.9 **RELEASE** the TROLLEY LEFT pushbutton,
VERIFY the Trolley motion stops
AND **INITIAL** Attachment 2.

5.3.10 **PRESS** the HOIST LOWER pushbutton,
VERIFY the following
AND **INITIAL** Attachment 2.

A. Auxiliary Hoist cable moves downward.

B. Speed Control has high and low speed and is smooth and continuous.

- A slight depression on the pushbutton will produce a slow speed.
- A full depression on the pushbutton will produce a slow speed for a short period of time then switch to fast speed.

5.3.11 **RELEASE** the HOIST LOWER pushbutton,
VERIFY the hoist cable motion stops
AND **INITIAL** Attachment 2.

5.3.12 **PRESS** the HOIST RAISE pushbutton,
VERIFY the following
AND **INITIAL** Attachment 2.

A. Auxiliary Hoist cable moves upward.

B. Speed control has high and low speed and is smooth and continuous.

- A slight depression on the pushbutton will produce a slow speed.
- A full depression on the pushbutton will produce a slow speed for a short period of time then switch to fast speed.

5.3.13 **RELEASE** the HOIST RAISE pushbutton before it reaches the Normal Up Rotary electrical stop, **VERIFY** the hoist cable motion stops AND **INITIAL** Attachment 2. N/A

5.3.14 **PRESS** the HOIST RAISE pushbutton to raise the hoist cable to the Normal Up Rotary electrical stop. **VERIFY** the hoist cable motion automatically stops AND **INITIAL** Attachment 2.

NOTE 5.3.15

The Mechanical Jam Stop may be moved down on the cable to check the MAX UP ROTARY Switch. HC.OP-SO.KE-0001(Q) should be referred to for stop setup.

5.3.15 Simultaneously **PRESS** the HOIST LIMIT OVERRIDE AND the HOIST RAISE pushbuttons. **VERIFY** the Frame Hoist cable moves upward and automatically stops at the Maximum Up Rotary Switch AND **INITIAL** Attachment 2. N/A

NOTE 5.3.16

This tool is used for load cell operability testing in this procedure. The Dummy Bundle will only be relocated with the Fuel Grapple.

5.3.16 **ATTACH** the Jet Pump Grapple to the Frame Auxiliary Hoist cable in accordance with HC.OP-SO.KE-0001(Q). **TIGHTEN** the locking nut on the cable terminal to prevent inadvertent separation of the grapple from the cable. **[CD-949A]** N/A

A. **ATTACH** Quick Disconnect Air fittings and hose to the Grapple AND **ACTUATE** the grapple open and closed.

B. **VERIFY** correct operation WHEN the correct button is pressed.

5.3.17 **SUBMERGE** the Jet Pump Grapple in the Spent Fuel Pool water taking care to avoid splashing.

5.3.18 Using the Refuel Platform (Bridge and Trolley) position controls, **MANEUVER** the Jet Pump Grapple over the test weight located at V-47.

5.3.19 **LOWER** the Jet Pump Grapple to the level of the Test Weight Handle. N/A

NOTE 5.3.20

No fuel assemblies are to be grappled or moved while conducting this procedure.

5.3.20 **ATTACH** the Jet Pump Grapple to the Test Weight Handle. N/A

NOTE 5.3.21

Hoist Load Cell should indicate approximately 200 lbs. plus the weight of the stop block and tool.

5.3.21 **RAISE** the test weight only high enough to **VERIFY** the Auxiliary Hoist Load Cell indication operability AND **INITIAL** Attachment 2. N/A

5.3.22 **LOWER** the test weight until the Auxiliary Hoist cable is slack.

5.3.23 **REMOVE** the Jet Pump Grapple from the Test Weight Handle.

5.3.24 **VERIFY** that NO fuel assemblies OR other equipment have been inadvertently grappled AND **INITIAL** Attachment 2.

5.3.25 Using the HOIST RAISE pushbutton, **RAISE** the Jet Pump Grapple to the Auxiliary Hoist Maximum limit.

5.4 Monorail Auxiliary Hoist Controls Functional Test

NOTE 5.4

IF defective or inoperative equipment is discovered while conducting this test a Notification should be generated which directs equipment repair.

CAUTION 5.4

During movement of the Refuel Platform ensure that the Fuel Grapple is not damaged by impact with the Fuel Pool walls or underwater obstructions.

5.4.1 At the Start/Stop Station,
TURN the CONSOLE SELECT Switch to MONO. _____

NOTE 5.4.2 through 5.4.29

All remaining steps for the Monorail Hoist Functional Test are performed using the Monorail Hoist (Monorail) pendant controls

5.4.2 On the Monorail Pendant,
PRESS the BRIDGE FORWARD joystick,
VERIFY the following
AND **INITIAL** Attachment 2. _____

A. Refuel Platform moves North. _____

B. Speed control is smooth and continuous. _____

C. Refuel Platform movement alarm is sounding
AND the warning beacon is illuminated. _____

D. **VERIFY** Bridge motion from only this station. _____

5.4.3 **RELEASE** the BRIDGE FORWARD joystick, **VERIFY** the following AND **INITIAL** Attachment 2. _____

A. Refuel Platform movement stops. _____

B. Refuel Platform movement alarm is silent AND the warning beacon is off. _____

5.4.4 **PRESS** the BRIDGE REVERSE joystick, **VERIFY** the following AND INITIAL Attachment 2. _____

A. Refuel Platform moves south. _____

B. Speed control is smooth and continuous. _____

C. Refuel Platform movement alarm is sounding AND the warning beacon is illuminated. _____

5.4.5 **RELEASE** the BRIDGE REVERSE joystick, **VERIFY** the following AND **INITIAL** Attachment 2. _____

A. Refuel Platform motion stops. _____

B. Refuel Platform movement alarm is silent AND the warning beacon is off. _____

5.4.6 **PRESS** the TROLLEY RIGHT pushbutton, **VERIFY** the following AND **INITIAL** Attachment 2. _____

A. Trolley moves west. _____

B. Speed control is smooth and continuous. _____

5.4.7 **RELEASE** the TROLLEY RIGHT pushbutton, **VERIFY** the Trolley motion stops AND **INITIAL** Attachment 2. _____

5.4.8 **PRESS** the TROLLEY LEFT pushbutton,
VERIFY the following
AND **INITIAL** Attachment 2. _____

A. Trolley moves east. _____

B. Speed control is smooth and continuous. _____

5.4.9 **RELEASE** the TROLLEY LEFT pushbutton,
VERIFY the Trolley motion stops
AND **INITIAL** Attachment 2. _____

5.4.10 PRESS the HOIST LOWER pushbutton,
AND **LOWER** the grapple to greater than 7 feet below the surface of the water to clear the hoist override.
VERIFY the following
AND **INITIAL** Attachment 2. _____

A. Monorail Hoist cable moves downward. _____

B. Speed control has high and low speed and is smooth and continuous. _____

- A slight depression on the pushbutton will produce a slow speed. _____
- A full depression on the pushbutton will produce a slow speed for a short period of time then switch to fast speed. _____

5.4.11 **RELEASE** the HOIST LOWER pushbutton,
VERIFY the hoist cable motion stops
AND **INITIAL** Attachment 2. _____

5.4.12 **PRESS** the HOIST RAISE pushbutton,
VERIFY the following
AND **INITIAL** Attachment 2. _____

A. Monorail Hoist cable moves upward. _____

B. Speed control has high and low speed and is smooth and continuous _____

- A slight depression on the pushbutton will produce a slow speed. _____
- A full depression on the pushbutton will produce a slow speed for a short period of time then switch to fast speed. _____

5.4.13 **RELEASE** the HOIST RAISE pushbutton
before it reaches the Normal Up Rotary electrical stop,
VERIFY the hoist cable motion stops
AND **INITIAL** Attachment 2. _____

5.4.14 **PRESS** the HOIST RAISE pushbutton
to raise the hoist cable to the Normal Up Rotary electrical stop.
VERIFY the hoist cable motion automatically stops
AND **INITIAL** Attachment 2. _____

NOTE 5.4.15

The Mechanical Jam Stop may be moved down on the cable to check the MAX UP ROTARY Switch. HC.OP-SO.KE-0001(Q) should be referred to for stop setup.

5.4.15 Simultaneously **PRESS** the HOIST LIMIT OVERRIDE
AND HOIST RAISE pushbuttons.
VERIFY the Monorail Hoist cable moves upward
AND automatically stop at the Maximum Up Rotary limit switch cut-out
AND **INITIAL** Attachment 2. _____

CAUTION 5.4.16

A. Equipment submerged in the Spent Fuel Pool water may be highly radioactive. Tools and equipment should be monitored for radiation as they are slowly removed from the water. [CD-217B]

B. Equipment submerged in the Spent Fuel Pool is highly contaminated with radioactive materials. Established procedures should be followed to prevent the spread of radioactive contamination.

5.4.16 **REMOVE** the Jet Pump Grapple from the
Spent Fuel Pool water taking care to avoid splashing.
REMOVE the Jet Pump Grapple from the Frame Auxiliary Hoist cable,
IF not previously removed. _____

A. **ATTACH** Mono Aux Hoist Quick Disconnect air fittings
and hose to the Grapple
AND **ACTUATE** the grapple open and closed. _____

B. **VERIFY** correct operation when the correct button is pressed. _____

NOTE 5.4.17

This tool is used for load cell operability testing in this procedure. The Dummy Bundle will only be relocated with the Fuel Grapple.

5.4.17 **ATTACH** the Jet Pump Grapple to the Monorail Hoist cable in accordance with HC.OP-SO.KE-0001(Q).
TIGHTEN the locking nut on the cable terminal to prevent inadvertent separation of the grapple from the cable. [CD-949A] _____

5.4.18 **SUBMERGE** the Jet Pump Grapple in the Fuel Pool water taking care to avoid splashing. _____

5.4.19 Using the Refuel Platform (Bridge and Trolley) position controls, **MANEUVER** the Jet Pump Grapple over the test weight located at V-47. _____

5.4.20 **LOWER** the Jet Pump Grapple to the level of the Test Weight Handle. _____

CAUTION 5.4.21

NO fuel assemblies are to be grappled OR moved while conducting this procedure.

5.4.21 **ATTACH** the Jet Pump Grapple to the Test Weight Handle. _____

NOTE 5.4.22

Hoist Load Cell should indicate approximately 200 lbs. plus the weight of the stop block and tool.

5.4.22 **RAISE** the test weight only high enough to **VERIFY** the Monorail Hoist Load Cell indication operability AND **INITIAL** Attachment 2. _____

5.4.23 **LOWER** the test weight until the Monorail Hoist cable is slack. _____

5.4.24 **REMOVE** the Jet Pump Grapple from the test weight handle. _____

5.4.25 **VERIFY** that NO fuel assemblies OR other equipment have been inadvertently grappled AND **INITIAL** Attachment 2. _____

5.4.26 Using the HOIST RAISE pushbutton, **RAISE** the Jet Pump Grapple to the Monorail Hoist Maximum Up limit. _____

5.5 **Procedure Completion Instructions**

CAUTION 5.5.1

A. **Equipment submerged in the Spent Fuel Pool water may be highly radioactive. Tools and equipment should be monitored for radiation as they are slowly removed from the water.**

B. **Equipment submerged in the Spent Fuel Pool is highly contaminated with radioactive materials. Established procedures should be followed to prevent the spread of radioactive contaminated.**

5.5.1 **REMOVE** the Jet Pump Grapple from the Spent Fuel Pool water. N/A

5.5.2 **DISCONNECT** the Monorail Hoist Cable from the Jet Pump Grapple. _____

- **DISCONNECT** the Quick Disconnect Air fitting AND hose from the Jet Pump Grapple. _____

5.5.3 **DE-ENERGIZE** the underwater lamp. _____

5.5.4 **REMOVE** the underwater lamp from the Spent Fuel Pool water. _____

5.5.5 **REMOVE** the Plexiglass viewing aid from the water. _____

5.5.6 **RINSE** Jet Pump Grapple, underwater lamp and Plexiglass Viewing Aid. **WRAP** all equipment in individual polyethylene bags for storage. _____

5.5.7 **RETURN** all equipment to the designated contaminated storage location AND **INITIAL** Attachment 2. _____

5.5.8 IF no further testing is required,
PERFORM the following to log off
AND shut-off the Refuel Bridge Computer: _____

A. **TOUCH** the SHOW MENU icon on the Touch Screen. _____

B. **TOUCH** the LOG OFF icon. _____

C. **TOUCH** the YES/LOG OFF icon to verify system log off,
log off is now complete. _____

D. **PRESS** the SHUT DOWN icon on the touch screen. _____

E. **PRESS** the YES / SHUT DOWN icon to verify system shutdown. _____

F. **ENSURE** the SAFE SHUTDOWN message is displayed on the touch screen prior to securing power to the refueling platform. Failure to following this sequence could corrupt the database in Microsoft Access, resulting in loss of Automatic and Semi-Automatic operation. _____

NOTE 5.5.9

Portions of the Refuel Platform Hoists and equipment unaffected by noted deficiencies may still be considered operable.

5.5.9 **SUMMARIZE** on Attachment 1 the procedure steps
where deficiencies were noted.
INCLUDE the number of the Notification that
was submitted to correct the noted deficiencies.
RETURN the procedure and Attachment 1 to the OS/CRS for review.
DESCRIBE the operational limitations and restrictions on the
Refuel Platform hoists and equipment. _____

5.5.9 WHEN Station Maintenance has been
implemented to correct noted deficiencies.
PERFORM a retest using the applicable portions of this procedure. _____

5.5.10 WHEN a retest proves satisfactory
SIGN off the appropriate procedure step
AND **NOTE** the date of completion on Attachment 1.
Otherwise **REQUEST** additional maintenance. _____

5.5.11 IF equipment deficiencies were not discovered
while conducting this functional test,
INDICATE that on Attachment 1
AND **RETURN** this procedure to the OS/CRS for review. _____

6.0 RECORDS

6.1 **RETAIN** the following IAW NC.NA-AP.ZZ-0011(Q); Records Management Program:

Attachment 1 - Refueling Platform And Fuel Grapple Operability Test – Refueling Data sheet - Deficiency Summary

Attachment 2 - Refueling Platform And Fuel Grapple Operability Test – Refueling Functional Test - Check Sheet

7.0 REFERENCES

7.1 HCGS Equipment Location P-0047-1

7.2 Instruction Manuals:

GEK-75563 Vol. I & II, Refuel Platform Equipment Assembly (TDR No. N1-A41-52(1 & 2))
GEK-75578 Local Area Underwater Light (TDR No. N1-A41-41(2))
GEK-33087B Viewing Aid (TDR No. N1-A41-41(2)

7.3 HCGS FSAR Section 9.1.4.2.7.1

7.4 Commitment Documents

CD-949A	GE SIL No. 82
CD-182C	NRC CIRC 77-12
CD-950A	GE SIL No. 87
CD-281C	INPO SER 28-84
CD-978A	GE SIL No. 298
CD-673D	INPO OE 1239
CD-124B	
CD-736D	NRC INFO 85-12
CD-217B	INPO O+MR 111
CD-444X	FSAR
CD-986F	GE SIL No. 533

7.5 Procedures

HC.MD-ST-KE-0001(Q)	Refuel Platform 7 - Day Operational Check
HC.MD-PM-KE-0003(Q)	Refuel Platform Operational Check
HC.OP-SO.KE-0001(Q)	Refueling Platform and Fuel Grapple Operation

7.6 Other Documents

ECA 4HE-0021 Disconnected the Load Float function
DCP 80047191

ATTACHMENT 1
Page 1 of 2
REFUELING PLATFORM AND FUEL GRAPPLE OPERABILITY TEST - REFUELING DATA SHEET - DEFICIENCY SUMMARY

Procedure Step Number	Notification Number	Description	Retest SAT Date

ATTACHMENT 1
Page 2 of 2
REFUELING PLATFORM AND FUEL GRAPPLE OPERABILITY TEST - REFUELING DATA SHEET - DEFICIENCY SUMMARY

Procedure Step Number	Notification Number	Description	Retest SAT Date

Permission to test: _____ / _____
OS/CRS DATE-TIME

Performed by: _____ / _____
NAME DATE-TIME

Equipment returned to proper stowage location: _____ / _____
NAME DATE-TIME

Review by: _____ / _____
OS/CRS DATE-TIME

Order Number: _____ DR. NO. _____

ATTACHMENT 2
Page 1 of 5
REFUELING PLATFORM AND FUEL GRAPPLE OPERABILITY TEST - REFUELING FUNCTIONAL TEST - CHECK SHEET

STEP	TITLE	INITIALS
2.7	Procedure prerequisites have been completed	Q
5.1.1	No excessive leaking oil or grease. Drip pans are in place (as required).	N/A
	Pneumatic hose integrity	
	Electrical cable integrity	
	Hoist cable integrity	
	All fasteners are secure	
	All couplings, gearbox and safety covers are secure.	
	Foreign Material Exclusion requirements satisfied.	
	No damage or deterioration of any part or sub-assembly	
	Fuel Grapple gimbal pin integrity	
5.1.2	Main Power, Air Compressor and Monorail Hoist Disconnect Switches CLOSED	
5.1.3	Main Hoist Air Isolation Valve and Monorail Hoist Air Isolation Valves OPEN	
5.1.4	Air Compressor receiver pressure & integrity	
5.1.5	Air Compressor auto start	
5.1.7	Refuel Platform (Bridge) and Trolley position cog wheels in the tracking rack	

ATTACHMENT 2
Page 2 of 5
REFUELING PLATFORM AND FUEL GRAPPLE OPERABILITY TEST - REFUELING FUNCTIONAL TEST - CHECK SHEET

STEP	TITLE	INITIALS
5.2.1.B	Refuel Platform START pushbutton check (Start/Stop Station)	N/A
5.2.2.B	Refuel Platform STOP pushbutton check (Start/Stop Station)	
5.2.2.D	PLATFORM position control FORWARD checks (Console)	
5.2.2.E	PLATFORM position control in NEUTRAL checks (Console)	
5.2.2.F	PLATFORM position control REVERSE checks (Console)	
5.2.2.G	PLATFORM position control in NEUTRAL checks (Console)	
5.2.2.H	TROLLEY position control RIGHT checks (Console)	
5.2.2.I	TROLLEY position control in NEUTRAL check (Console)	
5.2.2.J	TROLLEY position control LEFT checks (Console)	
5.2.2.K	TROLLEY position control in NEUTRAL check (Console)	
5.2.2.L	GRAPPLE position control LOWER checks (Console)	
5.2.2.M	GRAPPLE position control RAISE checks (Console)	
5.2.2.P	HOIST GRAPPLE ENGAGE/RELEASE switch cover in place (Console)	
5.2.2.R	HOIST GRAPPLE ENGAGE/RELEASE switch ENGAGE checks (Console)	

ATTACHMENT 2
Page 3 of 5
REFUELING PLATFORM AND FUEL GRAPPLE OPERABILITY TEST - REFUELING FUNCTIONAL TEST - CHECK SHEET

PROCEDURE STEP	TITLE	INITIALS
5.2.2.S	HOIST GRAPPLE ENGAGE/RELEASE switch RELEASE checks (Console)	N/A
5.2.2.T	Fail Safe Position Check of GRAPPLE HOOK [CD-986F]	
5.2.3.C	Refuel Platform Traverse Toggle Switch checks (Console)	
5.2.3.H	Automatic down travel stop and SLACK CABLE light checks (Console)	
5.2.3.J	Initial position indication coordinates Bridge _____ Trolley _____ Hoist _____	
5.2.3.K	Automatic up travel stop and GRAPPLE NORMAL UP light checks (Console)	
5.2.3.O	GRAPPLE NORMAL UP light off check (Console)	
5.2.3.P	Dummy Bundle seated checks (Console)	
5.2.3.Q	Final position indication coordinates Bridge _____ Trolley _____ Hoist _____	
5.2.3.R	Position indication system values ± 0.50	
5.2.3.U	HOIST OVERRIDE pushbutton check (Console)	
5.2.3.W	Fuel Grapple lights (both) operability check	
5.3.2	Refuel Platform FORWARD control checks (Frame)	
5.3.3	Refuel Platform forward motion stop checks (Frame)	

ATTACHMENT 2
Page 4 of 5
REFUELING PLATFORM AND FUEL GRAPPLE OPERABILITY TEST - REFUELING FUNCTIONAL TEST - CHECK SHEET

PROCEDURE STEP	TITLE	INITIALS
5.3.4	Refuel Platform REVERSE control checks (Frame)	N/A
5.3.5	Refuel Platform reverse motion stop checks (Frame)	
5.3.6	Trolley RIGHT control checks (Frame)	
5.3.7	Trolley right motion stop check (Frame)	
5.3.8	Trolley LEFT control checks (Frame)	
5.3.9	Trolley left motion stop check (Frame)	
5.3.10	Auxiliary Hoist LOWER control checks (Frame)	
5.3.11	Auxiliary Hoist cable motion stop (Frame)	
5.3.12	Auxiliary Hoist RAISE control checks (Frame)	
5.3.13	Auxiliary Hoist cable motion stop (Frame)	
5.3.14	Auxiliary Hoist NORMAL UP ROTARY limit auto stop (Frame)	
5.3.15	Auxiliary Hoist MAXIMUM UP ROTARY limit auto stop (Frame)	
5.3.21	Auxiliary Hoist Load Cell operability test (Frame)	
5.3.24	Auxiliary Hoist free of fuel assemblies or other equipment	N/A
5.4.2	Refuel Platform FORWARD control checks (Monorail)	
5.4.3	Refuel Platform forward motion stop checks (Monorail)	
5.4.4	Refuel Platform REVERSE control checks (Monorail)	

ATTACHMENT 2
Page 5 of 5
REFUELING PLATFORM AND FUEL GRAPPLE OPERABILITY TEST - REFUELING FUNCTIONAL TEST - CHECK SHEET

PROCEDURE STEP	TITLE	INITIALS
5.4.5	Refuel Platform reverse motion stop checks (Monorail)	
5.4.6	Trolley RIGHT control checks (Monorail)	
5.4.7	Trolley right motion stop check (Monorail)	
5.4.8	Trolley LEFT control checks (Monorail)	
5.4.9	Trolley left motion stop check (Monorail)	
5.4.10	Monorail Hoist LOWER control checks (Monorail)	
5.4.11	Monorail Hoist cable motion stop (Monorail)	
5.4.12	Monorail Hoist RAISE control checks (Monorail)	
5.4.13	Monorail Hoist cable motion stop (Monorail)	
5.4.14	Monorail Hoist NORMAL UP ROTARY limit auto stop (Monorail)	
5.4.15	Monorail Hoist MAXIMUM UP ROTARY limit auto stop (Monorail)	
5.4.22	Monorail Hoist Load Cell operability test (Monorail)	
5.4.25	Monorail Hoist free of fuel assemblies and other equipment	
5.5.7	Equipment decontaminated and returned to designated storage location	

Reviewed and Accepted by: _____
OS/CRS

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

STATION: HOPE CREEK

SYSTEM: Refueling Platform

JPM NUMBER: 2003-NRC-S5

TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

TASK NUMBER: 234000A302

ALTERNATE PATH: [N/A]

K/A NUMBER: 234000 A3.02

IMPORTANCE FACTOR: 3.1 RO / 3.7 SRO

APPLICABILITY: EO [ ] RO [ ] STA [ ] SRO [X] LSRO [X]

EVALUATION SETTING/METHOD: Walkthrough/Simulate (Perform)

REFERENCES: HC.OP-SO.KE-0001(Q), Rev. 30

TOOLS AND EQUIPMENT: Refueling Platform/None

VALIDATED JPM COMPLETION TIME: 20 Min.

TIME PERIOD IDENTIFIED FOR TIME CRITICAL STEPS: N/A Min.

APPROVAL: N/A — BARGAINING UNIT REPRESENTATIVE; TRAINING SUPERVISOR; OPERATIONS MANAGER or Designee

CAUTION:	No plant equipment shall be operated during the performance of a JPM without the following: 1. Permission from the OS or Unit CRS; 2. Direct oversight by a qualified individual (determined by the individual granting permission based on plant conditions). 3. Verification of the "as left" condition by a qualified individual.

ACTUAL JPM COMPLETION TIME: _____ Min.

ACTUAL TIME CRITICAL COMPLETION TIME: N/A Min.

JPM PERFORMED BY: _____ GRADE: [ ] SAT [ ] UNSAT

REASON, IF UNSATISFACTORY:

EVALUATOR'S SIGNATURE: _____ DATE: _____

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____

DATE: _____

SYSTEM: Refueling Platform

JPM NUMBER: 2003-NRC-S5

TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

TASK NUMBER: 234000A302

INITIAL CONDITIONS:

- There are NO irradiated components grappled to any refueling platform hoist.
- Auxiliary hoists are fully raised with attached tooling clear of obstructions.
- HC.OP-ST.KE-0001 and HC.OP-FT.KE-0001 has been completed for the Refueling Platform.
- The Refuel platform is in a standby lineup.
- Main Hoist Grapple is RELEASED.
- Primary and Redundant encoders are selected for Bridge, Trolley and Hoist travel.
- An approved FUEL MOVEMENT SHEET for transfer of the dummy bundle has been obtained from Reactor Engineering. The Spent fuel rack locations specified on the FUEL MOVEMENT SHEET are within the Secure Travel Zone.
- Prerequisites for dummy bundle transfer within the Spent Fuel Pool are completed per HC.OP-SO.KE-0001.

INITIATING CUE:

Perform transfer of the dummy bundle within the spent fuel storage racks using Semi-Automatic XY mode of refueling platform operation, in accordance with the attached Fuel Movement Sheet step # 01.

Successful Completion Criteria:

All critical steps completed.

All sequential steps completed in order.

All time-critical steps completed within allotted time.

JPM completed within validated time. Completion time may exceed the validated time if satisfactory progress is being made.

JPM NUMBER: 2003-NRC-S5 OPERATOR TRAINING PROGRAM NAME: _____
JOB PERFORMANCE MEASURE DATE: _____

SYSTEM: Refueling Platform
TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
			Examiner Note: Provide operator with marked up copy of HC.OP-SO.KE-0001.		
		Operator reviews precautions and limitations	Operator reviews precautions and limitations. Examiner Cue: If excessive time is taken reviewing precautions and limitations, inform operator that all are satisfied.		
		Operator determines beginning step of procedure.	The operator determines the correct beginning step of the procedure to be 5.10.		
	5.1.3.C.	PERFORM the following to log on to the system:	Examiner Note: The operator will need to log in to the Refuel Platform Computer to perform this JPM. Login procedure is as follows:		
	5.1.3.C.1.	VERIFY the Log On Screen is on.	Verifies Log On Screen is on		

JPM NUMBER: 2003-NRC-S5

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform
TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
	5.1.3.C.2.	SELECT LOG ON icon, on the Touch Screen, AND VERIFY that the Keypad screen is visible.	Operator selects LOG ON ICON on the Touch Screen and verifies Keypad Screen is visible.		
*	5.1.3.C.3.	TYPE your name THEN TOUCH the ENTER icon.	Operator types name on Keypad on Touch Screen.		
	5.1.3.C.4.	IF incorrect name was entered, TOUCH the CHANGE NAME icon THEN TYPE your name THEN TOUCH the ENTER icon.	If necessary, re-enters name then touches Enter icon.		
*	5.1.3.C.5.	TOUCH the ENTER PASSWORD icon.	Operator touches Enter Password icon.		
*	5.1.3.C.6.	TYPE password THEN TOUCH the ENTER icon.	Operator types password on Keypad on Touch Screen.		

JPM NUMBER: 2003-NRC-S5

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform

TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
	5.1.3.C.7.	SELECT LIGHT TEST icon on the Touch Screen.	Operator selects LIGHT TEST icon on the Touch Screen.		
	NOTE 5.1.3.C.8	The Computer Override Light will not illuminate unless the keyswitch for Computer Override is used.	Operator reads NOTE.		
	5.1.3.C.8.	VERIFY all lamps on the Status Display Panel AND on the right and left hand controllers are illuminated.	Operator verifies all lamps on the Status Display Panel and the Right and Left Hand Controllers are illuminated.		
	5.1.3.C.9.	SELECT LIGHT TEST icon on the Touch Screen to end the lamp test.	Operator touches Light Test icon on the Touch Screen to end lamp test.		
*	5.1.3.C.10.	OBSERVE the "IS CASK GATE INSTALLED?" prompt on the screen, AND ANSWER by pressing YES or NO on the Touch Screen.	Operator Presses YES on Touch Screen.		

JPM NUMBER: 2003-NRC-S5

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform

TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*	5.1.3.C.11.	OBSERVE the "IS REACTOR GATE INSTALLED?" prompt on the screen, AND ANSWER by pressing YES or NO on the Touch Screen.	Operator presses YES on Touch Screen.		
	5.1.3.C.12.	VERIFY that the Log On Screen reappears.			
*	5.1.3.C.13.	TOUCH the PRESS FOR OPERATION icon to begin operation of the system.	Operator presses PRESS FOR OPERATION icon on the Touch Screen.		

JPM NUMBER: 2003-NRC-S5

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform

TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
	5.10	NOTE 5.10 All irradiated fuel moves or core alterations must be directly supervised by a licensed SRO or SRO limited to fuel-handling. Non-irradiated fuel handling not involving core alterations and blade guide movement do not require direct supervision by an SRO and can be annotated by the spotter directly involved with the evolution. [CD-168A] This procedure Section describes any combination of fuel/blade guide in Spent Fuel Storage Pool movements between any of the following fuel storage locations: • Fuel storage racks • Fuel preparation machines • Fuel sipping canisters • Special test and measurement devices	Operator reads Note 5.10		

JPM NUMBER: 2003-NRC-S5 OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform
TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
		Note 5.10 (cont.) This Section uses the term "source" location (from location) as the location where a fuel/blade guide assembly is initially grappled and "target" location (to location) as the destination of the fuel/blade guide assembly. Fuel Assembly channel fastener orientation and location must be accomplished and documented in accordance with the Fuel Movement Sheets.	Operator reads note.		
	5.10.1	ENSURE that all prerequisites have been satisfied IAW Section 2.10 of this procedure.	Operator checks prerequisites are satisfied.		
	5.10.2	ENSURE the MONO/FRAME/CONSOLE Switch on the Start/Stop Station is set to CONSOLE.	Operator checks the MONO/FRAME/CONSOLE Switch on the Start/Stop Station is set to CONSOLE. If not, the operator places it in CONSOLE.		

JPM NUMBER: 2003-NRC-S5

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform

TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*	5.10.3	TOUCH the Show Menu icon AND SELECT XY MODE ACTIVE icon.	Operator touches SHOW MENU touch screen button. Operator selects XY MODE ACTIVE.		
*	5.10.4	PRESS the PRESS FOR OPERATION button.	Operator presses the PRESS FOR OPERTION button.		
	5.10.5	TOUCH the SELECT AUTO on the Touch Screen.	Operator uses SELECT AUTO button to ensure SELECT AUTO is selected.		
	5.10.6	ENSURE the MANUAL OPERATION ACTIVE button is being displayed.	Operator ensures MANUAL OPERATION ACTIVE button is being displayed.		
*	5.10.7	TOUCH REQUEST on the Auto screen AND VERIFY that the keypad is displayed.	Operator touches REQUEST on touch screen. Operator verifies that the keypad is displayed.		

JPM NUMBER: 2003-NRC-S5 OPERATOR TRAINING PROGRAM NAME: _____
JOB PERFORMANCE MEASURE DATE: _____

SYSTEM: Refueling Platform

TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*	5.10.8	In accordance with the Fuel Movement Sheet(s), ENTER the location via the alphanumeric keypad displayed on the Touch Screen.	Operator enters location for Source Location as AD-28 using the keypad on the Touch Screen.		
*	5.10.9	After visually verifying the Bridge Position, Trolley position AND the requested location, PRESS the VERIFY button.	Operator visually verifies the Bridge Position, Trolley position AND the requested location *Operator Presses the VERIFY button.		
*	5.10.10	PRESS AUTO RUN icon on the touch screen to initiate Refuel Platform movement.	**Examiner Note:** Pressing AUTO RUN will cause the platform to move automatically from the current position to location AD-28. Operator presses AUTO RUN icon on the touch screen.		
	5.10.11	VERIFY that the bridge and trolley have moved to the requested position AND the message AUTO SEQUENCE COMPLETE is displayed on the Touch Screen.	Operator observes platform, trolley, and hoist movement to Source Location AD-28 in the Spent Fuel Pool over the Dummy Bundle. Operator verifies AUTO SEQUENCE COMPLETE is displayed on the Touch Screen.		

JPM NUMBER: 2003-NRC-S5

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform

TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
	5.10.12	ENSURE the Fuel Grapple is at the correct Fuel Pool Coordinates. (REFER TO NOTE 5.10)	Operator verifies location with Fuel Movement sheet FROM Location AD-28.		
*	5.10.13	LOWER the Fuel Grapple to approximately one foot above the fuel assembly/blade guide to be removed by using the Fuel Grapple Hoist control in the LOWER position AND OBSERVE the GRAPPLE NORMAL UP light off	*Operator uses the Hoist LOWER control to lower the Fuel Grapple to approximately one foot above the DUMMY Bundle. Operator observes Grapple NORMAL UP light extinguished.		
*	5.10.14	ROTATE the Fuel Grapple so that the grapple hooks are in line with the fuel assembly/blade guide handle.	*Operator rotates the Fuel Grapple in line with Dummy Bundle handle.		
	5.10.15	IF possible WHEN fuel is being moved, SRO should visually ENSURE correct serial number of Fuel Assembly. (REFER TO NOTE 5.10)	Operator verifies "DUMMY" marked on handle of Dummy Bundle using the Main Grapple camera.		

JPM NUMBER: 2003-NRC-S5

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform
TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
	5.10.16	PLACE the GRAPPLE ENGAGE/RELEASE Switch to the RELEASE position to ensure the Fuel Grapple hooks are open, OBSERVE the ENGAGE light off.	Operator ensures the GRAPPLE ENGAGE/RELEASE Switch to the RELEASE position to ensure the Fuel Grapple hooks are open, Operator observes the ENGAGE light off. **Examiner Note:** The grapple may already be open.		
*	5.10.17	Slowly LOWER the Fuel Grapple UNTIL the Fuel Grapple is resting on the fuel assembly/blade guide handle. Grapple may be gently twisted to seat on handle.	Operator slowly lowers the Fuel Grapple until the Fuel Grapple is resting on the fuel assembly/blade guide handle. The grapple may be gently twisted to seat on handle.		
	5.10.17.A	OBSERVE Fuel Grapple downward motion automatically stops.	Operator observes Fuel Grapple downward motion automatically stops.		
	5.10.17.B	OBSERVE the SLACK CABLE light on.	Operator observes the SLACK CABLE light on.		

JPM NUMBER: 2003-NRC-S5

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform
TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
	~~5.16.16.C~~ 5.10.17.C	ENSURE Fuel Grapple is at required depth by observing HOIST GRAPPLE ELEVATION Digital Readout.	Operator observes HOIST GRAPPLE ELEVATION Digital Readout at –215.		
*	~~5.16.16.D~~ 5.10.17.D	ROTATE grapple in both directions. [CD-739F]	Operator gently rotates the grapple in both directions to ensure grapple is seated.		
*	~~5.16.17~~ 5.10.18	PLACE the GRAPPLE ENGAGE/RELEASE Switch in the ENGAGE position to grapple the fuel assembly/blade guide.	Operator places the GRAPPLE ENGAGE/RELEASE Switch in the ENGAGE position to grapple the fuel assembly/blade guide.		
	~~5.16.17.A~~ 5.10.18.A	OBSERVE the grapple ENGAGE light on.	Operator observes the grapple ENGAGE light on. Operator Initials the Fuel Movement sheet FROM position time and date.		

JPM NUMBER: 2003-NRC-S5

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform

TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*	5.10.18.B	ROTATE grapple in both directions to ensure proper engagement. [CD-739F]	Operator rotates the grapple in both directions to ensure grapple is seated.		
*	5.10.19	Slowly RAISE the grappled fuel assembly/blade guide using the Fuel Grapple hoist control in the RAISE position.	Operator uses the Fuel Grapple hoist control in the RAISE position.		
	5.10.19.A	OBSERVE the SLACK CABLE light off	Operator checks the SLACK CABLE light is extinguished.		
	5.10.19.B	OBSERVE the HOIST LOADED light: • Light ON for Fuel Assembly • Light OFF for Blade Guide	Operator checks the HOIST LOADED light ON.		
	5.10.19.C	OBSERVE the Load Cell Indicator to ensure the assembly has been grappled.	Operator verifies the Load Cell reading consistent with Dummy Bundle weight.		

JPM NUMBER: 2003-NRC-S5

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform
TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
	5.10.19.D	Visually VERIFY assembly/blade guide is being lifted.	Operator verifies Dummy Bundle being raised.		
		CAUTION 5.10.20	Operator reads Caution 5.10.20		
*	5.10.20	RAISE AND CONTINUOUSLY OBSERVE the fuel assembly/blade guide during its upward travel.	Operator uses the Fuel Grapple hoist control in the RAISE position. Operator verifies Dummy Bundle being raised.		
	5.10.21	ENSURE hose and cable reels are taking up slack by observing cables and air hoses remain taught within the grapple.	Operator monitors hose and cable reels.		
		CAUTION 5.10.22	Operator reads caution.		

JPM NUMBER: 2003-NRC-S5

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform
TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*	5.10.22	WHEN the fuel assembly/blade guide has reached its upper limit:	Operator releases Raise control.		
	5.10.22.A	OBSERVE the GRAPPLE NORMAL UP light on.	OBSERVE the GRAPPLE NORMAL UP light on.		
	5.10.22.B	Fuel Grapple upward motion automatically stops.	Operator observes Fuel Grapple upward motion automatically stops.		
*	5.10.23	TOUCH the SELECT AUTO on the Touch Screen.	Operator presses the SELECT AUTO icon on the Touch Screen.		
	5.10.24	ENSURE the MANUAL OPERATION ACTIVE button is being displayed.	Operator ensures the MANUAL OPERATION ACTIVE button is being displayed.		
*	5.10.25	TOUCH REQUEST on the Auto screen AND VERIFY that the keypad is displayed.	Operator Touches "REQUEST" on touch screen. Operator verifies that the keypad is displayed.		

JPM NUMBER: 2003-NRC-S5

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform
TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*	5.10.26	In accordance with the Fuel Movement Sheet(s), ENTER the location via the alphanumeric keypad displayed on the Touch Screen.	Operator enters location for Target Location as AH-50 using the keypad on the Touch Screen.		
	5.10.27	After visually verifying the Bridge position, Trolley position, AND the requested location, PRESS the VERIFY button.	Operator visually verifies the Bridge Position, Trolley position AND the requested location *Operator Presses the VERIFY button.		
*	5.10.28	PRESS AUTO RUN icon on the touch screen to initiate Refuel Platform movement.	Operator presses AUTO RUN icon on the Touch Screen.		
	5.10.29	VERIFY that the bridge and trolley have moved to the requested position AND the display message AUTO SEQUENCE COMPLETE is displayed on the Touch Screen.	Operator verifies that the bridge, trolley, and hoist have moved to the requested position (AH-50) AND the display message AUTO SEQUENCE COMPLETE is displayed on the Touch Screen.		

JPM NUMBER: 2003-NRC-S5

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform

TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
	5.10.30	ENSURE the Fuel Grapple is at the correct Core OR Fuel Pool Coordinates. (REFER TO Note 5.10)	Operator ensures the Fuel Grapple with Dummy Bundle is above Target Location AH-50.		
*	5.10.31	ROTATE the Fuel Grapple AND attached fuel assembly/blade guide to attain direct alignment AND orientation with the target location. [CD-396Y]	Operator rotates the dummy bundle into NE orientation in accordance with the Fuel Movement Sheet		
	5.10.32	CAUTION 5.10.32	Operator reads CAUTION 5.10.32		
*	5.10.32	Slowly LOWER the fuel assembly/blade guide into the target location using the Fuel Grapple hoist position control in the LOWER position.	Operator uses the Fuel Grapple hoist position control in the LOWER position to slowly lower the bundle into the Target Location AH-50.		

JPM NUMBER: 2003-NRC-S5

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform
TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
*	5.10.33	WHEN the fuel assembly/blade guide is fully seated in the target location AND:	Operator releases the LOWER control when the Dummy Bundle is fully seated.		
	5.10.33.A	OBSERVE the SLACK CABLE light on.	Operator observes the SLACK CABLE light on.		
	5.10.33.B	OBSERVE the HOIST LOADED light off.	Operator observes the HOIST LOADED light off.		
	5.10.33.C	OBSERVE no load indicated (< 60 lbs) on the load cell indicator.	Operator observes no load indicated (< 60 lbs) on the load cell indicator.		
	5.10.33.D	OBSERVE Fuel Grapple downward motion automatically stops.	Operator observes Fuel Grapple downward motion automatically stops.		

JPM NUMBER: 2003-NRC-S5

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform

TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
	5.10.33.E	ENSURE Fuel Grapple is at required depth by observing HOIST GRAPPLE ELEVATION Digital Readout	Operator observes the Fuel Grapple is at required depth by observing HOIST GRAPPLE ELEVATION Digital Readout reading -215		
*	5.10.34	PLACE the GRAPPLE ENGAGE/RELEASE Switch to the RELEASE position AND OBSERVE the grapple ENGAGE light off.	Operator places the GRAPPLE ENGAGE/RELEASE Switch to the RELEASE position. Operator observes the grapple ENGAGE light off.		
*	5.10.35	Slowly RAISE the Fuel Grapple by using the hoist position control in the RAISE position.	Operator uses the hoist position control in the RAISE position.		
	5.10.35.A	OBSERVE the SLACK CABLE light off.	Operator observes the SLACK CABLE light off.		

JPM NUMBER: 2003-NRC-S5

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform

TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
	5.10.35.B	OBSERVE the HOIST LOADED light remains off.	Operator observes the HOIST LOADED light remains off.		
	5.10.35.C	OBSERVE the Load Cell Indicator to ensure that no load has been inadvertently grappled. [CD-442A]	Operator observes the Load Cell Indicator to ensure that no load has been inadvertently grappled.		
*	5.10.36	RAISE the Fuel Grapple fully to avoid collision with any underwater obstructions. IF next Fuel Assembly OR blade guide to be moved is nearby, RAISE the Fuel Grapple at least one foot.	Operator raises Fuel Grapple at least one foot above racks and releases the RAISE control.		
	5.10.37	ENSURE hose and cable reels are taking up slack by observing cables and air hoses remain taught within the grapple.	Operator observes hose and cable reels for slack.		

JPM NUMBER: 2003-NRC-S5

OPERATOR TRAINING PROGRAM
JOB PERFORMANCE MEASURE

NAME: _____
DATE: _____

SYSTEM: Refueling Platform

TASK: Perform Semi-Automatic Fuel Transfer within the Spent Fuel Pool.

# *	STEP NO.	STEP (*Denotes a Critical Step) (#Denotes a Sequential Step)	STANDARD	EVAL S/U	COMMENTS (Required for UNSAT evaluation)
	5.10.38	IF Fuel Assemblies were moved, INITIAL the appropriate box on the Fuel Movement Sheet(s) indicating the fuel transfer has been completed.	Operator Initials the Fuel Movement sheet TO position time and date.		
	5.10.39	NOTIFY the Control Room that the fuel transfer has been completed. STOP TIME: _____	Operator notifies Control Room that fuel transfer is completed. Terminating Cue: Repeat back message from the operator on the status of the JPM, and then state "This JPM is complete".		

JOB PERFORMANCE MEASURE
OPERATOR INFO SHEET

INITIAL CONDITIONS:

- There are NO irradiated components grappled to any refueling platform hoist.
- Auxiliary hoists are fully raised with attached tooling clear of obstructions.
- HC.OP-ST.KE-0001 and HC.OP-FT.KE-0001 has been completed for the Refueling Platform.
- The Refuel platform is in a standby lineup.
- Main Hoist Grapple is RELEASED.
- Primary and Redundant encoders are selected for Bridge, Trolley and Hoist travel.
- An approved FUEL MOVEMENT SHEET for transfer of the dummy bundle has been obtained from Reactor Engineering. The Spent fuel rack locations specified on the FUEL MOVEMENT SHEET are within the Secure Travel Zone.
- Prerequisites for dummy bundle transfer within the Spent Fuel Pool are completed per HC.OP-SO.KE-0001.

INITIATING CUE:

Perform transfer of the Dummy Bundle within the spent fuel storage racks using Semi-Automatic XY mode of refueling platform operation, in accordance with the attached Fuel Movement Sheet step # 01.

ATTACHMENT 1
FUEL MOVEMENT SHEET

REFUEL NO. N/A SHEET NO. 1

CONTINUED ON SHEET N/A

Step Number	I.D. Number	FROM Location	Orientation	Time / Date	TO Location	Orientation	Time / Date	Operator Initials	Verified By Initials
01	DUMMY	SFP AD - 28	ANY		SFP AH - 50	NE			
02	DUMMY	SFP AH - 50	NE		SFP AD - 28	NW			

Prepared By — 2/13/03 Date

CARL LOSQUE DAHL PER TELCON — Independently Verified By — 2/13/03 Date

PSEG NUCLEAR L.L.C.

HOPE CREEK GENERATING STATION

HC.OP-SO.KE-0001(Q) - Rev. 30

REFUELING PLATFORM AND FUEL GRAPPLE OPERATION

USE CATEGORY: II

A. Biennial Review performed Yes ___ No ___ N/A ✓

B. Change Package(s) and Affected Document Number(s) incorporated into this revision.

- CP No. _____ CP Rev. No. ___ AD No. _____ AD Rev. No. ___ or None ✓

C. OTSC(s) incorporated into this revision:

- OTSC No(s) _____ or None ✓

REVISION SUMMARY

1. The following changes have been incorporated based on **DCP 80047191**
   Added Sections 2.10 and 5.10 - Fuel/Blade Guide Movement - Within Spent Fuel Storage Pool (other than Refuel Mode) in Semi-Automatic Mode
2. CAUTION 5.8 has been revised to indicated the "source" location is the "from location" on the Fuel Movement Sheets and the "target" location is the "to location" on the Fuel Movement Sheets. Editorial

IMPLEMENTATION REQUIREMENTS Effective date 3-27-03

APPROVED: _____ 3/27/03
Manager - Hope Creek Operations **Date**

REFUELING PLATFORM AND FUEL GRAPPLE OPERATION

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REFUELING PLATFORM AND FUEL GRAPPLE OPERATION

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REFUELING PLATFORM AND FUEL GRAPPLE OPERATION

1.0 PURPOSE

1.1 This procedure provides detailed instructions to accomplish the following Refueling tasks:

1.1.1 Transfer fuel to and from the Spent Fuel Storage Pool and Reactor Core. **[CD-736D].**

1.1.2 Transfer blade guides to and from the Spent Fuel Storage Pool and Reactor Core.

1.1.3 Transfer fuel within Reactor Vessel.

1.1.4 Transfer blade guides within Reactor Vessel.

1.1.5 Transfer Fuel and Blade Guides within the Spent Fuel Storage Pool (other than Refuel Mode). **[CD-736D]**

1.1.6 Install necessary tools on Refueling Platform Auxiliary Hoists.

1.2 In addition this procedure provides the prerequisites, precautions and limitations required to maintain fuel integrity during Refueling Operations.

2.0 PREREQUISITES

2.1 Refuel Platform Start-up and Shutdown

2.1.1 Breaker 52-254061 is closed to provide power to Refuel Platform. _____

2.1.2 Applicable Precautions and Limitations have been reviewed by each procedure user. _____

2.2 Fuel Transfer - Reactor Core to Spent Fuel Storage Pool

2.2.1 The Reactor Building Secondary Containment Ventilation System RBVS & FRVS automatic isolation dampers shall be operable IAW T.S. 3.6.5.2. _____

2.2.2 Reactor Building integrity shall be maintained IAW T.S. 3.6.5.1.b. _____

2.2.3 The Fuel Grapple Hoist shall be verified operable IAW USFAR 9.1.4.2.12.3 by performing procedure HC.OP-ST.KE-0001(Q), Refuel Interlock Operability Functional Test - Section 5.4. _____

2.2.4 At least 23 feet of water shall be maintained over the top of irradiated Fuel Assemblies seated in the Spent Fuel Storage Racks IAW T.S. 3.9.9. _____

2.2.5 The Filtration, Recirculation and Ventilation System shall be operable IAW T.S. 3.6.5.3. _____

2.2.6 Procedure HC.OP-ST.KE-0001(Q); Refuel Interlock Operability Test must be performed prior to CORE ALTERATIONS, IAW T.S. 3.9.1. **[CD-182C]** _____

2.2.7 The Reactor Mode Switch shall be operable
AND locked in the REFUEL
OR the SHUTDOWN position IAW T.S. 3.9.1. _____

2.2.8 At least two Source Range Monitors (SRM) shall be operable
AND inserted to the normal operating level IAW T.S. 3.9.2
AND: _____

A. Annunciation and continuous visual indication of these monitors is available in the Control Room. _____

B. One of the required SRM detectors is located in the Reactor Core quadrant where CORE ALTERATIONS are being performed
AND the other SRM detector shall be located in an adjacent quadrant. _____

2.2.9 All control rods are fully inserted IAW T.S. 3.9.3. _____

2.2.10 The Reactor shall be subcritical for a minimum of 24 hours
[UFSAR 9.1.4.2.12.1. _____

2.2.11 Establish and maintain direct communication between the Control Room and Refueling Floor personnel **[UFSAR 9.1.4.2.12.2.]** _____

2.2.12 At least 22 feet 2 inches of water shall be maintained over the top of the Reactor Pressure Vessel flange IAW T.S. 3.9.8. _____

2.2.13 All CORE ALTERATIONS shall be observed
AND directly supervised by either a Senior Reactor Operator
OR a Senior Reactor Operator Limited to Fuel Handling who has no other concurrent responsibilities during this operation IAW T.S. 6.2.2.C. _____

2.2.14 Breaker 52-254061 is closed to provide power to Refuel Platform. _____

2.2.15 Prior to moving the Refueling Platform ensure the following conditions exist: _____

A. Refuel Platform tracks are clear of equipment or materials which would impede platform motion. _____

B. Cables, ropes or other devices are not tied to the Refuel Platform or Trolley. _____

C. The Jib Cranes and Channel Handling Boom have been positioned to prevent collisions with the Refuel Platform. _____

D. The Fuel Grapple, Monorail Hoist and Auxiliary Hoist are not carrying any loads. _____

E. Underwater obstructions which may interfere with fuel transfer are identified and repositioned IF possible. **CD-396Y** _____

F. **PERFORM** HC.OP-FT.KE-0001(Q); Refuel Platform and Fuel Grapple Operability Test - Refueling: _____

1. IF maintenance has been completed on the Refueling Platform and/or Hoists. _____

2. Monthly during fuel handling operations. _____

G. **PERFORM** HC.OP-FT.KE-0002(Q); Fuel Grapple Full Down Travel Functional Test – Refueling IF not performed within 30 days of starting fuel handling operations. _____

2.2.16 No testing, maintenance or other activity is in progress on the Refuel Platform, Spent Fuel Storage Pool, New Fuel Vault, Reactor Cavity or Shipping Cask Area which would impede the movement of the Refuel Platform. _____

2.2.17 Permission to move irradiated nuclear fuel OR **PERFORM** CORE ALTERATIONS has been granted by the OS/CRS. ____

2.2.18 **OBTAIN** the Fuel Movement Sheet(s) developed by Reactor Engineering IAW HC.RE-FR.ZZ-0001(Q). _____

2.2.19 All personnel that will operate the Refuel Platform and Fuel Grapple have completed training and are qualified. **[CD-124B]** _____

2.2.20 WHEN transferring irradiated fuel, or any other irradiated Reactor internal, between Reactor Vessel and Spent Fuel Storage Pool the Shielded Fuel Transfer Chute shall be installed. _____

2.2.21 **NOTIFY** the Radiation Protection Department prior to starting any fuel transfer operation. The Radiation Protection Department shall ensure that personnel leave the upper level of the Drywell prior to fuel transfer. **[CD-069A]** _____

2.2.22 Power to Refuel Platform Control Console energized. _____

2.2.23 Position indication cameras for the Main Hoist are selected for display. _____

2.2.24 No equipment or tools, with the exception of; the Refueling Platform, the Polar Crane or any ANALYZED LOADS (ANALYZED LOADS are listed in Attachment 1), SHALL be moved over IRRADIATED FUEL UNLESS SECONDARY CONTAINMENT INTEGRITY is in effect IAW T.S. 1.39. _____

2.2.25 During fuel movement and control blade movement, the Service Pole Caddy is to be locked in its storage position on the East end of the rail using the two locking brakes to the handrail provided on the pole caddy. _____

2.2.26 Applicable Precautions and Limitations have been reviewed by each procedure user. _____

2.2.27 Underwater lights have been installed in the Reactor Vessel and Cavity and energized as necessary to support Refueling activities. _____

2.3 Fuel Transfer - Spent Fuel Storage Pool to Reactor Core

2.3.1 The Reactor Building Secondary Containment Ventilation System RBVS & FRVS automatic isolation dampers shall be operable IAW T.S. 3.6.5.2. _____

2.3.2 Reactor Building integrity shall be maintained IAW T.S. 3.6.5.1.b. _____

2.3.3 The Fuel Grapple Hoist shall be verified operable IAW UFSAR. 9.1.4.2.12.3 by performing procedure HC.OP-ST.KE-0001(Q), Refuel Interlock Operability Functional Test - Section 5.4. _____

2.3.4 At least 23 feet of water shall be maintained over the top of irradiated Fuel Assemblies seated in the Spent Fuel Storage Racks IAW T.S. 3.9.9. _____

2.3.5 The Filtration, Recirculation and Ventilation System shall be operable IAW T.S. 3.6.5.3. _____

2.3.6 Procedure HC.OP-ST.KE-0001(Q); Refuel Interlock Operability Test must be performed prior to CORE ALTERATIONS IAW T.S. 3.9.1. **[CD-182C]** _____

2.3.7 The Reactor Mode Switch shall be operable
AND locked in the REFUEL
OR the SHUTDOWN position IAW T.S. 3.9.1. _____

2.3.8 At least two Source Range Monitors (SRM) shall be operable
AND inserted to the normal operating level IAW T.S. 3.9.2
AND: _____

A. Annunciation
AND continuous visual indication of these
monitors is available in the Control Room. _____

B. One of the required SRM detectors is located in the Reactor core quadrant where CORE ALTERATIONS are being performed
AND the other SRM detector shall be located in an adjacent quadrant. ____

2.3.9 All control rods are fully inserted IAW T.S. 3.9.3. _____

2.3.10 The Reactor shall be subcritical for a minimum of 24 hours **[UFSAR 9.1.4.2.12.1]**. _____

2.3.11 Establish and maintain direct communication between the Control Room and Refueling Floor personnel **[UFSAR 9.1.4.2.12.2]**. _____

2.3.12 At least 22 feet 2 inches of water shall be maintained over the top of the Reactor Pressure Vessel flange IAW T.S. 3.9.8. _____

2.3.13 All CORE ALTERATIONS shall be observed AND directly supervised by either a Senior Reactor Operator OR a Senior Reactor Operator Limited to Fuel Handling who has no other concurrent responsibilities during this operation IAW T.S. 6.2.2.c. _____

2.3.14 Breaker 52-254061 is closed to provide power to Refuel Platform. _____

2.3.15 Prior to moving the Refueling Platform ensure the following conditions exist: _____

A. Refuel Platform tracks are clear of equipment or materials which would impede platform motion. _____

B. Cables, ropes or other devices are not tied to the Refuel Platform or Trolley.

C. The Jib Cranes and Channel Handling Boom have been positioned to prevent collisions with the Refuel Platform. _____

D. The Fuel Grapple, Monorail Hoist and Auxiliary Hoist are not carrying any loads. _____

E. Underwater obstructions which may interfere with fuel transfer are identified and repositioned IF possible. **[CD-396Y]** _____

F. **PERFORM** HC.OP-FT.KE-0001(Q); Refuel Platform and Fuel Grapple Operability Test - Refueling: _____

1. IF maintenance has been completed on the Refueling Platform and/or Hoists. _____

2. Monthly during fuel handling operations. _____

G. **PERFORM** HC.OP-FT.KE-0002(Q); Fuel Grapple Full Down Travel Functional Test – Refueling IF not performed within 30 days of starting fuel handling operations. _____

2.3.16 No testing, maintenance or other activity is in progress on the Refuel Platform, Spent Fuel Storage Pool, New Fuel Vault, Reactor Cavity or Shipping Cask Area which would impede the movement of the Refuel Platform. _____

2.3.17 Permission to move irradiated nuclear fuel OR perform CORE ALTERATIONS has been granted by the OS/CRS. _____

2.3.18 **OBTAIN** the Fuel Movement Sheet(s) developed by Reactor Engineering IAW HC.RE-FR.ZZ-0001(Q). _____

2.3.19 All personnel that will operate the Refuel Platform and Fuel Grapple have completed training and are qualified. **[CD-124B]** _____

2.3.20 WHEN transferring irradiated fuel, or any other irradiated Reactor internal, between Reactor Vessel and Spent Fuel Storage Pool the Shielded Fuel Transfer Chute shall be installed. _____

2.3.21 **NOTIFY** the Radiation Protection Department prior to starting any fuel transfer operation. The Radiation Protection Department shall ensure that personnel leave the upper level of the Drywell prior to fuel transfer. **[CD-069A]** _____

2.3.22 Power to Refuel Platform Control Console energized. _____

2.3.23 Position indication cameras for the Main Hoist are selected for display. _____

2.3.24 No equipment or tools, with the exception of; the Refueling Platform, the Polar Crane or any ANALYZED LOADS (ANALYZED LOADS are listed in Attachment 1), SHALL be moved over IRRADIATED FUEL UNLESS SECONDARY CONTAINMENT INTEGRITY is in effect IAW T.S. 1.39. ____

2.3.25 During fuel movement and control blade movement, the Service Pole Caddy is to be locked in its storage position on the East end of the rail using the two locking brakes to the handrail provided on the paddy caddy. _____

2.3.26 Applicable Precautions and Limitations have been reviewed by each procedure user. _____

2.3.27 Underwater lights have been installed in the Reactor Vessel and Cavity and energized as necessary to support Refueling activities. _____

2.4 Blade Guide Transfer - Spent Fuel Storage Pool to Reactor Core

2.4.1 The Fuel Grapple Hoist shall be verified operable IAW UFSAR 9.1.4.2.12.3 by performing procedure HC.OP-ST.KE-0001(Q), Refuel Interlock Operability Functional Test - Section 5.4. _____

2.4.2 At least 23 feet of water shall be maintained over the top of irradiated Fuel Assemblies seated in the Spent Fuel Storage Racks IAW T.S. 3.9.9. _____

2.4.3 Procedure HC.OP-ST.KE-0001(Q); Refuel Interlock Operability Test must be performed prior to CORE ALTERATIONS IAW T.S. 3.9.1. **[CD-182C]** _____

2.4.4 The Reactor Mode Switch shall be operable
AND locked in the REFUEL
OR the SHUTDOWN position IAW T.S. 3.9.1. _____

2.4.5 The Reactor shall be subcritical for a minimum of 24 hours **[UFSAR 9.1.4.2.12.1]**. _____

2.4.6 At least 22 feet 2 inches of water shall be maintained over the top of the Reactor Pressure Vessel flange IAW T.S. 3.9.8. _____

2.4.7 Breaker 52-254061 is closed to provide power to Refuel Platform. _____

2.4.8 Prior to moving the Refueling Platform ensure the following conditions exist: _____

A. Refuel Platform tracks are clear of equipment or materials which would impede platform motion. _____

B. Cables, ropes or other devices are not tied to the Refuel Platform OR Trolley. _____

C. The Jib Cranes and Channel Handling Boom have been positioned to prevent collisions with the Refuel Platform. _____

D. The Fuel Grapple, Monorail Hoist and Auxiliary Hoist are not carrying any loads. _____

Continued next page

2.4.8 (continued)

E. Underwater obstructions which may interfere with fuel transfer are identified and repositioned IF possible. **[CD-396Y]** _____

F. **PERFORM** HC.OP-FT.KE-0001(Q); Refuel Platform and Fuel Grapple Operability Test - Refueling: _____

1. IF maintenance has been completed on the Refueling Platform and/or Hoists. _____

2. Monthly during fuel handling operations. _____

G. **PERFORM** HC.OP-FT.KE-0002(Q); Fuel Grapple Full Down Travel Functional Test – Refueling IF not performed within 30 days of starting fuel handling operations. _____

2.4.9 No testing, maintenance or other activity is in progress on the Refuel Platform, Spent Fuel Storage Pool, New Fuel Vault, Reactor Cavity or Shipping Cask Area which would impede the movement of the Refuel Platform. _____

2.4.10 **OBTAIN** the Fuel Movement Sheet(s) developed by Reactor Engineering IAW HC.RE-FR.ZZ-0001(Q). _____

2.4.11 All personnel that will operate the Refuel Platform and Fuel Grapple have completed training and are qualified. **[CD-124B]** _____

2.4.12 **NOTIFY** the Radiation Protection Department prior to starting any fuel transfer operation. The Radiation Protection Department shall ensure that personnel leave the upper level of the Drywell prior to fuel transfer. **[CD-069A]** _____

2.4.13 Power to Refuel Platform Control Console energized. _____

2.4.14 Position indication cameras for the Main Hoist are selected for display. _____

2.4.15 No equipment or tools, with the exception of; the Refueling Platform, the Polar Crane or any ANALYZED LOADS (ANALYZED LOADS are listed in Attachment 1), SHALL be moved over IRRADIATED FUEL UNLESS SECONDARY CONTAINMENT INTEGRITY is in effect IAW T.S. 1.39. ____

2.4.16 During fuel movement and control blade movement, the Service Pole Caddy is to be locked in its storage position on the East end of the rail using the two locking brakes to the handrail provided on the paddy caddy. _____

2.4.17 Applicable Precautions and Limitations have been reviewed by each procedure user. _____

2.4.18 Underwater lights have been installed in the Reactor Vessel and Cavity and energized as necessary to support Refueling activities. _____

2.5 Blade Guide Transfer - Reactor Core to Spent Fuel Storage Pool

2.5.1 The Fuel Grapple Hoist shall be verified operable IAW UFSAR 9.1.4.2.12.3 by performing procedure HC.OP-ST.KE-0001(Q), Refuel Interlock Operability Functional Test - Section 5.4. _____

2.5.2 At least 23 feet of water shall be maintained over the top of irradiated Fuel Assemblies seated in Spent Fuel Storage Racks IAW T.S. 3.9.9. _____

2.5.3 Procedure HC.OP-ST.KE-0001(Q); Refuel Interlock Operability Test must be performed prior to CORE ALTERATIONS IAW T.S. 3.9.1. **[CD-182C]** _____

2.5.4 The Reactor Mode Switch shall be operable
AND locked in the REFUEL
OR the SHUTDOWN position IAW T.S. 3.9.1. _____

2.5.5 The Reactor shall be subcritical for a minimum of 24 hours **[UFSAR 9.1.4.2.12.1]** _____

2.5.6 At least 22 feet 2 inches of water shall be maintained over the top of the Reactor Pressure Vessel flange IAW T.S. 3.9.8. _____

2.5.7 Breaker 52-254061 is closed to provide power to Refuel Platform. _____

2.5.8 Prior to moving the Refueling Platform ensure the following conditions exist: _____

A. Refuel Platform tracks are clear of equipment or materials which would impede platform motion. _____

B. Cables, ropes or other devices are not tied to the Refuel Platform or Trolley. _____

C. The Jib Cranes and Channel Handling Boom have been positioned to prevent collisions with the Refuel Platform. _____

D. The Fuel Grapple, Monorail Hoist AND Auxiliary Hoist are not carrying any loads. _____

E. Underwater obstructions which may interfere with fuel transfer are identified AND repositioned IF possible. **[CD-396Y]** _____

F. **PERFORM** HC.OP-FT.KE-0001(Q); Refuel Platform and Fuel Grapple Operability Test - Refueling: _____

1. IF maintenance has been completed on the Refueling Platform and/or Hoists. _____

2. Monthly during fuel handling operations. _____

G. **PERFORM** HC.OP-FT.KE-0002(Q); Fuel Grapple Full Down Travel Functional Test – Refueling IF not performed within 30 days of starting fuel handling operations. _____

2.5.9 No testing, maintenance or other activity is in progress on the Refuel Platform, Spent Fuel Storage Pool, New Fuel Vault, Reactor Cavity or Shipping Cask Area which would impede the movement of the Refuel Platform. _____

2.5.10 **OBTAIN** the Fuel Movement Sheet(s) developed by Reactor Engineering IAW HC.RE-FR.ZZ-0001(Q). _____

2.5.11 All personnel that will operate the Refuel Platform and Fuel Grapple have completed training and are qualified. **[CD-124B]** _____

2.5.12 **NOTIFY** the Radiation Protection Department prior to starting any fuel transfer operation. The Radiation Protection Department shall ensure that personnel leave the upper level of the Drywell prior to fuel transfer. **[CD-069A]** _____

2.5.13 Power to Refuel Platform Control Console energized. _____

2.5.14 Position indication cameras for the Main Hoist are selected for display. _____

2.5.15 No equipment or tools, with the exception of; the Refueling Platform, the Polar Crane or any ANALYZED LOADS (ANALYZED LOADS are listed in Attachment 1), SHALL be moved over IRRADIATED FUEL UNLESS SECONDARY CONTAINMENT INTEGRITY is in effect IAW T.S. 1.39. ____

2.5.16 During fuel movement and control blade movement, the Service Pole Caddy is to be locked in its storage position on the East end of the rail using the two locking brakes to the handrail provided on the paddy caddy. _____

2.5.17 Applicable Precautions and Limitations have been reviewed by each procedure user. _____

2.5.18 Underwater lights have been installed in the Reactor Vessel and Cavity and energized as necessary to support Refueling activities. _____

2.6 **Fuel Movement - Within Reactor Vessel**

2.6.1 The Reactor Building Secondary Containment Ventilation System RBVS & FRVS automatic isolation dampers shall be operable IAW T.S. 3.6.5.2. _____

2.6.2 Reactor Building integrity shall be maintained IAW T.S. 3.6.5.1.b. _____

2.6.3 The Fuel Grapple Hoist shall be verified operable IAW UFSAR 9.1.4.2.12.3 by performing procedure HC.OP-ST.KE-0001(Q), Refuel Interlock Operability Functional Test - Section 5.4. _____

2.6.4 At least 23 feet of water shall be maintained over the top of irradiated Fuel Assemblies seated in the Spent Fuel Storage Racks IAW T.S. 3.9.9. _____

2.6.5 The Filtration, Recirculation and Ventilation System shall be operable IAW T.S. 3.6.5.3. _____

2.6.6 Procedure HC.OP-ST.KE-0001(Q); Refuel Interlock Operability Test must be performed prior to CORE ALTERATIONS IAW T.S. 3.9.1. **[CD-182C]** _____

2.6.7 The Reactor Mode Switch shall be operable
AND locked in the REFUEL
OR SHUTDOWN position IAW T.S. 3.9.1. _____

2.6.8 At least two Source Range Monitors (SRM) shall be operable
AND inserted to the normal operating level IAW T.S. 3.9.2
AND: _____

A. Annunciation
AND continuous visual indication of these
monitors is available in the Control Room. _____

B. One of the required SRM detectors is located in the Reactor Core
quadrant where CORE ALTERATIONS are being performed
AND the other SRM detector shall be located in an adjacent quadrant. ____

2.6.9 All control rods are fully inserted IAW T.S. 3.9.3. _____

2.6.10 The Reactor shall be subcritical for a minimum of 24 hours
[**UFSAR 9.1.4.2.12.1**]. _____

2.6.11 Establish and maintain direct communication between the Control Room
and Refueling Floor personnel [**UFSAR 9.1.4.2.12.2**]. _____

2.6.12 At least 22 feet 2 inches of water shall be maintained over the top
of the Reactor Pressure Vessel flange IAW T.S. 3.9.8. _____

2.6.13 All CORE ALTERATIONS shall be observed
AND directly supervised by either a Senior Reactor Operator
OR a Senior Reactor Operator Limited to Fuel Handling who has
no other concurrent responsibilities during this operation IAW T.S. 6.2.2.c._____

2.6.14 Breaker 52-254061 is closed to provide power to Refuel Platform. _____

2.6.15 Prior to moving the Refueling Platform ensure the following conditions exist: _____

A. Refuel Platform tracks are clear of equipment or materials which would impede platform motion. _____

B. Cables, ropes or other devices are not tied to the Refuel Platform or Trolley. _____

C. The Jib Cranes and Channel Handling Boom have been positioned to prevent collisions with the Refuel Platform. _____

D. The Fuel Grapple, Monorail Hoist and Auxiliary Hoist are not carrying any loads. _____

E. Underwater obstructions which may interfere with fuel transfer are identified and repositioned IF possible. **[CD-396Y]** _____

F. **PERFORM** HC.OP-FT.KE-0001(Q); Refuel Platform and Fuel Grapple Operability Test - Refueling: _____

1. IF maintenance has been completed on the Refueling Platform and/or Hoists. _____

2. Monthly during fuel handling operations. _____

G. **PERFORM** HC.OP-FT.KE-0002(Q); Fuel Grapple Full Down Travel Functional Test – Refueling IF not performed within 30 days of starting fuel handling operations. _____

2.6.16 No testing, maintenance or other activity is in progress on the Refuel Platform, Spent Fuel Storage Pool, New Fuel Vault, Reactor Cavity or Shipping Cask Area which would impede the movement of the Refuel Platform. _____

2.6.17 Permission to move irradiated nuclear fuel or perform CORE ALTERATIONS has been granted by the OS/CRS. _____

2.6.18 **OBTAIN** the Fuel Movement Sheet(s) developed by Reactor Engineering IAW HC.RE-FR.ZZ-0001(Q). _____

2.6.19 All personnel that will operate the Refuel Platform and Fuel Grapple have completed training and are qualified. **[CD-124B]** _____

2.6.20 **NOTIFY** the Radiation Protection Department prior to starting any fuel transfer operation. The Radiation Protection Department shall ensure that personnel leave the upper level of the Drywell prior to fuel transfer. **[CD-069A]** _____

2.6.21 Power to Refuel Platform Control Console energized. _____

2.6.22 Position indication cameras for the Main Hoist are selected for display. _____

2.6.23 No equipment or tools, with the exception of; the Refueling Platform, the Polar Crane or any ANALYZED LOADS (ANALYZED LOADS are listed in Attachment 1), SHALL be moved over IRRADIATED FUEL UNLESS SECONDARY CONTAINMENT INTEGRITY is in effect IAW Tech Spec 1.39. _____

2.6.24 During fuel movement and control blade movement, the Service Pole Caddy is to be locked in its storage position on the East end of the rail using the two locking brakes to the handrail provided on the paddy caddy. _____

2.6.25 Applicable Precautions and Limitations have been reviewed by each procedure user. _____

2.6.26 Underwater lights have been installed in the Reactor Vessel and Cavity and energized as necessary to support Refueling activities. _____

2.7 Blade Guide Movement - Within Reactor Vessel

2.7.1 The Fuel Grapple Hoist shall be verified operable IAW UFSAR 9.1.4.2.12.3 by performing procedure HC.OP-ST.KE-0001(Q), Refuel Interlock Operability Functional Test - Section 5.4. _____

2.7.2 At least 23 feet of water shall be maintained over the top of irradiated Fuel Assemblies seated in the Spent Fuel Storage Racks IAW T.S. 3.9.9. _____

2.7.3 Procedure HC.OP-ST.KE-0001(Q); Refuel Interlock Operability Test must be performed prior to CORE ALTERATIONS IAW T.S. 3.9.1. **[CD-182C]** _____

2.7.4 The Reactor Mode Switch shall be operable AND locked in the REFUEL OR the SHUTDOWN position IAW T.S. 3.9.1. _____

2.7.5 The Reactor shall be subcritical for a minimum of 24 hours **[UFSAR 9.1.4.2.12.1]** _____

2.7.6 At least 22 feet 2 inches of water shall be maintained over the top of the Reactor Pressure Vessel flange IAW T.S. 3.9.8. _____

2.7.7 Breaker 52-254061 is closed to provide power to Refuel Platform. _____

2.7.8 Prior to moving the Refueling Platform ensure the following conditions exist: _____

A. Refuel Platform tracks are clear of equipment or materials which would impede platform motion. _____

B. Cables, ropes or other devices are not tied to the Refuel Platform or Trolley. _____

C. The Jib Cranes and Channel Handling Boom have been positioned to prevent collisions with the Refuel Platform. _____

D. The Fuel Grapple, Monorail Hoist and Auxiliary Hoist are not carrying any loads. _____

E. Underwater obstructions which may interfere with fuel transfer are identified and repositioned IF possible. **[CD-396Y]** _____

F. Perform HC.OP-FT.KE-0001(Q); Refuel Platform and Fuel Grapple Operability Test - Refueling: _____

1. IF maintenance has been completed on the Refueling Platform and/or Hoists. _____

2. Monthly during fuel handling operations. _____

G. **PERFORM** HC.OP-FT.KE-0002(Q); Fuel Grapple Full Down Travel Functional Test – Refueling IF not performed within 30 days of starting fuel handling operations. _____

2.7.9 No testing, maintenance or other activity is in progress on the Refuel Platform, Spent Fuel Storage Pool, New Fuel Vault, Reactor Cavity or Shipping Cask Area which would impede the movement of the Refuel Platform. _____

2.7.10 **OBTAIN** the Fuel Movement Sheet(s) developed by Reactor Engineering IAW HC.RE-FR.ZZ-0001(Q). _____

2.7.11 All personnel that will operate the Refuel Platform and Fuel Grapple have completed training and are qualified. **[CD-124B]** _____

2.7.12 **NOTIFY** the Radiation Protection Department prior to starting any fuel transfer operation. The Radiation Protection Department shall ensure that personnel leave the upper level of the Drywell prior to fuel transfer. **[CD-069A]** _____

2.7.13 Power to Refuel Platform Control Console energized. _____

2.7.14 Position indication cameras for the Main Hoist are selected for display. _____

2.7.15 An SRO shall be on the Refuel Bridge to ensure no CORE ALTERATIONS take place. _____

2.7.16 No equipment or tools, with the exception of; the Refueling Platform, the Polar Crane or any ANALYZED LOADS (ANALYZED LOADS are listed in Attachment 1), SHALL be moved over IRRADIATED FUEL UNLESS SECONDARY CONTAINMENT INTEGRITY is in effect IAW Tech Spec 1.39. _____

2.7.17 During fuel movement and control blade movement, the Service Pole Caddy is to be locked in its storage position on the East end of the rail using the two locking brakes to the handrail provided on the paddy caddy. _____

2.7.18 Applicable Precautions and Limitations have been reviewed by each procedure user. _____

2.7.19 Underwater lights have been installed in the Reactor Vessel and Cavity and energized as necessary to support Refueling activities. _____

2.8 **Fuel/Blade Guide Movement - Within Spent Fuel Storage Pool (other than Refuel Mode) in Manual**

2.8.1 The Reactor Building Secondary Containment Ventilation System RBVS & FRVS automatic isolation dampers shall be operable IAW T.S. 3.6.5.2. _____

2.8.2 Reactor Building integrity shall be maintained IAW T.S. 3.6.5.1.b. _____

2.8.3 The Fuel Grapple Hoist shall be verified operable by performing procedure HC.OP-ST.KE-0001(Q), Refuel Interlock Operability Functional Test - Section 5.4. **[UFSAR 9.1.4.2.12.3, CD-178H]** _____

2.8.4 At least 23 feet of water shall be maintained over the top of irradiated Fuel Assemblies seated in spent Fuel Storage Racks IAW T.S. 3.9.9. _____

2.8.5 The Filtration, Recirculation and Ventilation System shall be operable IAW T.S. 3.6.5.3. _____

2.8.6 Procedure HC.OP-FT.KE-0001(Q); Refuel Platform and Fuel Grapple Operability Test - Refueling has been completed. **[CD-182C]** _____

2.8.7 Procedure HC.OP-ST.KE-0001(Q), Refuel Interlock Operability Functional Test - Section 5.4); has been completed to demonstrate Refuel Platform load cell setpoint. **[UFSAR 9.1.4.2.12.3, CD-178H]** _____

2.8.8 The Refuel Platform is in a standby line up. _____

2.8.9 Breaker 52-254061 is closed to provide power to Refuel Platform. _____

2.8.10 Prior to moving the Refueling Platform ensure the following conditions exist: _____

A. Refuel Platform tracks are clear of equipment or materials which would impede platform motion. _____

B. Cables, ropes or other devices are not tied to the Refuel Platform or Trolley. _____

C. The Jib Cranes and Channel Handling Boom have been positioned to prevent collisions with the Refuel Platform. _____

D. The Fuel Grapple, Monorail Hoist and Auxiliary Hoist are not carrying any loads. _____

E. Underwater obstructions which may interfere with fuel transfer are identified and repositioned IF possible. _____

2.8.11 Irradiated Fuel movements in Spent Fuel Storage Pool shall be observed AND directly supervised by either a Senior Reactor Operator OR a Senior Reactor Operator Limited to Fuel Handling who has no other concurrent responsibilities during this operation. This is required since the SRO may have to evacuate Refuel floor IAW HC.OP-AB.CONT-0005(Q), Irradiated Fuel Damage, in the event a fuel bundle is dropped and radiation levels increase. **[CD-168A]** _____

2.8.12 Permission to move irradiated nuclear fuel has been granted by the OS/CRS. _____

2.8.13 **OBTAIN** the Fuel Movement Sheet(s) developed by Reactor Engineering IAW HC.RE-FR.ZZ-0001(Q). _____

2.8.14 All personnel that will operate the Refuel Platform and Fuel Grapple have completed training and are qualified. **[CD-124B]** _____

2.8.15 **NOTIFY** the Radiation Protection Department prior to starting any fuel transfer operation. _____

2.8.16 Power to Refuel Platform Control Console energized. _____

2.8.17 Spent Fuel Pool gates are verified installed per HC.MD-FR.KE-0013(Q), Refuel Floor-Shield and Pool Plugs Removal and Replacement. _____

2.8.18 No equipment or tools, with the exception of; the Refueling Platform, the Polar Crane or any ANALYZED LOADS (ANALYZED LOADS are listed in Attachment 1), SHALL be moved over IRRADIATED FUEL UNLESS SECONDARY CONTAINMENT INTEGRITY is in effect IAW T/S 1.39. _____

2.8.19 During fuel movement and control blade movement, the Service Pole Caddy is to be locked in its storage position on the East end of the rail using the two locking brakes to the handrail provided on the paddy caddy. _____

2.8.20 Applicable Precautions and Limitations have been reviewed by each procedure user. _____

2.9 **Auxiliary Hoist Tool Installation**

Applicable Precautions and Limitations have been reviewed by each procedure user. _____

2.10 **Fuel/Blade Guide Movement - Within Spent Fuel Storage Pool (other than Refuel Mode) in Semi-Automatic Mode**

2.10.1 The Reactor Building Secondary Containment Ventilation System RBVS & FRVS automatic isolation dampers shall be operable IAW T.S. 3.6.5.2. _____

2.10.2 Reactor Building integrity shall be maintained IAW T.S. 3.6.5.1.b. _____

2.10.3 The Fuel Grapple Hoist shall be verified operable by performing procedure HC.OP-ST.KE-0001(Q), Refuel Interlock Operability Functional Test - Section 5.4. **[UFSAR 9.1.4.2.12.3, CD-178H]** _____

2.10.4 At least 23 feet of water shall be maintained over the top of irradiated Fuel Assemblies seated in spent Fuel Storage Racks IAW T.S. 3.9.9. _____

2.10.5 The Filtration, Recirculation and Ventilation System shall be operable IAW T.S. 3.6.5.3. _____

2.10.6 Procedure HC.OP-FT.KE-0001(Q); Refuel Platform and Fuel Grapple Operability Test - Refueling has been completed. **[CD-182C]** _____

2.10.7 Procedure HC.OP-ST.KE-0001(Q), Refuel Interlock Operability Functional Test - Section 5.4); has been completed to demonstrate Refuel Platform load cell setpoint. **[UFSAR 9.1.4.2.12.3, CD-178H]** _____

2.10.8 The Refuel Platform is in a standby line up. _____

2.10.9 Breaker 52-254061 is closed to provide power to Refuel Platform. _____

2.10.10 Prior to moving the Refueling Platform **ENSURE** the following conditions exist: _____

A. Refuel Platform tracks are clear of equipment or materials which would impede platform motion. _____

B. Cables, ropes or other devices are not tied to the Refuel Platform or Trolley. _____

C. The Jib Cranes and Channel Handling Boom have been positioned to prevent collisions with the Refuel Platform. _____

D. The Fuel Grapple, Monorail Hoist and Auxiliary Hoist are not carrying any loads. _____

E. Underwater obstructions which may interfere with fuel transfer are identified and repositioned IF possible. _____

2.10.11 Irradiated Fuel movements in Spent Fuel Storage Pool shall be observed AND directly supervised by either a Senior Reactor Operator OR a Senior Reactor Operator Limited to Fuel Handling who has no other concurrent responsibilities during this operation. This is required since the SRO may have to evacuate Refuel floor in accordance with HC.OP-AB.CONT-0005(Q), Irradiated Fuel Damage, in the event a fuel bundle is dropped and radiation levels increase. **[CD-168A]** _____

2.10.12 Permission to move irradiated nuclear fuel has been granted by the OS/CRS. _____

2.10.13 **OBTAIN** the Fuel Movement Sheet(s) developed by Reactor Engineering IAW HC.RE-FR.ZZ-0001(Q). _____

2.10.14 All personnel that will operate the Refuel Platform and Fuel Grapple have completed training and are qualified. **[CD-124B]** _____

2.10.15 **NOTIFY** the Radiation Protection Department prior to starting any fuel transfer operation. _____

2.10.16 Power to Refuel Platform Control Console energized. _____

2.10.17 Spent Fuel Pool gates are verified installed per HC.MD-FR.KE-0013(Q), Refuel Floor-Shield and Pool Plugs Removal and Replacement. _____

2.10.18 No equipment or tools, with the exception of; the Refueling Platform, the Polar Crane or any ANALYZED LOADS (ANALYZED LOADS are listed in Attachment 1), SHALL be moved over IRRADIATED FUEL UNLESS SECONDARY CONTAINMENT INTEGRITY is in effect IAW T/S 1.39. _____

2.10.19 During fuel movement and control blade movement, the Service Pole Caddy is to be locked in its storage position on the East end of the rail using the two locking brakes to the handrail provided on the paddy caddy. _____

2.10.20 Applicable Precautions and Limitations have been reviewed by each procedure user. _____

3.0 PRECAUTIONS AND LIMITATIONS

3.1 Precautions

3.1.1 The normal up stop on Refueling Platform Main Hoist shall NOT be bypassed when handling Fuel Assemblies. The normal up stop on the Refueling Platform Auxiliary Hoist shall not be bypassed when handling irradiated components. **(UFSAR 9.1.4.2.12.3)** _____

3.1.2 To prevent damage to Fuel Assemblies: _____

A. DO NOT attempt to release a grappled Fuel Assembly UNTIL it is fully seated in a storage OR Reactor Core location. **[CD-736D, CD-123E, CD-182C]** _____

B. DO NOT reposition the Refuel Platform or Trolley while the Fuel Assembly is grappled and not fully withdrawn from the storage or Reactor Core location. _____

C. DO NOT twist a grappled Fuel Assembly while it is held fast in a storage or Reactor Core location. _____

3.1.3 WHEN transferring irradiated fuel between the Reactor Cavity AND Spent Fuel Pool. _____

A. Minimize the time the fuel is in the Drywell Bellows Area. **[CD-612X, CD-069A]** _____

B. Restrict fuel transfer to most direct path between the Reactor Vessel AND Spent Fuel Pool. **[CD-612X]** _____

3.1.4 While positioning irradiated fuel in the Reactor Vessel or Spent Fuel Pool, maximize the amount of water shielding between the Fuel Assembly AND Reactor Vessel wall or Spent Fuel Pool wall. **[CD-069A, CD-612X, CD-719A]** _____

3.1.5 DO NOT remove a blade guide from its Reactor Core location IF the respective control rod will be left unsupported. _____

3.1.6 The Service Pole Caddy which rides on the same rail as the Monorail Auxiliary Hoist is for the removal and installation of the Moisture Separator and miscellaneous in vessel work. During the use of this procedure for fuel movement and control blade movement it is to be locked in its storage position on the East end of the rail using the two locking brakes to the handrail provided on the paddy caddy.
REFER to procedures HC.MD-FR.KE-0006(Q) AND HC.MD-FR.KE-0026(Q) for operation of the Pole Caddy. _____

3.1.7 Any of the Refueling Bridge Mast Sections (10", 7", or 5"), can bind while being extended or retracted. The Encoder readout (distance traveled), used in conjunction with the Load Cell readout (weight on main mast cable), can be used to effectively verify whether binding is occurring. For example, IF you start from a full up position (10", 7", and 5" sections fully retracted), and start lowering the mast sections while observing the Encoder and Load Cell indications, the weight of the 10" section should transfer from the main mast cable to the 12" section at approximately 180" on the Encoder reading (the Load Cell indication will decrease by approximately 105#). Continuing down, the weight of the 7" section should transfer from the main mast cable to the 10" section at approximately 380" on the Encoder reading (the Load Cell indication will decrease by approximately 88#). This methodology can also be applied for use in the opposite direction. IF while lowering the mast, an unexpected slack cable OR pre-mature weight transfer occurs, stop lowering, raise the load to clear the slack cable (if one exists), and notify the cognizant Refuel SRO OR OS/CRS before attempting any corrective action. **[CD-619G]** _____

3.1.8 WHEN handling fuel out of the Fuel Prep Machine **VERIFY** the channel fastener is clearly visible and not enclosed by the grapple head. This is the only place that the operator can see the channel fastener while grabbing a fuel bundle. **[CD-739F]** _____

3.1.9 To prevent damage to underwater lamps ensure that the lamps remain fully submerged while they are energized. **[CD-673D]** _____

3.1.10 Operation of the Refuel Platform (Bridge), Trolley or Fuel Grapple with the variable speed control operators should be accomplished by gradual accelerations and decelerations, rather than full on and full off deflections of the operators. This will produce less wear on the equipment and better operator control. _____

3.1.11 The Refueling Platform should never be left unattended with the "POWER ON" (as indicated by the STOP light on the Left Hand Controller). An electrical failure could cause the platform to move on its own accord. Turning off the power for short durations while the operator leaves the platform should be a standard practice. _____

3.1.12 Abnormalities that may occur during operation, such as spurious high load readings or audible indications should not be ignored. Such occurrences must be investigated and the cause ascertained to prevent possible subsequent damage to the platform or handled fuel. _____

3.1.13 Should an emergency stop occur during lowering of auxiliary or monorail hoists, the safety brake of that hoist will set without delay and take the hoist load on its ratchet-pawl arrangement. _____

- Prior to attempting to releasing the brake, the cause of the emergency stop should be understood. IF possible, the grapple should be moved away from irradiated fuel prior to performing the release. _____

- In the case where a full load is being lowered at the time of the stop, this load may prevent the safety brake from immediately releasing on a subsequent hoist operation, unless the hoist is commanded to raise as an initial operation, thereby taking the load off the safety brake. _____

- IF the brake does not release because of a lowering command, it will emit a loud chattering noise, alerting the operator to raise the load. In most cases, no harm will occur as the result of an operator not following this procedure. The only consequence is that the safety brake will prevent the hoist from lowering. _____

3.1.14 Should an emergency stop occur during the lowering of the Main Hoist, the hoist safety brake will set without delay and take the hoist load. _____

- Prior to attempting to release the brake, the cause of the emergency stop should be understood. IF possible, the grapple should be moved away from irradiated fuel prior to performing the release. _____

- In the case where a full load is being loaded at the time of the stop, this load may prevent the safety brake from immediately releasing on a subsequent hoist operation, unless the hoist is commanded to raise as an initial operation, thereby taking the load off the safety brake. _____

- In most cases, IF the brake does not release because of a lowering command, no harm will occur as the result of an operator not following this procedure. The only consequence is that the safety brake will prevent the hoist from lowering. _____

3.1.15 An indication that the Grapple has missed completely is a Full Grapple Down Light ON with **NO** Slack Cable Light. _____

3.2 **Limitations**

3.2.1 Operate the Refuel Platform, Trolley and Fuel Grapple Hoist variable speed controls in a manner which results in gradual accelerations or decelerations. _____

3.2.2 The Fuel Grapple is the only hoist used to transfer Fuel Assemblies in the Spent Fuel Pool and Reactor Cavity. _____

3.2.3 The fuel may be transferred only to those devices and storage locations specified on the Fuel Movement Sheet(s) developed by Reactor Engineering IAW HC.RE-FR.ZZ-0001(Q). **[CD-719A]** _____

3.2.4 DO NOT move a Fuel Assembly within one foot of any assembly stored in a fuel preparation machine, shipping canister or special test fixture. **[CD-719A]** _____

3.2.5 A designated "spotter" is required for all bridge activities which require any grapple to be loaded. _____

3.2.6 No individual should perform bridge activities for greater than six consecutive hours. _____

3.2.7 IF the Technical Specification requirements listed in Section 2.0 of this procedure cannot be maintained: _____

A. **COMPLETE** the transfer of any fuel loaded on the Fuel Grapple OR **RETURN** the fuel to its original location. _____

B. **TERMINATE** all further fuel transfers AND CORE ALTERATIONS UNTIL the conditions specified in the Technical Specification requirements listed in Section 2.0 are restored. _____

3.2.8 IF Refuel Platform or Fuel Grapple hoist equipment failure occurs while fuel is loaded on the Fuel Grapple: **[CD-736D, CD-442A]**

A. **PERFORM** corrective actions IAW Attachment 2. _____

B. **REPORT** the nature and extent of the equipment damage to the Refuel Floor Supervisor or Operations Superintendent. _____

3.2.9 IF underwater lights are used for illumination ensure the lamps are de-energized prior to removing them from the water. **[CD-673D]** _____

3.2.10 The Radiation Protection Department should be notified when fuel transfers are completed or are to be delayed for greater than one hour. _____

3.2.11 Operate the Refuel Platform, Trolley and Fuel Grapple in a manner to avoid collisions with underwater obstructions that can not be repositioned. _____

3.2.12 At the discretion of the Refuel Bridge SRO, and, with concurrence from Station Management, operation of the bridge and mast in concurrent multiple directions is permissible (e.g., moving the mast up/down with bridge motion, etc.). Individual responsibilities (SRO and spotter) regarding collision-avoidance should be briefed prior to any multiple dimensional fuel moves. **[70007921]** _____

3.2.13 WHEN inserting and removing Fuel Assemblies in the Reactor Core prevent contact between the Fuel Assembly and incore detectors and installed neutron sources. **[CD-365D]** _____

3.2.14 **ENSURE** the Refuel Bridge handrails remain in place whenever the camera cart is on the bridge. **[CD-711F]** _____

3.2.15 Pre-operational assembly requirements for the Fuel Support Grapple is dependent upon the configuration of the control rod and drive assembly at the site of the fuel support. _____

3.2.16 The control blade grapple, the combined CRB/FSP grapple and the jet pump grapple are the only grapples to be used to handle control blades within the reactor pressure vessel. _____

3.2.17 All torque wrenches used in the performance of this procedure should be of the appropriate range to read the reference value or the last recorded torque value between 20% and 100% of range. **[PR 960128076]** _____

3.2.18 IF alternate RHR-FPCC assist mode is in service, up to 9000 gpm may flow through the spent fuel pool to the reactor well. This will cause increased drag loads on the refuel mast when a load is transported through the fuel pool gates. It may be necessary to reduce bridge speed, when passing through the gate, to control vertical swing on the mast. _____

3.2.19 The refueling mast should not be permitted to swing against the trolley. This may cause bending or damage to the mast. _____

3.3 Interlocks

NOTE 3.3.1

Main hoist loaded relays actuate at 535 pounds and 550 pounds.

3.3.1 The following conditions will cause a Rod Block: _____

A. Main Hoist loaded, the Refuel Bridge over the Reactor Core, AND Mode Switch in REFUEL. _____

B. The Refuel Bridge over the Reactor Core AND Mode Switch in STARTUP. _____

3.3.2 The following conditions will prevent the Refueling Bridge from traveling in the reverse direction: _____

A. Main Hoist loaded, the Refuel Bridge over the Core, and any control rod withdrawn. _____

B. Refuel Bridge over the Core AND Mode Switch in STARTUP. _____

3.3.3 The following conditions will prevent Main Hoist up motion: _____

A. Normal up stop (can be bypassed). _____

B. Backup hoist limit. _____

C. Hoist jammed as indicated by 1200 pounds load. _____

D. Grapple not closed and the Main Hoist weight over 550 lbs. _____

E. Fuel Hoist Interlock: _____

- Rod out signal from Control Room _____
- RS1 Limit Switch actuated _____
- Main Hoist Loaded _____

3.3.4 The following conditions will prevent Main Hoist down motion: _____

A. Slack cable as indicated by (< 60 lbs) and the Slack Cable Light on. (Actual weight indication will vary between Fuel Pool and In Core operation due to the length of cable used and the weight of that cable). _____

B. Full down limit reached at approximately 4 inches below the elevation of a fuel bundle in the core (as indicated by the Full Grapple Down Light on). _____

C. Fuel Hoist Interlock: _____

- Rod out signal from Control Room _____
- RS1 Limit Switch actuated _____
- Main Hoist Loaded _____

3.3.5 Load Float function is disconnected per ECA 4HE-0021. _____

3.3.6 Reference Attachment 3 for Interlock drawing. _____

4.0 EQUIPMENT REQUIRED

- Thread Sealant Loctite 2432 or 5772.
- Calibrated M&TE Torque Wrench (25 - 30 ft-lbs) for a 3/4" nut.

5.0 PROCEDURE

NOTE 5.0

All movements of the Refuel Platform, Trolley and Fuel Grapple hoist described in this procedure are performed at the Fuel Grapple Operator's Console. WHEN moving the auxiliary hoist(s) to set the mechanical jam, the hoist is operated from the applicable hoist pendant.

5.1 Refuel Platform Start-up and Shutdown

5.1.1 **ENSURE** that all prerequisites have been satisfied IAW Section 2.1. _____

NOTE 5.1.2

IF the AC power to the Refuel Platform was open, the Refuel Platform should be warmed up for a minimum of 1/2 hour prior to use.

5.1.2 Refuel Platform Start-up Instructions _____

A. At the West end of the Refuel Platform
VERIFY the following: _____

1. The Main Power Disconnect Switch is in the CLOSED position. _____

2. The Monorail Hoist Disconnect Switch is in the CLOSED position. _____

B. At the West end of the Refuel Platform (Bridge),
VERIFY the Main Hoist Air Isolation Valve
AND Monorail Hoist Air Isolation Valve are open. _____

C. At the West end of the Refuel Platform
PLACE the Air Compressor Disconnect Switch is in the CLOSED position. _____

NOTE 5.1.3

The computer takes approximately one minute to load all the files required for operation.

5.1.3 **PERFORM** the following to activate the Refuel Bridge Computer: _____

A. **TURN** all circuit breakers for the Control System to the ON position. [Located on top of Bridge] _____

B. **PRESS** the START PB on the START/STOP Station mounted in the Main Trolley Cab.
AND the following will occur: _____

- STOP PB illuminates _____
- Heater circuits to the motors and cabinets are automatically disconnected when power is turned on. _____

C. **PERFORM** the following to log on to the system: _____

1. **VERIFY** the Log On Screen is on. _____
2. **SELECT** LOG ON icon, on the Touch Screen, AND **VERIFY** that the Keypad screen is visible. _____
3. **TYPE** your name
THEN **TOUCH** the ENTER icon. _____
4. IF incorrect name was entered,
TOUCH the CHANGE NAME icon
THEN **TYPE** your name
THEN **TOUCH** the ENTER icon. _____
5. **TOUCH** the ENTER PASSWORD icon. _____
6. **TYPE** password
THEN **TOUCH** the ENTER icon. _____
7. **SELECT** LIGHT TEST icon on the Touch Screen. _____

Continued next page

5.1.3.C (continued)

NOTE 5.1.3.C.8

The Computer Override Light will not illuminate unless the keyswitch for Computer Override is used.

8. **VERIFY** all lamps on the Status Display Panel AND on the right and left hand controllers are illuminated. _____

9. **SELECT** LIGHT TEST icon on the Touch Screen to end the lamp test. _____

10. **OBSERVE** the "IS CASK GATE INSTALLED?" prompt on the screen, AND **ANSWER** by pressing YES or NO on the Touch Screen. _____

11. **OBSERVE** the "IS REACTOR GATE INSTALLED?" prompt on the screen, AND **ANSWER** by pressing YES or NO on the Touch Screen. _____

12. **VERIFY** that the Log On Screen reappears. _____

13. **TOUCH** the PRESS FOR OPERATION icon to begin operation of the system. _____

NOTE 5.1.4

AC power should remain available to the Refuel Platform. Breaker 52-254061 should remain closed to ensure adequate warm-up prior to use. The Control Panels heaters are required to be energized to prevent condensation between periods of use (outages).

5.1.4 Refuel Platform Shutdown/Standby Instructions _____

A. **PRESS** the Refuel Platform STOP pushbutton AND **VERIFY** the red STOP pushbutton light is off. _____

B. **PERFORM** the following to log off the Refuel Bridge Computer: _____

1. **TOUCH** the SHOW MENU icon on the Touch Screen. _____

2. **TOUCH** the LOG OFF icon. _____

3. **TOUCH** the YES/LOG OFF icon to verify system log off, log off is now complete. _____

C. **PLACE** the Air Compressor Disconnect Switch is in the OPEN position at the West end of the Refuel Platform. _____

D. **ENSURE** the Main Power Disconnect Switch AND the Monorail Hoist Disconnect Switch remain in the CLOSED position until maintenance is to be performed. _____

5.1.5 **PERFORM** the following to shut-off the system: _____

A. **PRESS** the SHUT DOWN icon on the touch screen. _____

B. **PRESS** the YES / SHUT DOWN icon to verify system shutdown. _____

C. **ENSURE** the SAFE SHUTDOWN message is displayed on the touch screen prior to securing power to the refueling platform. Failure to following this sequence could corrupt the database in Microsoft Access, resulting in loss of Automatic and Semi-Automatic operation. _____

5.2 Fuel Transfer - Reactor Core to Spent Fuel Storage Pool

5.2.1 **ENSURE** that all prerequisites have been satisfied IAW Section 2.2 of this procedure. _____

5.2.2 **USE** the Trolley position control to position the Fuel Grapple to attain direct alignment with the center of the fuel transfer path. **[CD-396Y]** _____

5.2.3 **USE** the Refuel Platform position control in the REVERSE position to maneuver the Refuel Platform over the Reactor Core. _____

5.2.4 Using the Refuel Platform
AND Trolley position controls
AND position indication system
MANEUVER the Fuel Grapple to the coordinates listed on the Fuel Movement Sheet(s). _____

5.2.5 **LOWER** the Fuel Grapple to approximately one foot above the Fuel Assembly to be removed by using the Fuel Grapple Hoist control in the LOWER position. _____

5.2.6 **ROTATE** the Fuel Grapple so that the grapple hooks are in line with the Fuel Assembly handle. _____

5.2.7 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch to the RELEASE position to ensure the Fuel Grapple hooks are open. **OBSERVE** the grapple ENGAGE light off. _____

5.2.8 Slowly **LOWER** the Fuel Grapple until the Fuel Grapple is resting on the Fuel Assembly handle. Grapple may be gently twisted to seat on handle. _____

A. **OBSERVE** Fuel Grapple Hoist downward motion automatically stops. _____

B. **OBSERVE** the SLACK CABLE light on. **[CD-736D]** _____

C. **ENSURE** Fuel Grapple is at required depth by observing HOIST GRAPPLE ELEVATION Digital Readout. _____

D. **ROTATE** grapple in both directions. **[CD-739F]** _____

5.2.9 **ENSURE** the Fuel Grapple is at the correct Core Coordinates. _____ (SRO)

5.2.10 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch in the ENGAGE position to grapple the Fuel Assembly. _____

A. **OBSERVE** the grapple ENGAGE light is on. _____

B. **ROTATE** grapple in both directions to ensure proper engagement. **[CD-739F]** _____

5.2.11 **NOTIFY** Control Room that assembly is being removed from Core AND that the SRM's should be observed UNTIL assembly is out of the core. _____

5.2.12 Slowly **RAISE** the grappled Fuel Assembly using the Fuel Grapple Hoist Control in the RAISE position. _____

A. **OBSERVE** the SLACK CABLE light off. _____

B. **OBSERVE** the HOIST LOADED light on. **[CD-736D]** _____

C. **OBSERVE** the load cell indicator to ensure the assembly has been grappled. _____

D. Visually **VERIFY** assembly is being lifted. _____

CAUTION 5.2.13

A. DO NOT attempt to release the Fuel Assembly unless it is fully seated in a storage or Reactor Core location. [CD-123E, CD-736D, CD-182C]

B. DO NOT reposition the Refuel Platform or Trolley while the Fuel Assembly is grappled and not fully withdrawn from the storage or Reactor Core location.

C. DO NOT twist a grappled fuel assembly while it is held fast in a Storage or Reactor Core location.

D. While positioning irradiated fuel in the Reactor Vessel or Spent Fuel Pool maximize the amount of water shielding between the Fuel Assembly and Reactor Vessel or Fuel Pool wall. [CD-612X, CD-069A]

5.2.13 **RAISE** AND CONTINUOUSLY **OBSERVE** the Fuel Assembly during its upward travel.
NOTIFY Control Room when assembly is out of the Core. _____

5.2.14 **ENSURE** hose and cable reels are taking up slack by observing cables and air hoses remain taught within the grapple. _____

CAUTION 5.2.15

DO NOT bypass the Main Hoist normal up stop when handling Fuel Assemblies or control rod blades in order to comply with UFSAR 9.1.4.2.12.3.

5.2.15 WHEN the Fuel Assembly has reached its upward limit: _____

A. **OBSERVE** the GRAPPLE NORMAL UP light on. **[CD-736D]** _____

B. Fuel Grapple upward motion automatically stops. _____

CAUTION 5.2.16

A. Minimize the time the fuel is in the Drywell Bellows Area. [CD-612X, CD-069A]

B. Restrict fuel transfer to the most direct path between the Reactor Vessel and Spent Fuel Pool. [CD-612X]

5.2.16 **USE** the Trolley position control to position the Fuel Grapple to attain direct alignment with the center of the fuel transfer path to the Fuel Storage Pool. **[CD-396Y]** _____

5.2.17 **ENSURE** the Refuel Platform position control is in the FORWARD position to maneuver the Refuel Platform to the Spent Fuel Pool. _____

5.2.18 **USE** the Refuel Platform and Trolley position controls to maneuver the Fuel Grapple to the Spent Fuel Pool Storage Rack location listed on the Fuel Movement Sheet(s). _____

5.2.19 **ROTATE** the Fuel Grapple
AND attached Fuel Assembly to attain direct alignment
and correct orientation with the Fuel Storage Rack location. _____

CAUTION 5.2.20

A. DO NOT attempt to release the Fuel Assembly unless it is fully seated in a storage or Reactor Core location. [CD-123E, CD-736D, CD-182C]

B. DO NOT reposition the Refuel Platform or Trolley while the Fuel Assembly is grappled and not fully withdrawn from the storage or Reactor Core location.

C. DO NOT twist a grappled fuel assembly while it is held fast in a Storage or Reactor Core location.

D. While positioning irradiated fuel in the Reactor Vessel or Spent Fuel Pool maximize the amount of water shielding between the Fuel Assembly and Reactor Vessel or Fuel Pool wall. [CD-612X, CD-069A]

5.2.20 **ENSURE** the Fuel Grapple is at the correct Core or Fuel Pool Coordinates. ____ SRO

5.2.21 Slowly **LOWER** the Fuel Assembly into the storage rack location using the Fuel Grapple Hoist position control in the LOWER position. _____

5.2.22 WHEN the SRO has ensured that the Fuel Assembly is fully seated in the correct Fuel Storage Rack location: _____

A. **OBSERVE** the SLACK CABLE light on. **[CD-736D]** _____

B. **OBSERVE** the HOIST LOADED light off. **[CD-736D]** _____

C. **OBSERVE** no load indicated (< 60 lbs) on the load indicator. _____

D. **OBSERVE** Fuel Grapple downward motion automatically stops _____

E. **ENSURE** Fuel Grapple is at required depth by observing HOIST GRAPPLE ELEVATION Digital Readout. _____

5.2.23 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch to the RELEASE position AND **OBSERVE** the grapple ENGAGE light off. **[CD-736D]** _____

5.2.24 Slowly **RAISE** the Fuel Grapple by using the hoist position control in the RAISE position AND:

A. **OBSERVE** the SLACK CABLE light off. **[CD-736D]** _____

B. **OBSERVE** the HOIST LOADED light remains off. **[CD-736D]** _____

C. **OBSERVE** the load cell indicator to ensure that no load has been inadvertently grappled. **[CD-442A]** _____

D. **ENSURE** that hose and cable reels are taking up slack by observing air hoses remain taught within the Grapple. _____

5.2.25 **RAISE** the Fuel Grapple fully to avoid collision with any underwater obstructions. **[CD-396Y]** _____

5.2.26 **INITIAL** the appropriate box on the Fuel Movement Sheet(s) indicating the fuel transfer has been completed. _____

5.2.27 **NOTIFY** the Control Room personnel that the fuel move has been completed. _____

5.2.28 Control Room personnel should update the fuel location tracking tool in use. _____

5.3 Fuel Transfer - Spent Fuel Storage Pool to Reactor Core

5.3.1 **ENSURE** that all prerequisites have been satisfied IAW Section 2.3 of this procedure. _____

5.3.2 **USE** the Refuel Platform and Trolley position controls to maneuver the Fuel Grapple to the Spent Fuel Pool location listed on the Fuel Movement Sheets. _____

5.3.3 **LOWER** the Fuel Grapple to approximately one foot above the Fuel Assembly to be removed by using the Fuel Grapple Hoist control in the LOWER position. _____

5.3.4 IF possible, visually **ENSURE** correct serial number of Fuel Assembly. _____ SRO

NOTE 5.3.5

The Fuel Assembly should be grappled in the Spent Fuel Pool so that the Fuel Assembly channel fastener is in the proper orientation for Fuel Assembly installation in the Reactor Core. The Fuel Movement Sheet(s) provides correct core channel fastener orientation.

5.3.5 **ROTATE** the Fuel Grapple so that the grapple hooks are in line with the Fuel Assembly handle. _____

5.3.6 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch to the RELEASE position to ensure the Fuel Grapple hooks are open, **OBSERVE** the grapple ENGAGE light off. _____

5.3.7 Slowly **LOWER** the Fuel Grapple UNTIL the Fuel Grapple is resting on the Fuel Assembly handle. Grapple may be gently twisted to seat on handle
AND :

A. **OBSERVE** Fuel Grapple downward motion automatically stops. _____

B. **OBSERVE** the SLACK CABLE light is on. **[CD-736D]** _____

C. **ENSURE** Fuel Grapple is at required depth by observing HOIST GRAPPLE ELEVATION Digital Readout. _____

D. **ROTATE** grapple in both directions. **[CD-739F]** _____

5.3.8 **ENSURE** the Fuel Grapple is at the correct Core OR Fuel Pool Coordinates. _____ SRO

5.3.9 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch in the ENGAGE position to grapple the Fuel Assembly. _____

A. **OBSERVE** the GRAPPLE ENGAGED light is on. **[CD-736D]** _____

B. **ROTATE** grapple in both directions to ensure proper engagement. **[CD-739F]** _____

5.3.10 Slowly **RAISE** the grappled Fuel Assembly using the Fuel Grapple hoist control in the RAISE position. _____

A. **OBSERVE** the SLACK CABLE light is off. **[CD-736D]** _____

B. **OBSERVE** the HOIST LOADED light is on. **[CD-736D]** _____

C. **OBSERVE** the load cell indicator to ensure the assembly has been grappled. _____

D. Visually **ENSURE** assembly is being lifted. _____

E. **ENSURE** that hose and cable reels are taking up slack by observing air hoses remain taught within the Grapple. _____

CAUTION 5.3.11

A. DO NOT attempt to release the Fuel Assembly unless it is fully seated in a Storage or Reactor Core location. [CD-123E, CD-736D, CD-182C]

B. DO NOT reposition the Refuel Platform or Trolley while the Fuel Assembly is grappled and not fully withdrawn from the storage or Reactor Core location.

C. DO NOT twist a grappled fuel assembly while it is held fast in a storage or Reactor Core location.

D. While positioning irradiated fuel in the Reactor Vessel or Spent Fuel Pool maximize the amount of water shielding between the Fuel Assembly and Reactor Vessel or Fuel Pool wall. [CD-612X, CD-069A]

5.3.11 **RAISE** AND CONTINUOUSLY **OBSERVE** the Fuel Assembly during its upward travel. _____

CAUTION 5.3.12

DO NOT bypass the Main Hoist normal up stop when Handling Fuel Assemblies or control rod blades in order to comply with UFSAR 9.1.4.2.12.3.

5.3.12 WHEN the Fuel Assembly has reached its upper limit of travel THEN **OBSERVE**: _____

A. GRAPPLE NORMAL UP light on. **[CD-736D]** _____

B. Fuel Grapple upward motion automatically stops. _____

CAUTION 5.3.13

A. Minimize the time the fuel is in the Drywell Bellows area. [CD-612X, CD-069A]

B. Restrict fuel transfer to the most direct path between the Reactor Vessel and Spent Fuel Pool.

5.3.13 **USE** the Trolley position control to position the Fuel Grapple in direct alignment with the center of the fuel transfer path to the Reactor Well. **[CD-396Y]** _____

5.3.14 **USE** the Refuel Platform Position Control in the REVERSE position to maneuver the Refuel Platform to the Reactor Cavity area. _____

5.3.15 **USE** the Refuel Platform and Trolley Position Controls and Position Indication System to maneuver the Fuel Grapple to the Reactor Core location listed on the Fuel Movement Sheet(s). _____

5.3.16 **NOTIFY** Control Room that platform is moving over the Core. _____

5.3.17 **ENSURE** the Fuel Grapple is at the correct Core OR Fuel Pool Coordinates. _____ SRO

5.3.18 **ROTATE** the Fuel Grapple AND attached Fuel Assembly in direct alignment with the Reactor Core location and corresponding channel fastener orientation listed on the Fuel Movement Sheet(s). _____

5.3.19 **NOTIFY** the Control Room that the assembly is about to enter the Core and that SRM's must be observed until assembly is seated. _____

CAUTION 5.3.20

A. DO NOT attempt to release the Fuel Assembly unless it is fully seated in a storage or Reactor Core location. [CD-123E, CD-736D, CD-182C]

B. DO NOT reposition the Refuel Platform or Trolley while the Fuel Assembly is grappled and not fully withdrawn from the storage or Reactor Core location.

C. DO NOT twist a grappled fuel assembly while it is held fast in a storage or Reactor Core location.

D. While positioning irradiated fuel in the Reactor Vessel or Spent Fuel Pool maximize the amount of water shielding between the Fuel Assembly and Reactor Vessel or Fuel Pool wall. [CD-612X, CD-069A]

5.3.20 Slowly **LOWER** the Fuel Assembly into the Reactor Core location using the Fuel Grapple Hoist Position Control in the LOWER position. _____

5.3.21 WHEN the SRO has ensured that the Fuel Assembly is fully seated in the correct Reactor Core location: _____

A. **NOTIFY** Control Room that assembly is seated in it proper Core location. _____

B. **OBSERVE** the SLACK CABLE light on. **[CD-736D]** _____

C. **OBSERVE** the HOIST LOADED light off. **[CD-736D]** _____

D. **OBSERVE** no load indicated (< 60 lbs) on the load cell indicator. _____

E. **OBSERVE** Fuel Grapple downward motion automatically stops. _____

F. **ENSURE** Fuel Grapple is at required depth by observing HOIST GRAPPLE ELEVATION Digital Readout. _____

5.3.22 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch to the RELEASE position
AND **OBSERVE** the grapple ENGAGE light off. **[CD-736D]** _____

5.3.23 Slowly **RAISE** the Fuel Grapple by using the Hoist Position Control in the RAISE position AND:

A. **OBSERVE** the SLACK CABLE light off. **[CD-736D]** _____

B. **OBSERVE** the HOIST LOADED light remains off. **[CD-736D]** _____

C. **OBSERVE** the Load Cell Indicator to ensure that no load has inadvertently been grappled. **[CD-442A]** _____

5.3.24 **ENSURE** that hose and cable reels are taking up slack by observing air hoses remain taught within the Grapple. _____

5.3.25 **RAISE** the Fuel Grapple fully to avoid collision with any underwater obstructions. **[CD-396Y]** _____

5.3.26 **INITIAL** the appropriate box on the Fuel Movement Sheet(s) indicating the fuel transfer has been completed. _____

5.3.27 **NOTIFY** the Control Room personnel that the fuel move has been completed. _____

5.3.28 Control Room personnel should **UPDATE** the fuel location tracking tool in use. _____

5.4 Blade Guide Transfer - Spent Fuel Storage Pool to Reactor Core

5.4.1 **ENSURE** that all prerequisites have been satisfied IAW Section 2.4 of this procedure. _____

5.4.2 **USE** the Refuel Platform and Trolley position controls to maneuver the unloaded Fuel Grapple to the blade guide location in the Spent Fuel Pool. _____

5.4.3 **ENSURE** the Fuel Grapple is at the correct Core OR Fuel Pool Coordinates. _____ SRO

5.4.4 **LOWER** the Fuel Grapple to approximately one foot above the blade guide to be grappled by using the Fuel Grapple Hoist Control in the LOWER position. _____

5.4.5 **ROTATE** the Fuel Grapple so that the grapple hooks are in line with the blade guide handle. _____

5.4.6 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch to the RELEASE position to ensure the Fuel Grapple hooks are open, **OBSERVE** the grapple ENGAGE light off. _____

5.4.7 Slowly **LOWER** the Fuel Grapple UNTIL the Fuel Grapple is resting on the blade guide handle. Grapple may be gently twisted to seat on handle. _____

A. **OBSERVE** Fuel Grapple Hoist downward motion automatically stops. _____

B. **OBSERVE** the SLACK CABLE light on. **[CD-736D]** _____

C. **ENSURE** Fuel Grapple is at required depth by observing HOIST GRAPPLE ELEVATION Digital Readout. _____

5.4.8 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch in the ENGAGE position to grapple the blade guide AND **OBSERVE** the GRAPPLE ENGAGE light on. **[CD-736D]** _____

5.4.9 Slowly **RAISE** the grappled blade guide using the Fuel Grapple hoist control in the RAISE position AND :

A. **OBSERVE** the SLACK CABLE light off. **[CD-736D]** _____

B. **OBSERVE** the Load Cell Indicator to ensure that blade guide has been grappled. _____

C. Visually **VERIFY** blade guide is being lifted. _____

5.4.10 **RAISE** AND CONTINUOUSLY **OBSERVE** the blade guide during its upward travel. _____

5.4.11 **ENSURE** hose and cable reels are taking up slack by observing cables and air hoses remain taught within the grapple. _____

NOTE 5.4.12

HOIST LOADED light may come on when hoist is almost full up.

5.4.12 WHEN the blade guide has reached its upper limit AND **OBSERVE:** _____

A. GRAPPLE NORMAL UP light on. **[CD-736D]** _____

B. Fuel Grapple upward motion automatically stops. _____

5.4.13 **USE** the Trolley Position Control to position the Fuel Grapple in direct alignment with the center of the fuel transfer path to the Reactor Well. **[CD-396Y]** _____

5.4.14 **USE** the Refuel Platform Control in the Reverse position to maneuver the Refuel Platform to the Reactor Cavity area. _____

5.4.15 **USE** the Refuel Platform and Trolley Position Controls to maneuver the Fuel Grapple to the Reactor Core location listed on the Fuel Movement Sheet(s). Position Indication System should be used for single blade guides. ____

5.4.16 **NOTIFY** Control Room that platform is moving over the core. _____

5.4.17 **ENSURE** the Fuel Grapple is at the correct Core OR Fuel Pool Coordinates. _____ SRO

5.4.18 **ROTATE** the Fuel Grapple AND attached blade guide in direct alignment with the Reactor Core location AND orientation listed on the Fuel Movement Sheet(s). _____

CAUTION 5.4.19

A. DO NOT attempt to release the blade guide unless it is fully seated in the Reactor Core location. [CD-123E]

B. DO NOT reposition the Refuel Platform or Trolley while the blade guide is grappled and not fully withdrawn from the Reactor Core location.

C. DO NOT twist a grappled blade guide while it is held fast in a Reactor Core location.

5.4.19 Slowly **LOWER** the blade guide into the Reactor Core location(s) using the Fuel Grapple hoist in the LOWER position. _____

5.4.20 WHEN the blade guide is fully seated in the Reactor Core location(s): _____

A. **OBSERVE** the SLACK CABLE light on. _____

B. **OBSERVE** the HOIST LOADED light off. _____

C. **OBSERVE** no load indicated (< 60 lbs) on the load cell indicator. _____

D. **OBSERVE** Fuel Grapple downward motion automatically stops _____

E. **ENSURE** Fuel Grapple is at required depth by observing HOIST GRAPPLE ELEVATION Digital Readout. _____

5.4.21 **NOTIFY** the Control Room that the blade guides are in the Core location(s). _____

5.4.22 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch to the RELEASE position AND **OBSERVE** the grapple ENGAGE light off. _____

5.4.23 Slowly **RAISE** the Fuel Grapple by using the Hoist Position Control in the RAISE position. _____

A. **OBSERVE** the SLACK CABLE light off. _____

B. **OBSERVE** the HOIST LOADED light remains off. _____

C. **OBSERVE** the Load Cell Indicator to ensure that no load has been inadvertently been grappled. **[CD-442A]** _____

5.4.24 **ENSURE** that hose and cable reels are taking up slack by observing cables and air hoses remain taught within the grapple. _____

5.4.25 **RAISE** the Fuel Grapple fully to avoid collision with any underwater obstructions. **[CD-396Y]** _____

5.4.26 **INITIAL** the appropriate box on the Fuel Movement Sheet(s) indicating the completion of the blade guide transfer step. _____

5.4.27 Control Room personnel should **UPDATE** the location tracking tool in use. _____

5.5 Blade Guide Transfer - Reactor Core to Spent Fuel Storage Pool

5.5.1 **ENSURE** that all prerequisites have been satisfied IAW Section 2.5 of this procedure. _____

5.5.2 **USE** the Refuel Platform and Trolley Position Controls to maneuver the Fuel Grapple to the coordinates listed on the Fuel Movement Sheet(s). Digital Position Indication System should be used for single blade guides. _____

5.5.3 **ENSURE** the Fuel Grapple is at the correct Core OR Fuel Pool Coordinates. _____ SRO

5.5.4 **LOWER** the Fuel Grapple to approximately one foot above the blade guide to be removed by using the Fuel Grapple Hoist control in the LOWER position. _____

5.5.5 **ROTATE** the Fuel Grapple so that the grapple hooks are in line with the blade guide handle. _____

5.5.6 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch to the RELEASE to ensure the Fuel Grapple hooks are open, **OBSERVE** the grapple ENGAGE light off. _____

5.5.7 Slowly **LOWER** the Fuel Grapple UNTIL the Fuel Grapple is resting on the blade guide handle. Grapple may be gently twisted to seat on handle. _____

A. **OBSERVE** Fuel Grapple Hoist downward motion automatically stops. _____

B. **OBSERVE** the SLACK CABLE light on. _____

C. **ENSURE** Fuel Grapple is at required depth by observing HOIST GRAPPLE ELEVATION Digital Readout. _____

5.5.8 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch in the ENGAGE position to grapple the blade guide AND **OBSERVE** the GRAPPLE ENGAGE light on. _____

CAUTION 5.5.9

DO NOT remove a blade guide from its Reactor Core location if the respective control rod will be left unsupported.

5.5.9 Slowly **RAISE** the grapple blade guide using the Fuel Grapple Hoist Control in the RAISE position. _____

A. **OBSERVE** the SLACK CABLE light off. _____

B. **OBSERVE** the load cell indicator to ensure the blade guide has been grappled. _____

C. Visually **VERIFY** blade guide is being lifted. _____

CAUTION 5.5.10

A. DO NOT attempt to release the blade guide unless it is fully seated in the Reactor Core location. [CD-123E]

B. DO NOT reposition the Refuel Platform or Trolley while the blade guide is grappled and not fully withdrawn from the Reactor Core location.

C. DO NOT twist a grappled blade guide while it is held fast in a Reactor Core location.

5.5.10 **RAISE** AND CONTINUOUSLY **OBSERVE** the blade guide during its upward travel. _____

5.5.11 **ENSURE** that hose and cable reels are taking up slack by observing cables and air hoses remain taught within the grapple. _____

NOTE 5.5.12

HOIST LOADED light may come on when hoist is almost full up.

5.5.12 WHEN the blade guide has reached its upper limit THEN **OBSERVE**: _____

A. GRAPPLE NORMAL UP light on. _____

B. Fuel Grapple upward motion automatically stops. _____

5.5.13 **NOTIFY** the Control Room that blade guide is out of the core. _____

5.5.14 **USE** the Trolley position control to position the Fuel Grapple in direct alignment with the center of the fuel transfer path to the Fuel Pool. **[CD-396Y]** _____

5.5.15 **USE** the Refuel Platform position control in the FORWARD position to maneuver the Refuel Platform to the Spent Fuel Pool. _____

5.5.16 **NOTIFY** the Control Room that the platform is over the Fuel Pool. _____

5.5.17 **USE** the Refuel Platform
AND Trolley Position Controls to maneuver the Fuel Grapple
to an available blade guide storage location. _____

5.5.18 **ENSURE** the Fuel Grapple is at the correct Core
OR Fuel Pool Coordinates. _____
SRO

5.5.19 **ROTATE** the Fuel Grapple
AND attached blade guide so the blade guide cross beam
is directly over the storage location support listed on the
Fuel Movement Sheet(s). _____

5.5.20 Slowly **LOWER** the blade guide
UNTIL it is fully seated on the support. _____

5.5.21 WHEN the blade guide is fully seated on the support
THEN: _____

A. **OBSERVE** the SLACK CABLE light on. _____

B. **OBSERVE** the HOIST LOADED light off. _____

C. **OBSERVE** no load indicated (< 60 lbs) on the load cell indicator. _____

D. **ENSURE** Fuel Grapple is at required depth by observing
HOIST GRAPPLE ELEVATION Digital Readout. _____

5.5.22 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch
to the RELEASE position
AND **OBSERVE** the grapple ENGAGE light off. _____

5.5.23 Slowly **RAISE** the Fuel Grapple using the Hoist Control in the
RAISE position. _____

A. **OBSERVE** the SLACK CABLE light off. _____

B. **OBSERVE** the HOIST LOADED light remains off. _____

C. **OBSERVE** the load cell indicator to verify that a load was not
inadvertently grappled. **[CD-442A]** _____

D. **ENSURE** that hose and cable reels are taking up slack by
observing air hoses remain taught within the Grapple. _____

5.5.24 **RAISE** the Fuel Grapple fully to avoid collision with any underwater obstructions. **[CD-396Y]** _____

5.5.25 **INITIAL** the appropriate block on the Fuel Movement Sheet(s) indicating that the blade guide transfer has been completed. _____

5.5.26 **NOTIFY** Control Room personnel that the blade guide transfer has been completed. _____

5.6 Fuel Movement - Within Reactor Vessel

5.6.1 **ENSURE** that all prerequisites have been satisfied IAW Section 2.6 of this procedure. _____

5.6.2 **USE** the Trolley Position Control to position the Fuel Grapple to attain direct alignment with the center of the fuel transfer path. **[CD-396Y]** _____

5.6.3 **USE** the Refuel Platform Position Control in the REVERSE position to maneuver the Refuel Platform over the Reactor Core. _____

5.6.4 Using the Refuel Platform and Trolley Position Controls AND Position Indication System, **MANEUVER** the Fuel Grapple to the coordinates listed on the Fuel Movement Sheet(s). _____

5.6.5 **LOWER** the Fuel Grapple to approximately one foot above the Fuel Assembly to be transferred by using the Fuel Grapple Hoist control in the LOWER position. _____

5.6.6 **ENSURE** the Fuel Grapple is at the correct Core Coordinates. _____ SRO

5.6.7 **ROTATE** the Fuel Grapple so that the grapple hooks are in line with the fuel assembly handle. _____

5.6.8 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch to the RELEASE position to ensure the Fuel Grapple hooks are open, **OBSERVE** the grapple ENGAGE light off. _____

5.6.9 Slowly **LOWER** the Fuel Grapple UNTIL the Fuel Grapple resting on the Fuel Assembly handle. Grapple may be gently twisted to seat on handle. _____

A. **OBSERVE** Fuel Grapple Hoist downward motion automatically stops. _____

B. **OBSERVE** the SLACK CABLE light on. **[CD-736D]** _____

C. **ENSURE** Fuel Grapple is at required depth by observing HOIST GRAPPLE ELEVATION Digital Readout. _____

D. **ROTATE** grapple in both directions. **[CD-739F]** _____

5.6.10 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch in the ENGAGE position to grapple the fuel assembly AND: _____

A. **OBSERVE** the grapple ENGAGE light is on. _____

B. **ROTATE** grapple in both directions to ensure proper engagement. **[CD-739F]** _____

5.6.11 **NOTIFY** Control Room the assembly is being removed from Core AND that the SRM's should be observed until assembly is out of the Core. _____

5.6.12 Slowly **RAISE** the grappled Fuel Assembly using the Fuel Grapple Hoist Control in the RAISE position. _____

A. **OBSERVE** the SLACK CABLE light off. _____

B. **OBSERVE** the HOIST LOADED light on. **[CD-736D]** _____

C. **OBSERVE** the Load Cell Indicator to ensure the assembly has been grappled. _____

D. Visually **VERIFY** assembly is being lifted. _____

CAUTION 5.6.13

A. DO NOT attempt to release the Fuel Assembly unless it is fully seated in a storage or Reactor Core location. [CD-123E, CD-736D, CD-182C]

B. DO NOT reposition the Refuel Platform or Trolley while the Fuel Assembly is grappled and not fully withdrawn from the storage or Reactor Core location.

C. DO NOT twist a grappled fuel assembly while it is held fast in a storage or Reactor Core location.

D. While positioning irradiated fuel in the Reactor Vessel or Spent Fuel Pool maximize the amount of water shielding between the Fuel Assembly and Reactor Vessel or Fuel Pool wall. [CD-612X, CD-069A]

5.6.13 **RAISE** AND CONTINUOUSLY **OBSERVE** the Fuel Assembly during its upward travel.
NOTIFY Control Room when assembly is out of the core. _____

5.6.14 **ENSURE** that hose and cable reels are taking up slack by observing cables and air hoses remain taught within the grapple. _____

NOTE 5.6.15

Safe working height is the height of the Fuel Assembly so that the top guide is cleared by approximately 5 feet.

5.6.15 WHEN the Fuel Assembly has reached its safe working height as indicated with a hoist grapple elevation digital readout (< 300 inches) THEN **NOTIFY** Control Room that Fuel Assembly is out of its old core location. _____

5.6.16 **USE** the Refuel Platform
AND Trolley Position Controls
AND Digital Position Indication System to maneuver the Fuel Grapple to the Reactor Core location listed on the Fuel Movement Sheet(s). _____

5.6.17 **NOTIFY** Control Room that Fuel Assembly is over its new core location. _____

5.6.18 **ENSURE** the Fuel Grapple is at the correct Core OR Fuel Pool Coordinates. _____ SRO

5.6.19 **ROTATE** the Fuel Grapple AND attached Fuel Assembly in direct alignment with the Reactor Core location and corresponding channel fastener orientation listed on the Fuel Movement Sheet(s). _____

5.6.20 **NOTIFY** the Control Room that the assembly is about to enter the Core AND that SRM's must be observed until assembly is seated. _____

5.6.21 Slowly **LOWER** the Fuel Assembly into the Reactor Core location using the Fuel Grapple Hoist Position Control in the LOWER position. _____

5.6.22 WHEN the SRO has ensured that the Fuel Assembly is fully seated in the correct Reactor Core location: _____

A. **NOTIFY** Control Room that assembly is seated in its proper Core location. _____

B. **OBSERVE** the SLACK CABLE light on. **[CD-736D]** _____

C. **OBSERVE** the HOIST LOADED light off. **[CD-736D]** _____

D. **OBSERVE** no load (< 60 lbs) indicated on the load cell indicator. _____

E. **OBSERVE** Fuel Grapple downward motion automatically stops. _____

F. **ENSURE** Fuel Grapple is at required depth by observing HOIST GRAPPLE ELEVATION Digital Readout. _____

5.6.23 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch to the RELEASE position AND **OBSERVE** the grapple ENGAGE light off. **[CD-736D]** _____

5.6.24 Slowly **RAISE** the Fuel Grapple by using the Hoist Position Control in the RAISE position. _____

A. **OBSERVE** the SLACK CABLE light off. **[CD-736D]** _____

B. **OBSERVE** the HOIST LOADED light remains off. **[CD-736D]** _____

C. **OBSERVE** the load cell indicator to ensure that no load has been inadvertently grappled. **[CD-442A]** _____

5.6.25 **ENSURE** that hose and cable reels are taking up slack by observing cables and air hoses remain taught within the grapple. _____

5.6.26 **RAISE** the Fuel Grapple fully to avoid collision with any underwater obstructions.
IF next Fuel Assembly to be handled is nearby,
RAISE the Fuel Grapple at least one foot. **[CD-396Y]** _____

5.6.27 **INITIAL** the appropriate box on the Fuel Movement Sheet(s) indicating the fuel transfer has been completed. _____

5.6.28 **NOTIFY** the Control Room personnel that the fuel move has been completed. _____

5.6.29 Control Room personnel should
UPDATE the fuel location tracking tool in use. _____

5.7 Blade Guide Movement - Within Reactor Vessel

5.7.1 **ENSURE** that all prerequisites have been satisfied IAW Section 2.7 of this procedure. _____

5.7.2 **USE** the Refuel Platform and Trolley Position Controls to maneuver the Fuel Grapple to the coordinates listed on the Fuel Movement Sheet(s). Digital Position Indication System should be used for single blade guides. _____

5.7.3 **ENSURE** the Fuel Grapple is at the correct Core OR Fuel Pool Coordinates. _____ SRO

5.7.4 **LOWER** the Fuel Grapple to approximately one foot above the blade guide to be transferred by using the Fuel Grapple hoist control in the LOWER position. _____

5.7.5 **ROTATE** the Fuel Grapple so that the grapple hooks are in line with the blade guide handle. _____

5.7.6 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch to the RELEASE position to ensure the Fuel Grapple hooks are open, **OBSERVE** the ENGAGE light off. _____

5.7.7 Slowly **LOWER** the Fuel Grapple UNTIL the Fuel Grapple is resting on the blade guide handle. Grapple may be gently twisted to seat on handle. _____

A. **OBSERVE** Fuel Grapple hoist downward motion automatically stops. _____

B. **OBSERVE** the SLACK CABLE light on. _____

C. **ENSURE** Fuel Grapple is at required depth by observing HOIST GRAPPLE ELEVATION Digital Readout. _____

5.7.8 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch in the ENGAGE position to grapple the blade guide AND **OBSERVE** the GRAPPLE ENGAGE light on. _____

CAUTION 5.7.9

DO NOT remove a blade guide from its Reactor Core location if the respective control rod will be left unsupported.

5.7.9 Slowly **RAISE** the grapple blade guide using the Fuel Grapple Hoist Control in the RAISE position. _____

A. **OBSERVE** the SLACK CABLE light off. _____

B. **OBSERVE** the Load Cell Indicator to ensure that blade guide has been grappled. _____

C. Visually **VERIFY** blade guide is being lifted. _____

CAUTION 5.7.10

A. DO NOT attempt to release the blade guide unless it is fully seated in the Reactor Core location. [CD-123E]

B. DO NOT reposition the Refuel Platform or Trolley while the blade guide is grappled and not fully withdrawn from the Reactor Core location.

C. DO NOT twist a grappled blade guide while it is held fast in a Reactor Core location.

5.7.10 **RAISE** AND CONTINUOUSLY **OBSERVE** the blade guide during its upward travel. _____

5.7.11 **ENSURE** hose and cable reels are taking up slack by observing cables and air hoses remain taught within the grapple. _____

NOTE 5.7.12

Safe working height is the height of the Fuel Assembly so that the top guide is cleared by approximately 5 feet.

5.7.12 WHEN the blade guide has reached its safe working height as indicated with a hoist grapple elevation digital readout (< 300 inches) THEN **NOTIFY** Control Room that blade guide is out of the core. _____

5.7.13 **USE** the Refuel Platform AND Trolley position controls to maneuver the Fuel Grapple to the Reactor Core location listed on the Fuel Movement Sheet(s). Digital Position Indication System should be used for single blade guides. _____

5.7.14 **NOTIFY** Control Room that platform is moving to new location over the core. _____

5.7.15 **ENSURE** the Fuel Grapple is at the correct Core OR Fuel Pool Coordinates. _____

SRO

5.7.16 **ROTATE** the Fuel Grapple
AND attached blade guide in direct alignment
with the Reactor Core location
AND orientation listed on the Fuel Movement Sheet(s). _____

CAUTION 5.7.17

A. DO NOT attempt to release the blade guide unless it is fully seated in the Reactor Core location. [CD-123E]

B. DO NOT reposition the Refuel Platform or Trolley while the blade guide is grappled and not fully withdrawn from the Reactor Core location.

C. DO NOT twist a grappled blade guide while it is held fast in a Reactor Core location.

5.7.17 Slowly **LOWER** the blade guide into the Reactor Core location(s)
using the Fuel Grapple hoist in the LOWER position. _____

5.7.18 WHEN the blade guide is fully seated on the support
THEN: _____

A. **OBSERVE** the SLACK CABLE light on. _____

B. **OBSERVE** the HOIST LOADED light off. _____

C. **OBSERVE** no load indicated (< 60 lbs) on the load cell indicator. _____

D. **OBSERVE** Fuel Grapple downward motion automatically stops. _____

E. **ENSURE** Fuel Grapple is at required depth by observing
HOIST GRAPPLE ELEVATION Digital Readout. _____

5.7.19 **NOTIFY** the Control Room that the blade guides are in the core
location(s). _____

5.7.20 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch
to the RELEASE position
AND **OBSERVE** the grapple ENGAGE light off. _____

5.7.21 Slowly **RAISE** the Fuel Grapple using the Hoist Position Control in the RAISE position AND: _____

A. **OBSERVE** the SLACK CABLE light off. _____

B. **OBSERVE** the HOIST LOADED light remains off. _____

C. **OBSERVE** the Load Cell Indicator to ensure that no load has been inadvertently been grappled. **[CD-442A]** _____

5.7.22 **ENSURE** that hose and cable reels are taking up slack by observing cables and air hoses remain taught within the grapple. _____

5.7.23 **RAISE** the Fuel Grapple fully to avoid collision with any underwater obstructions.
IF next blade guide to be handled is nearby
RAISE the Fuel Grapple at least one foot. **[CD-396Y]** _____

5.7.24 **INITIAL** the appropriate box on the Fuel Movement Sheet(s) indicating the completion of the blade guide transfer step. _____

NOTE 5.7.25

Control Room personnel should update the location tracking tool in use.

5.7.25 **NOTIFY** Control Room personnel that the blade guide transfer has been completed. _____

5.8 Fuel/Blade Guide Movement - Within Spent Fuel Storage Pool (other than Refuel Mode) in Manual

NOTE 5.8

All irradiated fuel moves or core alterations must be directly supervised by a licensed SRO or SRO limited to fuel-handling. Non-irradiated fuel handling not involving core alterations and blade guide movement do not require direct supervision by an SRO and can be annotated by the spotter directly involved with the evolution. **[CD-168A]**

This procedure Section describes any combination of fuel/blade guide in Spent Fuel Storage Pool movements between any of the following fuel storage locations:

- Fuel storage racks
- Fuel preparation machines
- Fuel sipping canisters
- Special test and measurement devices

This Section uses the term "source" location (from location) as the location where a fuel/blade guide assembly is initially grappled and "target" location (to location) as the destination of the fuel/blade guide assembly.

Fuel Assembly channel fastener orientation and location must be accomplished and documented in accordance with the Fuel Movement Sheets.

5.8.1 **ENSURE** that all prerequisites have been satisfied IAW Section 2.8 of this procedure. _____

5.8.2 **TOUCH** the SELECT MANUAL on the Touch Screen. _____

5.8.3 **ENSURE** the MANUAL OPERATION ACTIVE button is being displayed. _____

5.8.4 Using the Refuel Platform
AND Trolley Position Controls
AND Position Indication System
MANEUVER the Fuel Grapple to the coordinates listed for the source location on the Fuel Movement Sheet(s). _____

5.8.5 **ENSURE** the Fuel Grapple is at the correct Fuel Pool Coordinates. (**REFER TO** Note 5.8) _____

5.8.6 **LOWER** the Fuel Grapple to approximately one foot above the fuel assembly/blade guide to be removed by using the Fuel Grapple Hoist control in the LOWER position
AND **OBSERVE** the GRAPPLE NORMAL UP light off. _____

5.8.7 IF possible
WHEN fuel is being moved, SRO should
visually **ENSURE** correct serial number of Fuel Assembly.
(**REFER TO** Note 5.8) _____

5.8.8 **ROTATE** the Fuel Grapple so that the grapple hooks are in line with the fuel assembly/blade guide handle. _____

5.8.9 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch to the RELEASE position to ensure the Fuel Grapple hooks are open,
OBSERVE the ENGAGE light off. _____

5.8.10 Slowly **LOWER** the Fuel Grapple UNTIL the Fuel Grapple is resting on the fuel assembly/blade guide handle. Grapple may be gently twisted to seat on handle. _____

A. **OBSERVE** Fuel Grapple downward motion automatically stops. _____

B. **OBSERVE** the SLACK CABLE light on. _____

C. **ENSURE** Fuel Grapple is at required depth by observing HOIST GRAPPLE ELEVATION Digital Readout. _____

D. **ROTATE** grapple in both directions. **[CD-739F]** _____

5.8.10 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch in the ENGAGE position to grapple the fuel assembly/blade guide. _____

A. **OBSERVE** the grapple ENGAGE light on. _____

B. **ROTATE** grapple in both directions to ensure proper engagement. **[CD-739F]** _____

5.8.11 Slowly **RAISE** the grappled fuel assembly/blade guide using the Fuel Grapple hoist control in the RAISE position. _____

A. **OBSERVE** the SLACK CABLE light off _____

B. **OBSERVE** the HOIST LOADED light: _____

- Light ON for Fuel Assembly _____
- Light OFF for Blade Guide _____

C. **OBSERVE** the Load Cell Indicator to ensure the assembly has been grappled. _____

D. Visually **VERIFY** assembly/blade guide is being lifted. _____

CAUTION 5.8.12

A. DO NOT attempt to release the fuel assembly/blade guide unless it is fully seated in storage location. [CD-182C, CD-123E]

B. DO NOT reposition the Refuel Platform or Trolley while the fuel assembly/blade guide is grappled and not fully withdrawn from the storage location.

C. DO NOT twist a grappled fuel assembly/blade guide while it is held fast in a storage location. [CD-069A CD-612X]

D. While positioning irradiated fuel in the Spent Fuel Pool maximize the amount of water shielding between the Fuel Assembly and Fuel Pool wall.

5.8.13 **RAISE** AND CONTINUOUSLY **OBSERVE** the fuel assembly/blade guide during its upward travel. _____

5.8.14 **ENSURE** hose and cable reels are taking up slack by observing cables and air hoses remain taught within the grapple. _____

5.8.20 WHEN the fuel assembly/blade guide is fully seated in the target location AND: _____

A. **OBSERVE** the SLACK CABLE light on. _____

B. **OBSERVE** the HOIST LOADED light off. _____

C. **OBSERVE** no load indicated (< 60 lbs) on the load cell indicator. _____

D. **OBSERVE** Fuel Grapple downward motion automatically stops. _____

E. **ENSURE** Fuel Grapple is at required depth by observing HOIST GRAPPLE ELEVATION Digital Readout. _____

5.8.21 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch to the RELEASE position AND **OBSERVE** the grapple ENGAGE light off. _____

5.8.22 Slowly **RAISE** the Fuel Grapple by using the hoist position control in the RAISE position. _____

A. **OBSERVE** the SLACK CABLE light off. _____

B. **OBSERVE** the HOIST LOADED light remains off. _____

C. **OBSERVE** the Load Cell Indicator to ensure that no load has been inadvertently grappled. **[CD-442A]** _____

5.8.23 **RAISE** the Fuel Grapple fully to avoid collision with any underwater obstructions.
IF next Fuel Assembly
OR blade guide to be moved is nearby,
RAISE the Fuel Grapple at least one foot. _____

5.8.24 **ENSURE** hose and cable reels are taking up slack by observing cables and air hoses remain taught within the grapple. _____

5.8.25 IF Fuel Assemblies were moved,
INITIAL the appropriate box on the Fuel Movement Sheet(s) indicating the fuel transfer has been completed. _____

5.8.26 **NOTIFY** the Control Room that the fuel transfer has been completed. _____

5.8.27 Control Room personnel should
UPDATE the fuel location tracking tool in use. _____

5.9 Auxiliary Hoist Tool Installation [CD-117G]

NOTE 5.9

A. The installation steps in this section will be performed by a qualified Maintenance Technician under the direction of the operations department.

B. The fitting on the end of the auxiliary and monorail hoist cable has 1/2" -13 UNC threads. The Control Rod Grapple, Jet pump Grapple, Fuel Support Piece Grapple, Combined CRB/FSP Grapple and the General Purpose Grapple have 7/16" -14 UNC threads in the mounting stud (threaded hole on top of tool). Failure to use a cable terminal/adaptor, which threads between the hoists cable fitting and the tool mounting stud can cause failure due to thread mismatch. **[CD-217E, CD-949A]**

5.9.1 The following tools may be mounted to the Auxiliary Hoist's (Monorail OR Frame mounted) cable terminal, using the cable terminal/adaptor: _____

A. Jet Pump Grapple _____

B. Control Rod Grapple _____

C. Fuel Support Grapple _____

D. Instrument Handling Tool _____

E. General Purpose Grapple _____

F. Combined CRB/FSP Grapple _____

5.9.2 **CONNECT** the Instrument Handling Tool to a Refueling Platform Auxiliary Hoist as follows: _____

NOTE 5.9.2.A

To assure preload, thread sealant should NOT be used on the jam nuts at both ends of the cable terminal/adapter.

A. **APPLY** a thread sealant, either Loctite Thread Sealant 2432 or 5772, on both the male cable terminal threads and the female cable terminal/adaptor threads. **[CD-949A]** _____

B. **THREAD** the cable terminal/adaptor onto the Auxiliary Hoist cable terminal. **[CD-949A]** _____

C. **APPLY** a thread sealant, either Loctite Thread Sealant 2432 or 5772, to the male cable terminal threads and the female mounting stud on top of the tool. **[CD-949A]** _____

D. **SUPPORT** the instrument handling tool in the vertical position AND **THREAD** the cable terminal/adaptor into the top of the mounting stud. _____

E. **VERIFY** proper thread depth of insertion, both visually AND by point insertion at the sight hole in the square mounting stud. **[CD-949A]** _____

F. **TIGHTEN** the jam nuts, by torquing each jam nut to 25 - 30 ft-lbs **[CD-949A]**. _____

NOTE 5.9.2.G

Radioactive water may be present in the air lines. Radiation Protection should monitor performance of Step 5.9.2.G.

G. Carefully **BLEED** Refuel Platform dual airlines into rag to remove any moisture, THEN **ATTACH** the air supply connections to the tool quick connect devices. _____

Continued next page

5.9.2 (continued)

H. IF the hoist must be removed from the water AND irradiated components are not being handled, **LOOSEN** the bolts on the mechanical jam AND **SLIDE** the jam toward the grapple to allow full withdrawal of the grapple. **TIGHTEN** the bolts. _____

I. IF the hoist to be set is used for handling irradiated components, **PERFORM** the following: **[CD-451X]** _____

NOTE 5.9.2.I.1

Performance of Step 5.9.2.I.1 will meet the requirements for the Instrument Handling tool. **[80033517]**

1. **VERIFY** the electrical stops for the applicable Refueling Platform Auxiliary Hoist have been set IAW HC.OP-ST.KE-0001(Q), Refuel Interlock Operability Functional Test - Section 5.4 for the Jet Pump Grapple. _____

2. **LOWER** the grapple to greater than 7 feet below the surface of the water to clear the hoist override. _____

3. **RAISE** the grapple to reach the electrical stops. (The mechanical jam may have to be lowered to allow this). _____

4. **LOOSEN** the bolts on the mechanical jam AND **SLIDE** the jam up UNTIL it just touches the limit switch LS4 (LS4 is a finger switch just below the mechanical jam entry point). _____

5. **TIGHTEN** the bolts. _____

5.9.3 **CONNECT** a Control Rod Grapple to a Refueling Platform Auxiliary Hoist as follows: _____

NOTE 5.9.3.A

To assure preload, thread sealant should NOT be used on the jam nuts at both ends of the cable terminal/adapter.

A. **APPLY** a thread sealant, either Loctite Thread Sealant 2432 or 5772, on both the male cable terminal threads and the female cable terminal/adaptor threads. **[CD-949A]** _____

B. **THREAD** the cable terminal/adaptor onto the Auxiliary Hoist cable terminal. **[CD-949A]** _____

C. **APPLY** a thread sealant, either Loctite Thread Sealant 2432 or 5772, to the male cable terminal threads and the female mounting stud on top of the tool. **[CD-949A]** _____

D. **SUPPORT** the Control Rod Grapple tool in the vertical position AND **THREAD** the cable terminal/adaptor into the top of the mounting stud. _____

E. **VERIFY** proper thread depth of insertion, both visually AND by point insertion at the sight hole in the square mounting stud. **[CD-949A]**. _____

F. **TIGHTEN** the jam nuts, by torquing each jam nut to 25 - 30 ft-lbs. **[CD-949A]**. _____

NOTE 5.9.3.G

Radioactive water may be present in the air lines. Radiation Protection should monitor performance of Step 5.9.3.G.

G. Carefully **BLEED** Refuel Platform dual airlines into rag to remove any moisture, THEN **ATTACH** the air supply connections to the tool quick connect devices. _____

Continued next page

5.9.3 (continued)

H. IF the hoist must be removed from the water AND irradiated blades are not being handled, **LOOSEN** the bolts on the mechanical jam AND **SLIDE** the jam toward the grapple to allow full withdrawal of the grapple. **TIGHTEN** the bolts. _____

I. IF the hoist is to be set to be used for handling irradiated blades, **PERFORM** the following: **[CD-451X]** _____

1. **VERIFY** the electrical stops for the applicable Refueling Platform Auxiliary Hoist have been set IAW HC.OP-ST.KE-0001(Q), Refuel Interlock Operability Functional Test - Section 5.4 for the Control Rod Grapple. _____

2. **LOWER** the grapple to greater than 7 feet below the surface of the water to clear the hoist override. _____

3. **RAISE** the grapple to reach the electrical stops. (The mechanical jam may have to be lowered to allow this). _____

4. **LOOSEN** the bolts on the mechanical jam AND **SLIDE** the jam up UNTIL it just touches the limit switch LS4 (LS4 is a finger switch just below the mechanical jam entry point). _____

5. **TIGHTEN** the bolts. _____

5.9.4 **CONNECT** the Jet Pump Grapple to a Refueling Platform auxiliary hoist as follows: _____

NOTE 5.9.4.A

To assure preload, thread sealant should NOT be used on the jam nuts at both ends of the cable terminal/adapter.

A. **APPLY** a thread sealant, either Loctite Thread Sealant 2432 or 5772, on both the male cable terminal threads and the female cable terminal/adaptor threads. **[CD-949A]** _____

B. **THREAD** the cable terminal/adaptor onto the Auxiliary Hoist cable terminal. **[CD-949A]**. _____

C. **APPLY** a thread sealant, either Loctite Thread Sealant 2432 or 5772, to the male cable terminal threads and the female mounting stud on top of the tool. **[CD-949A]** _____

D. **SUPPORT** the Jet Pump Grapple in the vertical position AND **THREAD** the cable terminal/adaptor into the top of the mounting stud. _____

E. **VERIFY** proper thread depth of insertion, both visually AND by point insertion at the sight hole in the square mounting stud. **[CD-949A]**. _____

F. **TIGHTEN** the jam nuts, by torquing each jam nut to 25 - 30 ft-lbs. **[CD-949A]**. _____

NOTE 5.9.4.G

Radioactive water may be present in the air lines. Radiation Protection should monitor performance of Step 5.9.4.G.

G. Carefully **BLEED** Refuel Platform dual airlines into rag to remove any moisture, THEN **ATTACH** the air supply connections to the tool quick connect devices. _____

Continued next page

5.9.4 (continued)

H. **PRESS** the GRAPPLE RELEASE pushbutton
AND **VERIFY** the keeper on the jet pump grapple hook is open. _____

I. **PRESS** the GRAPPLE ENGAGE pushbutton
AND **VERIFY** the keeper closes over the grapple hook.
PRESS the GRAPPLE RELEASE pushbutton to open the keeper. _____

J. IF the hoist must be removed from the water
AND irradiated components are not being handled,
LOOSEN the bolts on the mechanical jam
AND **SLIDE** the jam toward the grapple to allow full withdrawal of the grapple.
TIGHTEN the bolts. _____

K. IF the hoist is to be set to be used for handling irradiated blades,
PERFORM the following: **[CD-451X]** _____

1. **VERIFY** the electrical stops for the applicable Refueling Platform Auxiliary Hoist have been set IAW HC.OP-ST.KE-0001(Q), Refuel Interlock Operability Functional Test - Section 5.4 _____

2. **LOWER** the grapple to greater than 7 feet below the surface of the water to clear the hoist override. _____

3. **RAISE** the grapple to reach the electrical stops. (The mechanical jam may have to be lowered to allow this). _____

4. **LOOSEN** the bolts on the mechanical jam
AND **SLIDE** the jam up UNTIL it just touches the limit switch LS4 (LS4 is a finger switch just below the mechanical jam entry point). _____

5. **TIGHTEN** the bolts. _____

NOTE 5.9.5

IF the control rod is partially extended through the cruciform slot in the support, and the protrusion is observed to exceed the internal dimension of the slot in the grapple, the assembly is prepared using the two-legged top frame.

IF no obstructions are observed to exist, the grapple is assembled with the grid guide, a device provided to hold the grapple in proper orientation with respect to the top guide structure.

IF the location of the support is readily accessible, the hoist connection may be made directly to the stud and plate assembly.

5.9.5 **CONNECT** the Fuel Support Grapple to a Refueling Platform auxiliary hoist as follows: _____

A. IF necessary,
INSTALL the top frame or the top guide. _____

B. **REMOVE** the lockwire from the 4 caps on the bolts
AND **SCREW** out the bolts to take off the stud plate. _____

C. WITH the components supported to avoid torsional stress,
BOLT the top assembly to the grapple top plate
AND **REWIRE** the caps to specification. _____

NOTE 5.9.5.D

To assure preload, thread sealant should NOT be used on the jam nuts at both ends of the cable terminal/adapter.

D. **APPLY** a thread sealant, either Loctite Thread Sealant 2432 or 5772, on both the male cable terminal threads and the female cable terminal/adaptor threads. **[CD-949A]** _____

E. **THREAD** the cable terminal/adaptor onto the Auxiliary Hoist cable terminal. **[CD-949A]**. _____

Continued next page

5.9.5 (continued)

F. **APPLY** a thread sealant, either Loctite Thread Sealant 2432 or 5772, to the male cable terminal threads and the female mounting stud on top of the tool. **[CD-949A]** _____

G. **SUPPORT** the Fuel Support Grapple in the vertical position AND **THREAD** the cable terminal/adaptor into the top of the mounting stud. _____

H. **VERIFY** proper thread depth of insertion, both visually AND by point insertion at the sight hole in the square mounting stud. **[CD-949A]**. _____

I. **TIGHTEN** the jam nuts, by torquing each jam nut to 25 - 30 ft-lbs. **[CD-949A]**. _____

NOTE 5.9.5.J

Radioactive water may be present in the air lines. Radiation Protection should monitor performance of Step 5.9.5.J.

J. Carefully **BLEED** Refuel Platform dual airlines into rag to remove any moisture, THEN **ATTACH** the air supply connections to the tool quick connect devices. _____

K. IF the hoist must be removed from the water and fuel support pieces are NOT being handled, **LOOSEN** the bolts on the mechanical jam AND **SLIDE** the jam toward the grapple to allow full withdrawal of the grapple. **TIGHTEN** the bolts. _____

Continued next page

5.9.5 (continued)

L. IF the hoist is to be set to be used for handling fuel support pieces, **PERFORM** the following: **[CD-451X]** _____

NOTE 5.9.5.L.1

IF the electrical stops are set in accordance with Step 5.9.5.L.1, this will meet the requirement for the DEI or the GE Fuel Support Piece Grapple.

1. **VERIFY** the electrical stops for the applicable Refueling Platform Auxiliary Hoist have been set for either the Control Rod Grapple or the Jet Pump Grapple IAW HC.OP-ST.KE-0001(Q), Refuel Interlock Operability Functional Test - Section 5.4 _____

2. **LOWER** the grapple to greater than 7 feet below the surface of the water to clear the hoist override. _____

3. **RAISE** the grapple to reach the electrical stops. (The mechanical jam may have to be lowered to allow this). _____

4. **LOOSEN** the bolts on the mechanical jam AND **SLIDE** the jam up UNTIL it just touches the limit switch LS4 (LS4 is a finger switch just below the mechanical jam entry point). _____

5. **TIGHTEN** the bolts. _____

5.9.6 **CONNECT** a Combined CRB/FSP Grapple to a Refueling Platform Auxiliary Hoist as follows: _____

NOTE 5.9.6.A

To assure preload, thread sealant should NOT be used on the jam nuts at both ends of the cable terminal/adapter.

A. **APPLY** a thread sealant, either Loctite Thread Sealant 2432 or 5772, on both the male cable terminal threads and the female cable terminal/adaptor threads. **[CD-949A]** _____

B. **THREAD** the cable terminal/adaptor onto the Auxiliary Hoist cable terminal. **[CD-949A]** _____

C. **APPLY** a thread sealant, either Loctite Thread Sealant 2432 or 5772, to the male cable terminal threads and the female mounting stud on top of the tool. **[CD-949A]** _____

D. **SUPPORT** the Combined CRB/FSP Grapple tool in the vertical position AND **THREAD** the cable terminal/adaptor into the top of the mounting stud. _____

E. **VERIFY** proper thread depth of insertion, both visually AND by point insertion at the sight hole in the square mounting stud. **[CD-949A]**. _____

F. **TIGHTEN** the jam nuts, by torquing each jam nut to 25 - 30 ft-lbs. **[CD-949A]**. _____

NOTE 5.9.6.G

Radioactive water may be present in the air lines. Radiation Protection should monitor performance of Step 5.9.6.G.

G. Carefully **BLEED** Refuel Platform dual airlines into rag to remove any moisture, THEN **ATTACH** the air supply connections to the tool quick connect devices. _____

Continued next page

5.9.6 (continued)

H. IF the hoist must be removed from the water AND irradiated blades are NOT being handled, **LOOSEN** the bolts on the mechanical jam AND **SLIDE** the jam toward the grapple to allow full withdrawal of the grapple. **TIGHTEN** the bolts. _____

I. IF the hoist is to be set to be used for handling irradiated blades, **PERFORM** the following: **[CD-451X]** _____

1. **VERIFY** the electrical stops for the applicable Refueling Platform Auxiliary Hoist have been set IAW HC.OP-ST.KE-0001(Q), Refuel Interlock Operability Functional Test - Section 5.4 for the Combined CRB/FSP Grapple. _____

2. **LOWER** the grapple to greater than 7 feet below the surface of the water to clear the hoist override. _____

3. **RAISE** the grapple to reach the electrical stops. (The mechanical jam may have to be lowered to allow this). _____

4. **LOOSEN** the bolts on the mechanical jam AND **SLIDE** the jam up UNTIL it just touches the limit switch LS4 (LS4 is a finger switch just below the mechanical jam entry point). _____

5. **TIGHTEN** the bolts. _____

Continued next page

5.9.6 (continued)

NOTE 5.9.6.J

Overhead Crane should be used for lifting Combined Grapple with grid guide installed.

J. To install Combined Grapple Grid Guide
PERFORM the following: _____

1. **PLACE** guide on mounts at top of grapple
WITH the "L" latches pointing towards hoist cable. _____

2. **SEAT** guide on mounts
AND while pushing down on T-handle,
TURN each latch 90° (one turns clockwise
and one turns counter clockwise). _____

3. **LIFT-UP** on guide to verify it is latched to grapple. _____

4. **PLACE** hoist cable within the rollers
on the top of the guide
THEN **CLOSE**
AND **PIN** gate with ball lock pin. _____

5.10 Fuel/Blade Guide Movement - Within Spent Fuel Storage Pool (other than Refuel Mode) in Semi-Automatic Mode

NOTE 5.10

All irradiated fuel moves or core alterations must be directly supervised by a licensed SRO or SRO limited to fuel-handling. Non-irradiated fuel handling not involving core alterations and blade guide movement do not require direct supervision by an SRO and can be annotated by the spotter directly involved with the evolution. **[CD-168A]**

This procedure Section describes any combination of fuel/blade guide in Spent Fuel Storage Pool movements between any of the following fuel storage locations:

- Fuel storage racks
- Fuel preparation machines
- Fuel sipping canisters
- Special test and measurement devices

This Section uses the term "source" location (from location) as the location where a fuel/blade guide assembly is initially grappled and "target" location (to location) as the destination of the fuel/blade guide assembly.

Fuel Assembly channel fastener orientation and location must be accomplished and documented in accordance with the Fuel Movement Sheets.

5.10.1 **ENSURE** that all prerequisites have been satisfied IAW Section 2.10 of this procedure. _____

5.10.2 **ENSURE** the MONO/FRAME/CONSOLE Switch on the Start/Stop Station is set to CONSOLE. _____

5.10.3 **TOUCH** the Show Menu icon AND **SELECT** the XY MODE ACTIVE icon. _____

5.10.4 **PRESS** the PRESS FOR OPERATION button. _____

5.10.5 **TOUCH** the SELECT AUTO on the Touch Screen. _____

5.10.6 **ENSURE** the MANUAL OPERATION ACTIVE button is being displayed. _____

5.10.7 **TOUCH** REQUEST on the Auto screen AND **VERIFY** that the keypad is displayed. _____

5.10.8 In accordance with the Fuel Movement Sheet(s),
ENTER the source location via the alphanumeric keypad
displayed on the Touch Screen. _____

5.10.9 After visually verifying the Bridge position, Trolley position
AND the requested location,
PRESS the VERIFY button. _____

5.10.10 **PRESS** AUTO RUN icon on the touch screen
to initiate Refuel Platform movement. _____

5.10.11 **VERIFY** that the bridge and trolley have moved to the requested position
AND the message AUTO SEQUENCE COMPLETE is displayed
on the Touch Screen. _____

5.10.12 **ENSURE** the Fuel Grapple is at the correct Fuel Pool Coordinates.
(REFER TO NOTE 5.10) _____

5.10.13. **LOWER** the Fuel Grapple to approximately one foot above the
fuel assembly/blade guide to be removed by using the
Fuel Grapple Hoist control in the LOWER position
AND **OBSERVE** the GRAPPLE NORMAL UP light off _____

5.10.14 **ROTATE** the Fuel Grapple so that the grapple hooks are in line
with the fuel assembly/blade guide handle. _____

5.10.15 IF possible
WHEN fuel is being moved, SRO should
visually **ENSURE** correct serial number of Fuel Assembly.
(REFER TO NOTE 5.10) _____

5.10.16 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch
to the RELEASE position to ensure the Fuel Grapple hooks are open,
OBSERVE the ENGAGE light off. _____

5.10.17 Slowly **LOWER** the Fuel Grapple UNTIL the Fuel Grapple is resting on the fuel assembly/blade guide handle. Grapple may be gently twisted to seat on handle. _____

A. **OBSERVE** Fuel Grapple downward motion automatically stops. _____

B. **OBSERVE** the SLACK CABLE light on. _____

C. **ENSURE** Fuel Grapple is at required depth by observing HOIST GRAPPLE ELEVATION Digital Readout. _____

D. **ROTATE** grapple in both directions. **[CD-739F]** _____

5.10.18 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch in the ENGAGE position to grapple the fuel assembly/blade guide. _____

A. **OBSERVE** the grapple ENGAGE light on. _____

B. **ROTATE** grapple in both directions to ensure proper engagement. **[CD-739F]** _____

5.10.19 Slowly **RAISE** the grappled fuel assembly/blade guide using the Fuel Grapple hoist control in the RAISE position. _____

A. **OBSERVE** the SLACK CABLE light off _____

B. **OBSERVE** the HOIST LOADED light: _____

- Light ON for Fuel Assembly _____
- Light OFF for Blade Guide _____

C. **OBSERVE** the Load Cell Indicator to ensure the assembly has been grappled. _____

D. Visually **VERIFY** assembly/blade guide is being lifted. _____

CAUTION 5.10.20

A. DO NOT attempt to release the fuel assembly/blade guide unless it is fully seated in storage location. [CD-182C, CD-123E]

B. DO NOT reposition the Refuel Platform or Trolley while the fuel assembly/blade guide is grappled and not fully withdrawn from the storage location.

C. DO NOT twist a grappled fuel assembly/blade guide while it is held fast in a storage location. [CD-069A CD-612X]

D. While positioning irradiated fuel in the Spent Fuel Pool maximize the amount of water shielding between the Fuel Assembly and Fuel Pool wall.

5.10.20 **RAISE** AND CONTINUOUSLY **OBSERVE** the fuel assembly/blade guide during its upward travel. _____

5.10.21 **ENSURE** hose and cable reels are taking up slack by observing cables and air hoses remain taught within the grapple. _____

CAUTION 5.10.22

DO NOT bypass the Main Hoist normal up stop when handling Fuel Assemblies or control rod blades.

5.10.22 WHEN the fuel assembly/blade guide has reached its upper limit: _____

A. **OBSERVE** the GRAPPLE NORMAL UP light on. _____

B. Fuel Grapple upward motion automatically stops. _____

5.10.23 **TOUCH** the SELECT AUTO on the Touch Screen. _____

5.10.24 **ENSURE** the MANUAL OPERATION ACTIVE button is being displayed. _____

5.10.25 **TOUCH** REQUEST on the Auto screen
AND **VERIFY** that the keypad is displayed. _____

5.10.26 In accordance with the Fuel Movement Sheet(s),
ENTER the target location via the alphanumeric keypad displayed
on the Touch Screen. _____
SRO

5.10.27 After visually verifying the Bridge position, Trolley position
AND the requested location,
PRESS the VERIFY button. _____

5.10.28 **PRESS** AUTO RUN icon on the touch screen
to initiate Refuel Platform movement. _____

5.10.29 **VERIFY** that the bridge and trolley have moved to the requested position
AND the display message AUTO SEQUENCE COMPLETE is displayed
on the Touch Screen. _____

5.10.30 **ENSURE** the Fuel Grapple is at the correct Fuel Pool coordinates.
(REFER TO Note 5.10) _____

5.10.31 **ROTATE** the Fuel Grapple
AND attached fuel assembly/blade guide to attain direct alignment
AND orientation with the target location. **[CD-396Y]** _____

CAUTION 5.10.32

A. DO NOT attempt to release the fuel assembly/blade guide unless it is fully seated in a storage location. [CD-182C, CD-123E]

B. DO NOT reposition the Refuel Platform or Trolley while the fuel assembly is grappled and not fully withdrawn from the storage or Reactor Core location.

C. DO NOT twist a grappled fuel assembly while it is held fast in a storage location.

5.10.32 Slowly **LOWER** the fuel assembly/blade guide into the target location
using the Fuel Grapple hoist position control in the LOWER position. _____

5.10.33 WHEN the fuel assembly/blade guide is fully seated in the target location AND: _____

A. **OBSERVE** the SLACK CABLE light on. _____

B. **OBSERVE** the HOIST LOADED light off. _____

C. **OBSERVE** no load indicated (< 60 lbs) on the load cell indicator. _____

D. **OBSERVE** Fuel Grapple downward motion automatically stops. _____

E. **ENSURE** Fuel Grapple is at required depth by observing HOIST GRAPPLE ELEVATION Digital Readout. _____

5.10.34 **PLACE** the GRAPPLE ENGAGE/RELEASE Switch to the RELEASE position AND **OBSERVE** the grapple ENGAGE light off. _____

5.10.35 Slowly **RAISE** the Fuel Grapple by using the hoist position control in the RAISE position. _____

A. **OBSERVE** the SLACK CABLE light off. _____

B. **OBSERVE** the HOIST LOADED light remains off. _____

C. **OBSERVE** the Load Cell Indicator to ensure that no load has been inadvertently grappled. **[CD-442A]** _____

5.10.36 **RAISE** the Fuel Grapple fully to avoid collision with any underwater obstructions.
IF next Fuel Assembly
OR blade guide to be moved is nearby,
RAISE the Fuel Grapple at least one foot. _____

5.10.37 **ENSURE** hose and cable reels are taking up slack by observing cables and air hoses remain taught within the grapple. _____

5.10.38 IF Fuel Assemblies were moved,
INITIAL the appropriate box on the Fuel Movement Sheet(s) indicating the fuel transfer has been completed. _____

5.10.39 **NOTIFY** the Control Room that the fuel transfer has been completed. _____

5.10.40 Control Room personnel should **UPDATE** the fuel location tracking tool in use. _____

5.10.41 IF additional fuel movement is required, **GO TO** Step 5.10.4. _____

6.0 REFERENCES

6.1 GE Documents:

GEK 75563, Refueling Platform Equipment Assembly
GEK 33076A
GEK 33147C
GEK 33221A
GEK 33143D
GEK 33073B
GEK 103853A

6.2 Commitment Documents

CD-069A	IE BULLETIN 78-08
CD-442A	INPO SER 59.81
CD-719A	GE SIL 152
CD-124B	SER 31-83
CD-182C	NRC C-77-12
CD-281C	INPO SER 28-84
CD-365D	GE SIL 409
CD-673D	INPO OE 1239
CD-736D	NRC IN 85-12
CD-789D	GE AID 55
CD-123E	INPO OE 1470
CD-711F	H-1-KE-SEE-0332
CD-739F	GE SIL 486
CD-443X	F09-0025-00
CD-612X	F01-0091-01
CD-267Y	FSAR Question 410.59
CD-396Y	DSER 142 A&B
CD-217E	INPO OE 1556
CD-117G	NHO INCI 354/91-166
CD-619G	NHO INCI 354/94-049
CD-451X	FSAR - Mechanical Jam, Stop Block - Backups to Normal Up Limit Section 9.1
CD-949A	GE SIL 82 R1 S1
CD-168A	IE Cir 80-21

6.3 DCP No. 4-HM-0643
DCP 80016207

Continued next page

6.0 (continued)

6.4 **Procedures**

HC.OP-ST.KE-0001(Q) - Refuel Interlock Operability Test
HC.OP-FT.KE-0002(Q); Fuel Grapple Full Down Travel Functional Test – Refueling
HC.OP-FT.KE-0001(Q) - Refuel Platform and Fuel Grapple Operability Test
HC.RE-FR.ZZ-0001(Q) - Refuel Handling Controls
HC.OP-AP.ZZ-0046(Q) - Radiological Access Control Program
HC.OP-AB.CONT-0005(Q) - Irradiated Fuel Damage
NC.NA-AP.ZZ-0049(Q) - Conduct of Fuel Handling

6.5 **Letters**

HCGS-L-95-036

6.6 **Other Documents**

PR 960821103 GE SIL 82 R1 S1
PR 960128076
Order 70007921
Order 70006867

ATTACHMENT 1
Page 1 of 1
ANALYZED LOADS PERMITTED OVER IRRADIATED FUEL
NOT REQUIRING SECONDARY CONTAINMENT INTEGRITY

NOTE

70 feet relates to 17 feet above the surface of the water.

1. Fuels analysis is for an object ≤ 117 lbs.
   WITH a maximum distance of 70 ft from the load to the top of irradiated fuel in the Reactor Vessel.

REFERENCE: NFS 2000-069
Calculation File T03.6-068, Light loads limits over irradiated fuel 14 Dec 1990
NFU-90-734

CAUTION 5.8.15

DO NOT bypass the Main Hoist normal up stop when handling Fuel Assemblies or control rod blades in order to comply with UFSAR 9.1.4.2.12.3.

5.8.15 WHEN the fuel assembly/blade guide has reached its upper limit: _____

A. **OBSERVE** the GRAPPLE NORMAL UP light on. _____

B. Fuel Grapple upward motion automatically stops. _____

5.8.16 **USE** the Refuel Platform
AND Trolley Position Controls
AND Position Indicating System to maneuver the Fuel Grapple
to the target location listed on the Fuel Movement Sheet(s). _____

5.8.17 **ENSURE** the Fuel Grapple is at the correct Core
OR Fuel Pool Coordinates.
(**REFER TO** Note 5.8) _____

5.8.18 **ROTATE** the Fuel Grapple
AND attached fuel assembly/blade guide to attain direct alignment
AND orientation with the target location. **[CD-396Y]** _____

CAUTION 5.8.19

A. DO NOT attempt to release the fuel assembly/blade guide unless it is fully seated in a storage location. [CD-182C, CD-123E]

B. DO NOT reposition the Refuel Platform or Trolley while the fuel assembly is grappled and not fully withdrawn from the storage or Reactor Core location.

C. DO NOT twist a grappled fuel assembly while it is held fast in a storage location.

5.8.19 Slowly **LOWER** the fuel assembly/blade guide into the target location using the Fuel Grapple hoist position control in the LOWER position. _____

ATTACHMENT 2
Page 1 of 4
INSTRUCTIONS FOR MANUALLY LOWERING A FUEL BUNDLE

During fuel handling, various scenarios depict the need to lower a fuel bundle to a safe location in the Core or Fuel Pool. These scenarios may include the loss of power to the Bridge or malfunctions in other parts of the Bridge or the plant.

Except in emergency (evacuation, injury, etc.)
IF the Bridge malfunctions while fuel is grappled,
NOTIFY the cognizant Refuel SRO
OR OS/CRS before attempting any corrective action.

The purpose of this Attachment is to place the Fuel Assembly in the nearest appropriate storage location to allow the Bridge malfunction to be safely corrected. The cognizant SRO AND Reactor Engineer will determine the appropriate storage location.

1.0 **In the event of a Loss of Power to the Bridge or Hoist Motor Malfunction (burnout, short)**

1.1 IF the power is lost, the Hoist electric motor brake and emergency brake will engage.

NOTE 1.2

The Bridge/Trolley movement should be the minimum required to reach an appropriate location.

1.2 **MOVE** the Bridge/Trolley to an appropriate cell location using the handwheels provided for the Bridge Drive and Trolley Drive.

1.3 **VERIFY** the bundle is over an appropriate cell location.

NOTE 1.4

DO NOT drop the handwheel while installing it on the shaft.

1.4 **ATTACH** the handwheel on the West end of the Hoist Motor shaft AND **SECURE** it.

ATTACHMENT 2
Page 2 of 4
INSTRUCTIONS FOR MANUALLY LOWERING A FUEL BUNDLE

1.5 WITH one person holding the handwheel
AND ready to lower the bundle, another person should
release the emergency (safety) brake using the manual release
on the brake

NOTE 1.6

The handwheel is marked with a direction indicator.

1.6 **TAKE UP** on the handwheel until the bundle starts to raise (approximately 3" bundle upward travel). This assures the handwheel has the load.

CAUTION 1.7

Step 1.7 will immediately transfer the bundle weight to the handwheel.

1.7 While holding the handwheel, release the motor brake by pushing the lever located inside the East end of the motor housing down and to the side. This permits lowering the bundle with the handwheel.

1.8 The cover is left off for the motor brake housing to preclude the need for tools in the case of an emergency.

ATTACHMENT 2
Page 3 of 4
INSTRUCTIONS FOR MANUALLY LOWERING A FUEL BUNDLE

NOTE 2.0

DO NOT attempt to lower or release the bundle without SRO approval if a bent Mast is encountered.

2.0 **Bent Mast**

IF the Mast is bent while it is loaded with a Fuel Bundle, its ability to extend and safely "put down" the Fuel Bundle may be impaired. Attempting to lower the load electrically may unspool the cable and allow an uncontrolled descent. A "slack cable" indication may also be received do to Mast Section(s) binding. Unless in the case of an emergency, SRO permission is required prior to attempting to move after binding the mast.

Any of the refueling bridge mast sections (10", 7", or 5"), can bind while being extended or retracted. The Encoder readout (distance traveled), used in conjunction with the Load Cell readout (weight on main mast cable), can be used to effectively verify whether binding is occurring. For example, IF you start from a full up position (10", 7", and 5" sections fully retracted), and start lowering the mast sections while observing the Encoder and Load Cell indications, the weight of the 10" section should transfer from the main mast cable to the 12" section at approximately 180" on the Encoder reading (the Load Cell indication will decrease by approximately 105#). Continuing down, the weight of the 7" section should transfer from the main mast cable to the 10" section at approximately 380" on the Encoder reading (the Load Cell indication will decrease by approximately 88#). This methodology can also be applied for use in the opposite direction. IF while lowering the mast, an unexpected slack cable or pre-mature weight transfer occurs, stop lowering, raise the load to clear the slack cable (if one exists), and notify the cognizant Refuel SRO or OS/CRS before attempting any corrective action. **[CD-619G]**

ATTACHMENT 2
Page 4 of 4
INSTRUCTIONS FOR MANUALLY LOWERING A FUEL BUNDLE

NOTE 3.0

DO NOT attempt to lower or release the bundle without SRO approval if Platform failure is encountered.

3.0 **Platform Failure**

A Platform failure includes Hoist Gear Train failure, Coupling failure or related structure failure. As these components affect the ability to lower a Fuel Bundle (either electrically or manually), unless in the case of an emergency, SRO approval is required prior to an attempt to move or lower the Fuel Bundle.

ATTACHMENT 3
Page 1 of 1
Refueling Platform Interlocks