

Effective Date 9/9/09

CATEGORY II

FUEL POOL COOLING

ALARMS

- | | |
|------------------------------------|----------------------------------|
| • FUEL POOL LEVEL HI/LO | D1-A5 |
| • FUEL POOL COOLING SYS LEAKAGE HI | D1-B5 |
| • FUEL POOL COOLING SYS TROUBLE | D1-D5 |
| • REFUEL FLR EXH RAD ALARM/ TRBL | E6-A3 |
| • FUEL POOL LEVEL LOW | Local Alarm Panel 201' EI |

INDICATIONS

- | | |
|--------------------------------------|------------------|
| • Lowering Fuel Pool level | |
| • Lowering Skimmer Surge Tank level. | [CD-434A] |
| • Lowering Fuel Pool temperature | [CD-437X] |

TERMINATED Date/Time: _____

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IMMEDIATE OPERATOR ACTIONS

CONDITION	ACTION
Significant loss of Fuel Pool inventory. [CD-827D] Date/Time: _____	PERFORM the following: _____ • EVACUATE the Refuel Floor. _____ • RETURN irradiated fuel assembly to the Vessel or Pool. _____ • LOWER any bundle in the Fuel Prep Machine to the Full Down Position.

AUTOMATIC ACTIONS

- Skimmer Surge Tank Makeup Valve opens at 49".
- Fuel Pool Cooling Pumps trip on: **[CD-434A]**
 - Low Skimmer Surge Tank level 22"
 - Low flow 500 gpm after 30 sec time delay
(low flow trip enabled 30 sec after pump start)
- Fuel Pool Filter Demin isolates on low Skimmer Surge Tank level 22". **[CD-434A]**
- RBVS isolates and FRVS starts on:
 - Reactor Building Exhaust Hi Rad 1.0 x 10⁻³ uCi/cc
 - Refuel Floor Exhaust Hi Rad 2.0 x 10⁻³ uCi/cc

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LIST OF CONDITIONS

A. Lowering Fuel Pool level.....7
B. Loss of inventory with Rising CST level.....9
C. Loss of inventory with rising SACS head tank level.....9
D. Loss of inventory with rising TORUS level.....9
E. Loss of inventory with rising RACS head tank level.....9
F. Loss of inventory with excessive Drywell Equipment/Floor Drain sump runs.....9
G. Loss of inventory with excessive Reactor Building Equipment Drain sump runs.....11
H. Degraded FPCC cannot handle Pool Heat Load.....11

NOTES:

1. Backup Bottle Air Pressure and Regulator Output are measured from 178' Reactor Building.

ADDITIONAL INFORMATION:

Procedures:

- HC.OP-SO.GU-0001(Q), Filtration Recirculation and Ventilation System Operation
- HC.OP-SO.AP-0001(Q), Condensate Storage and Transfer System Operation
- HC.OP-SO.BC-0001(Q), Residual Heat Removal System Operation
- HC.OP-SO.EC-0001(Q), Fuel Pool Cooling and Cleanup System

Valves:

- 1-EC-LV-4660, Skimmer Surge Tank Makeup Valve, Room 4601.

Other.

The existence of this procedure fulfills the requirements of the following Closing Documents:

- CD-434A, INPO SER 51-81
- CD-375D, NRC BULL 84-03
- CD-660D, NRC INFO 84-93
- CD-827D, INPO SOER 85-01
- CD-386E, NHO INCI 354/86-013
- CD-800E, INPO SER 40-86
- CD-437X, NHO HSAR F09-0019-00/NRC OPEN 354/87-23-F2
- CD-021X, NHO HSAR F09-002A-02
- CD-009F, NRC INFO 87-28

SUBSEQUENT OPERATOR ACTIONS

CONDITION	ACTION
A. Lowering Fuel Pool level [CD-827D] [CD-434A] [CD-800E] [CD-009F] T/S 3.9.9 Date/Time: _____	___ A.1 <u>IF</u> the Refuel Floor has been Evacuated, <u>THEN</u> EVACUATE the Reactor Building of all Non-Essential personnel. ___ A.2 <u>IF</u> the path of the loss is apparent, ISOLATE the leak. <div style="text-align: center;">** NOTE 1 **</div> ___ A.3 VERIFY Adequate air supply to the gate seals from Service Air or the Backup Air bottles. ___ A.4 ENSURE LV-4660 is OPEN. ___ A.5 CHECK Liner drains IAW Attachment 3 to locate leakage path. ___ A.6 <u>IF</u> Refuel Floor Rad levels are rising, PLACE FRVS in service. (GU) ___ A.7 DIRECT Radiation Protection to survey the Refuel Floor and Reactor Building, <u>AND</u> control access. ___ A.8 DIRECT Rad Waste to check filter demin. Rooms for leaks. A.9 ADD water to the Fuel Pool from one of the following sources: ___ • Condensate Transfer. (AP) ___ • Suppression Pool via RHR LPCI Mode during Refueling. (BC) ___ • Fire Water System (EC) ___ • Service Water (EC) ___ A.10 COORDINATE with Maintenance and Radiation Protection to install the Inner Fuel Pool Gate <u>AND INSTALL</u> Cask Storage Pit Inner Gate <u>ONLY</u> when Cask Pit is source of leak <u>OR</u> REPAIR the Gate seals if that is the source of the loss.

ADDITIONAL INFORMATION:

Valves:

- HV-2314A(B), FUEL POOL HX SACS SUPPLY ISOLATION VALVE.
- HV-7921A(B), FUEL POOL HX SACS RETURN ISOLATION VALVE.
- HV-2512A(B), RHR HX SACS RETURN ISOLATION VALVE.
- 1-EG-V024, RHR HX 1AE205 SACS SUPPLY ISOLATION VALVE, ROOM 4113.
- 1-EG-V025, RHR HX 1BE205 SACS SUPPLY ISOLATION VALVE, ROOM 4109.

SUBSEQUENT OPERATOR ACTIONS (continued)

CONDITION	ACTION
B. Loss of inventory with Rising CST level. Date/Time: _____	___ B.1 ENSURE the valves listed on Attachment 2 are CLOSED: ___ B.2 VERIFY RWCU is lined up properly.
C. Loss of inventory with rising SACS head tank level. Date/Time: _____	C.1 <u>IF</u> FPCC is in-service, ISOLATE the affected FPCC Hx. as follows: ___ • CLOSE HV-2314A(B). ___ • CLOSE HV-7921A(B). C.2 <u>IF</u> RHR FPCC Assist <u>OR</u> Shutdown Cooling is in-service, ISOLATE the RHR Hx as follows: ___ • PRESS AND HOLD the close PB until the HV-2512A(B) indicates closed. ___ • CLOSE 1-EG-V024(V025).
D. Loss of inventory with rising TORUS level. Date/Time: _____	___ D.1 <u>IF</u> RHR FPCC Assist <u>OR</u> Shutdown Cooling is in-service, ENSURE RHR alignment is correct.
E. Loss of inventory with rising RACS head tank level. Date/Time: _____	___ E.1 <u>IF</u> RWCU is in-service, ISOLATE RWCU Non-Regenerative heat exchanger.
F. Loss of inventory with excessive Drywell Equipment/Floor Drain sump runs. Date/Time: _____	___ F.1 CONSULT D3838 Alarm response. ___ F.2 CONSIDER Drywell entry to check for system leakage <u>OR</u> alignment problems.

ADDITIONAL INFORMATION:

CAUTIONS:

1. **A Loss of FPCC during a Full Core Offload can require up to 130 GPM to meet the maximum evaporation rate, automatic make-up capability is 75 gpm.**

HC.OP -SO.EC-0001(Q) contains emergency make-up alternatives. [80048085]

Procedures:

- HC.OP-SO.BC-0003(Q), RHR Alternate Cooling Modes
- HC.OP-SO.EC-0001(Q), Fuel Pool Cooling And Cleanup Operation

SUBSEQUENT OPERATOR ACTIONS (continued)

CONDITION	ACTION
<p>G. Loss of inventory with excessive Reactor Building Equipment Drain sump runs.</p> <p>Date/Time: _____</p>	<p>___ G.1 CHECK Liner drains IAW Attachment 3 to locate leakage path.</p> <p>___ G.2 ENSURE the valves listed on Attachment 4 are CLOSED:</p> <p>G.3 EVALUATE Ongoing Evolutions/Tagging of the following systems:</p> <ul style="list-style-type: none"> ___ • FPCC ___ • RHR ___ • RWCU
<p>H. Degraded FPCC cannot handle Pool Heat Load.</p> <p>Date/Time: _____</p>	<p>___ H.1 PLACE A or B RHR in Fuel Pool Cooling Assist. (BC) [CD-437X]</p> <p style="text-align: center;">★ <u>CAUTION 1</u> ★</p> <p>___ H.2 MONITOR FPCC Skimmer Surge Tank Level <u>AND</u> MAKE-UP to the Fuel Pool as necessary IAW (SO.EC-0001).</p>

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COMPLETION AND REVIEW

1.0 COMPLETION AND REVIEW

- 1.1 **EXPLAIN** the entry Condition into the abnormal in the Comments Section. _____
- 1.2 **ANNOTATE** in the comments section all systems affected by the implementation of this procedure AND restoration actions (i.e. restoration line ups) completed/required. _____
- 1.3 **ATTACH** photocopies of any Hard Cards utilized as part of this procedure implementation to Attachment 1. _____
- 1.4 **ENSURE** the Exit time for any applicable conditions and this abnormal are annotated in the comment section AND the Control Room Logs. _____
- 1.5 **FORWARD** completed Portions of this procedure AND Sections 1 and 2 of Attachment 1 to SM/CRS for approval and Record Retention. _____

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**ATTACHMENT 1
COMPLETION AND REVIEW
Page 2 of 2**

2.0 SIGNATURES:

<u>PRINT NAME</u>	<u>SIGNATURE</u>	<u>INITIALS</u>	<u>DATE/TIME</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Completion of this attachment is annotated in the Control Room Logs:

_____	_____	_____
Printed Name	Signature	Date/Time

3.0 SM/CRS FINAL REVIEW AND APPROVAL:

This procedure and Attachment 1 have been reviewed for completeness and accuracy. Entry/Exit conditions and all deficiencies, including corrective actions, are clearly recorded in the COMMENTS Section above.

_____	_____	_____
Printed Name	Signature	Date/Time

4.0 RECORDS

4.1 **RETAIN** the following in accordance with RM-AA-101, Records Management Program:

- Procedure cover page
- Affected Conditions and Hard Cards performed
- Completion and Review section
- Attachment 1

**ATTACHMENT 2
Page 1 of 1**

ENSURE the following valves are CLOSED.

- 0-EC-V019, FPCC DEMIN RETURN, Room 3324. _____
- 1-EC-V143, REACTOR WELL DRAIN, Room 4607. _____
- 1-EC-V049, REFUEL FLR COND FILL DRN HDR VLV, Room 4508. _____
- 1-EC-V030, REACTOR WELL GRATES DRAIN, Room 4607. _____
- 1-EC-V051, FUEL CASK DIFFUSER DRAIN, Room 4508. _____
- 1-EC-V032, FUEL CASK DRAIN, Room 4508. _____
- 1-EC-V018, DRYER/ SEPARATOR STORAGE DRAIN, Room 4607. _____

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**ATTACHMENT 3
Page 1 of 2**

LNR DRN *	LNR DRN ISOL VLV	SOURCE OF FLUID	VALVE LOCATION
1	1-EC-V022	Dryer/Sep Pool	RB 162' Rm 4603 CPCS Rm (+8')
2	1-EC-V102	Dryer/Sep Pool	RB 162' Rm 4603 CPCS Rm (+8')
7	1-EC-V025	Reactor Well	RB 162' Rm 4603 CPCS Rm (+8')
23	1-EC-V137	Dryer/Sep Pool	RB 162' Rm 4603 CPCS Rm (+6')
9	1-EC-V107	Reactor Well	RB 162' Rm 4607A BFPC Pump Rm, in Shielded Pipe Run (+4)
8	1-EC-V029	Reactor Well	RB 162' Rm 4601 above DLD Rad Monitor Skid (+8')
3	1-EC-V103	Dryer/Sep Pool	RB 162' Rm 4604 H ₂ /O ₂ Recombiner Area A (+8')
5	1-EC-V105	Dryer/Sep Pool	RB 162' Rm 4604 H ₂ /O ₂ Recombiner Area A (+8')
6	1-EC-V106	Dryer/Sep Pool	RB 162' Rm 4602A H ₂ /O ₂ Recombiner Area A (+8')
4	1-EC-V104	Dryer/Sep Pool	RB 162' Rm 4602B H ₂ /O ₂ Recombiner Area B (+7')
24	1-EC-V138	Dryer/Sep Pool	RB 162' Rm 4602B H ₂ /O ₂ Recombiner Area B (+1')
13	1-EC-V110	Fuel Pool	RB 145' Rm 4512 behind B FRVS Vent Fan (+6')
14	1-EC-V111	Fuel Pool	RB 145' Rm 4508A across from Loading Hatch, against wall, outside SLC Inj. Valve Rm
17	1-EC-V055	Cask Storage Pit	RB 145' Rm 4508A across from Loading Hatch, against wall, outside SLC Inj. Valve Rm
18	1-EC-V114	Cask Storage Pit	RB 145' Rm 4508A across from Loading Hatch, against wall, outside SLC Inj. Valve Rm
19	1-EC-V115	Cask Storage Pit	RB 145' Rm 4508A across from Loading Hatch, against wall, outside SLC Inj. Valve Rm
20	1-EC-V116	Cask Storage Pit	RB 145' Rm 4508A across from Loading Hatch, against wall, outside SLC Inj. Valve Rm
21	1-EC-V135	Cask Storage Pit	RB 145' Rm 4508A across from Loading Hatch, against wall, outside SLC Inj. Valve Rm

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**ATTACHMENT 3
Page 2 of 2**

LNR DRN *	LNR DRN ISOL VLV	SOURCE OF FLUID	VALVE LOCATION
16	1-EC-V113	Fuel Pool	RB 132' Rm 4411D in hall across from PCIG Comp and D FRVS Recirc Unit (+8')
22	1-EC-V136	Fuel Pool Sump	RB 132' Rm 4411D (+7')
10	1-EC-V054	Fuel Pool	RB 132' Rm 4410A by A FRVS Recirc Unit Outlet (+8')
15	1-EC-V112	Fuel Pool	RB 132' Rm 4411A behind C FRVS Recirc Fan (+25')
11	1-EC-V108	Fuel Pool	RB 132' Rm 4411F behind C FRVS Recirc Fan (+25')
12	1-EC-V109	Fuel Pool	RB 132' Rm 4411F behind C FRVS Recirc Fan (+8')

* These Liner Drains are marked in-field as "Liner Drn 01(-24)".

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**ATTACHMENT 4
Page 1 of 1**

ENSURE the following valves are CLOSED.

- 1-EC-V034, FUEL POOL GATE SEAL DRAIN, ROOM 4607. _____
- 1-EC-V097, FUEL CASK GATE SEAL DRAIN, ROOM 4607. _____
- 1-EC-V031, REACTOR WELL GRATES DRAIN, ROOM 4607. _____
- 1-EC-V023, DRYER/ SEPARATOR POOL DRAIN, ROOM 4607. _____
- 1-EC-V085, DRYWELL TO REACTOR WELL SEAL RUPTURE DRAIN,
ROOM 4607 _____
- 1-EC-V095, DRYWELL TO REACTOR WELL SEAL RUPTURE DRAIN,
ROOM 4607 _____

-
- Biennial Review Performed: Yes No NA
 - Packages and Affected Document Numbers incorporated into this revision:
CP No. _____ CP Rev. _____ AD No. _____ Rev No. _____ None
 - The following OTSCs were incorporated into this revision: None
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REVISION SUMMARY

- Adds more detail about the low flow trip under the Automatic Actions. This comes from HC.OP-SO.EC-0001(Q) and is editorial. (70096168-0010)
- Adds initial lines throughout the procedure. This is an editorial change. Rev bars were not used.
- Updates the referenced procedure on Page 10. HC.OP-SO.BC-0002 was split into 0002 and 0003. This is an editorial change. (80097905-0010)

IMPLEMENTATION REQUIREMENTS

None