

NRC Job Performance Measure "K"

1233



Facility: **Vogtle**

Task No: V-LO-TA-12004

Task Title: Placing the RHR 25kVA Inverter 1DD1I6 in Service

JPM No: V-NRC-JP-13405-HL17

K/A Reference: 063G2.1.30 RO 4.4 SRO 4.0

Examinee: Carla

NRC Examiner: _____

Facility Evaluator: _____

Date: _____

Method of testing:

Simulated Performance _____

Actual Performance _____

Classroom _____

Simulator _____

Plant _____

Read to the examinee:

I will explain the initial conditions, which steps to simulate or discuss, and will provide initiating cues. When you complete the task successfully, the objective for this job performance measure will be satisfied.

Initial Conditions: Unit 1 is in Mode 4 and preparing for cooldown and entry into Mode 5. The operators are preparing to place RHR Train "A" in service for continued cooldown. 1DD1B is already in service.

Initiating Cue: The Shift Supervisor has directed you to place RHR loop inlet isolation inverter 1DD1I6 in service and energize 1-HV-8702A starting with step 4.4.3 of 13011-1, Residual Heat Removal System.

Task Standard: Loop 4 RHR 1-HV-8702A energized from associated inverter 1DD116.

Required Materials: 13011-1, "Residual Heat Removal System"
13405-1, "125V DC 1E Electrical Distribution System"

Time Critical Task: No

Validation Time: 10 minutes

Performance Information

Critical steps denoted with an asterisk

Step 4.4.3 of 13011-1, "Residual Heat Removal System", selected.

Step 4.4.3 Restore power to RHR PMP-B SUCTION FROM HOT LEG LOOP 4 Inlet Isolations and air to RHR System Flow Control Valves as follows:

- a. If shutdown, place Inverter 1DD116 in service per 13405-1, "125V DC 1E ELECTRICAL DISTRIBUTION SYSTEM."

Standard: Refers to 13405-1, "125V DC 1E Electrical Distribution System", section 4.1.11 for placing 1DD116 in service.

Comment:

Step 4.1.11 Placing the RHR 25kVA Inverter 1CD115 or 1DD116 in Service

NOTE

Inverters 1CD115 and 1DD116 are NOT analyzed loads for batteries 1CD1B and 1DD1B respectively in MODES 1, 2, or 3. Inverter 1CD115 and 1DD116 may be placed in service in MODES 1, 2, or 3 for pre-outage testing, however they should be attended while in service. In the event of an emergency condition or a condition that requires 1CD115 and 1DD116 be left unattended in MODES 1, 2, or 3, 1CD115 and 1DD116 must be removed from service in accordance with Section 4.3.2.

Standard: Section 4.1.11 chosen and Note is read.

Comment:

4.1.11.1 To place 1CD115 in service, perform the following:

Standard: All sub-steps of 4.1.11 are N/A for 1CD115. Proceeds to step 4.1.11.2 for 1DD116.

Comment:

4.1.11.2 To place 1DD116 in service, perform the following:

- a. Verify the 125V DC Battery 1DD1B in service per Section 4.1.2.4 of this procedure.

CUE: If asked, "Refer to initial conditions"

Standard: Battery 1DD1B already in service per initial conditions.

Comment:

4.1.11.2 b. Verify the following:

- Inverter 1DD116 DC Input Breaker Open.
- Inverter 1DD116 AC Output Breaker Open.

✓ 1238

Note to examiner: Breaker switches indicate Down position when open.

Standard: Verifies Inverter DC Input and AC Output breakers open.

Comment:

4.1.11.2 c. In the Main Control Room, install the Annunciator card associated with ALB34-F07 and check ALB34-F07 illuminates.

CUE: ***“SS reports ALB34-F07 annunciator card is installed and alarm is illuminated”***

←
1239

Standard: Annunciator card installed and alarm illuminated.

Comment:

*4.1.11.2 d. **Close Inverter 1DD116 DC Switchgear Breaker:**

1DD1-08 HS-1DD1-08

✓
1239

Standard: Simulates closing HS-1DD108, by turning Handswitch clockwise. Breaker located on 125V dc switchgear 1DD1 in same room as inverter.

CUE: ***“HS-1DD108 indicates Red Flag with Red Light lit, Green Light off”***

Comment:

NOTES

- The Precharge light must be lit for ≈ 5 seconds OR DC voltage as read on the Inverter DC Voltmeter must be reading ≈ 125 VDC and stable for ≈ 5 seconds, to allow closing the DC INPUT Breaker. The 5 seconds will allow time to fully charge the capacitor bank.
- The Precharge Pushbutton has a strong spring and will require a firm push to operate.
- If using the Precharge light above, and it extinguishes prior to closing the DC INPUT Breaker, Step 4.1.11.2.e will need to be repeated.
- If the inverter has just been shutdown, wait at least 60 seconds before restarting the inverter.

-
- *4.1.11.2 e. Press the Precharge Pushbutton, and maintain depressed for at least five seconds after the Precharge light illuminates OR the inverter DC Voltmeter is stable at ~ 125 VDC, then release.

CUE: *“Indicate Precharge light lit if Precharge Pushbutton is held for five seconds OR indicate that DC Input voltmeter indicates ~ 125 VDC”*

Standard: Precharge light illuminated and 125 VDC indicated on DC Input Voltmeter.

Comment:

✓

-
- *4.1.11.2 f. Close the inverter DC INPUT Breaker (within 3 seconds after releasing the Precharge Pushbutton).
- ✓

CUE: *“If performed correctly, Indicate DC INPUT Breaker in close (UP) position”*

Note to examiner: *Breaker switches indicate UP position when closed.*

Standard: DC Input Breaker in closed position.

Comment:

4.1.11.2 g. Check proper inverter operation by observing approximately 480 VAC on the INVERTER OUTPUT Voltmeters and 60 Hz on the INVERTER OUTPUT frequency meter.

CUE: *“Indicate ~ 480 VAC on Inverter Output Voltmeters and 60 Hz on Inverter Output frequency meter”*

Standard: Inverter indicates ~ 480 VAC and 60 Hz. ✓

Comment:

1243

*4.1.11.2 h. Close the INVERTER OUTPUT Breaker. ✓

CUE: *“Indicate Inverter Output Breaker in close position”*

Standard: Inverter output breaker closed.

Comment:

1243

4.1.11.2 i. MOMENTARILY press the PRESS TO RESET ALARMS pushbutton.

CUE: *“All alarm lights are as you see them”*

Standard: Simulate lifting cover and Alarm reset pushbutton depressed.

Comment:

4.1.11.2 j. Check ALB34-F07 extinguishes.

CUE: ***"SS reports ALB34-F07 alarm is clear"***

Standard: Control Room alarm window is clear.

Comment:

✓
1244

Step 4.4.3 of 13011-1, "Residual Heat Removal System"

4.4.3 b. Install the annunciator card associated with ALB34-E07 and check ALB34-E07 illuminates.

CUE: ***"SS reports ALB34-E07 annunciator card is installed and alarm is illuminated"***

Standard: Alarm card installed and illuminated.

Comment:

✓
1246

*4.4.3 c. At 1DD1I6N unlock and close disconnect for 1-HV-8702A.

CUE: ***"Indicate starter input breaker is in close position"***

Note to Examiner: Disconnect is locked with a company "B" lock. Discussion of key check out from C & T may be appropriate.

Standard: Simulation of placing Disconnect in on (Handle up) position. (Disconnect located on wall in same room as inverter).

Comment:

✓
1246

4.4.3 d. Check ALB34-E07 extinguishes.

CUE: ***"SS reports ALB34-E07 alarm is clear"***

Standard: Control Room alarm window is clear.

CUE: ***"Extra operator will perform the rest of section 4.4"***

Comment:

Terminating cue: Student returns initiating cue sheet.

Verification of Completion

Job Performance Measure No: V-NRC-JP-13405-HL17

Examinee's Name:

Examiner's Name:

Date Performed:

Number of Attempts:

Time to Complete:

Question Documentation:

Question: _____

Response: _____

Result: Satisfactory / Unsatisfactory

Examiner's signature and date: _____

Approved By
S. E. Prewitt

Vogtle Electric Generating Plant 

Procedure Number Rev
13011-1 69

Date Approved
6/15/2010

RESIDUAL HEAT REMOVAL SYSTEM

Page Number
1 of 108

RESIDUAL HEAT REMOVAL SYSTEM

PROCEDURE USAGE REQUIREMENTS-		SECTIONS
Continuous Use:	Procedure must be open and readily available at the work location. Follow procedure step by step unless otherwise directed.	ALL
Reference Use:	Procedure or applicable section(s) available at the work location for ready reference by person performing steps.	NONE
Information Use:	Available on plant site for reference as needed.	NONE

INITIALS

4.4 PLACING TRN-B RHR IN SERVICE FOR RCS COOLDOWN FROM STANDBY READINESS

4.4.1 If this is the second RHR train to be placed in shutdown cooling alignment, **verify** RHR Train A HX inlet temperature (computer point T0630) is less than 225 °F. _____

4.4.2 **Notify** HP that this RHR system change could affect area radiation levels so that surveys can be taken and personnel made aware of the changed condition. _____

4.4.3 **Restore** power to RHR PMP-B SUCTION FROM HOT LEG LOOP 4 Inlet Isolations and air to RHR System Flow Control Valves as follows: (IV REQUIRED)

a. IF shutdown, **place** Inverter 1DD1I6 in service per 13405-1, "125V DC 1E Electrical Distribution System." CS

b. **Install** the annunciator card associated with ALB34 E07 and **check** ALB34-E07 illuminates. CS

c. At 1DD1I6N **unlock** and **close** the disconnect for 1-HV-8702A. CS


d. **Check** ALB34-E07 extinguishes. CS

e. **Close** the K2 link for breaker 1BBE-13. (C B A 77) _____

f. **Unlock** and **close** RHR PMP B SUCTION FROM HOT LEG LOOP 4, 1-HV-8702B Supply Breakers 1BBE-13. _____

g. **Close** INST AIR LINE 136 DRAIN 1-2420-U4-152 (RC-89). _____

h. **Restore** air to RHR System Flow Control Valves by opening INSTR AIR ISOLATION TO LINE 136 1-2420-U4-151 (RC-85 overhead). _____

Approved By J.B. Stanley	Vogtle Electric Generating Plant 	Procedure Number Rev 13405-1 41.2
Date Approved 04/20/2011	125V DC 1E ELECTRICAL DISTRIBUTION SYSTEM	Page Number 1 of 115

125V DC 1E ELECTRICAL DISTRIBUTION SYSTEM

PROCEDURE LEVEL OF USE CLASSIFICATION PER NMP-AP-003	
CATEGORY	SECTIONS
Continuous:	ALL
Reference:	NONE
Information:	NONE



Approved By J.B. Stanley	Vogtle Electric Generating Plant 	Procedure Number Rev 13405-1 41.2
Date Approved 04/20/2011	125V DC 1E ELECTRICAL DISTRIBUTION SYSTEM	Page Number 2 of 115

TABLE OF CONTENTS

		<u>PAGE</u>
1.0	<u>PURPOSE</u>	3
2.0	<u>PRECAUTIONS AND LIMITATIONS</u>	5
3.0	<u>PREREQUISITES OR INITIAL CONDITIONS</u>	6
4.0	<u>INSTRUCTIONS</u>	7
5.0	<u>REFERENCES</u>	103


Approved By J.B. Stanley	Vogle Electric Generating Plant 	Procedure Number Rev 13405-1 41.2
Date Approved 04/20/2011	125V DC 1E ELECTRICAL DISTRIBUTION SYSTEM	Page Number 3 of 115

1.0


PURPOSE

This procedure provides the necessary instructions for energizing, operating and de-energizing the 125V DC 1E Electrical Distribution System. Instructions are included in the following sections:

- 4.1 Startup
 - 4.1.2 Placing 125V DC Battery 1AD1B, 1BD1B, 1CD1B, or 1DD1B In Service
 - 4.1.3 Placing TRAIN A Battery Charger 1AD1CA or 1AD1CB in Service
 - 4.1.4 Placing TRAIN B Battery Charger 1BD1CA or 1BD1CB in Service
 - 4.1.5 Placing TRAIN C Battery Charger 1CD1CA or 1CD1CB in Service
 - 4.1.6 Placing TRAIN D Battery Charger 1DD1CA or 1DD1CB in Service
 - 4.1.7 Placing "C & D" Type 125V DC Battery Chargers on Equalize Charge
 - 4.1.8 Placing Ametek 125V DC Battery Chargers on Equalize Charge
 - 4.1.9 Energizing 125V DC Switchgear 1AD1, 1BD1, 1CD1, Or 1DD1
 - 4.1.10 Energizing A 125V DC Panel
 - 4.1.11 Placing the RHR 25kVA Inverter 1CD1I5 or 1DD1I6 in Service
 - 4.1.12 Energizing 125V DC MCC 1AD1M, 1BD1M, or 1CD1M
- 4.2 System Operation

Approved By J.B. Stanley	Vogtle Electric Generating Plant 	Procedure Number Rev 13405-1 41.2
Date Approved 04/20/2011	125V DC 1E ELECTRICAL DISTRIBUTION SYSTEM	Page Number 4 of 115

- 4.3 Shutdown
 - 4.3.1 De-energizing 125V DC MCC 1AD1M, 1BD1M, or 1CD1M
 - 4.3.2 Removing the RHR 25kVA Inverter 1CD1I5 or 1DD1I6 from Service
 - 4.3.3 Removing A 125V DC Bus Battery Charger from Service
 - 4.3.4 Removing Battery 1AD1B Or 1BD1B from Service
 - 4.3.5 Removing Battery 1CD1B OR 1DD1B from Service
 - 4.3.6 De-energizing a 125V DC Switchgear
 - 4.3.7 De-energizing a 125V DC Panel
 - 4.3.8 Removing a "C & D" Type 125V DC Battery Charger from Equalize Charge
 - 4.3.9 Removing "Ametek" 125V DC Battery Charger from Equalize Charge.

Approved By J.B. Stanley	Vogle Electric Generating Plant 	Procedure Number Rev 13405-1 41.2
Date Approved 04/20/2011	125V DC 1E ELECTRICAL DISTRIBUTION SYSTEM	Page Number 5 of 115

2.0 PRECAUTIONS AND LIMITATIONS

2.1 PRECAUTIONS

2.1.1 Do not smoke, use open flames, or operate space heaters in the vicinity of the Storage Batteries.

2.1.2 Battery Room Ventilation Systems should be in operation to limit the buildup of hydrogen in the Battery Rooms.

2.1.3 If Battery Room Ventilation System is not available, verify doors to Battery Room propped open per 00310-C.

2.1.4 In Mode 5 or 6 when a battery must be removed from service for long periods such as for testing, it is preferable to transfer the 120V Vital busses to their regulated power supply, provided the Inverter is not required per Technical Specification 3.8.8. Transferring the vital busses to the regulated source will reduce the potential for power losses due to 125V DC bus instabilities. (Tech Spec 3.8.7 and 3.8.8)

2.1.5 The Control Room should be notified that alarms associated with battery chargers should be expected when starting up, shutting down, or swapping battery chargers.

2.2 LIMITATIONS

2.2.1 The 125V DC 1E Electrical Busses shall be operable in Modes, 1, 2, 3 and 4 per Technical Specification LCO 3.8.4 and LCO 3.8.9.


2.2.2 The 125V DC 1E Electrical Busses shall be operable in Modes 5 and 6 per Technical Specification LCO 3.8.5 and LCO 3.8.10.

2.2.3 The DC Input Breaker to the 25kVA Inverters can not be closed until the Inverter Internal Capacitor Bank has been charged.

2.2.4 The Battery Charger 480V AC input voltage shall be 480V AC $\pm 10\%$ (432V-528V).

2.2.5 If the electrical bus must be energized by the battery chargers alone (without battery breaker closed in), only one charger should be energized to supply the bus.

2.2.6 A 72-hour equalizing charge should be performed every six months on all 1E batteries.

Approved By J.B. Stanley	Vogtle Electric Generating Plant 	Procedure Number Rev 13405-1 41.2
Date Approved 04/20/2011	125V DC 1E ELECTRICAL DISTRIBUTION SYSTEM	Page Number 6 of 115

2.2.7

In Modes 5 and 6 removal of 125V DC equipment from service may necessitate performance of 14235-1, "On Site Power Distribution Operability Verification" to document that sufficient equipment (batteries and chargers) remains operable to satisfy Technical Specifications LCO 3.8.10.

2.2.8

Removal of 125V DC battery 1AD1B OR 1BD1B from service may necessitate performance of 14230-1, "AC SOURCE Verification" and entry into T.S. 3.8.1 due to administrative requirements to remove associated diesel from service.

2.2.9

If a battery is to be removed from service or becomes INOPERABLE, the compensatory actions listed in Attachment 1 should be completed prior to removing it from service or as soon as possible after being discovered INOPERABLE.

2.2.10

Several new 125 VDC breakers have been obtained that are equipped with a close and a trip pushbutton. The old style only had a trip pushbutton. These newer breakers will only be used for swap out during breaker maintenance. The close pushbutton on these breakers is never used by Operations personnel for operating the breaker.


2.2.11

RHR inverters are NOT to remain energized unless in service to support RHR operations. The DC bus system is not load-analyzed to carry loop suction valve inverters during normal power operation

3.0

PREREQUISITES OR INITIAL CONDITIONS

The Control Building Safety Feature Electrical Equipment Room HVAC System is operating.

Approved By J.B. Stanley	Vogtle Electric Generating Plant 	Procedure Number Rev 13405-1 41.2
Date Approved 04/20/2011	125V DC 1E ELECTRICAL DISTRIBUTION SYSTEM	Page Number 56 of 115

INITIALS

4.1.11 Placing the RHR 25kVA Inverter 1CD115 or 1DD116 in Service

NOTE

Inverters 1CD115 and 1DD116 are NOT analyzed loads for batteries 1CD1B and 1DD1B respectively in MODES 1, 2, or 3. Inverter 1CD115 and 1DD116 may be placed in service in MODES 1, 2, or 3 for pre-outage testing, however they should be attended while in service. In the event of an emergency condition or a condition that requires 1CD115 and 1DD116 be left unattended in MODES 1, 2, or 3, 1CD115 and 1DD116 must be removed from service in accordance with Section 4.3.2.

4.1.11.1 To place 1CD115 in service, **perform** the following:

- a. **Verify** the 125V DC Battery 1CD1B in service per Section 4.1.2.3 of this procedure.
- b. **Verify** the following:
 - Inverter 1CD115 DC Input Breaker open.
 - Inverter 1CD115 AC Output Breaker open.
- c. In the Main Control Room, **install** the annunciator card associated with ALB34 F06 and **check** ALB34 F06 illuminates.
- d. **Close** Inverter 1CD115 DC Switchgear Breaker:
 1CD1-08 HS-1CD108

N/A

INITIALS

NOTES

- The Precharge light must be lit for ≈ 5 seconds OR DC voltage as read on the Inverter DC Voltmeter must be reading ≈ 125 VDC and stable for ≈ 5 seconds, to allow closing the DC INPUT Breaker. The 5 seconds will allow time to fully charge the capacitor bank.
- The Precharge Pushbutton has a strong spring and will require a firm push to operate.
- The DC INPUT breaker should be closed immediately (within 3 seconds) after releasing the Precharge Pushbutton.
- If using the Precharge light above, and it extinguishes prior to closing the DC INPUT Breaker, Step 4.1.11.1.e will need to be repeated.
- If the inverter has just been shutdown, wait at least 60 seconds before restarting the inverter.

- e. **Press** the Precharge Pushbutton, and **maintain** depressed for at least five seconds after the Precharge light illuminates OR the inverter DC Voltmeter is stable at ≈ 125 VDC,, then **release**.
- f. **Close** the inverter DC INPUT Breaker (WITHIN 3 seconds after releasing the Precharge Pushbutton.
- g. **Check** proper inverter operation by observing approximately 480 VAC on the INVERTER OUTPUT Voltmeters and 60 Hz on the INVERTER OUTPUT frequency meter.
- h. **Close** the INVERTER OUTPUT Breaker.
- i. **MOMENTARILY press** the PRESS TO RESET ALARMS pushbutton.
- j. **Check** ALB34-F06 extinguishes.

N/A



INITIALS

4.1.11.2 To place 1DD1I6 in service, perform the following:

- a. ~~Verify the 125V DC Battery 1DD1B in service per Section 4.1.2.4 of this procedure.~~ CJ
- b. **Verify the following:**
 - Inverter 1DD1I6 DC Input Breaker ^{off} open. CJ
 - Inverter 1DD1I6 AC Output Breaker ^{off} open. CJ
- c. In the Main Control Room, **install** the annunciator card associated with ALB34 F07 and **check** ALB34 F07 illuminates. CJ
- d. **Close** Inverter 1DD1I6 DC Switchgear Breaker: CJ
1DD1-08 HS-1DD108

NOTES

- ~~The Precharge light must be lit for \approx 5 seconds OR DC voltage as read on the Inverter DC Voltmeter must be reading \approx 125 VDC and stable for \approx 5 seconds, to allow closing the DC INPUT Breaker. The 5 seconds will allow time to fully charge the capacitor bank.~~
- ~~The Precharge Pushbutton has a strong spring and will require a firm push to operate.~~
- ~~If using the Precharge light above, and it extinguishes prior to closing the DC INPUT Breaker, Step 4.1.11.2.e will need to be repeated.~~
- ~~If the inverter has just been shutdown, wait at least 60 seconds before restarting the inverter.~~

- e. **Press** the Precharge Pushbutton, and **maintain** depressed for at least five seconds after the Precharge light illuminates OR the inverter DC Voltmeter is stable at \approx 125 VDC, then **release**. CJ
- f. **Close** the inverter DC INPUT Breaker (within 3 seconds after releasing the Precharge Pushbutton). CJ

Approved By
J.B. Stanley

Vogle Electric Generating Plant



Procedure Number Rev
13405-1 41.2

Date Approved
04/20/2011

125V DC 1E ELECTRICAL DISTRIBUTION SYSTEM

Page Number
59 of 115

INITIALS

- g. **Check** proper inverter operation by observing approximately 480 VAC on the INVERTER OUTPUT Voltmeters and 50 Hz on the INVERTER OUTPUT frequency meter.
- h. **Close** the INVERTER OUTPUT Breaker.
- i. **MOMENTARILY press** the PRESS TO RESET ALARMS pushbutton.
- j. **Check** ALB34-F07 extinguishes.

CS

CS

CS

CS

Go to 13011-1

Initial Conditions: Unit 1 is in Mode 4 and preparing for cooldown and entry into Mode 5. The operators are preparing to place RHR Train "A" in service for continued cooldown. 1DD1B is already in service.

Initiating Cue: The Shift Supervisor has directed you to place RHR loop inlet isolation inverter 1DD1I6 in service and energize 1-HV-8702A starting with step 4.4.3 of 13011-1, Residual Heat Removal System.

- ① Put RHR inverter 1DD1I6 in SVC
- ② Energize HV 8702A.