

## **NRR-PMDAPEm Resource**

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**From:** Nevins, Kathleen J. <kjnevins@firstenergycorp.com>  
**Sent:** Monday, January 16, 2017 12:00 PM  
**To:** Hughey, John  
**Subject:** [External\_Sender] Additional Information on DBNPS FLEX Heat Habitability  
**Attachments:** White Paper - FLEX Heat Habitability.docx

During the telephone call discussion held on January 11, 2017, the NRC staff requested clarification on wording used in the Davis-Besse Nuclear Power Station (DBNPS) Final Integrated Plan, Section 2.11.1, Ventilation.

The manner in which the section was written brought into question whether ventilation may be required in some areas. During the discussion, FENOC communicated to the NRC staff that this was not the intent. The intent was to describe that ventilation is not required; however, as resources are available, temporary ventilation equipment (capable of removing heat load) is available for use. The NRC staff requested that FENOC provide additional supporting information for this via e-mail so that the detail may be publicly available in ADAMS.

A white paper is attached to support that the worst case area temperatures remain low enough to allow operators to safely complete tasks without ventilation.

This e-mail and its attachment may be made publicly available in ADAMS.

Thank you.

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Extreme heat conditions during an ELAP were considered to determine Davis Besse FLEX deployment strategies and timelines as applicable to ventilation. Calculations support that the worst case temperature in each area is low enough to allow operators to safely complete the mitigation tasks without deployment restoration of ventilation. NORM-LP-7201, DAVIS BESSE FLEX VALIDATION PROCESS REPORT, validated the FLEX strategy timelines with minimum crew manning assumed. The team concluded that ventilation can be deployed as resources become available. The following page from the validation report shows assignments of the 6 Station Blackout Equipment Operators (SBOEO) for the first 6 hours until additional resources are assumed per NEI 12-06.

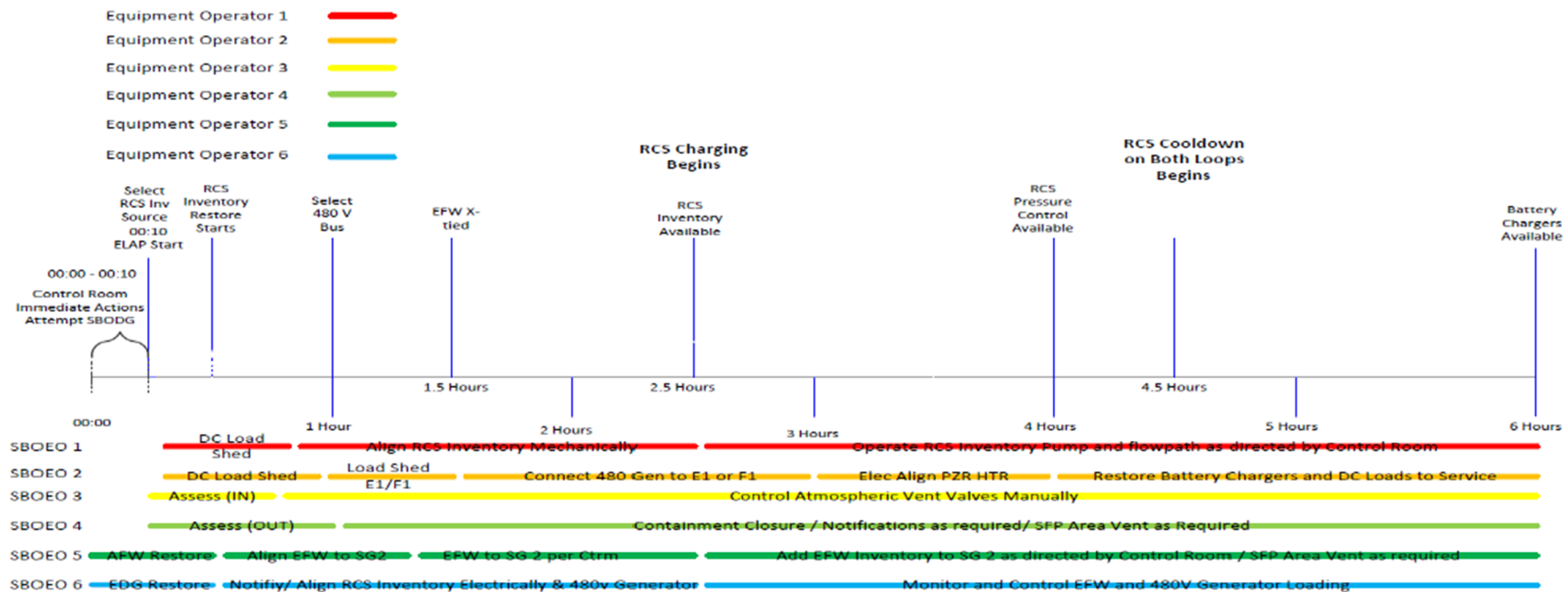
NUCLEAR OPERATING REFERENCE MATERIAL		Number:	NORM-LP-7201
Title:	Davis Besse FLEX Validation Process Report	Revision:	00
		Page:	28 of 635

ATTACHMENT 1: DAVIS BESSE FLEX SBOEO TIMELINE OVERVIEW  
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## ELAP From At-Power Condition (Mode 1-4) SBOEO Actions

### Assumptions:

1. Minimum Crew Manning is on shift as described in ERO Staffing Study.
2. Control Room Crew remains in Control Room for duration of event i.e. no field actions by Control Room Staff. This includes the Shift Manager, Shift Technical Advisor, Command SRO, ATC Reactor Operator and Balance of Plant Reactor Operator. All remaining operators are available to implement FLEX actions and are NOT required to respond as the Fire Brigade. As a result, 6 equipment operators (5 Fire Brigade and 1 Safe Shutdown Operator) will be available to implement FLEX.
3. Additional Off-Site Operator Resources are not available until Time = 6 hours.
4. EFW Auto/Manual Start and Control Room controls #1 SG level. Main Steam Safety Valves Control SG Pressure until manual control of AVVs available. Manual cross connect from EFW to SG 2 required to restore level to SG 2 prior to RCS Cooldown.
5. ALL Operators filling a minimum manning spot must be able to implement FLEX Strategies. This requires all SBOEOs to be qualified FLEX.
6. ERO response assumed to start at 6 hours.



Revision 07 – Prepared by Jeff Carr; 11-14-15; Revised for NRC FLEX Audit.

White Paper to clarify FIP Section 2.11.1, in that environmental conditions remain acceptable for personnel habitability during FLEX implementation without ventilation.

The table below was created to clarify the calculation cross reference to maximum area temperatures used for habitability reviews.

Location	Description	Max °F without ventilation	Calculation
HVSG	High Voltage Switchgear Rooms 323, 324, 325	115.5°F	C-ME-099.25-001 referencing Calc 24.001 (steady state calc)
LVSG	Low Voltage Switchgear Rooms 428/A/B, 429/A/B	114.4°F	C-ME-099.25-001 referencing Calc 25.020 (Time vs. Temp calc showing temp plateau/steady state)
CTRM	Control Room 505	110.3°F	C-ME-099.25-001 referencing Calc 57.001 (steady state calc)
MP3	Mechanical Penetration Room 303	104°F	C-ME-099.25-001
Fan Alley	Rooms 500, 501, 515	104°F	C-ME-099.25-001
SFP	Spent Fuel Pool Room 300	104°F	C-ME-099.25-001
RM100	BWST Pipe Chase Room 100/101	86°F	C-ME-050.05-008 (steady state calc)
RM124	CWRT 1 Room 124	95°F	C-ME-050.05-008 (steady state calc)
EFWF <sup>1</sup>	Emergency Feedwater Facility	118.5°F	S&L Evaluation 2016-05980 (Time vs. Temp 0-2.5 hrs after ELAP; referenced in EFWF HVAC sizing calc C-ME-050.05-007)

<sup>1</sup> EFWF ventilation is restored when 480V is aligned to EFWF MCC by T+2.5 hours after ELAP, maintaining temperature ≤ 120°F.

Time sensitive operator actions are discussed throughout the Final Integrated Plan and section 3.1.2 includes a table for those actions. Columns have been added to the table to combine the detail from the validation report (Reference Page 1) and maximum area temperatures (Reference table above).

Time Sensitive Operator Action	Task Description	Time required for completion from Loss of all AC power	Task Performed By	Task Location	Time in Area	Maximum Equilibrium Room Temp assumed at T+0
FLEX Action 1 - Preserve RCS Inventory.	Following a Station Blackout, isolate RCS Letdown and Reactor Coolant Pump Seal Return.	10 minutes	CTRM Staff	CTRM	Continuous	110.3°F
FLEX Action 2 - Declare an ELAP.	Following a Station Blackout, declare an Extended Loss of AC Power.	10 minutes	CTRM Staff	CTRM	Continuous	110.3°F
FLEX Action 3 – DC Bus Load Shed.	Following a Station Blackout, align DC Buses and Loads to extend the life of Station Batteries.	30 minutes for 1st phase and a total of 60 minutes for all actions.	SBOEO1 Phase 1 SBOEO2 Phase 2	LVSG LVSG	30 minutes 15 minutes	114.4°F 114.4°F
Align 480V to E1 or E2	Connect Cables across HVSG Rooms to E1 or F1 for power to PZR Heaters	180 minutes	SBOEO2	HVSG	30 minutes	115.5°F
FLEX Action 4 – Manually Start the EFW Pump.	Following a Station Blackout and loss of all AFW, manually start the EFW Pump and supply inventory to SG1.	10 minutes	CTRM Staff	CTRM	Continuous	110.3°F

White Paper to clarify FIP Section 2.11.1, in that environmental conditions remain acceptable for personnel habitability during FLEX implementation without ventilation.

Time Sensitive Operator Action	Task Description	Time required for completion from Loss of all AC power	Task Performed By	Task Location	Time in Area	Maximum Equilibrium Room Temp assumed at T+0
FLEX Action 5 – Provide inventory to SG2.	Following a Station Blackout and AFW System Failure, manually align Emergency Feedwater to provide inventory to SG2.	90 minutes	SBOEO5	MP3	25 minutes After alignment, SG2 flow control is required, but does not require SBOEO5 to remain in area continuously	104°F
FLEX Action 6 – Mechanically align FLEX Charging Pump for RCS inventory.	Following a Station Blackout, mechanically align a FLEX Charging Pump to provide inventory to the Reactor Coolant System.	150 minutes	SBOEO1	RM100 or RM124	60 minutes After alignment, pump start and stop is required, but does not require SBOEO1 to remain in area continuously	86°F  95°F
FLEX Action 7 – Electrically align FLEX Charging Pump for RCS inventory.	Following a Station Blackout, electrically align a FLEX Charging Pump to provide inventory to the Reactor Coolant System.	150 minutes	SBOEO6	RM100  RM 100, RM124	30 minutes Primary connection  120 minutes Alt connection	86°F  95°F
FLEX Action 8 – Electrically align 480 volt power to EFWF MCC.	Following a Station Blackout, electrically align 480 volt power to the EFW Facility MCC.	150 minutes	SBOEO6	EFWF <sup>1</sup>	30 minutes After start, monitoring does not require SBOEO6 to remain in area continuously	118.5°F
FLEX Action 9 – Initiate RCS Cooldown.	Following a Station Blackout, initiate cooldown of the Reactor Coolant System.	4.5 hours	CTRM Staff SBOEO1 SBOEO3 SBOEO5	CTRM RM100 Fan Alley MP3	Continuous As Required, not continuous As Required, not continuous As Required, not continuous	110.3°F

Based on time before required completion, expected time in area for task, effort required, and maximum area temperatures, it is reasonable to expect that the tasks can be performed without ventilation restoration or deployment. The FSGs have been written to deploy ventilation as resources become available.

Wording in FIP section 2.11.1 had been interpreted to suggest that ventilation may be required in some areas. The intent was to describe that ventilation is not required, however, as resources are available, temporary ventilation equipment (capable of removing heat load) is available.