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Davis Besse Power Station  
Transmittal / Receipt Acknowledgement

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		Document							
	TOC 1	TOC 2	Type	Number	Sht/Sec	Changes	Rev	Status	
old	EPOC	EPON	PROC	RA-EP-02820		E01-3033	0002	APPROVED	
new	EPOC	EPON	PROC	RA-EP-02820		E01-3033	0002	APPROVED	

**PROCEDURE DEVELOPMENT FORM**  
ED 7635-17

SHEET 1 OF 1  
PROCEDURE ACTIVITY TRACKING NO. 01-3033

**SECTION 1 - IDENTITY**

PROCEDURE NO. / CURRENT REVISION RA-EP-02820	PROPOSED REVISION NO.	PROPOSED C or E NO. E-1	<input type="checkbox"/> NEW (N) <input type="checkbox"/> REVISION (R) <input type="checkbox"/> CHANGE (C) <input type="checkbox"/> TEMPORARY APPROVAL (TA) <input checked="" type="checkbox"/> EDITORIAL CORRECTION (E)	<input type="checkbox"/> CANCELLATION (CX) <input type="checkbox"/> INACTIVATION (IN) <input type="checkbox"/> REACTIVATION (RA)	<input type="checkbox"/> RESTRICTED (CR/TR) ESTIMATED EXPIRATION (DATE / EVENT)
SUPERSEDES					

PROCEDURE TITLE  
Earthquake

PROCEDURE CLASSIFICATION <input checked="" type="checkbox"/> SR <input type="checkbox"/> QR <input type="checkbox"/> N-QR	HAS PROCEDURE BEEN EXEMPTED FROM REGULATORY APPLICABILITY? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	PAT / PCR NOS. CLOSED OUT N/A	<input type="checkbox"/> CONTINUED
CHANGE TO? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO			

ACTIVITY SUMMARY / PURPOSE  
 (1) Step 2.1.1 - Delete extra "Nuclear"  
 (2) Change "Shift Supervisor" to "Shift Manager"  
 (3) Step 6.2.4.c- Add "Station Review Board"

**SECTION 2 - CONCURRENT EFFECTIVE DOCUMENTS**

DOCUMENT NO. / REVISION	DOCUMENT TITLE	PAT NO. / CHANGE REQUEST
N/A		

**SECTION 3 - REVIEW ORGANIZATIONS**

REQUIRED	REQUESTED
N/A	

PROCEDURE PREPARER Paul F. Timmerman	DATE 11/20/01	QUALIFIED REVIEWER N/A	DATE
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**SECTION 4 - ATTACHMENTS**

YES N/A <input type="checkbox"/> <input checked="" type="checkbox"/> VALIDATION CHECKLIST <input type="checkbox"/> <input checked="" type="checkbox"/> COMMITMENT VERIFICATION SUMMARY <input type="checkbox"/> <input checked="" type="checkbox"/> REGULATORY APPLICABILITY DETERMINATION NO. _____	COMPLETED AND ATTACHED YES N/A <input type="checkbox"/> <input checked="" type="checkbox"/> 10CFR50.59 SCREEN NO. _____ <input type="checkbox"/> <input checked="" type="checkbox"/> 10CFR50.59 EVALUATION NO. _____ <input type="checkbox"/> <input checked="" type="checkbox"/> DOCUMENT REVIEW SHEETS	YES N/A <input type="checkbox"/> <input checked="" type="checkbox"/> REVISED CROSS REFERENCES LIST <input type="checkbox"/> <input checked="" type="checkbox"/> PCRs <input type="checkbox"/> <input checked="" type="checkbox"/> OTHER _____
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FINAL QUALIFIED REVIEWER CONCURRENCE N/A	DATE
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**SECTION 5 - TEMPORARY APPROVAL**

MANAGEMENT SRO N/A	DATE	APPROVAL AUTHORITY N/A	DATE
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**SECTION 6 - CONCURRENCE / FINAL APPROVAL**

PROCEDURE SPONSOR N/A	DATE	<input type="checkbox"/> SRB N/A	DATE
<input type="checkbox"/> MANAGER - NUCLEAR QUALITY ASSESSMENT (QA) N/A	DATE	<input type="checkbox"/> PLANT MANAGER N/A	DATE
		APPROVAL AUTHORITY N/A	DATE

**SECTION 7 - TRAINING / PROCEDURE EFFECTIVITY**

TRAINING COMPLETE <input type="checkbox"/> YES <input checked="" type="checkbox"/> N/A	ALTERATION EFFECTIVE DATE 12/10/01	PROCEDURE SPONSOR N/A	DATE 12-401
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Davis-Besse Nuclear Power Station  
EMERGENCY PLAN OFF NORMAL OCCURRENCE PROCEDURE

RA-EP-02820

(Supersedes RA-EP-02820 R1)

EARTHQUAKE

REVISION 2

Prepared by: *Devin J. Jordan* 9/15/97  
Date

Sponsor: *[Signature]* 10/2/97  
Manager - Regulatory Affairs Date

Approved by: *Robert E. Donnellon* 10/27/97  
Director - Engineering & Services Date

Approved by: *[Signature]* 10/27/97  
Plant Manager Date

Effective Date: NOV 6 1997

Procedure Classification:

- Safety Related
- Quality Related
- Non-Quality Related

LEVEL OF USE:  
**STEP-BY-STEP**



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## 1.0 PURPOSE

This procedure describes the actions to be taken in the event of a seismic event.

## 2.0 REFERENCES

### 2.1 Developmental

- 2.1.1 10 CFR 100, Appendix A, Seismic and Geologic Siting Criteria for Nuclear Power Plants
- 2.1.2 Davis-Besse Nuclear Power Station Emergency Plan
- 2.1.3 USAR 2.5, Geology and Seismology
- 2.1.4 USAR 3.7.4.3, Accelerograph Readout Procedure
- 2.1.5 USAR 9.2.1.2 and 9.2.5.1, Loss of Ultimate Heat Sink
- 2.1.6 Davis-Besse Nuclear Power Station Technical Specifications

### 2.2 Implementation

- 2.2.1 DB-OP-00002, Operations Section Event/Incident Notifications and Actions
- 2.2.2 DB-OP-02504, Rapid Shutdown
- 2.2.3 DB-OP-02511, Loss of Service Water Pumps/System
- 2.2.4 DB-OP-02550, Dry Fuel Storage Abnormal Event
- 2.2.5 DB-OP-06012, Decay Heat & Low Pressure Injection System
- 2.2.6 DB-OP-06233, Auxiliary Feedwater System
- 2.2.7 DB-OP-06414, Seismic Monitoring System
- 2.2.8 DB-SC-03070, Emergency Diesel Generator 1 Monthly Test
- 2.2.9 DB-SC-03071, Emergency Diesel Generator 2 Monthly Test
- 2.2.10 DB-SC-03272, Control Rod Exercising Test
- 2.2.11 DB-SP-03356, RCP Seal Leakage (Monthly)
- 2.2.12 RA-EP-01500, Emergency Classification

### 3.0 DEFINITIONS

3.1 SAFE SHUTDOWN EARTHQUAKE (SSE) - The SSE as defined in 10 CFR 100, Appendix A, is that earthquake which is based upon an evaluation of the maximum earthquake potential considering the regional and local geology and seismology and specific characteristics of local subsurface material. It is that earthquake which produces the maximum vibratory ground motion for which certain structures, systems, and components are designed to remain functional. These structures, systems, and components are those necessary to assure:

3.1.1 The integrity of the reactor coolant pressure boundary

3.1.2 The capability to shut down the reactor and maintain it in safe shutdown condition, or

3.1.3 The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures.

3.2 OPERATING BASIS EARTHQUAKE (OBE) - The OBE as defined in 10 CFR 100, Appendix A, is that earthquake which, considering the regional and local geology and seismology and specific characteristics of local subsurface material, could reasonably be expected to affect the plant site during the operating life of the plant; it is that earthquake which produces the vibratory ground motion for which those features of the nuclear power plant necessary for continued operation without undue risk to the health and safety of the public are designed to remain functional.

### 4.0 RESPONSIBILITIES

The Shift Manager shall be responsible for directing the operating shift in the utilization of this procedure.

### 5.0 INITIATING CONDITIONS

The following conditions shall initiate the use of this procedure:

5.1 The Strong Motion Recording System and Seismic Monitoring Equipment are actuated and record a seismic disturbance.

5.2 As directed by Station management.

6.0 PROCEDURE6.1 Immediate Operator Action

6.1.1 The Shift Manager shall:

- a. Order all fuel handling operations suspended.
- b. IF fuel is being supported from a crane or a bridge,  
THEN order that it be lowered into a safe storage location.
- c. IF the Spent Fuel Pool Demineralizer and/or filters are in service for the Decay Heat System (DH) or the recirculation of the Borated Water Storage Tank (BWST),  
THEN verify the following valves are closed:

<u>BWST</u>	<u>DH</u>
BW 16	DH 28
SF 98	DH 29
	DH 70

- d. Evaluate control position, reactor power, and other pertinent variables to verify that no change has occurred in core reactivity.

6.2 Supplementary Action

6.2.1 The Control Room Operators shall:

- a. Monitor the control panels to determine the effect of the earthquake, if any, on instrumentation, controls or station operations.
- b. Notify the Shift Manager of any abnormal indications.
- c. Verify that there is no abnormal sump pump operation and that tank levels are stable.
- d. Verify the operability of systems or components not running at the time of the earthquake before relying upon them.
- e. IF the unit has been shutdown by automatic protection systems,  
THEN place the unit in a safe shutdown condition.

## 6.2.2 The Shift Manager shall:

NOTE 6.2.2.a

A plant shutdown following an earthquake shall proceed slowly enough to allow evaluation of the operation of systems used to support the plant shutdown.

- a. IF a valid OBE or SSE Alarm is received, AND ground motion is felt THEN, conduct a carefully controlled shutdown of the unit.
- b. Utilize RA-EP-01500, Emergency Classification, to determine the proper emergency classification and take actions accordingly.
- c. Analyze the magnitude of the earthquake utilizing DB-OP-06414, Seismic Monitoring System. Assistance in analyzing the graphic record of the event may be required from the Engineering Department, or from other knowledgeable personnel responding to the Emergency Plan activation.
- d. Order an inspection of the station looking for:
  - ° leaking fluids
  - ° deformed structures, particularly those spanning seismic joints
  - ° broken gauge glasses
  - ° any physical damage.

Particular attention shall be directed to the following systems:

1. Emergency Core Cooling Systems, including the Borated Water Storage Tank
2. Nuclear Steam Supply System
3. Auxiliary Feedwater
4. Component Cooling Water
5. Service Water  
REFER TO DB-OP-02511, Loss of Service Water Pumps/ System;  
Service Water Non-Seismic Line Rupture section
6. Makeup and Purification Systems
7. Boric Acid Storage Tanks and associated piping
8. Radwaste Systems

9. Spent Fuel Pool and Spent Fuel Pool Cooling System
10. New Fuel Storage
11. Containment Integrity
12. Intake Canal and Intake Forebay
13. Dry Fuel Storage

REFER TO DB-OP-02550, Dry Fuel Storage Abnormal Events

- e. Verify the Aux Feed Pump turbines casing drains and drip leg drains have not been blocked by the Seismic Event.  
IF the Aux Feed Pump turbines casing drains and drip leg drains can not be verified clear,  
THEN perform either of the following two steps within two hours after receiving the seismic alarm:
  1. Start the Aux Feed Pump Turbines in accordance with DB-OP-06233, Aux Feedwater System Procedure
  2. Drain the Aux Feed Pump turbine case drains and drip legs every two hours.
- f. IF the Seismic event results in a break of the Cooling Tower makeup line,  
THEN perform the following:
  1. Verify Service Water returns lined up to the Forebay or Intake Structure.
  2. Verify Service Water returns to the Cooling Tower isolated within 3 hours. REFER TO DB-OP-02511, Loss of Service Water Pumps/System.
- g. IF the seismic event results in loss of the supply pipe from Lake Erie to the intake canal (collapse of the dike)  
THEN perform the following:
  1. Perform a rapid shutdown of the reactor, REFER TO DB-OP-02504, Rapid Shutdown.
  2. Close CT 840, Cooling Tower Blowdown Valve.

3. Verify service water returns are aligned to the intake forebay or the intake structure.
  4. IF the dilution pump is running in the dilution mode, THEN shutdown the dilution pump.
  5. IF forebay water level decreases to 564' IGLD THEN:
    - a. Trip the reactor.
    - b. Initiate AFW flow and isolation using HIS 6403 (AFW1 TO SG1 & ISO SG1) and HIS 6404 (AFW2 TO SG2 & ISO SG2).
    - c. Reduce SW loads as directed by the Shift Manager.
    - d. Begin a cooldown to Hot Shutdown using the Aux Feedwater pumps using CST's if available.
    - e. Maintain cooling from AFW until directed by the Emergency Director to transfer to the Decay Heat Removal System. This decision will be based on available forebay cooling.
  - h. IF the seismic event results in a loss of the Spent Fuel Pool Cooling System, THEN notify the Operations Superintendent and perform an evaluation to consider aligning a Decay Heat Removal train to provide Spent Fuel Pool Cooling. REFER TO DB-OP-06012, Decay Heat and Low Pressure Injection System Operating Procedure.
  - i. Notify the Plant Manager and/or the Operations Superintendent of the results of the physical inspection of the Station.
- 6.2.3 Operating personnel shall perform the following tests as deemed necessary by the Shift Manager.
- a. DB-SP-03356, RCP Seal Leakage (Monthly).
  - b. DB-SC-03272, Control Rod Exercising Test.
  - c. DB-SC-03070, Emergency Diesel Generator 1, Monthly Test.
  - d. DB-SC-03071, Emergency Diesel Generator 2, Monthly Test.
- 6.2.4 The Plant Manager shall:
- a. Notify the on-call Vice President Nuclear of the earthquake.
  - b. Notify the NRC in accordance with DB-OP-00002, Operations Section Event/Incident Notifications and Actions.

- c. With the assistance of the plant operating shift and staff personnel, convene the Station Review Board (SRB) to evaluate the reports, records, and recordings for any possible earthquake damage to equipment and structures. Determine if any of the engineered safety features have been damaged.
- d. IF a seismic event inhibits the use of Lake Erie as a water source, THEN the Engineering Department shall be notified so that temporary pumping to the intake forebay can be established before the end of the 30-day stored water cooling period.
- e. IF a seismic event greater than OBE has occurred, THEN conduct an unscheduled inservice inspection of the steam generators during the subsequent shutdown in accordance with Technical Specification 4.4.5.3.c.2.
- f. Order an inspection of hydraulic and mechanical snubbers in accordance with Technical Specification 4.7.7.1.e.
- g. Order restoration of the seismic monitoring instrumentation in accordance with the Technical Requirements Manual.

## 7.0 FINAL CONDITIONS

The plant is in a stable condition and it has been determined that no classifiable emergency has occurred.

## 8.0 RECORDS

8.1 The following quality assurance records are completed by this procedure and shall be listed on the Nuclear Records List, captured, and submitted to Nuclear Records Management in accordance with NG-NA-00106:

8.1.1 None

8.2 The following non-quality assurance records are completed by this procedure and may be captured and submitted to Nuclear Records Management, in accordance with NG-NA-00106:

8.1.2 None

COMMITMENTS

<u>Section</u>	<u>Reference</u>	<u>Comments</u>
Entire Procedure	TERMS Q 00070	Acts of nature procedure
6.1.1.c	Generic Letter 87-02	Insure the non-seismic SFP demineralizer system is not in use on the BWST or DH systems.
6.2.2.a	USAR Section 3.7.4.3	Station shutdown if acceleration exceeds safe shutdown limit
6.2.2.d.5	Safety Evaluation 88-0189	Service water concerns in the event of an earthquake
6.2.2.f	USAR Section 9.2.1.1	Break in non-seismic line to cooling tower
6.2.2.g	USAR Section 9.2.5.1	Loss of Intake Canal
6.2.2.h	TERMS A18969	Loss of Spent Fuel Cooling
6.2.4.e.	PCAQR 86-0519	OTSG inspection
6.2.4.g.	Tech. Spec. Verification Program	Seismic monitoring instruction

END