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Davis-Besse Nuclear Power Station

EMERGENCY PLAN OFF NORMAL OCCURRENCE PROCEDURE

RA-EP-02861

RADIOLOGICAL INCIDENTS

REVISION 03

Prepared by: Dan Emery

Procedure Owner: Director – Organizational Development

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  X   Safety Related  
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**LEVEL OF USE:**  
**IN-FIELD REFERENCE**

## RADIOLOGICAL INCIDENTS

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## 1.0 PURPOSE

- 1.1 This procedure describes actions and tasks to be performed when one or more of the following radiological incidents occur at the Davis-Besse Nuclear Power Station:
  - 1.1.1 Confirmation of abnormal radiation levels
  - 1.1.2 Confirmation of abnormal radioactivity
  - 1.1.3 Confirmation of a spill of radioactive material inside of a Radiologically Restricted Area (RRA)
  - 1.1.4 Confirmation of a spill of potentially or known radioactive material outside a posted RRA

## 2.0 REFERENCES

### 2.1 Developmental

- 2.1.1 Davis-Besse Nuclear Power Station (DBNPS) Emergency Plan
- 2.1.2 Surface Contamination Decision Levels; Healey, J.W.; LA-4558-MS, Los Alamos National Laboratory; 1981
- 2.1.3 Model Spill Procedures, Appendix J to Regulatory Guide 10.8R2, USNRC; White Flint, MD; 1987

### 2.2 Implementation

- 2.2.1 RA-EP-01500, Emergency Classification
- 2.2.2 HS-EP-02240, Offsite Dose Assessment
- 2.2.3 RA-EP-02864, Containment Evacuation
- 2.2.4 DB-OP-00002, Operations Section Event/Incident Notifications and Actions
- 2.2.5 DB-OP-02530, Fuel Handling Accident
- 2.2.6 DB-OP-02550, Dry Fuel Storage Abnormal Event
- 2.2.7 DB-OP-06412, Process and Area Radiation Monitors
- 2.2.8 DB-OP-06504, Emergency Ventilation System
- 2.2.9 Offsite Dose Calculation Manual (ODCM)

### 3.0 DEFINITIONS

3.1 CONFIRMATION – As it is used in this procedure, means an initial alarm is determined to be valid by one or more of the following:

- Radiation Protection survey or investigative results
- An independent radiation monitor alarm
- System or equipment conditions would make a release of radioactive material likely

### 4.0 RESPONSIBILITIES

4.1 The Shift Manager shall implement this procedure.

4.2 Radiation Protection personnel shall investigate, verify and keep the Shift Manager informed of the radiological conditions.

### 5.0 INITIATING CONDITIONS

5.1 When one or more of the following conditions exist:

5.1.1 Confirmed area radiation monitor alarm from one or more of the following:

- a. FIRE OR RADIATION TRBL (9-1-G).

5.1.2 Confirmed process radiation monitor alarm from one or more of the following:

- a. CREVS TRAIN 1 RAD HI (9-1-A)
- b. CREVS TRAIN 2 RAD HI (9-2-A)
- c. UNIT VENT RAD HI (9-3-A).

5.1.3 Abnormal radiation levels or airborne radioactivity detected during a survey

5.1.4 A spill of radioactive or potentially radioactive material, that causes any of the following:

- a. Within the RRA – unposted, unconfined liquid or solid radioactive material in sufficient quantity to cause a dose rate equal to or greater than 100 mrem/hour at 30 cm above the surface of the radioactive material.
- b. Outside the RRA, but within the Protected Area – unposted, unconfined liquid or solid radioactive material in sufficient quantity to cause a dose rate equal to or greater than 5 mrem/hour at 30 cm above the surface of the radioactive material.
- c. Outside the Protected Area – unposted, unconfined liquid or solid radioactive material in sufficient quantity to be detected by readily available survey methods and equipment.

- d. Unposted, unconfined liquid or solid radioactive material in such quantity, location, or form that there exists a potential such that, in the judgement of the Shift Manager, the resources available on shift would be insufficient to control, confine, survey, and post the area.
- 5.1.5 Confirmed computer radiation alarm.
- 5.1.6 Confirmed alert and/or high radiation alarm on the Radiation Monitoring System (RMS) panel.

**6.0 PROCEDURE****6.1 General**

- 6.1.1 Contact Radiation Protection personnel to investigate the radiation event and to take appropriate actions.
- 6.1.2 Evaluate making an announcement describing the radiation event, and areas to evacuate or avoid.  
REFER TO Step 6.2.1.d for announcement.
- 6.1.3 WHEN confirmation of a radiation event as described in Section 5.0 is completed, THEN GO TO the appropriate section:

Section 6.2, Abnormal or Unknown Radiation Levels,

OR

Section 6.3, Abnormal or Unknown Airborne Radioactivity,

OR

Section 6.4, Radioactive Material Spill.

**6.2 Abnormal or Unknown Radiation Levels**

- 6.2.1 The Shift Manager should perform the following as necessary:

Note 6.2.1.a

Operations personnel who are instrument qualified may perform radiation surveys of the affected areas using portable radiation monitoring equipment.

- a. Direct Radiation Protection personnel to investigate the incident and conduct radiological surveys.
- b. REFER TO DB-OP-06412, Process and Area Radiation Monitors, and verify automatic or manual actions associated with alarming area radiation monitors or process radiation monitors are correct.
- c. Consider the following actions.
  - 1. Evacuation of affected areas
  - 2. Control or prevent access to the affected areas.



- d. IF the decision has been made to evacuate the affected area,  
THEN sound the Containment Evacuation Alarm  
AND make an announcement such as:  
  
"Attention all personnel."  
  
"Attention all personnel."  
  
"Evacuate the \_\_\_\_\_ Area and report to the  
Radiological Restricted Area Access Control Point. Notify your supervisor.  
Avoid the \_\_\_\_\_ Area."  
  
"Evacuate the \_\_\_\_\_ Area and report to the  
Radiological Restricted Area Access Control Point. Notify your supervisor.  
Avoid the \_\_\_\_\_ Area."
- e. IF containment evacuation is necessary,  
THEN REFER TO RA-EP-02864, Containment Evacuation.
- f. IF Dry Fuel Storage is the source of the abnormal radiation levels,  
THEN REFER TO DB-OP-02550, Dry Fuel Storage Abnormal Events.
- g. REFER TO RA-EP-01500, Emergency Classification, and evaluate radiation  
levels for emergency classification.
- h. Review current plant status and determine operating conditions which may  
affect or have caused the situation.
- i. Initiate actions to recover from the radiological incident.
  - 1. Contact Radiation Protection to determine the course of action to take  
to minimize radiation dose to the plant staff and the public.
- j. IF normal access has been restricted,  
THEN make an announcement when normal access is restored to the affected  
area.

#### 6.2.2 Radiation Protection personnel:

Investigate the abnormally high or unknown radiation areas and perform the following  
as necessary:

- a. Radiation surveys
- b. Verify area radiation monitor alarms
- c. Establish and post radiological boundaries
- d. Determine the source of radiation
- e. Inform the Shift Manager of survey results
- f. Inform plant personnel of radiological conditions.

- g. Contact the On Call Manager – Radiation Protection, explain the radiological incident and request their presence at the plant to help determine the course of action. Request additional Radiation Protection personnel, if needed.
- h. Coordinate with the Shift Manager to determine the course of action to take to minimize radiation dose when recovering from the radiological incident. The following items should be considered:
  - What are the offsite dose consequences?
  - What are the dose consequences if the radiological incident continues both to the plant staff and the public?
  - What are the dose consequences to the personnel attempting to fix the problem?
  - Can the normal work control process be used to fix the problem?
- i. Provide coverage for personnel entering a radiation area greater than or equal to 100 mrem/hr.
- j. Consider suspending Radiation Work Permits (RWPs) which would allow access to the area involved.
- k. Supervise the decontamination of personnel.
- l. Supervise the decontamination of areas or equipment.
- m. Inform the Shift Manager of changes in the radiological conditions in the affected areas.

### 6.3 Abnormal or Unknown Airborne Radioactivity

#### 6.3.1 Shift Manager shall perform the following as necessary:

- a. IF a fuel handling accident has occurred,  
THEN REFER TO DB-OP-02530, Fuel Handling Accident.
- b. Direct Radiation Protection personnel to investigate the incident and conduct radiological surveys.
- c. REFER TO DB-OP-06412, Process and Area Radiation Monitors, and verify automatic or manual actions associated with alarming area radiation monitors or process radiation monitors are correct.
- d. Consider the following actions:
  - 1. Evacuation of affected areas.
  - 2. Control or prevent access to the affected areas.

- e. IF the decision has been made to evacuate the affected area,  
THEN sound the Containment Evacuation Alarm  
AND make an announcement such as:
- “Attention all personnel.”
- “Attention all personnel.”
- “Evacuate the \_\_\_\_\_ Area and report to the  
Radiological Restricted Area Access Control Point. Notify your supervisor.  
Avoid the \_\_\_\_\_ Area.”
- “Evacuate the \_\_\_\_\_ Area and report to the  
Radiological Restricted Area Access Control Point. Notify your supervisor.  
Avoid the \_\_\_\_\_ Area.”
- f. IF containment evacuation is necessary,  
THEN REFER TO RA-EP-02864, Containment Evacuation.
- g. IF desired,  
AND the Equipment Hatch is NOT closed,  
THEN perform the following:
1. Make an announcement such as:  
  
“Attention all personnel.”  
  
“Attention all personnel.”  
  
“All assigned personnel establish containment closure immediately.”  
  
“All assigned personnel establish containment closure immediately.”
  2. Notify the Maintenance Supervisor (or designee) to perform an  
emergency closure of the Equipment Hatch.

**CAUTION 6.3.1.h**

If CTMT isolation is needed, SFAS will not initiate a trip signal due to radiation. It is the responsibility of the Control Room Operator to establish CTMT integrity by verifying SFAS Level 1 equipment.

- h. **IF** any of the following ventilation systems have shutdown due to off-normal airborne radioactivity levels:
- Fuel Handling Ventilation System
- OR**
- Radwaste Area Ventilation System
- OR**
- Containment Purge Area Ventilation System,
- THEN REFER TO** DB-OP-06504, Emergency Ventilation System.
- i. **IF** the Station Vent Monitor alarms,  
**THEN** perform the following:
1. Stop all releases in progress
  2. **REFER TO** DB-OP-06412, Process and Area Radiation Monitors, (Station Vent Radiation Monitor Operation during a Radioactive Release Event).
- j. **IF** the Station Vent Monitor alarm does not clear after the releases have been terminated,  
**THEN** contact Radiation Protection personnel,  
**AND** request an initial assessment to determine if the release has exceeded any limits or requirements as stated in the following documents:
1. Offsite Dose Calculation Manual (ODCM)
  2. DB-OP-00002, Operations Section Event/Incident Notifications and Actions.
- k. **IF** Dry Fuel Storage is the source of the abnormal airborne radioactivity levels,  
**THEN REFER TO** DB-OP-02550, Dry Fuel Storage Abnormal Events.
- l. **REFER TO** RA-EP-01500, Emergency Classification,  
**AND** evaluate airborne activity levels for emergency classifications.

- m. IF the station has entered an emergency classification  
AND an abnormal release is in progress,  
THEN REFER TO HS-EP-02240, Offsite Dose Assessment  
AND perform dose assessment calculation to determine protective action recommendations (PARs).
- n. Review current plant status and determine operating conditions which may affect or have caused the situation.
- o. Initiate actions to recover from the radiological incident.
  - 1. Contact Radiation Protection to determine the course of action to take to minimize radiation dose to the plant staff and the public.
- p. IF normal access has been restricted,  
THEN make an announcement when normal access is restored to the affected area.

#### 6.3.2 Radiation Protection personnel:

Investigate the high airborne activity areas and perform the following as necessary:

- a. Radiological surveys of the affected and adjacent areas
- b. Verify area radiation monitor alarms
- c. Establish radiological boundaries
- d. Determine the source of airborne activity
- e. Inform the Shift Manager of survey results and discuss actions to reduce airborne radioactivity
- f. Inform plant personnel of radiological conditions
- g. Contact the On Call Manager - Radiation Protection, explain the radiological incident and request their presence at the plant to help determine the course of action. Request additional Radiation Protection personnel, if needed.
- h. Coordinate with the Shift Manager to determine course of action to take to minimize radiation dose when recovering from the radiological incident. The following items should be considered:
  - What are the offsite dose consequences?
  - What are the dose consequences if the radiological incident continues both to the plant staff and the public?
  - What are the dose consequences to the personnel attempting to fix the problem?
  - Can the normal work control process be used to fix the problem?

- i. Provide coverage for personnel entering airborne radioactivity areas.
- j. Consider suspending those RWP's which allow access to the areas involved.
- k. Supervise the decontamination of personnel.
- l. Supervise the decontamination of areas or equipment.
- m. Inform the Shift Manager of changes in the radiological conditions of the affected areas.
- n. Perform an assessment on the radiological release and provide this information to the Shift Manager.

#### 6.4 Radioactive Material Spill

##### 6.4.1 Shift Manager shall perform the following as necessary:

NOTE 6.4.1.a

Operations personnel who are instrument qualified may perform radiation surveys of the affected areas using portable radiation monitoring equipment.

- a. Direct Radiation Protection personnel to investigate the incident and conduct radiological surveys.
- b. REFER TO DB-OP-06412, Process and Area Radiation Monitors, and verify automatic or manual actions associated with alarming area radiation monitors or process radiation monitors are correct.
- c. Consider evacuation of affected areas, and take actions to prevent access.
- d. IF the decision has been made to evacuate the affected area, THEN sound the Containment Evacuation Alarm, AND make an announcement such as:

"Attention all personnel."

"Attention all personnel."

"Evacuate the \_\_\_\_\_ Area and report to the Radiological Restricted Area Access Control Point. Notify your supervisor. Avoid the \_\_\_\_\_ Area."

"Evacuate the \_\_\_\_\_ Area and report to the Radiological Restricted Area Access Control Point. Notify your supervisor. Avoid the \_\_\_\_\_ Area."

- e. IF containment evacuation is necessary,  
THEN REFER TO RA-EP-02864, Containment Evacuation.
- f. IF the spill results in abnormal airborne radioactivity levels,  
THEN REFER TO Subsection 6.3, Abnormal or Unknown Airborne Radioactivity.
- g. REFER TO RA-EP-01500, Emergency Classification, and evaluate radiation levels for emergency classification.
- h. Review current plant status and determine operating conditions which may affect or have caused the situation.
- i. Initiate actions necessary to contain, and stop the spill.
  - 1. Contact Radiation Protection to determine the course of action to take to minimize radiation dose to the plant staff and the public.
- j. Make an announcement when normal access is restored to the affected area.

#### 6.4.2 Radiation Protection personnel:

Investigate the area of the radioactive spill and perform the following as necessary:

- a. Radiological surveys
- b. Verify area radiation monitor alarms
- c. Establish radiological boundaries
- d. Determine the source of the spilled radioactive material
- e. Take steps in order to contain or reduce the spill
- f. Inform plant personnel of radiological conditions
- g. Contact the On Call Manager - Radiation Protection, explain the radiological incident and request their presence at the plant to help determine the course of action. Request additional Radiation Protection personnel, if needed.
- h. Coordinate with the Shift Manager to determine course of action to take to minimize radiation dose when recovering from the radiological incident. The following items should be considered:
  - What are the offsite dose consequences?
  - What are the dose consequences if the radiological incident continues both to the plant staff and the public?
  - What are the dose consequences to the personnel attempting to fix the problem?
  - Can the normal work control process be used to fix the problem?

- i. Provide coverage for personnel entering the affected area.
- j. Consider suspending those RWPs which would allow access to the areas involved.
- k. Inform the Shift Manager of survey results and discuss actions to contain or reduce the spill.
- l. Supervise the decontamination of personnel.
- m. Supervise the decontamination of equipment.
- n. Inform the Shift Manager of changes in the radiological conditions of the affected areas.

#### 7.0 FINAL CONDITIONS

The radiological incident is under control as determined by the Shift Manager.

#### 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:

8.2.1 None



COMMITMENTS

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Step NumberReferenceComments

P00243

Inadvertant Draining of Reactor Vessel to  
Suppression Pool at BWRs