

February 13, 2002

Enclosed per your request is the current "Controlled" copy of EP-101 from Fermi 2. Please note that the colored pages were copied in black & white also per your request. If you have any questions, please feel free to contact me @ 734.586.4338 or laubensteins@dteenergy.com. Thank you!

Sharon Laubenstein

A045-

CLASSIFICATION OF EMERGENCIES

Revision Summary

- 1) Deleted commitments throughout Section 4.0.
- 2) Added "using nuclide analysis method" to EAL #1 of AA1 in Enclosure A, Tab A.
- 3) Added 15 minute duration qualifier to EAL #1 of HA2 in Enclosure A, Tab H.
- 4) Added EAL #4 for a confirmed credible site-specific security threat notification to HU4 in Enclosure A, Tab H.
- 5) Revised HG1 to reflect intent of EALs as being loss of physical control of facility in Enclosure A, Tab H, and Enclosure B, Tab H.
- 6) Changed Nuclear Shift Supervisor (NSS) to Shift Manager (SM) in Enclosure A, Tabs H and S.

Implementation Plan

- 1) This revision goes into effect upon issuance and upon completion of all implementation requirements for LCR 01-014-REP.

Attachments - None

Enclosures

A	Emergency Action Levels
121101	Tab A Recognition Category A - Abnormal Rad Levels/Radiological Effluent
120100	Tab F Recognition Category F - Fission Product Barrier Degradation
121101	Tab H Recognition Category H - Hazards and Other Conditions Affecting Plant Safety
121101	Tab S Recognition Category S - System Malfunctions

B	Initiating Condition Matrix
121101	Tab A Abnormal Rad Levels/Radiological Effluent
121101	Tab F Fission Product Barrier Degradation
121101	Tab H Hazards and other Conditions Affecting Plant Safety
121101	Tab S System Malfunction

CONTROLLED

Information and Procedures				
DSN EP-101	Revision 27	DCR # 01-1987	DTC TPEPT	File # 1703.10
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1.0 PURPOSE

To provide a guide for identifying initiating conditions for proper classification of emergencies.

2.0 USE REFERENCES

2.1 29.100.01, Sheet 1, RPV Control

29.100.01, Sheet 1A, RPV Control - ATWS

2.2 29.100.01, Sheet 2, Primary Containment Control

2.3 29.100.01, Sheet 3, Emergency Depressurization, Steam Cooling, RPV and PC Flooding

29.100.01, Sheet 3A, Emergency Depressurization, Steam Cooling, RPV and PC Flooding - ATWS

2.4 29.100.01, Sheet 4, Primary Containment H₂/O₂ Control

2.5 29.100.01, Sheet 5, Secondary Containment and Rad Release

2.6 29.100.01, Sheet 6, Curves, Cautions, and Tables

3.0 ENTRY CONDITIONS

3.1 Conditions exist that require use of Abnormal Operating Procedures, Emergency Operating Procedures, or entry into a Technical Specification Limiting Condition for Operation.

and

3.2 Conditions exist that may require classification in accordance with the emergency action levels in Enclosure A.

4.0 GENERAL INFORMATION

4.1 Detailed emergency action levels are listed for each initiating condition under each category of events in Enclosure A. Categories and conditions are summarized in a matrix format in Enclosure B.

4.2 The following is a list of event categories by tab in Enclosure A

- | | | |
|-------|-------|---|
| 4.2.1 | Tab A | Abnormal Rad Levels/Radiological Effluent |
| 4.2.2 | Tab F | Fission Product Barrier Degradation |
| 4.2.3 | Tab H | Hazards and Other Conditions Affecting Plant Safety |
| 4.2.4 | Tab S | System Malfunctions |

4.3 **Control Room Chain of Command**

4.3.1 The **Shift Manager** shall:

1. Perform initial evaluation of any abnormal or emergency situation.
2. Ensure the appropriate actions of applicable Abnormal and Emergency Operating Procedures are performed.
3. Ensure a determination is made of:
 - a. Magnitude of the emergency conditions
 - b. Whether or not a potential hazard exists to the health and safety of site personnel or the general public
4. Classify the emergency condition using the initiating conditions and emergency action levels of Enclosure A.
5. Assume the position of Emergency Director until properly relieved or until the emergency is terminated.
6. Continue to evaluate the emergency condition and make classification recommendations to the Emergency Director in the Technical Support Center (TSC) when the TSC is functional.

4.3.2 The **Control Room Supervisor** shall assume the responsibilities of the Shift Manager if the he/she is absent or incapacitated.

4.4 The **Emergency Director (Plant Manager/alternate)** shall:

- 4.4.1 Evaluate and assess the emergency condition.

4.4.2 Perform the following actions:

1. Classify/reclassify the emergency.
2. Authorize emergency response personnel to exceed radiation exposure limits delineated in 10 CFR 20, if required.
3. Augment the Emergency Response Organization as appropriate for the severity of the emergency
4. Recommend protective actions to offsite authorities when appropriate

4.5 **Emergency Class Definitions**

- 4.5.1 Unusual Event - Events are in process or have occurred that indicate a potential degradation of the level of safety of the plant. No release of radioactive material requiring offsite response or monitoring is expected.
- 4.5.2 Alert - Events are in process or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the Environmental Protection Agency (EPA) Protection Action Guidelines exposure levels.
- 4.5.3 Site Area Emergency - Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public. Any releases are not expected to exceed Environmental Protection Agency (EPA) Protection Action Guidelines exposure levels except at or near the site boundary.
- 4.5.4 General Emergency - Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed Environmental Protection Agency (EPA) Protection Action Guidelines exposure levels offsite for more than the immediate site area.

5.0 **IMMEDIATE ACTIONS - None**

6.0 PROCEDURE

6.1 The Emergency Director shall:

- 6.1.1 Verify initial emergency indications (such as an alarm or surveillance report) by such means as:
 - 1. Comparison with redundant instrument channels
 - 2. Comparison with other related plant parameters
 - 3. Physical observations
 - 4. Field measurements
- 6.1.2 Determine appropriate emergency classification by comparing verified plant conditions with the initiating conditions identified in Enclosure A or B, and the emergency action levels in Enclosure A.
- 6.1.3 Take actions in accordance with:
 - 1. EP-102, "Unusual Event"
 - 2. EP-103, "Alert"
 - 3. EP-104, "Site Area Emergency"
 - 4. EP-105, "General Emergency"

7.0 FOLLOW-UP ACTIONS

- 7.1 Continually assess the emergency situation. As necessary, upgrade, de-escalate, or terminate the emergency classification as more definitive information becomes available, and/or if plant conditions change.
 - 7.1.1 Eliminating one or more of the conditions constituting an event classification does not necessarily ensure the event can be de-escalated or terminated.
 - 7.1.2 Use EP-102, EP-103, EP-104, and EP-105 for criteria on de-escalation and termination of the emergency.
- 7.2 Continue to perform this procedure until event is terminated.

8.0 RECORDS

There are no required records generated through the performance of this procedure.

END OF TEXT

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

UNUSUAL EVENT

AU1 Any Unplanned Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds Two Times the Values of ODCM Control 3.11.2.1 or 3.11.1.1 for 60 Minutes or Longer

OPERATING MODE APPLICABILITY: All

Emergency Action Levels:

1. Note: If a valid monitor reading indicates a release of radioactivity that may be in excess of 2 times the ODCM Control value for greater than 60 minutes, and it is not confirmed by sample analysis within that time, then the declaration must be based on the valid monitor reading. Confirmatory sample and analysis in response to reaching AU1 monitor EAL value is done for the purpose of both confirming the existence of the uncontrolled condition (AU1/AA1) and also to verify that there is no radiological hazard (AS1/AG1).

A valid monitor reading from the table below which exceeds the corresponding value may indicate a release in excess of 2 times the ODCM Control 3.11.2.1 or 3.11.1.1 value, and warrants immediate confirmation by sampling and analysis in accordance with ODCM methodology or by performing dose assessment using nuclide analysis method.

Effluent Monitor	Channel	Reading
RB SPING	5	4.6E-3 $\mu\text{Ci/cc}$
SGTS I SPING	7	5.3E-2 $\mu\text{Ci/cc}$
SGTS II SPING	7	4.6E-2 $\mu\text{Ci/cc}$
RW SPING	5	4.9E-3 $\mu\text{Ci/cc}$
TB SPING	5	3.3E-4 $\mu\text{Ci/cc}$
CW Decant	N/A	2600 cpm

2. Valid projection of Actual Dose indicates a dose rate in excess of 0.1 mRem/hr TEDE at the site boundary using computerized dose assessment by nuclide analysis method, with the condition sustained for a duration of 60 minutes or greater
3. Valid sample analysis of gaseous or liquid effluent release using ODCM methodology indicates a release rate or concentration in excess of 2 times the ODCM Control 3.11.2.1 or 3.11.1.1 value, with the condition sustained for a duration of 60 minutes or greater

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

ALERT

AA1 Any Unplanned Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds 200 Times the Values of ODCM Control 3.11.2.1 or 3.11.1.1 for 15 Minutes or Longer

OPERATING MODE APPLICABILITY: All

Emergency Action Levels:

1. **Note:** If a valid monitor reading indicates a release of radioactivity that may be in excess of 200 times the ODCM Control value for greater than 15 minutes, and it is not confirmed by **sample analysis** within that time, then the declaration must be based on the valid monitor reading. Confirmatory sample and analysis in response to reaching AA1 monitor EAL value is done for the purpose of both confirming the existence of the **uncontrolled condition** (AU1/AA1) and also to verify that there is no **radiological hazard** (AS1/AG1).

A valid monitor reading from the table below which exceeds the corresponding value may indicate a release in excess of 200 times the ODCM Control 3.11.2.1 or 3.11.1.1 value, and warrants immediate confirmation by sampling and analysis in accordance with ODCM methodology or by performing dose assessment using nuclide analysis method.

Effluent Monitor	Channel	Reading
Div I AXM	4	5.3 $\mu\text{Ci/cc}$
Div II AXM	4	4.6 $\mu\text{Ci/cc}$
CW Decant	N/A	2.6E5 cpm

2. Valid projection of Actual Dose indicates a dose rate in excess of 10 mRem/hr TEDE at the site boundary using computerized dose assessment by nuclide analysis method, with the condition sustained for a duration of 15 minutes or greater
3. Valid sample analysis of gaseous or liquid effluent release using ODCM methodology indicates a release rate or concentration in excess of 200 times the ODCM Control 3.11.2.1 or 3.11.1.1 value, with the condition sustained for a duration of 15 minutes or greater

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

SITE AREA EMERGENCY

AS1 Site Boundary Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 100 mrem TEDE or 500 mrem Adult Thyroid for the Actual or Projected Duration of the Release

OPERATING MODE APPLICABILITY: All

Emergency Action Levels:

1. **Note:** If a valid monitor reading indicates a release of radioactivity that may result in a Site Boundary Doses in excess of 100 mrem TEDE or 500 mrem Adult Thyroid for greater than 15 minutes, and it is not confirmed by sample analysis or dose projection within that time, then the declaration must be based on the valid monitor reading.

A valid monitor reading of greater than 80 $\mu\text{Ci/cc}$ on SGTS DIV I/II AXM, Channel 3, may indicate a release resulting in Site Boundary Dose Rates in excess of 100 mrem/hr TEDE or 500 mrem/hr Adult Thyroid, and warrants immediate confirmation by sampling and analysis in accordance with ODCM methodology or by performing dose assessment.

2. Valid projection of Actual **or** Potential Dose indicates a dose in excess of 100 mrem TEDE or 500 mrem Adult Thyroid at the Site Boundary for the projected duration of the release
3. Site Boundary Dose Rate measurements in excess of 100 mrem/hr expected to continue for more than one hour; **or** a sample analysis indicating a combined radioiodine concentration in excess of 20 DAC expected to continue for more than one hour

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

GENERAL EMERGENCY

AG1 Site Boundary Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 1000 mrem TEDE or 5000 mrem Adult Thyroid for the Actual or Projected Duration of the Release Using Actual Meteorology

OPERATING MODE APPLICABILITY: All

Emergency Action Levels:

1. **Note:** If a valid monitor reading indicates a release of radioactivity that may result in Site Boundary Doses in excess of 1000 mrem TEDE or 5000 mrem Adult Thyroid for greater than 15 minutes, and it is not confirmed by dose projection within that time, then the declaration must be based on the valid monitor reading.

A valid monitor reading of greater than 800 $\mu\text{Ci/cc}$ on SGTS DIV I/II AXM, Channel 3, may indicate a release resulting in Site Boundary Dose Rates in excess of 1000 mRem/hr TEDE or 5000 mRem/hr Adult Thyroid, and warrants immediate confirmation by sampling and analysis in accordance with ODCM methodology or by performing dose assessment.

2. Valid projection of Actual or Potential Dose indicates a dose in excess of 1000 mrem TEDE or 5000 mrem Adult Thyroid for the projected duration of the release
3. Site Boundary Dose Rate measurements in excess of 1000 mrem/hr expected to continue for more than one hour; or a sample analysis indicating a combined radioiodine concentration in excess of 200 DAC expected to continue for more than one hour

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

UNUSUAL EVENT

AU2 Unexpected Increase of Plant Radiation Levels

OPERATING MODE APPLICABILITY: All

Emergency Action Levels:

1. **Uncontrolled** water level decrease in the reactor refueling cavity with level at 619 inches and lowering by Floodup Level Indicator **or** 20 feet and lowering by visual indication, with all irradiated fuel assemblies remaining covered by water
2. **Uncontrolled** water level decrease in the spent fuel storage pool with level at 21.5 feet and lowering by visual indication, with all irradiated fuel assemblies remaining covered by water
3. Valid direct Area Radiation Monitor readings which exceed the Maximum Normal Operating Level of 29.100.01, Sheet 5, Table 14, inside secondary containment, **or** which have increased by a factor of 1000 over normal* levels in other areas of the plant

* Normal levels can be considered as the highest reading in the past twenty-four hours excluding the current peak value

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

ALERT

AA2 Major Damage to Irradiated Fuel or Loss of Water Level That Has or Will Result in the Uncovering of Irradiated Fuel Outside the Reactor Vessel

OPERATING MODE APPLICABILITY: All

Emergency Action Levels:

1. An unplanned valid alarm of ARM Channel 18, Refuel Area High Radiation Monitor, reading ≥ 1000 mR/hr
2. An unplanned valid alarm of ARM Channels 15 and 17, Fuel Storage Pool and Refuel Area Low Range Radiation Monitors, and a valid trip of the Fuel Pool Area Ventilation Exhaust Radiation Monitor indicated by Annunciator 3D35, DIV I/II FP VENT EXH RADN MONITOR UPSCALE TRIP
3. Report of visual indication of irradiated fuel uncovered
4. Spent Fuel Pool Water Level below the bottom of the Spent Fuel Pool Gates and lowering indicating a loss of inventory which will result in uncovering irradiated fuel

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

ALERT

AA3 Releases of Radioactive Material or Increases in Radiation Levels Within the Facility That Impede Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Cold Shutdown

OPERATING MODE APPLICABILITY: All

Emergency Action Levels:

1. Valid reading on ARM Channel 6, Control Room Direct Area Radiation Monitor, GREATER THAN 15 mR/hr
2. Valid, unplanned, direct Area Radiation Monitor readings which exceed the Maximum Safe Operating Level of 29.100.01, Sheet 5, Table 14

FISSION PRODUCT BARRIER DEGRADATION

OPERATING MODE APPLICABILITY: 1, 2, 3

UNUSUAL EVENT

FU1 Any Loss or Any Potential Loss of Primary Containment

ALERT

FA1 Any Loss or Any Potential Loss of Either Fuel Clad or Reactor Coolant System

SITE AREA EMERGENCY

FS1 Loss or Potential Loss of Any Two Barriers

GENERAL EMERGENCY

FG1 Loss of Any Two Barriers and Potential Loss of Third Barrier

FUEL CLAD BARRIER EALS

LOSS

1. RPV Water Level

RPV Water Level less than -40 inches

2. Containment Radiation

CHRRM reading greater than 2,500 R/hr

3. Primary Coolant Activity Level

Primary coolant activity level greater than 300 $\mu\text{Ci/gm}$ DE I-131 (see SU4 also)

4. Determination of release of at Least 5% of the Gap Activity from the Fuel

5. Emergency Director Judgment

Any condition in the judgment of the Emergency Director that indicates Loss of the Fuel Clad Barrier

POTENTIAL LOSS

1. RPV Water Level

RPV Water Level less than 0 inches

5. Emergency Director Judgment

Any condition in the judgment of the Emergency Director that indicates a Potential Loss of the Fuel Clad Barrier

REACTOR COOLANT BARRIER EALS

LOSS

1. **RPV Water Level**

RPV Water Level less than
0 inches

3. **Drywell Pressure**

Drywell pressure greater than 1.68 psig

4. **Containment Radiation**

CHRRM reading greater than 5 R/hr two
minutes after reactor shutdown or beyond

5. **Emergency Director Judgment**

Any condition in the judgment of the
Emergency Director that indicates Loss of the
Reactor Coolant Barrier

POTENTIAL LOSS

2. **Reactor Coolant Leak Rate***

Reactor Coolant unidentified leakage greater
than 50 gpm inside the Drywell,

or

Unisolable Primary System leakage outside
Drywell as indicated by isolation mimic, **or**
exceeding a maximum safe operating
Secondary Containment temperature or
radiation level of 29.100.01, Sheet 5, Table
12 **or** 14 (see SU5 and SA6 also)

5. **Emergency Director Judgment**

Any condition in the judgment of the
Emergency Director that indicates a
Potential Loss of the Reactor Coolant
Barrier

* Stuck open SRV is not a Reactor Coolant Barrier loss or potential loss unless there is a concurrent loss of the Fuel Clad Barrier, in which case the stuck open SRV constitutes a potential loss of the Reactor Coolant Barrier (FS1 applies).

PRIMARY CONTAINMENT BARRIER EALS

LOSS

POTENTIAL LOSS**

- | | |
|--|--|
| <p>2. Containment Isolation Valve Status After Containment Isolation</p> <p>Failure of both valves in any one line to close and downstream pathway to the environment exists, or</p> <p>Containment venting requiring trip defeat per EOPs, or</p> <p>Unisolable Primary System leakage outside Drywell as indicated by isolation mimic, or exceeding a Secondary Containment maximum safe operating temperature or radiation level of 29.100.01, Sheet 5, Table 12 or 14 (see SA6 also)</p> <p>3. Drywell Pressure</p> <p>Rapid unexplained decrease following initial increase, or</p> <p>Drywell Pressure response not consistent with LOCA conditions</p> <p>6. Emergency Director Judgment</p> <p>Any condition in the judgment of the Emergency Director that indicates Loss of the Containment Barrier</p> | <p>1. RPV Water Level*</p> <p>RPV Water Level less than -40 inches or unknown AND Maximum Core Uncovery Time Limit (MCUTL) of 29.100.01, Sheet 6, is exceeded</p> <p>3. Containment Pressure or Gas Mix</p> <p>Torus Pressure cannot be maintained below the Primary Containment Pressure Limit, or</p> <p>Drywell or Torus Hydrogen concentration $\geq 6\%$ and Drywell or Torus Oxygen concentration $> 5\%$</p> <p>4. Containment Radiation</p> <p>CHRRM reading greater than 10,000R/hr</p> <p>5. Determination of release of at least 20% Gap activity from the fuel</p> <p>6. Emergency Director Judgment</p> <p>Any condition in the judgment of the Emergency Director that indicates a Potential Loss of the Containment Barrier</p> |
|--|--|

* It is not a prerequisite to be in the section of the EOPs where MCUTL is tracked (RPV Flooding) to apply this EAL. The intent is based on the assurance of adequate core cooling and therefore MCUTL must be calculated for the EAL, possibly independent of EOP use. For the EAL, MCUTL starts when RPV level is less than -40 inches or unknown. Also, the MCUTL curve can be extrapolated to a value of 2.35 minutes at 10 minutes after shutdown.

** Primary Containment Barrier Potential Loss EALs 1 - 5 are indicative of conditions warranting a General Emergency declaration.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

UNUSUAL EVENT

HU1 Natural and Destructive Phenomena Affecting the Protected Area

OPERATING MODE APPLICABILITY: All

Emergency Action Levels:

1. Seismic monitor indicates earthquake greater than 0.01g
2. Report by plant personnel of tornado striking within protected area boundary
3. Vehicle crash into plant structures or systems within protected area boundary
4. Report by plant personnel of an unanticipated explosion within protected area boundary resulting in visible damage to permanent structure or equipment
5. Report of turbine failure resulting in casing penetration or damage to turbine or generator seals
6. Sustained winds greater than 75 mph as measured at the 10 m or 60 m elevations on the meteorological tower
7. External flooding indicated by wave crests exceeding the top of the shore barrier
8. Internal flooding in the Auxiliary Building, Reactor Building, or RHR Complex that has the potential to affect the operation of safe shutdown equipment
9. Assessment by the Control Room that a destructive event affecting the protected area has occurred

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

ALERT

HA1 Natural and Destructive Phenomena Affecting the Plant Vital Area

OPERATING MODE APPLICABILITY: All

Emergency Action Levels:

1. Seismic monitor indicates seismic event greater than 0.08 g
2. Report by plant personnel of tornado striking Reactor Building, Auxiliary Building, or RHR Complex
3. Any occurrence that results in visible damage to the Reactor Building, Auxiliary Building, or RHR Complex
4. Control Room indications which in the judgment of Control Room personnel reflect damage to the Reactor Building, Auxiliary Building, or RHR Complex
5. Vehicle crash affecting the Reactor Building, Auxiliary Building, or RHR Complex
6. Turbine failure generated missiles result in any visible structural damage to or penetration of the Reactor Building, Auxiliary Building, or RHR Complex
7. Sustained winds greater than 90 mph as measured at the 10 m or 60 m elevations on the meteorological tower
8. Flooding from internal or external sources that has affected the operation of safe shutdown equipment in the Reactor Building, Auxiliary Building, or RHR Complex

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

UNUSUAL EVENT

HU2 Fire Within Protected Area Boundary Not Extinguished Within 15 Minutes of Detection

OPERATING MODE APPLICABILITY: All

Emergency Action Level:

1. Fire in the Auxiliary Building, Reactor Building, Control Center, Turbine Building, Radwaste Building, or RHR Complex not extinguished within 15 minutes of Control Room notification or verification of a control room alarm

NOTE: If a Control Room Fire Alarm is verified, the 15 minute period starts at the time that the Control Room Fire Alarm was received.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

ALERT

HA2 Fire or Explosion Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown

OPERATING MODE APPLICABILITY: All

Emergency Action Level:

1. Fire not extinguished within 15 minutes of Control Room notification or verification of a Control Room alarm or explosion in any of the following areas:

- Reactor Building
- Auxiliary Building
- Control Center
- RHR Complex

and

Affected system parameter indications show degraded performance or plant personnel report visible damage to permanent structures or equipment within the specified area

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

UNUSUAL EVENT

HU3 Release of Toxic or Flammable Gases Deemed Detrimental to Safe Operation of the Plant

OPERATING MODE APPLICABILITY: All

NOTE (1): Potential sources of offsite toxic releases include, but are not limited to:

1. Berlin Water Treatment Plant
1.5 miles North Northwest (Sector R, 330°)
600 pounds of chlorine gas
2. Meijer Distribution Center
3.8 miles Northwest (Sector Q, 315°)
22,000 pounds of anhydrous ammonia

NOTE (2): Fire suppression gases are not considered toxic for the purpose of this EAL.

NOTE (3): The HAZWOPER Plan may be used for additional reference.

Emergency Action Levels:

1. Report or detection of toxic or flammable gases that could enter within the site area boundary in amounts that can affect normal operation of the plant
2. Report by Local, County or State Officials for potential evacuation of site personnel based on offsite event

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

ALERT

HA3 Release of Toxic or Flammable Gases Within a Facility Structure Which Jeopardizes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Cold Shutdown

OPERATING MODE APPLICABILITY: All

NOTE (1): Fire suppression gases are not considered toxic for the purpose of this EAL.

NOTE (2): The HAZWOPER Plan may be used for additional reference.

Emergency Action Levels:

1. Report or detection of toxic gases within a facility structure in concentrations that will be life threatening to plant personnel
2. Report or detection of flammable gases within a facility structure in concentrations that will affect the safe operation of the plant

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

UNUSUAL EVENT

HU4 Confirmed Security Event Which Indicates a Potential Degradation in the Level of Safety of the Plant

OPERATING MODE APPLICABILITY: All

Emergency Action Levels:

1. Attempted unauthorized entry into the protected area
2. Attempted sabotage within the protected area
3. Internal disturbance within the protected area not brought under immediate control or presenting an unknown threat
4. A confirmed credible site-specific security threat notification

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

ALERT

HA4 Security Event in a Plant Protected Area

OPERATING MODE APPLICABILITY: All

Emergency Action Levels:

1. Explosive device discovered within the plant protected area but outside the plant vital areas
2. Intrusion into plant protected area by a hostile force
3. Confirmed act of sabotage within the plant protected area

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

SITE AREA EMERGENCY

HS1 Security Event in a Plant Vital Area

OPERATING MODE APPLICABILITY: All

Emergency Action Levels:

1. Explosive device discovered in a plant vital area
2. Intrusion into a plant vital area by a hostile force
3. Confirmed act of sabotage within a plant vital area

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

GENERAL EMERGENCY

HG1 Security Event Resulting in Loss of Physical Control of Facility

OPERATING MODE APPLICABILITY: All

Emergency Action Levels:

1. Loss of physical control of the Control Room due to security event
2. Loss of physical control of remote shutdown capability due to security event

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

ALERT

HA5 Control Room Evacuation has been Initiated

OPERATING MODE APPLICABILITY: All

Emergency Action Level:

1. Evacuation of the Control Room ordered by the Shift Manager (SM).

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

SITE AREA EMERGENCY

HS2 Control Room Evacuation has been Initiated and Plant Control Cannot be Established

OPERATING MODE APPLICABILITY: All

Emergency Action Level:

1. Control Room evacuation has been initiated

and

Control of RPV level and pressure cannot be established per 20.000.18 or 20.000.19 within 15 minutes

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

UNUSUAL EVENT

**HU5 Other Conditions Existing Which in the Judgment of the Emergency Director
Warrant Declaration of an Unusual Event**

OPERATING MODE APPLICABILITY: All

Example Emergency Action Level:

1. Other conditions exist which in the judgment of the Emergency Director indicate a potential degradation of the level of safety of the plant. No release of radioactive material requiring offsite response or monitoring is expected.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

ALERT

**HA6 Other Conditions Existing Which in the Judgment of the Emergency Director
Warrant Declaration of an Alert**

OPERATING MODE APPLICABILITY: All

Emergency Action Level:

1. Other conditions exist which in the judgment of the Emergency Director indicate that an actual or potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the EPA Protective Action Guidelines (PAG) exposure levels.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

SITE AREA EMERGENCY

**HS3 Other Conditions Existing Which in the Judgment of the Emergency Director
Warrant Declaration of a Site Area Emergency**

OPERATING MODE APPLICABILITY: All

Emergency Action Level:

1. Other conditions exist which in the judgment of the Emergency Director indicate actual or likely major failures of plant functions needed for protection of the public. Any releases are not expected to exceed EPA Protective Action Guidelines (PAG) exposure levels except near the site boundary.

HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

GENERAL EMERGENCY

HG2 Other Conditions Existing Which in the Judgment of the Emergency Director Warrant Declaration of General Emergency

OPERATING MODE APPLICABILITY: All

Emergency Action Level:

1. Other conditions exist which in the judgment of the Emergency Director indicate: actual or imminent substantial core degradation or melting with potential for loss of containment. **or** potential for uncontrolled radionuclide releases which can reasonably be expected to exceed EPA PAG plume exposure levels outside the site boundary

SYSTEM MALFUNCTIONS

UNUSUAL EVENT

SU1 Loss of All Offsite Power to Essential Busses for Greater Than 15 Minutes

OPERATING MODE APPLICABILITY: All

Emergency Action Level:

1. Loss of power to System Service Transformers 64 and 65 for greater than 15 minutes

and

Emergency Diesel Generators are supplying power to all Div. 1 and Div. 2 emergency busses

SYSTEM MALFUNCTIONS

ALERT

SA1 Loss of all Offsite Power and Loss of all Onsite AC Power to Essential Busses During Cold Shutdown or Refueling Mode

OPERATING MODE APPLICABILITY: 4, 5, defueled

Emergency Action Level:

1. The following conditions exist for the **required** AC Power Distribution Source:
 - a. Loss of power to System Service Transformers 64 or 65

and
 - b. Failure of Emergency Diesel Generators to supply power to the required division
of emergency busses

and
 - c. Failure to restore power to at least one required division of busses within
15 minutes from the time of loss of both offsite and onsite AC power sources

SYSTEM MALFUNCTIONS

ALERT

SA5 AC Power Capability to Essential Busses Reduced to a Single Power Source for Greater Than 15 Minutes Such That Any Additional Single Failure Would Result in Station Blackout

OPERATING MODE APPLICABILITY: 1, 2, 3

Emergency Action Levels:

1. Loss of Power to System Service 64 and 65 transformers for greater than 15 minutes

and

Onsite ESF power capability has been degraded to one full division of emergency busses

2. Loss of ability to power Div. 1 and Div. 2 emergency busses from Emergency Diesel Generators for greater than 15 minutes

and

Loss of power to System Service Transformer 64 or 65

SYSTEM MALFUNCTIONS

SITE AREA EMERGENCY

SS1 Loss of all Offsite Power and Loss of all Onsite AC Power to Essential Busses

OPERATING MODE APPLICABILITY: 1, 2, 3

Emergency Action Levels:

1. Loss of power to System Service Transformers 64 and 65

and

Failure of Emergency Diesel Generators to supply power to one full division of emergency busses

and

Failure to restore power to at least one division of emergency busses within 15 minutes from the time of loss of both offsite and onsite AC power

SYSTEM MALFUNCTIONS

GENERAL EMERGENCY

SG1 Prolonged Loss of all Offsite Power and Prolonged Loss of all Onsite AC Power

OPERATING MODE APPLICABILITY: 1, 2, 3

Emergency Action Level:

1. Loss of power to System Service Transformers 64 and 65

and

Failure of Emergency Diesel Generators to supply power to one full division of emergency busses

and

Restoration of at least one full division of emergency busses within 4 hours is **NOT** likely. **or** RPV water level less than 0 inches

SYSTEM MALFUNCTIONS

ALERT

SA2 Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Scram Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Scram Was Successful

OPERATING MODE APPLICABILITY: 1, 2

Emergency Action Level:

1. A valid initiating scram signal received. **but** no automatic scram occurred

and

Manual actions taken at COP H11-P603 were successful in scram of control rods to achieve reactor power < 3%

SYSTEM MALFUNCTIONS

SITE AREA EMERGENCY

SS2 Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Scram Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Scram Was NOT Successful

OPERATING MODE APPLICABILITY: 1, 2

Emergency Action Level:

1. A valid initiating scram signal received, **but** no automatic scram occurred

and

Manual actions taken at COP H11-P603 were **not** successful in scram of control rods to achieve reactor power < 3%

SYSTEM MALFUNCTIONS

GENERAL EMERGENCY

SG2 Failure of the Reactor Protection System to Complete an Automatic Scram and Manual Scram was NOT Successful and there is Indication of an Extreme Challenge to the Ability to Cool the Core

OPERATING MODE APPLICABILITY: 1, 2

Emergency Action Level:

1. A valid initiating scram signal received, **but** no automatic scram occurred

and

Manual actions taken at COP H11-P603 were **not** successful in scram of control rods to achieve reactor power $< 3\%$

and

Emergency depressurization is required by any Emergency Operating Procedure

SYSTEM MALFUNCTIONS

UNUSUAL EVENT

SU2 Inability to Reach Required Shutdown within Technical Specification Limits

OPERATING MODE APPLICABILITY: 1, 2, 3

Emergency Action Level:

1. Plant is not brought to required operating mode within Technical Specifications LCO
Action Statement Time

SYSTEM MALFUNCTIONS

UNUSUAL EVENT

SU3 Unplanned Loss of most or all Safety System Annunciation in the Control Room for Greater than 15 Minutes

OPERATING MODE APPLICABILITY: 1, 2, 3

Emergency Action Level:

1. Loss of most or all (greater than approximately 75%) annunciators on H11-P601, P602, and P603 for greater than 15 minutes

and

Compensatory non-alarming indications are available

and

In the opinion of the Shift Manager (SM), the loss of the annunciators requires increased surveillance to safely operate the plant

and

Annunciator loss does not result from planned action

SYSTEM MALFUNCTIONS

ALERT

SA4 **Unplanned Loss of most or all Safety System Annunciation in Control Room with Either (1) a Significant Transient in Progress, or (2) Compensatory Non-Alarming Indicators Unavailable**

OPERATING MODE APPLICABILITY: 1, 2, 3

Emergency Action Level:

1. Loss of most or all (greater than approximately 75%) annunciators on H11-P601, P602, and P603 for greater than 15 minutes

and

In the opinion of the Shift Manager (SM), the loss of the annunciators requires increased surveillance to safely operate the plant

and

Annunciator loss does not result from planned action

and

A significant plant transient is in progress, or

Compensatory non-alarming indications are unavailable

NOTE: Significant transients include:

1. Manual or automatic scrams
2. Runbacks involving greater than 25% thermal power change
3. ECCS injections
4. Thermal power oscillations of 10% or greater

SYSTEM MALFUNCTIONS

SITE AREA EMERGENCY

SS6 Inability to Monitor a Significant Transient in Progress

OPERATING MODE APPLICABILITY: 1, 2, 3

Emergency Action Level:

1. Loss of most or all (greater than approximately 75%) annunciators associated with H11-P601, P602, and P603

and

Compensatory non-alarming indications unavailable

and

Indications needed to monitor safety functions associated with lost annunciators unavailable

and

Significant transient in progress

NOTE: Significant transients include:

1. Manual or automatic scrams
2. Runbacks involving greater than 25% thermal power change
3. ECCS injections
4. Thermal power oscillations of 10% or greater

SYSTEM MALFUNCTIONS

UNUSUAL EVENT

SU4 Fuel Clad Degradation

OPERATING MODE APPLICABILITY: All

Emergency Action Levels:

1. Gross radioactivity rate of noble gases measured at the discharge of the 2.2 minute delay piping greater than 340 millicuries/sec after 30 minute delay
2. Reactor scram due to main steam line radiation greater than three times full power value as may be indicated by Annunciator 3D82
3. Dose Equivalent I-131 greater than 0.2 $\mu\text{Ci/gm}$ for more than 48 hours
4. Dose equivalent I-131 greater than 4.0 $\mu\text{Ci/gm}$

SYSTEM MALFUNCTIONS

UNUSUAL EVENT

SU5 RCS Leakage

OPERATING MODE APPLICABILITY: 1, 2, 3

Emergency Action Levels:

1. Unidentified or pressure boundary leakage greater than 10 gpm
2. Identified leakage greater than 25 gpm

SYSTEM MALFUNCTIONS

ALERT

SA6 Main Steam Line Break

OPERATING MODE APPLICABILITY: 1, 2, 3

Emergency Action Level:

1. Indication of Main Steam Line Break on Isolation Mimic

SYSTEM MALFUNCTIONS

UNUSUAL EVENT

SU6 Unplanned Loss of All Onsite or Offsite Communications Capabilities

OPERATING MODE APPLICABILITY: All

Emergency Action Levels:

1. Loss of **all** the following onsite communications capabilities affecting the ability to perform routine operations:

Administrative Telephones
Hi-Com
Plant radios

2. Loss of **all** the following offsite communications capabilities:

Administrative Telephones
Emergency Telephones

SYSTEM MALFUNCTIONS

UNUSUAL EVENT

**SU7 Unplanned Loss of Required DC Power During Cold Shutdown or Refueling Mode
for Greater than 15 Minutes**

OPERATING MODE APPLICABILITY: 4, 5

Emergency Action Level:

1. Loss of both Div. 1 **and** Div. 2 130V DC Systems as indicated by DC bus voltage less than:

Div 1: 112.2V DC

Div 2: 107.4V DC

and

Inability to restore voltage on either Div. 1 or Div. 2 130V DC bus within 15 minutes from discovery of loss

SYSTEM MALFUNCTIONS

SITE AREA EMERGENCY

SS3 Loss of All Vital DC Power

OPERATING MODE APPLICABILITY: 1, 2, 3

Emergency Action Level:

1. Loss of both Div. 1 **and** Div. 2 130V DC Systems as indicated by DC bus voltage less than:

Div 1: 112.2V DC

Div 2: 107.4V DC

and

Inability to restore voltage on either Div. 1 or Div. 2 130V DC bus within 15 minutes from discovery of loss

SYSTEM MALFUNCTIONS

ALERT

SA3 Inability to Maintain Plant in Cold Shutdown

OPERATING MODE APPLICABILITY: 4, 5

Emergency Action Level:

1. Div. 1 and Div. 2 of the RHR System are not effective in Decay Heat Removal

and

Reactor coolant temperature exceeds 200°F, **or**

Results in uncontrolled temperature rise approaching 200°F

SYSTEM MALFUNCTIONS

SITE AREA EMERGENCY

SS5 Loss of Water Level in the Reactor Vessel that has or will Uncover Fuel in the Reactor Vessel

OPERATING MODE APPLICABILITY: 4, 5

Emergency Action Level:

1. RPV water level cannot be kept above 0 inches

SYSTEM MALFUNCTIONS

SITE AREA EMERGENCY

SS4 Complete Loss of Function Needed to Achieve or Maintain Hot Shutdown

OPERATING MODE APPLICABILITY: 1, 2, 3

Emergency Action Level:

1. Any combination of events which would require the plant to be shutdown from normal operating pressure and temperature

and

Torus water temperature and RPV pressure cannot be kept below the Heat Capacity Limit (HCL)

INITIATING CONDITION MATRIX

TAB A

TAB A Abnormal Rad Levels/Radiological Effluent			
GENERAL EMERGENCY	AG1		
	Site boundary dose resulting from an actual or imminent release of gaseous radioactivity that exceeds 1000 mrem TEDE or 5000 mrem Adult Thyroid for the actual or projected duration of the release using actual meteorology		
SITE AREA EMERGENCY	All AS1	Pg A-4	
	Site boundary dose resulting from an actual or imminent release of gaseous radioactivity that exceeds 100 mrem TEDE or 500 mrem Adult Thyroid for the actual or projected duration of the release		
ALERT	All AA1	Pg A-3	
	Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds 200 times the values of ODCM control 3.11.2.1 or 3.11.1.1 for 15 minutes or longer	AA2 Major damage to irradiated fuel or loss of water level that has or will result in the uncovering of irradiated fuel outside the reactor vessel	AA3 Releases of radioactive material or increases in radiation levels within the facility that impede operation of systems required to maintain safe operations or to establish or maintain cold shutdown
	All Pg A-2	All Pg A-6	All Pg A-7
UNUSUAL EVENT	AU1	AU2	
	Any unplanned release of gaseous or liquid radioactivity to the environment that exceeds two times the values of ODCM control 3.11.2.1 or 3.11.1.1 for 60 minutes or longer	Unexpected increase of plant radiation levels	
	All Pg A-1	All Pg A-5	

INITIATING CONDITION MATRIX

TAB F

		TAB F Fission Product Barrier Degradation					
		Fuel Clad Barrier EALS		Reactor Coolant Barrier EALS		Primary Containment Barrier EALS	
GENERAL EMERGENCY	FG1 Loss of any two barriers and potential loss of third barrier						
SITE AREA EMERGENCY	1, 2, 3 FS1 Loss or potential loss of any two barriers						
ALERT	1, 2, 3 FA1 Any loss or any potential loss of either fuel clad or reactor coolant system						
UNUSUAL EVENT	1, 2, 3 FU1 Any loss or any potential loss of primary containment						

NOTE 1: Stuck open SRV is not a reactor coolant barrier loss or potential loss unless there is a concurrent loss of the fuel clad barrier, in which case the stuck open SRV constitutes a potential loss of the reactor coolant barrier (FS1 applies).

NOTE 2: It is not a prerequisite to be in the section of the EOPs where MCUTL is tracked (RPV flooding) to apply this EAL. The intent is based on the assurance of adequate core cooling and therefore MCUTL must be calculated for the EAL, possibly independent of EOP use. For the EAL, MCUTL starts when RPV level is less than - 40" or unknown. Also, the MCUTL curve can be extrapolated to a value of 2.35 minutes at 10 minutes after shutdown.

NOTE 3: Primary Containment Barrier Potential Loss EALS 1 - 5 are indicative of conditions warranting a General Emergency declaration.

INITIATING CONDITION MATRIX

TAB H

TAB H Hazards and Other Conditions Affecting Plant Safety						
GENERAL EMERGENCY				HG1		HG2
				Security event resulting in loss of physical control of the facility		Other conditions existing which in the judgement of the Emergency Director warrant declaration of General Emergency
SITE AREA EMERGENCY				All Pg H-10 HS1		All Pg H-16 HS3
				Security event in a Plant Vital Area		Control Room evacuation has been initiated and Plant control cannot be established
					Other conditions existing which in the judgement of the Emergency Director warrant declaration of a Site Area Emergency	
				All Pg H-9	All Pg H-12	All Pg H-15
ALERT	HA1	HA2	HA3	HA4	HA5	HA6
	Natural and destructive phenomena affecting the Plant Vital Area	Fire or explosion affecting the operability of Plant safety systems required to establish or maintain safe shutdown	Release of toxic or flammable gases within a facility structure which jeopardizes operation of systems required to maintain safe operations or to establish or maintain cold shutdown	Security event in a Plant Protected Area	Control Room evacuation has been initiated	Other conditions existing which in the judgement of the Emergency Director warrant declaration of an Alert
				All Pg H-8	All Pg H-11	All Pg H-14
UNUSUAL EVENT	HU1	HU2	HU3	HU4		HU5
	Natural and destructive phenomena affecting the Protected Area	Fire within Protected Area boundary not extinguished within 15 minutes of detection	Release of toxic or flammable gases deemed detrimental to safe operation of the Plant	Confirmed security event which indicates a potential degradation in the level of safety of the Plant		Other conditions existing which in the judgement of the Emergency Director warrant declaration of an Unusual Event
				All Pg H-7		All Pg H-13
				All Pg H-1	All Pg H-3	All Pg H-5

INITIATING CONDITION MATRIX

TAB S

TAB S System Malfunction																											
GENERAL EMERGENCY	SG1		SG2																								
	Prolonged loss of all offsite power and prolonged loss of all onsite AC power		Failure of the reactor protection system to complete an automatic scram and manual scram was NOT successful and there is indication of an extreme challenge to the ability to cool the core																								
SITE AREA EMERGENCY	1, 2, 3 SS1		Pg S-5		1, 2 SS2		Pg S-8		SS6		SS3		SS5		SS4												
	Loss of all offsite power and loss of all onsite AC power to essential busses		Failure of reactor protection system instrumentation to complete or initiate an automatic reactor scram once a reactor protection system setpoint has been exceeded and manual scram was NOT successful		Inability to monitor a significant transient in progress		Loss of all vital DC power		Loss of water level in the reactor vessel that has or will uncover fuel in the reactor vessel		Complete loss of function needed to achieve or maintain hot shutdown																
ALERT	1, 2, 3 SA1		Pg S-4		1, 2 SA2		Pg S-7		1, 2, 3 SA4		Pg S-12		1, 2, 3 SA6		Pg S-18		4, 5 SA3		Pg S-20		1, 2, 3 Pg S-21						
	Loss of all offsite power and loss of all onsite AC power to essential busses during cold shutdown or refueling mode		AC power capability to essential busses reduced to a single power source for greater than 15 minutes such that any additional single failure would result in station blackout		Failure of reactor protection system instrumentation to complete or initiate an automatic reactor scram once a reactor protection system setpoint has been exceeded and manual scram was successful		Unplanned loss of most or all safety system annunciation in Control Room with either (1) a significant transient in progress, or (2) compensatory non-alarming indicators unavailable		Main steam line break		Inability to maintain plant in cold shutdown																
UNUSUAL EVENT	4, 5, defueled SU1		Pg S-2		1, 2, 3 SU2		Pg S-3		1, 2 SU3		Pg S-6		1, 2, 3 SU4		Pg S-11		1, 2, 3 SU5		Pg S-15		1, 2, 3 SU6		Pg S-19				
	Loss of all offsite power to essential busses for greater than 15 minutes		Inability to reach required shutdown within Technical Specification limits		Unplanned loss of most or all safety system annunciation in the Control Room for greater than 15 minutes		Fuel clad degradation		RCS Leakage		Unplanned loss of all onsite or offsite communication capabilities		Unplanned loss of required DC power during cold shutdown or refueling mode for greater than 15 minutes														
All		Pg S-1		1, 2, 3		Pg S-9		1, 2, 3		Pg S-10		All		Pg S-13		1, 2, 3		Pg S-14		All		Pg S-16		4, 5		Pg S-17	

END

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