Nine Mile Point Unit 2 EAL Matrix

R – Abnorm. Rad Release / Rad Effluent

1 – Offsite Rad Conditions

General Emergency	Site Area Emergency	Alert	Unusual Event
RG1.1 (1 2 3 4 5 D) **ANY** monitor reading > Table R-1 "GE" column for ≥ 15 min. (Note 1) • Do **not** delay declaration awaiting dose assessment results • If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values (see EAL RG1.2)	**RS1.1** (1 2 3 4 5 D) **ANY** monitor reading > Table R-1 "SAE" column for ≥ 15 min. (Note 1) • Do **not** delay declaration awaiting dose assessment results • If dose assessment results are available, declaration should be based on dose assessment instead of radiation monitor values (see EAL RS1.2)	**RA1.1** (1 2 3 4 5 D) **ANY** gaseous monitor reading > Table R-1 "Alert" column for ≥ 15 min. (Note 2) **RA1.2** (1 2 3 4 5 D) **ANY** liquid monitor > Table R-1 "Alert" column for ≥ 15 min. (Note 2) **RA1.3** (1 2 3 4 5 D) Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 200 x ODCM limits for ≥ 15 min. (Note 2)	**RU1.1** (1 2 3 4 5 D) **ANY** gaseous monitors > Table R-1 "UE" column for ≥ 60 min. (Note 2) **RU1.2** (1 2 3 4 5 D) **ANY** liquid monitor reading > Table R-1 "UE" column for ≥ 60 min. (Note 2) **RU1.3** (1 2 3 4 5 D) Confirmed sample analyses for gaseous or liquid releases indicate concentrations or release rates > 2 x ODCM limits for ≥ 60 min. (Note 2)
RG1.2 (1 2 3 4 5 D) Dose assessment using actual meteorology indicates doses > 1,000 mRem TEDE or 5,000 mRem thyroid CDE at or beyond the SITE BOUNDARY	**RS1.2** (1 2 3 4 5 D) Dose assessment using actual meteorology indicates doses > 100 mRem TEDE or 500 mRem thyroid CDE at or beyond the SITE BOUNDARY	None	None
RG1.3 (1 2 3 4 5 D) Field survey results indicate closed window dose rates > 1,000 mRem/hr expected to continue for ≥ 60 min. at or beyond the SITE BOUNDARY (Note 1) **OR** Analyses of field survey samples indicate thyroid CDE > 5,000 mRem for 1 hr of inhalation at or beyond the SITE BOUNDARY (Note 1)	**RS1.3** (1 2 3 4 5 D) Field survey results indicate closed window dose rates > 100 mRem/hr expected to continue for ≥ 60 min. at or beyond the SITE BOUNDARY (Note 1) **OR** Analyses of field survey samples indicate thyroid CDE > 500 mRem for 1 hr of inhalation at or beyond the SITE BOUNDARY (Note 1)	None	None

2 – Onsite Rad Conditions & Spent Fuel Events

Table R-1 Effluent Monitor Classification Thresholds

	Monitor	GE	SAE	ALERT	UE
GASEOUS	Radwaste/RB Vent Effluent	5.5E+7 μCi/s	5.5E+6 μCi/s	200 x Alarm	2 x Alarm
GASEOUS	Main Stack Effluent	1.0E+10 μCi/s	1.0E+9 μCi/s	200 x Alarm	2 x Alarm
LIQUID	Service Water Effluent	N/A	N/A	200 x DRMS High (red)	2 x DRMS High (red)
LIQUID	Liquid RadWaste Effluent	N/A	N/A	N/A	2 x DRMS High (red)
LIQUID	Cooling Tower Blowdown	N/A	N/A	200 x DRMS High (red)	2 x DRMS High (red)

Alert

RA2.1 (1 2 3 4 5 D)
Alarm on **ANY** of the following radiation monitors due to damage to irradiated fuel or loss of water level:
- 2RMS-RE111
- 2RMS-RE112
- 2RMS-RE113
- 2RMS-RE114
- 2RMS-RE140
- 2HVR*RE14A
- 2HVR*RE14B

RA2.2 (1 2 3 4 5 D)
A water level drop in a reactor refueling pathway that will result in irradiated fuel becoming uncovered

Unusual Event

RU2.1 (1 2 3 4 5 D)
UNPLANNED water level drop in a reactor refueling pathway as indicated by inability to restore and maintain SFP level > low water level alarm (Note 3)
AND
Area radiation monitor reading rise on **ANY** of the following:
- 2RMS-RE111
- 2RMS-RE112
- 2RMS-RE113
- 2RMS-RE114
- 2RMS-RE140

RU2.2 (1 2 3 4 5 D)
UNPLANNED area radiation readings rise by a factor of 1,000 over NORMAL LEVELS

3 – CR/CAS Rad

General Emergency	Site Area Emergency	Alert	Unusual Event
None	None	**RA3.1** (1 2 3 4 5 D) Dose rates > 15 mRem/hr in **EITHER** of the following areas requiring continuous occupancy to maintain plant safety functions: Control Room **OR** CAS	None

H – Hazards & Other Conditions Affecting Plant Safety

1 – Natural or Destructive Phenomena

General Emergency: (none listed) Site Area Emergency: (none listed)

Table H-1 Safe Shutdown Areas
- Reactor Building (including Primary Containment)
- Control Room
- Diesel Generator Engine and Board Rooms
- Standby Switchgear and Battery Rooms
- HPCS Switchgear and Battery Rooms
- Remote Shutdown Rooms
- Control Building HVAC Rooms
- Service Water Pump Rooms
- Electrical Protection Assembly Room
- PGCC Relay Room

Notes
1. The ED should **not** wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition will likely exceed the applicable time
2. The ED should **not** wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the release duration has exceeded, or will likely exceed, the applicable time. In the absence of data to the contrary, assume that the release duration has exceeded the applicable time if an ongoing release is detected and the release start time is unknown.
3. If loss of water level in the refueling pathway occurs while in Mode 4, 5 or D, consider classification under EALs CU3.1, CU3.2 or CU3.3
4. The ED should **not** wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time.
5. If the equipment in the stated area was already inoperable, or out of service, before the event occurred, then EAL HA3.1 should **not** be declared as it will have **no** adverse impact on the ability of the plant to safely operate or safely shutdown beyond that already allowed by Technical Specifications at the time of the event.

Alert

HA1.1 (1 2 3 4 5 D)
Seismic event > OBE (0.075g)
as indicated by **EITHER**:
Computer Point ERSNC02, OBE Detected
OR
ANY amber LED light lit at the Seismic Monitor Panel, Response Spectrum Annunciator
AND
Earthquake confirmed by **ANY** of the following:
- Earthquake felt in plant
- JAFNPP seismic instrumentation
- Control Room indication of degraded performance of systems required for the safe shutdown of the plant

HA1.2 (1 2 3 4 5 D)
Tornado striking
OR
Sustained high winds > 90 mph
resulting in **EITHER**:
VISIBLE DAMAGE to **ANY** SAFETY-RELATED STRUCTURE, SYSTEM or COMPONENT within **ANY** Table H-1 area
OR
Control Room indication of degraded performance of **ANY** SAFETY-RELATED STRUCTURE, SYSTEM or COMPONENT within **ANY** Table H-1 area

HA1.3 (1 2 3 4 5 D)
Internal flooding
resulting in **EITHER**:
An electrical shock hazard that precludes access to operate or monitor **ANY** SAFETY-RELATED STRUCTURE, SYSTEM or COMPONENT within **ANY** Table H-1 area
OR
Control Room indication of degraded performance of **ANY** SAFETY-RELATED STRUCTURE, SYSTEM or COMPONENT within **ANY** Table H-1 area

HA1.4 (1 2 3 4 5 D)
Turbine failure-generated PROJECTILEs
resulting in **EITHER**:
VISIBLE DAMAGE to or penetration of **ANY** SAFETY-RELATED STRUCTURE, SYSTEM or COMPONENT within **ANY** Table H-1 area
OR
Control Room indication of degraded performance of **ANY** SAFETY-RELATED STRUCTURE, SYSTEM or COMPONENT within **ANY** Table H-1 area

HA1.5 (1 2 3 4 5 D)
Lake water level > 254 ft
OR
Intake water level < 233 ft

HA1.6 (1 2 3 4 5 D)
Vehicle crash
resulting in **EITHER**:
VISIBLE DAMAGE to **ANY** SAFETY-RELATED STRUCTURE, SYSTEM or COMPONENT within **ANY** Table H-1 area
OR
Control Room indication of degraded performance of **ANY** SAFETY-RELATED STRUCTURE, SYSTEM or COMPONENT within **ANY** Table H-1 area

Unusual Event

HU1.1 (1 2 3 4 5 D)
Seismic event identified by **ANY two** of the following:
- Annunciator 842121 SEISMIC ACCELERATION EXCEEDED indicates seismic event detected
- Confirmation of earthquake received on NMP-1 or JAFNPP seismic instrumentation
- Earthquake felt in plant

HU1.2 (1 2 3 4 5 D)
Tornado striking within PROTECTED AREA boundary
OR
Sustained high winds > 90 mph

HU1.3 (1 2 3 4 5 D)
Internal flooding that has the potential to affect **ANY** SAFETY-RELATED STRUCTURE, SYSTEM, OR COMPONENT required by Technical Specifications for the current operating mode in **ANY** Table H-1 area

HU1.4 (1 2 3 4 5 D)
Turbine failure resulting in **ANY** of the following:
- Casing penetration
- Damage to turbine seals
- Damage to generator seals

HU1.5 (1 2 3 4 5 D)
Lake water level > 248.2 ft
OR
Intake water level < 237 ft

2 – Fire or Explosion

General Emergency	Site Area Emergency	Alert	Unusual Event
None	None	**HA2.1** (1 2 3 4 5 D) FIRE or EXPLOSION resulting in **EITHER**: VISIBLE DAMAGE to **ANY** SAFETY-RELATED STRUCTURE, SYSTEM or COMPONENT within **ANY** Table H-1 area **OR** Control Room indication of degraded performance of **ANY** SAFETY-RELATED STRUCTURE, SYSTEM or COMPONENT within **ANY** Table H-1 area	**HU2.1** (1 2 3 4 5 D) FIRE **not** extinguished within 15 min. of Control Room notification or verification of a Control Room FIRE alarm in **ANY** Table H-1 area or Turbine Building (Note 4) **HU2.2** (1 2 3 4 5 D) EXPLOSION of sufficient force to damage permanent structures or equipment within the PROTECTED AREA

3 – Hazardous Gas

General Emergency	Site Area Emergency	Alert	Unusual Event
None	None	**HA3.1** (1 2 3 4 5 D) Access to **ANY** Table H-1 area is prohibited due to toxic, corrosive, asphyxiant or flammable gases which jeopardize operation of **ANY** SAFETY-RELATED STRUCTURE, SYSTEM or COMPONENT (Note 5)	**HU3.1** (1 2 3 4 5 D) Toxic, corrosive, asphyxiant or flammable gases in amounts that have or could adversely affect NORMAL PLANT OPERATIONS **HU3.2** (1 2 3 4 5 D) Recommendation by local, county or state officials to evacuate or shelter site personnel based on an offsite event

4 – Security

General Emergency	Site Area Emergency	Alert	Unusual Event
HG4.1 (1 2 3 4 5 D) A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions **HG4.2** (1 2 3 4 5 D) A HOSTILE ACTION has caused failure of Spent Fuel Cooling systems **AND** IMMINENT fuel damage is likely	**HS4.1** (1 2 3 4 5 D) A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the Security Site Supervisor	**HA4.1** (1 2 3 4 5 D) A HOSTILE ACTION is occurring or has occurred within the Owner Controlled Area as reported by the Security Site Supervisor **OR** A validated notification from NRC of an AIRLINER attack threat within 30 min. of the site	**HU4.1** (1 2 3 4 5 D) A SECURITY CONDITION that does **not** involve a HOSTILE ACTION as reported by the Security Site Supervisor **OR** A credible site-specific security threat notification **OR** A validated notification from NRC providing information of an aircraft threat

5 – Control Room Evacuation

General Emergency	Site Area Emergency	Alert	Unusual Event
None	**HS5.1** (1 2 3 4 5 D) Control Room evacuation has been initiated **AND** Control of the plant **cannot** be established within 15 min. ~~(Note 4)~~	**HA5.1** (1 2 3 4 5 D) Control Room evacuation has been initiated	None

6 – Judgment

General Emergency	Site Area Emergency	Alert	Unusual Event
HG6.1 (1 2 3 4 5 D) Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or IMMINENT substantial core degradation or melting with potential for loss of containment integrity or HOSTILE ACTION that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels (1,000 mRem TEDE or 5,000 mRem thyroid CDE) offsite for more than the immediate site area	**HS6.1** (1 2 3 4 5 D) Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve actual or likely major failures of plant functions needed for protection of the public or HOSTILE ACTION that results in intentional damage or malicious acts; (1) toward site personnel or equipment that could lead to the likely failure of or; (2) that prevent effective access to equipment needed for the protection of the public. **ANY** releases are **not** expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels (1,000 mRem TEDE or 5,000 mRem thyroid CDE) beyond the SITE BOUNDARY	**HA6.1** (1 2 3 4 5 D) Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. **ANY** releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels (1,000 mRem TEDE or 5,000 mRem thyroid CDE)	**HU6.1** (1 2 3 4 5 D) Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the plant or indicate a security threat to facility protection has been initiated. **No** releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs

E – ISFSI

General Emergency	Site Area Emergency	Alert	Unusual Event
None	None	None	**EU1.1** (1 2 3 4 5 D) Damage to a loaded cask CONFINEMENT BOUNDARY as indicated by measured dose rates > then **ANY** of the following: • 400 mRem/hr at 3 feet from the HSM surface • 100 mRem/hr outside HSM door on centerline • 20 mRem/hr end shield wall exterior

Modes:

1	2	3	4	5	D
Power Operation	Startup	Hot Shutdown	Cold Shutdown	Refuel	Defueled

C – Cold SD/ Refuel System Malfunct.

1 – Loss of AC Power

Table C-1 AC Power Sources

Onsite	• 2EGS*EG1 • 2EGS*EG3
Offsite	• Reserve Transformer A • Reserve Transformer B • Aux Boiler Transformer

Alert – **CA1.1** (4 5 D)
Loss of **all** offsite and **all** onsite AC power, Table C-1, to 4.16 KV emergency buses 2ENS*SWG101 and 2ENS*SWG103 for ≥ 15 min. (Note 4)

Unusual Event – **CU1.1** (4 5 D)
AC power capability to 4.16 KV emergency buses 2ENS*SWG101 and 2ENS*SWG103 reduced to a single power source, Table C-1, for ≥ 15 min. (Note 4)
AND
ANY additional single power source failure will result in a loss of **all** power to 4.16 KV emergency buses 2ENS*SWG101 and 2ENS*SWG103

2 – Loss of DC Power

Alert: None

Unusual Event – **CU2.1** (4 5)
< 105 VDC on **required** 125 VDC emergency buses for ≥ 15 min. (Note 4)

3 – RPV Water Level

General Emergency	Site Area Emergency	Alert	Unusual Event
CG3.1 (4 5) RPV level < -14 in. for ≥ 30 min. (Note 4) **AND** **ANY** Containment Challenge Indication, Table C-3	**CS3.1** (4 5) With CONTAINMENT CLOSURE **not** established, RPV water level < 11.8 in.	**CA3.1** (4 5) RPV water level < 17.8 in. **OR** RPV water level **cannot** be monitored for ≥ 15 min. with **ANY** UNPLANNED RPV leakage indication, Table C-2 (Note 4)	**CU3.1** (4) RCS leakage results in the inability to maintain or restore RPV water level > 159.3 in. for ≥ 15 min. (Note 4)
CG3.2 (4 5) RPV water level **cannot** be monitored with core uncovery indicated by **ANY** of the following for ≥ 30 min. (Note 4): • **ANY** UNPLANNED RPV leakage indication, Table C-2 • Erratic Source Range Monitor indication **AND** **ANY** Containment Challenge Indication, Table C-3	**CS3.2** (4 5) With CONTAINMENT CLOSURE established, RPV water level < -14 in. **CS3.3** (4 5) RPV water level **cannot** be monitored for ≥ 30 min. (Note 4) with a loss of RPV inventory as indicated by **ANY** of the following: • **ANY** UNPLANNED RPV leakage indication, Table C-2 • Erratic Source Range Monitor indication		**CU3.2** (5) UNPLANNED RPV water level drop below **EITHER** of the following for ≥ 15 min. (Note 4): • 364 in. (RPV flange) • RPV water level band (when the RPV water level band is established below the RPV flange) **CU3.3** (5) RPV water level **cannot** be monitored with a loss of RPV inventory as indicated by **ANY** UNPLANNED RPV leakage indication, Table C-2

Table C-2 RPV Leakage Indications
- Drywell equipment drain sump level rise
- Drywell floor drain sump level rise
- Reactor building equipment sump level rise
- Reactor Building floor drain sump level rise
- Suppression Pool level rise
- UNPLANNED rise in RPV make-up rate
- Observation of UNISOLABLE RCS leakage

4 – RCS Temp.

Table C-3 Containment Challenge Indications
- CONTAINMENT CLOSURE **not** established
- Explosive mixture exists inside Primary Containment ($H_2 \geq 6\%$ and $O_2 \geq 5\%$)
- UNPLANNED rise in Primary Containment pressure
- RB area radiation > 8.00E+3 mR/hr

Alert – **CA4.1** (4 5)
An UNPLANNED event results in **EITHER**:
RCS temperature > 200°F for > Table C-4 duration
OR
RPV pressure increase > 10 psi due to an UNPLANNED loss of decay heat removal capability

Unusual Event – **CU4.1** (4 5)
UNPLANNED event results in RCS temperature > 200°F

CU4.2 (4 5)
Loss of **all** RCS temperature and RPV water level indication for ≥ 15 min. (Note 4)

5 – Inadvertent Criticality

Table C-4 RCS Reheat Duration Thresholds

* If an RCS heat removal system is in operation within this time frame and RCS temperature is being reduced, the EAL is **not** applicable

RCS Status	CONTAINMENT CLOSURE Status	Duration
INTACT	N/A	60 min.*
Not INTACT	Established	20 min.*
	Not established	0 min.

Unusual Event – **CU5.1** (4 5)
An UNPLANNED sustained positive period observed on nuclear instrumentation

6 – Comm.

Table C-5 Communications Systems

System	Onsite (internal)	Offsite (external)
PBX (normal dial telephones)	X	X
Gaitronics	X	
Station radio (portable)	X	
Control Room installed satellite phones (non portable)		X
ENS		X
RECS		X
~~UHF radios~~		~~X~~

Unusual Event – **CU6.1** (4 5 D)
Loss of **all** Table C-5 onsite (internal) communication methods affecting the ability to perform routine operations
OR
Loss of **all** Table C-5 offsite (external) communication methods affecting the ability to perform offsite notifications

EAL Identifier

XXX.X
- Category (R, H, E, S, F, C)
- Emergency classification (G, S, A, U)
- Subcategory number (1 if no subcategory)
- Sequential number within subcategory/classification

MODE 4, 5 or D

D04

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