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HOPE CREEK GENERATING STATION
EVENT CLASSIFICATION GUIDE TECHNICAL BASIS
February 1, 2001

CHANGE PAGES FOR
REVISION #10

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The Table of Contents forms a general guide to the current revision of each section and attachment of the Hope Creek ECG Technical Basis. The changes that are made in this TOC Revision #10 are shown below.

1. Check that your revision packet is complete.
2. Add the revised documents.
3. Remove and recycle the outdated material listed below.

ADD			REMOVE		
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All	Section 9.2	01	All	Section 9.2	00
All	Section 9.3	01	All	Section 9.3	00
All	Section 9.6	01	All	Section 9.6	00
All	Section 9.7	01	All	Section 9.7	00
All	Section 9.8	01	All	Section 9.8	00

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HOPEAL Technical Basis
T.O.C.
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(If Editorial Revisions Only, Last Approved Revision)

1/27/01
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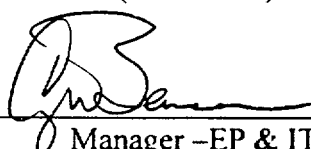
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Date

Date

Effective Date of this Revision: 02/01/01
Date

9.0 Hazards - Internal/External

9.2 Fire

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UNUSUAL EVENT - 9.2.1

IC Fire within the Protected Area Boundary Not Extinguished within 15 minutes of Detection

EAL

Valid Fire Alarm is received in the Main Control Room OR
Report of a **fire** from personnel at the scene

AND

Fire is within ANY one of the following Plant Structures
(EXCLUDING small fires that have NO potential to affect **Safety Systems** or Protected Area Permanent Plant Structures)

- Reactor Building
- Turbine Building
- Control/Aux Building
- Service Water Intake Structure
- Service/Rad Waste Building
- Low Level Radwaste Interim Storage Facility

AND

Fire is NOT extinguished within **15 minutes** of EITHER one of the following:

- Receipt of a **Valid Fire Alarm**
- Report of a fire from the scene

OPERATIONAL CONDITION - All

BASIS

Fires classified under this EAL include those of a magnitude and extent that may be a potential precursor to damage to **Safety Systems**, and hence have safety significance. This EAL includes Plant Vital Structures and also structures and areas that are contiguous to Plant Vital Structures, due to the potential for a fire to spread from a non-safety related structure to an adjoining safety related structure.

A fire alarm received in the Main Control Room is considered to be **Valid** when the alarm is substantiated by the receipt of related independent alarms (fire, temperature, deluge, etc.) in the Main Control Room or by visual confirmation if only a single detector is alarming.

This EAL EXCLUDES such items as fires in Plant Structures other than those listed in the EAL, wastebasket fires, and other small fires of no safety significance based on the judgment of the OS that NO potential to affect a **Safety System** exists. Emergency Coordinator judgment must be exercised to determine if a fire within a Plant Structure is of any safety significance.

The 15-minute clock starts upon receipt of a **Valid Fire Alarm** or report of a fire from personnel at the scene. 15 minutes was determined to be a reasonable time limit for small fires to be extinguished. A **Safety System** is defined as any system or component included within the Technical Specification.

Fire is defined as combustion characterized by the generation heat and smoke. Sources of smoke such as overheated electrical equipment and slipping drive belts, for example, do not constitute fires. Observation of a flame is preferred but is NOT required if large quantities of smoke and heat are observed.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to an Alert if the fire damages more than one plant Safety System or damages any Plant Vital Structures.

DISCUSSION

The presence of a fire within the specified areas must be evaluated to determine the potential impact on **Safety Systems**, even if initial reports are that the fire is effecting a non-safety related portion of the plant, but has the potential to spread.

Excluded non-vital structures include:

Circulating Water Structure
Station Service Transformer and Switchyard Area
Hope Creek Admin Building
Onsite Warehouses
Onsite Trailers
Main and Aux Guardhouse
Nuclear Services Building
Auxiliary Boiler House

DEVIATION

None.

REFERENCES

NUMARC NESP-007, HU2

HCGS Fire & Medical Emergency Response; HC.FP-EO.ZZ-0001 (Z)

NUMARC Questions and Answers, June 1993, "Hazards Question #7"

9.0 Hazards - Internal/External

9.2 Fire

ALERT - 9.2.2

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

EAL

Fire within ANY one of the following Plant Vital Structures:

- Reactor Building
- Control/Aux Building
- Service Water Intake Structure
- Service/Rad Waste Building

AND

The **Fire** is of a magnitude that it SPECIFICALLY results in **Damage** to ANY one of the following:

- TWO OR MORE subsystems of a **Safety System**
- MORE THAN ONE **Safety System**
- Any Plant Vital Structure which renders the structure incapable of performing its Design Function

AND

Damaged Safety System(s) or Plant Vital Structure is required for the present Operational Condition

OPERATIONAL CONDITION - All

BASIS

The primary concern in this EAL is the magnitude of the fire and the effects on **Safety Systems** required for the present Operational Condition. Specific system degradation is addressed in the System Malfunction EALs. A detailed assessment of system damage is not required prior to classification. The term "**Damage**" is defined as evidence that the fire has caused component malfunction (pump trip, breaker trip, etc.) or a report of visible scorching,

EAL - 9.2.2

Rev. 01

blistering or other deformation that may have resulted in the equipment/structure being INOPERABLE or otherwise incapable of performing its design function. A **Safety System** is defined as any system required to maintain safe operation or to establish or maintain Cold Shutdown. In those cases where it is believed that the fire may have caused damage to **Safety Systems**, then an Alert declaration is warranted, since the full extent of the damage may not be known. For Plant Vital Structure damage, classification is required under this EAL if the structure houses or otherwise supports **Safety Systems** required for the present Operational Condition.

For example, a fire that has been confirmed to be localized to a single piece of equipment, like a 4.16 KV Breaker, with no potential to spread to adjacent equipment, does not warrant classification as an Alert. In the event, however, that the fire has spread or is believed to be spreading to other 4.16 KV Breakers for component(s) required for the present operating condition, then an Alert is warranted.

When considering two or more trains of a Safety System or more than one Safety System affected by the fire; only Safety Systems or trains that are affected by the event should be considered. Safety Systems or Safety System components that were previously removed from service or previously inoperable prior to the event or are later removed from service or become inoperable for reasons unrelated to the magnitude of the fire should **not** be considered under this EAL classification even if Technical Specifications may apply.

For example: Twelve hours ago, A Residual Heat Removal (RHR) Pump was declared inoperable due excessive vibrations. While in OPGON 1, a fire in the Reactor Building, near the B RHR Pump, damaged the B RHR Pump but did not affect any other Safety System or Safety System component. Although from a technical specification viewpoint both trains of RHR are inoperable, from an EAL viewpoint, the fire was **not** of a magnitude that it specifically resulted in damage to two or more trains of a safety system. This event would meet the EAL criteria for an Unusual Event (UE) but not the criteria for an Alert.

Fire is defined as combustion characterized by the generation heat and smoke. Sources of smoke such as overheated electrical equipment and slipping drive belts, for example, do not constitute fires. Observation of a flame is preferred, but is NOT required if large quantities of smoke and heat are observed.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate based on further damage to plant safety systems, loss of fission product barriers, or abnormal radiological releases. The EC may use Emergency Coordinator Discretion and escalate the classification to SAE based on the nature of the fire.

EAL - 9.2.2

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DISCUSSION

No lengthy and time-consuming assessment of damage is required prior to classification. In this EAL, no attempt is made to quantify the magnitude of the damage to any Safety System, but instead an attempt is made to identify any damage in order to quantify the magnitude and extent of the fire. In short, if the fire is big enough that it has damaged MORE THAN ONE Safety System, or more than one subsystem of a Safety System, then the fire is big enough to justify an Alert declaration.

Damage to Plant Vital Structures must be to the extent that EC judgment must be used to determine if the structure is still capable of performing its design function. Electrical failures (such as shorts, grounds, arcing, etc.) should be evaluated for the possibility of a fire. Any security aspects of this event should be considered under EAL sections covering Security Events.

DEVIATION

None

REFERENCES

NUMARC NESP-007, HA2

HCGS Fire & Medical Emergency Response; HC.FP-EO.ZZ-0001(Z)

HCGS Technical Specifications Section 3/4 7-6, Control Room Emergency Filtration System

NUMARC Questions and Answers, June 1993, "Hazards Question #7"

9.0 Hazards - Internal/External

9.3 Explosion

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UNUSUAL EVENT - 9.3.1

IC Natural and Destructive Phenomena Affecting the Protected Area

EAL

Confirmed Explosion within the Protected Area

AND

Report of visible damage to Plant equipment or Protected Area
Permanent Plant Structures

OPERATIONAL CONDITION - All

BASIS

Occurrence of these event within the Protected Area, that cause visible damage to plant equipment or Protected Area Permanent Plant Structures warrant declaration as an Unusual Event under this EAL. Confirmed Explosions outside the Protected Area should not be classified under this EAL. No attempt should be made to assess the magnitude of the damage. The confirmed occurrence of the explosion with a report of damage (deformation/scorching) is sufficient for declaration. A **confirmed explosion** is defined as visual evidence that a rapid, unconfined combustion, or a catastrophic failure of pressurized equipment that imparts energy of sufficient force to damage or potentially damage Permanent Plant Structures, systems or components.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to Alert if the explosion damages more than one Safety Systems or damages any Plant Vital Structure.

EAL - 9.3.1
Rev. 01

DISCUSSION

Electrical failures (such as shorts, grounds, arcing, etc.) should not be considered an explosion; however, they should be evaluated for the possibility of a fire. Any security aspects of this event should be considered under EAL sections covering Security Events.

DEVIATION

None

REFERENCES

NUMARC NESP-007, HU1.5

HCGS Fire & Medical Emergency Response; HC.FP-EO.ZZ-0001 (Z)

9.0 Hazards - Internal/External

9.3 Explosion

ALERT - 9.3.2

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

EAL

Confirmed Explosion within ANY one of the following Plant Vital Structures:

- Reactor Building
- Control/Aux Building
- Service Water Intake Structure
- Service/Rad Waste Building

AND

The **Explosion** is of a magnitude that it SPECIFICALLY results in **Damage** to ANY one of the following:

- TWO OR MORE subsystems of a **Safety System**
- MORE THAN ONE **Safety System**
- Any Plant Vital Structure which renders the structure incapable of performing its Design Function

AND

Damaged Safety System(s) or Plant Vital Structure is required for the present Operational Condition

OPERATIONAL CONDITION - All

BASIS

The primary concern in this EAL is the magnitude of the explosion and the effects on **safety systems** required for the present Operational Condition. Specific system degradation is addressed in the System Malfunction EALs. A detailed assessment of system **damage** is not required prior to classification. The term "**Damage**" is defined as evidence that the explosion has caused component malfunction (pump trip, breaker trip, etc.) that may have resulted in the equipment/structure being **INOPERABLE** or otherwise incapable of performing it's design

EAL - 9.3.2

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function. A **Safety System** is defined as any system required to maintain safe operation or to establish or maintain Cold Shutdown. In those cases where it is believed that the explosion may have caused damage to **Safety Systems**, then an Alert declaration is warranted, since the full extent of the damage may not be known. For Plant Vital Structure **damage**, classification is required under this EAL if the structure houses or otherwise supports **safety systems** required for the present Operational Condition.

When considering two or more trains of a Safety System or more than one Safety System affected by the explosion; only Safety Systems or trains that are affected by the event should be considered. Safety Systems or Safety System components that were previously removed from service or previously inoperable prior to the event or are later removed from service or become inoperable for reasons unrelated to the magnitude of the explosion should **not** be considered under this EAL classification even if Technical Specifications may apply.

For example: Twelve hours ago, the A Residual Heat Removal (RHR) Pump was declared inoperable due excessive vibrations. While in OPCON 1, an explosion in the Reactor Building, near the B RHR Pump, damaged the B RHR Pump but did not affect any other Safety System or Safety System component. Although from a technical specification viewpoint both trains of RHR are inoperable, from an EAL viewpoint, the explosion was not of a magnitude that it specifically resulted in damage to two of more trains of a safety system. This event would meet the EAL criteria for an Unusual Event (UE) but not the criteria for an Alert.

A **confirmed explosion** is defined as visual evidence that a rapid, unconfined combustion, or a catastrophic failure of pressurized equipment that imparts energy of sufficient force to damage or potentially damage Permanent Plant Structures, systems or components.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate based on further damage to plant safety systems, loss of fission product barriers, or abnormal radiological releases. The EC may use Emergency Coordinator Discretion and escalate the classification to SAE based on the nature of the explosion.

DISCUSSION

No lengthy and time-consuming assessment of damage is required prior to classification. In this EAL, no attempt is made to quantify the magnitude of the damage to any safety system but instead an attempt is made to identify any damage in order to quantify the magnitude and extent of the explosion. In short, if the explosion is big enough that it has damaged MORE THAN ONE safety system, or more than one subsystem of a Safety System, then the explosion is big enough to justify an Alert declaration.

Damage to Plant Vital Structures must be to the extent that EC judgment must be used to determine if the structure is still capable of performing its design function. Electrical failures (such as shorts, grounds, arcing, etc.) should not be considered an explosion; however, they should be evaluated for the possibility of a fire. Any security aspects of this event should be considered under EAL sections covering Security Events.

DEVIATION

None

REFERENCES

NUMARC NESP-007, HA2

HCGS Fire & Medical Emergency Response; HC.FP-EO.ZZ-0001 (Z)

9.0 Hazards - Internal/External

9.6 High Winds

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UNUSUAL EVENT - 9.6.1.a

IC Natural and Destructive Phenomena Affecting the Protected Area

EAL

Report of a Tornado TOUCHING DOWN within the Protected Area

OPERATIONAL CONDITION - All

BASIS

A tornado touching down within the Protected Area is an observed event with the potential to cause damage to structures containing systems or functions necessary for safe shutdown of the plant. As such, a tornado represents a potential degradation in the level of safety of the plant. Verification of the tornado should be by direct observation and report by plant personnel.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to an Alert if the tornado causes damage to Plant Vital Structures or affects the operability of Technical Specification required equipment

DISCUSSION

The National Weather Service can be contacted for further information about existing or projected Adverse Weather Conditions:

Wilmington	(302) 573-6142
Mount Holly	(609) 261-6604
Mount Holly	(609) 261-6602

DEVIATION

None

EAL - 9.6.1.a
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REFERENCES

NUMARC NESP-007, HU1.2 and HU1.7

HC.OP-AB.ZZ-0139 (Q), Acts of Nature

HCGS Technical Specification Section 3/4, 3.7.3, Meteorological Monitoring Instrumentation

HCGS UFSAR Sections 2.3, 3.3.1

9.0 Hazards - Internal/External

9.6 High Winds

UNUSUAL EVENT - 9.6.1.b

IC Natural and Destructive Phenomena Affecting the Protected Area

EAL

Sustained wind speeds > 75 MPH for 15 minutes at ANY elevation of the Met Tower

OPERATIONAL CONDITION - All

BASIS

Sustained wind speeds in excess of 75 MPH are of sufficient velocity to have the potential to cause damage to Plant Vital Areas. These conditions are indicative of unstable weather conditions and represent a potential degradation in the level of safety of the plant. The wind speed threshold is well below the structure design basis of 108 mph, and is set at the value used to characterize Hurricane force winds. Sustained wind speed means winds in excess of the threshold value for greater than 15 minutes.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to an Alert if the high winds cause damage to Plant Vital Structures or affects the operability of Technical Specification required equipment.

DISCUSSION

Verification of sustained wind speed will be by observation of meteorological tower data. The Wind Speed indication from the Met Tower instrumentation is full scale at 100 mph.

EAL - 9.6.1.b
Rev. 01

The National Weather Service can be contacted for further information about existing or projected Adverse Weather Conditions:

Wilmington	(302) 573-6142
Mount Holly	(609) 261-6604
Mount Holly	(609) 261-6602

DEVIATION

None

REFERENCES

NUMARC NESP-007, HU1.2 and HU1.7

HC.OP-AB.ZZ-0139 (Q), Acts of Nature

HCGS Technical Specification Section 3/4, 3.7.3, Meteorological Monitoring Instrumentation

HCGS UFSAR Sections 2.3, 3.3.1

9.0 Hazards - Internal/External

9.6 High Winds

ALERT - 9.6.2

IC Natural and Destructive Phenomena Affecting the Plant Vital Area

EAL

EITHER one of the following:

- Report of a Tornado TOUCHING DOWN within the Protected Area
- Sustained wind speeds > 75 MPH for 15 minutes, from at ANY elevation of the Met Tower

AND

The Wind Speed is of a magnitude that it SPECIFICALLY results in **Damage** to ANY one of the following:

- TWO OR MORE subsystems of a **Safety System**
- MORE THAN ONE **Safety System**
- Rendering ANY of the following structures incapable of performing its Design Function:
 - Reactor Building
 - Control/Aux Building
 - Service Water Intake Structure
 - Service/Radwaste Building

AND

Damaged Safety System(s) or Plant Vital Structure is required for the present Operating Condition

OPERATIONAL CONDITION - All

BASIS

The primary concern in this EAL is the magnitude of the high winds and the effects on safety functions required for the present Operational Condition. Specific system degradation is addressed in the System Malfunction EALs. A detailed assessment of system damage is not required prior to classification. The term "**Damage**" is defined as evidence that the high

EAL - 9.6.2

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winds has caused component malfunction (pump trip, breaker trip, etc.) or a report of visible scorching, blistering or other deformation that may have resulted in the equipment/structure being INOPERABLE or otherwise incapable of performing its design function. A **Safety System** is defined as any system required to maintain safe operation or to establish or maintain Cold Shutdown. In those cases where it is believed that the high winds may have caused damage to **Safety Systems**, then an Alert declaration is warranted, since the full extent of the damage may not be known.

When considering two or more trains of a Safety System or more than one Safety System affected by the high winds; only Safety Systems or trains that are affected by the event should be considered. Safety Systems or Safety System components that were previously removed from service or previously inoperable prior to the event or are later removed from service or become inoperable for reasons unrelated to the magnitude of the high winds should **not** be considered under this EAL classification even if Technical Specifications may apply.

For example: Twelve hours ago, the B Service Water Pump was declared inoperable due excessive vibrations. While in OPCON 1, a tornado touched down and the high winds damaged the A Service Water Pump, but did not affect any other Safety System or Safety System component. Although from a technical specification viewpoint both trains of Service Water have been affected, from an EAL viewpoint, the high winds were **not** of a magnitude that it specifically resulted in damage to two or more trains of a safety system. This event would meet the EAL criteria for an Unusual Event (UE) but not the criteria for an Alert.

For Plant Vital Structure damage, classification is required under this EAL if the structure houses or otherwise supports **safety systems** required for the present Operational Condition.

It is not intended that a lengthy engineering analysis be performed to determine if damage has affected structural design but EC judgment must determine whether to exclude minor exterior damage that does not affect the structural design capability. **Sustained** wind speed means winds in excess of the threshold value for greater than 15 minutes.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate based on further damage to plant Safety Systems, loss of fission product barriers, or abnormal radiological releases. The EC may use discretion and escalate the classification to SAE based on the nature of the winds.

DISCUSSION

The wind speed threshold is well below the structure design basis of 108 mph, and is set at the value used to characterize Hurricane force winds. The Wind Speed indication from the Met Tower instrumentation is full scale at 100 mph.

The National Weather Service can be contacted for further information about existing or projected Adverse Weather Conditions:

Wilmington	(302) 573-6142
Mount Holly	(609) 261-6604
Mount Holly	(609) 261-6602

DEVIATION

None

REFERENCES

NUMARC NESP-007, HA1.2 and HA1.3

HC.OP-AB.ZZ-0139 (Q), Acts of Nature

HCGS Technical Specification Section 3/4, 3.7.3, Meteorological Monitoring Instrumentation

HCGS UFSAR Sections 2.3, 3.3.1

9.0 Hazards - Internal/External**9.7 Flooding**PSE&G
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UNUSUAL EVENT - 9.7.1

IC Internal Flooding in Excess of Sump Handling Capability Affecting Safety Related Areas of the Plant

EAL

Visual Observation of **Uncontrolled Flooding** that confirms ANY one of the following:

- Reactor Building Floor Levels above the Maximum Normal Floor Level (> 1") referenced in EOP 103, Secondary Containment Control
- Receipt of a SSWS Pump Room Flooded Alarm
- Greater than 2" of water in ANY area that contains a **Safety System(s)**, not included above

OPERATIONAL CONDITION - All**BASIS**

Uncontrolled flooding in the areas listed in the EAL represents the potential to directly impact continued safe operation of the plant. This EAL specifically addresses those areas of the plant where **uncontrolled flooding** presents a challenge to **Safety System(s)**. Visual Observation of the flooding should occur prior to classification to validate any alarm conditions. **Uncontrolled flooding** is defined as event or condition that does not result from a controlled evolution.

Events classified under this EAL, for example, include the effects of flooding from system malfunctions, component failures, or repair activity failures (such as a failed freeze seal). Those events that result in the flooding of an area as the direct result of a planned evolution, such as system draining in preparation for an equipment outage, do not warrant event classification, unless the draining can not be successfully terminated. **Safety System** is defined as any system or component included in the Technical Specification.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to an Alert if the flooding results in damage to equipment required for the present Operational Condition.

DISCUSSION

For the purpose of implementing this EAL, levels in the Reactor Building that would require classification under this EAL are defined as the Maximum Normal Floor Level in the EOPs. Exceeding this level in any of the Reactor Building areas would require running all available sump pumps. If level in these areas cannot be lowered to below the 1" level, then systems discharging into this area are to be isolated, except for systems required to:

- Ensure adequate core cooling
- Shutdown the reactor
- Protect primary containment integrity
- Suppress a fire

DEVIATION

None

REFERENCES

NUMARC NESP-007, HU1.7

HC.OP-EO.ZZ-0103 (Q)-FC, Reactor Building Control

HCGS Technical Specifications Section 3/4 7-3, Flood Protection

9.0 Hazards - Internal/External

9.7 Flooding

ALERT - 9.7.2

IC Internal Flooding Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown

EAL

Visual Observation of Flooding within ANY one of the following Plant Vital Structures:

- Reactor Building
- Control/Aux Building
- Service Water Intake Structure
- Service/Rad Waste Building

AND

The Flooding is of a magnitude that it SPECIFICALLY results in **Damage** to ANY one of the following:

- TWO OR MORE subsystems of a **Safety System**
- MORE THAN ONE **Safety System**
- Any of the above listed Plant Vital Structures which renders the structure incapable of performing its Design Function

AND

Damaged Safety System(s) or Plant Vital Structure is required for the present Operational Condition

OPERATIONAL CONDITION - All

BASIS

The primary concern in this EAL is the magnitude of the internal flooding and the effects on **Safety Systems** required for the present Operational Condition. Specific system degradation is addressed in the System Malfunction EALs. A detailed assessment of system damage is not required prior to classification. The term "**Damage**" is defined as evidence that the internal flooding has caused component malfunction (pump trip, breaker trip, etc.) that may have resulted in the equipment/structure being **INOPERABLE** or otherwise incapable of performing

EAL - 9.7.2

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it's design function. A **Safety System** is defined as any system required to maintain safe operation or to establish or maintain cold shutdown. In those cases where it is believed that the internal flooding may have caused damage to **Safety Systems**, then an Alert declaration is warranted, since the full extent of the damage may not be known.

When considering two or more trains of a Safety System or more than one Safety System affected by flooding; only Safety Systems or trains that are affected by the event should be considered. Safety Systems or Safety System components that were previously removed from service or previously inoperable prior to the event or are later removed from service or become inoperable for reasons unrelated to the magnitude of the flooding should **not** be considered under this EAL classification even if Technical Specifications may apply.

For example: Twelve hours ago, the A Residual Heat Removal (RHR) Pump was declared inoperable due excessive vibrations. While in OPCON 1, flooding in the Reactor Building, near the B RHR Pump, damaged the B RHR Pump but did not affect any other Safety System or Safety System component. Although from a technical specification viewpoint both trains of RHR are inoperable, from an EAL viewpoint, the flooding was not of a magnitude that it specifically resulted in damage to two of more trains of a safety system. This event would meet the EAL criteria for an Unusual Event (UE) but not the criteria for an Alert.

For Plant Vital Structure **damage**, classification is required under this EAL if the structure houses or otherwise supports **safety systems** required for the present Operational Condition.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate based on damage to plant systems, loss of fission product barriers, or abnormal radiological releases. The EC may use discretion and escalate the classification to SAE based on the nature of the flooding.

DISCUSSION

Degraded system performance or observation of potential for damage that could degrade system performance is used as the indicator that the safety system operability was actually affected. A report of damage should not be interpreted as mandating a lengthy and timely assessment prior to justification; there is no inference in this EAL that the actual magnitude of damage be qualified or quantified.

DEVIATION

None

REFERENCES

NUMARC NESP-007, HA1.7
HCGS Technical Specifications

9.0 Hazards - Internal/External

9.8 Turbine Failure / Vehicle Crash / Missile Impact

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UNUSUAL EVENT - 9.8.1.a

IC Natural and Destructive Phenomena Affecting Certain Structures Within the Protected Area

EAL

Catastrophic damage to the Main Turbine as evidenced by EITHER one of the following:

- Main Turbine casing penetration
- Main Turbine/Generator Damage potentially releasing Lube Oil or Hydrogen Gas to the Turbine Building

OPERATIONAL CONDITION - All

BASIS

Main Turbine failure of sufficient magnitude to cause damage to the turbine casing or generator seals increases the potential for leakage of combustible/explosive gases and of combustible liquids to the Turbine Building, warrants declaration of an Unusual Event. The presence of H₂ gas in sufficient quantities may present a flammable/explosive hazard. Turbine Lube Oil may also be present which may contribute to the flammability hazard.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate to an Alert based upon damage done by missiles generated by the failure.

DISCUSSION

Turbine rotating component failures may also result in other direct damage to plant systems and components. Damage may rupture the Turbine Lubricating Oil System, which would release flammable liquids to the Turbine Building. Potential rupture of the Main Condenser

EAL - 9.8.1.a
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and condenser tubes may cause flooding in the lower levels of the Turbine Building. This damage should be readily observable.

Escape of hydrogen gas from the generator due to a loss of seal oil pumps or turbine lube oil without a turbine rotating component failure should not be classified under this event.

DEVIATION

None

REFERENCES

NUMARC NESP-007, HU1.6

9.0 Hazards - Internal/External

9.8 Turbine Failure / Vehicle Crash / Missile Impact

UNUSUAL EVENT - 9.8.1.b

IC Natural and Destructive Phenomena Affecting Certain Structures Within the Protected Area

EAL

Vehicle Crash / Missile Impact with or within ANY one of the following Plant Structures:

- Reactor Building
- Turbine Building
- Control/Aux Building
- Service Water Intake Structure
- Service/Radwaste Building

OPERATIONAL CONDITION - All

BASIS

A **Vehicle Crash / Missile Impact** with or within a listed Plant Structure represents a potential challenge to plant safety. Events classified under this EAL include those of a magnitude and extent that may be a potential precursor to damage to **Safety Systems**, and hence has safety significance. **Vehicle Crash** includes Aircraft, Helicopters, Ships, Barges, or any other vehicle types of sufficient momentum to potentially damage the structure. **Missile Impact** includes flying objects from both offsite and onsite, rotating equipment or turbine failure causing turbine casing penetration.

Barrier Analysis

None

ESCALATION CRITERIA

Emergency Classification will escalate to Alert if the vehicle crash or missile impact causes damage to Plant Vital Structures.

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DISCUSSION

Any security aspects of this event should be considered under ECG Section 9.1, Security Events.

DEVIATION

None

REFERENCES

NUMARC NESP-007, HU1.4

NUMARC Questions and Answers, June 1993, "Hazards Question #6"

9.0 Hazards - Internal/External

9.8 Turbine Failure / Vehicle Crash / Missile Impact

ALERT - 9.8.2

IC Natural and Destructive Phenomena Affecting Certain Structures Within the Plant Vital Area

EAL

Vehicle Crash / Missile Impact with or within ANY one of the following Plant Vital Structures:

- Reactor Building
- Control/Aux Building
- Service Water Intake Structure
- Service/Rad Waste Building

AND

The **Vehicle Crash / Missile Impact** is of a magnitude that it SPECIFICALLY results in **Damage** to ANY one of the following:

- TWO OR MORE subsystems of a **Safety System**
- MORE THAN ONE **Safety System**
- Any of the above Plant Vital Structures which renders the structure incapable of performing its Design Function

AND

Damaged Safety System(s) or Plant Vital Structure is required for the present Operational Condition

OPERATIONAL CONDITION - All

BASIS

The primary concern in this EAL is the magnitude of the vehicle crashes / missile impact and the effects on **safety systems** required for the present Operational Condition. Specific system degradation is addressed in the System Malfunction EALs. A detailed assessment of system damage is not required prior to classification. The term "**Damage**" is defined as evidence that the vehicle crashes / missile impact has caused component malfunction (pump trip, breaker

EAL - 9.8.2

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trip, etc.) that may have resulted in the equipment/structure being INOPERABLE or otherwise incapable of performing its design function.

A **Safety System** is defined as any system required to maintain safe operation or to establish or maintain cold shutdown. In those cases where it is believed that the vehicle crashes/missile impact may have caused damage to **Safety Systems**, then an Alert declaration is warranted, since the full extent of the damage may not be known.

When considering two or more trains of a Safety System or more than one Safety System affected by the vehicle crash/missile impact; only Safety Systems or trains that are affected by the event should be considered. Safety Systems or Safety System components that were previously removed from service or previously inoperable prior to the event or are later removed from service or become inoperable for reasons unrelated to the magnitude of the vehicle crash/missile impact should **not** be considered under this EAL classification even if Technical Specifications may apply.

For example: Twelve hours ago, the A Residual Heat Removal (RHR) Pump was declared inoperable due excessive vibrations. While in OPCON 1, a missile impact in the Reactor Building, damaged the B RHR Pump but did not affect any other Safety System or Safety System component. Although from a technical specification viewpoint both trains of RHR are inoperable, from an EAL viewpoint, the missile impact was **not** of a magnitude that it specifically resulted in damage to two or more trains of a safety system. This event would meet the EAL criteria for an Unusual Event (UE) but not the criteria for an Alert.

For Plant Vital Structure **damage**, classification is required under this EAL if the structure houses or otherwise supports **safety systems** required for the present Operational Condition.

Barrier Analysis

N/A

ESCALATION CRITERIA

Emergency Classification will escalate based on further damage to plant safety systems, fission product barriers, or abnormal radiation releases in other EAL sections. The EC may use discretion and escalate the classification based on the nature of the damage.

DISCUSSION

This EAL is intended to address the threat to safety related equipment imposed by vehicle or missile impacts. No attempt should be made to assess the magnitude of damage to Safety Systems or Plant Vital Structures prior to classification. The evidence of damage is sufficient for declaration.

DEVIATION

None

REFERENCES

NUMARC NESP-007, HA1.5 and HA1.6

NUMARC Questions and Answers, June 1993, "Hazards Question #6"