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PRIORITY 1 DOCUMENT

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DUKE POWER

March 9, 1995

US Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287

Request for Additional Information Concerning Oconee Nuclear Station Proposed Emergency Action Levels
(TAC Nos. M89467, M89468, and M89469)

Dear Mr. Weins:

The attached enclosures provide additional information for the proposed Oconee Nuclear Site emergency classification scheme as provided in NUMARC/NESP-007, Rev.2. Coleman Jennings (Emergency Planning) discussed the submittal with NRC (Ed Foxx and Scott Boynton) on February 8 and March 8, 1995. As a result of these phone conversations, Duke Power Company (Oconee Nuclear Site) agreed to provide the following:

- Unique identifiers for Loss of Fission Product Barrier Chart (Attachment A)
- Revise Loss of Fission Product Barrier Chart to include number/system emergency action levels as identifiers for Heat Sink Red and RCS Integrity Red (Attachment A)
- Revise loss of containment barrier relating to Steam Generator Tube Rupture (Attachment A)
- Revise emergency action level regarding use of LT5 as an indicator of an Unusual Event, Enclosure 4.3, page 25. (Attachment B).
- Provide Oconee number/system identifiers for critical safety functions in the Loss of Fission Product Barrier Chart (Attachment C)
- Provide additional guidance in the Basis Document, Enclosure 4.6, pages 56 and 58 relating to fires/explosions (Attachment D).

A001
1/1

If you have any additional questions regarding the response, please contact Coleman Jennings at (803) 885-3294.

Sincerely,

J. W. Hampton
VP, Oconee Nuclear Site

cc with attachments

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cc w/o attachments

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Duke Power Company
Oconee Nuclear Site

OCONEE NUCLEAR SITE
NUMARC EAL SUBMITTAL

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ENCLOSURE 4.1

FISSION PRODUCT BARRIER MATRIX

DETERMINE THE APPROPRIATE CLASSIFICATION USING THE TABLES BELOW. CIRCLE EAL's CHOSEN. ADD POINTS TO CLASSIFY.

RCS BARRIERS (BD 5-7)		FUEL CLAD BARRIERS (BD 8-9)		CONTAINMENT BARRIERS (BD 10-12)	
Potential Loss (4)	Loss (5)	Potential Loss (4)	Loss (5)	Potential Loss (1)	Loss (3)
RCS Leakrate >Makeup capacity of one HPI pump in normal makeup mode (approx. 160 gpm) with letdown isolated.	RCS leakrate > available makeup capacity as indicated by a loss of subcooling	Average of the 5 highest CETC ≥700°F on ICCM	Average of the 5 highest CETC ≥1200 °F on ICCM	CETCs ≥ 1200 °F > 15 min **OR** CETCs ≥ 700 °F > 15 min with valid RVLS reading of 0"	Rapid unexplained containment pressure decrease after increase or containment pressure or sump level not consistent w/LOCA
SGTR > Makeup capacity of one HPI pump in normal makeup mode (approx. 160 gpm) with letdown isolated		Valid RVLS reading 0"	Coolant activity ≥ 300 uCi/ml DEI	RB pressure ≥ 59 psig **OR** RB pressure ≥10 psig and no RBCU or RBS available	Failure of secondary side of SG results in a direct opening to the environment
Entry into the TSOR (Thermal shock) operating range	RIA 57/58 reading > 1 R/hr		Hours Since SD / RIA57/58 R/HR 0 - <.5: ≥300/150 .5 - <2: ≥ 80/ 40 2 - 8: ≥ 32/ 16	Hours Since SD / RIA 57/58 R/HR 0 - <.5: ≥1800/860 .5 - <2: ≥ 400/195 2 - 8: ≥ 280/130	Containment isolation is incomplete and a release path to the environment exists
Initiation of HPI Forced Cooling	RCS pressure spike ≥ 2750 psig			Hydrogen concentration ≥ 9%	
Emergency Coordinator/EOF Director judgement	Emergency Coordinator/EOF Director judgement	Emergency Coordinator/EOF Director judgement	Emergency Coordinator/EOF Director judgement	Emergency Coordinator EOF/Director judgement	Emergency Coordinator/EOF Director judgement

UNUSUAL EVENT (1-3)	ALERT (4-6)	SITE AREA EMERGENCY (7-10)	GENERAL EMERGENCY (11-13)
OPERATING MODE: POWER OPERATION, HOT STANDBY, HOT SHUTDOWN ♦ Any potential loss of containment. ♦ Any loss of containment.	**OPERATING MODE:** POWER OPERATION, HOT STANDBY, HOT SHUTDOWN ♦ Any potential loss or loss of the RCS. ♦ Any potential loss or loss of Fuel Clad.	**OPERATING MODE:** POWER OPERATION, HOT STANDBY, HOT SHUTDOWN ♦ Loss of any two barriers ♦ Loss of one barrier and potential loss of either the RCS or Fuel Clad ♦ Potential loss of both the RCS or Fuel Clad	**OPERATING MODE:** POWER OPERATION, HOT STANDBY, HOT SHUTDOWN ♦ Loss of any three barriers ♦ Loss of any two barrier and potential loss of the third barrier

Note: An event for multiple events could occur which would result in the conclusion that exceeding the loss or potential loss threshold is **IMMINENT** (i.e. within 1-3 hours). In this **IMMINENT** loss situation, use judgement and classify as if the thresholds are exceeded.

ENCLOSURE 4.1

RCS Barrier EALS (Continued)

2. SG Tube Rupture (continued)

Secondary radiation increases should be observed via radiation monitoring of Condenser Air Ejector Discharge, Main Steam, and/or SG Sampling System. Determination of the "uncontrolled" depressurization of the ruptured SG should be based on indication that the pressure decrease in the ruptured steam generator is not a function of operator action. This should prevent declaration based on a depressurization that results from an EOP induced cooldown of the RCS that does not involve the prolonged release of contaminated secondary coolant from the affected SG to the environment. This EAL should encompass steam breaks, feed breaks, and stuck open safety or relief valves.

A steam generator tube leak less than 160 gpm would be classified under Enclosure 4.2, Systems Malfunctions, RCS leakage as an Unusual Event. If a release (steam relief failed open, feedwater line break, steam line break on the affected steam generator) a loss of the Containment Barrier would also occur. Upgrade to a higher classification would be by Enclosure 4.3, Abnormal Rad Levels/Radiological Effluent or further degradation of RCS or Fuel Clad Barriers.

3. Entry Into TSOR

Entry into the Thermal Shock Operating Range could cause damage to the reactor vessel severe enough to cause a loss of coolant accident. Therefore, this situation represents a potential loss of the RCS.

4. Reactor Coolant System Integrity

HPI Forced cooling represents the failure of the steam generators to remove heat from the core. To use this mode of cooling indicates that all feedwater (both main and emergency) are not available for use and the pressure in the reactor coolant system is greater than or equal to 2300 psig. The power-operated relief valve must be opened to initiate the cooling through the high pressure injection system. In effect, a self-imposed loss of coolant is established. The condition is classified as a potential loss of the reactor coolant system.

A reactor coolant system pressure spike of greater than or equal to design pressure of 2750 psig represents a loss of the RCS barrier.

2. Containment Isolation Valve Status After Containment Isolation

Failure to isolate those containment pathways which would allow containment atmosphere to be released to the environment is a loss of the containment barrier.

There is no "Potential Loss" EAL associated with this item.

3. SG Secondary Side Release With Primary To Secondary Leakage

Secondary side releases to atmosphere include those from the condenser air ejector, atmospheric dump valves, and main steam safety valves. Steam releases in combination with a **failure of the secondary side which results in a direct opening to the environment constitutes a bypass of the containment and, therefore, a loss of the containment barrier.**

In combination with the SG Tube Rupture EAL under the RCS barrier the appropriate classification can be determined.

There is no "Potential Loss" EAL associated with this item.

4. Significant Radioactive Inventory in Containment

Containment radiation readings shown in the table below are values which indicate significant fuel damage well in excess of the EALs associated with both loss of Fuel Clad and loss of RCS Barriers. NUREG-1228, "Source Estimations During Incident Response to Severe Nuclear Power Plant Accidents," indicates that such conditions do not exist when the amount of clad damage is less than 20%. This amount of activity in containment, if released, could have such severe consequences that it is prudent to treat this as a potential loss of containment.

By treating the radioactive inventory in containment as a potential loss, a General Emergency will be declared when the conditions of the fuel clad and RCS barriers are included in the evaluation. This will allow the appropriate protective actions to be recommended.

Hours Since SD	RIA 57/58 R/Hr
0 - <.5	≥ 1800/860
.5 - >2	≥ 400/195
2 - 8	≥ 280/130

There is no "Loss" EAL associated with this item.

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ENCLOSURE 4.3

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

UNUSUAL EVENT

2. Unexpected Increase in Plant Radiation or Airborne Concentration.

OPERATING MODE APPLICABILITY: All

EMERGENCY ACTION LEVELS:

1. LT 5 reading 14" and decreasing with makeup not keeping up with leakage **WITH** fuel in the core

2. Uncontrolled water level decrease in the spent fuel pool and fuel transfer canal with all irradiated fuel assemblies remaining covered by water.

3. 1 R/hr radiation reading at one foot away from a damaged irradiated spent fuel dry storage module.

4. Valid area or process monitor exceeds limits stated in Enclosure 4.9 of RP/O/B/1000/01.

BASIS:

Valid means that a radiation monitor reading has been confirmed to be correct.

Emergency action level 1 indicates that the water level in the reactor refueling cavity is uncontrolled. **If the area/process monitors reach the HIGH alarm setpoint, classification should be upgraded to an Alert.**

All of the above events tend to have long lead times relative to potential for radiological release outside the site boundary, thus impact to public health and safety is very low.

In light of reactor cavity seal failure incidents, explicit coverage of these types of events via EALs 1 and 2 is appropriate given their potential for increased doses to plant staff. Classification as an Unusual Event is warranted as a precursor to a more serious event.

EAL 3 applies to licensed dry storage of older irradiated spent fuel to address degradation of this spent fuel.

ENCLOSURE 4.3
ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
2. **UNEXPECTED INCREASE IN PLANT RADIATION OR AIRBORNE CONCENTRATION (BD25)** ========== **OPERATING MODE: ALL** ♦ LT 5 reading 14" and decreasing with makeup not keeping up with leakage **WITH** fuel in the core ♦ Uncontrolled water level decrease in the SFP and fuel transfer canal with all irradiated fuel assemblies remaining covered by water ♦ 1 R/hr radiation reading at one foot away from a damaged storage cask located at the ISFSI ♦ Valid area monitor readings exceeds limits stated in Enclosure 4.9. **(END)**	3. **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 (BD31)** ========== **OPERATING MODE: ALL** ♦ Valid RIA 3, 6, 41 OR 49 **HIGH alarm** ♦ **HIGH** alarm for portable area monitors on the main bridge or auxiliary bridge or SFP bridge ♦ Report of visual observation of irradiated fuel uncovered. ♦ Operators determine water level drop in either the SFP or fuel transfer canal will exceed makeup capacity such that irradiated fuel will be uncovered. **(END)**	2. **LOSS OF WATER LEVEL IN THE REACTOR VESSEL THAT HAS OR WILL UNCOVER FUEL IN THE REACTOR VESSEL (BD43)** ========== **OPERATING MODE: COLD SHUTDOWN, REFUELING** ♦ Failure of heat sink causes loss of cold shutdown condition **AND** LT-5 indicates 0 inches and decreasing after initiation of RCS makeup ♦ Failure of heat sink causes loss of cold shutdown conditions **AND** Either train ultrasonic level indication less than 0 inches and decreasing after initiation of RCS makeup. **Note: This initiating condition is also located in Enclosure 4.4. High radiation levels will also be see with this condition.** **(END)**	
INITIAL NOTIFICATION REQUIREMENTS: SEE EMERGENCY TELEPHONE DIRECTORY **NOTIFY 1, 2, 3, 4**	**INITIAL NOTIFICATION REQUIREMENTS: SEE EMERGENCY TELEPHONE DIRECTORY** **NOTIFY 1, 2, 3, 4**	**INITIAL NOTIFICATION REQUIREMENTS: SEE EMERGENCY TELEPHONE DIRECTORY** **NOTIFY 1, 2, 3, 4**	

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ATTACHMENTC

The critical functions tree status is not utilized within the Emergency Operating Procedures at the Oconee Nuclear Site. NRC has approved the emergency operating procedure and therefore, critical safety computer display functions are not immediately used by the Control Rooms to assess and mitigate plant conditions. The critical safety function status trees are used by the Westinghouse plants and are readily utilized within the emergency operating procedures. The vendor that put together the NUMARC document was familiar with the Westinghouse Plants and since the critical safety functions were a part of the emergency operating procedure, it was suggested that the color-coded functions be placed in the emergency action levels.

However, the Oconee Nuclear Site has utilized the critical safety parameter values in developing the emergency action levels for the fission product barrier table to the extent possible.

The Oconee EALS have the following critical safety functions indicators :

1. Core Cooling Orange - 700 degrees F (potential loss of the Fuel Clad Barrier and potential loss of Containment)

   Core Cooling Red - 1200 degrees F (loss of the Fuel Clad Barrier and potential loss of containment)

2. Containment Red - 59 pounds pressure (design pressure) in Containment (potential loss of Containment)

3. Heat Sink Red - HPI Forced Cooling (potential loss of RCS)

   Heat Sink Red (HPI Forced Cooling) is not used an indicator of the loss of the RCS boundary initially. If HPI cooling is unable to maintain subcooling, loss of of the RCS Boundary would be applicable. Core Exit Thermocouple (CETC) readings of 700 degrees F would be utilized to upgrade the classification to) a Site Area Emergency based on Loss of RCS Boundary and potential loss of the Fuel Clad Boundary. The Oconee Nuclear Site classification system will drive the same classification as that of the status trees used by Westinghouse plants.

4. RCS Integrity Red - RCS pressure spike greater than or equal to 2750 psig (RCS design pressure) (loss of RCS barrier)

ENCLOSURE 4.6
FIRE/ EXPLOSIONS AND SECURITY EVENTS

UNUSUAL EVENT

1. Explosion or Fire Within the Plant Not Extinguished Within 15 Minutes of Detection.

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVEL: Note: Within the plant means Turbine Building, Auxiliary Building, Reactor Building, Keowee Hydro

1. Fire within the plant not extinguished within 15 minutes of control room notification or verification of a control room alarm.

2. Unanticipated explosion within protected area boundary resulting in visible damage to permanent structures/ equipment.

BASIS:

The purpose of this IC is to address the magnitude and extent of fires/ explosions that may be potentially significant precursors to damage to safety systems. This excludes such items as fires within administration buildings, waste-basket fires, and other small fires of no safety consequence. **This IC applies to buildings and areas contiguous to plant vital areas containing safety equipment or other significant buildings or areas.** Verification of the alarm in this context means those actions taken in the control room to determine that the control room alarm is not spurious. **The intent of the 15-minute duration of extinquishing efforts is to size the fire and to discriminate against small fires that are readily extinquished.**

Only those explosions of sufficient force to damage permanent structures or equipment within the protected area and **Keowee Hydro** should be considered. As used here, an explosion is a rapid, violent, unconfined combustion, or a catastrophic failure of pressurized equipment, that potentially imparts significant energy to near-by structures and materials. No attempt is made in this EAL to assess the actual magnitude of the damage. The occurrence of the explosion with reports of evidence of damage (e.g., deformation, scorching) is sufficient for declaration. The Emergency Coordinator also needs to consider any security aspects of the explosion, if applicable.

Escalation to a higher emergency class is by, "Fire/ Explosion Affecting the Operability of Plant Safety Systems Required to Establish or Maintain Safe Shutdown".

Reference

NUMARC/NESP-007, Rev. 2, 01/92, HU2

ENCLOSURE 4.6

FIRE/ EXPLOSIONS AND SECURITY EVENTS

ALERT

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

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVEL: Note: Only one train of a system needs to be affected or damaged in order to satisfy this condition.

The following conditions exist:

a. Fire or explosion **AND ONE OF THE FOLLOWING:**

Affected safety-related system parameter indications show degraded performance

OR

Plant personnel report visible damage to permanent structures or equipment required for safe shutdown of the unit.

BASIS:

With regard to explosions, only those explosions of sufficient force to damage permanent structures or equipment required for safe operation of the plant should be considered. As used here, an explosion is a rapid, violent, unconfined combustion, or a catastrophic failure of pressurized equipment, that potentially imparts significant energy to near-by structures and materials. A fire is combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flames is preferred but is NOT required if large quantities of smoke and heat are observed.

The key to classifying fires/ explosions as an Alert is the damage as a result of the incident. The fact that safety-related equipment required for safe shutdown of the unit has been affected or damaged as a result of the fire/ explosion is the driving force for declaring the Alert. **It is important to note that this EAL addresses a fire/ explosion and not just the degradation of a safety system. The reference to damage of the systems is used to identify the magnitude of the fire/ explosion and to discrimate against minor fires/ explosions.**

Escalation to a higher emergency class, if appropriate, will be based on System Malfunction, Fission Product Barrier Degradation, Abnormal Rad Levels/ Radiological Effluent, or Emergency Coordinator Judgement ICs.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, HA2

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