

CERTIFICATION OF ENGINEERING CALCULATION

Station And Unit Number Oconee Units 1, 2 & 3

Title Of Calculation NFPA 805 Transition Radioactive Release G-1 Table

Calculation Number OSC-9293

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(See Form 101.4)

These engineering Calculations cover QA Condition 2 Items. In accordance with established procedures, the quality has been assured and I certify that the above Calculation has been Originated, Checked, or Approved as noted below:

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CALCULATION IMPACT ASSESSMENT (CIA)

Station / Unit <u>Oconee 123/</u>	Calculation No. <u>OSC-9293</u>	Rev. <u>0</u>	Page <u>iv</u>
PIP No. (if applicable) <u>O-08-02009</u>	By <u>J. E. Lechner</u>	Date <u>5/23/2008</u>	
Prob. No. (stress & s/r use only) <u>n/a</u>	Checked By <u>J.A. Oldham</u>	Date <u>5/23/08</u>	
NEDL reviewed to identify calculations? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO (formally SAROS)		Note: A NEDL search is NOT required for calculation originations (i.e. Rev. 0's)	
Identify in the blocks below, the groups consulted for an Impact Assessment of this calculation origination/revision.			
	Indiv. Contacted/Date		Indiv. Contacted/Date
<input type="checkbox"/> RES (Power, I&C, ERRT, Reactor)	_____	<input type="checkbox"/> NGO (QA Tech. Services (IS), Severe Accident Analysis, Elect. Sys. & Equip., Design & Reactor Supp., Civil Structural, Core Mech. & T/H Analysis, Mech. Sys. & Equip., Nuclear Design and Safety Analysis, Matls/Metallurgy/Piping)	_____
<input type="checkbox"/> MCE (Primary Systems, Balance of Plant, Rotating Equipment, Valves & Heat Exchangers, Civil)	_____	<input checked="" type="checkbox"/> Training	Scott Boggs 1-28-08 Ike Adams 3-26-08
<input type="checkbox"/> MOD (Mechanical Engr., Electrical Engr., Civil Engr.)	_____	<input type="checkbox"/> Local IT	_____
<input type="checkbox"/> Operations - OPS Support	_____	<input type="checkbox"/> Regulatory Compliance	_____
<input type="checkbox"/> Maintenance - Tech. Support	_____	<input type="checkbox"/> Chemistry	_____
<input type="checkbox"/> Work Control - Program. Supp.	_____	<input type="checkbox"/> Radiation Protection	_____
<input type="checkbox"/> Other Group	_____	<input type="checkbox"/> No Group required to be consulted	
Listed below are the identified documents (ex: TECHNICAL SPECIFICATION SECTIONS, UFSAR SECTIONS, DESIGN BASIS DOCUMENTS, STATION PROCEDURES*, DRAWINGS, OTHER CALCULATIONS, ETC.) that may require revision as a result of the calculation origination or revision, the document owner/group and the change required (including any necessary PIP Corrective Actions). *Note: Any design changes, which require changes to Station Procedures, must be transmitted as Design Deliverable Documents.			
<u>DOCUMENT</u>	<u>GROUP</u>	<u>CHANGE REQUIRED</u>	
New Lesson Plan	Emergency Planning	New Fire Brigade Lesson Plan per PIP O-08-02009	

1.0. Problem Statement

The transition for Oconee to a new NFPA-805 fire protection licensing basis under 10 CFR 50.48 (c) requires that the potential of radioactive release due to fire suppression activities be evaluated under the licensing basis transition to NFPA-805. This calculation documents the results of that review for incorporation into the Duke Document Control system as a QA condition 2 design input.

2.0. Methodology

The guidance for performing this review is contained in Nuclear Energy Institute (NEI) 04-02, *Guidance for Implementing a Risk-Informed, Performance-Based Program Under 10 CFR 50.48(c)*, Revision 1 (Sections 4.3 and Appendix B), as endorsed by Regulatory Guide 1.205, *Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants*, Revision 0. Sections 4.3.4 and Appendix G of NEI 04-02, Revision 1 provided the background and basis for the Radioactive Release Transition Reviews.

The treatment of radioactive release to any unrestricted area due to fire is focused on potential radioactive release due to potential fuel damage and fire fighting activities. The Nuclear Safety Goal, Objectives and Performance Criteria require the prevention of fuel cladding damage. As such, radioactive release due to fuel damage does not require a separate examination since no such damage is assumed to occur without violating the basic requirements of NFPA-805. This effectively limits the source of radiation (release source term). Therefore, containment integrity does not require specific examination either. Not all containment isolation valves are included within the scope of the fire protection safety analyses. The potential for radioactive release is addressed by examination of the direction for and conduct of fire fighting activities. The primary objective in conducting the examinations of fire fighting activities is to address the potential for loss of boundary control for contaminated spaces.

The pre-fire plans were reviewed to ensure that locations which have the potential for contamination contain specific steps for confinement/containment and monitoring of potentially contaminated fire suppression water and contaminated smoke. Those pre-plans for zones that did not have the potential to contain radioactive materials were screened from further review. Updating of pre-fire plans and other fire brigade procedures and instructions were recommended where applicable.

Fire Brigade Training lesson plans and related materials were reviewed to ensure that they specified how to deal with the containment and monitoring of potentially contaminated fire suppression water and contaminated smoke.

3.0. Design Bases and References

- 3.1 Title 10 Code of Federal Regulations, Section 50.48 (c)
- 3.2 National Fire Protection Association 805, *Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants*, 2001 Edition.
- 3.3 Nuclear Energy Institute (NEI) 04-02, Revision 1, *Guidance for Implementing a Risk-Informed, Performance-Based Program Under 10 CFR 50.48(c)*, September 2005
- 3.4 Regulatory Guide 1.205, *Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants*, May 2006
- 3.5 10 CFR 50, Appendix R, *Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979*

- 3.6 NGD-FP-01, Rev. 3, *FIRE BRIGADE ORIENTATION*
- 3.7 NGD-FP-02, Rev. 2, *FIRE BEHAVIOR AND METHODS OF EXTINGUISHMENT*
- 3.8 SAF-FP-03, Rev. 3, *PORTABLE FIRE EXTINGUISHERS*
- 3.9 NGD-FB-04, Rev. 4, *FIRE FIGHTING PERSONAL PROTECTIVE EQUIPMENT (PPE)*
- 3.10 NGD-FP-05, Rev. 4, *FIRE HOSE, NOZZLES, APPLIANCES, AND STREAMS*
- 3.11 NGD-FP-06, Rev. 4, *FIRE SUPPRESSION AND DETECTION SYSTEMS*
- 3.12 NGD-FP-07, Rev. 1, *SELF CONTAINED BREATHING APPARATUS (SCBA)*
- 3.13 NGD-FP-08, Rev. 4, *INCIDENT COMMAND SYSTEM AND FIRE FIGHTER SAFETY*
- 3.14 NGD-FP-09, Rev. 3, *FIRE AREA SEARCH AND RESCUE*
- 3.15 NGD-FP-10, Rev. 4, *VENTILATION AND DAMAGE CONTROL*
- 3.16 NGD-FP-11, Rev. 2, *INTRODUCTION TO HAZARDOUS MATERIALS*
- 3.17 ONS-FBL, Rev. 0, *FIRE BRIGADE LEADER TRAINING*
- 3.18 Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 1, General Response Guidelines, dated 2-27-97.
- 3.19 Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 2, Staffing Guidelines, dated 10-25-05.

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- 3.20 Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 3, Electrical Fires, dated 2-27-97.
- 3.21 Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 4, Fire Brigade Leadership Guidelines, dated 2-27-97.
- 3.22 Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 5, Fires Involving Main Transformers, dated 2-27-97.
- 3.23 Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 6, Restoring Equipment, dated 2-27-97.
- 3.24 Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 7, Wheeled Fire Extinguisher Locations, dated 2-13-07.
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- 3.25 Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 8, Hazardous Materials Response, dated 2-27-97.
- 3.26 Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 9, Hose Selection and Use, dated 11-16-98.
- 3.27 Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 10, Fire Brigade Equipment Locations, dated 4-23-03.
- 3.28 Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 11, Hydrogen Bulk Storage, dated 10-2-07.
- 3.29 Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 12, Purging Electrical Generator, dated 12-20-01.
- 3.30 Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 13, Sprinkler Cross Reference, dated 9-19-07.
- 3.31 Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 14, Fire Fighting Foam Carts, dated 9-18-07.
- 3.32 Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 15, Fire Response to CO2 Dump, dated 10-2-07.
- 3.33 Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 16, Fire Within a RCA/RCZ, dated 1-23-08.
- 3.34 Oconee Nuclear Station Fire Brigade Pre-Fire Plans (all fire zones)
- 3.35 FAQ 06-0025, Minimum Pre-plan Scope, dated 7-19-07, ML072080246.
- 3.36 NSD-112, Rev. 8, Fire Brigade Organization, Training and Responsibilities.

- 3.37 ERTG-001, Rev. 17, Emergency Response Organization and Emergency Services Training Program.
- 3.38 PIP O-08-02009, Need for New Fire Brigade Lesson Plan.
- 3.39 SLC 16.11.1, Radioactive Liquid Effluents, dated 07/12/01.
- 3.40 SLC 16.11.2, Radioactive Gaseous Effluents, dated 01/31/00.

4.0. Summary Information

~~This is a Type I calculation because it must be reviewed for each Engineering Change that is implemented and updated when required. The Attachment 1, G-1 table can reasonably be expected to routinely involve insignificant changes due to Engineering Changes since it is basically a review of fire brigade pre-fire plans and lesson plans. These insignificant changes would not directly challenge any SSC's ability to perform its design function(s).~~

*paw
5/23/08*

The fire brigade pre-plans were reviewed to determine if any fire zones had the potential for radioactive materials or if they were within the Radiologically Controlled Area (RCA). The review also assessed the consideration of radioactive release paths. Revisions to Standard Operating Guidelines for the Fire Brigade (SOG's) were recommended to address the additional needs identified. SOG-16 was written to address the additional strategies necessary for fighting fires within a RCA/RCZ to control and monitor potential radioactive releases.

Fire Brigade Training lesson plans and related materials were reviewed to assess how fire brigade members were being taught to control and monitor potential radioactive releases. Of the lesson plans reviewed only the one on Hazardous Materials discussed potential radioactive releases and ALARA principles. The development of the new SOG-16 also requires additional training of fire brigade members. Given the fleet-wide nature of fire brigade training lesson plans, an open item was generated to create a new lesson plan for initial fire brigade training to address radioactive release control and monitoring measures. This Open Item is documented and being tracked in PIP O-08-02009.

The results of this review have determined that the fire brigade pre-fire plans and lesson plans needed minor updates on managing fires in areas containing radioactive materials. The results were summarized and entered into a database utilized to capture the NFPA-805 transition information and provide the NEI 04-02 Table G-1 - Radioactive Release Transition Report.

5.0. Assumptions

- 5.1. The methodology is based upon NEI 04-02, Revision 1 and FAQ 06-0025. The FAQ states that plans shall detail the fire area configuration and fire hazards to be encountered in the fire area, along with any nuclear safety components and fire protection systems and features that are present. The assumption is made of there being eventual endorsement of this FAQ on pre-fire plan scope by the NRC via revision to NEI 04-02 and R.G. 1.205. Adjustments to the calculation may be necessary based upon changes to those documents.

6.0 Technical Presentation

Attachment 1 – Table G-1 – Radioactive Release Transition Report

Calculation No.: OSC-9293

Revision No.: 0

Applicable Units: Oconee Unit 1, 2, & 3

Attachment 1

Attachment 1

Table G-1 – Radioactive Release Transition Report

3 total pages

Table G-1 - Radioactive Release Transition Report

NFPA 805 Section 1.5.2 Radioactive Release Performance Criteria

Radiation release to any unrestricted area due to the direct effects of fire suppression activities (but not involving fuel damage) shall be as low as reasonably achievable and shall not exceed applicable 10 CFR, Part 20, Limits.

Implementing Guidance, Appendix G Step 1

Review pre-fire plans.

Ensure for locations that have the potential for contamination that specific steps are included for containment and monitoring of potentially contaminated fire suppression water. Update pre-fire plans as necessary.

Review

A comprehensive review of the ONS fire pre-plans, including applicable outbuildings was conducted. Areas known to contain a RCA/RCZ are identified in the "Special Hazards" Section of the specific fire plan zone. The Pre fire plans also address smoke management in the "Ventilation Equipment section of each pre fire plan. This section discusses / informs the fire brigade leader and or control room of existing or possible supply air pathways as well as exhaust air pathways and ventilation pathways via HVAC units as well as fire dampers. These units can be shut down for smoke management during a contaminated fire event. Also identified are ingress and egress points for smoke mitigation. General building ventilation is monitored by RIA's. Fire Brigade Standard Operating Guideline 16 "Fires within a RCA/RCZ" was developed to address radiological release concerns.

Floor drains in radiological areas are routed to contaminated hold-up tanks, then processed prior to release. Yard drains and other drains are routed to Chemical Treatment Pond #3 and monitored for radioactive liquid releases before the water leaves site. ONS has prior NRC approval for the concentration of radioactive material in releases of liquid effluents at anytime from the site boundary to unrestricted areas [denoted in Figure 2.1-4(a) of the ONS UFSAR] that shall be limited to 10 times the effluent concentrations specified in 10 CFR20.

Standard Operating Guideline for "Fires within a RCA/RCZ" has been created to address smoke management as well as potentially contaminated run off when fires involve potentially contaminated areas that may not be identified in the fire plan. These areas may include other RCZ's that may be established for short term periods such as maintenance.

Unit Applicability 1, 2, and 3

Comments Pre-fire plans for zones 1-47 were screened from review due to being outside the RCA. Pre-fire plans for outbuildings which may be used for storage of radioactive materials and which may house a RCA were included in the review. Outbuildings included were 8027, 8055, 8087, 8089, 8091, 8093, and 8096.

Reference Document

Document Detail

SLC 16.11.1, Radiological Effluents Control, 7/12/2001

SOG 8, Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 8, Hazardous Materials Response, 2/27/1997

SOG 9, Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 9, Hose Selection and Use, 11/16/1998

SOG 10, Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 10, Fire Brigade Equipment Locations, 4/24/2003

SOG 11, Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 11, Hydrogen Bulk Storage, 10/2/2007

SOG 12, Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 12, Purging Electric Generator, 12/20/2001

SOG 13, Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 13, Sprinkler Cross Reference, 9/19/2007

SOG 14, Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 14, Firefighting Foam Carts, 9/18/2007

SOG 15, Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 15, Fire Response to CO2 Dump, 10/2/2007

Table G-1 - Radioactive Release Transition Report

NFPA 805 Section 1.5.2 Radioactive Release Performance Criteria

SOG 16, Oconee Nuclear Station, Fire Brigade Operations,
Standard Operating Guideline Number 16, Fires Within a
RCA/RCZ, 1/23/2008

SOG 6, Oconee Nuclear Station, Fire Brigade Operations,
Standard Operating Guideline Number 6, Restoring
Equipment, 2/27/1997

SOG 5, Oconee Nuclear Station, Fire Brigade Operations,
Standard Operating Guideline Number 5, Fires Involving Main
Transformers, 2/27/1997

SOG 4, Oconee Nuclear Station, Fire Brigade Operations,
Standard Operating Guideline Number 4, Fire Brigade
Leadership Guidelines, 2/27/1997

SOG 3, Oconee Nuclear Station, Fire Brigade Operations,
Standard Operating Guideline Number 3, Electrical Fires,
2/27/1997

SOG 2, Oconee Nuclear Station, Fire Brigade Operations,
Standard Operating Guideline Number 2, Staffing Guidelines,
10/25/2005

SOG 1, Oconee Nuclear Station, Fire Brigade Operations,
Standard Operating Guideline Number 1, General Response
Guidelines, 2/27/1997

SLC 16.11.2, Radiological Effluents Control, 1/31/2000

FAQ 06-0025, Define Minimum Acceptable Pre-Plan Scope,
7/19/2007

Oconee Nuclear Site Fire Plan

Table G-1 - Radioactive Release Transition Report

NFPA 805 Section 1.5.2 Radioactive Release Performance Criteria

Radiation release to any unrestricted area due to the direct effects of fire suppression activities (but not involving fuel damage) shall be as low as reasonably achievable and shall not exceed applicable 10 CFR, Part 20, Limits.

Implementing Guidance Appendix G Step 2

Review fire brigade training materials.
Ensure that training materials deal specifically with the containment and monitoring of potentially contaminated fire suppression water.
Update training materials as necessary.

Review

Training on radiological release potential is provided in one lesson plan. The Hazardous Materials lesson plan discusses radioactive materials and need for containment of run off and use of ALARA principles. Other topical lesson plans do not address radiological release boundary control or monitoring. Creation of SOG-16 for fires within a RCA/RCZ requires inclusion into this training.

Unit Applicability 1, 2, and 3

Comments Control and monitoring of potential radiological releases consistent with SOG-16 needs to be incorporated into the initial fire brigade training and continuing curriculum.

Reference Document

Document Detail

SOG-16, Oconee Nuclear Station, Fire Brigade Operations, Standard Operating Guideline Number 16, Fires Within a RCA/RCZ, 1/23/2008

FAQ 06-0025, Define Minimum Acceptable Pre-Plan Scope, 7/19/2007

NGD-FP-01, FIRE BRIGADE ORIENTATION, Rev. 3

NGD-FP-02, FIRE BEHAVIOR AND METHODS OF EXTINGUISHMENT, Rev. 2

NGD-FP-05, FIRE HOSE, NOZZLES, APPLIANCES, AND STREAMS, Rev. 4

SAF-FP-03, PORTABLE FIRE EXTINGUISHERS, Rev. 3

NGD-FB-04, FIRE FIGHTING PERSONAL PROTECTIVE EQUIPMENT (PPE), Rev. 4

NGD-FP-06, FIRE SUPPRESSION AND DETECTION SYSTEMS, Rev. 4

NGD-FP-07, SELF CONTAINED BREATHING APPARATUS (SCBA), Rev. 1

NGD-FP-08, INCIDENT COMMAND SYSTEM AND FIRE FIGHTER SAFETY, Rev. 4

NGD-FP-09, FIRE AREA SEARCH AND RESCUE, Rev. 3

NGD-FP-10, VENTILATION AND DAMAGE CONTROL, Rev. 4

NGD-FP-11, INTRODUCTION TO HAZARDOUS MATERIALS, Rev. 2

ONS-FBL, FIRE BRIGADE LEADER TRAINING, Rev. 0

CERTIFICATION OF ENGINEERING CALCULATION - REVISION LOG

Station And Unit Number Oconee Units 1, 2 & 3

Title Of Calculation NFPA 805 Transition B-1 Table/Report

Calculation Number OSC-9295

Active Calculation / Analysis Yes No

Rev. No.	Calculation Pages (Vol)			Supporting Documentation (Vol)			Volumes		Orig	Chkd	Verif. Meth.	Appr ¹	Issue Date
	Revised	Deleted	Added	Revised	Deleted	Added	Deleted	Added	Date	Date	1, 2, 3, "Other"	Date	Rec'd Date
1		iv, 1-84	iv, 1-85		Att A 1-37	Att A 1-35			RAT 10/11/08	JA O'Dell 10/13/08	1	JA will 10/17/08	

Note 1: When approving a Calculation revision with multiple Originators or Checkers, the Approver need sign only one block.