DUKE ENERGY®

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ONS-2014-165

January 19, 2015 10 CFR 50.54(q)

Attn: Document Control Desk
U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, Maryland 20852-2746

Subject: Duke Energy Carolinas, LLC
Oconee Nuclear Station, Units 1, 2, and 3
Docket Nos. 50-269, -270, and -287
Emergency Plan Revision 2014-003

Please find attached for your use and review copies of the revisions to the Oconee Nuclear Station Emergency Plan along with the associated revision instructions and 10 CFR 50.54(q) evaluation.

This revision is being submitted in accordance with 10 CFR 50.54(q) and does not reduce the effectiveness of the Emergency Plan. If there are any questions or concerns pertaining to this revision please call Pat Street, Emergency Preparedness Manager, at 864-873-3124.

By copy of this letter, two copies of this revision are being provided to the NRC, Region II, Atlanta, Georgia.

Sincerely,

Scott L. Batson

Scott L. Batson
Vice President
Oconee Nuclear Station

Attachments:
Revision Instructions
Emergency Plan Revision 2014-003
10 CFR 50.54(q) Evaluation(s)

A X45
NRC

ONS-2014-165

U. S. Nuclear Regulatory Commission
January 19, 2015

xc: w/2 copies of attachments

Mr. Victor McCree, Regional Administrator
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w/o attachments

Mr. Eddy Crowe
NRC Senior Resident Inspector
Oconee Nuclear Station

ELL
EC2ZF

December 18, 2014

OCONEE NUCLEAR STATION

SUBJECT: Emergency Plan Revision 2014-003

Please make the following changes to the Emergency Plan:

REMOVE	**INSERT**
Cover Sheet Rev. 2014-002	Cover Sheet Rev. 2014-003
EPA List of Effective Pages Rev 012	EPA List of Effective Pages Rev 013
EPA Record of Changes Rev 012	EPA Record of Changes Rev 013
EPA Section D Rev 007	EPA Section D Rev 008
EPA Section F Rev 005	EPA Section F Rev 006
EPA Section H Rev 005	EPA Section H Rev 006
EPA Section I Rev 004	EPA Section I Rev 005
EPA Section J Rev 005	EPA Section J Rev 006
EPA Section P Rev 006	EPA Section P Rev 007
EPA Appendix 02 Rev 002	EPA Appendix 02 Rev 003
EPA Appendix 03 Rev 001	EPA Appendix 03 Rev 002

Pat Street

Pat Street
ONS Emergency Preparedness Manager

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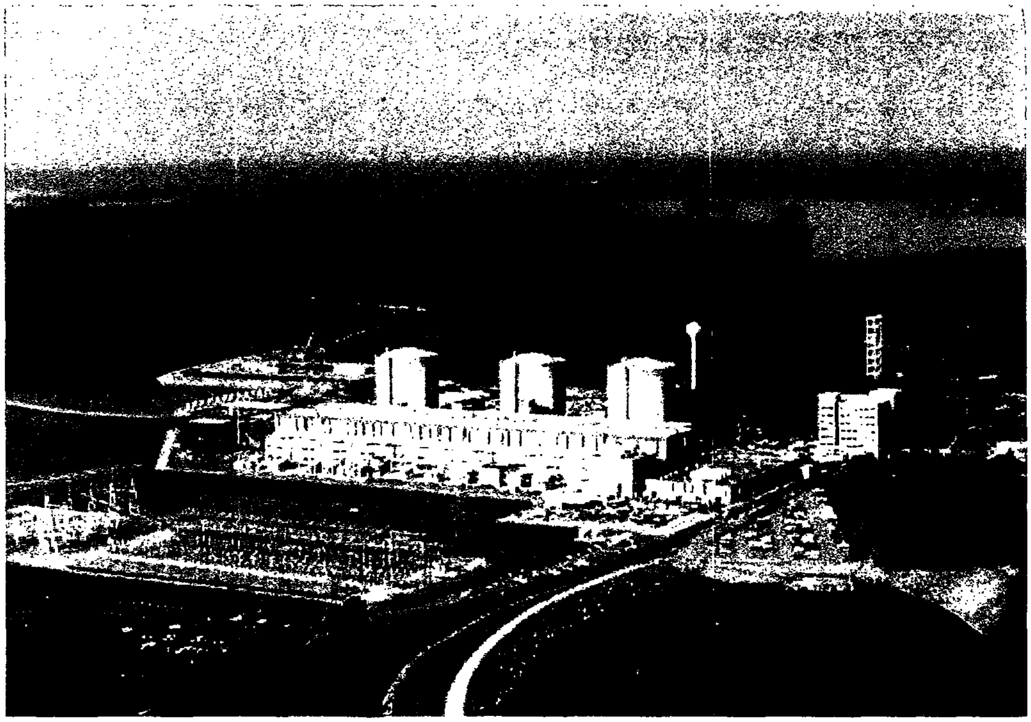
OCONEE NUCLEAR STATION
EMERGENCY PLAN



APPROVED:

Scott L. Batson
Scott L. Batson

01-08-2015
Date Approved

REVISION 2014-003
December 2014

Duke Energy Oconee Nuclear Station **EMERGENCY PLAN A - LIST OF EFFECTIVE PAGES**	Procedure No. **EPA LIST OF EFFECTIVE]**
	Revision No. **013**
	Electronic Reference No. **OAP000HN**

PDF Format

Prepared By* ______________________________ Date __________

Requires Applicability Determination? ☐ Yes ☐ No

Reviewed By* ______________________________(QR) Date __________

Cross-Disciplinary Review By* ______________________(QR) NA __________ Date __________

Reactivity Mgmt. Review By* ______________________(QR) NA __________ Date __________

Additional Reviews

Reviewed By* ______________________________ Date __________

Reviewed By* ______________________________ Date __________

Approved By* ______________________________ Date __________

** Printed Name and Signature*

Oconee Emergency Plan
List Of Effective Pages

SECTION	PAGE NUMBER	REVISION NO.	DATE
Emergency Plan Approval Cover Sheet		Rev. 2014-03	December 2014
List of Effective Pages	Page 1 - 3	Rev. 2014-03	December 2014
List Of Figures	Page 1 - 5	Rev. 2014-01	March 2014
Record Of Changes	Page 1 - 10	Rev. 2014-03	December 2014
Table of Contents	Page 1	Rev. 2012-05	December 2012
I. Introduction	Page 1 - 5	Rev. 2012-05	December 2012
	Page i-6	Rev. 2008-02	October 2008
	Page i-6a	Rev. 2012-05	December 2012
II. Planning Standards and Evaluation Criteria			
A. Assignment of Responsibility	Page A-1 - A-8	Rev. 2014-02	October 2014
B. Onsite Emergency Organization	Page B-1 - B-21	Rev. 2014-02	October 2014
C. Emergency Response Support And Resources	Page C-1 & C-2	Rev. 2012-05	December 2012
D. Emergency Classification System	Page D-1 - D-100	Rev. 2014-03	December 2014
E. Notification	Page E-1 & E-2	Rev. 2008-02	December 2008
F. Emergency Communications	Page F-1 - F-8	Rev. 2014-03	December 2014
G. Public Information and Education	Page G-1 - G-5	Rev. 2014-02	October 2014

Oconee Emergency Plan
List Of Effective Pages

SECTION	PAGE NUMBER	REVISION NO.	DATE
H. Emergency Facilities And Equipment	Page H-1 - H-39	Rev. 2014-03	December 2014
I. Accident Assessment	Page I-1 - I-37	Rev. 2014-03	December 2014
J. Protective Response	Page J-1 - J-12	Rev. 2014-02	October 2014
K. Radiological Exposure Control	Page K-1 - K-12	Rev. 2012-05	December 2012
L. Medical And Public Health Support	Page L-1 - L-5	Rev. 2012-05	December 2012
M. Recovery And Reentry Planning And Post-Accident Operations	Page M-1 - M-5	Rev. 2014-02	October 2014
N. Exercises and Drills	Page N-1 - N-3	Rev. 2012-05	December 2012
O. Emergency Response Training	Page O-1 - O-3	Rev. 2012-05	December 2012
P. Responsibility For The Planning Effort: Development, Periodic Review and Distribution Of The Emergency Plans	Page P-1 - P-18	Rev. 2014-03	December 2014
III. APPENDICIES			
APPENDIX 1 Definitions	Page 1 - 5	Rev. 2012-05	December 2012
APPENDIX 2 Meteorology And Offsite Dose Assessment Program	Page 1 -4	Rev. 2014-03	December 2014

Oconee Emergency Plan
List Of Effective Pages

SECTION	PAGE NUMBER	REVISION NO.	DATE
APPENDIX 3 Alert And Notification System Description	Page 1 - 4	Rev. 2014-03	December 2014
APPENDIX 4 Evacuation Time Estimates	Page 1	Rev. 2013-01	October 2013
APPENDIX 5 Letters of Agreement	Page 1	Rev. 2014-01	March 2014
	Page 2	Rev. 2014-01	March 2014
APPENDIX 6 Distribution List	Page 1 - 4	Rev. 2014-02	October 2014
APPENDIX 7 Emergency Data Transmittal System	Page 1	Rev. 2012-01	June 2012
APPENDIX 8			
Spill Prevention Control And Countermeasure Plan	Page 1 - 40	Rev. 2012-05	October 2009
ONS Pollution Prevention Plan - Rev. 11	Page 1 - 29	Rev. 2012-05	December 2009
Site Drawing	Drawing	Revision 2001-03	October 2001
APPENDIX 9 ONS Chemical Treatment Ponds 1, 2 and 3, Groundwater Monitoring Sampling And Analysis Plan	Page 1 - 17	Rev. 2012-05	July 2010
APPENDIX 10 Hazardous Materials Response Plan	Page 1 - 12	Rev. 2010-01	February 2010

Duke Energy Oconee Nuclear Station **EMERGENCY PLAN A - RECORD OF CHANGES**	Procedure No. **EPA RECORD OF CHANGI** Revision No. **013** Electronic Reference No. **OAP000HP**

PDF Format

Prepared By* ______________________________ Date __________

Requires Applicability Determination? ☐ Yes ☐ No

Reviewed By* ______________________________(QR) Date __________

Cross-Disciplinary Review By* ____________________(QR) NA __________ Date __________

Reactivity Mgmt. Review By* ____________________(QR) NA __________ Date __________

Additional Reviews

Reviewed By* ______________________________Date __________

Reviewed By* ______________________________Date __________

Approved By* ______________________________ Date __________

* *Printed Name and Signature*

RECORD OF CHANGES

REVISION NUMBER	EFFECTIVE DATE	REASON FOR REVISIONS
Revision 1	April 1, 1981	Meteorological Update
Revision 2	December 31, 1981	Rewrite Emergency Plan in Nureg 0654 Format
Revision 3	March, 1982	Update Emergency Plan
Revision 4	April, 1982	Revisions & Changes to update Emergency Plan
Revision 5	September 1, 1982	Revision to coincide with Crisis Management Plan
Revision 6	November 1, 1982	Revision update
Revision 7	December 14, 1982	Review and update
83-1	June 10, 1983	Changes required by action items due to annual exercise and review and general update
83-2	November 17, 1983	Changes required by review and general update
84-1	March 26, 1984	Revisions as determined by QA audit and minor editing
84-2	November 15, 1984	Revisions as determined by annual review
85-1	June 7, 1985	Revisions/changes/editing
85-2	-------------	Revisions/changes/editing-annual review
86-1	March 8, 1986	New Oconee Brochure
86-2	November 13, 1986	Revisions/changes/editing-annual review
86-3	December 9, 1986	Correct changes identified as deficiencies by the NRC in Rev. 85-2.
87-1	February 4, 1987	Revision update, minor editing changes, included failed fuel accident assessment information.
87-2	-------------	Revision update, minor editing changes Review Section D. Agreement letters updated.
87-4	December 10, 1987	Incorporate alternate TSC and OSC into Emergency Plan
88-1	June 7, 1988	Revised EALS in Section D.
88-2	October 14, 1988	Annual review. Minor editorial revisions.
89-1	February 28, 1989	Major revision to Section D. Added Appendix 7. Minor editorial changes.
89-2	August 14, 1989	Change to Section D. Minor editorial revisions.
89-3	January 5, 1990	Annual Review

RECORD OF CHANGES (Continued)

REVISION NUMBER	EFFECTIVE DATE	REASON FOR REVISIONS
90-1	March 1, 1990	Changes to Section D as required by NRC commitment.
90-2	June 1, 1990	Changes reflect upgrade of radiation monitor system and minor editing.
90-3	July 2, 1990	Change to Section D, Emergency Classification.
90-4	October 31, 1990	Annual Review
91-1	January 21, 1991	Section D revision. (RIA upgrade)
91-2	February 20, 1991	Section D revision. (TS to SLC)
91-3	March 22, 1991	Section D revision. (RIA upgrade); Section D revision. (SLB revision)
91-5	September 19, 1991	Section D revision. (RIA upgrade)
91-6	December 16, 1991	Annual review.
92-1	March 1, 1992	Section D (RIA upgrade). Minor editorial changes.
92-2	June 30, 1992	Major Revision
92-3	October 29, 1992	Annual review
92-4	12/31/92	Section B, D, H, J, Appendix 4, 5 & 6 changes.
93-1	03/01/93	Sections D, G, H, N, P, and Appendix 6
93-2	05/07/93	Sections A, B, D, Appendix 5 and 6
93-3	07/23/93	Sections A, B, G, H, I, J, L, M, N, & Appendix 6
93-4	08/11/93	Sections B, D, and Appendix 5
93-05	01/01/94	Annual Review, Incorporation of EPA-400 guidelines.
94-01	03/15/94	Additions of Appendix 8 and 9. - (Minor revisions)
94-02	05/09/94	Changes to Appendix 5, Pages 1 and 2; Changes to Appendix 6, Pages 2 and 4; State of South Carolina Agreement Letter
94-03	05/25/94	Changes to Appendix 5, Page 2; Changes to Appendix 6, Pages 4 and 5; INPO Agreement Letter
94-04	06/06/94	Changes to Appendix 5, Page 2; Change Teledyne Isotopes Badge Service agreement letter to Northeast Utilities Service Company
94-05	08/08/94	Changes to Section D
94-06	12/29/94	Annual review. Editorial changes, minor revisions.

RECORD OF CHANGES (Continued)

REVISION NUMBER	EFFECTIVE DATE	REASON FOR REVISIONS
95-01	02/23/95	Changes to Sections B, G, Appendix 5.
95-02	10/23/95	Annual review and changes
95-03	11/01/95	Section D. Change, Incorporated new EAL'S.
95-04	12/31/95	Calendar 1996, HAZMAT Changes, RP/14 deleted
96-01	02/13/96	Changes to Sections B, D, and N.
96-02	06/25/96	Changes to Section D
96-03	07/96	Changes to Section D
96-04	12/96	Annual review, editorial changes, minor changes with major change to Appendix 10.
97-01	07-97	Section B, I, Appendix 5 & 7, with editorial/minor changes to Section H & P
97-02	12-97	Annual review and editorial/minor changes
98-01	02-98	Section D, page 35. Correction of title on Enclosure 4.3
98-02	03-98	Section N, page 1 & 2, Added part a (General) to Section N.2 to ensure drills conducted between NRC evaluated exercises are performed in accordance with 10CFR50, Appendix E, Section IV.F.2.b
98-03	04-98	List of Figures page number corrections, Added Emergency Operation Facility to Figure H-15, Figure H-20 reformatted. Added Agreement Letter with Keowee-Key Volunteer Fire Department, Appendix 5, #24. Appendix 10 - Hazardous Materials Response Plan, corrections on Table of Contents with minor revisions. Headings on Appendix 10, Figure 2 with minor revisions.
98-04	12-98	Annual review and editorial/minor changes.
99-01	03-99	The ONS Technical Specifications have been converted to a set of Technical Specifications based on NUREG 1430. "Standard Technical Specifications Babcock and Wilcox Plants." Replaced the description phrases (titles) in Section D for Operating Modes with the Mode number from Improved Technical Specifications. In Section I the portion describing leak rate volume percent per day was changed to percent of the containment air weight per day. The reference to Tech Spec 4.4.1.1 was changed to reference Improved Technical Specification 5.5.2. NOTE: The implementation date of Improved Tech Specs was moved from March 4, 1999 to March 27, 1999, therefore the revision date for revision 99-01 will depict February when the actual administrative changes were completed.

RECORD OF CHANGES (Continued)

REVISION NUMBER	EFFECTIVE DATE	REASON FOR REVISIONS
99-02	12-99	Annual review and editorial/minor changes
2000-01	04-2000	Addition of List of Effective Pages
2000-02	05/2000	Editorial /minor changes
2000-03	12/2000	Annual review and editorial/minor changes
2001-01	02/07/2001	Additions and corrections as result of 50.54(t) audit. Additional information added to Basis Document and additional EAL's resulting from EP drill critiques.
2001-02	08/2001	Changes in areas of responsibility. Added note concerning RVLS to Fission Product Barrier Matrix; 2001 calendar; information added to EP Functional Area Manual; added/updated information on annual average meteorology; Appendix 5; Appendix 6; editorial/minor changes.
2001-03	12/2001	Added information in Basis Document concerning a reactor building containment break. Replaced the 2001 calendar with the 2002 calendar. Editorial/minor changes.
2002-01	01/02	The present Oconee Nuclear Station Emergency Operating Procedure is written in a different format and with some different terms than the earlier version. The term PTS (Pressurized Thermal Shock) has replaced TSOR (Thermal Shock Operating Range). This is only a change in terminology. The additional EAL is to ensure a site specific credible threat results in a declaration of a notification of Unusual Event (NOUE). This change is also intended to achieve an appropriate level and consistent response Nationwide.
2002-02	06/02	Section B - minor changes; Section D - Added information requested by Emergency Coordinators to Enclosure 4.1; Section G - Rewrite of entire section; Section H - Updated information on Figure H-4 relating to Met Data; Appendix 5 - Updated Letters of Agreement; and miscellaneous spelling/grammar errors.
2002-03	09/02	Section A - Compliance with the NRC Security Interim Compensatory Measure (ICM) issued 02/25/02; Section P - Audit frequencies per revised 10 CFR 50.54 (t) as stated in Federal Register Vol 64, 03/29/99. Appendix 1 - Added definition of monthly and Semi-Annual; Appendix 5, Agreement Letters, updated #17, Appendix 6 - Changed name on 78A. Miscellaneous corrections.
2003-01	02/03	Section D - RIA setpoints change, Section G - 2003 Calendar, Appendix 3 - Siren upgrade, new map (i-5) ; Appendix 5 - Agreement Letters, Appendix 6 - Issued To change, Section B, E, F editorial/minor changes
2003-02	08/03	Section D - incorporates additional guidance for the Emergency Coordinator/EOF Director related to classification of a high energy line break, such as a Main Steam Line Break. In addition, Section D has been retyped using a consistent font style - no changes in content resulted from the retype.

RECORD OF CHANGES (Continued)

REVISION NUMBER	EFFECTIVE DATE	REASON FOR REVISIONS
2004-01	02/04	Incorporates a retype of the majority of the sections as an editorial change to adopt a consistent format: Section G - Added information concerning One Mile Exclusion Area Signs; Section H - Strip Chart Recorders were removed under an NSM; Section J - Incorporated guidance on the use of KI as a protective action recommendation; Section K - changed KI dose to 5 REM CDE from 25 REM; Appendix 4 - Incorporate results of Evacuation Time Estimate; Appendix 5 - Revised Agreement Letters
2004-02	12/21/04	Editorial changes to correct typos, drawings, and title/organizational names. This revision also incorporates clarifying information from the latest Evacuation Time Estimate (ETE); clarification of offsite agency responsibilities for protective actions for impediments and special populations; revised EAL #2 for Enclosure 4.3, Unusual Event IC #2; clarification of ERO activation after normal working hours; and revisions to the site's SPCC Plan included in Appendix 8. In addition to these changes, applicable references have replaced generic references in Figure P-1. This revision also incorporates the 2005 Calendar distributed to the 10 mile EPZ population.
2005-01	02/01/05	Section D, Enclosure 4.7, Page 66 - Duke Power Hydro-Electric Group has revised the Lake Keowee water level from 807 to 815.5 feet for initiating a Condition B. This elevation is used in Enclosure 4.7 for classifying the event as an Unusual Event. The Hydro -Electric Group notifies the Control Room when Condition B has been declared. No protective actions by the plant are changed.
2005-02	05/17/05	Section I & Letters of Agreement - Incorporates an editorial revision that describes the makeup of Field Monitoring Teams and updated Agreement Letters. I.7&8 replaced "....personnel from Radiation Protection and Chemistry." with "..a RP Technician and a Driver." Editorial Change - Chemistry personnel no longer perform the function of FMT Driver. FMT Drivers are now provided by other groups.
2005-03	08/24/05	Revision 2005-03 incorporates an addendum for the Fire Department/Volunteer Fire Department Agreement Letters. This addendum was added as a result of NRC guidance provided to utilities. The addendum to these letters provides guidance on the use of the Incident Command System at ONS and identifies the ONS Fire Brigade Leader as the on-scene commander and site-interface for responding offsite fire departments.
2005-04	09/15/05	Revision 2005-04 is a change to Page 66, Enclosure 4.7, Emergency Action Levels #1 - Reservoir elevation greater than or equal to 807.0 feet with all spillway gates open and the lake elevation continues to rise. This change undoes Revision 2005-01 which changed Keowee Lake level from 807 feet elevation to 815.5 feet elevation. This revision was determined to be a non conservative change in that it delayed the Unusual Event emergency classification. Appendix 5, Agreement Letter #21 has been updated.
2005-05	01/09/06	Revision 2005-05 incorporates editorial changes that clarify organizational charts/responsibilities, revise procedure references, replaces public information calendar, and replaces obsolete survey instruments. Agreement Letters #16 and #19 were updated.

RECORD OF CHANGES (Continued)

REVISION NUMBER	EFFECTIVE DATE	REASON FOR REVISIONS
2006-03	06/8/06	Section D - Change #1 Revised initiating condition #2 for the Alert classification for Enclosure 4.6 (Fire/Explosions and Security Events). This change is based on a correction to the NEI White Paper, Enhancements to Emergency Preparedness Programs For Hostile Actions which was endorsed in a letter from the NRC on December 8, 2005. Change #2 - Renumbered Emergency Action Levels through out Section D to match the numbering scheme found in RP/0/B/1000/001 (Emergency Classification) procedure - Renumbering makes it easier for procedure users to locate the correct emergency action level in the Basis Document. Appendix 5 - Agreement Letters #8, 14,15 & 23 were updated.
2006-04	11/06	Reference changes to the deletion of the Clemson EOF and incorporates reference to the Charlotte EOF. In addition, miscellaneous editorial changes are included in this revision.
2007-01	03/07	Appendix 5 Agreement Letters that have been updated/revised.
2007-02	12/07	Editorial changes including a revised 50 mile radius map (Figure B), a revision to the Emergency Classification Basis Section D , the 2008 Emergency Planning Calendar, a revised layout drawing for the JIC, a revised listing of portable survey instruments, the latest renewal of existing agreement letters and a revised Ground Water Monitoring Plan
2008-01	09/08	The original order of the EALs created a human performance trap. The first fission barrier column that the procedure user reviews is the RCS Barrier column which is on the left side of the page. The second fission barrier column that is reviewed is the Fuel Clad Barrier which is in the center of the page. This order gives the procedure user the mind set that the EALs are listed in the same order: RCS EAL followed by the Fuel Clad EAL. Changing the order of the EALs is not a deviation from the approved EAL scheme but is a difference. This change does not constitute a decrease in the effectiveness of the EPLAN since the EALs are exactly the same.
2008-02	10/08	As of this change 2008-02, the Emergency Plan is now available on NEDL/SCRIBE and has been completely re-issued. All changes in the future to the Emergency Plan will be completed thru NEDL/SCRIBE. The following Agreement Letters were also updated: 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 19 and 21.
2009-01	02/09	Revised existing information relating to organization names that have changed, removed specific names and replaced with a title to mitigate the need for future revisions due to personnel changes, and changed staging location names based on changes made to area designation names; however staging will still occur in same area. Changes made only reflect actual organization names, functional position names, and current location names being used to make the E-Plan more accurately reflect current information. No changes are being made to the process or conduct of the how the E-Plan is to be implemented.

RECORD OF CHANGES (Continued)

REVISION NUMBER	EFFECTIVE DATE	REASON FOR REVISIONS
2010-10	02/10	Revised existing information relating to changes made to the callback system, who performs the dose assessments, the basis information for the Containment Barrier EAL based on NEI 99-01 Rev 5 FAQ lessons learned. Made name change for Oconee Medical Center, corrected information relating to testing frequency for major elements referenced in the E-Plan, the new neutron instrument used by radiation protection, and street name change for figure H-3A. Changes made are the result of the Annual Review process and no changes are being made to the process or conduct of how the E-Plan is to be implemented. The following Agreement Letters were also updated: Number - 6, 8, 13, 14, 15, 16, 18, 20, 22, & 23.
2011-01	05/11	Figure B-10 - Redistribution of support for Field Monitoring Teams from Chemistry to Business Management and Work Control. Section D - Basis corrected to delete reference to USFAR Table 15-114 which has been deleted, revised ICs 4.3.A.3 and 4.4.A.3, EAL A to align with RP/0/B/1000/001, revised ICs and EALs to add levels of operating modes that represent the operating levels of hot shutdown, cold shutdown and hot standby were listed, added "AC" back to IC 4.5.A.1 where it had been inadvertently deleted, add SSF to IC 4.6.U.1, correct IC 4.5.G.1, EAL 1 to reflect SSF maintaining Mode 3 (hot standby) rather than hot shutdown, add new ICs for Jocassee Dam condition A and B declarations, correct misprint in IC 4.7.A.2, EAL B, correct formatting errors, and add Security EALs. Section F - deleted onsite areas requiring phone notifications for site assembly due to new wireless system being installed in those areas. Section G - replace 2010 calendar with 2011 calendar. Figure H-1 - revised room layout to reflect current arrangement. Section N - Revised the testing cycle for the EPLAN from a 5 year cycle to a 6 year cycle. Appendix 5 - update letters of agreement.
2011-02	10/11	This evaluation supports a request to revise the Oconee (ONS), McGuire (MNS), and Catawba (CNS) Emergency Plans to allow for an alternate approach for compliance with 10 CFR 50.47(b)(2) relative to meeting the minimum staffing requirement during emergencies for site Radiation Protection (RP) personnel and the Emergency Operations Facility (EOF) position staffing to that in Table B-1 in NUREG-0654, endorsed by Regulatory Guide 1.101.
2012-01	6/12	Section F - A change to the process for answering the 4911 emergency phone calls. The new process will have both Operations and Security(SAS) answering the phone. Appendix 7 -Will clarify the ERDS related system description verbiage from the modem based data transfer system to the new VPN System.
2012-02	06/12	The NRC published Federal Register notice [RIN 3150-AI10], "Enhancements to Emergency Preparedness Regulations" on November 23, 2011. The amendments contained in the rule are summarized as twelve (XII) topics with varying implementation due dates. Emergency Plan changes to the following sections (C, D, H, I, J, P, and Appendix 1) are made in accordance with the rule and the appropriate guidance documents pertaining to Topic V – Emergency Action Level for Hostile Action, Topic VI – Emergency Declaration Timeliness, Topic VIII – Emergency Operation Facility (Performance Based), Topic IX – Emergency Response Organization Augmentation at Alternate Facility, and Topic XI – Protective Actions for On-site Personnel.

RECORD OF CHANGES (Continued)

REVISION NUMBER	EFFECTIVE DATE	REASON FOR REVISIONS
2012-03	06/13	Added Agreement Letter 25 - G&G Metal Fabrication to provide Hale pump technical support and Agreement Letter 26 Operating Agreement between Duke Energy's Lincoln Combustion Turbine Facility & MNS, CNS and ONS Nuclear Supply Chain concerning an Emergency Supply of Diesel Fuel.
2012-04	12/12	Section B - This change is to incorporate the new staffing analysis for the new EP rule and editorial changes.
2012-05	12/12	Revised Section D, Enclosure 4.3 to add threshold values for unit vent sampling as a compensatory measure. Unit vent sampling is performed on the 6th floor auxiliary building at sampling equipment where manual grab samples are retrieved per HP/0/B/1000/060-D. Additionally, the use of RIA 56 was added as a compensatory measure for Site Area Emergency and General Emergency Classifications. This change allows for classification of gaseous radiological releases in the event of a loss of either RIA-45 or 46. This change only clarifies the values to be used in the event normal monitoring is not available. The plan is also being revised based on annual review requirements, changes are mainly editorial or formatting. Additional changes are being made to reflect current name changes, update Agreement letters, Spill Prevention and Control, and Groundwater monitoring programs.
2013-01	10/13	Section D - Added clarification in the basis for Loss of Shutdown function. Section I - Revised to reference procedures versus RPSM 11.7 which has been deleted. Section J - Revised to incorporate latest revision to ETE. Deleted climate data tables which were duplicative to information contained within the ETE (Appendix 4). Section P - Updated appropriate references. Appendix 4 - Added latest ETE as reference.

RECORD OF CHANGES (Continued)

REVISION NUMBER	EFFECTIVE DATE	REASON FOR REVISIONS
2014-01	03/14	Section B - Removed reference to having home addresses listed in the emergency telephone directory as these were never listed in the telephone directory and clarified EOF Services Group actions. Updated titles of ERO positions in the TSC and OSC consistent with duty roster. Section D - Added clarification for which RIA-45 is to be used. Respectively, it is expected that 1RIA-45, 2RIA-45 and 3RIA-45 would be used in connection with Enclosure 4.3, Abnormal Rad Level/Radiological Effluent. 4RIA-45 is not specifically related to a unit and therefore it is not applicable to Enclosure 4.3. Section G - Removed Calendar and replaced with Note that the calendar is retained on file with EP Staff. Section H - Eliminated drawings of Alternate TSC and Alternate OSC as these are for implementation and not needed in Emergency Plan. Removed implementation details from Primary TSC and Primary OSC drawings. Corrected Figure H-20 and shifted table alignment. Section J - Provided editorial corrections to procedure numerical references where applicable. Section M - Provided clarification of EOF Services listed on Figure M-2. Section P - Provided editorial corrections to procedure numerical references where applicable, and changed a reference from the EP Functional Area Manual to a fleet administrative procedure reference (EP FAM to AD-EP-ALL-0001). Eliminated reference to HR Emergency Plan. Appendix 5 - Removed all copies of the Letters of Agreement and indicated they are included by reference. The actual Letters of Agreement are retained on file by the EP Staff.
2014-02	10/14	Section A - Revised for change from pagers to notify the ERO to using cell phones. Shift Manager delegates actual activation of notification device to Security if available or qualified operator if security is unable. Section B - Revised responsibility for Radwaste function from Chemistry Group to Operations Group. Section D - Revised responsibility for Radwaste function from Chemistry Group to Operations Group, including reference to chemistry procedures to operation procedures. Section F - Revised for change from pagers to notify the ERO to using cell phones. Shift Manager delegates actual activation of notification device to Security if available or qualified operator if security is unable. Section G - Procedure number changes Section H - Removed specific locations of kits as these were insufficiently detailed and did not contain all kit locations.

Record OF CHANGES (Continued)

Section I - Procedure number changes.

Section J - Procedure number changes.

Section M - Procedure number changes, title changes.

Section N - Changes to show new rules including 8 year cycle, consistency with fleet documents practices, and format.

Section P - Revised responsibility for independent audit from NSRB to NOS Manager, deleted duplicated paragraph and updated the listing of the implementing procedures.

Appendix 6 - Updated distribution list to reflect new format of E Plan and associated implementing procedures.

2014-003	12/14	Changes made associated with the modification from Raddose V to URI, and updates to WEBEOC.

Duke Energy Oconee Nuclear Station **EMERGENCY PLAN A - SECTION D EMERGENCY CLASSIFICATION SYSTEM**	Procedure No. **EPA SECTION D**
	Revision No. **008**
	Electronic Reference No. **OAP000HT**

PDF Format

Prepared By* ______________________________ Date __________

Requires Applicability Determination? ☐ Yes ☐ No

Reviewed By* ______________________________(QR) Date __________

Cross-Disciplinary Review By* ____________________(QR) NA __________ Date __________

Reactivity Mgmt. Review By* ____________________(QR) NA __________ Date __________

Additional Reviews

Reviewed By* ______________________________Date __________

Reviewed By* ______________________________Date __________

Approved By* ______________________________ Date __________

** Printed Name and Signature*

D. EMERGENCY CLASSIFICATION SYSTEM

RegGuide 1.101, Rev. 3, August, 1992, approved the guidance provided by NUMARC/NESP-007, Revision 2, as an Alternative Methodology for the Development of Emergency Action Levels. Oconee Nuclear Site used the NUMARC guidance for the development of initiating conditions and emergency action levels. The emergency action levels provided in this section have been modified to implement the guidance provided in NRC Bulletin 2005-02, NEI guidance as endorsed in Regulatory Issue Summary 2006-12 and to support the implementation of NEI 03-12.

The emergency classification system utilizes four categories for classification of emergency events.

D.1.a. UNUSUAL EVENT

Events are in process 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.

The purpose of an Unusual Event classification is to provide notification of the emergency to the station staff, State and Local Government representatives, and the NRC.

Specific initiating conditions and their corresponding emergency action levels are provided in the Basis Document beginning on page D-4.

D.1.b ALERT

Events are in process 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.

The purpose of the Alert classification is to assure that emergency personnel are readily available to:

1. Activate the onsite response centers
2. Respond if the situation becomes more serious or to perform confirmatory radiation monitoring if required
3. Provide offsite authorities current status information

Specific initiating conditions and their corresponding emergency action levels are provided in the Basis Document beginning on page D-4.

D.1.c. SITE AREA EMERGENCY

Events are in process or have occurred which involve actual or likely major failures of plant functions needed for protection of the public 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 beyond the site boundary.

The purpose of the Site Area Emergency classification is to:

1. Activate the offsite response centers

2. Assure that monitoring teams are mobilized

3. Assure that personnel required for taking protective actions of near site areas are at duty stations should the situation become more serious

4. Provide current information to the public and be available for consultation with offsite authorities

Specific initiating conditions and their corresponding emergency action levels are provided in the Basis Document beginning on page D-4.

D.1.d. GENERAL EMERGENCY

Events are in process or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity 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 offsite for more than the immediate site area.

The purpose of the General Emergency classification is to:

1. Initiate predetermined protective actions for the public

2. Provide continuous assessment of information from onsite and offsite measurements

3. Initiate additional measures as indicated by event releases or potential releases

4. Provide current information to the public and be available for consultation with offsite authorities

Specific initiating conditions and their corresponding emergency action levels are provided in the Basis Document beginning on page D-4.

D.2 Initiating Conditions

Initiating conditions and their corresponding emergency actions levels are contained in the BASIS document beginning on page D-4. Classification procedure (RP/0/A/1000/001) provides the guidance necessary to classify events and promptly declare the appropriate emergency condition within 15 minutes after the availability of indications to cognizant facility staff that an emergency action level threshold has been exceeded. Specific response procedures are in place for the Control Room, Technical Support Center and the Emergency Operations Facility which delineate the required response during the appropriate classification.

D.3 LOCAL AND STATE EMERGENCY ACTION LEVELS

Pickens County FNF Plans
Oconee County FNF Plans
State of South Carolina FNF Plans (Site Specific)

D.4 LOCAL AND STATE EMERGENCY PROCEDURES

Pickens County FNF Plans
Oconee County FNF Plans
State of South Carolina FNF Plans (Site Specific)

ENCLOSURE 4.1
FISSION PRODUCT BARRIER MATRIX

DETERMINE THE APPROPRIATE CLASSIFICATION USING THE TABLE BELOW: ADD POINTS TO CLASSIFY. SEE NOTE BELOW

RCS BARRIERS (BD 5-7)		FUEL CLAD BARRIERS (BD 8-9)		CONTAINMENT BARRIERS (BD 10-12)	
Potential Loss (4 Points)	**Loss (5 Points)**	**Potential Loss (4 Points)**	**Loss (5 Points)**	**Potential Loss (1 Point)**	**Loss (3 Points)**
RCS Leakrate ≥ 160 gpm	RCS Leak rate that results in a loss of subcooling.	Average of the 5 highest CETC ≥ 700° F	Average of the 5 highest CETC ≥ 1200° F	CETC ≥ 1200° F ≥ 15 minutes **OR** CETC ≥ 700° F ≥ 15 minutes with a *valid* RVLS reading 0″	Rapid unexplained containment pressure decrease after increase **OR** containment pressure or sump level not consistent with LOCA
SGTR ≥ 160 gpm		*Valid* RVLS reading of 0″ NOTE: RVLS is <u>NOT</u> valid if one or more RCPs are running <u>OR</u> if LPI pump(s) are running <u>AND</u> taking suction from the LPI drop line.	Coolant activity ≥ 300 µCi/ml DEI	RB pressure ≥ 59 psig **OR** RB pressure ≥ 10 psig and no RBCU or RBS	Failure of secondary side of SG results in a direct opening to the environment with SG Tube Leak ≥ 10 gpm in the <u>**SAME**</u> SG
Entry into the PTS (Pressurized Thermal Shock) Operation **NOTE:** PTS is entered under either of the following: • A cooldown below 400°F @ > 100°F/hr. has occurred. • HPI has operated in the injection mode while **NO** RCPs were operating.	1RIA 57 or 58 reading ≥ 1.0 R/hr 2 RIA 57 reading ≥ 1.6 R/hr 2 RIA 58 reading ≥ 1.0 R/hr 3RIA 57 or 58 reading ≥ 1.0 R/hr		**Hours Since SD / RIA 57 OR RIA 58 R/hr / R/hr** 0 - <0.5 / ≥ 300 / ≥ 150 0.5 - < 2.0 / ≥ 80 / ≥ 40 2.0 - 8.0 / ≥ 32 / ≥ 16	**Hours Since SD / RIA 57 OR RIA 58 R/hr / R/hr** 0 - < 0.5 / ≥ 1800 / ≥ 860 0.5 - < 2.0 / ≥ 400 / ≥ 195 2.0 - 8.0 / ≥ 280 / ≥ 130	SG Tube Leak ≥ 10 gpm exists in one SG. <u>**AND**</u> the other SG has secondary side failure that results in a direct opening to the environment <u>**AND**</u> is being fed from the affected unit.
HPI Forced Cooling	RCS pressure spike ≥ 2750 psig			Hydrogen concentration ≥ 9%	Containment isolation is incomplete and a release path to the environment exists
Emergency Coordinator/EOF Director judgment	Emergency Coordinator/EOF Director judgment	Emergency Coordinator/EOF Director judgment	Emergency Coordinator/EOF Director judgment	Emergency Coordinator/EOF Director judgment	Emergency Coordinator/EOF Director judgment

UNUSUAL EVENT (1-3 Total Points)	ALERT (4-6 Total Points)	SITE AREA EMERGENCY (7-10 Total Points)	GENERAL EMERGENCY (11-13 Total Points)
<u>**OPERATING MODE:**</u> 1, 2, 3, 4 4.1.U.1 Any potential loss of Containment 4.1.U.2 Any loss of containment	<u>**OPERATING MODE:**</u> 1, 2, 3, 4 4.1.A.1 Any potential loss or loss of the RCS 4.1.A.2 Any potential loss or loss of the Fuel Clad	<u>**OPERATING MODE:**</u> 1, 2, 3, 4 4.1.S.1 Loss of any two barriers 4.1.S.2 Loss of one barrier and potential loss of either RCS or Fuel Clad Barriers 4.1.S.3 Potential loss of both the RCS and Fuel Clad Barriers	<u>**OPERATING MODE:**</u> 1, 2, 3, 4 4.1.G.1 Loss of any two barriers and potential loss of the third barrier 4.1.G.2 Loss of all three barriers

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

ENCLOSURE 4.1

BASIS INFORMATION FOR FISSION PRODUCT BARRIER REFERENCE TABLE

RCS BARRIER EALs: (1 or 2 or 3 or 4 or 5)

The RCS Barrier includes the RCS primary side and its connections up to and including the pressurizer safety and relief valves, and other connections up to and including the primary isolation valves.

1. RCS Leak Rate

Small leaks may result in the inability to maintain normal liquid inventory within the Reactor Coolant System (RCS) by normal operation of the High Pressure Injection System. The capacity of one HPI pump at normal system pressure is approximately 160 gpm. Leakage in excess of this value would call for compensatory action to maintain normal liquid inventory. As such, this is an indication of a degraded RCS barrier and is considered to be a potential loss of the barrier.

The loss of subcooling is the fundamental indication that the inventory loss from the primary system exceeds the capacity of the inventory control systems. If the loss of subcooling is indicated, the RCS barrier is considered lost.

2. SG Tube Rupture

Small Steam Generator tube leaks may result in the inability to maintain normal liquid inventory within the Reactor Coolant System (RCS) by normal operation of the High Pressure Injection System. The capacity of one HPI pump at normal system pressure is approximately 160 gpm. Leakage in excess of this value would call for compensatory action to maintain normal liquid inventory. As such, this is an indication of a degraded RCS barrier and is considered to be a potential loss of the barrier.

A tube rupture (> than 160 gpm) with an unisolable secondary line rupture is generally indicated by a reduction in primary coolant inventory, increased secondary radiation levels, and an uncontrolled or complete depressurization of the ruptured SG. This set of conditions represents a potential loss of the RCS and loss of containment fission product barrier and will result in the declaration of a Site Area Emergency. Escalation to a General Emergency would be indicated by at least a potential loss of the fuel clad barrier.

ENCLOSURE 4.1

BASIS INFORMATION FOR FISSION PRODUCT BARRIER REFERENCE TABLE

2. SG Tube Rupture

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 also occurs such as steam through a steam relief valve failed open, feedwater line break, steam line break on the affected steam generator then a loss of the Containment Barrier has also occurred. 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 PTS

Entry into Pressurized Thermal Shock Operation 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. This EAL is satisfied if Rule 8 (Pressurized Thermal Shock) is implemented.

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.

5. Containment Radiation Monitoring

A containment radiation monitor reading of > 1 R/hr on radiation monitors 1RIA-57 or 58 (Unit 1), 2RIA-58 (Unit 2), and 3RIA-57 or 58 (Unit 3) indicates the release of reactor coolant to the containment. A containment radiation monitor reading of >1.6 R/hr on radiation monitor 2RIA-57 (Unit 2) also indicates the release of reactor coolant to the containment. The difference in these values is due to the relative strength of the detector check source which affects the background readings for the detector (the source for 2RIA-57 is stronger than that for the remaining detectors). This reading is less than that specified for Fuel Clad Barrier EAL#3. Thus, this EAL would be indicative of a RCS leak only. If the radiation monitor reading increased to that specified by Fuel Clad Barrier EAL #3, fuel damage would also be indicated.

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

6. Emergency Coordinator/EOF Director Judgment

This EAL is intended to address unanticipated conditions not addressed explicitly but warrant declaration of an emergency because conditions exist which are believed by the Emergency Coordinator/EOF Director to fall under either the loss or potential loss of the RCS Barrier.

ENCLOSURE 4.1

BASIS INFORMATION FOR FISSION PRODUCT BARRIER REFERENCE TABLE

FUEL CLAD BARRIER EALs: (1 or 2 or 3 or 4)

The Fuel Clad Barrier is the zircalloy tubes that contain the fuel pellets.

1. Core Exit Thermocouple Readings
The "Potential Loss" EAL reading corresponds to loss of subcooling. The value of 700 °F is indicative of superheated steam and is a value referenced in the Emergency Operating procedure. The loss of subcooling may lead to clad damage and, therefore, this is a potential loss of the fuel clad barrier.

The "Loss" EAL reading (1200 °F) indicates significant superheating of the coolant and core uncovery. Clad damage under these conditions is likely; therefore, this is indication of loss of the Fuel Clad Barrier.

2. Primary Coolant Activity Level
The value of 300 μCi/ml DEI coolant activity is well above that expected for iodine spikes and corresponds to about 4% fuel clad damage. This amount of clad damage indicates significant clad damage and thus the Fuel Clad Barrier is considered lost. Basis for determination is Engineering Calculation OSC-5283.

There is no equivalent "Potential Loss" EAL for this item.

3. Reactor Vessel Water Level
A valid reading of 0" on the RVLS (Reactor Vessel Level System) is an indicator that the fuel **could be** uncovered and would signify a potential loss of the fuel clad barrier. RVLS is invalid if LPI pumps are running and taking suction from the LPI drop line.

4. Containment Radiation Monitoring
Containment monitor readings on RIA 57/58 in the below listed table is higher than can be attributed to normal reactor coolant activity alone. These levels indicate that approximately 4% of the fuel cladding has failed which is consistent with the release of 300 uC/ml DEI to the containment atmosphere. Release of this amount of activity into containment corresponds to a loss of both the fuel clad and RCS barriers. Basis for the calculation which determined the activity levels can be found in engineering calculation OSC-5283.

Hours Since SD	RIA 57	RIA 58
0 - < 0.5	≥ 300	≥ 150
0.5 - < 2.0	≥ 80	≥ 40
2.0 - 8.0	≥ 32	≥ 16

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

ENCLOSURE 4.1

BASIS INFORMATION FOR FISSION PRODUCT BARRIER REFERENCE TABLE

5. Emergency Coordinator/EOF Director Judgment

This EAL is intended to address unanticipated conditions not addressed explicitly but warrant declaration of an emergency because conditions exist which are believed by the Emergency Coordinator/EOF Director to fall under either the loss or potential loss of the Fuel Clad Barrier.

ENCLOSURE 4.1

BASIS INFORMATION FOR FISSION PRODUCT BARRIER REFERENCE TABLE

CONTAINMENT BARRIER EALs: (1 or 2 or 3 or 4 or 5 or 6)

The Containment Barrier includes the containment building, its connections up to and including the outermost containment isolation valves. This barrier also includes the main steam, feedwater, and blowdown line extensions outside the containment building up to and including the outermost secondary side isolation valve.

1. Containment Pressure

- Containment pressure above 59 psig (the design pressure) indicates that the containment or its heat removal systems are not functioning as intended. This degradation of containment pressure control represents a potential loss of containment integrity.

- Containment pressure of 10 psig with no reactor building cooling units or reactor building spray available represents degradation in the control of the containment conditions. Therefore, this situation represents a potential loss of containment integrity.

- A containment hydrogen concentration greater than 9 percent volume is sufficient to expect that any ignition would result in complete combustion of the hydrogen in containment and a significant pressure rise. At hydrogen concentrations near 9 percent volume no challenge to containment integrity would be expected. At levels somewhat higher the possibility of a deflagration to detonation transition raises the uncertainty as to the actual response of the containment. Therefore, it is prudent that this level of hydrogen in the containment be considered a potential loss of containment integrity.

- Rapid unexplained loss of pressure (i.e., not attributable to containment spray or condensation effects) following an initial pressure increase indicates a loss of containment integrity.

  Containment pressure and sump levels should increase as a result of the mass and energy release into containment from a LOCA. Thus, sump level or pressure not increasing indicates an interfacing systems LOCA which is a containment bypass and a loss of containment integrity.

ENCLOSURE 4.1

BASIS INFORMATION FOR FISSION PRODUCT BARRIER REFERENCE TABLE

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.

The use of the modifier "direct" in defining the release path discriminates against release paths through interfacing liquid systems. The existence of an in-line charcoal filter does not make a release path indirect since the filter is not effective at removing fission product noble gases. Typical filters have an efficiency of 95-99% removal of iodine. Given the magnitude of the core inventory of iodine, significant releases could still occur. In addition, since the fission product release would be driven by boiling in the reactor vessel, the high humidity in the release stream can be expected to render the filters ineffective in a short period.

There is no Potential Loss threshold associated with this item.

The decision of whether this EAL is satisfied should be based on present and readily available information. This includes physical data seen and heard. It is not the intent of this EAL to use relatively long term calculations to make the determination. If there is a pathway which would allow containment atmosphere to be released to the environment, this EAL is satisfied.

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

3. SG Secondary Side Release With Primary To Secondary Leakage

Secondary side releases directly to the atmosphere include atmospheric dump valves and stuck open main steam safety valves. If the main condenser is available, there may be releases via air ejector, gland seal exhauster, and other similar controlled, and often monitored, pathways. These pathways do not meet the intent of a direct opening to the environment. These minor releases are assessed using Abnormal Rad Levels/Radiological Effluent Initiating Conditions. A failure of the secondary side which results in a direct opening to the environment, in combination with Primary to Secondary leakage $\geq$ 10 gpm in the same steam generator, constitutes a bypass of the containment, and therefore, a loss of the containment barrier.

Likewise, a failure of the secondary side which results in a direct opening to the environment, in combination with Primary to Secondary leakage ≥ 10 gpm in the other steam generator, constitutes a bypass of the containment, **IF** the SG with the secondary side failure is being fed feedwater from the affected unit. Therefore, this condition also constitutes a loss of the containment barrier.
In combination with the SG Tube Rupture EAL under the RCS barrier section, 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	RIA 58
0 - < 0.5	≥ 1800	≥ 860
0.5 - < 2.0	≥ 400	≥ 195
2.0 - 8.0	≥ 280	≥ 130

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

ENCLOSURE 4.1

BASIS INFORMATION FOR FISSION PRODUCT BARRIER REFERENCE TABLE

5. Core Exit Thermocouple

Core Exit Thermocouple temperatures ≥ 1200 °F or ≥ 700 °F with a valid RVLS reading for greater than 15 minutes, in this potential loss EAL represent imminent core damage that, if not terminated, could lead to vessel failure and an increased potential for containment failure. The potential for containment challenge as a result of events at reactor vessel failure makes it prudent to consider an unmitigated core damage condition as a potential loss of the containment barrier.

Severe accident analyses (e.g., NUREG-1150) have concluded that function restoration procedures can arrest core degradation within the reactor vessel in a significant fraction of the core damage scenarios, and that the likelihood of containment failure is very small in these events. Given this, it is appropriate to provide a reasonable period to allow function restoration procedures to arrest the core melt sequence. Whether or not the procedures will be effective should be apparent within 15 minutes. The Emergency Coordinator should make the declaration as soon as it is determined that the procedures have been, or will be ineffective.

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

6. Emergency Coordinator/EOF Director Judgment

This EAL is intended to address unanticipated conditions not addressed explicitly but warrant declaration of an emergency because conditions exist which are believed by the Emergency Coordinator/EOF Director to fall under either the loss or potential loss of the Containment Barrier.

Reference

NUMARC/NESP-007, Rev 2, 01/92, Table 5-F-3

ENCLOSURE 4.2

SYSTEM MALFUNCTION

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
RCS Leakage Unplanned Loss of Most or All Safety System Annunciation or Indication in the Control Room for Greater than 15 minutes Inability to Reach Required Shutdown Within Technical Specification Limits Unplanned Loss of All Onsite or Offsite Communications Fuel Clad Degradation	Unplanned Loss of Most or All Safety System Annunciation or Indication in Control Room With Either (1) a Significant Transient in Progress, or (2) Compensatory Non-Alarming Indicators are Unavailable	Inability to Monitor a Significant Transient in Progress	

ENCLOSURE 4.2

SYSTEM MALFUNCTION

UNUSUAL EVENT

1. RCS Leakage

OPERATING MODE APPLICABILITY: 1,2,3,4

EMERGENCY ACTION LEVELS:

A. Unidentified leakage ≥ 10 gpm

B. Pressure boundary leakage ≥ 10 gpm

C. Identified leakage ≥ 25 gpm
   - Includes SG tube leakage

BASIS:
Reactor Coolant system (RCS) Leakage is defined in RCS Operational Leakage in the Technical Specifications Basis B 3.4.13.

This IC is included as an Unusual Event because it may be a precursor of more serious conditions and, as result, is considered to be a potential degradation of the level of safety of the plant. The 10 gpm value for the unidentified and pressure boundary leakage was selected as it is observable with normal control room indications. Lesser values must generally be determined through time-consuming surveillance tests (e.g., mass balances). The EAL for identified leakage is set at a higher value due to the lesser significance of identified leakage in comparison to unidentified or pressure boundary leakage. In either case, escalation of this IC to the Alert level is via Fission Product Barrier Degradation ICs or IC, Enclosure 4.4, Loss of Shutdown Function, "Inability to Maintain Plant in Cold Shutdown".

Reference
NUMARC/NESP-007, Rev. 2, 01/92, SU5

ENCLOSURE 4.2

SYSTEM MALFUNCTION

UNUSUAL EVENT

2. Unplanned Loss of Most or All Safety System Annunciation or Indication in the Control Room for Greater Than 15 Minutes.

OPERATING MODE APPLICABILITY: 1,2,3,4

EMERGENCY ACTION LEVEL:

The following conditions exist:

A. Unplanned loss of > 50% of the following annunciators for greater than 15 minutes

Units 1&3	1SA 1, 2, 3, 4, 5, 6, 7, 8, 9, 14, 15, 16 and 18 3SA 1, 2, 3, 4, 5, 6, 7, 8, 9, 14, 15, 16 and 18
Unit 2	2SA 1, 2, 3, 4, 5, 6, 7, 8, 9, 14, 15 and 16

AND

In the opinion of the Operations Shift Manager, the loss of the annunciators or indicators requires additional personnel (beyond normal shift compliment) to safely operate the unit.

BASIS:

This IC and its associated EAL are intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment.

"Unplanned" loss of annunciators or indicator excludes scheduled maintenance and testing activities. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses. Equipment monitored by referenced annunciator panel is shown on page 20.

This Unusual Event will be escalated to an Alert if a transient is in progress during the loss of annunciation or indication.

Due to the limited number of safety systems in operation during cold shutdown, refueling, and defueled modes, no IC is indicated during these modes of operation.

Reference NUMARC/NESP-007, Rev. 2, 01/92, SU3

ENCLOSURE 4.2

SYSTEM MALFUNCTION

UNUSUAL EVENT

3. Inability to Reach Required Shutdown Within Technical Specification Limits

OPERATING MODE APPLICABILITY: 1, 2, 3, 4

EMERGENCY ACTION LEVELS:

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

BASIS:

Technical Specification Actions Statements require the plant to be brought to a required shutdown mode when the Technical Specification required configuration cannot be restored. Depending on the circumstances, this may or may not be an emergency or precursor to a more severe condition. In any case, the initiation of plant shutdown required by the site Technical Specifications requires a one hour report under 10 CFR 50.72 (b) Non-emergency events. The plant is within its safety envelope when being shut down within the allowable action statement time in the Technical Specifications. An immediate Notification of an Unusual Event is required when the plant is not brought to the required operating mode within the allowable action statement time in the Technical Specifications. **Declaration of an Unusual Event is based on the time at which the LCO-specified action statement time period elapses under the site Technical Specifications and is not related to how long a condition may have existed.** Other required Technical Specification shutdowns that involve precursors to more serious events are addressed by other System Malfunction, Hazards, or Fission Product Barrier Degradation ICs.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, SU2

ENCLOSURE 4.2

SYSTEM MALFUNCTION

UNUSUAL EVENT

4. Unplanned Loss of All Onsite or Offsite Communications

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVELS:

A. Loss of all onsite communications capability (internal phone system, PA system, ERO notification system, onsite radio system) affecting the ability to perform routine operations.

B. Loss of all offsite communications capability (Selective Signaling, ETS lines, offsite radio system, commercial phone system) affecting the ability to communicate with offsite authorities.

BASIS:

The purpose of this IC and its associated EALs is to recognize a loss of communications capability that either defeats the plant operations staff ability to perform routine tasks necessary for plant operations or the ability to communicate problems with offsite authorities. The loss of offsite communications ability is expected to be significantly more comprehensive than the condition addressed by 10 CFR 50.72.

This EAL is intended to be used only when extraordinary means are being utilized to make communications possible (relaying of information from radio transmissions, individuals being sent to offsite locations, etc.).

Reference
NUMARC/NESP-007, Rev. 2, 01/92, SU6

ENCLOSURE 4.2

SYSTEM MALFUNCTION

UNUSUAL EVENT

5. Fuel Clad Degradation.

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVEL:

A. DEI > 5 uCi/ml

BASIS:

Chemistry analysis which indicates the presence of > 5 uci/ml dose equivalent iodine in the reactor coolant system clearly denotes a potential degradation in the level of safety of the plant and a potential precursor of more serious problems. The basis for the 5 uCi/ml is based upon the Oconee FSAR, Chapter 15, Table 15-14 of RCS Coolant Activity for 1% failed fuel. Escalation of this IC to the Alert level is via the Fission Product Barrier Degradation Monitoring ICs, Enclosure 4.1 of this document.

Reference
NUMARC/NESP-007, Rev. 2, 01/92, SU4

ENCLOSURE 4.2

SYSTEM MALFUNCTION

ALERT

1. Unplanned Loss of Most or All Safety System Annunciation or Indication in Control Room With Either (1) a Significant Transient in Progress, or (2) Compensatory Non-Alarming Indicators are Unavailable.

OPERATING MODE APPLICABILITY: 1, 2, 3, 4

EMERGENCY ACTION LEVEL:

The following conditions exist:

A. Unplanned loss of > 50% of the following annunciators for greater than 15 minutes.

Units 1&3	1SA 1, 2, 3, 4, 5, 6, 7, 8, 9, 14, 15, 16, and 18 3SA 1, 2, 3, 4, 5, 6, 7, 8, 9, 14, 15, 16, and 18
Unit 2	2SA 1, 2, 3, 4, 5, 6, 7, 8, 9, 14, 15 and 16

AND

In the opinion of the Operations Shift Manager, the loss of the annunciators or indicators requires additional personnel (beyond normal shift compliment) to safely operate the unit.

AND

Either of the following:

A significant plant transient is in progress.

OR

Loss of the OAC and PAM indications.

ENCLOSURE 4.2

SYSTEM MALFUNCTION

BASIS:

SA 1-9 : ES, RPS, CRD breakers, basic information concerning primary system, fire alarms, seismic trigger, condenser cooling, HPSW and LPSW system status.

SA 14-16: Electrical load (Keowee emergency start, load shed, emergency power switching logic)

SA-18 : CRD shunt trip relay, ICS, PZR relief valve flow, hydrogen concentration in RB, chlorine gas leakage.

This IC and its associated EAL are intended to recognize the difficulty associated with monitoring changing plant conditions without the use of a major portion of the annunciation or indication equipment during a transient.

Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

"Significant Transient" includes response to automatic or manually initiated functions such as scrams, runbacks involving greater than 25% thermal power change, ECCS injections, or thermal power oscillations of 10% or greater.

Significant indication is available from the OAC (operational aid computer) and from post accident monitoring (PAM). Loss of this data in conjunction with the loss of other indications would further impair the ability to monitor plant parameters.

Due to the limited number of safety systems in operation during cold shutdown, refueling and defueled modes, no IC is indicated during these modes of operation.

This Alert will be escalated to a Site Area Emergency if the operating crew cannot monitor the transient in progress.

Reference
NUMARC/NESP-007, Rev. 2, 01/92/ SA4

ENCLOSURE 4.2

SYSTEM MALFUNCTION

SITE AREA EMERGENCY

1. Inability to Monitor a Significant Transient in Progress

OPERATING MODE APPLICABILITY: 1, 2, 3, 4

EMERGENCY ACTION LEVEL:
The following conditions exist:

A Unplanned loss of > 50% of the following annunciators for greater than 15 minutes.

Units 1&3	1SA 1, 2, 3, 4, 5, 6, 7, 8, 9, 14, 15, 16, and 18 3SA 1, 2, 3, 4, 5, 6, 7, 8, 9, 14, 15, 16, and 18
Unit 2	2SA 1, 2, 3, 4, 5, 6, 7, 8, 9, 14, 15, and 16

AND

A significant plant transient is in progress.

AND

Loss of the OAC and the PAM indications.

AND

Inability to directly monitor any one of the following functions:
- Subcriticality
- Inadequate core cooling
- Heat sink
- Containment Integrity
- RCS integrity
- RCS Inventory

BASIS:
This IC and its associated EAL are intended to recognize the inability of the control room staff to monitor the plant response to a transient. The inability to directly monitor indicates that computer data points or SPDS indicators are not available to monitor the critical safety functions.

ENCLOSURE 4.2

SYSTEM MALFUNCTION

SITE AREA EMERGENCY

"Significant Transient" includes response to automatic or manually initiated functions such as scrams, runbacks involving greater than 25% thermal power change, ECCS injections, or thermal power oscillations of 10% of greater.

Reference
NUMARC/NESP-007, Rev. 2, 01/92, SS6

ENCLOSURE 4.3

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
Any Unplanned Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds Two Times the SLC Limits for 60 Minutes or Longer	Any Unplanned Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds 200 Times the SLC limits for 15 Minutes or Longer	Boundary Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity Exceeds 100 mRem TEDE or 500 mRem CDE thyroid for the Actual or Projected Duration of the Release	Boundary Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity that Exceeds 1000 mRem TEDE or 5000 mRem CDE thyroid for the Actual or Projected Duration of the Release
Unexpected Increase in Plant Radiation Levels or Airborne Concentration	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		
	Release of Radioactive Material or Increases in Radiation Levels Within the Facility That Impedes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Cold Shutdown		

ENCLOSURE 4.3

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

UNUSUAL EVENT

1. Any Unplanned Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds Two Times the SLC Limits for 60 Minutes or Longer

OPERATING MODE APPLICABILITY: ALL
EMERGENCY ACTION LEVELS:

A. A valid indication on radiation monitor RIA 33 of ≥ 4.06E+06 cpm for > 60 minutes. (See Note)

B. Valid indication on radiation monitor RIA-45 of ≥ 9.35E+05 cpm or RP sample reading of ≥ 6.62E-2uCi/ml Xe 133 eq for > 60 minutes. (See Note)

C. Confirmed sample analysis of liquid effluent being released exceeds two times SLC 16.11.1 for > 60 minutes as determined by Chemistry procedures.

D. Confirmed sample analysis of gaseous effluent being released exceeds two times SLC 16.11.2 for > 60 minutes as determined by Radiation Protection procedures.

Note: If monitor reading is sustained for the time period indicated in the EAL AND the required assessments (procedure calculations) cannot be completed within this period, declaration must be made on the valid Radiation monitor reading.

BASIS:
The term "Unplanned", as used in this context, includes any release for which a liquid waste release (LWR) or gaseous waste release (GWR) package was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable package.

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

ENCLOSURE 4.3

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

UNUSUAL EVENT

Chapter 16, Selected Licensee Commitments, of the Oconee Nuclear Station FSAR provides guidance to ensure that the release of liquid or gaseous effluent does not exceed the limits established in 10 CFR 20, Appendix B, Table II and Appendix I, 10 CFR 50. Unplanned releases in excess of two times the selected licensee commitments that continue for 60 minutes or longer represent an uncontrolled situation and hence, a potential degradation in the level of safety. It is not intended that the release be averaged over 60 minutes. The event should be declared as soon as it is determined that the release duration has or will likely exceed 60 minutes.

1. **Any Unplanned Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds Two Times the SLC Limits for 60 Minutes or Longer**

Monitor indications are based on the methodology of the site Offsite Dose Calculation Manual (ODCM). Annual average meteorology (semi-elevated 1.672E-06 sec/m3) has been used. Radiation Protection will use HP/0/B/1009/015 to quantify a gaseous release. Operations will use OP/0/A/1104/068 and/or OP/0/A/1104/072 to quantify a liquid release.

BASIS:

References to RIA-45 are intended to be related to unit specific RIA-45 only. 4RIA-45 provides a concentration value, not in cpm, that is used by unit 1, 2, 3 RIA-45. Additionally, a radionuclide concentration value of 6.62E-2 uCi/ml cannot be obtained in the Radwaste Facility (RWF) ventilation system discharge without the input of post-accident concentrations of gaseous radionuclides. There are no post-accident inputs to the RWF other than planned batch transfers of liquids and resins that would be transferred in a controlled manner. All gaseous radionuclides would be entrained in the liquids and resins since there are no gas storage tanks in the RWF to accept a transfer of gaseous waste. Unit 1,2,3 RIA-45 could detect a concentration of 6.62E-2 uCi/ml post-accident since a LOCA in the Auxiliary Building could provide the source activity.

ENCLOSURE 4.3

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

UNUSUAL EVENT

The Radwaste Facility is only used for waste water and resin processing. The type of waste processed, even if it contained entrained gasses from the reactor coolant system, cannot contain sufficient activity during normal operation to result in SLC limits being exceeded. Liquid waste is not transferred to the Radwaste Facility during an event. The Radwaste Facility 4RIA-45 alarm set point is set at 5% of the station release limit. This set point is based on providing a set point that will not cause spurious alarms and will maintain total effluent releases below 100% of the station release limit. It is recognized that the Radwaste Facility is a less significant gaseous release pathway since the 4RIA-45 set point is set at one sixth of the 1, 2, or 3 RIA-45 set points. This EAL is only applicable to 1, 2, or 3 RIA-45 since the accident related source term that enters an intact Auxiliary Building will be released out of the unit vents.

Reference
NUMARC/NESP/-007, Rev. 2, 01/92, AU1

<u>ENCLOSURE 4.3</u>

<u>ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT</u>

UNUSUAL EVENT

2. Unexpected Increase in Plant Radiation or Airborne Concentration.

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVELS:

A. LT 5 reading 14" and decreasing with makeup not keeping up with leakage <u>**WITH**</u> fuel in the core

B. Valid indication of *uncontrolled* water decrease in the SFP or fuel transfer canal with all fuel assemblies remaining covered by water <u>**AND**</u> unplanned *valid* RIA 3, 6 or portable area monitor readings increase.

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

D. Valid area or process monitor exceeds limits stated in Enclosure 4.9 of RP/0/A/1000/001.

BASIS:

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

EAL 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

EAL 4 addresses unplanned increases in in-plant radiation levels that represent a degradation in the control of radioactive material, and represent a potential degradation in the level of safety of the plant. The RIA readings for an Unusual Event are 1000 times the normal value. Enclosure 4.9 of RP/0/A/1000/001 will provide the actual readings for the monitors.

Reference
NUMARC/NESP-007, Rev. 2, 01/92, AU2
NEI 99-01, Rev. 4, 08/00, AU2

ENCLOSURE 4.9 (RP/0/A/1000/001)

UNEXPECTED/UNPLANNED INCREASE IN AREA MONITOR READINGS

This initiating condition is not intended to apply to anticipated temporary increases due to planned events (e.g., incore detector movement, radwaste container movement, depleted resin transfers, etc.)

MONITOR NUMBER	UNIT 1, 2, 3	
	UNUSUAL EVENT 1000 x normal levels mRad/hr	ALERT mRad/hr
RIA 7, Hot Machine Shop Elevation 796	150	≥ 5000
RIA 8, Hot Chemistry Lab Elevation 796	4200	≥ 5000
RIA 10, Primary Sample Hood, Elevation 796	830	≥ 5000
RIA 11, Change Room Elevation 796	210	≥ 5000
RIA 12, Chem Mix Tank Elevation 783	800	≥ 5000
RIA 13, Waste Disposal Sink, Elevation 771	650	≥ 5000
RIA 15, HPI Room Elevation 758	**NOTE***	≥ 5000

NOTE*: RIA 15 normal readings are approximately 9 mRad/hr on a daily basis. Applying the 1000 x normal readings would put this monitor greater than 5000 mRad/hr just for an Unusual Event. For this reason, an Unusual Event will not be declared for any reading less than 5000 mRad/hr

ENCLOSURE 4.3

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

ALERT

1. **Any Unplanned Release of Gaseous or Liquid Radioactivity to the Environment that Exceeds 200 Times Radiological Technical Specifications for 15 Minutes or Longer.**

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVELS:

A. Valid indication of RIA-46 of ≥ 2.09E+04 cpm or RP sample reading of ≥ 6.62 uCi/ml Xe 133 eq for > 15 minutes (See Note)

B RIA 33 HIGH alarm **AND** Liquid effluent being released exceeds 200 times the level of SLC 16.11.1 for > 15 minutes as determined by chemistry procedure.

C. Gaseous effluent being released exceeds 200 times the level of SLC 16.11.2 for > 15 minutes as determined by RP procedure.

Note: If monitor reading is sustained for the time period indicated in the EAL AND required assessments (procedure calculations) cannot be completed within this period, declaration must be made on the valid Radiation monitor reading.

BASIS:

The term "Unplanned", as used in this context, includes any release for which a liquid waste release (LWR) or gaseous waste release (GWR) package was not prepared, or a release that exceeds the conditions (e.g., minimum dilution flow, maximum discharge flow, alarm setpoints, etc.) on the applicable package.

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

This event escalates from the Unusual Event by escalating the magnitude of the release by a factor of 100.

ENCLOSURE 4.3

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

ALERT

It is not intended that the release be averaged over 15 minutes. The event should be declared as soon as it is determined that the release duration has or will likely exceed 15 minutes.

Monitor indications are based on the methodology of the site Offsite Dose Calculation Manual (ODCM). Annual average meteorology (semi-elevated release 1.672 E-06 sec/m3) has been used.

Chapter 16, Selected Licensee Commitments, of the Oconee Nuclear Station FSAR outlines the release limits for gaseous effluent is released by the Control Room. Liquid effluent is discharged by Operations from the Radwaste Facility. Effluent monitors have setpoints established to alarm should activity be detected that would exceed limits established by 10 CFR 20, Table B, Appendix II. Radiation Protection and/or Chemistry would calculate the release rate and quantify the amount being released.

Reference
NUMARC/NESP-007, Rev. 2, 01/92, AA1

ENCLOSURE 4.3

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

ALERT

2. Release of Radioactive Material or Increases in Radiation Levels Within the Facility That Impedes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Cold Shutdown

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVELS:

A. Valid radiation reading $\geq$ 15 mRad/hr in the Control Room, CAS, or Radwaste Control Room.

B. Unplanned/unexpected valid area radiation monitor readings exceed limits stated in Enclosure 4.9 of RP/0/A/1000/001.

BASIS:
Valid means that a radiation reading has been confirmed by the operators to be correct.

This IC addresses unplanned/unexpected increased radiation levels that impede necessary access to operating stations, or other areas containing equipment that must be operated manually, in order to maintain safe operation or perform a safe shutdown. It is this impaired ability to operate the plant that results in the actual or potential substantial degradation of the level of safety of the plant.

The Control Room, Central Alarm Station (CAS) and the Radwaste Control Room are areas that will need to be continuously occupied. No radiation monitors are in the CAS or the Radwaste Control Room.

Oconee has chosen to use a generic emergency action level of greater than or equal to 5000 mRad/hr for the Alert classification for areas in the plant that would need to be utilized for safe operation or safe shutdown of the unit. Enclosure 4.9 of RP/0/A/1000/001 provides the monitor number and the location of the area monitor.

This IC is not intended to apply to anticipated temporary increases due to planned events (e.g., incore detector movement, radwaste container movement, depleted resin transfers, etc.)

Reference
NUMARC/NESP-007, Rev. 2, 01/92, AA3

ENCLOSURE 4.3

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

ALERT

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.

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVELS:

A. Valid RIA 3*, 6, 41, or 49* **HIGH** alarm readings
*Applies to Mode 6 and No Mode Only

B. Valid **HIGH** alarm reading on portable area monitors on the main bridge or spent fuel pool bridge.

C. Report of visual observation of irradiated fuel uncovered.

D. Operators determine water level drop in either the SFP or fuel transfer canal will exceed makeup capacity such that irradiated fuel will be uncovered.

BASIS:

This IC applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage.

The HIGH alarm for RIA 3 (containment area monitor) and RIA 49 (RB gaseous process monitor) corresponds to the setpoints established to assure that 10 CFR 20 limits are not exceeded.

The HIGH alarm setpoint for RIA 6 (SFP bridge area monitor) is designed to make operators aware of increased readings above 10 CFR 20 limits. The HIGH alarm setpoint for RIA 41 (Spent Fuel Pool gaseous atmosphere) is set to alarm if 4 times the limits of 10 CFR 20 are exceeded based upon Xe-133. RIA 49 monitors the reactor building gas. Portable monitors are established during refueling outages and are located on the main bridge, and the spent fuel pool bridge.

ENCLOSURE 4.3

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

ALERT

There is time available to take corrective actions, and there is little potential for substantial fuel damage. Thus, an Alert Classification for this event is appropriate. Escalation, if appropriate, would occur via Abnormal Rad Level/Radiological Effluent or Emergency Coordinator Judgment.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, AA2

ENCLOSURE 4.3

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

SITE AREA EMERGENCY

1. **Boundary Dose Resulting from an Actual or Imminent Release of Radioactivity Exceeds 100 mRem TEDE or 500 mRem CDE Adult Thyroid for the Actual or Projected Duration of the Release.**

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVELS:

A. Valid reading on RIA-46 of ≥ 2.09E+05 cpm or RIA 56 reading of ≥ 17.5 R/hr or RP sample reading of 6.62E+01 uCi/ml Xe 133 eq for > 15 minutes. (See Note)

B. Valid reading on RIA 57 or 58 as shown on Enclosure 4.8 of RP/0/A/1000/001. (See Note)

C. Dose calculations result in a dose projection at the site boundary of 100 mRem TEDE or 500 mRem CDE Adult Thyroid.

D. Field survey results indicate site boundary dose rates exceeding 100 mRad/hr expected to continue for more than one hour; **OR** analysis of field survey samples indicate adult thyroid dose commitment (CDE) of 500 mRem for one hour of inhalation.

Note: If actual Dose Assessment cannot be completed within 15 minutes, then the valid monitor reading should be used for emergency classification.

BASIS:

Valid means that a radiation monitor reading has been confirmed to be correct.
The calculation for RIA 46 (vent monitor) setpoint is based on whole body dose (100 mRem) using ODCM guidance: average annual meteorology (semi-elevated release 1.672E-6 sec/m3), vent flow rate of 65,000 cfm, and release duration of 15 minutes. No credit is taken for vent filtration.

The calculation for RIA 57/58 (in containment monitors) setpoints are based on the following: LOCA conditions which provide the more conservative reading, Committed Dose Equivalent (CDE) thyroid (500 mRem), average annual meteorology (7.308 E-6 sec/m3), design basis leakage of 5.6E6 ml/hr, release duration of one hour, and time since unit trip. No credit is taken for filtration.

ENCLOSURE 4.3

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

SITE AREA EMERGENCY

Dose assessment team members use actual meteorology, release duration, and unit vent flow rate or actual leakage rate from containment. Therefore, the predetermined monitor readings would not be used if dose assessment team calculations are available from the TSC or EOF in a timely manner (within approximately 15 minutes).

The 100 mRem Total Effective Dose Equivalent (TEDE) and the 500 mRem Committed Dose Equivalent (CDE) thyroid in this initiating condition is based on 10 CFR 20 annual average population exposure. The dose projection typically uses a 4-hour default for time of release. The Dose Assessment program will provide dose projection default times for specific release pathways. If the real time release time is known it will be used in the calculation. One order of magnitude is the gradient factor between the Site Area Emergency and General Emergency classes. These values are 10% of the EPA PAG values given in EPA-400-R-92-001.

The field monitoring survey results are based on actual hand-held instrument readings at the site boundary. It is assumed that the release will continue for more than one hour. Adult thyroid is considered to be the limiting factor.

Reference
NUMARC/NESP-007, Rev. 2, 01/92, AS1

ENCLOSURE 4.8 (RP/0/A/1000/001)
RADIATION MONITOR READINGS FOR EMERGENCY CLASSIFICATION

NOTE: IF ACTUAL DOSE ASSESSMENT CANNOT BE COMPLETED WITHIN 15 MINUTES, THEN THE VALID MONITOR READING SHOULD BE USED FOR EMERGENCY CLASSIFICATION.

ALL RIA VALUES ARE CONSIDERED TO BE GREATER THAN OR EQUAL TO.

HOURS SINCE REACTOR TRIPPED	RIA 57 R/hr		RIA 58 R/hr*	
	Site Area Emergency	General Emergency	Site Area Emergency	General Emergency
0 - < 0.5	5.9E+003	5.9E+004	2.6E+003	2.6E+004
0.5 - < 1.0	2.6E+003	2.6E+004	1.1E+003	1.1E+004
1.0 - < 1.5	1.9E+003	1.9E+004	8.6E+002	8.6E+003
1.5 - < 2.0	1.9E+003	1.9E+004	8.5E+002	8.5E+003
2.0 - < 2.5	1.4E+003	1.4E+004	6.3E+002	6.3E+003
2.5 - < 3.0	1.2E+003	1.2E+004	5.7E+002	5.7E+003
3.0 - < 3.5	1.1E+003	1.1E+004	5.2E+002	5.2E+003
3.5 - < 4.0	1.0E+003	1.0E+004	4.8E+002	4.8E+003
4.0 - < 8.0	1.0E+003	1.0E+004	4.4E+002	4.4E+003

*Note: RIA 58 is partially shielded.

Assumptions used for calculation of high range in-containment monitors RIA 57 and 58:

1. Average annual meteorology (7.308 E-6 sec/m3)
2. Design basis leakage (5.6 E6 ml/hr)
3. One hour release duration
4. General Emergency PAGs are 1 rem TEDE and 5 rem CDE; SAE determination is based on 10% of the General Emergency PAGs.
5. Calculations for monitor readings are based on CDE (adult thyroid - 500 mRem) because thyroid dose is limiting.
6. No credit is taken for filtration.
7. LOCA conditions are limiting and provide the more conservative reading.

Assumptions used for calculation of vent monitor RIA 46:

1. Average annual meteorology (1.672 E-6 sec/m3), semi-elevated
2. Vent flow rate 65,000 cfm (average daily flow rate)
3. No credit is taken for vent filtration
4. Fifteen minute release duration.
5. General Emergency PAGs are 1 rem TEDE and 5 rem CDE; SAE determination is based on 10% of the General Emergency PAGs.
6. Calculations for monitor readings are based on whole body dose (100 mRem).
7. Calculation is based on ODCM methodology and NUMARC guidance

ENCLOSURE 4.3

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

SITE AREA EMERGENCY

2. Loss of Water Level in the Reactor Vessel That Has or Will Uncover Fuel in the Reactor Vessel.

OPERATING MODE APPLICABILITY: 5, 6

EMERGENCY ACTION LEVEL:

Loss of Reactor Vessel Water Level as indicated by:

A. Failure of heat sink causes loss of Mode 5 (Cold Shutdown) conditions **AND** LT-5 indicates 0 inches after initiation of RCS makeup.

B. Failure of heat sink causes loss of Mode 5 (Cold Shutdown) conditions **AND** either train ultrasonic level indication less than 0 inches and decreasing after initiation of RCS makeup.

BASIS:

Under the conditions specified by this IC, severe core damage can occur due to prolonged boiling following loss of decay heat removal. Declaration of a Site Area Emergency is warranted under the conditions specified by the IC. Escalation to a General Emergency is via Enclosure 4.3, Abnormal Rad Levels/Radiological Effluent.

Note: Both the LT-5 and the ultrasonic level instrumentation are located in the center line of the hot leg.

Reference
NUMARC/NESP-007, Rev.2, 01/92, SS5

ENCLOSURE 4.3

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

GENERAL EMERGENCY

1. **Boundary Dose Resulting from an Actual or Imminent Release of Gaseous Radioactivity that Exceeds 1000 mRem TEDE or 5000 mRem (CDE) Adult Thyroid for the Actual or Projected Duration of the Release Using Actual Meteorology.**

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVELS:

A. Valid reading on RIA 46 of ≥ 2.09E+06 cpm or RIA 56 reading of ≥ 175 R/hr or RP sample reading of 6.62E +02uCi/ml Xe 133 eq for ≥ 15 minutes (See Note)

B. Valid reading on RIA 57 or 58 as shown on Enclosure 4.8 of RP/0/A/1000/001. (See Note)

C. Dose calculations result in a dose projection at the site boundary of ≥ 1000 mRem TEDE **OR** ≥ 5000 mRem CDE (Adult Thyroid).

D. Field survey results indicate site boundary dose rates exceeding 1000 mRad/hr expected to continue for more than one hour; **OR** analyses of field survey samples indicate adult thyroid commitment (CDE) of 5000 mRem for one hour of inhalation.

Note: If actual Dose Assessment cannot be completed within 15 minutes, then the valid monitor reading should be used for emergency classification.

BASIS:

Valid means that a radiation monitor reading has been confirmed to be correct.
The calculation for RIA 46 (vent monitor) setpoint is based on the following: whole body dose (100 mRem) using ODCM guidance, average annual meteorology (semi-elevated release l.672E-6 sec/m3), vent flow rate of 65,000 CFM, and release duration of 15 minutes. No credit is taken for vent filtration.

The calculation for RIA 57/58 (incontainment monitors) setpoints are based on the following: LOCA conditions which provide the more conservative reading, Committed Dose Equivalent (CDE-adult thyroid 500 mRem), average annual meteorology (7.308 E-6, sec/m3), design basis leakage of 5.6E6 ml/hr, release duration of one hour, and time since unit trip. No credit is taken for filtration.

ENCLOSURE 4.3

ABNORMAL RAD LEVELS/RADIOLOGICAL EFFLUENT

GENERAL EMERGENCY

Calculations by the dose assessment team use **actual** meteorology, duration, and unit vent flow rate or actual leakage rate from containment. Therefore, the predetermined monitor readings would not be used if dose assessment calculations are available from the TSC or EOF in a timely manner (within approximately 15 minutes).

The 1000 mRem Total Effective Dose Equivalent (TEDE) and the 5000 mRem Committed Dose Equivalent (CDE) adult thyroid in this initiating condition is based on 10 CFR 20 annual average population exposure. These values are EPA PAG guidelines as expressed in EPA-400-R-92-001. The Dose Assessment program will provide dose projection default time for specific release pathways. This default value will be utilized until a corrected release time is determined.

Field monitoring results will utilize a one hour period of time for calculating survey results.

Enclosure 4.8 of RP/0/A/1000/001 is shown on page 34 of this document.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, AG1

ENCLOSURE 4.4

LOSS OF SHUTDOWN FUNCTION

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
Unexpected increase in plant radiation levels or airborne concentrations	Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Scram Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Scram Was Successful	Failure of Reactor Protection System Instrumentation to Complete or Initiate an Automatic Reactor Scram Once a Reactor Protection System Setpoint Has Been Exceeded and Manual Scram Was NOT Successful	Failure of the Reactor Protection System to Complete an Automatic Scram and Manual Scram was NOT Successful and There is Indication of an Extreme Challenge to the Ability to Cool the Core
	Inability to Maintain Plant in Cold Shutdown	Complete Loss of Function Needed to Achieve or Maintain Hot Shutdown	
	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	Loss of Water Level in the Reactor Vessel That Has or Will Uncover Fuel in the Reactor Vessel	

ENCLOSURE 4.4

LOSS OF SHUTDOWN FUNCTIONS

UNUSUAL EVENT

1. Unexpected Increase in Plant Radiation or Airborne Concentration.

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVELS:

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

B. Valid indication of *uncontrolled* water decrease in the SFP or fuel transfer canal with all fuel assemblies remaining covered by water **AND** unplanned *valid* RIA 3, 6 or portable area monitor readings increase.

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

D. Valid area or process monitor exceeds limits stated in Enclosure 4.9 of RP/0/A/1000/001.

BASIS:

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

EAL 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 4.4

LOSS OF SHUTDOWN FUNCTIONS

UNUSUAL EVENT

EAL 4 addresses unplanned increases in in-plant radiation levels that represent a degradation in the control of radioactive material, and represent a potential degradation in the level of safety of the plant. The RIA readings for an Unusual Event are 1000 times the normal value. Enclosure 4.9 of RP/0/A/1000/001 will provide the actual readings for the monitors.

Reference
NUMARC/NESP-007, Rev. 2, 01/92, AU2
NEI 99-01, Rev. 4, 08/00, AU2

ENCLOSURE 4.4

LOSS OF SHUTDOWN FUNCTIONS

ALERT

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

OPERATING MODE APPLICABILITY: 1, 2, 3

EMERGENCY ACTION LEVEL:
The following conditions exist:

A. VALID reactor trip signal received or required without automatic scram

AND ONE OF THE FOLLOWING:

DSS has inserted Control Rods

OR

Manual reactor trip from the control room is successful and reactor power is less than 5% and decreasing.

BASIS:

This condition indicates failure of the automatic protection system to scram the reactor. This condition is more than a potential degradation of a safety system in that a front line automatic protection system did not function in response to a plant transient and thus the plant safety has been compromised, and design limits of the fuel may have been exceeded. An Alert is indicated because conditions exist that lead to potential loss of fuel clad or RCS. Reactor protection system setpoint being exceeded (rather than limiting safety system setpoint being exceeded) is specified here because failure of the automatic protection system is the issue. If the reactor protective system fails, the Diverse Scram Signal system (which was installed at Oconee since 10/7/91 as a result of Generic Letter 83-28) will drop control rod groups 5,6,7 into the core.

A manual scram is any set of actions by the reactor operator(s) at the reactor control console which causes control rods to be RAPIDLY inserted into the core and brings the reactor subcritical.

Reference
NUMARC/NESP-007, Rev. 2, 01/92, SA2

ENCLOSURE 4.4

LOSS OF SHUTDOWN FUNCTIONS

ALERT

Operator action to drive rods does **NOT** constitute a reactor trip, (i.e. does not meet the rapid insertion criterion).

Failure of Diverse Scram Signal and the manual scram would escalate the event to a Site Area Emergency.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, SA2

ENCLOSURE 4.4

LOSS OF SHUTDOWN FUNCTIONS

ALERT

2. Inability to Maintain Plant in Mode 5 (Cold Shutdown).

OPERATING MODE APPLICABILITY: 5, 6

EMERGENCY ACTION LEVELS:

A. Loss of LPI and/or LPSW

AND

Inability to maintain RCS temperature below 200 °F as indicated by either of the following:
RCS temperature at the LPI pump suction

OR

Average of the 5 highest CETCs as indicated by ICCM display.

OR

Visual observation

BASIS:
LPI is the low pressure injection system
LPSW is low pressure service water.

This IC is based on concerns raised by Generic Letter 88-17, "Loss of Decay Heat Removal." number of phenomena such as pressurization, vortexing, RCS level differences when operating at a mid-loop condition, decay heat removal system design, and level instrumentation problems can lead to conditions where decay heat removal is lost and core uncovery can occur. NRC analyses show sequences that can cause core uncovery in 15 to 20 minutes and severe core damage within an hour after decay heat removal is lost.

Loss of the LPI system and/or the LPSW system causes an uncontrolled temperature rise in the reactor coolant system. Uncontrolled is understood to be "not as the result of operator action." Rising temperature of the reactor coolant system can be determined at the LPI pump suction, average of the 5 highest CETCs as indicated by ICCM display or through operator visual observation (steam or boiling) in the reactor building.

ENCLOSURE 4.4

LOSS OF SHUTDOWN FUNCTIONS

ALERT

With a loss of LPI pumps there will be no RCS flow at the LPI pump suction and RCS temperature at that point will not represent RCS temperature in the reactor vessel. Also, with the reactor head in place, visual observation may not be possible.

Escalation to the Site Area Emergency is by, "Loss of Water Level in the Reactor Vessel That Has or Will Uncover Fuel in the Reactor Vessel," or by Abnormal Rad Levels/Radiological Effluent ICs.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, SA3

ENCLOSURE 4.4

LOSS OF SHUTDOWN FUNCTIONS

ALERT

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.

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVELS:

A. Valid RIA 3*, 6, 41 or 49* **HIGH** alarm readings
   Applies to Mode 6 and No Mode Only.

B. Valid **HIGH** alarm reading on portable area monitors on the main bridge or spent fuel pool bridge.

C. Report of visual observation of irradiated fuel uncovered.

D. Operators determine water level drop in either the SFP or fuel transfer canal will exceed makeup capacity such that irradiated fuel will be uncovered.

BASIS:

This IC applies to spent fuel requiring water coverage and is not intended to address spent fuel which is licensed for dry storage.

The HIGH alarm for RIA 3 (containment area monitor) and RIA 49 (RB gaseous process monitor) corresponds to the setpoints established to assure that 10 CFR 20 limits are not exceeded.

The HIGH alarm setpoint for RIA 6 (SFP bridge area monitor) is designed to make operators aware of increased readings above 10 CFR 20 limits. The HIGH alarm setpoint for RIA 41 (Spent Fuel Pool gaseous atmosphere) is set to alarm if 4 times the limits of 10 CFR 20 are exceeded based upon Xe-133. RIA 49 monitors the reactor building gas. Portable monitors are established during refueling outages and are located on the main bridge, and the spent fuel pool bridge.

ENCLOSURE 4.4

LOSS OF SHUTDOWN FUNCTIONS

ALERT

There is time available to take corrective actions, and there is little potential for substantial fuel damage. Thus, an Alert Classification for this event is appropriate. Escalation, if appropriate, would occur via Abnormal Rad Level/Radiological Effluent, Loss of Shutdown Functions or Emergency Coordinator Judgment.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, AA2

ENCLOSURE 4.4

LOSS OF SHUTDOWN FUNCTIONS

SITE AREA EMERGENCY

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

OPERATING MODE APPLICABILITY: 1, 2

EMERGENCY ACTION LEVEL:

The following conditions exist:

A. VALID reactor trip signal received or required without automatic scram

AND

DSS has **NOT** inserted Control Rods

AND

Manual reactor trip from the control room was not successful in reducing reactor power to less than 5% and decreasing.

BASIS:

Automatic and manual scram are not considered successful if action away from the reactor control console is required to scram the reactor.

This EAL is met if a reactor trip is required and the manual reactor trip function fails. A failure of the manual reactor trip pushbutton to initiate a reactor trip is indication of a failure of the Reactor Protection System.

Under these conditions, the reactor is producing more heat than the maximum decay heat load for which the safety systems are designed. A Site Area Emergency is indicated because conditions exist that lead to imminent loss or potential loss of both fuel clad and RCS. Although this IC may be viewed as redundant to the Fission Product Barrier Degradation IC, its inclusion is necessary to better assure timely recognition and emergency response. Escalation of this event to a General Emergency would be via Fission Product Barrier Degradation or Emergency Coordinator Judgment ICs.

Reference
NUMARC/NESP-007, Rev. 2, 01/92, SS2

ENCLOSURE 4.4

LOSS OF SHUTDOWN FUNCTIONS

SITE AREA EMERGENCY

2. Complete Loss of Function Needed to Achieve or Maintain Mode 4 (Hot Shutdown).

OPERATING MODE APPLICABILITY: 1, 2, 3, 4

EMERGENCY ACTION LEVELS:

Any of the following conditions exist:

A. Average of the 5 highest CETCs $\geq$ 1200 °F on ICCM.

B. Unable to maintain reactor subcritical

C. EOP directs feeding SG from SSF ASWP or PSW Pump

BASIS:

This EAL addresses complete loss of functions, core cooling and heat sink, required for hot shutdown with the reactor at pressure and temperature. Under these conditions, there is an actual major failure of a system intended for protection of the public. Thus, declaration of a Site Area Emergency is warranted. Escalation to General Emergency would be via Abnormal Rad Levels/Radiological Effluent, Emergency Coordinator Judgment, or Fission Product Barrier Degradation ICs.

Core exit thermocouple readings are considered to be the average of the five (5) highest thermocouple readings shown on the Inadequate Core Cooling Monitor.

The SSF can provide the following: (1) makeup to the Reactor Coolant pump seals, (2) low pressure service water to the steam generators (additional method for heat sink), (3) capability to keep the unit in hot shutdown for 72 hours following an Appendix R fire.

Reference
NUMARC/NESP-007, Rev. 2, 01/92, SS4

ENCLOSURE 4.4

LOSS OF SHUTDOWN FUNCTIONS

SITE AREA EMERGENCY

3. Loss of Water Level in the Reactor Vessel That Has or Will Uncover Fuel in the Reactor Vessel.

OPERATING MODE APPLICABILITY: 5, 6

EMERGENCY ACTION LEVEL:

Loss of Reactor Vessel Water Level as indicated by:

A. Failure of heat sink causes loss of Mode 5 (Cold Shutdown) conditions.

AND

LT-5 indicates 0 inches after initiation of RCS makeup.

B. Failure of heat sink causes loss of Mode 5 (Cold Shutdown) conditions.

AND

Either train ultrasonic level indication less than 0 inches and decreasing after initiation of RCS makeup.

BASIS:

Under the conditions specified by this IC, severe core damage can occur due to prolonged boiling following loss of decay heat removal. Declaration of a Site Area Emergency is warranted under the conditions specified by the IC. Escalation to a General Emergency is via Enclosure 4.3, Abnormal Rad Levels/Radiological Effluent.

Note: Both the LT-5 and the ultrasonic level instrumentation are located in the center line of the hot leg.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, SS5

ENCLOSURE 4.4

LOSS OF SHUTDOWN FUNCTIONS

GENERAL EMERGENCY

1. **Failure of the Reactor Protection System to Complete an Automatic Scram and Manual Scram was NOT Successful and There is Indication of an Extreme Challenge to the Ability to Cool the Core.**

OPERATING MODE APPLICABILITY: 1, 2

EMERGENCY ACTION LEVEL:

The following conditions exist:

A. VALID reactor trip signal received or required **WITHOUT** automatic scram

AND

Manual reactor trip from the control room was not successful in reducing reactor power to less than 5% and decreasing.

AND

Average of five highest CETCs $\geq$ 1200 °F on the ICCM.

BASIS:
Automatic and manual scram are not considered successful if action away from the reactor control console is required to scram the reactor. Under the conditions of the IC and its associated EALs, the efforts to bring the reactor subcritical have been unsuccessful and, as a result, the reactor is producing more heat than the maximum decay heat load for which the safety systems were designed. The extreme challenge to the ability to cool the core is intended to mean that the core exit temperatures are at or approaching 1200 °F. (Note: CETCs reading $\geq$ 1200 °F is also a good indicator that the reactor vessel water level is below the top of the active fuel. Oconee does not have an indication for the reactor vessel water level below the top of the active fuel.)

The General Emergency declaration is intended to be anticipatory of the fission product barrier matrix declaration to permit maximum offsite intervention time.

Reference
NUMARC/NESP-007, Rev. 2, 01/92, SG2

ENCLOSURE 4.5

LOSS OF POWER

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
Loss of All Offsite Power to Essential Busses for Greater Than 15 Minutes	Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses During Cold Shutdown Or Refueling Mode	Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses	Prolonged Loss of All (Offsite and Onsite) AC Power
Unplanned Loss of Required DC Power During Cold Shutdown or Refueling Mode for Greater than 15 Minutes	AC power to essential busses reduced to a single power source for greater than 15 minutes such that an additional single failure could result in station blackout	Loss of All Vital DC Power	

ENCLOSURE 4.5

LOSS OF POWER

UNUSUAL EVENT

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

OPERATING MODE APPLICABILITY ALL

EMERGENCY ACTION LEVEL:

The following conditions exist:

A. Unit auxiliaries being supplied from Keowee or CT5.

AND

Inability to energize either MFB from an offsite source (either switchyard) within 15 minutes.

BASIS:

Prolonged loss of AC power reduces required redundancy and potentially degrades the level of safety of the plant by rendering the plant more vulnerable to a complete Loss of AC Power (Station Blackout). Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

Keowee Hydro station provides the emergency power to the Oconee Nuclear Site. CT5 is powered from the Lee Steam Station and provides back-up power to the site.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, SU1

ENCLOSURE 4.5

LOSS OF POWER

UNUSUAL EVENT

2. Unplanned Loss of Required DC Power During Mode 5 (Cold Shutdown) or Mode 6 (Refueling Mode) for Greater than 15 Minutes.

OPERATING MODE APPLICABILITY: 5, 6

EMERGENCY ACTION LEVEL:

The following conditions exist:

A. Unplanned Loss of Vital DC power to required DC busses as indicated by bus voltage less than 110 VDC.

AND

Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

BASIS:

The purpose of this IC and its associated EALs is to recognize a loss of DC power compromising the ability to monitor and control the removal of decay heat during Cold Shutdown or Refueling operations. This EAL is intended to be anticipatory in as much as the operating crew may not have necessary indication and control of equipment needed to respond to the loss.

"Unplanned" is included in this IC and EAL to preclude the declaration of an emergency as a result of planned maintenance activities.

If this loss results in the inability to maintain cold shutdown, the escalation to an Alert will be per Enclosure 4.4, Loss of Shutdown Functions "Inability to Maintain Plant in Cold Shutdown."

Reference

NUMARC/NESP-007, Rev. 2, 01/92, SU7

ENCLOSURE 4.5

LOSS OF POWER

ALERT

1. Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses During Mode 5 (Cold Shutdown) Or Mode 6 (Refueling Mode).

OPERATING MODE APPLICABILITY: 5, 6, Defueled

EMERGENCY ACTION LEVEL:

The following conditions exist:

A. MFB 1 and 2 de-energized.

AND

Failure to restore power to at least one main feeder bus within 15 minutes from the time of loss of both offsite and onsite AC power.

BASIS:

Loss of all AC power compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal, Spent Fuel Heat Removal and the Ultimate Heat Sink. When in cold shutdown, refueling, or defueled mode the event can be classified as an Alert, because of the significantly reduced decay heat, lower temperature and pressure, increasing the time to restore one of the emergency busses, relative to that specified for the Site Area Emergency EAL. Escalating to Site Area Emergency, if appropriate, is by Enclosure 4.3, Abnormal Rad Levels/Radiological Effluent, or Enclosure 4.7, Natural Disasters, Hazards, and Other Conditions Affecting Plant Safety, Emergency Coordinator Judgment ICs. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

References

NUMARC/NESP-007, Rev. 2, 01/92, SA1

ENCLOSURE 4.5

LOSS OF POWER

ALERT

2. AC power capability to essential busses reduced to a single power source for greater than 15 minutes such that an additional single failure could result in station blackout.

OPERATING MODE APPLICABILITY: 1, 2, 3, 4

EMERGENCY ACTION LEVEL:

The following condition exists:

A. AC power capability has been degraded to a single power source for > 15 min. due to the loss of all but one of the following:

Unit Normal Transformer (backcharged)
Unit Startup transformer
Another Unit Startup Transformer (aligned)
CT4
CT5

BASIS:

This IC and the associated EAL is intended to provide an escalation from IC, "Loss of All Offsite Power To Essential Busses for Greater Than 15 Minutes." The condition indicated by this IC is the degradation of the offsite and onsite power systems such that an additional single failure could result in a station blackout. In this particular situation, a station blackout applies to the unit in question even though the other units may not be affected. This condition could occur due to a loss of offsite power with a concurrent failure of either CT4 or CT5 to supply power to the main feeder busses.

The subsequent loss of this single power source would escalate the event to a Site Area Emergency in accordance with IC, "Loss of All Offsite and Loss of All Onsite AC Power to Essential Busses."

Reference

NUMARC/NESP-007, Rev. 2, 01/92, SA5

ENCLOSURE 4.5

LOSS OF POWER

SITE AREA EMERGENCY

1. Loss of All Offsite Power and Loss of All Onsite AC Power to Essential Busses

OPERATING MODE APPLICABILITY: 1, 2, 3, 4

EMERGENCY ACTION LEVEL:

Loss of all offsite and onsite AC power as indicated by:

A. MFB 1 and 2 de-energized

AND

Failure to restore power to at least one main feeder bus within 15 minutes from the time of loss of both offsite and onsite AC power.

BASIS:

Loss of all AC power compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all AC power will cause core uncovering and loss of containment integrity, thus this event can escalate to a General Emergency.

Escalation to General Emergency is via Enclosure 4.1 Fission Product Barrier Degradation or IC, "Prolonged Loss of All Offsite Power and Prolonged Loss of All Onsite AC Power."

Loss of offsite power (6900V) eliminates the use of power from Duke Power grid and also eliminates distribution of power from the unit generator. Loss of onsite AC (4160V) which includes both Keowee Hydro units, eliminates the use of HPI pumps, LPI pumps, reactor building spray pumps, low pressure service water pumps, CCW pumps, condensate booster pumps, hotwell pumps, heater drain pumps and motor driven emergency feedwater pumps. Turbine driven emergency feedwater pumps are assumed to be available. It is assumed for this scenario that the Standby Shutdown Facility would be available for RCS and secondary inventory control utilizing the RC makeup pump and the auxiliary service water pump.

References

NUMARC/NESP-007, Rev. 2, 01/92, SS1

ENCLOSURE 4.5

LOSS OF POWER

SITE AREA EMERGENCY

2. Loss of All Vital DC Power.

OPERATING MODE APPLICABILITY: 1, 2, 3, 4

EMERGENCY ACTION LEVEL:

The following conditions exist:

A. Unplanned Loss of Vital DC power to required DC busses as indicated by bus voltage less than 110 VDC.

AND

Failure to restore power to at least one required DC bus within 15 minutes from the time of loss.

BASIS:

Loss of all DC power compromises ability to monitor and control plant safety functions. Prolonged loss of all DC power will cause core uncovering and loss of containment integrity when there is significant decay heat and sensible heat in the reactor system. Escalation to a General Emergency would occur by Enclosure 4.3, Abnormal Rad Levels/Radiological Effluent, Enclosure 4.1, Fission Product Barrier Degradation, Enclosure 4.7, Natural Disasters, Hazards and Other Conditions Affecting Plant Safety or Emergency Coordinator Judgment ICs. Fifteen minutes was selected as a threshold to exclude transient or momentary power losses.

ENCLOSURE 4.5

LOSS OF POWER

SITE AREA EMERGENCY

The purpose of the onsite DC Power system is:

1. Provide a source of reliable, continuous power for instrumentation and controls needed for normal operation and safe shutdown of the unit through the vital DC power distribution system panelboards and essential DC power which feed Inverters for an uninterrupted source of AC power.

2. Supply DC motor operated valves and pumps required during normal operation and a total loss of AC.

Loss of DC power would place the plant in a situation of losing vital instrumentation, valves, and pumps needed to safely operate and shutdown the plant any time the unit is above cold shutdown conditions.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, SS3

ENCLOSURE 4.5

LOSS OF POWER

GENERAL EMERGENCY

1. Prolonged Loss of All Offsite Power and Prolonged Loss of All Onsite AC Power.

OPERATING MODE APPLICABILITY: 1, 2, 3, 4

EMERGENCY ACTION LEVEL:

Prolonged loss of all offsite and onsite AC power as indicated by:

A. MFB 1 and 2 de-energized

AND

Standby Shutdown Facility (SSF) fails to maintain Mode 3 (Hot Standby).

AND

AT LEAST ONE OF THE FOLLOWING:

Restoration of power to at least one MFB within 4 hours is NOT likely

OR

Indication of continuing degradation of core cooling based on Fission Product Barrier monitoring.

BASIS:

Loss of all AC power compromises all plant safety systems requiring electric power including RHR, ECCS, Containment Heat Removal and the Ultimate Heat Sink. Prolonged loss of all those functions necessary to maintain hot shutdown will lead to loss of fuel clad, RCS, and containment.

The Standby Shutdown Facility (SSF) is capable of providing the necessary functions to maintain Mode 3 (Hot Standby) condition for up to 72 hours. No fission product barrier degradation would be expected if the SSF is functioning as intended.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, SG1

ENCLOSURE 4.5

LOSS OF POWER

GENERAL EMERGENCY

Analysis in support of the station blackout coping study indicates that the plant can cope with a station blackout for 4 hours without core damage.

The likelihood of restoring at least one emergency bus should be based on a realistic appraisal of the situation since a delay in an upgrade decision based on only a chance of mitigating the event could result in a loss of valuable time in preparing and implementing public protective actions.

In addition, under these conditions, fission product barrier monitoring capability may be degraded. Although it may be difficult to predict when power can be restored, it is necessary to give the Emergency Coordinator a reasonable idea of how quickly (s)he may need to declare a General Emergency based on two major considerations:

1. Are there any present indications that core cooling is already degraded to the point that Loss or Potential Loss of Fission Product Barriers is IMMINENT?

2. If there are no present indications of such core cooling degradation, how likely is it that power can be restored in time to assure that a loss of two barriers with a potential loss of the third barrier can be prevented?

Thus, indication of continuing core cooling degradation must be based on Fission Product Barrier monitoring with particular emphasis on Emergency Coordinator judgment as it relates to IMMINENT Loss or Potential Loss of fission product barriers and degraded ability to monitor fission product barriers.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, SG1

ENCLOSURE 4.6

FIRE/EXPLOSIONS AND SECURITY EVENTS

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
Fire/Explosion Within the Plant	Fire or Explosion Affecting the operability of plant safety systems required to establish or maintain safe shutdown	HOSTILE ACTION within the Protected Area	
Confirmed Security condition or threat which indicates a potential degradation in the level of safety of the plant	HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat	Other conditions exist which in the judgment of the Emergency Director warrant declaration of a SITE AREA EMERGENCY	HOSTILE ACTION resulting in Loss of Physical Control of the Facility
Other conditions exist which in the judgment of the Emergency Director warrant declaration of a NOUE	Other conditions exist which in the judgment of the Emergency Director warrant declaration of an ALERT		Other conditions exist which in the judgment of the Emergency Director warrant declaration of a GENERAL EMERGENCY

ENCLOSURE 4.6

FIRE/EXPLOSIONS AND SECURITY EVENTS

UNUSUAL EVENT

1. Explosion or Fire Within the Plant

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVEL: Note: Within the plant means Turbine Building, Auxiliary Building, Reactor Building, Keowee Hydro, Transformer Yard, B3T, B4T, Service Air Diesel Compressors, Keowee Hydro and associated transformers and SSF.

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

B. Unanticipated explosion within the plant resulting in visible damage to permanent structures/equipment.

- Includes steam line break and FDW line break

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 extinguishing efforts is to size the fire and to discriminate against small fires that are readily extinguished.**

Only those explosions of sufficient force to damage permanent structures or equipment within the plant 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. A high energy line break (e.g., Main Steam Line or Main Feedwater Line, Heater Drain Line, etc.) would satisfy this EAL **IF** no additional damage is done to ECCS (safety related systems) equipment/components. 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.

ENCLOSURE 4.6

FIRE/EXPLOSIONS AND SECURITY EVENTS

UNUSUAL EVENT

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

UNUSUAL EVENT

2. CONFIRMED SECURITY CONDITION or THREAT which indicates a potential degradation in the level of Safety of the plant.

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVELS:

A. A SECURITY CONDITION that does **NOT** involve a HOSTILE ACTION as reported by the security shift supervisor.

B. A credible site-specific security threat notification.

C. A validated notification from NRC providing information of an aircraft threat.

BASIS:

NOTE: Timely and accurate communication between Security Shift Supervisor and the control room is crucial in the implementation of effective Security EALs.

Security events which do not represent a potential degradation in the level of safety of the plant are reported under 10 CFR 73.71 or in some cases under 10 CFR 50.72. Security events assessed as HOSTILE ACTIONS are classifiable under 4.6.A.2, 4.6.S.1, and 4.6.G.1

A higher initial classification could be made based upon the nature and timing of the threat and potential consequences. The licensee shall consider upgrading the emergency response status and emergency classification in accordance with the Safeguards Contingency Plan and Emergency Plans.

EAL A

Reference is made to site specific security shift supervision because these individuals are the designated personnel on-site qualified and trained to confirm that a security event is occurring or has occurred. Training on security event classification confirmation is closely controlled due to the strict secrecy controls placed on the plant Safeguards Contingency Plan.

This threshold is based on site specific security plans. Site specific Safeguards Contingency Plans are based on guidance provided by NEI 03-12.

ENCLOSURE 4.6

FIRE/EXPLOSIONS AND SECURITY EVENTS

UNUSUAL EVENT

EAL B

This threshold is included to ensure that appropriate notifications for the security threat are made in a timely manner. This includes information of a credible threat. Only the plant to which the specific threat is made need declare the Notification of an Unusual Event.

The determination of "credible" is made through use of information found in the site specific Safeguards Contingency Plan.

EAL C

The intent of this EAL is to ensure that notifications for the aircraft threat are made in a timely manner and that OROs and plant personnel are at a state of heightened awareness regarding the credible threat. It is not the intent of this EAL to replace existing non-hostile related EALs involving aircraft.

This EAL is met when a plant receives information regarding an aircraft threat from NRC. Validation is performed by calling the NRC or by other approved methods of authentication. Only the plant to which the specific threat is made need declare the Unusual Event.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Escalation to Alert emergency classification level would be via 4.6.A.2 would be appropriate if the threat involves an airliner within 30 minutes of the plant.

Reference

NEI 99-01, Rev. 5, 02/2008, HU4

Frequently asked questions (FAQs) generated by users and developers during conversion from previous classifications schemes to NEI 99-01, Revision 4

Security EALs with the Hostile Action changes endorsed by the NRC in RIS 2006-12 on July 19, 2006 Enhanced guidance related to Security EALs to ensure consistency with NEI 03-12.

ENCLOSURE 4.6

FIRE/EXPLOSIONS AND SECURITY EVENTS

UNUSUAL EVENT

3. Other conditions exist which in the judgment of the Emergency Director warrant declaration of a NOUE.

OPERATING MODE APPLICABILITY: ALL

A. 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 off-site response or monitoring are expected unless further degradation of safety systems occurs.

BASIS

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the NOUE emergency classification level.

Reference

NEI 99-01, Rev. 5, 02/2008, HU5

Frequently asked questions (FAQs) generated by users and developers during conversion from previous classifications schemes to NEI 99-01, Revision 4

Security EALs with the Hostile Action changes endorsed by the NRC in RIS 2006-12 on July 19, 2006.

Enhanced guidance related to Security EALs to ensure consistency with NEI 03-12.

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 discriminate against minor fires/explosions.**

ENCLOSURE 4.6

FIRE/EXPLOSIONS AND SECURITY EVENTS

ALERT

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 Judgment ICs.

Reference

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

ENCLOSURE 4.6

FIRE/EXPLOSIONS AND SECURITY EVENTS

ALERT

2. HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat.

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVEL: (A or B)

A. A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLED AREA as reported by the Security Shift Supervisor.

B. A validated notification from NRC of an airliner attack threat within 30 minutes of the site.

BASIS:

Note: Timely and accurate communication between Security Shift Supervision and the Control Room is crucial for the implementation of effective Security EALs.

These EALs address the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. They are not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack or is an identified attack target with minimal time available for further preparation or additional assistance to arrive requires a heightened state of readiness and implementation of protective measures that can be effective (such as on-site evacuation, dispersal or sheltering).

EAL A

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the OCA.

ENCLOSURE 4.6

FIRE/EXPLOSIONS AND SECURITY EVENTS

ALERT

Note that this EAL is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA. This includes ISFSI's that may be outside the PROTECTED AREA but still within the OWNER CONTROLLED AREA.

EAL B

This EAL addresses the immediacy of an expected threat arrival or impact on the site within a relatively short time.

The intent of this EAL is to ensure that notifications for the airliner attack threat are made in a timely manner and that OROs and plant personnel are at a state of heightened awareness regarding the credible threat. Airliner is meant to be a large aircraft with the potential for causing significant damage to the plant.

This EAL is met when a plant receives information regarding an airliner attack threat from NRC and the airliner is within 30 minutes of the plant. Only the plant to which the specific threat is made need declare the Alert.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an airliner (airliner is meant to be a large aircraft with the potential for causing significant damage to the plant). The status and size of the plane may be provided by NORAD through the NRC.

Reference

NEI 99-01, Rev. 5, 02/2008, HA4

Frequently asked questions (FAQs) generated by users and developers during conversion from previous classifications schemes to NEI 99-01, Revision 4

Security EALs with the Hostile Action changes endorsed by the NRC in RIS 2006-12 on July 19, 2006

Enhanced guidance related to Security EALs to ensure consistency with NEI 03-12.

ENCLOSURE 4.6

FIRE/EXPLOSIONS AND SECURITY EVENTS

ALERT

3. Other conditions exist which in the judgment of the Emergency Director warrant declaration of an ALERT.

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVEL:

A. 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.

BASIS:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the Alert emergency classification level.

Reference

NEI 99-01, Rev. 5, 02/2008, HA6

Frequently asked questions (FAQs) generated by users and developers during conversion from previous classifications schemes to NEI 99-01, Revision 4

Security EALs with the Hostile Action changes endorsed by the NRC in RIS 2006-12 on July 19, 2006

Enhanced guidance related to Security EALs to ensure consistency with NEI 03-12.

ENCLOSURE 4.6

FIRE/EXPLOSIONS AND SECURITY EVENTS

SITE AREA EMERGENCY

1. HOSTILE ACTION within the PROTECTED AREA.

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVELS:

A. A HOSTILE ACTION is occurring or has occurred within the PROTECTED AREA as reported by the (Security Shift Supervision).

BASIS

This condition represents an escalated threat to plant safety above that contained in the Alert in that a HOSTILE FORCE has progressed from the OWNER CONTROLLED AREA to the PROTECTED AREA.

This EAL addresses the contingency for a very rapid progression of events, such as that experienced on September 11, 2001. It is not premised solely on the potential for a radiological release. Rather the issue includes the need for rapid assistance due to the possibility for significant and indeterminate damage from additional air, land or water attack elements.

The fact that the site is under serious attack with minimal time available for further preparation or additional assistance to arrive requires ORO readiness and preparation for the implementation of protective measures.

This EAL addresses the potential for a very rapid progression of events due to a HOSTILE ACTION. It is not intended to address incidents that are accidental events or acts of civil disobedience, such as small aircraft impact, hunters, or physical disputes between employees within the PROTECTED AREA. Those events are adequately addressed by other EALs.

ENCLOSURE 4.6

FIRE/EXPLOSIONS AND SECURITY EVENTS

SITE AREA EMERGENCY

Reference

NEI 99-01, Rev. 5, 02/2008, HS4

Frequently asked questions (FAQs) generated by users and developers during conversion from previous classifications schemes to NEI 99-01, Revision 4

Security EALs with the Hostile Action changes endorsed by the NRC in RIS 2006-12 on July 19, 2006

Enhanced guidance related to Security EALs to ensure consistency with NEI 03-12.

ENCLOSURE 4.6

FIRE/EXPLOSIONS AND SECURITY EVENTS

SITE AREA EMERGENCY

2. Other conditions exist which in the judgment of the Emergency Director warrant declaration of a Site Area Emergency

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVELS:

A. 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 beyond the site boundary.

BASIS:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for Site Area Emergency.

Reference:

NEI 99-01, Rev. 5, 02/2008, HS3

Frequently asked questions (FAQs) generated by users and developers during conversion from previous classifications schemes to NEI 99-01, Revision 4

Security EALs with the Hostile Action changes endorsed by the NRC in RIS 2006-12 on July 19, 2006

Enhanced guidance related to Security EALs to ensure consistency with NEI 03-12.

ENCLOSURE 4.6

FIRE/EXPLOSIONS AND SECURITY EVENTS

GENERAL EMERGENCY

1. HOSTILE ACTION resulting in loss of physical control of the facility.

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVELS: (A or B)

A A HOSTILE ACTION has occurred such that plant personnel are unable to operate equipment required to maintain safety functions.

B. A HOSTILE ACTION has caused failure of Spent Fuel Cooling Systems and IMMINENT fuel damage is likely for a freshly off-loaded reactor core in pool.

BASIS:

EAL A

This EAL encompasses conditions under which a HOSTILE ACTION has resulted in a loss of physical control of VITAL AREAS (containing vital equipment or controls of vital equipment) required to maintain safety functions and control of that equipment cannot be transferred to and operated from another location.

Typically, these safety functions are reactivity control (ability to shut down the reactor and keep it shutdown) RCS inventory (ability to cool the core), and secondary heat removal (ability to maintain a heat sink).

Loss of physical control of the control room or remote shutdown capability alone may not prevent the ability to maintain safety functions per se. Design of the remote shutdown capability and the location of the transfer switches should be taken into account. Primary emphasis should be placed on those components and instruments that supply protection for and information about safety functions.

If control of the plant equipment necessary to maintain safety functions can be transferred to another location, then the threshold is not met.

ENCLOSURE 4.6

FIRE/EXPLOSIONS AND SECURITY EVENTS

GENERAL EMERGENCY

EAL B

This EAL addresses failure of spent fuel cooling systems as a result of HOSTILE ACTION if IMMINENT fuel damage is likely such as when a freshly off-loaded reactor core is in the spent fuel pool.

Reference:

NEI 99-01, Rev. 5, 02/2008, HG1

Frequently asked questions (FAQs) generated by users and developers during conversion from previous classifications schemes to NEI 99-01, Revision 4

Security EALs with the Hostile Action changes endorsed by the NRC in RIS 2006-12 on July 19, 2006

Enhanced guidance related to Security EALs to ensure consistency with NEI 03-12.

ENCLOSURE 4.6

FIRE/EXPLOSIONS AND SECURITY EVENTS

GENERAL EMERGENCY

2. Other conditions exist which in the judgment of the Emergency Director warrant declaration of a General Emergency.

Operating Mode Applicability: All

EMERGENCY ACTION LEVEL:

A. 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 off-site for more than the immediate site area.

BASIS:

This EAL addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for General Emergen\cy.

Reference

NEI 99-01, Rev. 5, 02/2008, HG2

Frequently asked questions (FAQs) generated by users and developers during conversion from previous classifications schemes to NEI 99-01, Revision 4

Security EALs with the Hostile Action changes endorsed by the NRC in RIS 2006-12 on July 19, 2006

Enhanced guidance related to Security EALs to ensure consistency with NEI 03-12.

ENCLOSURE 4.7

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

UNUSUAL EVENT	ALERT	SITE AREA EMERGENCY	GENERAL EMERGENCY
Natural and Destructive Phenomena Affecting the Protected Area	Natural and Destructive Phenomena Affecting the Plant Vital Area	Control Room Evacuation Has Been Initiated and Plant Control Cannot Be Established	Other Conditions Existing Which in the Judgment of the Emergency Coordinator Warrant Declaration of General Emergency
Natural and Destructive Phenomena Affecting Keowee Hydro Condition B			
Natural and destructive phenomena affecting Jocassee Hydro Condition B			
Release of Toxic or Flammable Gases Deemed Detrimental to Safe Operation of the Plant	Release of Toxic or Flammable Gases Jeopardizes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Cold Shutdown	Keowee Hydro Dam Failure	
	Turbine Building Flood	Other Conditions Existing Which in the Judgment of the Emergency Coordinator Warrant Declaration of Site Area Emergency	
Other Conditions Existing Which in the Judgment of the Emergency Coordinator Warrant Declaration of an Unusual Event	Control Room Evacuation Has Been Initiated		
Natural and Destructive Phenomena Affecting Keowee Hydro	Other Conditions Existing Which in the Judgment of the Emergency Coordinator Warrant Declaration of an Alert		

ENCLOSURE 4.7

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

UNUSUAL EVENT

1. Natural and Destructive Phenomena Affecting the Protected Area.

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVELS:

A. Tremor felt and valid alarm on the "strong motion accelerograph".

B. Tornado striking within protected area boundary.

C. Vehicle crash into plant structures or systems within protected area boundary.

D. Turbine failure resulting in casing penetration or damage to turbine or generator seals.

BASIS:

The protected area boundary is typically that part within the security isolation zone and is defined in the site security plan.

EAL 1. Damage may be caused to some portions of the site, but should not affect ability of safety functions to operate. Strong motion accelerograph will begin to record at .01g. As defined in the EPRI-sponsored "Guidelines for Nuclear Plant Response to an Earthquake", dated October 1989, a "felt earthquake" is:

> ***An earthquake of sufficient intensity such that: (a) the vibratory ground motion is felt at the nuclear plant site and recognized as an earthquake based on a consensus of control room operators on duty at the time, and (b) valid alarm on seismic instrumentation occurs.***

EAL 2. A tornado striking (touching down) within the protected boundary may have potentially damaged plant structures containing functions or systems required for safe shutdown of the plant. If such damage is confirmed visually or by other in-plant indications, the event may be escalated to Alert.

ENCLOSURE 4.7

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

UNUSUAL EVENT

EAL 3 Addresses such items as a car, truck, plane, or helicopter crash, or train crash that may potentially damage plant structures containing functions and systems required for safe shutdown of the plant. If the crash is confirmed to affect a plant area containing equipment required for safe shutdown of the unit, the event may be escalated to Alert.

EAL 4 Addresses main turbine rotating component failures of sufficient magnitude to cause observable damage to the turbine casing or to the seals of the turbine generator. Of major concern is the potential for leakage of combustible fluids (lubricating oils) and gases (hydrogen cooling) to the plant environs. Actual fires and flammable gas build up are appropriately classified via other EALs. This EAL is consistent with the definition of an Unusual Event while maintaining the anticipatory nature desired and recognizing the risk to non-safety related equipment. Escalation of the emergency classification is based on potential damage done by the missiles generated by the failure.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, HU1

ENCLOSURE 4.7

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

UNUSUAL EVENT

2. Natural and Destructive Phenomena Affecting Keowee Hydro Condition B.

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVELS:

A. Reservoir elevation greater than or equal to 805.0 feet with all spillway gates open and the lake elevation continues to rise.

B. Seepage readings increase or decrease greatly or seepage water is carrying a significant amount of soil particulates.

C. New area of seepage or wetness, with large amounts of seepage water observed on dam, dam toe, or the abutments.

D. A slide or other movements of the dam or abutments which could develop into a failure.

E. Developing failure involving the powerhouse or appurtenant structures and the operator believes the safety of the structure is questionable.

F. Emergency Coordinator judgment

BASIS:

Keowee Hydro is the emergency AC power source for the Oconee Nuclear Station and is covered by the site emergency plan. The conditions cited above are considered to be situations where dam failure may develop. The potentially hazardous situation may allow days or weeks for mitigative actions to prevent failure.

ENCLOSURE 4.7

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

UNUSUAL EVENT

3. Natural and Destructive Phenomena Affecting Jocassee Hydro Condition B.

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVELS:

A. Condition B has been declared for Jocassee

BASIS:

Jocassee Hydro is located upstream of the Oconee Nuclear Station. The mitigation strategies for a Condition B for the Jocassee Dam includes shutdown of all operating Oconee Nuclear units and relocation and installation of other equipment in anticipation of the Condition B escalating to a Condition A.

ENCLOSURE 4.7

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

UNUSUAL EVENT

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

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVELS:

A. Detection of toxic or flammable gases that could enter within the site area boundary in amounts that can affect normal operation of the plant.

B. Report by Local, County or State Officials for potential evacuation of site personnel based on offsite event.

BASIS:

This IC is based on releases in concentrations within the site boundary that will affect the health of plant personnel or the safe operation of the plant with the plant being within the evacuation area of an offsite event (i.e., tanker truck accident releasing toxic gases, etc.) The evacuation area is as determined from the DOT Evacuation Tables for Selected Hazardous Materials in the DOT Emergency Response Guide for Hazardous Materials.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, HU3

ENCLOSURE 4.7

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

UNUSUAL EVENT

5. **Other Conditions Exist Which in the Judgment of the Emergency Coordinator Warrant Declaration of an Unusual Event.**

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVEL:

Other conditions exist which in the judgment of the Emergency Coordinator indicate a potential degradation of the level of safety of the plant.

BASIS:

This EAL is intended to address unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Coordinator to fall under the Unusual Event emergency class.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, HU5

<u>ENCLOSURE 4.7</u>

<u>NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY</u>

ALERT

1. Natural and Destructive Phenomena Affecting the Plant Vital Area.

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVELS:

A. Tremor felt and seismic trigger actuates (.05g)

Note: Only one train of a safety related system needs to be affected or damaged in order to satisfy these conditions.

B. Tornado, high winds, missiles resulting from turbine failure, vehicle crashes, or other catastrophic events <u>**AND**</u> one of the following:

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

<u>**OR**</u>

Affected safety related system parameter indications show degraded performance

BASIS:

EAL 1 Based on the FSAR design basis. Seismic events of this magnitude can cause damage to safety functions.

EAL 2 is intended to address the threat to safety related structures or equipment from uncontrollable and possibly catastrophic events. Damage to safety-related equipment and or structures housing safety-related equipment caused by natural phenomena after striking the site is the key point of this EAL. Only one train of a safety-related system needs to be affected or damaged in order to satisfy this condition. This EAL is, therefore, consistent with the definition of an ALERT in that if events have damaged areas containing safety-related equipment the potential exists for substantial degradation of the level of safety of the plant.

ENCLOSURE 4.7

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

ALERT

Structures/equipment which provide safety functions are designed to withstand sustained wind force of 95mph. These structures are designed to withstand external wind forces resulting from a tornado having a velocity of 300mph. Because high winds may disable the meteorological instrumentation well before the design basis speed is reached, the meteorological tower should not be used for assessment of tornado winds for emergency classification. For tornados, damage would be the prima facie evidence of winds exceeding design basis.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, HA1

ENCLOSURE 4.7

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

ALERT

2. **Release of Toxic or Flammable Gases Jeopardizes Operation of Systems Required to Maintain Safe Operations or to Establish or Maintain Mode 5 (Cold Shutdown).**

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVELS:

A. Report or detection of toxic gases in concentrations that will be life threatening to plant personnel.

B. Report or detection of flammable gases in concentrations that will affect the safe operation of the plant.

Reactor Building
Auxiliary Building
Turbine Building
Control Room

BASIS:

EAL 1 is based on toxic gases that have entered a plant structure that are life-threatening to plant personnel. This EAL applies to structures required to maintain safe operations or to establish or maintain cold shutdown. It is appropriate that increased monitoring be done to ascertain whether consequential damage has occurred. Escalation to a higher emergency class, if appropriate, will be based on System Malfunction, Fission Product Barrier Degradation, Abnormal Rad Levels/Radioactive Effluent, or Emergency Coordinator Judgment ICs.

ENCLOSURE 4.7

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

ALERT

EAL 2 is based on the detection of flammable gases in areas containing equipment required for safe shutdown of the unit. It is appropriate that increased monitoring be done to ascertain whether consequential damage has occurred. Escalation to a higher emergency class, if appropriate, will be based on System Malfunction, Fission Product Barrier Degradation, Abnormal Rad Levels/Radioactive Effluent, or Emergency Coordinator Judgment ICs.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, HA3

ENCLOSURE 4.7

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

ALERT

3. TURBINE BUILDING FLOOD

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVEL:

A. Turbine building flood requiring use of AP/1,2,3/A/1700/010, Turbine Building Flood.

BASIS:

This initiating condition is discussed in the Oconee Probabilistic Risk Assessment report. A flood caused by the rupture of the Jocassee Dam could flood the turbine building basement which could disable the main feedwater pumps and the turbine and motor driven emergency feedwater pumps. Also, rupture of some portions of the condenser intake piping could result in a flood in the turbine building basement. Water tight doors have been provided to prevent the water from seeping into the auxiliary building. This scenario assumes that the Standby Shutdown Facility (SSF) would be available to provide water to the steam generators. Escalation of the event to a higher category would be based on the ability to maintain core cooling or shutdown functions.

ENCLOSURE 4.7

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

ALERT

4. Control Room Evacuation Has Been Initiated.

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVEL:

A. Evacuation of control room **AND** one of the following:

Plant control is established from the Aux SD panel or the SSF

OR

Plant control is being established from the Aux SD panel or the SSF

BASIS:

The auxiliary shutdown panel will allow operators to use turbine bypass valves to maintain RCS temperature, one HPI pump for RCS inventory control, pressurizer heaters to maintain RCS pressure and control of the feedwater startup valves but not control over the feedwater pumps.

The standby shutdown facility can maintain hot shutdown by using auxiliary service water to the steam generators for primary heat removal and also to provide makeup to the reactor coolant system. The SSF is only used under extreme conditions since it may involve pumping lake water into the steam generators for heat removed purposes.

With the control room evacuated, additional support, monitoring and direction through the Technical Support Center and/or other Emergency Operations Facility is necessary. Inability to establish plant control from outside the control room, as evidenced by the inability to maintain RCS or SG inventories, will escalate this event to a Site Area Emergency.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, HA5

ENCLOSURE 4.7

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

ALERT

5. Other Conditions Existing Which in the Judgment of the Emergency Coordinator Warrant Declaration of an Alert.

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVEL:

A. Other conditions exist which in the Judgment of the Emergency Coordinator indicate that plant safety systems may be degraded **AND** that increased monitoring of plant functions is warranted.

BASIS:

This EAL is intended to address unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Coordinator to fall under the Alert emergency class.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, HA6

ENCLOSURE 4.7

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

SITE AREA EMERGENCY

1. Control Room Evacuation Has Been Initiated and Plant Control Cannot Be Established.

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVEL:

The following conditions exist:

A. Control room evacuation has been initiated

AND

Control of the plant cannot be established from the Aux SD panel or the SSF within 15 minutes.

BASIS:

The timely transfer of control to alternate control areas has not been accomplished. This failure to transfer control would be evidenced by deteriorating reactor coolant system or steam generator parameters. For most conditions RCP seal LOCAs or steam generator dryout would be indications of failure to accomplish the transfer in the necessary time.

Escalation of this event, if appropriate, would be by Fission Product Barrier Degradation, Abnormal Rad Levels/Radiological Effluent, or Emergency Coordinator Judgment ICs

Reference

NUMARC/NESP-007, Rev. 2, 01/92, HS2

ENCLOSURE 4.7

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

SITE AREA EMERGENCY

2. Keowee Hydro Dam Failure

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVEL:

A. Imminent/actual dam failure exists involving any of the following:
Keowee Hydro Dam
Little River Dam
Dikes A,B,C,D
Intake Canal Dike
Jocassee Dam - Condition A

BASIS:

The Keowee Hydro Dam project includes the Keowee Hydro Dam, Little River Dam and Dikes A, B, C, D, and the Intake Canal Dike. Dam failure of any portion of the Keowee Hydro Dam would result in loss of the emergency AC power supply AND the potential to lose the ultimate heat sink source. Some flooding of the site may result. Evaluation of the plant status following failure of the dam would determine the need to escalate to a General Emergency. Failure of the Jocassee Dam has the potential to result in the failure of the Keowee Hydro Project Dams/Dikes.

ENCLOSURE 4.7

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

SITE AREA EMERGENCY

3. Other Conditions Existing Which in the Judgment of the Emergency Coordinator Warrant Declaration of Site Area Emergency.

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVEL:

A. Other conditions exist which in the Judgment of the Emergency Coordinator indicate actual or likely major failures of plant functions needed for protection of the public.

BASIS:

This EAL is intended to address unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Coordinator/EOF Director to fall under the emergency class description for Site Area Emergency.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, HS3

ENCLOSURE 4.7

NATURAL DISASTERS, HAZARDS AND OTHER CONDITIONS AFFECTING PLANT SAFETY

GENERAL EMERGENCY

1. **Other Conditions Existing Which in the Judgment of the Emergency Coordinator Warrant Declaration of General Emergency.**

OPERATING MODE APPLICABILITY: ALL

EMERGENCY ACTION LEVEL:

A. Other conditions exist which in the Judgment of the Emergency Coordinator/ EOF DIRECTOR indicate:

(1) Actual or imminent substantial core degradation with potential for loss of containment

OR

(2) Potential for uncontrolled radionuclide release that would result in a dose projection at the site boundary greater than 1000 mRem TEDE or 5000 mRem CDE Adult Thyroid.

BASIS:

This EAL is intended to address unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Coordinator/EOF Director to fall under the General Emergency class.

Releases (if made) can reasonably be expected to exceed EPA PAG levels outside the site boundary.

Reference

NUMARC/NESP-007, Rev. 2, 01/92, HG2

ENCLOSURE 4.8

Radiation Monitor Readings for Emergency Classification

All RIA values are considered GREATER THAN or EQUAL TO

HOURS SINCE REACTOR TRIPPED	RIA 57 R/hr		RIA 58 R/hr*	
	Site Area Emergency	General Emergency	Site Area Emergency	General Emergency
0.0 - < 0.5	5.9E+003	5.9E+004	2.6E+003	2.6E+004
0.5 - < 1.0	2.6E+003	2.6E+004	1.1E+003	1.1E+004
1.0 - < 1.5	1.9E+003	1.9E+004	8.6E+002	8.6E+003
1.5 - < 2.0	1.9E+003	1.9E+004	8.5E+002	8.5E+003
2.0 - < 2.5	1.4E+003	1.4E+004	6.3E+002	6.3E+003
2.5 - < 3.0	1.2E+003	1.2E+004	5.7E+002	5.7E+003
3.0 - < 3.5	1.1E+003	1.1E+004	5.2E+002	5.2E+003
3.5 - < 4.0	1.0E+003	1.0E+004	4.8E+002	4.8E+003
4.0 - < 8.0	1.0E+003	1.0E+004	4.4E+002	4.4E+003

*** RIA 58 is partially shielded**

Assumptions used for calculation of high range in-containment monitors RIA 57 and 58:

1. Average annual meteorology (7.308 E^{-6} sec/m^3)
2. Design basis leakage (5.6 E^6 ml/hr)
3. One hour release duration
4. *General Emergency* PAGs are 1 rem TEDE and 5 rem CDE; *Site Area Emergency* determination is based on 10% of the *General Emergency* PAGs
5. Calculations for monitor readings are based on CDE because thyroid dose is limiting
6. No credit is taken for filtration
7. LOCA conditions are limiting and provide the more conservative reading

Duke Energy Oconee Nuclear Station **EMERGENCY PLAN A - SECTION F EMERGENCY COMMUNICATIONS**	Procedure No. **EPA SECTION F** Revision No. **006** Electronic Reference No. **OAP000HV**

PDF Format

Prepared By* ______________________________ Date __________

Requires Applicability Determination? ☐ Yes ☐ No

Reviewed By* ______________________________(QR) Date __________

Cross-Disciplinary Review By* ____________________(QR) NA __________ Date __________

Reactivity Mgmt. Review By* ____________________(QR) NA __________ Date __________

Additional Reviews

Reviewed By* ______________________________Date __________

Reviewed By* ______________________________Date __________

Approved By* ______________________________ Date __________

* *Printed Name and Signature*

F. EMERGENCY COMMUNICATIONS

Provisions exist for prompt communications among principal response organizations, emergency personnel, and to the public.

F.1 Emergency Response Organization

The Emergency Response Organization has been developed in such a manner to list primary and alternate personnel. Primary and backup means of communication have been established between the Site, local government agencies, and State response organizations (Figure F-1).

F.1.a Calls to activate State/County agency's emergency function are the responsibility of the Operations Shift Manager/Emergency Coordinator. These calls are made:

1. By selective signaling phone system (where applicable).

2. The site telephone system to a 24-hour emergency number.

Some agencies have numbers for designated work schedules. Numbers can be found in the Emergency Telephone Directory.

A back-up radio system provides alternate communications with Oconee and Pickens Counties emergency response organizations. (Figure F-2)

F.1.b On a monthly basis, a communication check is made to state and local government warning points within the Emergency Planning Zone. Communications during an emergency situation would be by selective signaling phone system, site telephone system/commercial phone service, or by radio (where appropriate).

F.1.c The EOF organization has the responsibility to ask for federal response. However, communication with the Nuclear Regulatory Commission from the emergency response facilities, would be by use of the Emergency Telecommuication System (ETS) located in the Control Room areas, Technical Support Center, or the Emergency Operations Facility.

F. EMERGENCY COMMUNICATIONS

F.1.d The Emergency Response Organization has the following communications systems available for use during emergencies:

1) Oconee Nuclear Station Telephone System
(Generator backed and battery backed)

Fiber-Optic to Charlotte GO (65 lines)
Telephone line to Easley (6 circuits)
Anderson (4 lines)
Six-Mile (4 lines)
Site Telephone System - Inward and outward direct dial available from the Control Room, TSC, and OSC

2) Commercial phone service does not go through the site telephone system

3) Duke Selective Signaling (Generator backed at the microwave tower)

The Selective Signaling System is the primary means of communication with the offsite agencies. The Selective Signaling is on the Duke fiber optic system tied to short leased lines from the local telephone company. This circuit allows intercommunication among the EOF, TSC, control room, counties, and states.

Oconee County
Pickens County
State Warning Point
State Emergency Operations Center (Columbia)
Emergency Operations Facility (Charlotte)
Technical Support Center
Control Rooms 1&2,
Backup TSC/OSC (OOB)
Alternate Reporting Location (Issaqueena Trail)

4) Emergency Radio System (Offsite System-Battery Backed)

Control Room Units 1&2
Technical Support Center
Field Monitoring Teams (800 MHZ)
Emergency Operations Facility
Pickens County (48.5 MHZ)
Oconee County (48.5 MHZ)
State of South Carolina

F. EMERGENCY COMMUNICATIONS

5) Radio Systems (Onsite) (Emergency Back-up Power by Keowee Hydro Units)

Control Room 1&2, 3
Fire Brigade
Chemistry
Safety
Radiation Protection
Maintenance
Medical Emergency Response Team
Hazardous Materials Response Team

6) Security Radio System (Emergency Back-up Power by Standby Shutdown Facility)

CAS/SAS
All Security Guards
Oconee County LEC
Control Room 1&2, 3

7) Public Address (PA) System

Oconee Nuclear Station (Protected Area)
Oconee Office Building
Oconee Administration Building
Oconee Complex
Oconee Maint. Training Facility (Unique Page Number)
Oconee Garage (Unique Page Number)
Oconee Training Facility (Unique Page Number)
Keowee Hydro Station (Unique Page Number)
World of Energy

8) Site Assembly Warning System

Paging by Control Room
Warble Tone over PA
Siren Assembly Horn (Outside Warning)

9) EOF Communication System (Energy Center has back-up generator power)

The emergency communications systems at the Charlotte EOF are designed to ensure the reliable, timely flow of information between all parties having an emergency response role. The Selective Signaling System is the primary means of communicating changes in event classification and protective action recommendations to the state and counties. The Decision Line provides the state and counties with a dedicated line to discuss and coordinate protective action recommendations. Existing commercial telephone service will serve as the designated backup means for communications in the event of a Selective Signaling System or Decision Line failure.

Duke Telephone System (battery backed)
Selective Signaling System (for state/county notifications)
Decision Line (for discussions/coordination of PARs)
Commercial telephones from the Charlotte switch network
Radio System to communicate with the Field Monitoring Teams
NRC Emergency Telecommunications System phones
South Carolina Local Government Radio

F.1.e Recall of Emergency Response Organization

Should an emergency occur that will require activation of the Emergency Response Organization, the Operations Shift Manger will require the following actions to occur:

Normal Working Hours (Figure A-2A)

1. Have announced over the Public Address system that the Emergency Response Organization (Technical Support Center and Operational Support Center) are to be staffed.

2. Security will activate the ERO. If security is unable to activate the ERO, the SM (or designee) will activate the ERO.

3. Notify Duty Operations Engineer who verifies Plant Manager and Superintendent of Operations have been notified.

4. Initiate a Site Assembly.

5. Individual groups will contact corporate personnel for support.

Weekends, Holidays, Backshift (Figure A-2B)

1. Security will activate the ERO. If security is unable to activate the ERO, the SM (or designee) will activate the ERO.

2. Duty Operations Engineer who verifies Plant Manager and Superintendent of Operations have been notified.

3. Announce over the PA system that the Emergency Response Organization (Technical Support Center and Operational Support Center) is to be activated.

4. Initiate a Site Assembly.

5. Individual groups will contact corporate personnel for support.

F.1.f Redundant two way communication exists for communication with the Nuclear Regulatory Commission. The ETS system, the regular site or EOF telephone system exists for the communication link with NRC. (Figure F-1)

F.2 Medical Support Communication Link

Operations and/or Security will utilize the public address system and radio pager system to activate the Medical Emergency Response Team to respond to a medical emergency to assess the situation and render first aid. If an ambulance is needed, Operations and/or Security will call for an ambulance to be dispatched from the Oconee Medical Center by one of several ways:

1. Regular ONS switchboard line
2. Outside line (Commercial Phone Service)
3. Selective Signaling phone to Oconee County who then would contact the Oconee Medical Center. (Operations only)
4. Radio in the Control Room and/or CAS/SAS to Oconee County, who then would contact the Oconee Medical Center.

However, should an emergency at the Oconee Nuclear Station cause the Emergency Response Organization to be activated, personnel will staff the Operational Support Center who can respond to a medical emergency. Calls will be made from the Operational Support Center for additional medical assistance (i.e. ambulance transport and hospital contact).

F.3 Periodic Testing of the Emergency Communications System

Testing of the Emergency Communications System will be tested on a monthly and a quarterly basis in accordance with site procedures. Phones and radios will be checked to determine their availability.

FIGURE F-1

DUKE ENERGY COMPANY
OCONEE NUCLEAR STATION

EMERGENCY COMMUNICATIONS SYSTEM

Organization	Commercial Phone Service Private Line	ONS Site Phone System	Select Signal System	DPC Offsite Radio System	DPC Onsite Radio System	DPC Mcrwav. System	State LGR Radio System	Decision Line	ETS System	EOF Phone System
Control Room	x	x	x	x	x	x			x	x
Technical Support Center	x	x	x	x	x	x			x	x
Operational Support Center		x			x	x				x
Emergency Operations Facility	x		x	x		x	x	x	x	x
Pickens LEC	x	x	x	x				x		x
Pickens EOC	x	x	x	x			x	x		x
Oconee LEC	x	x	x	x				x		x
Oconee EOC	x	x	x				x	x		x
State EOC	x	x	x				x	x		x
State FEOC	x	x	x	x			x	x		x
NRC Headquarters	x	x							x	x
NRC Region II	x	x							x	x

FIGURE F-2

DUKE ENERGY COMPANY
OCONEE NUCLEAR STATION

EMERGENCY RADIO NETWORK

The offsite emergency radio network at the Oconee Nuclear Station (ONS) is specifically limited to use in an emergency event. The network consists of two radio frequencies which provide the following services:

A. 48.5 MHZ

- Backup communications between ONS, Pickens County Emergency Preparedness Agency and Oconee County Emergency Preparedness Agency.
- Backup internal communications between the Technical Support Center and the Emergency Operations Facility.
- Operating instructions are shown in the Emergency Telephone Directory and SH/0/B/2005/002 (Protocol for the Field Monitoring Coordinator During Emergency Conditions)

B. 800 MHZ

- Provide communications between Field Monitoring Team Coordinator and field teams.
- Base station radios are located in the TSC, backup TSC and EOF.
- Operating instructions are located in RP Directive 11.7 and SH/0/B/2005/002 (Protocol for the Field Monitoring Coordinator During Emergency Conditions)

Duke Energy Oconee Nuclear Station **EMERGENCY PLAN A - SECTION H EMERGENCY FACILITIES AND EQUIPMENT**	Procedure No. **EPA SECTION H** Revision No. **006** Electronic Reference No. **OAP000HX**

PDF Format

Prepared By* ______________________________ Date ________

Requires Applicability Determination? ☐ Yes ☐ No

Reviewed By* ______________________________(QR) Date ________

Cross-Disciplinary Review By* ________________(QR) NA ________ Date ________

Reactivity Mgmt. Review By* ________________(QR) NA ________ Date ________

Additional Reviews

Reviewed By* ______________________________Date ________

Reviewed By* ______________________________Date ________

Approved By* ______________________________ Date ________

** Printed Name and Signature*

Emergency Facilities And Equipment

H.1.a Technical Support Center (TSC)

A Technical Support Center has been designated for the Oconee Nuclear Station in the area known as the Operations Center, together with the nearby offices adjacent to the Control Rooms 1&2 on the fifth floor of the Auxiliary Building. This area has the same ventilation and shielding as the Control Room enabling plant management and supporting technical and engineering personnel to evaluate plant status and support operations in conjunction with the Operational Support Center.

The Technical Support Center has the capability to display and transmit plant status to those individuals who are knowledgeable of and responsible for engineering and management support of the reactor operations in the event of an accident, and those persons who are responsible for the management of the accident. Upon activation, this facility will provide the main communication link between the Plant, Operational Support Center, the Nuclear Regulatory Commission Regional Headquarters, and the Emergency Operations Facility. The Technical Support Center is staffed by plant management and technical personnel.

The Technical Support Center has access to the following capabilities and characteristics: (Figure H-1).

1. Redundant two-way communication with the Control Room, the Emergency Operations Facility and the Nuclear Regulatory Commission Operations Center.

2. Monitoring for direct radiation and airborne radioactive contaminants, with local readout of radiation level and alarms if preset levels are exceeded. Laboratory analysis is required if it becomes necessary to detect radioiodines at concentrations as low as 1.0 E-7 microcurie/cc.

3. Display, printout or trending of comprehensive data necessary to monitor reactor systems status and to evaluate plant system abnormalities; in-plant radiological parameters and meteorological parameters are also available. This capability is provided via each unit's Operator Aid Computer.

   Offsite radiological conditions are provided via radio from the field monitoring teams.

4. Ready access to as-built plant drawings such as general arrangement, flow diagrams, electrical one-lines, instrument details, etc.

5. Habitability during postulated radiological accidents to the same degree as the Control Room.

H.1.b Operational Support Center (OSC)(Figure H-2)

An Operational Support Center has been established in the Operations Center located in the Unit 3 Control Room. Personnel assigned to this support center will include the following:

- Work Control
- Chemistry
- Radiation Protection
- Maintenance
- Safety
- Operations
- Engineering
- Nuclear Supply Chain
- Security

The Operational Support Center has shielding and ventilation to the same degree as the Control Room. Breathing equipment and protective clothing are available in the Operational Support Center should any craftsman/technician be required to perform a task or function in an area that would require protective clothing and breathing apparatus.

H.1.c Backup Emergency Response Facility (ERF) (Figure H-14 and H-2A)

A Backup Technical Support Center has been established at the Oconee Office Building, Room 316. Radio and telephone communications are available to offsite agencies and the NRC to the same extent as the designated TSC.

A Backup Operational Support Center has been established in the Oconee Office Building, Room 316 A. Communication links are provided for information flow both to the Control Room and Technical Support Center.

H. EMERGENCY FACILITIES AND EQUIPMENT

The Issaqueena Trail Facility (JIC) serves as an alternate response facility that would be accessible even if the site is under threat of or experiencing hostile action, to function as a staging area for augmentation of emergency response staff and having the following characteristics required collectively of the alternate facilities for use when onsite emergency facilities cannot be safely accessed during hostile action:

- The capability for communication with the emergency operations facility, control room, and plant security.
- The capability to perform offsite notifications.
- The capability for engineering assessment activities, including damage control team planning and preparation.

H.2 Emergency Operations Facility (EOF) (Figures H3-A thru H3-E)

The Emergency Operations Facility is located at the Charlotte General Office in North Carolina. The facility is located approximately 120 miles from the Oconee Nuclear Station.

The EOF has the following capabilities:

a. The capability for obtaining and displaying plant data and radiological information for each reactor at a nuclear power reactor site and for each nuclear power reactor site that the facility serves.

b. The capability to analyze plant technical information and provide technical briefings on event conditions and prognosis to licensee and offsite response organizations for each reactor at a nuclear power reactor site and for each nuclear power reactor site that the facility serves.

c. The capability to support response to events occurring simultaneously at more than one nuclear power reactor site if the emergency operations facility serves more than one site.

H. EMERGENCY FACILITIES AND EQUIPMENT

Two utility circuits feed Energy Center Phase 1 where the EOF is located. Primary power to the Power Building is provided by commercial power. All electrical outlets, as well as lighting fixtures and the wiring closet that supports both the voice and data communications in the Energy Center EOF are on generator backed up power. A loss of commercial power should not impact any of the voice or data communications equipment located in the EOF. All common Duke Energy telecom infrastructures that support EOF functions, including, but not limited to, fiber optic transmission equipment, telephone switching equipment and data network routers, is configured to operate from at least one and usually multiple backup power sources in the event of a loss of commercial power. These backup sources include generator, DC battery and UPS systems. EOF HVAC loads are not backed up.

H.3 County, State Emergency Operations Center

See Oconee County FNF Plan.
See Pickens County, FNF Plan.
See State of South Carolina FNF Plan, Site Specific.

H.4 Activation and Staffing of the Emergency Response Organization

Activation and staffing of the Emergency Response Organization will be in accordance with the emergency action levels and the procedures developed for determining emergency response.

Division/Section Directives describe the Emergency Response Organization. Figures A-2A, A-2B depicts the procedure for recall of the Emergency Organization.

H.5 Monitoring Systems

On Site - If an emergency situation occurs at the plant, plant personnel continually monitor plant parameters with regard to limits and surveillance requirements specified in the appropriate Technical Specifications, Operating Procedures and Emergency Procedures. These parameters will affect the emergency classification and therefore affect decisions implementing specific emergency measures. In addition to monitoring plant parameters, radiological surveys may be used to verify, augment and/or delineate the assessment of the emergency. (Figure H-20).

H. EMERGENCY FACILITIES AND EQUIPMENT

H.5.a Natural Phenomena Monitors

Natural phenomena instrumentation to monitor wind speed and direction, temperature and vertical temperature gradient (Figure H-4); and seismic activity (Figure H-18).

H.5.b Radiological Monitors (H-5)

Area Radiation Monitoring System

The area radiation monitoring system detectors are located throughout the plant in locations where significant radiation levels may exist, which may change with time and with the operation being performed. They are designed primarily for the protection of personnel performing such operations as routine coolant sampling, refueling, reactor building entry, radioactive waste disposal operations and for certain other operating and maintenance work. The system has sufficient range and flexibility to permit readout during routine operations and during any transient or emergency conditions that may exist. The equipment is self checking for proper operation and alarms both in the local area and in the respective control room. Where necessary or desirable, readout is also provided locally.

Process Radiation Monitoring System

Radiation monitoring of process systems provides early warning of equipment, component, or system malfunctions or potential radiological hazards. The Process Radiation Monitoring System includes alarms, indications, and recording of data in the control rooms. In some cases automatic action is taken upon an alarm condition; in others the alarm serves as a warning to the operator so that manual corrective action can be taken.

Radioactive liquid and gaseous waste effluent are monitored and coordinated by Operations and controlled to assure that radioactivity released does not exceed 10 CFR 20 limits for the plant as a whole.

H. EMERGENCY FACILITIES AND EQUIPMENT

Personnel Monitoring System

Personnel monitoring equipment consisting of film badges and/or their equivalent (thermo-luminescent dosimeters, TLD's), are assigned by the Radiation Protection Section and worn by all personnel at Oconee whose job involves significant levels of radiation exposure as defined in 10 CFR 20. In addition, pocket chambers, electronic dosimeters, self-reading dosimeters, pocket high radiation alarms, wrist badges, and/or finger tabs are readily available for use by those persons who ordinarily work in the Controlled Area or whose job requires frequent access to this area.

Portable Monitors - sufficient numbers are available for use in assessing radiological conditions. (Figure H-6).

Sampling Equipment - sufficient numbers are available for use in assessing radiological conditions. (Figure H-7).

H.5.c Process Monitors - Non-radiological Monitoring

Non-radiological monitoring capabilities include reactor coolant system pressure, temperatures, flows, and water level for detection of inadequate core cooling. Containment pressure, temperature, liquid levels, flow rates, and status of equipment components are monitored to assess containment integrity.

H.5.d Fire and Combustion products detectors - (Figure H-8).

H.6 Offsite Monitoring and Analysis for Emergency Response

H.6.a Natural-Phenomena Monitors

Facilities and equipment include two onsite meteorological towers. Also, an agreement has been established with the Greenville-Spartanburg National Weather service to provide meteorological information should our system become inoperable.

H.6.b Radiological monitors for emergency environmental monitoring are provided in emergency kits. The established environmental monitoring network and sampling equipment in the surrounding area are also available to provide emergency assessment data.

The existing radiological monitoring program will provide base line information as well as in-place monitoring for early assessment data. (Figure A) (H-9 and H-10).

H. EMERGENCY FACILITIES AND EQUIPMENT

Normal environmental monitoring equipment includes radioiodine and particulate continuous air samplers and thermo-luminescent dosimeters, located and collected according to pre-established criteria. Environmental monitoring will be expanded as necessary during an emergency situation in accordance with offsite monitoring procedures.

H.6.c Laboratory Facilities - Include mobile emergency monitoring capabilities available through the S.C. Department of Health and Environmental Control, Bureau of Solid and Hazardous Waste Management and the DOE Radiological Assistance Team. In addition, Oconee Nuclear Station (ONS) has emergency vehicles for mobile assessment purposes. Fixed facilities are available for gross counting and spectral analysis in the ONS counting laboratory (Figure H-11) and at the Duke Energy Environmental Laboratory near the McGuire Nuclear Station, Charlotte, North Carolina.

Should the plant lose the capability to use the count room onsite, samples can be counted at the backup count room or in one of the mobile assessment field monitoring vans. Portable equipment would be relocated to this area. (Figure H-3)

H.7 Offsite radiological monitoring equipment is located in the storage area outside the protected area. Emergency kits are available for off-site monitoring teams who would be monitoring for radiation offsite. (Figure H-12).

H.8 Meteorological Instrumentation

A primary and one auxiliary meteorological tower provides the basic parameters on display in the Control Room. (Figure H-4 shows the meteorological equipment.)

Meteorological measurement equipment meets the criteria of the milestones addressed in Appendix 2 of NUREG 0654 and Proposed Revision 1 to Regulatory Guide 1.23.

An operable dose calculation methodology is in use in the Control Room, Technical Support Center and the Emergency Operations Facility.

The dose assessment methodology for the Oconee Nuclear Station consists of calculations for three separate source terms. The first source term is based on the activity that has been or is actually being released through the unit vent; the second source term is based on a potential release using the reactor building dose rate and design basis assumptions for containment leakage; the third source term is based on the activity that has been or is actually being released through the steam relief valves.

The release rate is calculated for each source term using relative atmospheric dispersion factors calculated by the meteorological model and either actual sample data or radiation monitor readings. These release rates are then added together and used to calculate the dose rate or a projected dose over the duration of the release or over 4 hours if release duration is unknown at 1, 2, 5 and 10 miles downwind from the plant.

These dose assessment methods provide the capability to calculate the dose from actual or potential releases following an accident. A fifty-year committed dose equivalent (CDE) to the thyroid and a total effective dose equivalent (TEDE) from exposure to a semi-infinite cloud and a four-day ground shine as applicable are determined. The dose conversion factors are derived from EPA-400. Near real time radiation monitor readings, sample data, and meteorological data are combined to provide timely, realistic dose calculations. This model will provide the capability to assess and monitor actual or potential offsite consequences of a radiological emergency condition.

Direct telephone access to the person responsible for making offsite dose calculations is available to the Nuclear Regulatory Commission through the use of the NRC Health Physics Network line. The physical location of this person is in the Emergency Operations Facility.

H.9 Operational Support Center - Emergency Supplies

The Operational Support Center will have the same shielding, and ventilation as the Control Room. Protective clothing and breathing equipment are available to the personnel assembled in these areas. (See Figures H-13, H-14, H-17)

H.10 Inspection and Inventory of Emergency Equipment and Supplies

All emergency equipment designated by the Oconee Nuclear Station Emergency Plan shall be inventoried and inspected on a quarterly basis or in agreement with established procedures. Supplies will be inventoried/replaced after each drill and/or exercise or actual emergency where supplies might have been used.

Calibration of any/all emergency equipment shall be at the intervals recommended by the supplier of the equipment.

H. EMERGENCY FACILITIES AND EQUIPMENT

H.11 Identification of Emergency Kits

Emergency kits are located in various locations. See figures below and procedure for specific locations.

Protective Equipment Kits - Figures H-13, H-14, H-17
Communications Equipment - Figures H-12, H-16
Radiological Monitoring Equipment - Figures H-12, H-16, H-17
Emergency Supplies - Figures H-16, Figure H-17
Emergency Medical Supplies - L-1, L-2, L-3
Decontamination Supplies - K-3
Spill Cleanup Equipment/Supplies - H-19

H.12 Field Monitoring Data Collection

The Emergency Operations Facility has been designated as the central point for the receipt and analysis of all field monitoring data and coordination of sample media. The Radiological Assessment Manager at the Emergency Operations Facility will be responsible for the coordination efforts.

FIGURE H-1

OCONEE NUCLEAR STATION
TYPICAL TECHNICAL SUPPORT CENTER (TSC)
PRIMARY LOCATION
UNIT 1&2 OPS CENTER

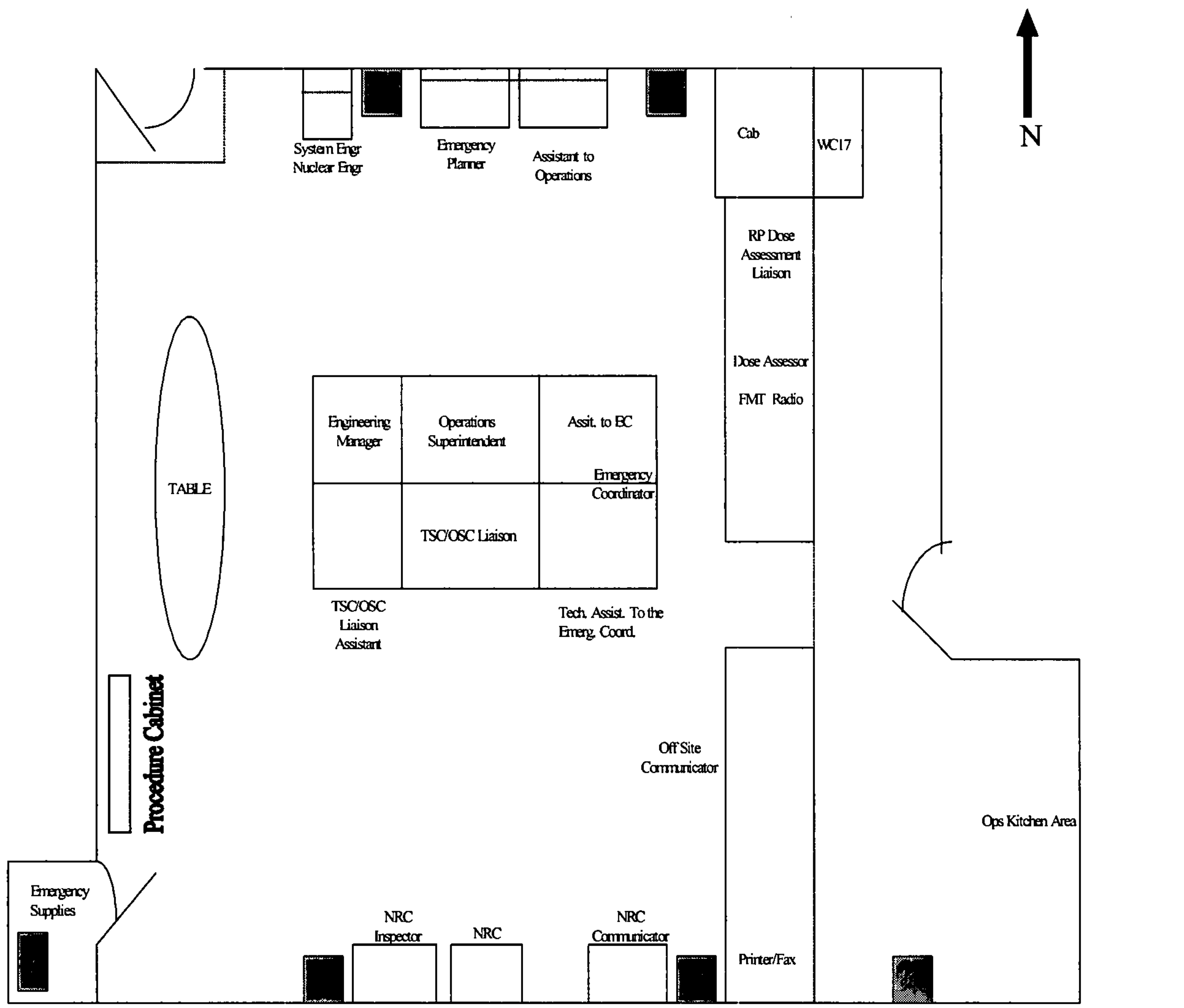
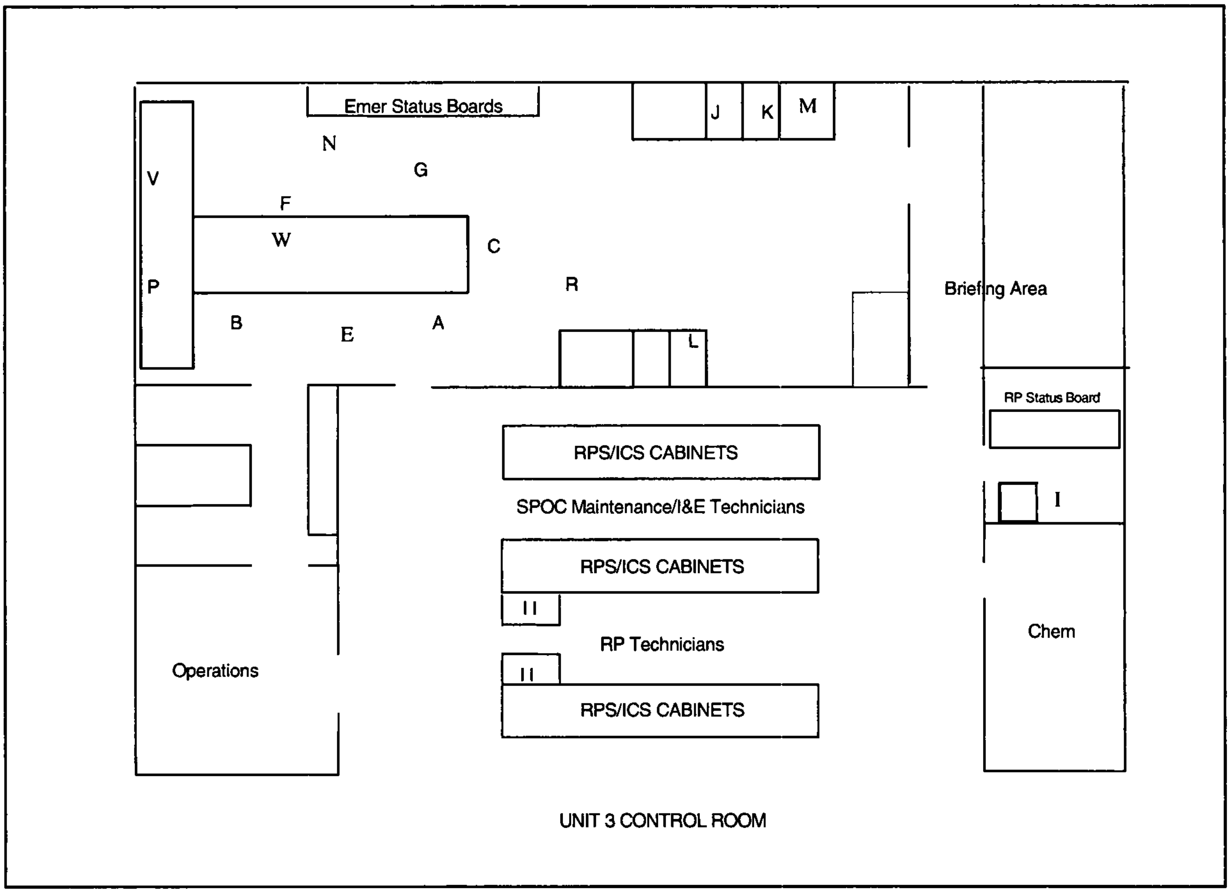


FIGURE H-1A

NO LONGER USED

FIGURE H-2

OCONEE NUCLEAR STATION
TYPICAL OPERATIONAL SUPPORT CENTER (OSC)
PRIMARY LOCATION
UNIT 3 OPERATONS CENTER



A. OSC Manager
B. Ops Liaison
C. RP Manager
D. Unassigned
E. Technical Assistant I
F. Chemistry Manager
G. Maintenance Manager
H. RP
I. SPOC
J. Electrical Engineering
K. Maintenance Supervisor (SPOC)
L. Chemistry Supervisor
M. SPOC
N. Technical Assistant II
O. RP Admin. Supervisor
P. Nuclear Supply Chain Liaison
Q. RP Shift
R. Assistant to RP Mgr.
V. Security Liaison

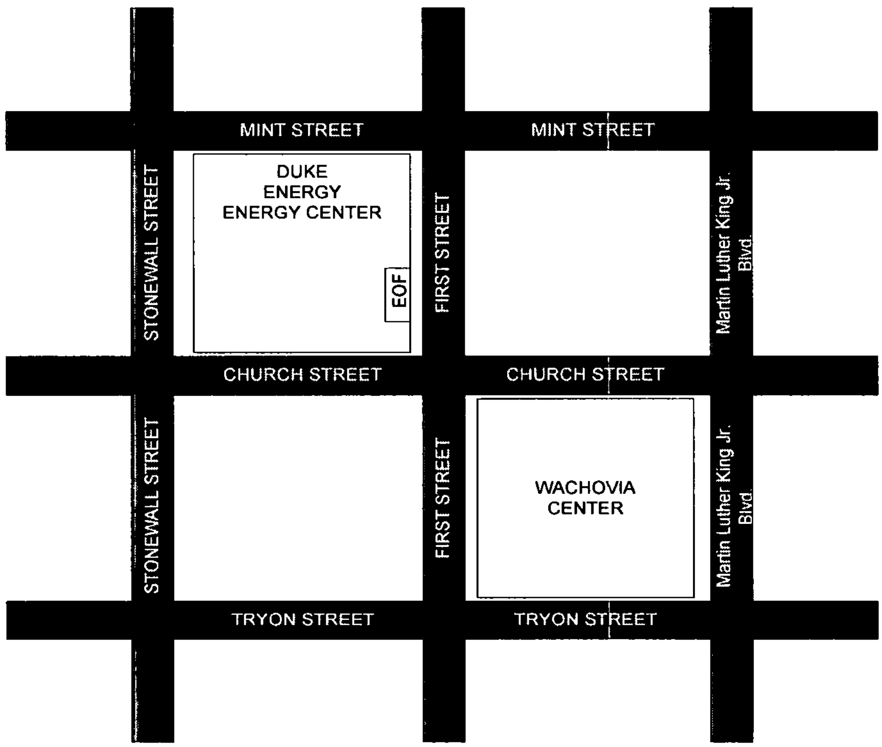
FIGURE H-2A

NO LONGER USED

FIGURE H-3A

DUKE ENERGY
OCONEE NUCLEAR STATION

CHARLOTTE EOF
GENERAL OFFICE BUILDING LAYOUT – CHARLOTTE, NC



The EOF is on the 1st Floor of the Energy Center.

FIGURE H-3B
DUKE ENERGY
OCONEE NUCLEAR STATION
CHARLOTTE EMERGENCY OPERATIONS FACILITY LAYOUT

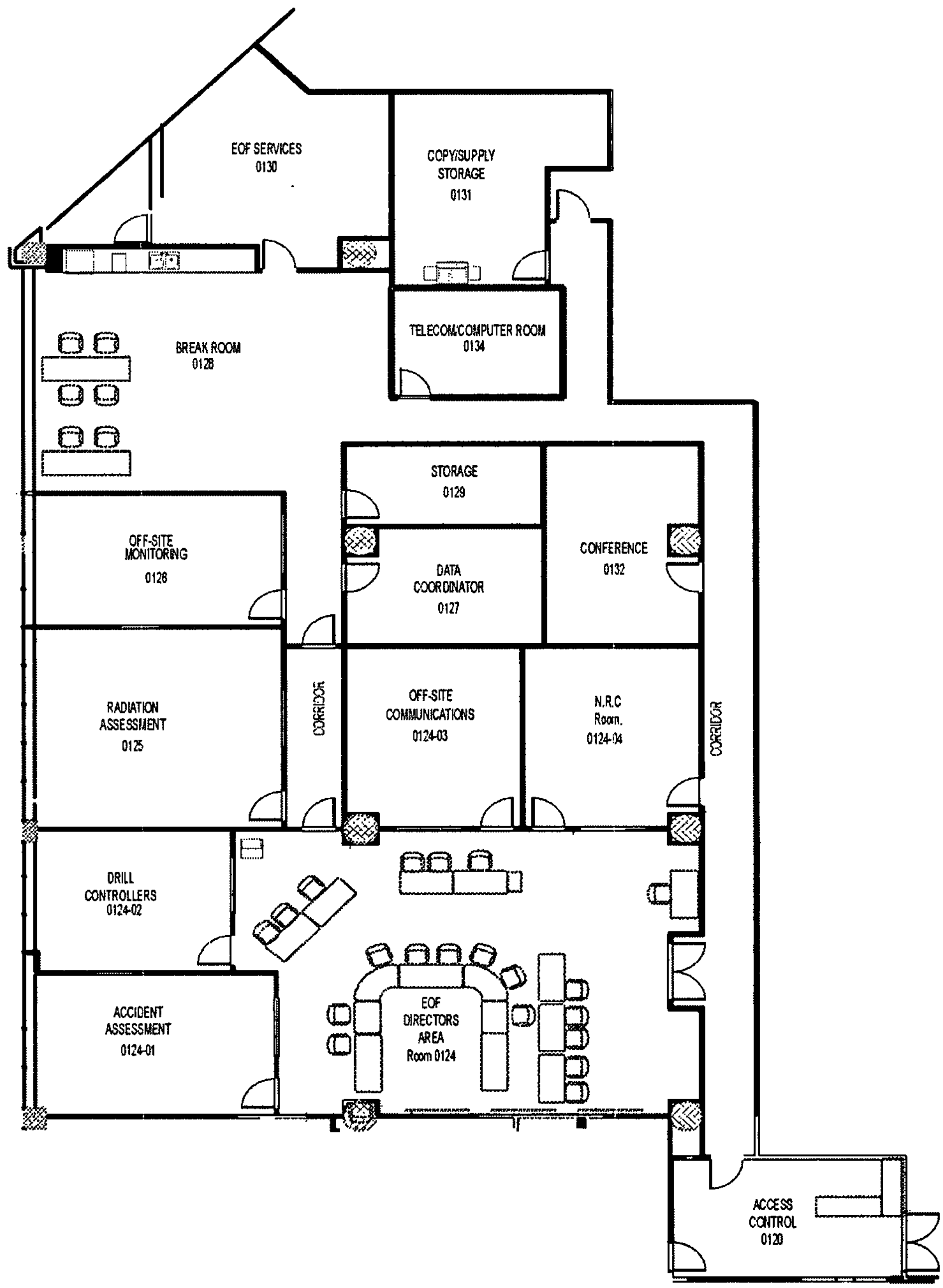


FIGURE H-3C

DUKE ENERGY
OCONEE NUCLEAR STATION

TYPICAL OCONEE JIC SET UP
(Alternate Emergency Response Facility)

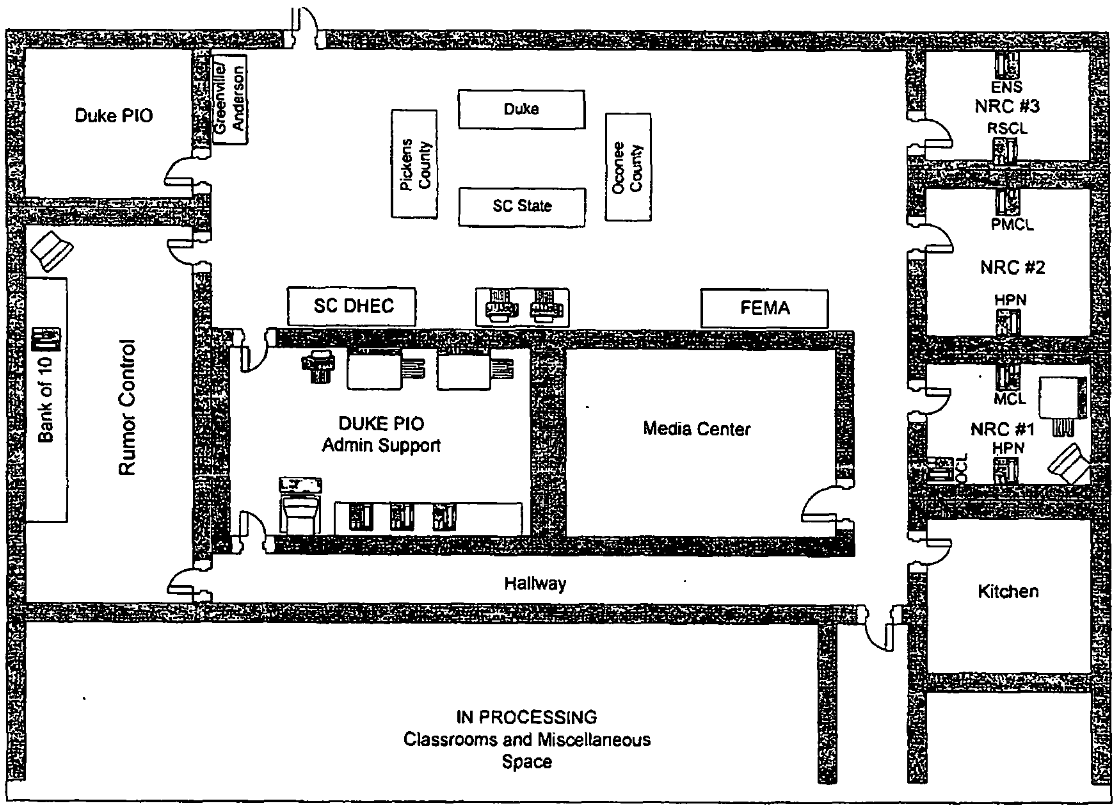


FIGURE H-3D

DUKE ENERGY
OCONEE NUCLEAR STATION

OCONEE MEDIA CENTER

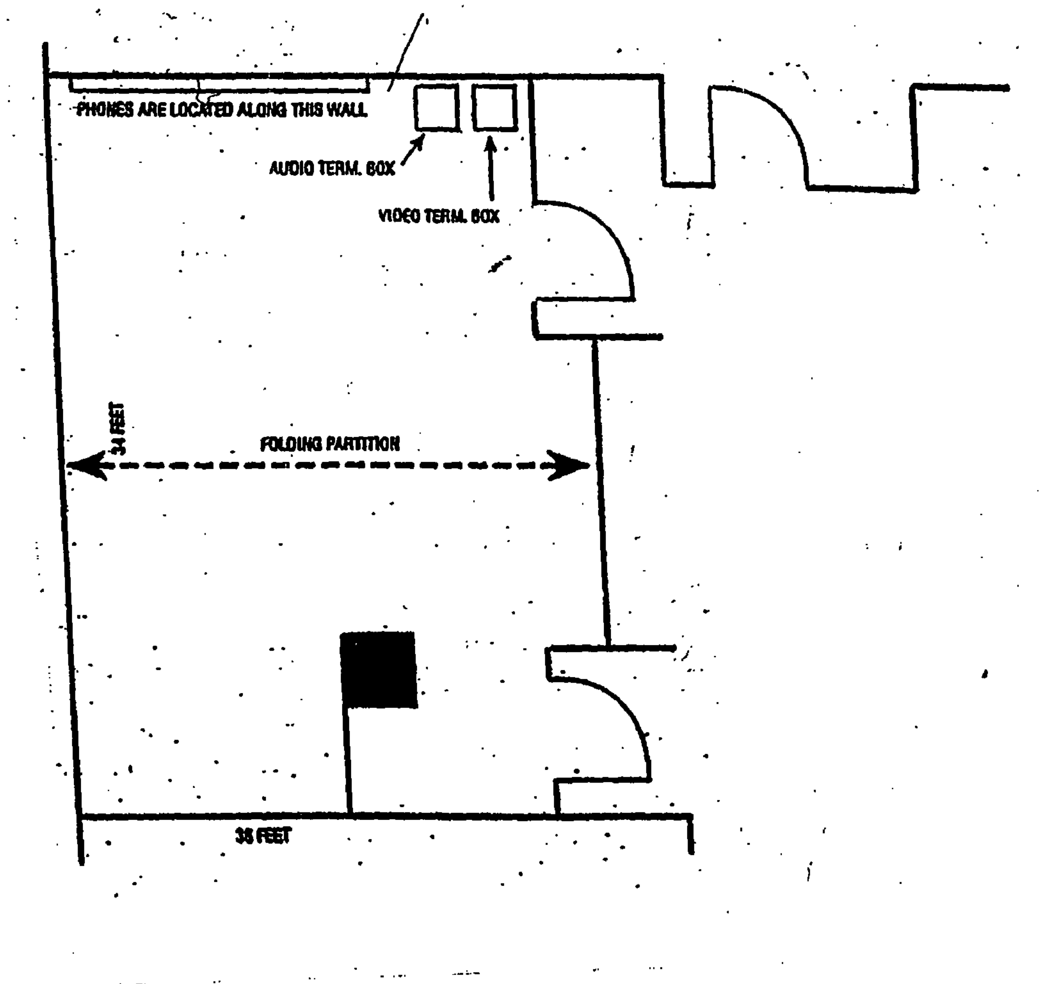


FIGURE H-3E

DUKE ENERGY
OCONEE NUCLEAR STATION

OCONEE JIC GENERAL LAYOUT

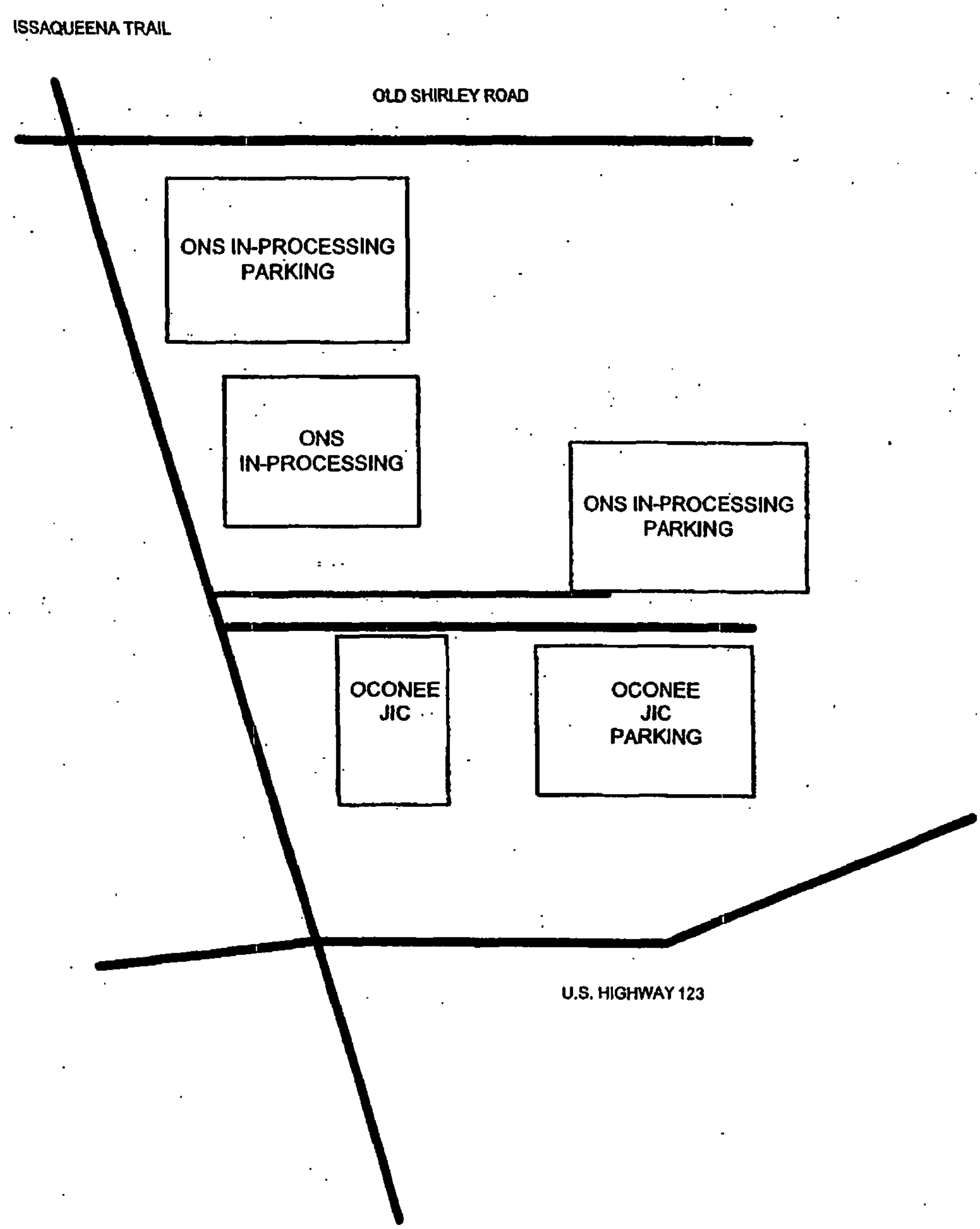


FIGURE H-3F

DUKE ENERGY
OCONEE NUCLEAR STATION

<u>OCONEE BACKUP COUNT ROOM LOCATION</u>
<u>ONS ADMIN BUILDING</u>

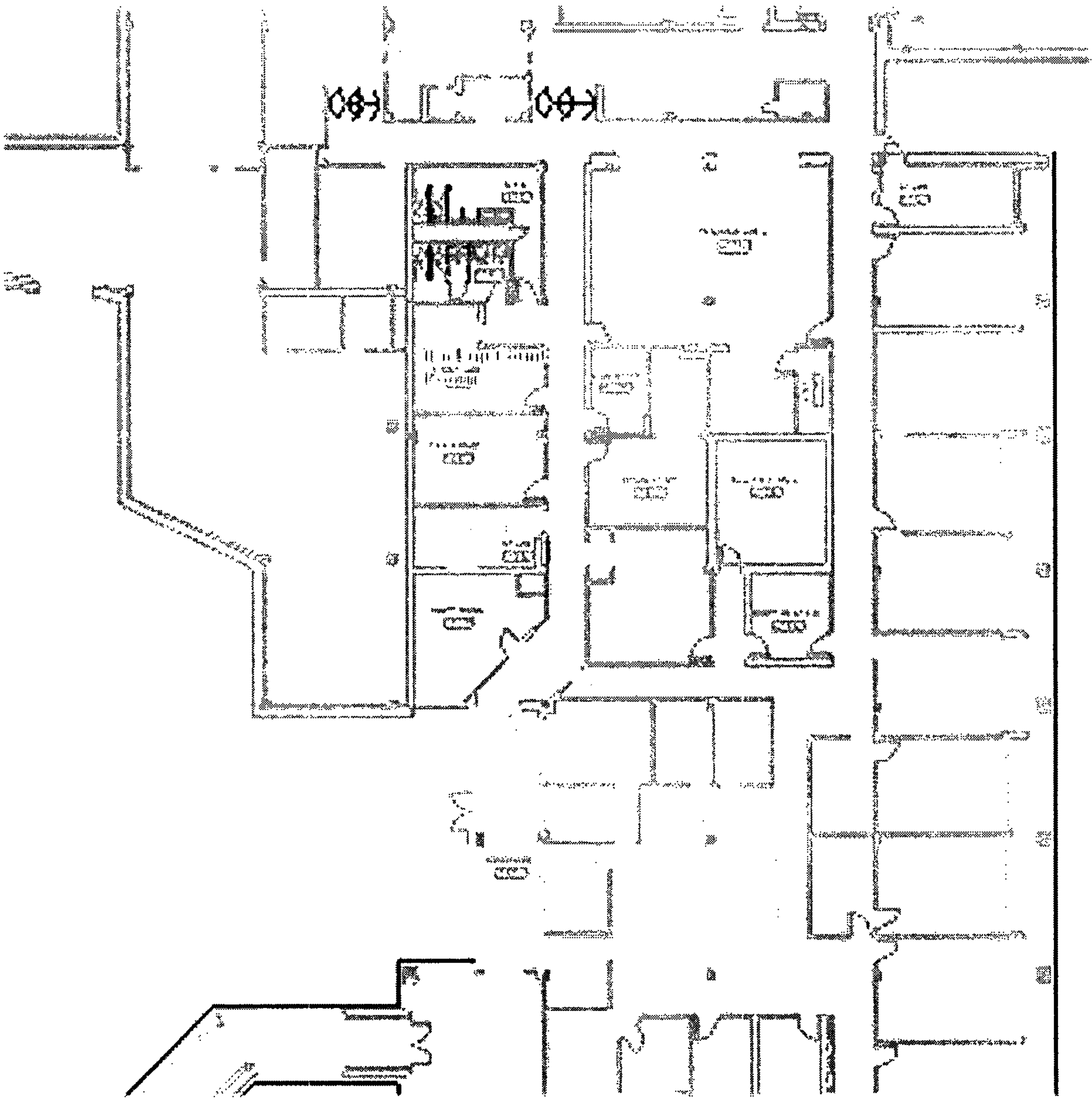


FIGURE H-4

DUKE ENERGY
OCONEE NUCLEAR STATION

METEOROLOGY EQUIPMENT

Wind Speed Monitoring Systems

Wind Direction Monitoring Systems

Platinum (RTD) T Delta or T/ΔT Monitoring System

Precipitation Monitoring System

NOTE: The Meteorological Monitoring System monitors and records continuous data for upper and lower levels of wind speed and direction, ambient air temperature and temperature differential at Site #1 (Northwest Met Tower). Wind speed, wind direction and precipitation is recorded at Site #2 (Keowee River Tower). All data points are included on each of the Units OAC computers where the data is averaged over a 15 minute period of time, except for precipitation.

IP/0/B/1601/003 gives range, accuracy and location.

FIGURE H-5

DUKE ENERGY
OCONEE NUCLEAR STATION

RADIATION INDICATING ALARMS (RIA)

RIA#	UNIT#	TYPE	RANGE	FUNCTION	LOCATION	CLASS
1	1,3	GM	.1 -1E4mRad/hr	Control Room	Control Room	Area
PAM*	1,2,3	GM	.1 -1E4mRad/hr	Main Bridge	Reactor Building	Area
PAM*	1,2,3	GM	.1 -1E4mRad/hr	Aux. Bridge	Reactor Building	Area
3	1,2,3	GM, IC	.1 -1E7mRad/hr	Refuel Canal	Transfer Canal	Area
4	1,2,3	GM, IC	.1 -1E7mRad/hr	RB Entrance	Personnel Hatch	Area
5	1,2,3	GM	.1 -1E4mRad/hr	Incore Tank	Outside Incore Tk Hatch	Area
PAM*	1,3	GM	.1 -1E4mRad/hr	Spent Fuel	SF Bridge	Area
6	1,3	GM, IC	.1 -1E7mRad/hr	Spent Fuel Area/Pool	SF Pool Area	Area
7	1	GM	.1 -1E4mRad/hr	Hot Machine Shop	East Wall	Area
8	1	GM	.1 -1E4mRad/hr	Hot Lab/ Chemistry	Hot Chem. Lab	Area
10	1,3	GM	.1 -1E4mRad/hr	Sample Hood/Primary	Primary Sample hood	Area
11	1,3	GM	.1 -1E4mRad/hr	Corridor 796'(3rd Level)	Unit 1/2 Change Room, Unit 3 Change Room	Area
12	1,3	GM	.1 -1E4mRad/hr	Chem Addition	Unit 1/2/3 Mix Tank	Area
13	1,3	GM	.1 -1E4mRad/hr	Waste Disposal Sink	Waste disposal Tk	Area
15	1,3	GM, IC	.1 -1E7mRad/hr	HPI	HPI Rooms	Area
16	1,3	GM, IC	.01 -1E7mRad/hr	"A" Main Steam Line	"A" Main Steam Lines	Area
17	1,3	GM, IC	.01 -1E7mRad/hr	"B" Main Steam Line	"B" Main Steam Lines	Area
31	1	NaI	10 -1E7cpm	LPI cooler LPSW Discharge	Turbine Building Basement	Effl

Figure H-5
DUKE ENERGY
OCONEE NUCLEAR STATION

RADIATION INDICATING ALARMS (RIA)

RIA#	UNIT#	TYPE	RANGE	FUNCTION	LOCATION	CLASS
32	1	P.Beta	10 - 1E7cpm	Aux. Bldg. Gas	AB-1 SF Resin Tank	Area
32	3	P.Beta	10 - 1E7cpm	Aux. Bldg. Gas	AB-2 Elevator Lobby	Area
33		NaI	10 - 1E7cpm	Normal LWD	Radwaste Facility	Effl
35	1,2,3	NaI	10 - 1E7cpm	LPSW Disch. Aux Building	Turbine Building Basement	Effl
37	1,3	P.Beta	10 - 1E7cpm	Normal GWD	Purge Equipment or Pen Room near elevator	Effl
38	1,3	GM	10 - 1E7cpm	High GWD	Purge Equipment or Pen Room near elevator	Effl
39	1,3	P.Beta	10 - 1E7cpm	CR-Gas	6th Fl. behind Em. Air Booster Pumps	Area
40	1,2,3	P.Beta	10 - 1E7cpm	Air ejector off gas	Purge Equip. room	Effl
41	1,3	P.Beta	10 - 1E7cpm	SF Bldg. Gas	Purge Equip. room	Area
42	1,3	NaI	10 - 1E7cpm	RCW return	Behind backwash pumps	Sys
43	1,2,3	P.Beta	10 - 1E7cpm	Unit vent particulates	Purge Equip. room	Effl
44	1,2,3	NaI	10 - 1E7cpm	Unit vent iodine	Purge Equip. room	Effl
45	1,2,3	P.Beta	10 - 1E7cpm	Unit vent gas normal	Purge Equip. room	Effl
46	1,2,3	CdTe	10 - 1E7cpm	Unit vent gas high	Purge Equip. room	Effl
47	1,2,3	P.Beta	10 - 1E7cpm	RB particulate	Purge Equip. room	Effl
48	1,2,3	NaI	10 - 1E7cpm	RB iodine	Purge Equip. room	Effl
49	1,2,3	P.Beta	10 - 1E7cpm	RB gas normal	Purge Equip. room	Effl
49A	1,2,3	CdTe	10 - 1E7cpm	RB gas high	Purge Equip. room	Effl
50	1,2,3	NaI	10 - 1E7cpm	Component Cooling	AB-1	Sys

Figure H-5

DUKE ENERGY
OCONEE NUCLEAR STATION

RADIATION INDICATING ALARMS (RIA)

RIA#	UNIT#	TYPE	RANGE	FUNCTION	LOCATION	CLASS
53	IB	P.Beta	10 - 1E7cpm	Interim Bldg. Gas	Interim Bldg.	Effl
54	1,3	NaI	10-1E7cpm	TB Sump	TB Basement	Effl
56	1,2,3	IC	1-1E8Rad/hr	Vent Stack Effluent	Vent Stack (Midway)	Effl
57	1,2,3	IC	1 -1E8Rad/hr	Containment High range monitor	Reactor Bldg. Penetration	Area
58	1,2,3	IC	1 -1E8Rad/hr	Containment High range monitor	Reactor Bldg. Penetration	Area

GM = Geiger Mueller

IC = Ion Chamber

PAM = Portable Area Monitor
* Portable area monitors do not have assigned RIA numbers and are local readout only.

IB = Interim Building

FIGURE H-6

DUKE ENERGY
OCONEE NUCLEAR STATION

PORTABLE SURVEY INSTRUMENTS

INSTRUMENT TYPE	RESPONSE TIME	DETECTOR TYPE	RANGES	RADIATION DETECTED	TUBE SATURATION	ADDITIONAL INFORMATION
Ludlum 3	4-22 seconds	Halogen quenched GM	X0.1 = 0-0.2 mR/hr X1.0 = 0-2.0 mR/hr X10 = 0-20 mR/hr X100 = 0-200 mR/hr	Beta & Gamma	Indicates offscale	Typically 1200 cpm per mR/hr. Speaker indication. Contains battery check position.
Eberline RM14	2.2 - 22 seconds variable	Halogen quenched GM	X1=0-500 cpm X10=0-5000 cpm X100=0-50000 cpm	Beta & Gamma	Indicates offscale	Has alarm setting. Speaker indication. 50 hr operation on fully charged battery.
MGPI Telepole	2-30 seconds variable	Two GM tubes 1 low range 1 high range	0.05 mR/hr - 1000 R/hr	Gamma	Indicates over range	Automatic switching between GM tubes. 11' extension probe. Battery self check.
Eberline RO20	5 seconds	Ion-chamber Air filled. Vented to atmosphere	0-50Rad/hr.	Beta & Gamma	Indicates offscale	Has battery check information
Eberline RO7	Variable	Air filled ion chamber	Med range: 0.1-199.9 Rad/hr Hi range: 0-.01 - 19,900 Rad/hr	Beta & Gamma	Indicates over range	Digital ion chamber with cables to extend detection up to 60' away or under water.

FIGURE H-6

DUKE ENERGY
OCONEE NUCLEAR STATION

PORTABLE SURVEY INSTRUMENTS

Instrument Type	Response Time	Detector Type	Ranges	Radiation Detected	Tube Saturation	Additional Information
Ludlum-12	4-22 seconds	Cadmium loaded polyethylene sphere with He tube in center. Tube operates in proportional region	0 - 100,000 mRad/hr	Neutron	Rejects Gamma up to 10 Rad/hr.	Detector can be attached or moved from meter.
AMP-100	Variable	Energy Compensated GM tube	0 - 1000 R/hr	Gamma	Over range alarm	Can be used with variable length of cable.
AMP-200	Variable	Energy Compensated GM tube	1 - 10,000 R/hr	Gamma	Over range alarm	Can be used with variable length of cable.
ESP 2	Variable	Sodium Iodide Scintillator	Variable	Gamma	Over range alarm	Single channel analyzer w/pulse height analysis Nal detectors

FIGURE H-7

DUKE ENERGY
OCONEE NUCLEAR STATION

AIR SAMPLERS

INSTRUMENT NAME	EXPECTED FLOW RATE	AIR PUMP TYPE	MAXIMUM LENGTH OF OPERATION
HD29A	2 CFM	Centrifugal Carbon Vane Pump air-cooled motor	Continuous, constant flow
H-809V	2 CFM	Two-stage turbine blower air-cooled motor	15 minutes
RAP-1	2 CFM	Oil Free, Carbon Vane	Continuous, constant flow

FIGURE H-8

DUKE ENERGY
OCONEE NUCLEAR STATION

FIRE AND COMBUSTION PRODUCTS AND DETECTORS

FIRE DETECTION SYSTEM - Inaccessible Detectors

The purpose of this fire detection system is to detect visible and/or invisible smoke or other products of combustion in any space covered by detectors.

The principal parts of this system; Fire indicating unit, zone indicating units and detectors, with up to 8 zone indicating units-for each fire Indicating unit. Up to 4 detectors circuits (zones) on each zone indicating unit. Each detector circuit (zone) has up to 12 detectors.

When products of combustion are detected a flashing lamp on the detector base is turned on. The zone lamp for the zone covering that detector will come on. The Red "Alarm" lamp on the fire indicating unit will come on. The statalarm in the control room will come on.

In the event of a failure in the system which makes the system inoperative, an amber "Trouble" lamp will come on, a buzzer will sound and the statalarm will come on.

FIRE DETECTION SYSTEM - Accessible Detectors

The purpose of this fire detection system is to detect visible and/or invisible smoke or other products of combustion in any space covered by detectors.

The principal parts of this system include; Fire indicating unit, Zone indication units and detectors, with up to 8 zone indicating units for each fire indicating unit. Up to 4 detector circuits (zones) are on each zone indicating unit. Each detector circuit (zone) has up to 99 detectors.

When products of combustion are detected a red "LED" on the Honeywell detector will come on. The zone lamp for that detector will come on. The Red "Alarm" lamp on the fire indicating unit will come on. The statalarm in the control room will come on.

In the event of a failure in the system which makes the system inoperative, an amber "Trouble" lamp on the Honeywell will come on, a buzzer will sound and the statalarm will come on.

FIGURE H-9

DUKE ENERGY
OCONEE NUCLEAR STATION

NORMAL ENVIRONMENTAL MONITORING PROGRAM

ONSITE/OFFSITE TLD LOCATIONS

See: Oconee Offsite Dose Calculation Manual

FIGURE H-10

DUKE ENERGY
OCONEE NUCLEAR STATION

NORMAL ENVIRONMENTAL MONITORING PROGRAM

AIR SAMPLE LOCATIONS

OFFSITE LOCATIONS

See: Oconee Offsite Dose Calculation Manual

FIGURE H-11

DUKE ENERGY
OCONEE NUCLEAR STATION

COUNT ROOM EQUIPMENT (ONSITE)

INSTRUMENT TYPE	DESCRIPTION
Canberra 9900 Gamma Spectroscopy System	Computer based gamma spectroscopy system with solid state germanium detectors for analysis of various sample media.
Canberra 9900/WBC6000 Body Burden Analyzer and Nuclear Data people mover	Computer based gamma spectroscopy system with three sodium detectors mounted in a shielded chair which can analyze the thyroid, lungs, and lower torso simultaneously, along with a stand-up total body analyzer using large sodium iodine detectors.
Tennelec APC Automatic Smear Counter	An automatic smear counter using a GM detector which performs beta only analyses on up to 50 smears.
Packard Liquid Scintillator	Multiple sample liquid scintillation analysis systems that detect and quantify H-3 and gross beta using a computer to correct for quench and activity.
Tennelec Alpha Scintillator	An automatic smear counter using a zinc sulfide scintillator detector to detect alpha only. Analyzes up to 50 smears/air samples at a time.
Tennelec Series V XLB Proportional Smear Counter	An automatic smear counter using a gas flow proportional detector. This instrument performs alpha and beta analyses.

FIGURE H-12

DUKE ENERGY
OCONEE NUCLEAR STATION

CONTENTS OF EMERGENCY KITS FOR FIELD MONITORING TEAMS

(Location World of Energy)

SEE HP/0/B/1009/001

FIGURE H-13

DUKE ENERGY
OCONEE NUCLEAR STATION

EMERGENCY KIT INVENTORY SHEET

Control Room Locations

See HP/0/B/1009/001

FIGURE H-14

DUKE ENERGY
OCONEE NUCLEAR STATION

EMERGENCY KIT INVENTORY SHEET

Respiratory Equipment

See HP/0/B/1009/001

FIGURE H-15

DUKE ENERGY
OCONEE NUCLEAR STATION

EMERGENCY SUPPLIES INVENTORY LIST

Technical Support Center

Operational Support Center

Emergency Operation Facility

See PT/0/A/2000/008 and ST/0/A/4600/086

FIGURE H-16

DUKE ENERGY
OCONEE NUCLEAR STATION

EMERGENCY CABINET INVENTORY SHEET

INPLANT SURVEILLANCE EQUIPMENT

(WORLD OF ENERGY)

SEE HP/0/B/1009/001

FIGURE H-17

DUKE ENERGY
OCONEE NUCLEAR STATION

INVENTORY LIST FOR OPERATIONAL SUPPORT CENTER

EMERGENCY CABINET

See HP/0/B/1009/001

FIGURE H-18

DUKE ENERGY
OCONEE NUCLEAR STATION

SEISMIC INSTRUMENTATION PROGRAM

SEISMIC EQUIPMENT	UNIT 1 CABLE ROOM	UNIT 1 TENDON ACCESS GALLERY	UNIT 1 REACTOR BUILDING
Seismic Trigger (1) (Setpoint .05g and actuates a statalarm and computer alarm in Control Room 1 & 3. Also actuates Unit 1 & 2 Events Recorder.		x	
STRONG-MOTION ACCELEROGRAPH SYSTEM. Starter (1) Setpoint .01g for 1 sec will actuate accelerometers and recorders on Control Panel. Also actuates a computer alarm in Control Room 1.		x	
Accelerometers (2) Actuates recorders on Control Panel at .01g for 1 sec		x	x
Recorders (2) Records for 10 additional sec following completion of seismic events up to 30 minutes	x		
Control Panel (1) Event alarm-alarm light turns yellow to indicate system is recording approximately 10 sec. Event Indicator-normally black but after an event is recorded, it is white	x		
PEAK ACCELERATION RECORDER (6) Records the peak acceleration experienced. Capability to measure up to 2g. Uses no power supply.		x	x

FIGURE H-19

DUKE ENERGY
OCONEE NUCLEAR STATION

SPILL CONTROL EQUIPMENT/SUPPLIES

SEE THE FOLLOWING PROCEDURES/DOCUMENTS:

Emergency Planning:

PT/0/B/0250/030
PT/0/B/0250/045
ONS Prefire Plan

Chemistry:

CP/0/B/2001/008

Safety Assurance:

Spill Prevention Control Countermeasures Plan (SPCC)

FIGURE H-20

DUKE ENERGY
OCONEE NUCLEAR STATION

SURVEYS

Emergency	Control Room Instrumentation	In Station Radiological	Site and Site Boundary	Environs
Unusual	X	X	*	*
Alert	X	X	X	*
Site Area	X	X	X	X
General	X	X	X	X

* Conducted in the event effluent technical specifications are exceeded.

Duke Energy Oconee Nuclear Station **EMERGENCY PLAN A - SECTION I ACCIDENT ASSESSMENT**	Procedure No. **EPA SECTION I** Revision No. **005** Electronic Reference No. **OAP000HY**

PDF Format

Prepared By* ______________________________ Date __________

Requires Applicability Determination? ☐ Yes ☐ No

Reviewed By* ______________________________(QR) Date __________

Cross-Disciplinary Review By* ____________________(QR) NA __________ Date __________

Reactivity Mgmt. Review By* ____________________(QR) NA __________ Date __________

Additional Reviews

Reviewed By* ______________________________Date __________

Reviewed By* ______________________________Date __________

Approved By* ______________________________ Date __________

** Printed Name and Signature*

I. Accident Assessment

To assure the adequacy of methods, systems and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition.

I.1 Emergency Action Level Procedures
Implementing procedures to the Oconee Nuclear Station Emergency Plan have been developed. These procedures have been developed by many sections of the station. The Oconee Nuclear Station Implementing Procedures make up Volumes B and C of the station emergency plan. The Emergency Classification procedure (RP/0/A/1000/001) identifies plant parameters that can be used to determine emergency situations that require activation of the station emergency plan. NUMARC/NESP-007 (Rev. 2) which was approved by the NRC in Rev. 3 of Regulatory Guide 1.101 and subsequent guidance provided in NRC Bulletin 2005-02, the NEI guidance as endorsed in RIS 2006-12 and to support implementation of NEI 03-12 has been used as guidance. See BASIS document Section D.

I.2 Onsite Capability and Resources to Provide Initial Values and Continuing Assessment

Post Accident Sampling -

The NRC issued Amendments No. 346 (Renewed License No. DPR-38), No. 348 (Renewed License No. DPR-47), and No. 347 (Renewed License No. DPR-55) on 07/12/05. These amendments, effective 01/08/06, delete Technical Specification Section 5.5.4, Post Accident Sampling for Oconee Nuclear Site Units 1, 2, and 3 and thereby eliminate the requirements to have and maintain Post Accident Sampling Systems - PASS (PALS/PAGS). Consistent with the requirements of the NRC safety evaluation, contingency plans for obtaining samples have been developed.

Procedures have been developed for taking and analyzing post accident reactor coolant samples using either the normal sample points or the existing PALS sample panels. Containment atmosphere samples are no longer required; however, procedures are in place for surveying the containment building wall as well as sampling the environment and using these values to develop off site dose projections and provide appropriate protective action recommendations for the public.

Radiation and effluent monitors
Radiation and effluent monitors are indexed in Figure H-5. The chart shows location, range, radiation detected.

Containment High Range Radiation Monitor

Duke Energy has designed a system for monitoring containment high range radiation. 1, 2, 3 RIA-57 and 58 are the post-accident high range containment monitors. RIA-57 is located in a penetration in the East Penetration Room. RIA-58 is located in a penetration in the West Penetration Room. The monitors are coaxial ion chambers with a range of 1 to 10E8 Rad/hr which corresponds to an activity of 1.11E0 μCi/ml to 1.11E8 μCi/ml at the time of trip/incident.

In- Plant Iodine Instrumentation

The Oconee Nuclear Station has developed Procedure HP/0/B/1009/009 for quantifying high level gaseous radioactivity releases during accident conditions. The purpose of the procedure is to determine quantitative release of radioiodines and particulates for dose calculation and assessment.

Failed Fuel Determination

(1) The attached Figures I-1, I-2, I-3, and I-4 provide the technical basis for estimating failed fuel for three conditions: non-overheating, fuel overheating without fuel melt, and overheating with fuel melt, respectively.

(2) The NON-OVERHEATING CONDITION METHODOLOGY for assessing failed fuel is based on steady-state iodine radionuclides in the reactor coolant system. This methodology is judged to provide a significant improvement in accuracy over previous NON-OVERHEATING CONDITION methods employing a single escape coefficient. The reason being the new methods explicitly models the production, decay, and release of radionuclides to the coolant as a function of measured iodine ratio.

The methods CAN ONLY PROVIDE THE best estimate analysis and are not intended for making conservative or licensing related calculations. These methods are benchmarked to long term steady-state iodine behavior, typically reached near mid to end of cycle. Therefore, leaker estimates (percent failed fuel) will vary substantially if based on other than steady-state conditions.

Radioisotope inventories predicted by LOR2 Computer Program are used to compare release isotope quantities to expected core inventories for the fuel overheating without fuel melt and overheating with fuel melt conditions. In order to determine a conservative core inventory for Oconee, three LOR2 computer runs were made. All three runs assumed an enrichment of 3.3%.

Each run represents a different burn-up region of the core. (i.e., one run assumes fuel used for 3 cycles, another run assumes fuel used for 2 cycles and the last run assumes fuel used for 1 cycle.) Each region assumed 59 assemblies. Figure I-5, page 1 of 2, gives activity level for one fuel assembly for each region. Figure I-5, page 2 of 2, gives total activity in the core and compares these values to UFSAR values. Most of the core values are close to UFSAR values except for XE-133 and XE-135. It is possible that this difference is the result of the higher enrichment value used in the LOR2 runs.

(3) Figures I-6 and I-7 provide the technical basis for an estimate of failed fuel from readings from area monitors (without fuel melt and with fuel melt, respectively).

(4) Figure I-8 provides the technical basis for an estimate of failed fuel from readings of containment building hydrogen analyzers.

(5) Figure I-9 provides calculations for decay correction in the event it is not available from analytical instrumentation.

I.3 <u>Method for Determining Release Source Term</u>

I.3.a <u>Source Term of Releases of Radioactive Material within Plant Systems</u>

Operations (Control Room Personnel) will use Enclosure 4.8 & 4.9 of RP/0/A/1000/001 to determine if radiation monitor readings will require classification. This enclosure is a simplified predetermined dose calculation for vent and in-containment radiation monitors. Operations can also get offsite dose projections from on-shift Radiation Protection technicians using procedure AD-EP-ALL-0202. AD-EP-ALL-0202 uses release paths of unit vents and the main steam relief valves. Assumptions for the calculations are based on the following:

1. Annual average meteorology for ground-level release points (7.308 E-6 sec/m^3) which is used for the reactor building and is in the ODCM. Annual average meteorology for semi-elevated release points 1.672E-6 sec/m^3 is used for the vent and is also in the ODCM.

2. Design basis leakage (5.6 E6 ml/hr) and/or daily average vent flow rate of 65,000 cfm.

3. One hour release duration

4. Calculations for reactor building monitor readings are based on CDE because thyroid dose is more limiting for this pathway. Calculations for vent monitor readings are based on whole body dose because whole body dose is more limiting for this pathway.

5. Offsite Protective Actions Guides are 1 rem Total Effective Dose Equivalent and 5 rem Committed Dose Equivalent (thyroid) for a General Emergency. Site Area Emergency levels are one-tenth the General Emergency PAGs.

6. LOCA conditions are limiting for calculating in-containment high range monitors readings for site area and general emergency conditions.

7. Core melt conditions are limiting for calculating vent monitor radiation monitor readings for site area and general emergency conditions.

I.3.b <u>Magnitude of the Release of Radioactive Materials</u>

Procedure AD-EP-ALL-0202 determines the magnitude of the release of radioactive materials based on plant system parameters and effluent monitors (vent release).

I.4 <u>Dose Calculation Methodology</u>

AD-EP-ALL-0202 establishes the relationship between effluent monitor readings or reactor building dose rate readings and onsite/offsite doses for various meteorological conditions.

AD-EP-ALL-0202 provides guidance for on shift personnel to perform initial dose assessment using a computer based tool.

I.5 <u>Meteorological Information Availability</u>

Meteorological information will be available to the Charlotte Emergency Operations Facility, the Technical Support Center, and the Control Room through the automated plant data system. Meteorological data averaged over a period of 15 minutes, will be available to the NRC through the ENS phone, by direct telephone communications with the individual responsible for making offsite dose assessments at the Emergency Operations Facility or through the NRC Emergency Response Data System.

Meteorological information will also be given to both County Emergency Operations Centers, and the State of South Carolina, during follow-up messages.

I.6 Release Rates/Projected Doses for Offscale Instrumentation Situations

AD-EP-ALL-0202 is the procedure that can be used to make offsite dose projections and/or protective action recommendations should instrumentation used for assessment indicate offscale or are inoperable.

I.7 & I.8 Offsite Field Monitoring-Emergency Planning Zone

Field teams have been organized by the Oconee Nuclear Station under the direction of the Field Monitoring Coordinator located in the Emergency Operations Facility. These teams are comprised of a RP Technician and a Driver. Procedures SH/0/B/2005/002 and SH/0/B/2005/003 describe predetermined sampling locations, sampling and monitoring equipment to be used, location of TLD's and air samplers and directions for taking Potassium Iodide Tablets.

I.9 Detect and Measure Radioiodine Concentration in the EPZ

Oconee Nuclear Station shall use appropriate instrumentation to measure radioactivity in counts per minute (CPM) and dose rates in mRad/hr. Air samples (taken with a Portable Air Sampler equipped with appropriate cartridge) shall be measured by a portable iodine analysis system.

Interference from the presence of noble gas and background radiation shall not decrease the minimum detectable activity of 1.0 E-7 uCi/cc (I-131) under field conditions.

Samples taken by the offsite monitoring teams will be evaluated further by one of the available laboratory facilities described in H.6.C of this Plan as necessary.

I.10 Relationship Between Contamination Levels and Integrated Dose/Dose Rates

Duke Energy Company has developed a means for relating the various measured parameters (e.g. contamination levels, air and water) and gross radioactivity levels.

I.11 Plume Tracking

The states of North Carolina, South Carolina and Georgia have arrangements to locate and track an airborne plume of radioactive materials. Duke Energy Company will have monitoring teams in the field, fixed TLD sites, and the capability for airborne monitoring to assist in plume tracking.

See State of North Carolina, FNF Plans
See State of South Carolina, FNF Plans
See State of Georgia, FNF Plans

FIGURE I-1

DUKE ENERGY COMPANY
OCONEE NUCLEAR STATION
ACCIDENT ASSUMPTIONS

DBA assumes draft NUREG 1465 release of fission products to the containment atmosphere:

(1) 100% of all core noble gas activity.

(2) 40% of all core iodine activity.

(3) Various quantities of particulate activity.

Loss of reactor coolant assumes the release of one reactor coolant volume with noble gas and iodine activity associated with operation at 100% power with 1% fuel failure before the release.

Gap activity release assumes that there is cladding failure sufficient to release all fission products in the gas gap of the fuel pins to the containment atmosphere. Assumed is loss of 5% of all core noble gas activity, 5% of all core iodine activity, and 5% of cesium particulate activity to the containment atmosphere.

The maximum allowable containment leakage rate following the accident is expressed in percent of the containment air weight per day.

Regulatory Guide 1.4 requires that we assume the design leak rate (Technical Specifications 5.5.2) the first 24 hours and half the design leak rate for the rest of the accident.

For Oconee these values are:

(a)	0.25%/day	for	0-24 hours
(b)	0.125%/day	for	24 hours - 30 days

The 0.25%/day is the Tech. Spec. leak rate at the peak calculated containment internal pressure, 59 psig, for the design basis LOCA.

Assumptions used in determining the contribution to the total dose from ECCS leakage are:

(a) 7520 cc/hr leakage from the pump seals and valves of the ECCS in the auxiliary building.

(b) An iodine partition factor of 0.1 is used to determine the amount of iodine released to the auxiliary building atmosphere.

(c) All activity released to the auxiliary building is released to the atmosphere with no filtering.

Most Oconee penetrations through the containment are located in the penetration room. This room has its own ventilation system which draws a negative pressure on the room. The air drawn from the penetration room passes through charcoal filters and is exhausted through the unit vent. Bypass leakage is the fraction of the total containment that bypasses the penetration room and escapes to the atmosphere unfiltered. Some examples of potential bypass leakage paths are:

(1) Leakage around the equipment hatch seals.

(2) Leakage through isolation valves that do not seal properly.

(3) Leakage through microscopic holes or cracks in the containment wall.

At Oconee the containment bypass leakage is 50% of the total containment leakage.

Tech. Spec. 5.5.2 requires that during the containment leak rate test, if the containment leakage is greater that 50% of the design leakage rate, local leak rate tests must be performed. These tests must verify that any leakage greater than 50% of the design leakage is going into the penetration room. This only verifies that the maximum leakage bypassing the penetration room is 50% of the containment leakage. It does not give the actual bypass leakage.

Dose contributions are as follows:

(a) Bypass leakage contributes approximately 84% of the total thyroid dose.

(b) ECCS leakage contributes approximately 1% of the total thyroid dose.

(c) Penetration room exhaust contributes approximately 15% of the total thyroid dose.

FIGURE I-2

TECHNICAL BASIS FOR ESTIMATION OF FAILED FUEL
NON-OVERHEATING CONDITION

A. Assumptions

1. All Iodine and Xenon isotopes are at equilibrium.

2. All Iodine isotopes in the RCS pass through a 90% efficient demineralizer at the rate of one coolant volume per day.

3. There is no plate out of Iodine in the RCS.

4. The noble gases are equally mixed throughout the RCS and consideration is not given to noble gases that may be in the letdown storage tank or pressurizer.

5. The reactor is operating at 100% power - 2568 MWT or at any steady-state power level with Steps 1 through 4 applicable.

B. Two Region Model Theory

The two region model assumes a single escape coefficient for the release from the fuel directly into the coolant through the defect site. The model first solves for the dynamic iodine concentrations in the fuel pellet, then through the use of an escape coefficient, solves for the steady-state release into the coolant. Once into the coolant, the methodology also calculates the effects of radioactive decay and coolant purification on the measured iodine concentrations. The following is a delineation of the dynamic solution of the above phenomena, including a simplification for steady-state conditions where appropriate.

I. <u>In-Fuel Concentration</u>

The rate of change of the number of atoms is given by:

$$\frac{dN_t^f}{dt} = \text{(GENERATION RATE) - (DECAY RATE) - (RELEASE RATE)}$$

$$\frac{dN_t^f}{dt} = \dot{F}\bar{Y} - N_t^f \lambda - N_t^f \upsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where N_t^f is the dynamic number of atoms of a short-lived isotope in a single fuel rod (atoms/rod)

t is the time (sec)

$\dot{F}$ is the rod volumetric total fission rate, which is a constant for the limits of integration (fiss/sec)

$\bar{y}$ is the effective fission product yield (atoms/fiss)

λ is the decay constant for the isotope (decay probability fraction per atom per second)

υ is the two-region model escape-rate coefficient from the fuel to the coolant for the isotope (escape probability fraction per atom per second).

SOLVING FOR TIME EQUALS TO ZERO YIELDS:

$$N_t^f = {}^f_o e^{-(\lambda+\upsilon)t} + \frac{\dot{F}\bar{y}}{(\lambda+\upsilon)} = (1 - e^{-(\lambda+\upsilon)t})$$

II. In-Coolant Concentration

The rate of change of the number of atoms of the isotope in the reactor coolant system is given by:

$$\frac{dN_t^c}{dt} = N_t^f\,(\upsilon) - N_t^c\,(\lambda) - N_t^c\,K = \frac{dN_t^c}{dt} = \text{(Release Rate)} - \text{(Decay Rate)} - \text{(Purification Rate)} \qquad (3)$$

where N_t^c is the dynamic number of atoms of a short-lived isotope in the reactor coolant system (atoms)

K is the purification constant associated with the letdown system and is equal to the system mass flow rate divided by the total non-stagnant coolant mass (purification probability fraction per atom per second)

SOLVING FOR TIME EQUALS TO ZERO YIELDS:

$$N_t^c = \frac{\dot{F}\,\bar{y}\,\upsilon}{(\lambda+\upsilon)\,(\lambda+K)}\left(1 - \frac{1}{(K-\upsilon)}\left[(\lambda+K)e^{-(\lambda+\upsilon)t} - (\lambda+\upsilon)e^{-(\lambda+K)t}\right]\right)$$

$$+\ \frac{N_o^f\,\upsilon}{(K-\upsilon)}\left[e^{-(\lambda+\upsilon)t} - e^{-(\lambda+K)t}\right]$$

$$+\ N_o^c\left[e^{-(\lambda+K)t}\right]$$

$$\text{or } N_t^c = N_t^{c1} + N_t^{c2} + N_t^{c3} \qquad (4)$$

In the above:

1) N_t^{c1} is the atoms of an isotope remaining in the coolant at time, t, from the inventory of atoms generated by fission events during the current time step (t=0 to t=t)

2) N_t^{c2} is the atoms of an isotope remaining in the coolant at time, t, from the inventory of atoms within the rod generated by fission events prior to the current time step; and

3) N_t^{c3} is the atoms of an isotope remaining in the coolant at time, t, from the atoms in the coolant at the beginning of the current time step.

For the event that fissioning begins at time t equals to zero, N_t^{c2} and N_t^{c3} are also equal to zero at all t. Furthermore, assuming steady-state conditons, Equation 4 reduces to:

$$N_{oo}^{c} = \frac{\dot{F}\,\bar{y}\upsilon}{(\gamma+\upsilon)(\lambda+K)} \qquad \text{(steady-state)}$$

The conventional units for measuring the concentration of atoms of a radioisotope are in terms of isotopic activity, with units of µCi/ml. A_t^c is defined as the activity associated with the concentration N_t^c

Since N_t^{c1}, N_t^{c2}, and N_t^{c3} are in units of atoms per rod in Equation 4, the following conversion is required to obtain A_t^c:

$$A_t^c = A_t^{c1} + A_t^{c2} + A_t^{c3}$$

$$A_t^c = [N_t^{c1} + N_t^{c2} + N_t^{c3}]\ \frac{(atoms)}{(rod)} \text{ x } N_r \text{ (rods) x } \frac{1}{V^c(ml)} \text{ x } \lambda \frac{(decay\ probability)}{(atom)(\text{sec})}$$

$$\text{x } \frac{1(\mu Ci)}{2.22x\ 10^6}\ \frac{(decays)}{(\text{min})} \text{ x } 60\ \frac{(\text{sec})}{(\text{min})}\text{, or}$$

$$A_t^c = [N_t^{c1} + N_t^{c2} + N_t^{c3}]\ [2.703\text{E-}5\ \lambda N_r/V^c],\ (\mu\text{Ci/ml}) \qquad (5)$$

where N_r is the number of perforated rods in the core

V^c is the non-stagnant volume of the reactor primary coolant system

And for steady-state conditions:

$$A_{\infty}^{c} = \frac{\dot{F}\,\bar{y}\,\upsilon}{(\lambda+\upsilon)(\lambda+K)} \text{ x } \frac{2.703E-5\,\lambda}{V^{c}} \text{ N}_{r} \text{ ((µci/ml)} \qquad (6)$$

III. <u>Escape Rate Methodology</u>

This section describes the model and supporting technical basis for an escape rate coefficient model dependent on measured iodine ratio. The need for such a model is illustrated by the following two examples.

At one extreme, assume a leaker with a tight radial through wall capillary type crack, which in effect bottles up the fission products and allows very little leakage to the coolant. At the other extreme, assume a pin with a large open hydride blister, exposing the surrounding fuel directly to the coolant. Obviously, both represent only one defect, however, the latter case would release much more fission products to the coolant than the first case.

Therefore, the need exists to differentiate between various defect conditions. To do this, the concept of holdup time, and its affect on relative radioactive decay is used. The tight defect, due to the long holdup time, would shift the iodine ratio (131/133) towards the high end (>1) due to the faster 133 decay (133 half life - 20.8 hrs, 131 half life - 8.05 days). For little or no holdup times, the existing ratio would be around 0.1. This is consistent with observations during failure generation events in which the observed iodine ratio in the coolant approaches two or greater. Calculations for an intact rod (infinite holdup time) yield ratios in excess of 10 or 15.

This rational forms the basis for an iodine ratio dependent escape coefficient model. It certainly is not perfect in that a combination of defects could easily exist at any one time, but it does give an approximation as to the average condition.

Towards this end, an empirical model was developed based on a Combustion Engineering Data Base. The data consists of several operating cycles in which the coolant activities and specific leaking rods were well characterized. The model is empirical, in that the necessary escape coefficients were back calculated and plotted as a function of corrected iodine ratio. However, the ratio needs to be corrected for the decay and purification effects occurring in the primary coolant, so that a consistent and independent model (independent of letdown flow, resin bed efficiency, etc.) can be developed.

The correct or "normalized" iodine ratio is determined as follows:

The equilibrium coolant activity ratio, as determined by Equation 6, is shown here as follows:

$$AR_{\infty}^{c} = \frac{\bar{y}131\,\upsilon131\,\lambda131\,(\lambda133+\upsilon133)\,(\lambda133+K)}{\bar{y}133\,\upsilon133\,\lambda133\,(\lambda133+\upsilon131)\,(\lambda131+K)} \qquad (7)$$

Assume that:

$R = AR_{\infty}^{c}$

$\underline{\upsilon 133} = a$

$\upsilon 133$

Substituting and solving for υ_{131} gives:

$$1 - \frac{R\ (\lambda 131\ +\ K)\ \bar{y}\ 133}{a\ (\lambda\ 133\ +\ K\ \bar{y}\ 131}$$

$$\upsilon 131 = \qquad (8)$$

$$\frac{R\,(\lambda 131 + K)\,\bar{y}\,133\ \ -1}{a\,(\lambda\,133 + K\ \bar{y}131\,\lambda 131\,a\lambda 131}$$

The normalized iodine ratio (R') is independent of the coolant volume and purification flow rate and is defined as:

$$R' = \frac{(\lambda_{131}\ + K)}{(\lambda_{133}\ + K)}\ (R) \qquad (9)$$

Equation 8 can be re-written as:

$$\frac{v}{v131} = 1 - \frac{R'}{a}\ \frac{\bar{y}_{133}}{\bar{y}_{131}}$$

$$\frac{R'}{a}\quad \frac{\bar{y}_{133}}{\bar{y}_{131}}\quad \frac{1}{\lambda_{131}}\quad \frac{-1}{a\lambda_{133}} \qquad (10)$$

Equation 10 gives a relationship between the iodine-131 escape rate and the normalized iodine ratio. The constant "a", which describes the relationship between the iodine-131 and iodine-133 escape rates, was derived through an analysis of 3 plant cycles in which the number of leaking rods was determined at the end of each cycle. Parametric cases were run to determine, given the known number of leaking rods, the iodine-131 and iodine-133 escape rates required

to predict the equilibrium activity levels of these isotopes for the 3 plant cycles. All data were taken at 100% power and at equilibrium conditions.

The escape rate (ration $\upsilon_{131} / \upsilon_{133} = a$) was assumed to be function of the normalized iodine ratio. A curve was fit to the data resulting in:

$$\frac{\upsilon_{131}}{\upsilon_{133}} = a = \frac{R'}{.437260 + .021089R' - .013293R'^2} \qquad (11)$$

<u>Power Dependence of Escape Rate</u>

The kinetics of fission product migration through the fuel pellet into the rod plenum/gap is governed primarily by temperature. Since temperature is primarily a function of power, a power dependent correction factor was developed based on total rod radial power.

The power dependence of escape rate was determined by evaluating the equilibrium coolant iodine-131 activity as a function of core power level. These data were taken from periods of operation at varying power levels for 8 plant-cycles.

A power function was assumed to represent each individual data set:

$$A_{131} = CP^n$$

where:

A_{131} is the equilibrium level of iodine 131 (µCi/ml)

C and n are fitting constants, and

P is the core power level (%)

C varies with the plant conditions (purification flow rate, etc.) and numbers of leaking rods but, in theory, n should be constant if the data are consistent. Least-squares analyses were performed for each of the sets of data. The values of n determined from this analysis ranged from 1.8 to 5.4. A value of n = 3.6 was selected as a reasonable representation of the data.

From Equation 6, the equilibrium coolant activity level is directly proportional to power (fission rate) and the escape rate. Therefore, the escape rate must be proportional to power to the (n-1), or 2.6 power. Escape rates are therefore calculated with the following equation:

$$\upsilon = \upsilon_o (P/P_o)^{2.6} \quad \text{or } \upsilon = \upsilon_o (Pr/P_o)^{2.6} \qquad (12)$$

where:

υ_o is the escape rate (sec^{-1}) determined at power P_o (%) (As derived from Equation #10); and

P is, optionally, the core power level (%), or Pr, the product of core power level and rod or batch peaking factor (relative to core).

If a specific rod or batch peaking factor is suspected, Pr should be used since it can make an appreciable difference.

FIGURE 1-3

TECHNICAL BASIS FOR ESTIMATION OF FAILED FUEL

Nuclear Engineering uses the following calculations to determine Fuel Overheating without Fuel Melt, Utilization of Area Monitors for Overheat Without Fuel Melt, and Utilization of Area Monitors for Fuel Melt Conditions.

OSC-5283 - ONS Core Damage Assessment Guidelines

OSC-3794 - Failed Fuel Determination using RIA 57-58

Nuclear Engineering uses the following calculations to determine containment volume versus containment level.

OSC-300 - Containment Volume and Heat Sink in Reactor Building

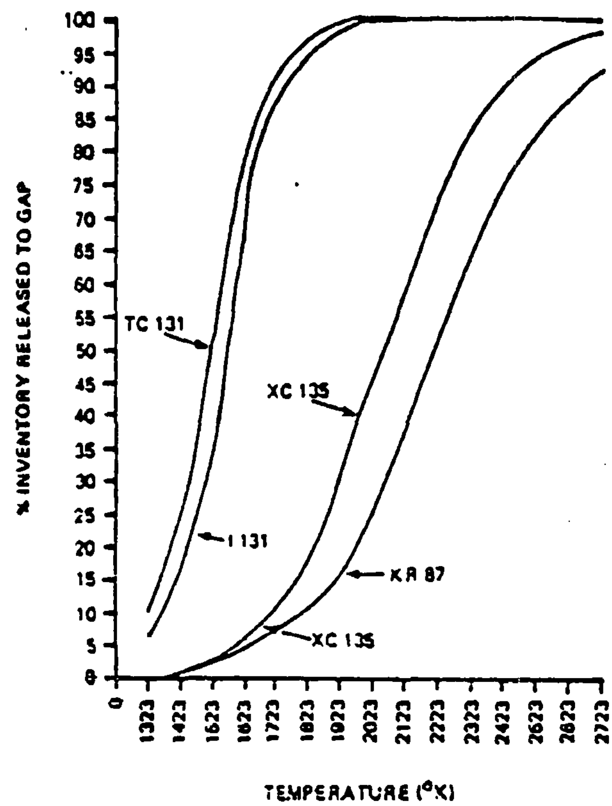
OSC-200 - Water Depth in Reactor Building

Information derived from the above calculations are used in RP/0/A/1000/018 to determine estimated failed fuel.

NOTE: Calculation documentation can be viewed at the Oconee Nuclear Engineering offices.

FIGURE I-3A

GAP INVENTORY VS. TEMPERATURE



BURNUP = 30,000 MWD/MTU
TIME = 420 DAYS

FIGURE I-3B

PERCENT ACTIVITY RELEASE FOR 100 PERCENT OVERTEMPERATURE CONDITIONS

Nuclear	Min.*	Max.*	Nominal**	Min.***	Max.***
Kr-85	40	70			
Xe-133	42	66	52.	40	70
I-131	41	55			
Cs-137	45	60			
Sr-90	0.08****				
Ba-140	0.1	0.2	0.15	0.08	0.2

* Release values based on TMI-2 measurements.

** Normal value is simple average of all Kr, Xe, I, and Cs measurements.

*** Minimum and maximum values of all Kr, Xe, I and Cs measurements.

**** Only value available.

FIGURE I-3C

RELATIONSHIP OF % FUEL OVERTEMPERATURE WITH % CORE INVENTORY RELEASED OF XE, KR, I, OR CS

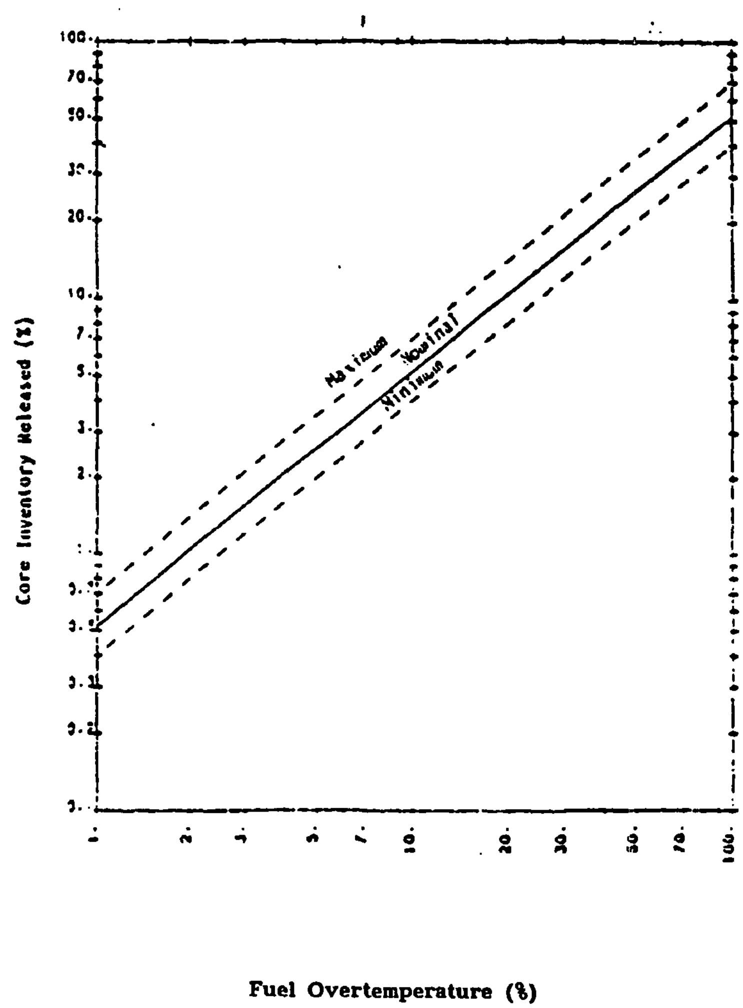


FIGURE I-4

TECHNICAL BASIS FOR ESTIMATION OF FAILED FUEL OVERHEATING WITH FUEL MELT

A. THEORY

In a fuel melt condition, all five release mechanisms discussed in Figure I-3 are involved. As fuel melts, up to 99% of the halogens and noble gases will be released. There will also be a significant release of barium and praseodymium. As in Case II, a linear relationship between failed fuel and isotope activity will be assumed. (See Figures I-4b and I-4c).

The major difference between fuel overheating without fuel melt and overheating with fuel melt is the percent of fission product inventory released from the fuel. The methodology for correcting isotopic decay and reactor power remains the same. The methodology for using hydrogen concentration to estimate core damage remains the same. The main changes will be in the radiochemistry method and area monitor method.

B. General Equations for Iodine and Xenon

1) $$P_i^{low} = \frac{\textit{Total Activity for Isotope} \quad (100)}{(\textit{Power Correction Factor} \; (\textit{Isotope Core Inventory})}$$

2) $$P_i^{high} = \frac{\textit{Total Activity for Isotope} \quad (100)}{(0.7)\,(\textit{Power Correction Factor})\,(\textit{Isotope Core Inventory})}$$

C. General Equations for Barium

1) $$P_i^{low} = \frac{\textit{Total Activity for Isotope} \quad (100)}{(0.44)\,(Y)\,(\textit{Isotope Core Inventory})}$$

2) $$P_1^{high} = \frac{\textit{Total Activity for Isotope} \quad (100)}{(0.10)\,(Y)(\textit{Isotope Core Inventory})}$$

D. General Equations for Praseodymium

1) $$P_i^{low} = \frac{\textit{Total Activity for Isotope} \quad (100)}{(0.024)\,(Y)\,(\textit{Isotope Core Inventory})}$$

2) $$P_i^{high} = \frac{\textit{Total Activity for Isotope} \quad (100)}{(0.008)\,(Y)\;\textit{Isotope Core Inventory})}$$

FIGURE I-4A

PERCENT ACTIVITY RELEASE FOR 100 PERCENT CORE MELT CONDITONS

Species	Large* LOCA	Transient*	Small* LOCA	Nominal** Release	Min.*** Release	Max.*** Release
Xe	88.35	99.45	78.38			
Kr	88.35	99.45	78.38			
				87	70	90
I	88.23	99.44	78.09			
Cs	88.55	99.46	78.84			
Te	78.52	94.88	71.04			
Sr	10.44	28.17	14.80	24	10	44
Ba	19.66	43.87	24.08			
Pr	0.82	2.36	1.02	1.4	0.8	2.4

* Calculated releases for severe accident scenarios without emergency safe-guard features, taken from draft NUREG-0956

** Normal release are averages of Xe, Kr, I, Cs, and Te groups or Sr and Ba groups

*** Maximum and minimum releases represent extremes of the groups.

FIGURE I-4B

RELATIONSHIP OF % FUEL MELT WITH % CORE INVENTORY RELEASED OF BA OR SR

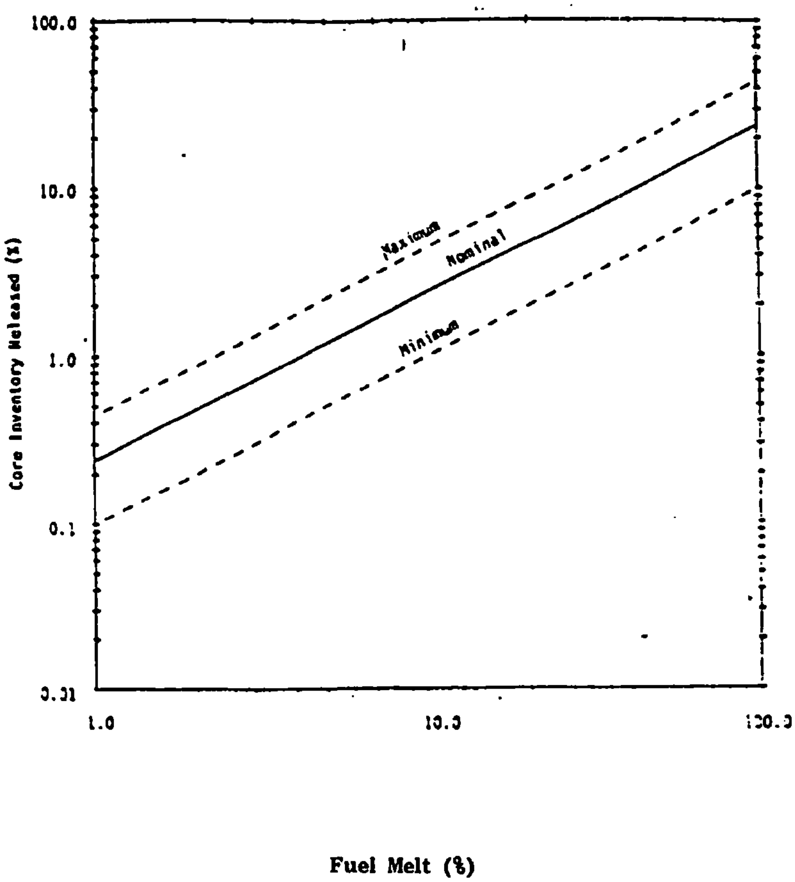


FIGURE I-4C

RELATIONSHIP OF % FUEL MELT WITH % CORE INVENTORY RELEASED OF XE, KR, I, CS, OR TE

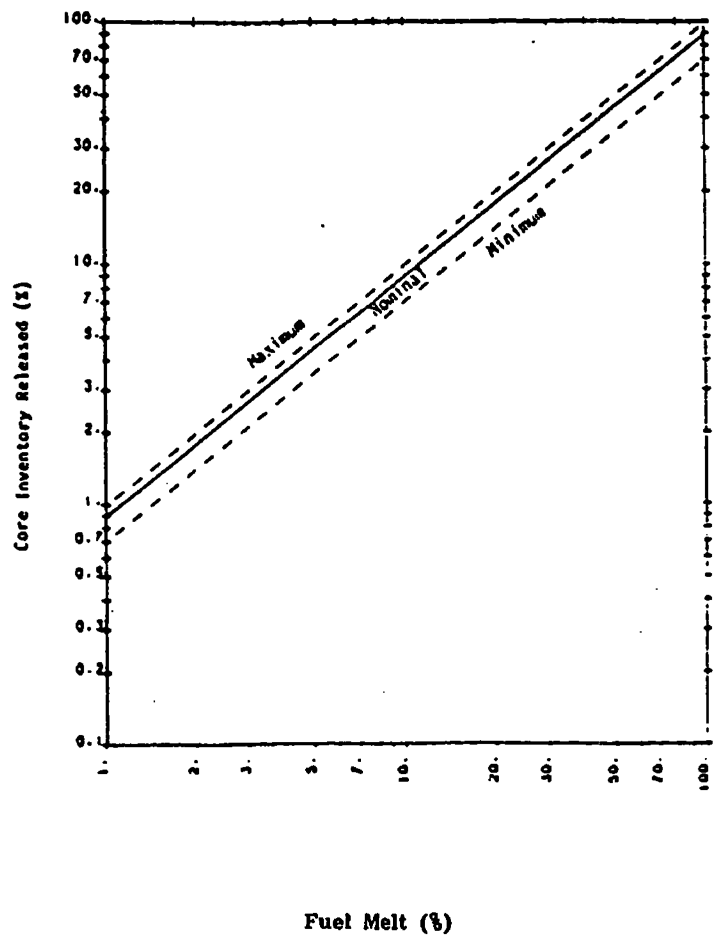


FIGURE I-5

ACTIVITY PER FUEL ASSEMBLY

Isotope	1 Cycle (Curies)	2 Cycles (Curies)	3 Cycles (Curies)
Kr85	2.102(3)*	3.272(3)	4.524(3)
Kr87	2.264(5)	1.433(5)	1.550(5)
Kr88	3.206(5)	2.030(5)	2.194(5)
Xe133	3.483(5)	6.335(5)	3.161(5)
Xe133m	1.610(5)	9.016(4)	1.164(5)
Xe135	4.714(5)	3.973(5)	4.499(5)
Xe135m	1.610(5)	1.255(5)	1.669(5)
I131	3.982(5)	3.075(5)	4.066(5)
I133	8.469(5)	6.317(5)	8.134(5)
I135	7.869(5)	5.879(5)	7.603(5)
Ba139	7.608(5)	5.561(5)	7.051(5)
Ba140	7.429(5)	5.432(5)	6.331(5)
Ba141	6.955(5)	5.073(5)	6.392(5)
Pr145	4.32(5)	3.177(5)	3.950(5)
Pr146	3.437(5)	2.537(5)	3.200(5)

*2.102(3) = 2.102 x 10^3

TOTAL CORE ACTIVITY

(Isotope)	(Curies)	(Curies)	% Δ*
Kr85	5.8405(5)**	5.84(5)	0.0
Kr87	3.0958(7)	4.00(7)	-29.207
Kr88	4.3837(7)	5.60(7)	-27.775
Xe133	1.355(8)	1.28(8)	7.800
Xe133m	2.1686(7)	3.07(6)	85.84
Xe135	7.7798(7)	2.19(7)	71.85
Xe135m	2.6751(7)	3.31(7)	-23.73
I131	6.5626(7)	7.42(7)	-13.065
I133	1.3523(8)	1.28(8)	5.340
I135	1.2597(8)	1.27(8)	-0.82
Ba139	1.193(8)		
Ba140	1.165(8)		
Ba141	1.087(8)		
Pr145	6.820(7)		
Pr146	5.442(7)		

$$\frac{*\,LOR2 - FSAR}{LOR2} \times 100$$

LOR2 = 59 (cycle 1 + cycle 2 + cycle 3)
where cycle 1, cycle 2, cycle 3 is on Table 5

**5.8405(5) = 5.8405 x 10^5

NOTE: FSAR values assume 400 EFPD and LOR2 values assume 421 EFPD

FIGURE I-6

TECHNICAL BASIS FOR ESTIMATION OF FAILED FUEL

AREA MONITORS FOR OVERHEAT WITHOUT FUEL MELT

Generally, a radiochemistry sample will give a more accurate indication of core damage than area monitors in the containment building. However, radiochemistry samples take a long time to evaluate, whereas area monitors give results immediately. This section will attempt to make some simplifying assumptions and give a rough estimate of failed fuel versus dose rate in containment. It will be assumed that only noble gases are in the containment atmosphere.* The noble gases are also assumed to be equally distributed throughout the containment building.

$\dot{X} = (2.62 \times 10^5) \times E\gamma \times 3600$ sec/hr

$\dot{X} = (9.432 \times 10^7) \times E\gamma$ R/hr

Where $\dot{X}$ = Ci/cm^3

$E\gamma$ = Average energy of all -γ rays per disintegration

$\dot{X}$ = Dose rate (R/HR)

Figure I-6a lists the average gamma energy level for the most prominent noble gas isotopes. Figure I-6b shows the methodology for calculating total noble gas dose rate. Figure I-6c is a plot of dose rate from Figure I-6b as the noble gases decay.

An approximation of failed fuel can be determined by the equation:

$$\text{Fm} = \frac{\dot{X}\,m}{(Y)\,\dot{X}(t)} \times 100$$

Where: Xm = Area monitor reading in the containment (R/HR)

$\dot{X}$ (t) = Dose rate from Figure I-6c (R/HR) at the appropriate time after shutdown

Y = Power correction factor

Where $Y = \dfrac{\textit{Average Power for Prior 30 days}}{\textit{Rated power level}}$

Fm = Fuel failure percent according to area monitors

It should be noted that this equation assumes a "PUFF" release of noble gases. If a small break LOCA occurs then the failed fuel estimate of m will be low. One possible method for using this equation during a small break LOCA is to wait until the monitor dose rate peaks and starts to decline. Figure I-9 is used to account for decay if required.

*It is understood that more isotopes than noble gases are released to the containment. However, modeling which isotopes and their activity is difficult. Therefore, only noble gases are considered. This will give a conservative estimate of failed fuel.

FIGURE I-6A

AVERAGE GAMMA ENERGY LEVEL

Isotope	(Mev)	Half-Life
Kr85m	0.151	4.4 Hrs.
Kr85	0.00211	10.76 Yrs.
Kr87	1.37	76.0 Min.
Kr88	1.74	2.79 Hrs.
Xe133m	0.326	2.26 Days
Xe133	0.030	5.27 Days
Xe135m	0.422	15.70 Min.
Xe135	0.246	9.20 Hrs.

FIGURE I-6B

VALUES FOR CALCULATING TOTAL NOBLE GAS DOSE RATE

Isotope	Activity in Containment At Shutdown	Eγ	χ	X
Kr85m	4.8405 (5)*	0.00211	9.3302(-6)	18.569
Kr87	2.0958 (7)	1.370	4.0397(-4)	5.22(5)
Kr88	3.0686 (7)	1.740	5.9148(-4)	9.71(5)
Xe133	9.3558 (7)	0.030	1.8034(-3)	5.10(4)
Xe133m	1.5180 (7)	0.0326	2.9260(-4)	9.00(4)
Xe135	5.4459 (7)	0.246	1.0497(-3)	2.43(5)

Total dose rate at shutdown = 1.88(6) R/HR)

* 4.8405(5) = 4.8405 x 10^5

FIGURE I-6C

DOSE RATE VS TIME FOR FUEL OVERHEATING WITHOUT FUEL MELT

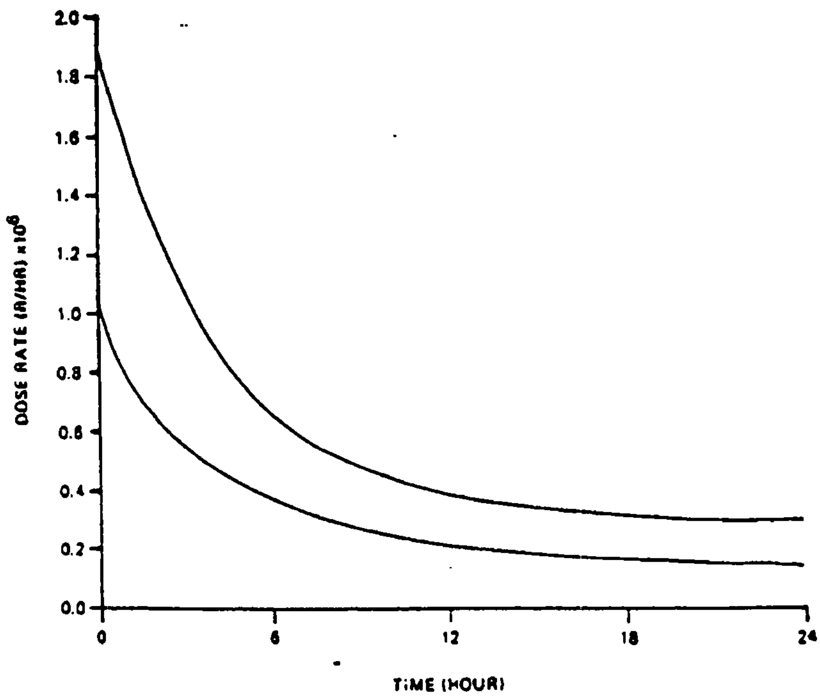


FIGURE I-7

TECHNICAL BASIS FOR ESTIMATION OF FAILED FUEL AREA MONITORS FOR FUEL MELT CONDITION

Dose rate is based on 70 to 100 percent release of noble gases instead of the 40 to 70 percent used in Figure I-6. Figure I-7a shows a plot of dose rate versus time for 100% failed fuel. An approximation of failed fuel can be determined by the equation:

$$Fm = \frac{X\,m}{(Y)\,(X(t))} \cdot 100$$

Where: Xm = Area monitor reading in the containment (R/HR)

X(t) = Dose rate from Figure I-7a

Y = Power correction factor= $\frac{Average\ Power\ for\ Prior\ 30\,days}{Rated\ power\,level}$

F m = Fuel failure percent

FIGURE I-7A

DOSE RATE VS. TIME FOR FUEL MELT

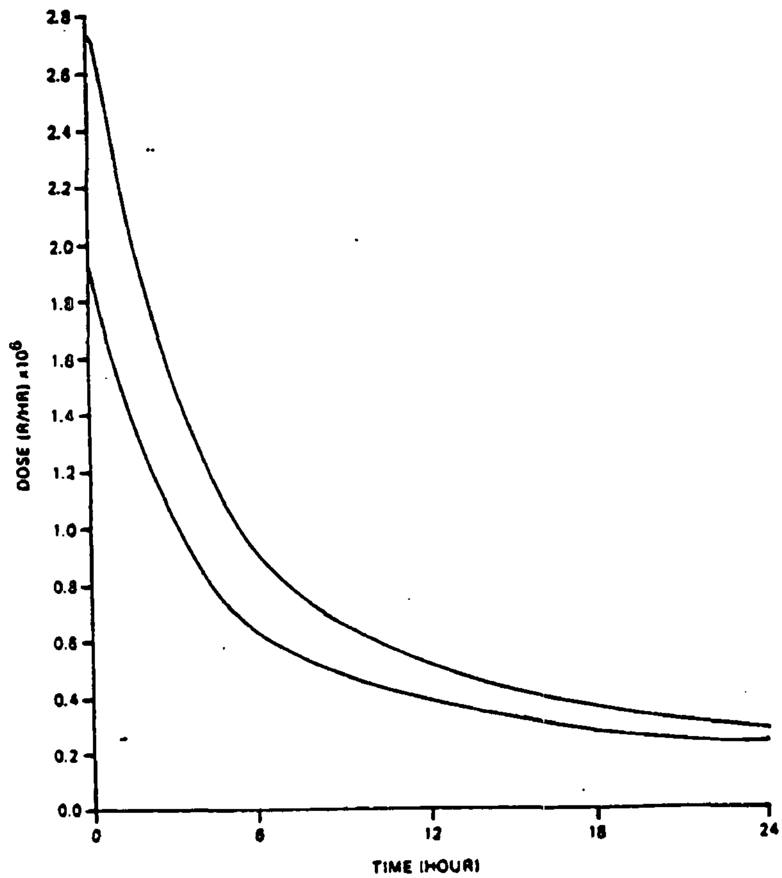


FIGURE I-8

TECHNICAL BASIS FOR ESTIMATION OF FAILED FUEL HYDROGEN CONCENTRATION IN THE CONTAINMENT BUILDING

At approximately 1600°F zirconium reacts with water to produce hydrogen. The greater the temperature the faster the reaction rate. During the zirconium - water reaction heat is also released which raises the cladding temperature which increases the reaction rate. If the hydrogen concentration is constant or increasing slightly without recombiners on, then the cladding temperature is probably around 1600°F or less. If hydrogen concentration is increasing rapidly (with or without recombiners) then the clad temperature is above 1600°F. A rough estimate of core damage can be made, based on hydrogen concentration in the containment if the following assumptions are made.

1. All hydrogen produced in the RCS is released to the containment building.

2. All hydrogen in the containment building comes from the zirconium - water reaction*.

3. The recombiners have not be turned on (i.e., no hydrogen has been burned).

The equation for the zirconium - water reaction is

$$Zr + 2H_20 \rightarrow Zr0_2 + 2H_2$$

or

Two moles of hydrogen in the containment building are produced by the reaction of one mole of zirconium in the core.

At STP 1 mole of hydrogen has a volume of

22.4. ℓ or 0.79 ft^3

Volume of hydrogen in containment = hydrogen concentration

(volume percent unit) X containment free volume

or

$$V_{H_2} = X_{H_2}{}^{x\ V} containment$$

where V_{H_2} is the volume of hydrogen in containment as a percent of atmosphere.

$$\frac{P_1 V_1}{T_s} = \frac{P_2 V_2}{T_2}$$

* There are other sources of hydrogen, but assuming all hydrogen is produced by the zirconium - water reaction will give a conservative estimate.

$$V_{STP} = \frac{P_C \; V_{H_2} \; T_{STP}}{P_{STP} \; T_C}$$

$$V_{STP} = \frac{P_C}{T_C} \quad \frac{TSTP}{P_{STP}} \quad XH_2 \;\; V_C$$

Where V_{STP}, T_{STP}, P_{STP} = Volume, temperature, and pressure at STP

$T_{STP} = 492°R$

$P_{STP} = 14.7$ PSI

$T_{STP} = 492°R$

$P_{STP} = 14.7$ PSI

V_c = Containment free volume = 1,832,033 ft^3

$$V_{STP} = \frac{P_C}{T_C} \; \frac{492}{14.7} \; (1{,}832{,}033) \; \left(X_{H_2}\right)$$

$$V_{STP} = \frac{P_C}{T_C} \; X_{H_2} \; (6.1317 \text{ s } 10^7)$$

The total amount of hydrogen moles in the containment = $\dfrac{V_{STP}}{Volume\ of\ one}\ mole$

$$M_H = \frac{P_C}{T_C} \; X_{H_2} \; \frac{6.317 \text{x} 10^7}{0.79} = \frac{P_C}{T_C} \; X_{H_2} \; (7.7616 \text{ x } 10^7)$$

Since it takes 1 mole of Zr to produce 2 moles of H_2 then the number of zirconium moles reacting with hydrogen is 1/2 M_H

or

$$M_{Zr} = 1/2 \; M_H = 1/2 \; \frac{P_C}{T_C} \; X_{H_2} \; (7.7616 \text{ x } 10^7)$$

The zirconium mass that reacts can be calculated by the equation

$Z_r = M_{Zr}$ x W_m

Where W_m = gram - Atomic Weight = 91.22 gr/mole

$$Z_r = (M_{Zr})\,(91.22) = \left(\frac{P_C}{T_C} \; X_{H_2}\right) (3.5401 \text{ x } 10^9)$$

The fraction of zirconium that reacts with water is calculated by

$$F_{Zr} = \frac{Z_r}{Z_{r_{tot}}}$$

Where Zr_{tot} = total amount of zirconium in the core = 8.1204×10^7 gm

$$F_{Zr} = \frac{P_C}{T_C} \quad X_{H_2} \frac{3.5401 \times 10^9}{8.1204 \times 10^7} = \frac{P_C}{T_C} \quad X_{H_2} \quad (43.594)$$

$$F_{Zr} = \frac{P_C}{T_C} \quad X_{H_2} \frac{43.6}{100} = \frac{P_C}{T_C} \quad P_{H_2} \quad (.436)$$

Where: F_{Zr} = Fraction of core damage

P_{Zr} = Percent of core damage

P_c = Containment pressure (PSIA)

T_c = Containment temperature (°F + 460)

P_{H_2} = Percent of hydrogen in containment atmosphere

$$X_{H_2} = \frac{P_{H_2}}{100}$$

It should be noted that when estimates of core damage are made using radio-chemistry samples, area monitors and hydrogen concentration that the results can be greatly different. Whenever possible, all three methods should be used and their combined results used as an indication of core damage.

FIGURE I-9

TECHNICAL BASIS FOR ESTIMATION OF FAILED FUEL

ISOTOPE DECAY CORRECTION

The specific activity of a sample is decay adjusted to time of reactor shutdown using the following equation.

$$\text{Specific activity at shutdown} = \frac{\textit{Specific activity}(\textit{meaured})}{e^{-\lambda_i t}}$$

Where:

λ_i = Radioactive decay constant, 1/sec

t = Time period from reactor shutdown to time of sample analysis, sec.

Since this correction may also be performed by some analytical equipment, care must be taken to avoid duplicate correction. Also, considerations must be given to account for precursor effect during the decay of the nuclide. For this methodology, only the parent-daughter relationship associated with the methodology. The decay scheme of the parent-daughter relationship (Figure I-9a) is described by the following equation.

$$Q_B = \frac{\lambda_B}{\lambda_B - \lambda_A} Q_A^o \left(e^{-\lambda_A t} - e^{-\lambda_B t} \right) Q_B^o e^{-\lambda_B t}$$

Where:

Q_A^o	=	Activity (Ci) or specific activity (µCi/gm or µCi/cc) of the parent at shutdown
Q_B^o	=	Activity (Ci) or specific activity (µCi/gm or µCi/cc) of the daughter at shutdown
Q_B	=	Activity (Ci) or specific activity (µCi/gm or µCi/cc) of the daughter at time of sample
λ_A	=	Decay constant of the parent, sec^{-1}
λ_B	=	Decay constant of the daughter, sec^{-1}
t	=	Time period from reactor shutdown to time of sample analysis, sec.

Since the activity of the daughter at sample time is due to the decay of the parent and the decay of the daughter initially released at shutdown, an estimation of the fraction of the measured activity at sample time due to only the decay of daughter is required.

To use the above equation to determine the fraction, an assumption is made that the fraction of source inventory released of the parent and the daughter at time of shutdown are equal (for the nuclides used here within a factor of 2). The following steps should be followed to calculate the fraction of the measured activity due to the decay of the daughter that was released and then to calculate the activity of the daughter released at shutdown.

1. Calculate the hypothetical daughter concentration (Q_B) at the time of the sample analysis assuming 100 percent release of the parent and daughter source inventory.

$$Q_B = \frac{\lambda_B}{\lambda_B - \lambda_A} Q_A^o \left(e^{-\lambda_A t} - e^{-\lambda_B t} \right) Q_B^o e^{-\lambda_B t}$$

Where:

Q_A^o	=	100% source inventory (Ci) of parent, Table 6
Q_B^o	=	100% source inventory (ci) of daughter, Table 6
$Q_B(t)$	=	Hypothetical daughter activity (Ci) at sample time
K	=	If parent has 2 daughters, K is the branching factor, Table 6
λ_A	=	Parent decay constant, sec^{-1}
λ_B	=	Daughter decay constant, sec^{-1}
t	=	Time period from reactor shutdown to time of sample analysis, sec.

2. Determine the contribution of only the decay of the initial inventory of the daughter to the hypothetical daughter activity at sample time.

$$Fr = \frac{Q_B^o e^{-\lambda_B t}}{Q_B(t)}$$

3. Calculate the amount of the measured sample specific activity associated with the decay of the daughter that was released.

   M_B = Fr x measure specific activity (µCi/gm or µCi/cc)

4. Decay correct the specific activity (M_B) to reactor shutdown.

$$M_B = \frac{B}{-\lambda_B t}$$

FIGURE I-9A

PARENT-DAUGHTER RELATIONSHIPS

Parent	Parent Half Life[1]*	Daughter	Daughter Half Life*	K^2**
Kr-88	2.8 h	Rb-88	17.8 m	1.00
I-131	8.05 d	Xe-131m	11.8 d	.008
I-133	20.3 h	Xe-133m	2.26 d	0.24
I-133	20.3 h	Xe-133	5.27 d	.976
Xe-133m	2.26 d	Xe-133	5.27 d	1.00
I-135	6.68 h	Xe-135	9.14 h	.70
Xe-135m	15.6 m	Xe-135	9.14 h	1.00
I-135	6.68 h	Xe-135m	15.6m	.30
Te-132	77.7 h	I-132	2.26 h	1.00
Sb-129	4.3 h	Te-129	68.7 m	.827
Te-129m	34.1 d	Te-129	68.7 m	.680
Sb-129	4.3 h	Te-129m	34.1 d	.173
Ba-140	12.8 d	La-140	40.22 h	1.00
Ba-142	11 m	La-142	92.5 m	1.00
Ce-144	284 d	Pr-144	17.27 m	1.00

[1] * Table of Isotopes, Lederer, Hollander, and Perlman, Sixth Edition

[2] ** Branching of decay factor

Duke Energy Oconee Nuclear Station **EMERGENCY PLAN A - SECTION J PROTECTIVE RESPONSE**	Procedure No. **EPA SECTION J**
	Revision No. **006**
	Electronic Reference No. **OAP000HZ**

PDF Format

Prepared By* ______________________________ Date __________

Requires Applicability Determination? ☐ Yes ☐ No

Reviewed By* ______________________________(QR) Date __________

Cross-Disciplinary Review By* ____________________(QR) NA ________ Date __________

Reactivity Mgmt. Review By* ____________________(QR) NA ________ Date __________

Additional Reviews

Reviewed By* ______________________________ Date __________

Reviewed By* ______________________________ Date __________

Approved By* ______________________________ Date __________

** Printed Name and Signature*

J. PROTECTIVE RESPONSE

To assure that a range of protective actions is available for the plume exposure pathway for emergency workers and the public. Guidelines for protective actions during an emergency, consistent with Federal guidance, are developed and in place and protective actions for the ingestion exposure pathway appropriate to the locale have been developed.

To protect onsite personnel during hostile action and ensure the continued ability to safely shutdown the reactor and perform the functions of the emergency plan a range of protective actions are in place.

J. 1 Accountability

The Oconee Nuclear Site has a Site Assembly Procedure that gives specific instructions to follow during a site assembly. Also, each division/section has specific directives that provide guidance for their personnel. (Site Assembly locations, Figure J-5)

Methods to notify and alert onsite personnel (essential and non-essential) during hostile action activities are described in AP/0/A/1700/045, "Site Security Threats". RP/0/A/1000/010 "Procedure for Emergency Evacuation/Relocation of Site Personnel". RP/0/A/1000/009, "Procedure for Site Assembly".

J. 2 Relocation Assembly Areas and Evacuation Routes

Should it be determined that non-essential personnel would need to be relocated onsite or evacuated from the site, procedures are in place to handle this process. Agreements have been reached with local authorities for the use of the Oconee and Pickens school facilities for evacuation of personnel. (Appendix 5)

Site directives and procedures establish onsite relocation areas as well as evacuation routes (Figure J-2) to suitable offsite locations.

J. 3 Site Evacuation Procedures - Personnel

The site evacuation procedure establishes guidelines for evacuation from the station site. This procedure outlines the radiological exposure limits. All station personnel inside the protected area will be monitored before being evacuated from the station. Records will be kept of the individual's exposure/contamination level prior to evacuation. All personnel, so designated, will then be evacuated to pre-designated areas for thorough personnel monitoring and decontamination.

Records will be kept for the station and personnel files. All personnel will be required to sign a copy of the monitor readings that will be recorded in personnel files. (Figures J-3, J-4)

During hostile threat conditions relocation of personnel away from the hazard areas are performed in accordance with AP/0/A/1700/045, "Site Security Threats". RP/0/A/1000/010, "Procedure for Emergency Evacuation/Relocation of Site Personnel". RP/0/A/1000/009, "Procedure for Site Assembly".

J. 4 Site Evacuation Procedures-Decontamination/Non Essential/Essential Personnel Criteria

Personnel who have been determined to be non-essential may be evacuated from the plant site in the event of a Site Area Emergency Classification. However, non-essential personnel are always evacuated from the site during a General Emergency Classification. Provisions are made for the decontamination of vehicles and personnel at an offsite location if the situation should warrant that to be necessary.

EPZ - Population Alerting and Notification

See Oconee County FNF Plans.
See Pickens County FNF Plans.
See State of South Carolina FNF Plans, Site Specific.
See Appendix 3.

J.5 & J.6 Site Evacuation Procedures-Personnel Accountability

Within thirty minutes of a Site Assembly, all persons at the Oconee Nuclear Station shall be accounted for and any person(s) determined to be missing from their control station, will be identified by name. To assist in the location of missing person(s), the Emergency Coordinator will appoint a Search and Rescue Team. Search procedures will be coordinated through the Operational Support Center.

After all non-essential personnel have been evacuated from the site, logsheets will be kept by Radiation Protection personnel in the Operational Support Center of all persons onsite together with their Radiation Protection records to include the following:

a. Individual respiratory protection
b. Protective clothing
c. Use of Radioprotective drugs

During hostile threat conditions personnel accountability is performed in accordance with AP/0/A/1700/045, "Site Security Threats" and RP/0/A/1000/009, "Procedure for Site Assembly".

J. 7 Protective Actions Recommendations

The Emergency Coordinator (Operations Shift Manager or Station Manager) or the EOF Director (depending on the facility activation) will be responsible for contacting the State and/or local governments to give prompt notification for implementing protective measures within the plume exposure pathway, and beyond it if necessary. Procedure RP/0/A/1000/024, "Protective Action Recommendations" and SR/0/A/2000/003, "Activation of the Emergency Operations Facility" has been written to provide specific guidance for issuing protective action recommendations under various plant conditions to the Emergency Coordinator in the TSC and the EOF Director in the EOF Figure (J-1) respectively. Protective Action Recommendations (PARs) provided to offsite officials take into account a range of protective actions including sheltering and evacuation. Discussions conducted with offsite officials determined that sheltering would be recommended during a hostile action based event in which no release of radioactive materials has occurred or is expected. The decision to use sheltering as an alternative to evacuation for impediments and special populations is one that will be made by offsite officials. If dose projections show that PAGs have been exceeded at 10 miles, the dose assessment code and in-field measurements, when available, shall be used to calculate doses at various distances down wind to determine how far from the site PAG levels are exceeded. The Radiological Assessment Manager shall forward the results to the EOF Director who will communicate this information to the offsite authorities.

Figure J-1A (Protective Action Guides) is adopted from EPA 400 and guidance in state plans on use of KI and considers protective action based on projected avoided dose.

Per Appendix 2, initial protective actions are predetermined for Control Room use for general emergency conditions. Meteorological conditions at Oconee require a complex method for determining appropriate sectors to evacuate. The Control Room will typically recommend evacuation out to five miles and shelter out to ten miles which simplifies the process for determining the appropriate sectors to evacuate and to shelter.

J. 8 Evacuation Time Estimates

A description of the methods and assumptions used in developing the analysis of evacuation time estimates is included in the current Evacuation Time Estimate Study for the Oconee Nuclear Site. (ONS-ETE-12142012, Rev. 000; ONS Evacuation Time Estimates (ETE) Dated 12/14/2012.) The Evacuation Time Estimates will be considered in evaluating protective action recommendations from the Technical Support Center or the Emergency Operations Facility. A copy of the most recent study is available in the Technical Support Center and the Emergency Operations Facility.

An updated ETE analysis will be submitted to the NRC under §50.4 no later than 365 days after ONS determination that the criteria for updating the ETE have been met and at least 180 days before using it to form protective action recommendations and providing it to State and local governmental authorities for use in developing offsite protective action strategies.

The criteria for determination that an updated ETE analysis have been met:

a. The availability of the most recent decennial census data from the U.S. Census Bureau;

OR

b. If at any time during the decennial period, the EPZ permanent resident population increases such that it causes the longest ETE value for the 2-mile zone or 5-mile zone, including all affected Emergency Response Planning Areas, or for the entire 10-mile EPZ to increase by 25 percent or 30 minutes, whichever is less, from the currently NRC approved or updated ETE.

During the years between decennial censuses ONS will estimate EPZ permanent resident population changes once a year, but no later than 365 days from the date of the previous estimate, using the most recent U.S. Census Bureau annual resident population estimate and State/local government population data, if available. ONS will maintain these estimates so that they are available for NRC inspection during the period between decennial censuses and shall submit these estimates to the NRC with any updated ETE analysis.

ONS' ETE analysis, using the 2010 decennial census data from the U.S. Census Bureau, was submitted to the NRC via §50.4 on December 14, 2012.

J.9 Implementing Protective Measures

See Pickens County FNF Plans.
See Oconee County FNF Plan.
See State of South Carolina FNF Plans, Site Specific.

For hostile action events, a range of protective actions for onsite workers including evacuation of essential personnel from potential target buildings, timely evacuation or relocation of non-essential site personnel, dispersal of critical personnel to safe locations, sheltering of personnel away from potential site targets and accountability of personnel after the attack are provided in emergency plan implementing procedures AP/0/A/1700/045, "Site Security Threats", RP/0/A/1000/010, "Procedure for Emergency Evacuation/Relocation of Site Personnel", RP/0/A/1000/009, "Procedure for Site Assembly".

J.10 Implementation of Protective Measures for Plume Exposure Pathway

J.10.a EPZ - Maps of Oconee EPZ.
See Figure A, page i-5.

J.10.b EPZ - Population Distribution Charts
See Appendix 4 Evacuation Time Estimates

J.10.c EPZ - Population Alerting and Notification

See Oconee County FNF Plans.
See Pickens County FNF Plans.
See State of South Carolina FNF Plans, Site Specific.

See Appendix 3.

J.10.d EPZ - Protecting Immobile Persons

See Oconee County FNF Plans.
See Pickens County FNF Plans.
See State of South Carolina FNF Plans, Site Specific.

J.10.e Use of Radioprotective Drugs for Persons in EPZ

See Oconee County FNF Plans.
See Pickens County FNF Plans.
See State of South Carolina Operational Radiological Emergency Response Plan - SCOREP, (FNF Plans, Site Specific).

J.10.f Conditions For Use of Radioprotective Drugs

See Oconee County FNF Plans.
See Pickens County FNF Plans.
See State of South Carolina SCOREP, (FNF Plans, Site Specific).

J.10.g Means of Relocation and
J.10.h State/County Relocation Center Plans

See Oconee County FNF Plans.
See Pickens County FNF Plans.
See State of South Carolina FNF Plans, Site Specific.

J.10.i Evacuation Route - Traffic Conditions

See Oconee County FNF Plans.
See Pickens County FNF Plans.
See State of South Carolina FNF Plans, Site Specific.

J.10.j Evacuated Area Access Control

See Oconee County FNF Plans.
See Pickens County FNF Plans.
See State of South Carolina FNF Plans, Site Specific.

J.10.k Planning for Contingencies in Evacuation

See Oconee County FNF Plans.
See Pickens County FNF Plans.
See State of South Carolina FNF Plans, Site Specific.

J.10.l State/County Evacuation Time Estimates

See Oconee County FNF Plans.
See Pickens County FNF Plans.
See State of South Carolina FNF Plans, Site Specific.

J.10.m Bases for Protective Action Recommendations

DUKE ENERGY uses the following considerations in determining protective action recommendations:

1) Protective Action Guides (PAG)
2) Core Condition

See State of South Carolina FNF Plan, Site Specific

J.11 Ingestion Pathway Planning:

See State of South Carolina FNF Plans.
See State of Georgia FNF Plans.
See State of North Carolina FNF Plans.

J. 12 Relocation Center - Registering: & Monitoring

See Oconee County FNF Plans.
See Pickens County FNF Plans.
See State of South Carolina FNF Plans.

FIGURE J-1

DUKE ENERGY
OCONEE NUCLEAR SITE

PROTECTIVE ACTION RECOMMENDATION FLOW CHART

CONDITION	FUEL DAMAGE SYMPTOMS	CONTAINMENT STATUS	PROTECTIVE ACTION RECOMENDED
General Emergency Declared	♦ Loss of critical functions required for core protection ♦ High CETCs ♦ RB High rad levels	Not applicable	Evacuate 2- mile radius and 5- miles downwind unless conditions make evacuation dangerous. (See Note 1). Shelter any sector not evacuated.
Additional protective recommendations will be based on the following conditions from either the Technical Support Center or the Emergency Operations Facility. TSC or the EOF shall continue assessment based on all available plant and field monitoring information. Modify protective actions as necessary. Locate and evacuate people from hot spots. Do not relax protective actions until the source of the threat is clearly under control.			
Fuel Damage Detected by Monitors	♦ High rad levels as determined by Reactor Building and unit vent monitors	Known containment breach or RB pressure greater than 1 PSIG	Dose calculations required to determine additional evacuation requirements and recommendations on use of stable iodine. Shelter any sector not evacuated.
Condition 2 failed fuel as determined by RP/0/A/1000/018	♦ RB high rad levels ♦ H-2 increasing ♦ Clad >1200° F	No credit is taken for containment.	Evacuate 5-mile radius and 10-miles downwind. Shelter any sector not evacuated.

Note 1. Dangerous travel conditions or immobile infirmed population.

FIGURE J-1A

DUKE ENERGY
OCONEE NUCLEAR SITE

PROTECTIVE ACTION GUIDES

Protective Action	Recommended Actions	Comments
Evacuation	1-5 rem TEDE from significant external and internal exposure from gamma radiation from the plume and from deposited material	Although the PAG is expressed as a range, under normal conditions evacuation of the public is usually justified when the projected dose to an individual is one rem.
Evacuation	5-25 rem thyroid CDE from significant inhalation of activity in the plume	Although the PAG is expressed as a range, under normal conditions evacuation of the public is usually justified when the projected dose to an individual is five rem.
Administration of stable iodine (e.g. KI)	5 rem thyroid CDE from radioiodine	Duke Energy will recommend that offsite agencies consider the use of KI at 5 rem thyroid CDE.

Sheltering Concepts:

Duke Energy will make evacuation recommendations to the offsite agencies. However, if hazardous environmental conditions exists, Oconee emergency personnel will provide information (plant status, release magnitude, release duration, consequences) for the offsite agencies to use in making their decisions as to whether or not the public will be evacuated or sheltered.

FIGURE J-2

DUKE ENERGY
OCONEE NUCLEAR SITE

<u>EVACUATION ROUTES CHART</u>

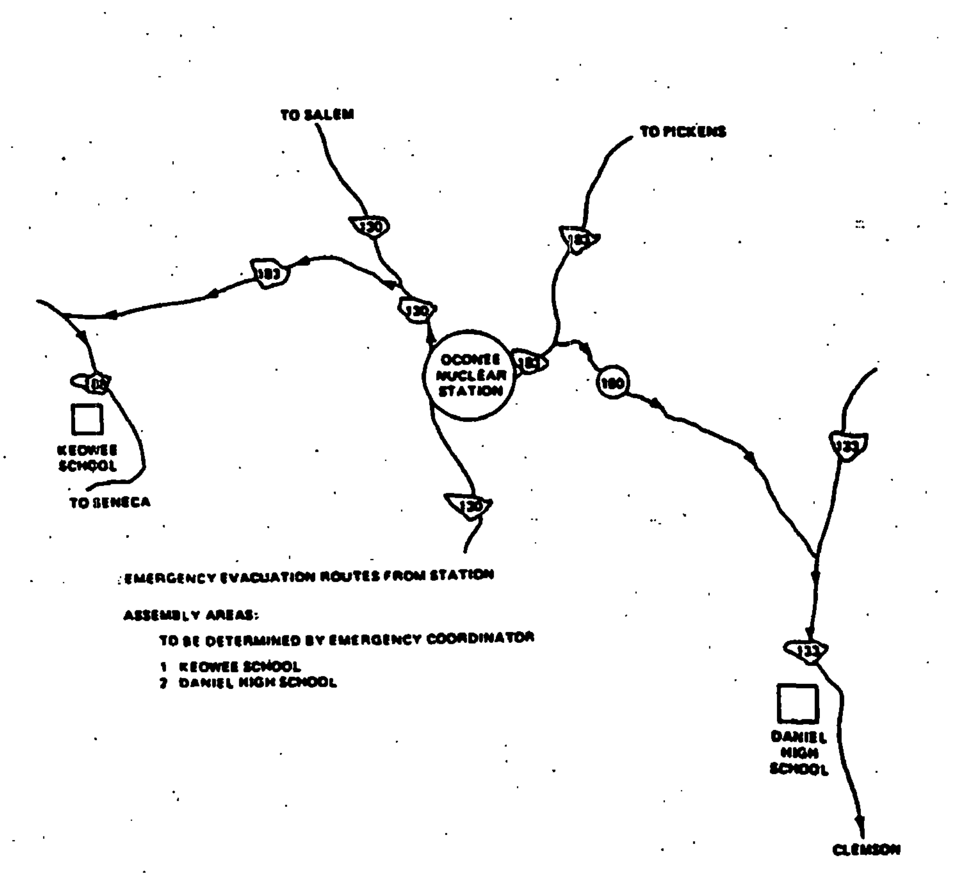


FIGURE J-3

DUKE ENERGY
OCONEE NUCLEAR SITE

INDIVIDUAL CONTAMINATION EXPOSURE LEVELS

LICENSEE: DUKE ENERGY

IDENTIFICATION INFORMATION

Name:______________________________ Date: ____________________

Social Security Number _________________________ Time: _____________

Employer:______________________ R.P. Badge ______________

CONTAMINATION EXPOSURE LEVELS

Instrument Used:____________ Instrument Reading: ________________________
(RM-14 with thin window detector or equivalent)

____

Date:______________ Employee Signature: ______________________________

Remarks: ____

Address: ______________________________

To the individual named above__________________________, this report is furnished to you so that you have a prompt record of your radioactive contamination level.

____
Radiation Protection Manager

Date: ______________________

Copies to:
Individual
Individual File
(New Form)

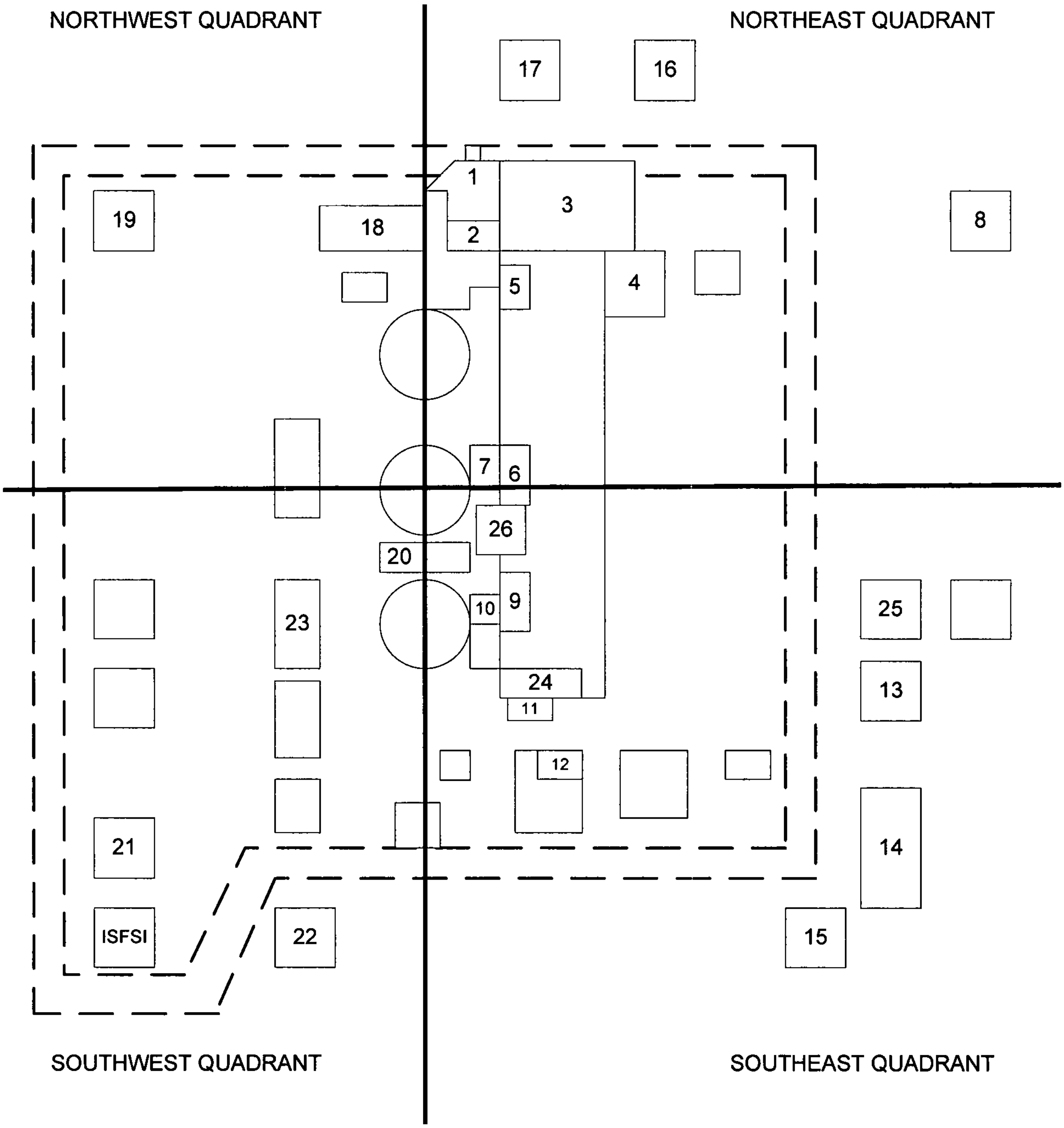
FIGURE J-4

DUKE ENERGY
OCONEE NUCLEAR SITE

INITIAL PERSONNEL CONTAMINATION RECORD
(ONSITE)

NAME	RP BADGE NUMBER	INITIAL DOSE RATE (mRad/hr)	DOSE RATE (mRad/hr) After Decon

FIGURE J-5
Oconee Nuclear Site
Building Layout



NORTHWEST QUADRANT	NORTHEAST QUADRANT
18. Administrating Building 19. Oconee Office Building **SOUTHWEST QUADRANT** 20. RP Assembly Building 21. Interim Outage Building 22. Operations Center (Geo-Technical Ctr.) 23. Warehouse Offices **SOUTHEAST QUADRANT** 9. Turbine Bd. 3 Offices 10. Unit 3 CR 11. Technical Support Bd. 12. Radwaste Facility 13. Oconee Garage 14. Oconee Complex 15. L-1 Storage Yard 24. Turbine Bd. South Offices 25. Maintenance Training Facility 26. SPA, RP Assembly Area	1. Security Building 2. Locker Building 3. Maintenance Service Bd./Clean Machine Shop 4. Maintenance Support Building 5. Turbine Building North Offices 6. Turbine Building 1&2 Offices/WCC 7. Unit 1&2 Control Room 8. Keowee Hydro Station 16. World of Energy 17. Oconee Training Center

Duke Energy Oconee Nuclear Station **EMERGENCY PLAN A - SECTION P RESPONSIBILITY FOR THE PLANNING EFFORT: DEVELOPMENT, PERIODIC REVIEW AND DISTRIBUTION OF THE EMERGENCY PLANS**	Procedure No. **EPA SECTION P** Revision No. **007** Electronic Reference No. **OAP000I5**

PDF Format

Prepared By* ____________________ Date ________

Requires Applicability Determination? ☐ Yes ☐ No

Reviewed By* ____________________(QR) Date ________

Cross-Disciplinary Review By* ____________________(QR) NA ________ Date ________

Reactivity Mgmt. Review By* ____________________(QR) NA ________ Date ________

Additional Reviews

Reviewed By* ____________________Date ________

Reviewed By* ____________________Date ________

Approved By* ____________________ Date ________

** Printed Name and Signature*

P. Responsibility for the Planning Effort: Development, Periodic Review and Distribution of the Emergency Plans

To assure that responsibilities for plan development, review and distribution of emergency plans are established and that planners are properly trained:

P.1 Training for Emergency Planning Personnel

Training for emergency planning personnel shall be provided in the form of workshop/seminar sessions on an annual basis. Courses developed by the Duke Training Center are also available in technically related subjects that will enhance the working knowledge of these people.

P.2 & P.3 Overall Authority

The Site Vice-President has the overall authority and responsibility for all hazards emergency response planning. The planning effort is delegated to the Manager, Emergency Planning.

The Manager of Emergency Planning at the Oconee Nuclear Site shall have the responsibility for the development, review and coordination of the site emergency plans with other response organizations and shall be responsible for conducting the biennial exercise, drills and training sessions to test the Oconee Nuclear Site Emergency Plan. This person is employed in the Safety Assurance Group.

P.4 & P.5 Review and Update of Emergency Plan

The ONS Emergency Plan shall be reviewed and updated annually. An in-depth review of the Emergency Plan will be made to determine if any/all changes have been made as a result of drills, exercises, commitments, audits, new regulatory requirements, and any other identified mechanism used to determine the appropriateness of the Emergency Plan. The Manager of Emergency Planning or designee is responsible for conducting the review and updating/revising the Emergency Plan and/or Implementing Procedures, as required. Once the review has been completed and changes made as determined, the Emergency Plan shall be certified as current.

Approved revisions of the Emergency Plan and Implementing Procedures shall be distributed according to Appendix 6, (Distribution of Emergency Plan and Implementing Procedures). Appendix 6 carries an itemized list of all organizations and individuals receiving copies of the Emergency Plan and

Implementing Procedures. Revised pages of the Emergency Plan shall be dated and marked to show where changes have been made.

P.6 Supporting: Plans

Figure P-2 lists plans in support of the ONS Emergency Plan.

P.7 Implementing Procedures

Written procedures will be established, implemented and maintained covering the activities associated with emergency plan implementation. Each procedure and changes thereto, shall be approved by the responsible manager prior to implementation.

Implementing procedures are indexed and cross referenced to the section applicable in NUREG 0654. (Figure P-1)

P.8 Table of Contents

The Oconee Nuclear Site Emergency Plan and Implementing Procedures contain a table of contents and an index tab system.

P.9 Independent Audit

The NOS Audit Manager will arrange for an independent review of Oconee Nuclear Station's Emergency Preparedness Program as necessary, based on an assessment against performance indicators, and as soon as reasonably practicable after a change occurs in personnel, procedures, equipment, or facilities that potentially could adversely affect emergency preparedness, but no longer than 12 months after the change. In any case, all elements of the emergency preparedness program will be reviewed at least once every 24 months. Guidance for performing the assessment against the performance indicators is provided in the Emergency Preparedness Administrative Procedure AD-EP-ALL-0001. The independent review will be conducted by the Independent Nuclear Oversight Division, which will include the following plans, procedures, training programs, drills/exercises, equipment, and State/local government interfaces:

1. Oconee Nuclear Station Emergency Plan
2. Oconee Nuclear Station Emergency Plan Implementing Procedures

3. State/Local Support Agency Training Program
4. Site Emergency Response Training Program
5. Public & Media Training/Awareness
6. Equipment: Communications, Monitoring, Meteorological, Public Alerting
7. State/Local Plan Interface

The review findings will be submitted to the appropriate corporate and nuclear site management. The part of the review involving the evaluation of the adequacy of interface with State and local governments will be reported to the appropriate State and local governments. Corporate or nuclear site management, as appropriate, will evaluate the findings affecting their area of responsibility and ensure effective corrective actions are taken. The results of the review, along with recommendations for improvements, will be documented, and retained for a period of five (5) years.

P.10 Phone Number Update

The Emergency Telephone Directory is updated quarterly.

FIGURE P1

EMERGENCY PLAN IMPLEMENTING PROCEDURES

Cross Reference

Emergency Plan Section(s) Implemented	Procedure	Procedure Title
Assignment of Responsibility		
A1a	ONS E Plan	ONS Emergency Plan, Appendix 5 Agreement Letters
A1b	RP/0/A/1000/002	Control Room Emergency Coordinator Procedure
	RP/0/A/1000/019	Technical Support Center Emergency Coordinator Procedure
	RP/0/A/1000/025	Operational Support Center Manager Procedure
	AD-EP-DEC-0107	Standard Procedure for EOF Services
	SR/0/A/2000/003	Activation of the Emergency Operations Facility
A1c	ONS E Plan	ONS Emergency Plan, Fig A1
A1d	RP/0/A/1000/002	Control Room Emergency Coordinator Procedure
	SR/0/A/2000/003	Activation of the Emergency Operations Facility
A1e	RP/0/A/1000/002	Control Room Emergency Coordinator Procedure
A2a	NA	State/County Responsibility
A2b	NA	State/County Responsibility
A3	ONS E Plan	ONS Emergency Plan, Appendix 5
A4	RP/0/A/1000/002	Control Room Emergency Coordinator Procedure
	RP/0/A/1000/019	Technical Support Center Emergency Coordinator Procedure
	RP/0/A/1000/025	Operational Support Center Manager Procedure
	SR/0/A/2000/003	Activation of the Emergency Operations Facility
On-Site Emergency Organization		
B1	ONS E Plan	ONS Emergency Plan
	NSD 117	Emergency Response Organization Staffing, Training, and Responsibilities
	RP/0/A/1000/002	Control Room Emergency Coordinator Procedure
	RP/0/A/1000/019	Technical Support Center Emergency Coordinator Procedure
	RP/0/A/1000/022	Procedure For Major Site Damage Assessment And Repair
	RP/0/A/1000/029	Fire Brigade Response
	AD-EP-DEC-0107	Standard Procedure for EOF Services
B2	RP/0/A/1000/002	Control Room Emergency Coordinator Procedure
	RP/0/A/1000/019	Technical Support Center Emergency Coordinator Procedure
	SR/0/A/2000/003	Activation of the Emergency Operations Facility
B3	RP/0/A/1000/002	Control Room Emergency Coordinator Procedure
	RP/0/A/1000/019	Technical Support Center Emergency Coordinator Procedure
	SR/0/A/2000/003	Activation of the Emergency Operations Facility

FIGURE P1

EMERGENCY PLAN IMPLEMENTING PROCEDURES

Cross Reference

Emergency Plan Section(s) Implemented	Procedure	Procedure Title
B3	NSD 117	Emergency Response Organization Staffing, Training, and Responsibilities
B4	RP/0/A/1000/002	Control Room Emergency Coordinator Procedure
	RP/0/A/1000/019	Technical Support Center Emergency Coordinator Procedure
	SR/0/A/2000/003	Activation of the Emergency Operations Facility
	NSD 117	Emergency Response Organization Staffing, Training, and Responsibilities
B5	OMP 2-16	Shift Turnover
	NSD 117	Emergency Response Organization Staffing, Training, and Responsibilities
	RP/0/A/1000/019	Technical Support Center Emergency Coordinator Procedure
	RP/0/A/1000/025	Operational Support Center Manager Procedure
	SR/0/A/2000/003	Activation of the Emergency Operations Facility
B6	ONS E Plan	ONS Emergency Plan
	NSD 117	Emergency Response Organization Staffing, Training, and Responsibilities
	SR/0/A/2000/003	Activation of the Emergency Operations Facility
	AD-EP-DEC-0107	Standard Procedure for EOF Services
B7a-d	NSD 117	Emergency Response Organization Staffing, Training, and Responsibilities
	SR/0/A/2000/003	Activation of the Emergency Operations Facility
	AD-EP-DEC-0107	Standard Procedure for EOF Services
	RP/0/B/1000/027	Re-Entry Recovery Procedure
	RP/0/A/1000/031	Joint Information Center Emergency Response Plan
B8	ONS E Plan	ONS Emergency Plan, Appendix 5
B9	ONS E Plan	ONS Emergency Plan, Appendix 5
Emergency Response Support and Resources		
C1a, b, c	ONS E Plan	ONS Emergency Plan, Appendix 5
	SR/0/A/2000/003	Activation of the Emergency Operations Facility
	RP/0/A/1000/031	Joint Information Center Emergency Response Plan
	RP/0/A/1000/037	Incident Command Post (ICP) Operations and Radiation Protection Liaison Guidelines
C2a	NA	State/County Responsibility
C2b	EP FAM 3.11	State/County EOC Liaison Reference Manual
	RP/0/A/1000/037	Incident Command Post (ICP) Operations and Radiation Protection Liaison Guidelines
C3	HP/0/B/1009/026	Environmental Monitoring For Emergency Conditions
C4	ONS E Plan	ONS Emergency Plan, Appendix 5
	SR/0/A/2000/003	Activation of the Emergency Operations Facility

FIGURE P1

EMERGENCY PLAN IMPLEMENTING PROCEDURES

Cross Reference

Emergency Plan Section(s) Implemented	Procedure	Procedure Title
Emergency Classification System		
D1a, b, c	ONS E Plan	ONS Emergency Plan
	RP/0/A/1000/001	Emergency Classification
D2	RP/0/A/1000/001	Emergency Classification
D3	NA	State/County Responsibility
D4	NA	State/County Responsibility
Notification Methods and Procedures		
E1	RP/0/A/1000/002	Control Room Emergency Coordinator Procedure
	RP/0/A/1000/015A	Offsite Communications From The Control Room
	RP/0/A/1000/015B	Offsite Communications From The Technical Support Center
	RP/0/A/1000/019	Technical Support Center Emergency Coordinator Procedure
	RP/0/A/1000/024	Protective Action Recommendations
	SR/0/A/2000/003	Activation of the Emergency Operations Facility
E2	RP/0/A/1000/002	Control Room Emergency Coordinator Procedure
E3	RP/0/A/1000/002	Control Room Emergency Coordinator Procedure
	RP/0/A/1000/015A	Offsite Communications From The Control Room
	RP/0/A/1000/015B	Offsite Communications From The Technical Support Center
	RP/0/A/1000/019	Technical Support Center Emergency Coordinator Procedure
	RP/0/A/1000/024	Protective Action Recommendations
	SR/0/A/2000/003	Activation of the Emergency Operations Facility
	SR/0/A/2000/004	Notification to States and Counties Facility for Catawba, McGuire, and Oconee
E4a-n	RP/0/A/1000/002	Control Room Emergency Coordinator Procedure
	RP/0/A/1000/015A	Offsite Communications From The Control Room
	RP/0/A/1000/015B	Offsite Communications From The Technical Support Center
	RP/0/A/1000/019	Technical Support Center Emergency Coordinator Procedure
	RP/0/A/1000/024	Protective Action Recommendations
	SR/0/A/2000/003	Activation of the Emergency Operations Facility
E5	NA	State/County Responsibility
E6	EP FAM 3.3	Alert and Notification System (Siren Program)
E7	RP/0/A/1000/024	Protective Action Recommendations
	SR/0/A/2000/003	Activation of the Emergency Operations Facility
E8	RP/0/A/1000/017	Spill Response
Emergency Communications		
F1a	RP/0/A/1000/002	Control Room Emergency Coordinator Procedure

FIGURE P1

EMERGENCY PLAN IMPLEMENTING PROCEDURES

Cross Reference

Emergency Plan Section(s) Implemented		Procedure		Procedure Title
F1a		RP/0/A/1000/015A		Offsite Communications From The Control Room
		RP/0/A/1000/015B		Offsite Communications From The Technical Support Center
		RP/0/A/1000/019		Technical Support Center Emergency Coordinator Procedure
		SR/0/A/2000/003		Activation of the Emergency Operations Facility
F1b		PT/0/A/2000/002		Periodic Test of Emergency Response Communications Equipment
F1c		RP/0/A/1000/002		Control Room Emergency Coordinator Procedure
		RP/0/A/1000/015A		Offsite Communications From The Control Room
		RP/0/A/1000/015B		Offsite Communications From The Technical Support Center
		RP/0/A/1000/019		Technical Support Center Emergency Coordinator Procedure
		RP/0/B/1000/003A		ERDS Operation
		PT/0/B/2000/009		Emergency Response Data System Quarterly Test
		SR/0/A/2000/003		Activation of the Emergency Operations Facility
F1d		PT/0/A/2000/002		Periodic Test of Emergency Response Communications Equipment
		ST/0/A44600/086		Standard Procedure For Periodic Verification of EOF Communication Equipment Operation and Equipment/ Supply Inventory-
		ST/0/A/4600/094		Standard Procedure For Periodic Test Of The EOF Selective Signaling, ENS and ETS
F1e		RP/0/A/1000/002		Control Room Emergency Coordinator Procedure
F1f		PT/0/A/2000/002		Periodic Test of Emergency Response Communications Equipment
		RP/0/B/1000/003 A		ERDS Operation
		PT/0/B/2000/009		Emergency Response Data System Quarterly Test
F2		PT/0/A/2000/002		Periodic Test of Emergency Response Communications Equipment
		RP/0/A/1000/016		MERT Activation Procedure For Medical, Confined Space, and High Angle Rescue Emergencies
		RP/0/A/1000/025		Operational Support Center Manager Procedure
F3		PT/0/A/2000/002		Periodic Test of Emergency Response Communications Equipment
		PT/0/B/2000/009		Emergency Response Data System Quarterly Test
Public Education and Information				
G1a,b,c		EP FAM 3.6		Alert and Notification System – Oconee Specific Supplement
		NPM Chapter 15		Corporate Communications Departmental Interface Agreement

FIGURE P1

EMERGENCY PLAN IMPLEMENTING PROCEDURES

Cross Reference

Emergency Plan Section(s) Implemented	Procedure	Procedure Title
G2	EP FAM 3.6	Alert and Notification System – Oconee Specific Supplement
	NPM Chapter 15	Corporate Communications Departmental Interface Agreement
G3a, b	RP/0/A/1000/028	Nuclear Communications Emergency Response Plan
	RP/0/A/1000/031	Joint Information Center Emergency Response Plan
	SR/0/B/2000/001	Standard Procedure For Corporate Communications Response To The Emergency Operations Facility
G4a, b, c	RP/0/A/1000/028	Nuclear Communications Emergency Response Plan
	RP/0/A/1000/031	Joint Information Center Emergency Response Plan
	SR/0/B/2000/001	Standard Procedure For Corporate Communications Response To The Emergency Operations Facility
G5	NPM Chapter 15	Corporate Communications Departmental Interface Agreement
Emergency Facilities and Equipment		
H1a, b, c	RP/0/A/1000/019	Technical Support Center Emergency Coordinator Procedure
	RP/0/A/1000/025	Operational Support Center Manager Procedure
	HP/0/B/1009/001	Emergency Equipment Inventory and Instrument Check
	PT/0/A/2000/002	Periodic Test of Emergency Response Communications Equipment
	PT/0/A/2000/008	Procedure to Verify the Availability of Supplies and Equipment in the Emergency Response Facilities
	PT/0/A/2000/010	Review of Emergency Plan and Implementing Procedures
H2	SR/0/A/2000/003	Activation of the Emergency Operations Facility
	ST/0/A44600/086	Standard Procedure For Periodic Verification of EOF Communication Equipment Operation and Equipment/Supply Inventory
	ST/0/A/4600/094	Standard Procedure For Periodic Test Of The EOF Selective Signaling, ENS and ETS
H3	NA	State/County Responsibility
H4	NSD 117	Emergency Response Organization Staffing, Training, and Responsibilities
	RP/0/A/1000/002	Control Room Emergency Coordinator Procedure

FIGURE P1

EMERGENCY PLAN IMPLEMENTING PROCEDURES

Cross Reference

Emergency Plan Section(s) Implemented	Procedure	Procedure Title
H4	RP/0/A/1000/019	Technical Support Center Emergency Coordinator Procedure
	RP/0/A/1000/025	Operational Support Center Manager Procedure
	RP/0/A/1000/031	Joint Information Center Emergency Response Plan
	SR/0/A/2000/003	Activation of the Emergency Operations Facility
	SR/0/B/2000/001	Standard Procedure For Corporate Communications Response To The Emergency Operations Facility
	AD-EP-DEC-0107	Standard Procedure for EOF Services
H5	RP/0/A/1000/001	Emergency Classification
H5a, b, c, d	ONS E Plan	ONS Emergency Plan
	IP/0/B/1601/003	Meteorological Equipment Checks
H6a, b, c	ONS E Plan	ONS Emergency Plan
	IP/0/B/1601/003	Meteorological Equipment Checks
	ONS ODCM	ONS Offsite Dose Calculation Manual
	HP/0/B/1009/001	Emergency Equipment Inventory and Instrument Check
	HP/0/B/1009/023	Radiation Protection Emergency Response
	PT/0/A/2000/008	Procedure to Verify the Availability of Supplies and Equipment in the Emergency Response Facilities
	ST/0/A/4600/086	Standard Procedure For Periodic Verification of EOF Communication Equipment Operation and Equipment/Supply Inventory
	PT/0/B/0250/030	Quarterly Fire Brigade Equipment Inspection
	PT/0/B/0250/032	Quarterly Inspection Of Emergency Medical Equipment
	PT/0/B/0250/045	Quarterly Inspection Of Hazardous Materials Response Team Equipment
	CP/0/B/2001/008	Chemistry Safety Equipment And Spill Control Response
	RP/0/A/1000/017	Spill Response
H7	HP/0/B/1009/001	Emergency Equipment Inventory and Instrument Check
	HP/0/B/1009/023	Radiation Protection Emergency Response
H8	ONS E Plan	ONS Emergency Plan
	IP/0/B/1601/003	Meteorological Equipment Checks
	AD-EP-ALL-0202	Emergency Response Offsite Dose Assessment
	RP/0/A/1000/024	Protective Action Recommendations
H9	ONS E Plan	ONS Emergency Plan
	IP/0/B/1601/003	Meteorological Equipment Checks
	ONS ODCM	ONS Offsite Dose Calculation Manual
	HP/0/B/1009/001	Emergency Equipment Inventory and Instrument Check

FIGURE P1

EMERGENCY PLAN IMPLEMENTING PROCEDURES

Cross Reference

Emergency Plan Section(s) Implemented		**Procedure**		**Procedure Title**
H9		PT/0/A/2000/008		Procedure to Verify the Availability of Supplies and Equipment in the Emergency Response Facilities
		ST/0/A/4600/086		Standard Procedure For Periodic Verification of EOF Communication Equipment Operation and Equipment/Supply Inventory
		PT/0/B/0250/030		Quarterly Fire Brigade Equipment Inspection
		PT/0/B/0250/032		Quarterly Inspection Of Emergency Medical Equipment
		PT/0/B/0250/045		Quarterly Inspection Of Hazardous Materials Response Team Equipment
		CP/0/B/2001/008		Chemistry Safety Equipment And Spill Control Response
		RP/0/A/1000/025		Operational Support Center Manager Procedure
H10		ONS E Plan		ONS Emergency Plan
		IP/0/B/1601/003		Meteorological Equipment Checks
		ONS ODCM		ONS Offsite Dose Calculation Manual
		HP/0/B/1009/001		Emergency Equipment Inventory and Instrument Check
		PT/0/A/2000/008		Procedure to Verify the Availability of Supplies and Equipment in the Emergency Response Facilities
		ST/0/A/4600/086		Standard Procedure For Periodic Verification of EOF Communication Equipment Operation and Equipment/Supply Inventory
		PT/0/B/0250/030		Quarterly Fire Brigade Equipment Inspection
		PT/0/B/0250/032		Quarterly Inspection Of Emergency Medical Equipment
		PT/0/B/0250/045		Quarterly Inspection Of Hazardous Materials Response Team Equipment
		CP/0/B/2001/008		Chemistry Safety Equipment And Spill Control Response
H11		ONS E Plan		ONS Emergency Plan, Section H.11
H12		HP/0/B/1009/023		Radiation Protection Emergency Response
		SH/0/B/2005/002		Protocol for the Field Monitoring Coordinator During Emergency Conditions
		SR/0/A/2000/003		Activation of the Emergency Operations Facility
Accident Assessment				
I1		ONS E Plan		ONS Emergency Plan, Section D
		RP/0/A/1000/001		Emergency Classification
I2		ONS E Plan		ONS Emergency Plan
		RP/0/B/1000/018		Core Damage Assessment
		CSM 5.1		Emergency Response Guidelines

FIGURE P1

EMERGENCY PLAN IMPLEMENTING PROCEDURES

Cross Reference

Emergency Plan Section(s) Implemented	Procedure	Procedure Title
I2	CSM 5.2	Procedure Use Guidelines During Emergency Response
	CP/1/A/2002/002	Rheodyne Sample Via Post Accident Liquid Sampling System (PALSS)
	CP/2/A/2002/002	Rheodyne Sample Via Post Accident Liquid Sampling System (PALSS)
	CP/3/A/2002/002	Rheodyne Sample Via Post Accident Liquid Sampling System (PALSS)
	HP/0/B/1009/009	Procedure For Determining The Inplant Radioiodine Concentration During Accident Conditions
	HP/0/B/1009/015	Procedure For Sampling And Quantifying High Level Gaseous, Radioiodine And Particulate Radioactivity
	HP/0/B/1009/026	Environmental Monitoring For Emergency Conditions
	AD-EP-ALL-0202	Emergency Response Offsite Dose Assessment
	SH/0/B/2005/002	Protocol for the Field Monitoring Coordinator During Emergency Conditions
I3a, b	RP/0/A/1000/001	Emergency Classification
	RP/0/A/1000/024	Protective Action Recommendations
	HP/0/B/1009/022	On-Shift Off-Site Dose Projections
	ONS ODCM	ONS Offsite Dose Calculation Manual
	AD-EP-ALL-0202	Emergency Response Offsite Dose Assessment
I4	HP/0/B/1009/018	Off-Site Dose Projections
	HP/0/B/1009/022	On-Shift Off-Site Dose Projections
	AD-EP-ALL-0202	Emergency Response Offsite Dose Assessment
I5	RP/0/A/1000/002	Control Room Emergency Coordinator Procedure
	RP/0/A/1000/003 A	ERDS Operation
	RP/0/A/1000/015 A	Offsite Communications From The Control Room
	RP/0/A/1000/015 B	Offsite Communications From The Technical Support Center
	RP/0/A/1000/019	Technical Support Center Emergency Coordinator Procedure
	SR/0/A/2000/003	Activation of the Emergency Operations Facility
	SR/0/A/2000/004	Notification to States and Counties from the Emergency Operations Facility for Catawba, McGuire, and Oconee
16	AD-EP-ALL-0202	Emergency Response Offsite Dose Assessment
I7	SR/0/A/2000/003	Activation of the Emergency Operations Facility

FIGURE P1

EMERGENCY PLAN IMPLEMENTING PROCEDURES

Cross Reference

Emergency Plan Section(s) Implemented		Procedure		Procedure Title
I7		SH/0/B/2005/002		Protocol for the Field Monitoring Coordinator During Emergency Conditions
		HP/0/B/1009/026		Environmental Monitoring For Emergency Conditions
I8		SR/0/A/2000/003		Activation of the Emergency Operations Facility
		SH/0/B/2005/002		Protocol for the Field Monitoring Coordinator During Emergency Conditions
		HP/0/B/1009/026		Environmental Monitoring For Emergency Conditions
I9		HP/0/B/1009/026		Environmental Monitoring For Emergency Conditions
		SH/0/B/2005/002		Protocol for the Field Monitoring Coordinator During Emergency Conditions
I10		AD-EP-ALL-0202		Emergency Response Offsite Dose Assessment
		HP/0/B/1009/020		Estimating Food Chain Doses Under Post-Accident Conditions
		HP/0/B/1009/026		Environmental Monitoring For Emergency Conditions
I11		NA		State/County Responsibility
Protective Response				
J1		AP/0/A/1700/045		Site Security Threats
		RP/0/A/1000/009		Procedure For Site Assembly
		RP/0/A/1000/010		Procedure For Emergency Evacuation/Relocation Of Site Personnel
J2		NSD 114		Site Assembly/Site Evacuation
		HP/0/B/1009/016		Procedure For Emergency Decontamination Of Personnel And Vehicles On-Site And From Off-Site Remote Assembly Areas
		RP/0/A/1000/010		Procedure For Emergency Evacuation/Relocation Of Site Personnel
		AD-EP-ALL-0202		Emergency Response Offsite Dose Assessment
J3		NSD 114		Site Assembly/Site Evacuation
		AP/0/A/1700/045		Site Security Threats
		HP/0/B/1009/018		Off-Site Dose Projections
		RP/0/A/1000/009		Procedure For Site Assembly
		RP/0/A/1000/010		Procedure For Emergency Evacuation/Relocation Of Site Personnel
		AD-EP-ALL-0202		Emergency Response Offsite Dose Assessment
J4		HP/0/B/1009/016		Procedure For Emergency Decontamination Of Personnel And Vehicles On-Site And From Off-Site Remote Assembly Areas
		AD-EP-ALL-0202		Emergency Response Offsite Dose Assessment
		RP/0/A/1000/009		Procedure For Site Assembly

FIGURE P1

EMERGENCY PLAN IMPLEMENTING PROCEDURES

Cross Reference

Emergency Plan Section(s) Implemented	Procedure	Procedure Title
J4	RP/0/A/1000/010	Procedure For Emergency Evacuation/Relocation Of Site Personnel
J5/J6	NSD 114	Site Assembly/Site Evacuation
	AP/0/A/1700/045	Site Security Threats
	HP/0/B/1009/009	Procedure For Determining The Inplant Airborne Radioiodine Concentration During Accident Conditions
	RP/0/A/1000/009	Procedure For Site Assembly
	SH/0/B/2005/003	Distribution of Potassium Iodide Tablets in the Event of a Radioiodine Release
	RPM	Radiation Protection Manual
J7	RP/0/A/1000/024	Protective Action Recommendations
	SR/0/A/2000/003	Activation of the Emergency Operations Facility
J8	ONS-ETE-12142012	ONS Evacuation Time Estimates (ETE) Dated 12/14/2012
J9	NA	State/County Responsibility
	AP/0/A/1700/045	Site Security Threats
	RP/0/A/1000/009	Procedure For Site Assembly
	RP/0/A/1000/010	Procedure For Emergency Evacuation/Relocation Of Site Personnel
J10a, b, c	ONS E Plan	ONS Emergency Plan
	RPM	Radiation Protection Manual
J10d - l	NA	State/County Responsibility
J10m	RP/0/A/1000/024	Protective Action Recommendations
	SR/0/A/2000/003	Activation of the Emergency Operations Facility
J11	NA	State/County Responsibility
J12	NA	State/County Responsibility
Radiological Exposure Control		
K1a - g	RP/0/B/1000/011	Planned Emergency Exposure
	SH/0/B/2005/003	Distribution of Potassium Iodide Tablets in the Event of a Radioiodine Release
K2	RP/0/B/1000/011	Planned Emergency Exposure
K3a	RPM	Radiation Protection Manual
K3a	HP/0/B/1009/001	Emergency Equipment Inventory and Instrument Check
	HP/0/B/1009/023	Radiation Protection Emergency Response
K3b	RPM	Radiation Protection Manual
	HP/0/B/1009/023	Radiation Protection Emergency Response
K4	NA	State/County Responsibility
K5a, b,	RPM	Radiation Protection Manual

FIGURE P1

EMERGENCY PLAN IMPLEMENTING PROCEDURES

Cross Reference

Emergency Plan Section(s) Implemented		Procedure		Procedure Title
K5a, b,		HP/0/B/1009/016		Procedure For Emergency Decontamination Of Personnel And Vehicles On-Site And From Off-Site Remote Assembly Areas
		HP/0/B/1009/024		Radiation Protection Response To A Medical Emergency
K6a, b, c		RPM		Radiation Protection Manual
		HP/0/B/1009/016		Procedure For Emergency Decontamination Of Personnel And Vehicles On-Site And From Off-Site Remote Assembly Areas
K7		HP/0/B/1009/001		Emergency Equipment Inventory and Instrument Check
		HP/0/B/1009/016		Procedure For Emergency Decontamination Of Personnel And Vehicles On-Site And From Off-Site Remote Assembly Areas
Medical and Public Health Support				
L1		ONS E Plan		ONS Emergency Plan, Appendix 5
		HP/0/B/1009/001		Emergency Equipment Inventory and Instrument Check
L2		RP/0/A/1000/016		MERT Activation Procedure For Medical, Confined Space, and High Angle Rescue Emergencies
		HP/0/B/1009/001		Emergency Equipment Inventory and Instrument Check
		HP/0/B/1009/024		Radiation Protection Response To A Medical Emergency
		PT/0/B/0250/032		Quarterly Inspection Of Emergency Medical Equipment
L3		NA		State/County Responsibility
L4		ONS E Plan		ONS Emergency Plan, Appendix 5
		RP/0/A/1000/016		MERT Activation Procedure For Medical, Confined Space, and High Angle Rescue Emergencies
		HP/0/B/1009/001		Emergency Equipment Inventory and Instrument Check
		HP/0/B/1009/024		Radiation Protection Response To A Medical Emergency
Recovery and Reentry Planning and Post Accident Operations				
M1		RP/0/A/1000/024		Protective Action Recommendations
M1		RP/0/B/1000/027		Re-Entry Recovery Procedure
		RP/0/A/1000/028		Nuclear Communications Emergency Response Plan
M2		ONS E Plan		ONS Emergency Plan, Section M
		RP/0/B/1000/027		Re-Entry Recovery Procedure
		RP/0/A/1000/028		Nuclear Communications Emergency Response Plan

FIGURE P1

EMERGENCY PLAN IMPLEMENTING PROCEDURES

Cross Reference

Emergency Plan Section(s) Implemented		Procedure		Procedure Title
M3		RP/0/A/1000/019		Technical Support Center Emergency Coordinator Procedure
		RP/0/A/1000/025		Operational Support Center Manager Procedure
		RP/0/B/1000/027		Re-Entry Recovery Procedure
		SR/0/A/2000/003		Activation of the Emergency Operations Facility
		RP/0/A/1000/031		Joint Information Center Emergency Response Plan
		NEWP 5.1		Oconee Nuclear Environmental Work Practice, Section 5.1, Spill Response .
M4		RP/0/B/1000/027		Re-Entry Recovery Procedure
Exercises and Drills				
N1a, b		EP FAM 3.19		Drills and Exercises
N2, c, d, e, f, g, h, i		EP FAM 3.19		Drills and Exercises
N2a		PT/0/A/2000/002		Periodic Test of Emergency Response Communications Equipment
		ST/0/A/4600/086		Standard Procedure For Periodic Verification of EOF Communication Equipment Operation and Equipment/Supply Inventory
		ST/0/A/4600/094		Standard Procedure For Periodic Test Of The EOF Selective Signaling, ENS and ETS
N2b		PT/0/B/2000/050		Fire Drill - Performance and Evaluation-
N3		EP FAM 3.19		Drills and Exercises
N4a, b		EP FAM 3.19		Drills and Exercises
N5		EP FAM 3.1		Administration of Emergency Plan and Emergency Plan Implementing Procedures
		EP FAM 3.19		Drills and Exercises
Radiological Emergency Response Training				
O1		NSD 117		Emergency Response Organization Staffing, Training, and Responsibilities
		ERTG-001		Emergency Response Organization and Emergency Services Training Program
		ETQS 7111.0		Emergency Response Training
O2		NSD 117		Emergency Response Organization Staffing, Training, and Responsibilities
O2		ERTG-001		Emergency Response Organization and Emergency Services Training Program
		ETQS 7111.0		Emergency Response Training
O3		NSD 119		Medical Emergency Response Team (MERT) Program Organization, Training, and Responsibilities
		ERTG-001		Emergency Response Organization and Emergency Services Training Program

FIGURE P1

EMERGENCY PLAN IMPLEMENTING PROCEDURES

Cross Reference

Emergency Plan Section(s) Implemented	**Procedure**	**Procedure Title**
O4.1, .2	NSD 117	Emergency Response Organization Staffing, Training, and Responsibilities
	ERTG-001	Emergency Response Organization and Emergency Services Training Program
	ETQS 7111.0	Emergency Response Training
O4.3	ETQS 3104.0	Radiation Protection Training and Qualifications
	ETQS 7104.0	Radiation Protection Staff Professional Development Program
O4.4	ETQS 7111.0	Emergency Response Training
O4.5, .7	NSD 119	Medical Emergency Response Team (MERT) Program Organization, Training, and Responsibilities
O4.6	ETQS 7111.0	Emergency Response Training
O4.8	ETQS 7111.0	Emergency Response Training
O4.9	ETQS 7111.0	Emergency Response Training
O4.10	OCI507-N	Appendix R Training
	OC6792-N	Maint SPOC Team Emergency Response Training
	TTC 471-N	Annual ERO Refresher /Update
O4.11	ERTG-001	Emergency Response Organization and Emergency Services Training Program
O5	ERTG-001	Emergency Response Organization and Emergency Services Training Program
Responsibility for the Planning Effort: Development, Periodic Review and Distribution of Emergency Plans		
P1	EP FAM 3.20	Emergency Planner Training & Qualification Plan
P2 & P3	ONS E Plan	ONS Emergency Plan
P4 & P5	PT/0/A/2000/010	Review of Emergency Plan and Implementing Procedures
	EP FAM 3.1	Administration of Emergency Plan and Emergency Plan Implementing Procedures
P6	ONS E Plan	ONS Emergency Plan
P7	ONS E Plan	ONS Emergency Plan
P8	ONS E Plan	ONS Emergency Plan
P9	AD-EP-ALL-0001	Emergency Preparedness Key Performance Indicators
P10	PT/0/A/2000/004	Qrtly Emergency Phone Book Update

FIGURE P1

EMERGENCY PLAN IMPLEMENTING PROCEDURES

Cross Reference

Appendices		
Appendix 1		Definitions
Appendix 2		Meteorology and Offsite Dose Assessment Program
Appendix 3		Alert and Notification System Description
Appendix 4		Evacuation Time Estimates
Appendix 5		Letters of Agreement
Appendix 6		Distribution List
Appendix 7		Emergency Data Transmittal System
Appendix 8		Spill Prevention Control and Countermeasure Plan ONS Pollution Prevention Plan Rev 11Site Drawing
Appendix 9		ONS Chemical Treatment Ponds 1,2 and 3 Groundwater Monitoring Sampling and Analysis Plan
Appendix 10		Hazardous Materials Response Plan

FIGURE P-2

DUKE ENERGY
OCONEE NUCLEAR SITE

<u>SUPPORTING PLANS</u>

State of South Carolina

Oconee County

Pickens County

DOE-IRAP Plan

INPO-Fixed Facility Agreement

NRC Region II

Duke Energy Oconee Nuclear Station **EMERGENCY PLAN A - APPENDIX 2 METEROLOGY AND OFFSITE DOSE ASSESSMENT PROGRAM**	Procedure No. **EPA APPENDIX 02**
	Revision No. **003**
	Electronic Reference No. **OAP000HD**

PDF Format

Prepared By* ______________________________ Date __________

Requires Applicability Determination? ☐ Yes ☐ No

Reviewed By* ______________________________(QR) Date __________

Cross-Disciplinary Review By* ______________________(QR) NA __________ Date __________

Reactivity Mgmt. Review By* ______________________(QR) NA __________ Date __________

Additional Reviews

Reviewed By* ______________________________Date __________

Reviewed By* ______________________________Date __________

Approved By* ______________________________ Date __________

** Printed Name and Signature*

APPENDIX 2

DUKE ENERGY
OCONEE NUCLEAR SITE

Meteorology And Offsite Dose Assessment Program

I. Meteorological Instrumentation (Figure H-4)

Basic meteorological parameters (wind speed, wind direction and delta temperature) averaged over a 15-minute period of time are available in each control room and in the Technical Support Center through a computer display. This information is also available to the Emergency Operations Facility and the Nuclear Regulatory Commission through the Emergency Response Data System (ERDS).

Meteorological data for dose calculation consists of a primary digital recording/storage system and a secondary data chart recording system both of which meet system accuracies and other specifications as suggested in Regulatory Guide 1.23, Proposed Revision 1. In the digital system meteorological variables are sampled at 60 second intervals from which 15 minute total or average quantities are computed. Digital data is placed on a 12-hour recall for emergency effluent dispersion modeling and dose calculation. The data recording system is maintained on the plant's OAC as a backup to the digital system. Therefore, the meteorological information is available on separated systems.

The river tower has wind speed, wind direction and precipitation instrumentation. In daytime conditions (1000 - 1559) a delta temperature of $\geq$ -0.26 degrees C (Stability Class D) is assumed if the primary tower delta temperature instrumentation is out of service. In nighttime conditions (1600 - 0959) a delta temperature of >+2.0 degrees C (Stability Class G) is assumed anytime the primary tower delta temperature instrumentation is out of service. Oconee Nuclear Site meets all the milestone requirements of NUREG 0654, Appendix 2; therefore, no additional compensatory meteorological actions are required.

Lightning protection is provided for all sensors and signal conditioning equipment; wind sensors are outfitted with heating jackets, when necessary, for protection against icing conditions. Signal conditioners are housed in an environmentally controlled enclosure at both high and low level towers. Signal cables to the OACs and analog recorders are shielded to minimize electrical interference.

Meteorological components have been designed, procured and installed as a non-safety related system. Equipment has been purchased from suppliers which have provided high quality, reliable products in the past. Surveillance during construction was provided as for any other non-safety system.

II. Calibration Requirements And Field Checks

A new primary meteorological tower and equipment were installed in 1988. Instrumentation accuracy for this tower meets the requirements of Proposed Revision 1, Reg. Guide 1.23. Meteorological instrumentation will be checked and calibrated in accordance with the guidance of this regulatory document as referenced in NUREG 0654, Appendix 2.

III. Offsite Dose Assessment

A. Class A Atmospheric Dispersion Model/Dose Calculation System

This system plots the movement and concentration of effluent during accident radiological conditions. The system uses meteorological data and Operational Aid Computer data from the applicable unit. The user is actively involved in the selection of data for the model input file.

The Class A Model which simulates the transport and diffusion of released effluent is a puff-advection model which incorporates a horizontal wind field that can vary in time but is consistent in space. It is assumed in the puff-type model that the spread within a puff along the direction of flow is equal to the spread in the lateral direction (i.e., horizontal Gaussian Symmetry). In the model, concentration averages are obtained by summing concentrations of individual elements for the grid points over which the puffs pass. Features incorporated into the model include the use of primary, backup ground release mode. Appropriate persistence would be used for initial releases until a meteorologist is notified to provide predictive data.

B. Back-Up Methodology

(1) Control Room Procedures

Enclosure 4.3 of RP/0/A/1000/001 provides the Operations Shift Manager in the Control Room with a conservative method of determining general emergency conditions based on reactor building and unit vent radiation monitors.

Initial protective actions are predetermined for Control Room use for general emergency conditions. Meteorological conditions at Oconee require a complex method for determining appropriate sectors to evacuate. The control room will evacuate out to five miles and shelter out to ten miles which will simplify the process for determining the appropriate sectors to evacuate and to shelter.

(2) TSC/EOF Procedures

Procedure AD-EP-ALL-0202, provides personnel with methods of projecting offsite doses for unit vent releases, containment building releases and steam relief valve releases at 1, 2, 5 and 10 miles unless otherwise directed.

Unit Vent Release

This method calculates a four-hour dose projection for total effective dose equivalent (TEDE) and committed dose equivalent (CDE thyroid) based on either unit vent radiation monitors and flow rate monitors or actual unit vent sample data and flow rate monitors.

Containment Building Release

This method calculates a four-hour TEDE and CDE dose projection based on the design leak rate and the reactor building dose rate which is determined by the reading from the containment high range monitor or a hand held survey instrument.

Steam Relief Valve Release

This method calculates a TEDE and CDE dose projection based on the activity released using the readings from the main steam line radiation monitors and the volume of steam released.

CDE (thyroid) doses calculated by these procedures are based on I-131 equivalent concentrations and are calculated for an adult. The dose conversion factor are obtained from EPA-400.

Duke Energy Oconee Nuclear Station **EMERGENCY PLAN A - APPENDIX 3 ALERT AND NOTIFICATION SYSTEM DESCRIPTION**	Procedure No. **EPA APPENDIX 03** Revision No. **002** Electronic Reference No. **OAP000HE**

PDF Format

Prepared By* ______________________________ Date __________

Requires Applicability Determination? ☐ Yes ☐ No

Reviewed By* ______________________________(QR) Date __________

Cross-Disciplinary Review By* ____________________(QR) NA __________ Date __________

Reactivity Mgmt. Review By* ____________________(QR) NA __________ Date __________

Additional Reviews

Reviewed By* ______________________________Date __________

Reviewed By* ______________________________Date __________

Approved By* ______________________________ Date __________

* *Printed Name and Signature*

APPENDIX 3

DUKE ENERGY
OCONEE NUCLEAR SITE

ALERT AND NOTIFICATION SYSTEM DESCRIPTION

GENERAL DESCRIPTION

The Alert and Notification System for Oconee Nuclear Site will include an acoustic alerting signal and notification of the public by commercial broadcast (EAS). The system is designed to meet the acceptance criteria of Section B of Appendix 3, NUREG-0654, FEMA-REP-1, Rev. 1.

The emergency plans of the State of South Carolina and the counties of Oconee and Pickens include the individuals, by title, who will be responsible for decision making in regards to the alert and notification system. The county locations from which the sirens would be activated and, potentially, the request for an EAS message would come are manned 24 hours per day. Each organization's plan describes provisions for use of public communications media or other emergency instructions to members of the public. The plan of the State of South Carolina includes a description of the information that would be communicated to the public under given circumstances.

A. Concept of Operations (Figure 2)

A system of 65 fixed sirens is installed in the 10 mile area around the Oconee Nuclear Site. A computerized feedback system is also available at the county level to poll each siren for activation response. Should a siren fail to activate, a backup means of alerting and notification is described in the State and County Plans. This backup method includes emergency service vehicles traversing the area and giving both an alerting signal and notification message.

Each county will control the activation of the sirens within its boundaries.

B. Criteria for Acceptance

The alert and notification system for the Oconee Nuclear Site provides an alerting signal and an informational or instructional message to the population (via the EAS) on an area wide basis throughout the 10 mile EPZ within 15 minutes from the time off-site agencies have determined the need for such alerting exists. The emergency plan of the state of South Carolina includes evidence of EAS preparation for emergency situations and the means for activating the system.

C. Physical Implementation

1. The activation of this alert and notification system requires procedures and relationships between both Duke Energy Company and the off-site agencies that support Duke and Oconee Nuclear Site. When an incident is determined to have reached the level requiring public protective actions, Duke contacts the cognizant off-site agency via the "Selective Signaling" or other phone system and provides its recommendations. This system is available for use 24 hours per day and links the control room, TSC, EOF, SC (EOC), the county warning points, and the county EOC's.

2. The alert and notification system has multipurpose use built into it. The sirens are capable of producing a three minute steady signal for the nuclear plant emergency or a three minute wailing signal for natural disasters or nuclear attack. Procedures exist at the counties to allow activation of either signal.

   The expected performance of the sirens used in this system is described in Figure 1. These sirens complement existing alerting systems. The ambient background sound level in the Oconee area is taken to be 50 db for areas of "less than 2000 persons/per square mile". On this basis, the siren coverage is designed to provide a signal 10 db above the average daytime ambient background (i.e., 60 db). Furthermore, the sirens have been located to assure that the maximum sound levels received by any member of the public should be lower than 123 db.

   Duke Energy installed this system without a field survey of ambient conditions. The basis for selection of the 60 db(c) and 70 db(c) criteria is documented as follows:

   Location of heavy industry - There is no "heavy industry" in the Oconee 10 mile EPZ.

   Attenuation factors with distance - 10 db loss per distance doubled (See Figure 1)

MODEL	TOP FREQUENCY	SOUND PRESSURE LEVEL AT 100'
Federal Signal 2001 AC	705 Hz	127dB(C)±1dB

*See Figure 1 for 10 dB loss column

Map showing siren location, - See i-5

Mounting height of sirens - 50 feet (approximate)

Special weather condition considerations (such as expected heavy snow) - None

The siren system will produce a 3 minute steady signal and is capable of repetition.

The siren system will be tested and maintained in accordance with the following schedule:

Test or Maintenance	Period
Silent Test	Every two weeks
Full Cycle Test	Quarterly
Repair	Before returning to service
Full-cycle*	Annually
Preventive Maintenance	At least annually

*Note: Full-cycle tests may substitute for growl tests.

APPENDIX 3
FIGURE 1

DUKE ENERGY
OCONEE NUCLEAR SITE

SIREN RANGE IN FEET

For Sirens Figured At 12 And 10 dB Loss Per Distance Doubled

MINIMUM LEVEL COVERAGE IN dB	127dB(C) SIREN FEDERAL SIGNAL 2001AC	
	12	10
85	1000	1600
80	1350	2250
75	1800	3200
73	2000	3700
70	2400	4500
68	2700	5200
63	3200	6400
60	4250	9050

NOTE: All range figures are rounded off to nearest 50 feet

Revision/Change Package Fill-In Form

Rev. 04/23/2012

The purpose of this fill-in form is to provide a location to type in information you want to appear on the various forms needed for Major/Minor Procedure Revisions, and Major/Minor Procedure Changes. After you type in information on this form, it will be electronically transferred to the appropriate locations in the attached forms when you perform Step 3 below.

Step 1- press [F12] (Save As) then save this form using standard file name convention in appropriate LAN storage location.

Step 2-type in basic information in the blanks below:

Note: place cursor in center of brackets before typing.

1. ID No.: _ONS Emergency Plan_
2. Revision No.: 2014-03 _
3. Change No.: __ **Note:** if this package is for a change, replace hyphen with a letter.
4. Procedure Title: ONS Emergency Plan _
5. For changes only, enter procedure sections affected: _LOEP, Record of changes, D,F,H,I,J,P, App 2, APP 3_
6. Prepared By: _John Kaminski_
7. Preparation Date: _10/28/14_
8. PCR Numbers Included in Revision: ONS-

Step 3- go to Print Preview to update this information in all the attached documents.

Step 4- page down to affected pages and enter any additional information needed.

Step 5- when all information is entered, print package and review for correctness.

Form 703-1. Procedure Process Record (PPR)

(R08-10)

Duke Energy

PROCEDURE PROCESS RECORD

(1) ID No. ONS Emergency Plan

Revision No. 2014-03

PREPARATION

(2) Station OCONEE NUCLEAR STATION

(3) Procedure Title ONS Emergency Plan

(4) Prepared By* John Kaminski (Signature) [signature] Date 10/28/14

Prepared By* Natalie Harness (E-Plan Sections App 3, F& H) [signature] Date 10/28/14

(5) Requires NSD 228 Applicability Determination?

☒ Yes (New procedure or revision with major changes) - Attach NSD 228 documentation.

☐ No (Revision with minor changes)

(6) Reviewed By* Donald A. Crowl [signature] (QR)(KI) Date 12-17-14

Cross-Disciplinary Review By* ______ (QR)(KI) NA DAC Date ______

Reactivity Mgmt Review By* ______ (QR) NA DAC Date ______

Mgmt Involvement Review By* ______ (Ops. Supt.) NA DAC Date ______

(7) Additional Reviews

Reviewed By* ______ Date ______

Reviewed By* ______ Date ______

(8) Approved By* Patrick M Street [signature] Date 12/18/14

PERFORMANCE *(Compare with control copy every 14 calendar days while work is being performed.)*

(9) Compared with Control Copy* ______ Date ______

Compared with Control Copy* ______ Date ______

Compared with Control Copy* ______ Date ______

(10) Date(s) Performed ______

Work Order Number (WO#) ______

COMPLETION

(11) Procedure Completion Verification:

☐ Unit 0 ☐ Unit 1 ☐ Unit 2 ☐ Unit 3 Procedure performed on what unit?

☐ Yes ☐ NA Check lists and/or blanks initialed, signed, dated, or filled in NA, as appropriate?

☐ Yes ☐ NA Required enclosures attached?

☐ Yes ☐ NA Charts, graphs, data sheets, etc. attached, dated, identified, and marked?

☐ Yes ☐ NA Calibrated Test Equipment, if used, checked out/in and referenced to this procedure?

☐ Yes ☐ NA Procedure requirements met?

Verified By* ______ Date ______

(12) Procedure Completion Approved ______ Date ______

(13) Remarks *(Attach additional pages, if necessary)*

Changes as a result of a change from RadDoseV to URI and updates to WEBEOC, and the change from ASW to PSW as a result of a system modification.

* *Printed Name and Signature*

Procedure Title: _ONS Emergency Plan _

SUMMARY OF CHANGES: (DESCRIPTION AND REASON)

General Changes

Changes as a result of a change from RadDoseV to URI and updates to WEBEOC, and the change from ASW to PSW as a result of a system modification

PCR Numbers Incorporated

ONS-

Enclosure

[Type text]

APPENDIX C. APPLICABILITY DETERMINATION (Rev. 10)

PART I – ACTIVITY DESCRIPTION

DUKE ENERGY CAROLINAS, LLC SITE			UNIT(S)		
☒ Oconee	☐ McGuire	☐ Catawba	☒ Unit 1	☒ Unit 2	☒ Unit 3

ACTIVITY TITLE/DOCUMENT/REVISION: **ONS Emergency Plan Rev 2014-03**

PART II – PROCESS REVIEW

For each activity, address all of the questions below. If the answer is "YES" for any portion of the activity, apply the identified process(es) to that portion of the activity. Note: It is not unusual to have more than one process apply to a given activity.

Will implementation of the above activity require a change to the:

		NO	YES	
1.	Technical Specifications (TS) or Operating License?	☒	☐	If YES, process as a license amendment per NSD 227.
2.	Quality Assurance Topical?	☒	☐	If YES, seek assistance from Independent Nuclear Oversight.
3.	Security Plans? (See Appendix H)	☒	☐	If YES, process per the Nuclear Security Manual.
4.	Emergency Plan?	☐	☒	If YES, process per the Emergency Planning Functional Area Manual.
5.	Inservice Testing Program Plan?	☒	☐	If YES, process per site IST Program for ASME code compliance and related facility changes.
6.	Inservice Inspection Program Plan?	☒	☐	If YES, process per Materials, Metallurgy and Piping Inservice Inspection FAM for ASME code compliance and related facility or procedure changes.
7.	Fire Protection Program Plan?	☒	☐	If YES, evaluate activity in accordance with NSD 320.
	7a -Utilize Appendix E to address Fire Protection Program Plan Impact.		☒	Check to confirm use of Appendix E Screening Questions.
8.	Regulatory Commitments?	☒	☐	If YES, process per NSD 214.
9.	Code of Federal Regulations?	☒	☐	If YES, contact the Regulatory Affairs group.
10.	Programs and manuals listed in the Administrative Section of the TS?	☒	☐	If YES, contact the Regulatory Affairs group.

[Type text]

PART IIIa - 10 CFR 72.48 APPLICABILITY

For each activity, address the question below. If the answer to question 11 is "YES," and questions 14 and 17 are answered "NO", then process the activity per NSD 211 - 10 CFR 72.48 does apply.

		NO	YES
11.	Does the activity involve SSCs, procedures or conduct tests or experiments that support/impact the loading or transport of the canister/cask to the ISFSI, the ISFSI facility, spent fuel cask design?	☒	☐

PART IIIb – 10 CFR 50.59 APPLICABILITY

For each activity, address all of the questions below. If the answer to question 18 is "YES," then 10 CFR 50.59 does not apply. If the answer to questions 18 is "NO," then process the activity per NSD 209 – 10 CFR 50.59 applies.

		NO	YES
12.	Does the activity involve a procedure, governed by NSD 703 that has been excluded from the 10 CFR 50.59 process per NSD 703 and the exclusion status remains valid?	☒	☐
13.	Does the activity involve an administrative procedure governed by NSD 100 or AD-DC-ALL-0201 that does not contain information regarding the operation and control of Structures, Systems and Components?	☒	☐
14.	Does the activity involve a type of Engineering Change that NSD 301 excludes from the 10 CFR 50.59 and/or 10 CFR 72.48 Processes? Consult NSD 301 for assistance.	☒	☐
15.	Does the activity involve (a) maintenance activities that restore SSCs to their as-designed condition (including activities that implement approved design changes) or (b) temporary alterations supporting maintenance that will be in effect during at-power operations for 90 days or less?	☒	☐
16.	Does the activity involve a UFSAR modification that NSD 220 excludes from the 10 CFR 50.59 Process? Consult NSD 220 for assistance.	☒	☐
17.	Does the activity involve NRC and/or Duke Energy Carolinas, LLC approved changes to the licensing basis?	☒	☐
18.	Are **ALL** aspects of the activity bounded by one or more "YES" answers to questions 1 through 17, above?	☐	☒

PART IV - UFSAR REVIEW

		NO	YES
19.	Does the activity require a modification, deletion, or addition to the UFSAR to satisfy the UFSAR content requirements of 10 CFR 50.34 (b), 10 CFR 50.71 (e), or Regulatory Guide (RG) 1.70? Consult NSD 220 for Assistance. IF YES, process per NSD 220.	☒	☐

PART V – SIGNOFF

(Print Name) Donald A. Carroll (Sign) [signature] DATE 12-17-14

Applicability Determination Preparer

Form 703-2. Procedure Change Process Record
(R08-10)

Duke Energy

PROCEDURE CHANGE PROCESS RECORD

(1) ID No. ONS Emergency Plan

Revision No. 2014-03 Change No.
Permanent/Restricted to

(2) Station: OCONEE NUCLEAR STATION

(3) Procedure Title: ONS Emergency Plan

(4) Section(s) of Procedure Affected: LOEP, Record of changes, D,F,H,I,J,P, App 2, APP 3

(5) Requires NSD 228 Applicability Determination?

☒ Yes (Procedure change with major changes) - Attach NSD 228 documentation.

☐ No (Procedure change with minor changes)

(6) Description of Change: *(Attach additional pages, if necessary.)*
Changes as a result of a change from RadDoseV to URI and updates to WEBEOC, and the change from ASW to PSW as a result of a system modification

(7) Reason for Change:
Changes as a result of a change from RadDoseV to URI and updates to WEBEOC, and the change from ASW to PSW as a result of a system modification

(8) Prepared By* John Kaminski (Signature) [signature] Date 10/28/14

Prepared By* Natalie Harness (E-Plan Sections App 3, F& H) [signature] Date 10/28/14

(9) Reviewed By* Donald A. Crowl [signature] (QR)(KI) Date 12-17-14

Cross-Disciplinary Review By* ______ (QR)(KI) NA DAC Date 12-17-14

Reactivity Mgmt. Review By* ______ (QR) NA DAC Date 12-17-14

Mgmt. Involvement Review By* ______ (Ops. Supt.) NA DAC Date 12-17-14

(10) Additional Reviews

Reviewed By* ______ Date ______

Reviewed By* ______ Date ______

(11) Approved By* Patrick M Street [signature] Date 12/18/14

* *Printed Name and Signature*

§50.54(q) Screening Evaluation Form

Activity Description and References: ONS Emergency Plan Rev 2014-03 **BLOCK 1**

Changes as a result of the change in from RadDose V to URI and updates to WEBEOC, and the change from ASW to PSW as a result of a system modification. See attached sheet for all changes pertaining to this procedure.

Activity Scope: **BLOCK 2**

☒ The activity is a *change* to the *emergency plan*

☐ The activity is not a *change* to the *emergency plan*

Change Type: **BLOCK 3**

☐ The change is editorial or typographical
☒ The change is not editorial or typographical

Change Type: **BLOCK 4**

☐ The change does conform to an activity that has prior approval
☒ The change does not conform to an activity that has prior approval

Planning Standard Impact Determination: **BLOCK 5**

☐ §50.47(b)(1) – Assignment of Responsibility (Organization Control)
☐ §50.47(b)(2) – Onsite Emergency Organization
☐ §50.47(b)(3) – Emergency Response Support and Resources
☒ **§50.47(b)(4) – Emergency Classification System***
☐ **§50.47(b)(5) – Notification Methods and Procedures***
☐ §50.47(b)(6) – Emergency Communications
☐ §50.47(b)(7) – Public Education and Information
☒ §50.47(b)(8) – Emergency Facility and Equipment
☒ **§50.47(b)(9) – Accident Assessment***
☒ **§50.47(b)(10) – Protective Response***
☐ §50.47(b)(11) – Radiological Exposure Control
☐ §50.47(b)(12) – Medical and Public Health Support
☐ §50.47(b)(13) – Recovery Planning and Post-accident Operations
☒ §50.47(b)(14) – Drills and Exercises
☐ §50.47(b)(15) – Emergency Responder Training
☒ §50.47(b)(16) – Emergency Plan Maintenance

***Risk Significant Planning Standards**

☐ The proposed activity does not impact a Planning Standard

Commitment Impact Determination: **BLOCK 6**

☐ The activity does involve a site specific EP commitment
Record the commitment or commitment reference: ____________________

☒ The activity does not involve a site specific EP commitment

Results: **BLOCK 7**

☐ The activity can be implemented without performing a §50.54(q) effectiveness evaluation
☒ The activity cannot be implemented without performing a §50.54(q) effectiveness evaluation

Preparer Name:	Preparer Signature:	Date:
John Kaminski Natalie Harness	[signature] Natalie Harness	12/10/14 12/17/14
Reviewer Name:	**Reviewer Signature:**	**Date:**
Don Crowl	[signature]	12-17-14

§50.54(q) Effectiveness Evaluation Form

Activity Description and References: ONS Emergency Plan rev 2014- BLOCK 1

Changes as a result of the change from RadDose V to URI and updates to WEBEOC, and the change from ASW to PSW as a result of a system modification. See attached sheet for all changes pertaining to this procedure.

Activity Type: BLOCK 2

☒ The activity is a *change* to the *emergency plan*
☐ The activity affects implementation of the *emergency plan*, but is not a *change* to the *emergency plan*

Impact and Licensing Basis Determination: BLOCK 3

Licensing Basis:
10CFR50.47(b)4 - A standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee, and State and local response plans call for reliance on information provided by facility licensees for determinations of minimum initial offsite response measures.
10CFR50 Appendix E.IV - The applicant's emergency plans shall contain, but not necessarily be limited to, information needed to demonstrate compliance with the elements set forth below, i.e., organization for coping with radiological emergencies, assessment actions, activation of emergency organization, notification procedures, emergency facilities and equipment, training, maintaining emergency preparedness, recovery, and onsite protective actions during hostile action.
10CFR50 Appendix E.IV.B.1 The means to be used for determining the magnitude of, and for continually assessing the impact of, the release of radioactive materials shall be described, including emergency action levels that are to be used as criteria for determining the need for notification and participation of local and State agencies, the Commission, and other Federal agencies, and the emergency action levels that are to be used for determining when and what type of protective measures should be considered within and outside the site boundary to protect health and safety.
ONS E Plan Section D - Emergency Classification System - RG 1.101, Rev. 3, August, 1992, approved the guidance provided by NUMARC/NESP-007, Revision 2, as an Alternative Methodology for the Development of Emergency Action Levels. Oconee Nuclear Site used the NUMARC guidance for the development of initiating conditions and emergency action levels. The emergency action levels provided in this section have been modified to implement the guidance provided in NRC Bulletin 2005-02, NEI guidance as endorsed in Regulatory Issue Summary 2006-12 and to support the implementation of NEI 03-12.
ONS E Plan Section D.2 - Initiating Conditions - Initiating conditions and their corresponding emergency actions levels are contained in the BASIS document beginning on page D-4. Classification procedure (RP/0/A/1000/001) provides the guidance necessary to classify events and promptly declare the appropriate emergency condition within 15 minutes after the availability of indications to cognizant facility staff that an emergency action level threshold has been exceeded. Specific response procedures are in place for the Control Room, Technical Support Center and the Emergency Operations Facility which delineate the required response during the appropriate classification.

10CFR50.47(b)8 - Adequate emergency facilities and equipment to support the emergency response are provided and maintained.
10CFR50 Appendix E.IV.G - Provisions to be employed to ensure that the emergency plan, its implementing procedures, and emergency equipment and supplies are maintained up to date shall be described.
ONS E Plan Section H10 Inspection and Inventory of Emergency Equipment and Supplies. All emergency equipment designated by the Oconee Station Emergency Plan shall be inventoried and inspected on a quarterly basis or in agreement with established procedures. Supplies will be inventoried/replaced after each drill and/or exercise or actual emergency where supplies might have been used.

10CFR50.47(b)9 - Adequate methods, systems, and equipment for assessing and monitoring actual or potential offsite consequences of a radiological emergency condition are in use.
10CFR50 Appendix E.IV.E.2 - Equipment for determining the magnitude of and for continuously assessing the impact of the release of radioactive materials to the environment;
10CFR50 Appendix E.IV. E.9 - At least one onsite and one offsite communications system; each system shall have a backup power source. All communication plans shall have arrangements for emergencies, including titles and alternates for those in charge at both ends of the communication links and the primary and backup means of communication. Where consistent with the function of the governmental agency, these arrangements will include:
a. Provision for communications with contiguous State/local governments within the plume exposure pathway EPZ. Such communications shall be tested monthly.
ONS E Plan Section I.4 - Dose Calculation Methodology, HP/0/B/1009/018 and SH/0/B/2005/001, (being superseded by AD-EP-ALL-0202) establish the relationship between effluent monitor readings or reactor building dose rate readings and onsite/offsite doses for various meteorological conditions. HP/0/B/1009/022 (being superseded by AD-EP-ALL-202) provides guidance for on shift personnel to perform initial dose assessment using a computer based tool.
ONS E Plan Section I.6 - Release Rates/Projected Doses for Offscale Instrumentation Situations. HP/0/B/1009/018 and SH/0/B/2005/001 , (being superseded by AD-EP-ALL-0202) are procedures that can be used to make offsite dose projections and/or protective action recommendations should instrumentation used for assessment indicate offscale or are inoperable.

10CFR50.47(b)10 -A range of protective actions has been developed for the plume exposure pathway EPZ for emergency workers and the public. In developing this range of actions, consideration has been given to evacuation, sheltering, and, as a supplement to these, the prophylactic use of potassium iodide (KI), as appropriate. Evacuation time estimates have been developed by applicants and licensees. Licensees shall update the evacuation time estimates on a periodic basis. Guidelines for the choice of protective actions during an emergency, consistent with Federal guidance, are developed and in place, and protective actions for the ingestion exposure pathway EPZ appropriate to the locale have been developed.
ONS E Plan Section J.7 - Protective Actions Recommendations. The Emergency Coordinator (Operations Shift Manager or Station Manager) or the EOF Director (depending on the facility activation) will be responsible for contacting the State and/or local governments to give prompt notification for implementing protective measures within the plume exposure pathway, and beyond it if necessary. Procedure RP/0/A/1000/024, "Protective Action Recommendations" and SR/0/A/2000/003, "Activation of the Emergency Operations Facility" has been written to provide specific guidance for issuing protective action recommendations under various plant conditions to the Emergency Coordinator in the TSC and the EOF Director in the EOF Figure (J-1) respectively. *(added as a result of rev 2014-003) Protective Action Recommendations (PARs) provided to offsite officials take into account a range of protective actions including sheltering and evacuation. Discussions conducted with offsite officials determined that the only time sheltering would be recommended would be during a hostile action based event in which no radiological release has occurred or is expected.* The decision to use sheltering as an alternative to evacuation for impediments and special populations is one that will be made by offsite officials. If dose projections show that PAGs have been exceeded at 10 miles, the dose assessment code and in-field measurements, when available, shall be used to calculate doses at various distances downwind to determine how far from the site PAG levels are exceeded. The Radiological Assessment Manager shall forward the results to the EOF Director who will communicate this information to the offsite authorities. Figure J-1A (Protective Action Guides) is adopted from EPA 400 and guidance in state plans on use of KI and considers protective action based on projected avoided dose. Per Appendix 2, initial protective actions are predetermined for Control Room use for general emergency conditions. Meteorological conditions at Oconee require a complex method for determining appropriate sectors to evacuate. The Control Room will *typically recommend evacuation (rev 2014-003)* out to five miles and shelter out to ten miles which will simplifies the process for determining the appropriate sectors to evacuate and to shelter.

10CFR50.47(b)(14) – Periodic exercises are (will be) conducted to evaluate major portions of emergency response capabilities, periodic drills are (will be) conducted to develop and maintain key skills, and deficiencies identified as a result of exercises or drills are (will be) corrected.
10CFR50 Appendix E.IV.F - F. Training. 2. The plan shall describe provisions for the conduct of emergency preparedness exercises as follows: Exercises shall test the adequacy of timing and content of implementing procedures and methods, test emergency equipment and communications networks, test the public alert and notification system, and ensure that emergency organization personnel are familiar with their duties.
ONS E Plan Section N
N.2 Drills, Oconee Nuclear Station will conduct drills in accordance with requirements of 10CFR50, Appendix E. Drills shall be conducted to test, develop and maintain skills in a particular operation. Drills may be a component of an exercise. Drills will be conducted and evaluated by a designated drill director. Drills will be held in accordance with Emergency Preparedness FAM Guide Section 3.19, Exercises and Drills.
N.2.e. Radiation Protection Drills shall be conducted semi-annually which involve response to and analysis of, simulated elevated airborne and liquid samples and direct radiation measurements in the environment. Analysis of samples may be simulated in Radiation Protection drills.

10CFR50.47(b)16 - Responsibilities for plan development and review and for distribution of emergency plans are established, and planners are properly trained.
10CFR50 Appendix E.IV.G - Provisions to be employed to ensure that the emergency plan, its implementing procedures, and emergency equipment and supplies are maintained up to date shall be described.
ONS E Plan Section P.4 & P.5 - Review and Update of Emergency Plan. The ONS Emergency Plan shall be reviewed and updated annually. An in-depth review of the Emergency Plan will be made to determine if any/all changes have been made as a result of drills, exercises, commitments, audits, new regulatory requirements, and any other identified mechanism used to determine the appropriateness of the Emergency Plan. The Manager of Emergency Planning or designee is responsible for conducting the review and updating/revising the Emergency Plan and/or Implementing Procedures, as required. Once the review has been completed and changes made as determined, the Emergency Plan shall be certified as current.

Compliance Evaluation and Conclusion: -continued

BLOCK 4

- The proposed changes does impact **ONS E Plan Section D**, Emergency Classification System. The changes being proposed serve to ensure that the ONS E Plan remains accurate and up to date with system changes being made at the station. The 50.54q effectiveness review completed for the URI System operating procedure (AD-EP-ALL-0202) determined that there was no reduction in effectiveness as a result of the change in dose assessment model. Changes being proposed for WEBEOC do not impact section D of the ONS E Plan. Changes being proposed for the addition of the PSW modification serve to ensure that the EAL Basis remains true to the requirements of NUMARC -007 EAL Scheme and therefore continued compliance with 10CFR50.47b(4) , 10CFR50 Appendix E.IV.D1 and D.3 is assured.

-The proposed change does not impact **ONS E Plan Section H10** Inspection and Inventory of Emergency Equipment and Supplies. The periodic testing and inventories that implement this section of the plan do not reflect testing that implements any of the above changes. Therefore continued compliance with 10CFR50.47(b)8 and 10CFR50 Appendix E.IV.G is assured.

- The proposed change does impact **ONS E Plan Section I4**, Dose Calculation Methodology. The change for the current does model to the URI dose model results in the need to supersede previously identified procedures HP/0/B/1009/018 and SH/0/B/2005/001 with procedure AD-EP-ALL-0202, which provides for the implementation, operation and use of the URI dose model. The 50.54q effectiveness review completed for the URI System operating procedure (AD-EP-ALL-0202) describes how the change in dose models at ONS resulted in a no reduction in effectiveness of the emergency plan. The new procedure ensures that the means to perform dose calculations is described and accurate. The proposed changes associated with PSW and WEBEOC do not impact this section of the ONS E Plan. Therefore continued compliance with 10CFR50.47(b)9, 10CFR50 Appendix E.IV.E.2 , and 10CFR50 Appendix E.IV. E.9 is assured.

- The proposed change does impact **ONS E Plan Section I6**, Release Rates/Projected Doses for Offscale Instrumentation Situations. The change for the current does model to the URI dose model results in the need to supersede previously identified procedures HP/0/B/1009/018 and SH/0/B/2005/001 with procedure AD-EP-ALL-0202, which provides for the implementation, operation and use of the URI dose model. The new procedure ensures that the means to perform release rates and project doses is described and accurate. The 50.54q effectiveness review completed for the URI System operating procedure (AD-EP-ALL-0202) describes how the change in dose models at ONS resulted in a no reduction in effectiveness of the emergency plan and continued compliance with regulations and commitments. Additionally, the proposed changes associated with PSW and WEBEOC do not impact this section of the ONS E Plan. Therefore continued compliance with 10CFR50.47(b)9, 10CFR50 Appendix E.IV.E.2 , and 10CFR50 Appendix E.IV.E.9 is assured.

The proposed change does not impact **ONS E Plan Section J**.7, A thorough review of this section showed that while Protective Response requirements may be impacted by the changes to implement the new dose assessment model (URI) the actual PARs and the notifications required have not been changed. Changes to PARs have been made consistent with NUREG 0654 Supplement 3 to include a range of protective actions and following discussions with offsite officials during a hostile action based event to include sheltering as long as no release of radiological materials is occurring or is expected. Additionally, the proposed changes associated with PSW and WEBEOC do not impact this section of the ONS E Plan. Therefore continued compliance with 10CFR50.47(b)10 is assured.

- The proposed change does not impact **ONS E Plan Section N2b**. A thorough review of this section showed that while the performance of both notifications and PARs, the use of PSW and WEBEOC will be tested, observed and critiqued, no actual changes will be required to implement these new processes, systems (URI) or procedures. Therefore continued compliance with 10CFR50.47b(14) and 10CFR50 Appendix E.IV.F is assured.

Continued - Block 4

The proposed change does impact **ONS E Plan Section P.4 & P.5**, The change for the current does model to the URI dose model results in the need to supersede previously identified procedures HP/0/B/1009/018 and SH/0/B/2005/001 with procedure AD-EP-ALL-0202, which provides for the implementation, operation and use of the URI dose model. The new procedure ensures that the means to perform release rates and project doses is described and accurate. The 50.54q effectiveness review completed for the URI System operating procedure (AD-EP-ALL-0202) describes how the change in dose models at ONS resulted in a no reduction in effectiveness of the emergency plan and continued compliance with regulations and commitments.. Appropriate changes were made to ensure the E Plan Section P cross reference in Figure P1 remains correct and current with appropriate procedure references. Additionally, the proposed changes associated with PSW and WEBEOC do not impact this section of the ONS E Plan. Therefore continued compliance with 10CFR50.47(b)16 , and 10CFR50 Appendix E.IV.G is assured.

As can be seen above, the changes being made to the ONS E Plan serve to ensure the E Plan remains up to date and accurate and adequately reflect the changes to implement URI, WEBEOC and the PSW projects. The proposed changes were reviewed and have been shown above to continue to comply with the requirements as specified.

Conclusion:
The proposed activity ☒ does / ☐ does not continue to comply with the requirements.

Reduction in Effectiveness (RIE) Evaluation and Conclusion: BLOCK 5

Evaluation:
10CFR50.47b(4) according to RG 1.219 this planning standard has the following function; A standard scheme of emergency classification and action levels is in use.
The ONS E Plan uses NUMARC - NESP-007 EALs as modified in 2005. The proposed changes associated with URI and PSW were made to the EALs and associated basis document to ensure that the document remains true to the NUMARC scheme, remains accurate with respect to systems used for notification and making of PARs, as well as the dose assessment model used for dose projections and dose modeling. URI uses path specific default times versus a standard 4 hr default time for all release paths as RADDOSE had used. The WEBEOC change has no impact on this section. There are no timing aspects associated with these changes. The timeliness aspect associated with this change would be associated with capability to notify offsite agencies within 15 minutes of the declaration of emergency. The maintenance of accurate and correct information within the EAL and basis would then serve to ensure that no questions regarding the understanding of the changes made and hence make it much more likely that complying with the 15 minute classification as well as 15 minute notification requirement will be met. As stated above, since the function continues to be provided for, the timing and timeliness aspects are met as discussed above, there is no reduction in effectiveness associated with the proposed change to **ONS E Plan Section D**.

10CFR50.47b(9) according to RG 1.219 this planning standard has the following functions associated with it; Methods, systems, and equipment for assessment of radioactive releases are in use.
The proposed changes associated with PSW and WEBEOC have no impact on this section. The change from RADDOSE 5 to URI is being implemented as a fleet initiative to change dose assessment models to a fleet consistent approach. The 50.54q effectiveness review completed for the URI System operating procedure (AD-EP-ALL-0202) describes how the change in dose models at ONS resulted in a no reduction in effectiveness of the emergency plan. Therefore since the functions are provided for, and the timing and timeliness aspects are met as discussed above, there is no reduction in effectiveness associated with the proposed change to **ONS E Plan Section I**.

10CFR50.47b(10) according to RG 1.219 this planning standard has the following (3) functions:
(1) A range of public PARs is available for implementation during emergencies.
(2) Evacuation time estimates for the population located in the plume exposure pathway EPZ are available to support the formulation of PARs and have been provided to State and local governmental authorities.
(3) A range of protective actions is available for plant emergency workers during emergencies, including those for hostile action events.
The proposed changes associated with URI, WEBEOC, and PSW have no impact on these functions. The 50.54q effectiveness review completed for the URI System operating procedure (AD-EP-ALL-0202) describes how the change in dose models at ONS resulted in no reduction in effectiveness of the emergency plan. While the outcomes from the change in dose assessment (from RADDOSE 5 to URI) may impact the protective actions being recommended (PARs), there are no changes identified for ONS E Plan Section J. Additionally, following discussions with offsite officials and in compliance with NUREG 0654 Supplement 3 a range of protective actions (sheltering) has been included specifically for hostile action based events in which no radiological release is occurring or is expected to occur. The appropriate forms have been added to the implementing procedures. Extensive training has been done on the URI model with those assigned dose assessment activities to ensure that there is no impact to the timing and or timeliness of PARs. The changes to WEBEOC and PSW had no specific impact on Protective Actions.

Since there are no changes needed as a result of the addition of URI, WEBEOC, and PSW, the functions continue to be provided for and the timing and timeliness aspects are met as discussed above, there is no reduction in effectiveness associated with the proposed change to **ONS E Plan Section J**.

10CFR50.47b(14) according to RG1.219 this planning standard has the following (3) functions:
(1) A drill and exercise program (including radiological, medical, health physics, and other program areas) is established.
(2) Drills, exercises, and training evolutions that provide performance opportunities to develop, maintain, and demonstrate key skills, are assessed via a formal critique process in order to identify weaknesses.
(3) Identified weaknesses are corrected.
The proposed changes associated with URI, WEBEOC, and PSW have essentially no impact on these functions. Procedures have been modified as appropriate for the operation of the URI system, WEBEOC, and the PSW modification. The performance by the ERO will continue to be evaluated and critiqued. While the outcomes from the change in dose assessment (from RADDOSE 5 to URI) may impact the protective actions being recommended (PARs), and the changes to WEBEOC on how the information is transmitted, there are no changes identified for ONS E Plan Section N as a result. The 50.54q effectiveness review completed for the URI System operating procedure (AD-EP-ALL-0202) describes how the change in dose models at ONS resulted in a no reduction in effectiveness of the emergency plan. The performance by the ERO will continue to be evaluated and critiqued. There are no timing aspects associated with these changes. Since there are no changes needed, the functions continue to be provided for as a result of the addition of URI, WEBEOC, and PSW and the timing and timeliness aspects are met as discussed above, there is no reduction in effectiveness associated with the proposed change to **ONS E Plan Section N.**

10CFR50.47b(16) according to RG1.219 this planning standard has (2) functions of which only the following is relevant:
(1) Responsibility for emergency plan development and review is established.
The proposed changes associated with URI, WEBEOC, and PSW have essentially no impact on these functions. Procedures have been modified as appropriate for the operation of the URI system, WEBEOC, and PSW. The E Plan is being revised as indicated in this review. There are no timing or timeliness aspects associated with this change or with this planning standard. The functions are provided for by making this change and maintaining the ONS E Plan up to date. Therefore there is no reduction in effectiveness associated with the proposed change to **ONS E Plan Section P.**

Overall as can be seen by the evaluation above, the proposed changes associated with the replacement of the dose assessment software from RADDose 5 to URI, the addition of a range of protective actions recommended, the inclusion of necessary changes as a result of the PSW project and the change in software for WEBEOC do not reduce the effectiveness of the emergency plan.
Reviewing the comparison matrix the following is noted:

- Change 1 is associated with a change to the ERONS that was completed in a previous rev and the effectiveness review showed no reduction in effectiveness as a result.
- Change 2 and 3 were changes brought about by the change from RADDOSE 5 to URI. URI used different default times based upon the release pathway.
- Change 4 removed reference of station ASW and replaced it with PSW as in keeping with the mod's purpose and in keeping with the bases and intent of the NUMARC-NESP-007 guidance.

All of these changes thus ensure the EAL scheme remains consistent with and true to the NUMARC NESP 007 bases document. Since the changes as proposed continue to maintain the EAL scheme correct and accurate, it can be seen that there is no reduction in effectiveness.

- Changes 5 thru 15 are editorial in nature, including a change in the name of the company. Changes made to differentiate between alternate and backup facilities is in keeping consistent with NEI-13-01.
- Changes 16-18 are being made to differentiate between alternate and backup facilities and is consistent with NEI-13-01.
- Change 19 thru 23, 25, 27, 32, 37, 39 - 41, and 43 are editorial - header / footer changes, title changes and grammar
- Change 24 and 26, include changes referencing the Alternate TSC/OSC to the Backup Emergency Response Facility (ERF) per NEI 13-01.
- Changes 28 thru 31, 33- 36, 38 are associated with the change from RADDOSE 5 to URI. The operation and use of the URI system is described / contained in AD-EP-ALL-0202. Therefore these changes ensure that the section remains technically correct, as the old procedures have been superseded. Therefore there is no reduction in effectiveness
- Change 42 is made to ensure the correctness of the testing being performed for ANS. ONS does not do growl testing. As indicated by the asterisk full cycle testing can be and is used at ONS in place of growl testing.

Overall, the change from RADDOSE 5 to URI to provide for dose assessment, the inclusion of a range of protective actions including sheltering, and the inclusion of the modifications brought about by PSW and WEBEOC has been appropriately and thoroughly reviewed as indicated above and found to result in no reduction in the effectiveness of the E Plan.

Conclusion:
The proposed activity ☐ does / ☒ does not constitute a RIE.

Effectiveness Evaluation Results		BLOCK 6
☒ The activity <u>does</u> continue to comply with the requirements of §50.47(b) and §50 Appendix E **and** the activity <u>does not</u> constitute a reduction in effectiveness. Therefore, the activity <u>can</u> be implemented without prior approval.		
☐ The activity <u>does not</u> continue to comply with the requirements of §50.47(b) and §50 Appendix E **or** the activity <u>does</u> constitute a reduction in effectiveness. Therefore, the activity <u>cannot</u> be implemented without prior approval.		
Preparer Name: John Kaminski Natalie Harness	Preparer Signature	Date: 12/10/14 12/17/14
Reviewer Name: Donald A Crowl	Reviewer Signature	Date: 12-17-14
Approver Name: Patrick M Street	Approver Signature	Date: 12/18/14

Revision 12

Attachment to 50.54q

ONS Emergency Plan Rev 2014-003
Change Matrix

Change #	Page #	Current	Proposed	Reason
1	Section D page D-18	A. Loss of all onsite communications capability (internal phone system, PA system, pager system, onsite radio system) affecting the ability to perform routine operations.	A. Loss of all onsite communications capability (internal phone system, PA system, ERO Notification system, onsite radio system) affecting the ability to perform routine operations.	Change to ERONS and cell phones evaluated in previous rev (2014-002).
2	Section D page D-37	The 100 mRem ... The dose projection uses a 4-hour default for time of release. If the real time ... the calculation.	The 100 mRem ... The dose projection typically uses a 4-hour default for time of release. The dose assessment program will provide dose projection default times for specific release pathways. If the real time ... the calculation.	The URI model is replacing the RADDose 5 program for dose projection. See 50.54q on AD-EP-ALL-0202 for additional details.
3	Section D page D-41	These values are EPA PAG guidelines as expressed in EPA-400-R-92-001. The dose calculation procedure utilizes a default of 4 hours for the release time.	These values are EPA PAG guidelines as expressed in EPA-400-R-92-001. The dose assessment program will provide dose projection default times for specific release pathways.	The URI model is replacing the RADDose 5 program for dose projection. See 50.54q on AD-EP-ALL-0202 for additional details.
4	Section D page D-52	Any of the following conditions exist: A. Average of the 5 highest CETCs > 1200 °F on ICCM. B. Unable to maintain reactor subcritical C. EOP directs feeding SG from SSF ASWP or station ASWP	Any of the following conditions exist: A. Average of the 5 highest CETCs > 1200 °F on ICCM. B. Unable to maintain reactor subcritical C. EOP directs feeding SG from SSF PSW or station PSW	As a result of the installation of the PSW modification, the EOPS are being modified to show use of PSW, to ensure continued compliance with NUMARC NESP-007 bases.
5	Section F all	no header	EMERGENCY PLAN - SECTION F EMERGENCY COMMUNICATIONS	Editorial - Header throughout the document (all caps in font 12 TNR)
6	Section F Page F-1	Provisions exist for prompt communications among principal response organizations and to emergency personnel and to the public.	Provisions exist for prompt communications among principal response organizations, emergency personnel, and to the public.	Editorial - added commas and removed an "and"
7	Section F Page F-1 Section F.1	F.1. <u>Emergency Response Organization</u> ... Primary and backup means of communication between the Site, local government agencies, and State response organizations have been established (Figure F-1).	F.1 <u>Emergency Response Organization</u> .... Primary and backup means of communication have been established between the Site, local government agencies, and State response organizations (Figure F-1).	Editorial - rearrange sentence for clarity " have been established" and removed the period behind F.1

Attachment to 50.54q

ONS Emergency Plan Rev 2014-003
Change Matrix

Change #	Page #	Current	Proposed	Reason
8	Section F Page F-2 F.1.d bullet 3	Duke Selective Signaling (Generator backed at the microwave tower)... Oconee County Pickens County State Warning Point State Emergency Operations Center (Columbia) Emergency Operations Facility (Charlotte) Technical Support Center Control Rooms 1&2, Alternate Technical Support Center	Duke Selective Signaling (Generator backed at the microwave tower)... Oconee County Pickens County State Warning Point State Emergency Operations Center (Columbia) Emergency Operations Facility (Charlotte) Technical Support Center Control Rooms 1&2, Backup TSC/OSC Alternate TSC/OSC (JIC)	Editorial - changed Alternate to reflect JIC and added Backup TSC/OSC, consistent with NEI 13-01 guidance.
9	Section F Page F-4 F.1.e bullet 4	4. Initiate a Site Assembly	4. Initiate a Site Assembly.	Editorial - period at the end of the sentence
10	Section H all	no header	EMERGENCY PLAN - SECTION H EMERGENCY FACILITIES AND EQUIPMENT	Editorial - Header throughout the document (all caps in font 12 TNR)
11	Section H all	H-x	Page H-x of x	Editorial - Footer throughout the document
12	Section H Page H-1	H.1.a Technical Support Center	H.1.a Technical Support Center (TSC)	Editorial - add acronym (TSC)
13	Section H Page H-1 bullet 1	1. Redundant two-way communication With the Control Room...	1. Redundant two-way communication with the Control Room...	Editorial - made with a small W instead of capitalized
14	Section H Page H-2 H.1.b	H.1.b Operational Support Center (Figure H-2)	H.1.b Operational Support Center (OSC Figure H-2)	Editorial - added acronym (OSC)
15	Section H Page H-2	An Operational Support Center has been established in the Operations Center located in the control room area of Unit # 3. Personnel assigned to this support center will include the following: Work Control Chemistry Radiation Protection Maintenance Safety Operations Engineering Nuclear Supply Chain Security	An Operational Support Center has been established in the Operations Center located in ~~the~~ Control Room ~~area of~~ 3. Personnel assigned to this support center will include the following: • Work Control • Chemistry • Radiation Protection • Maintenance • Safety • Operations • Engineering • Nuclear Supply Chain • Security	Editorial - to match section H.1.a changed the Control Room to Caps and removed Unit # added bullets to support center listing

Attachment to 50.54q

ONS Emergency Plan Rev 2014-003
Change Matrix

Change #	Page #	Current	Proposed	Reason
16	Section H Page H-2 H.1.c	H.1.c Backup Facilities	H.1.c Backup Emergency Response Facility (ERF) (Figure H-1A and H-2A)	changed Alternate Facility to Backup Emergency Response Facility (ERF) consistent with NEI 13-01 guidance. reference NEI 13-01
17	Section H Page H-2 H.1.c	An alternate Technical Support Center	A backup Technical Support Center	changed Alternate to Backup/ NEI 13-01
18	Section H Page H-2 H.1.c	An alternate Operational Support Center	A backup Operational Support Center	changed Alternate to Backup/ NEI 13-01
19	Section H Page H-3	The Issaqueena Trail Facility serves as an alternate facility that would be....	The Issaqueena Trail Facility (JIC) serves as an alternate facility that would be....	Editorial - added (JIC)
20	Section H Page H-3 H.2	Emergency Operations Facility The Emergency Operations Facility is located at the Charlotte General Office in North Carolina. The facility is located approximately 120 miles from the Oconee Nuclear Station. See Figures H3A thru H3-E.	Emergency Operations Facility (EOF) (See Figures H3-A thru H3-E) The Emergency Operations Facility is located at the Charlotte General Office in North Carolina. The facility is located approximately 120 miles from the Oconee Nuclear Station.	Editorial - added acronym (EOF) moved Figures to Title section
21	Section H Page H-7 H.8	The dose assessment methodology for the Oconee Nuclear STATION...	The dose assessment methodology for the Oconee Nuclear Station...	Editorial - changed STATION to Station (not all caps)
22	Section H Page H-8 H.10	All emergency equipment designated by the Oconee Station...	All emergency equipment designated by the Oconee Nuclear Station...	Editorial - added Nuclear
23	Section H All Section H FIGURES	DUKE ENERGY COMPANY OCONEE NUCLEAR STATION	DUKE ENERGY OCONEE NUCLEAR STATION	Editorial - format correction all titles font 11 Bold Remove COMPANY
24	Section H Figure H-1 Page H-10	TYPICAL TECHNICAL SUPPORT CENTER	TECHNICAL SUPPORT CENTER (TSC) [Move Emergency Planner to cubical by Engineer and replace Emergency Planner with Asst to EC & add Procedure Cabinet to diagram]	added (TSC) to title Move Emergency Planner to cubical by Engineer and replace Emergency Planner with Asst to EC & add Procedure Cabinet to diagram
25	Section H Figure H-2 Page H-12	TYPICAL OPERATIONAL SUPPORT CENTER	TYPICAL OPERATIONAL SUPPORT CENTER (OSC)	Editorial - added acronym (OSC)
26	Section H Figure H-3C Page H-16	TYPICAL OCONEE JIC SET UP	TYPICAL OCONEE JIC SET UP (ALTERNATE EMERGENCY RESPONSE FACILITY)	added (Alternate Emergency Response Facility) to title consistent with NEI 13-01

Attachment to 50.54q

ONS Emergency Plan Rev 2014-003
Change Matrix

Change #	Page #	Current	Proposed	Reason
27	Section H Figure H-19 Page H-38	Emergency Planning: PT/0/B/0250/045 PT/0/B/0250/030 ONS Pre-fire Plan	Emergency Preparedness: PT/0/B/0250/030 PT/0/B/0250/045 ONS Pre-fire Plan	Editorial - changed Planning to Preparedness & put procedure reference in sequential order
28	Section I I-3	I.3a Operations can also get offsite dose projections from on-shift Radiation Protection technicians using procedure HP/0/B/1009/022. HP/0/B/1009/022 uses release paths	I.3a Operations can also get offsite dose projections from on-shift Radiation Protection technicians using procedure AD-EP-ALL-0202. AD-EP-ALL-0202 uses release paths	Change to new procedure for using URI dose assessment model. See URI change evaluation attached to NEW PROCEDURE ad-ep-all-0202.
29	Section I I-4	I.3b Procedure HP/0/B/1009/18, SH/0/B/2005/001 and/or HP/0/B/1009/022 determines the magnitude...	I.3b Procedure AD-EP-ALL-0202 determines the magnitude...	Change to new procedure for using URI dose assessment model.
30	Section I I-4	I.4 HP/0/B/1009/018 and SH/0/B/2005/001 establish the relationship between effluent monitor readings or reactor building dose rate readings and onsite/offsite doses for various meteorological conditions. HP/0/B/1009/022 provides guidance for on shift personnel to perform initial dose assessment using a computer based tool.	I.4 AD-EP-ALL-0202 establishes the relationship between effluent monitor readings or reactor building dose rate readings and onsite/offsite doses for various meteorological conditions. AD-EP-ALL-0202 provides guidance for on shift personnel to perform initial dose assessment using a computer based tool.	Change to new procedure for using URI dose assessment model.
31	Section I I-5	I.6 HP/0/B/1009/018 and SH/0/B/2005/001 are procedures that can be used to make offsite dose projections and/or protective	I.6 AD-EP-ALL-0202 is the procedure that can be used to make offsite dose projections and/or protective	Change to new procedure for using URI dose assessment model.
32	Section I I-5	I.7&I.8 Procedures SH/0/B/2005/002 and HP/0/B/1009/026 describe predetermined sampling locations, sampling....	I.7&I.8 Procedures SH/0/B/2005/002 and SH/0/B/2005/003 describe predetermined sampling locations, sampling....	Editorial - Update to procedure number.
33	Section P Figure P1 page P-9	**H8**- SH/0/B/2005/001 HP/0/B/1009/018	AD-EP-ALL-0202 Emergency Response Offsite Dose Assessment	Change to new procedure for using URI dose assessment model.
34	Section P Figure P1 page P-11	**I2** - HP/0/B/1009/018 SH/0/B/2005/001	AD-EP-ALL-0202 Emergency Response Offsite Dose Assessment	Change to new procedure for using URI dose assessment model.
		I3a,b - HP/0/B/1009/018, HP/0/B/1009/022 SH/0/B/2005/001	AD-EP-ALL-0202 Emergency Response Offsite Dose Assessment	Change to new procedure for using URI dose assessment model.
		I4 - HP/0/B/1009/018, HP/0/B/1009/022 SH/0/B/2005/001	AD-EP-ALL-0202 Emergency Response Offsite Dose Assessment	Change to new procedure for using URI dose assessment model.

Attachment to 50.54q ONS Emergency Plan Rev 2014-003 Change Matrix				
Change #	**Page #**	**Current**	**Proposed**	**Reason**
35	Section P Figure P1 page P-12	**I6** - HP/0/B/1009/018 SH/0/B/2005/001	AD-EP-ALL-0202 Emergency Response Offsite Dose Assessment	Change to new procedure for using URI dose assessment model.
		I10 - HP/0/B/1009/018 SH/0/B/2005/001	AD-EP-ALL-0202 Emergency Response Offsite Dose Assessment	Change to new procedure for using URI dose assessment model.
36	Section P Figure P1 page P-13	**J2** - HP/0/B/1009/018 SH/0/B/2005/001	AD-EP-ALL-0202 Emergency Response Offsite Dose Assessment	Change to new procedure for using URI dose assessment model.
		J3 - HP/0/B/1009/018 SH/0/B/2005/001	AD-EP-ALL-0202 Emergency Response Offsite Dose Assessment	Change to new procedure for using URI dose assessment model.
		J4 - HP/0/B/1009/018	AD-EP-ALL-0202 Emergency Response Offsite Dose Assessment	Change to new procedure for using URI dose assessment model.
37	Appendix 2 Page 1	Duke Energy Company	Duke Energy	editorial - company name change
38	Appendix 2 Page 3	B.2 Procedure HP/0/B/1009/018, provides personnel with methods of projecting offsite doses for unit vent releases,...	Procedure AD-EP-ALL-0202, provides personnel with methods of projecting offsite doses for unit vent releases,...	Change to new procedure for using URI dose assessment model.
39	Appendix 3 all	Duke Energy Company	Duke Energy	editorial - company name change
40	Appendix 3 Page 2 C.1	The activation of this alert and notification system requires procedures and relationships between both Duke Energy Company and the off-site agencies that support Duke and Oconee Nuclear Site.	C1. The activation of this alert and notification system requires procedures and relationships between both Duke Company and the off-site agencies that support Duke and Oconee Nuclear Site.	editorial -company name change
41	Appendix 3 Page 2 C.2	Duke Energy Company installed this system without a field survey of ambient conditions. The...	Duke Energy installed this system without a field survey of ambient conditions. The...	editorial - company name change
42	Appendix 3 Page 3	Silent Test Growl Test Repair Full-cycle* Preventive Maintenance	Silent Test Full-cycle Test Repair Full-cycle* Preventive Maintenance	revised growl test to Full-Cycle. Duke Energy does not conduct growl tests
43	Appendix 3 Page 4	Appendix 3 Figure 1 Duke Energy Company	Appendix 3 Figure 1 Duke Energy	editorial - company name change

EAL Change Review Form

Change Description and References: ONS E Plan Section D / RP/0/A/1000/001, Emergency Classification **BLOCK 1**

Revision 14-003 of the ONS E Plan and Revision 002 of RP/0/A/1000/001 consists of the following changes:

- PSW pump replaces station ASW Pump as a result of a plant modification.
- E Plan Section D only - removed pagers and replaced with ERONS and Cell phones

Change Type: **BLOCK 2**

☒ The change is considered a *difference* from the approved wording.
☐ The change is considered a *deviation* from the approved wording.

Change Verification: **BLOCK 3**

Item	Yes	No	N/A	Resolution/Comments
Initiating Condition				
IC identification number is correct	☒	☐	☐	Click here to enter text.
Wording is consistent with the NRC approved IC	☒	☐	☐	Click here to enter text.
EAL / FPB				
EAL/FPB identification number is correct	☒	☐	☐	Click here to enter text.
Wording is consistent with the NRC approved EAL / FPB	☒	☐	☐	Click here to enter text.
Threshold values or conditions remain specific to ensure generic criteria are not substituted reducing clarity and accuracy of the EAL.	☒	☐	☐	Click here to enter text.
Sequencing/nesting logic format is correct	☒	☐	☐	Click here to enter text.
Source document inputs used for calculations and in thresholds are correct	☒	☐	☐	Click here to enter text.
Site specific content wording/tables/values are correct and specific: • Operations procedures are consistent with the change • Instrument/display number and noun name are provided • Alarm setpoints are equal to or below EAL/FPB values • Radiation monitor values account for background • Procedure references are correct	☒	☐	☐	Click here to enter text.
The EAL/FPB Matrix is legible and intuitively organized	☒	☐	☐	Click here to enter text.
Mode Applicability				
Operational mode alignment is consistent with the EAL licensing basis	☒	☐	☐	Click here to enter text.
Technical Bases				
Site specific bases is consistent with the EAL threshold	☒	☐	☐	Click here to enter text.
Bases for calculations and threshold values are consistent with the technical bases approved by the NRC	☒	☐	☐	Click here to enter text.
Source document inputs used for calculations and in thresholds are correct	☒	☐	☐	Click here to enter text.
Site specific bases remains accurate and consistent with the EAL technical bases approved by the NRC	☒	☐	☐	Click here to enter text.
Site specific bases has appropriate level of detail and is unambiguous	☒	☐	☐	Click here to enter text.
The change does not cause a change to the logic of the EAL scheme (i.e. gaps in classification thresholds)	☒	☐	☐	Click here to enter text.
Conflicts with the EAL/FPB wording have not been introduced	☒	☐	☐	Click here to enter text.

References				
Source document references are correct	☒	☐	☐	Click here to enter text.
Source document references are current	☒	☐	☐	Click here to enter text.
Definitions				
Wording is consistent with the license basis definitions approved by the NRC for the EALs and EAL technical bases	☒	☐	☐	Click here to enter text.
Other Manual Content				
Wording is consistent with the license basis definitions approved by the NRC for the EALs and EAL technical bases	☒	☐	☐	Click here to enter text.

Change Validation: BLOCK 4

Method

☐ In-Plant Walkdown ☐ Simulator ☒ Other (Specify) Mod package and EOP procedure changes

☐ Training ☐ Tabletop ☐ N/A

Item	Yes	No	N/A	Resolution/Comments
EAL / FPB				
Information and/or values are available in all facilities where classifications are required to be made	☒	☐	☐	Click here to enter text.
<u>Instrumentation and computer points are compatible:</u> • Instrument/display designation matches • Instrument/display units are correct • Proper significant digits are indicated and within the accuracy capabilities of the instrument/display • The instrument/display range is on scale for the threshold value • Instrument/display provides separation for escalating values	☐	☐	☒	Click here to enter text.
Conditions are easily recognizable and able to support declaration within 15 minutes.	☒	☐	☐	Click here to enter text.
Information and/or values are easily obtained and able to support declaration within 15 minutes	☒	☐	☐	Click here to enter text.
The change does not introduce a time delay to classification	☒	☐	☐	Click here to enter text.

Change Justification:	**BLOCK 5**

The ASW to PSW change is a result of a modification to the station. The change from the station ASW Pump to the PSW pump enabled the station to not require a blow-down of the SG's in order to commence feeding to achieve shutdown cooling, as the PSW pump is a high discharge head pump. The installation and use of the PSW pump provides a better margin of safety for the plant. The use of the PSW pump remains consistent with the technical basis of the EAL (NUMARC - NESP-007, IC - SS4 - Complete Loss of Heat Removal Capability EAL 1 Loss of core cooling and heat sink (PWR). The EOP that previously referenced use of the station ASW pump has been modified to reflect use of the PSW pump. The basis provides, "This EAL addresses complete loss of functions, core cooling and heat sink, required for hot shutdown with the reactor at pressure and temperature. Under these conditions, there is an actual major failure of a system intended for protection of the public. Thus, declaration of a Site Area Emergency is warranted. Escalation to General Emergency would be via Abnormal Rad Levels/Radiological Effluent, Emergency Coordinator Judgment, or Fission Product Barrier Degradation ICs. Core exit thermocouple readings are considered to be the average of the five (5) highest thermocouple readings shown on the Inadequate Core Cooling Monitor. The SSF can provide the following: (1) makeup to the Reactor Coolant pump seals, (2) low pressure service water to the steam generators (additional method for heat sink), (3) capability to keep the unit in hot shutdown for 72 hours following an Appendix R fire. This change is then in keeping true to the basis as currently written.

The change from pagers to ERONS and using cell phones was evaluated in E Plan rev. 2014-002, and shown to not be a reduction in effectiveness. The change is a result of a change in the method used to notify the ERO, and therefore the means to make offsite communications. The change to ERONS remains consistent with the technical basis of the EAL (NUMARC - NESP-007, IC SU6 - Unplanned Loss of All Onsite or Offsite Communications Capability, EAL 1, Loss of all onsite communications capability). This EAL address loss of the ability to perform routine operations and could represent a significant delay in notifying the ERO. The method previously used was using pagers, the new method uses cell phones activated by the ERONS system.

EAL Change Review Results:	**BLOCK 6**

☒ The EAL change <u>can</u> be implemented without prior NRC approval.

☐ The EAL change <u>cannot</u> be implemented without prior NRC approval.

Preparer Name: John Kaminski	Preparer Signature	Date: 12/17/14
Reviewer Name: Don Crowl	Reviewer Signature	Date: 12-17-14
Approver Name: Patrick M Street	Approver Signature	Date: 12/18/14