



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 13, 2015

LICENSEE: South Carolina Electric & Gas Company
FACILITY: Virgil C. Summer Nuclear Station, Unit 1
SUBJECT: SUMMARY OF SITE AUDIT TO SUPPORT THE REVIEW OF A LICENSE AMENDMENT REQUEST FOR VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1, TO TRANSITION TO THE NATIONAL FIRE PROTECTION ASSOCIATION STANDARD 805 FIRE PROTECTION LICENSING BASIS (TAC NO. ME7586)

The purpose of this summary is to document the results of an audit performed at Virgil C. Summer Nuclear Station (VCSNS), Unit 1, associated with a National Fire Protection Standard 805 (NFPA 805) license amendment requested (LAR) dated November 15, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML11321A172), as supplemented.

A review team, consisting of U.S. Nuclear Regulatory Commission (NRC) staff and contractors from the Center for Nuclear Waste Regulatory Analyses (CNWRA) and the Pacific Northwest National Laboratories (PNNL) participated in a regulatory audit of VCSNS, Unit 1, located in Jenkinsville, SC from June 4 to 8, 2012. The regulatory audit supported the review of the LAR filed by South Carolina Electric and Gas Company, to transition the plant's fire protection licensing basis to Title 10 of the *Code of Federal Regulations* Part 50.48(c), which endorses with exceptions the NFPA Standard 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants," 2001 Edition.

The purpose of the audit was to gain an understanding of the information needed to support the staff's licensing decision regarding the LAR and to develop requests for additional information (RAI), as needed.

The audit team consisted of 10 NRC, 3 CNWRA (NRC contractor), and 1 PNNL (NRC contractor) staff, of which 1 NRC staff member was an audit observer. Enclosure 1 provides the schedules of activities during the audit. Enclosure 2 lists the NRC staff, the CNWRA staff, the PNNL staff, the licensee staff, and the licensee contractors who participated in the audit.

The Audit Team held an entrance meeting on Monday, June 4, 2012, with the licensee staff and contractors, licensee management and NRC resident inspectors. During the remainder of the audit, team members met in smaller groups according to the Audit Plan. VCSNS staff provided plant walkdowns focusing on fire protection engineering, safe shutdown, fire probabilistic risk assessment (PRA), and fire modeling.

Technical discussions were focused on five major areas: fire protection engineering, post-safe shutdown/circuit analysis, fire PRA, fire modeling, and programmatic review. Documents reviewed during the audit were made previously available on the VCSNS reference portal and some additional documents were placed on the portal based on discussions during the audit. Enclosure 3 contains a list of documents that were made available for review on the portal

during the audit. In addition, hard copies that were reviewed during the audit are presented in this enclosure.

At the conclusion of the audit, the audit team participated in a summary exit meeting with VCSNS staff and management on June 8, 2012. The NRC staff expressed its appreciation to the VCSNS staff for providing informative walkdowns and presentations for the regulatory audit team.

Docket No. 50-395

Facility Operating License No.: NPF-12

Enclosures:

1. Audit Schedule
2. Audit Participants
3. Audit Documents

cc w/encls: Distribution via Listserv

Schedule of Activities

Monday, June 4, 2012

- 8:00 am** Audit team members met onsite at V.C. Summer Station
- 9:30 am** Audit entrance meeting
- 10:00 am** Technical discussions commenced: LAR overview, Fire PRA Overview, Fire PRA Quality/F&O resolution, Main Control Room Fire: CFAST Main Control Room Abandonment Time, Fire Modeling Generic Approach, Safe Shutdown: NSCA Development/Non Power Operations Development/Circuit Analysis/ Cable Selection
- 11:00am** Badging
- 12:00 pm** Lunch
- 1:00 pm** Breakout sessions conducted: Detailed review of FPE Attachments (I,L,T), Detailed review of Safe Shut Down, Detailed review of fire modeling began, Detailed review of fire PRA began Review Areas: Continuation of technical discussions initiated in the morning
- 4:45 pm** Licensee debrief
- 5:00 pm** Adjourn

Tuesday June 5, 2012

- 8:00pm** Morning breakout sessions and interviews were conducted and the following technical presentations commenced:
Rad Release – Conference Call
Programmatic/Configuration Management/Quality Assurance/Training Modifications
Fire Modeling: Performance Based Approach
Safe Shutdown/Circuit Analysis
- 12:00pm** Walkdowns/Tours were conducted: Turbine Building, Intermediate Building, Control Building, Diesel Generator Building; and Service Water Pumphouse
- 5:00 pm** Adjourn (Debrief held the morning of 6/6)

Wednesday, June 6, 2012

- 8:30 am** NRC staff conducted an audit team debrief to licensee staff on 06/05/2012 activities
- 9:00am** The following presentations, breakout sessions, and reviews were conducted:
NRC RAI process
Fire Protection Engineering
Fire Modeling Performance Based Approach
Fire PRA
Main Control Room Abandonment
Main Control Room Fire/NSCA/Recovery Actions (high level)
Simulator tour was conducted
- 4:00pm** NRC staff conducted an audit team debrief
- 4:30 pm** NRC debriefed licensee staff on the day's activities
- 5:00 pm** Adjourn

Thursday, June 7, 2012

- 8:00 am** The following are presentations, breakout sessions, and reviews that were conducted:
Configuration Management/Programmatic Feature Monitoring
Fire Modeling
Fire Protection Engineering
Defense in Depth/Fire Risk Evaluation
Fire Protection Engineering Unit 2 &3 Simulator Tour
- 4:00 pm** NRC Audit team debrief meeting
- 4:30 pm** NRC debriefed licensee

Friday, June 8, 2012

- 8:30 am** NRC conducted exit meeting with RAI Discussion
- 9:30 am** Adjourn

List of Participants

U.S. Nuclear Regulatory Commission (NRC) Team

Alexander Klein	Branch Chief/Oversight
Benjamin Beasley	Branch Chief/Oversight
Leslie Fields	Audit Team Leader
Harry Barrett	Audit Technical Lead
Robert Martin	DORL PM
Jay Robinson	Programmatic/RAI Coordinator
Alayna Pearson	FPE
Brian Metzger	FM
Gary Cooper	SSD/CA
JS Hyslop	PRA
Jigar Patel	PRA
Michael Snodderly	PRA

Pacific Northwest National Laboratories (PNNL) Team

Robert Layton	FPE
---------------	-----

Center for Nuclear Waste Regulatory Analyses (CNWRA) Team

Jason Huczek	FM (lead)
Marc Janssens	FM
Eric Nette	Programmatic
Pat Mackin	Programmatic

VC Summer Staff (South Carolina Electric and Gas)

Mike Kammer	NFPA 805 Project Manager/Fire Protection Engineer
Doug Edwards	Operations Management
Tom Keckeisen	Station Fire Protection Coordinator- Ops
Eric Rumpfelt	Licensing Supervisor/Operations
George Robertson	Licensing Engineer
Tammy Price	Licensing Administrative Support
Gerald Loignon	PRA Supervisor
Leo Kachnik	Fire PRA Engineer
Gil Williams	Design Supervisor: NSCA/NPO/FM
Jody Galloway	NSCA/NPO Engineer
Brian Boucher	Fire Protection Engineer: FM
Jeff Wagner	NEI00-01, Circuit Analysis
Jeff Cook	NEI00-01, Circuit Analysis
Tim Fanguy	NEI00-01, Circuit Analysis

VC Summer Contractor (SAIC)

Suzanne Loyd	Fire PRA Analyst
Paul Amico	Contract Project Manager/Fire PRA

VC Summer Contractor (Worley Parsons)

Donn Kelly PCKS/Circuit Analysis

VC Summer Contractor (Kleinsorg)

Francisco Joglar FirePRA/FM
Dan Funk NEI00-01, Circuit Analysis

VC Summer Contractor (Nexus)

Bill Guess NFPA 805 LAR Development
Steve Barrett Radioactive Release

VC Summer Contractor (Tri En)

Fleur DePeralta NSCA/NPO Analysis
John Cote NSCA/NPO Analysis

Industry Representatives

Paul Bemis Pacific Gas & Electric Co.

VC Summer Documents Available for Review on the Portal

Presentations

VCSNS NFPA805 Circuits Funk 20120602
VCSNS NFPA805 Configuration Control 20120531
VCSNS NFPA805 Fire Modeling FPRA CFAST
VCSNS NFPA805 Fire Modeling FPRA FDTs
VCSNS NFPA805 Fire Modeling FPRA Part 1 General
VCSNS NFPA805 Fire Modeling MCR Analysis
VCSNS NFPA805 Fire Modeling PB CFAST
VCSNS NFPA805 FPRA MCR Abandonment Modeling
VCSNS NFPA805 FPRA Quality 20120602
VCSNS NFPA805 Inspection Intro
VCSNS NFPA805 Monitoring Program 20120531
VCSNS NFPA805 NPO 20120531
VCSNS NFPA805 NSCA20120603
VCSNS NFPA805 Rad Release Study 20120601

Engineering Evaluations

TR0780E-001 FPEEE Safe Shutdown Separation
TR0780E-004 FPEEE Fire Admin Features and Materials
TR0780E-005 FPEE Fire Suppression
TR0780E-006 FPEEE Fire Protection

Calculations

DC07810-033 Evaluation of Fire System Flooding Effects
DC08010-007 Identification of Class 1E Equipment Subject to Water Flooding

Code Compliances

DC0780D-001 NFPA Code of Record
DC0780D-002 NFPA Code Compliance
DC0780D-003 Code Compliance Auto Fire Suppression
DC0780D-004 Code Compliance Manual Fire Suppression
DC0780D-005 Code Compliance Fire Alarm_ Fire Detection
DC0780D-006 Code Compliance Administrative Controls
DC0780D-007 Code Compliance Passive Fire Protection Features
DC0780D-008 Code Compliance Industrial Fire Brigade
DC0780D-009 Code Compliance Life Safety
DC00300-148 Revision 0
DC00300-146 Revision 0
DC00300-146 Revision 2
DC00300-146 Revision 1

Fire Protection Program Documents

20120403 QAPD Final
FPP022 Fire Prevention Rev 3
FPP031 Fire Preplans Rev 3B
Fire Pre-plan Drawings 001- 098
NFPA805 LAR Quality Assurance Summary
SAP131 Fire Protection Program Rev 6
TRP 2 Fire Protection R8D
Fire Protection Evaluation Report (FPER) November 2011

Drawings – Analysis Boundary

023-050 Site Yard Plan
023-051 Typical Details for Conduit Area Boundaries
023-052 Yard Area and Manhole Locations
023-053 Auxiliary Building- Reactor Building. - Plan Subbasements EL. 374'
023-054 Auxiliary Building- Reactor Building. - Plan Subbasements EL. 388' 397'
023-055 Auxiliary Building- Plan Shield Slab - EL. 400
023-056 Auxiliary. Reactor, and Fuel Handling Building-Plan EL. 412'
023-057 Auxiliary Building-Plan Shield Slab EL. 426'-6
023-058 Intermediate and Diesel Generator Building -Plan EL. 412'
023-059 Auxiliary. Reactor, and Fuel Handling Building-Plan Mezzanine EL. 436'
023-060 Drumming Station, Hot Machine Shop- Plan EL. 436' and 447'
023-061 Auxiliary Building- Plan Shield Slab EL. 446' and 452'
023-062 Intermediate and Diesel Generator Buildings- Plan EL. 436'
023-063 Auxiliary. Reactor, and Fuel Handling Building-Plan EL. 463'
023-064 Intermediate and Diesel Generator Buildings- Plan EL. 463'
023-065 Reactor Building- Plan EL. 515' and 552'
023-066 Auxiliary Building-Plan EL. 485'
023-067 Reactor and Fuel Handling Building Section A-A Looking West
023-068 Auxiliary and Reactor Buildings-Section B-B Looking North
023-069 Intermediate and Diesel Generator Buildings- Misc. Sections
023-070 Control Building Plans EL. 412', 436', 463', and 482'
023-071 Control Building Plans EL. 425', 448', and Roof EL. 505'
023-072 Control Building Miscellaneous Sections
023-073 Turbine Building - Plan El. 412'
023-074 Turbine Building - Plan El. 436'
023-075 Turbine Building - Plan El. 463'
023-080 Service Water Intake Screen and Pumphouse
023-081 Circulation Water Intake Screen and Pumphouse EL. 436'-0

Plant Layout Drawings

001-001_AB_RB_EL374
001-002_AB_RB_EL388-397
001-011_AB_RB_FB_EL412
001-012_IB_DB_EL412
001-013_TB_EL412
001-014_AB_MISC PLANS
001-021_AB_RB_FB_EL436

001-022_IB_DB_EL436
001-023_TB_EL436
001-031_AB_RB_FB_EL463
001-032_IB_DB_EL463
001-033_TB_EL463
001-034_RB_EL515-552
001-035_AB_EL485
001-061_BLDG LAYOUT
001-062_PLANT LAYOUT

Hard Copies Reviewed

Fire PRA Methods Report
VCS Fire PRA Plant Final Report - Task 5 16 Rev 0
Portal Fire Protection Drawings
VCS Fire PRA Plant Final Report Task 5 16 Rev 0
Fire PRA Quantification Calculations
Fire Risk Quantifications Task 14
PSA-05, "Data Update Guideline with Emphasis on Bayesian Updating," Revision 2
DC-00300-150, Revision 0
DC00340-001, "Fire PRA Human Reliability Analyses Report, Task 5.12," Revision 0
PSA-08, "PRA Model Updates," Revision 4
PSA-03, "PRA Quantification Guideline," Revision 2
PRA Evaluation LK19897, "Dependent Event Analysis for the Fire HRA," August 9, 2010

Performance-Based Calculations:

- a. DC0780F-096 Fire Modeling Fire Area CB10 VFDR
- b. DC0780F-097 Fire Modeling Fire Area CB12 VFDR
- c. DC0780F-103 Fire Modeling Fire Area CB18 VFDR
- d. DC0780F-173 Fire Modeling Fire Area IB11 VFDR

MCR Abandonment Study (Calculation DC0780B-100, Fire Modeling: CB17.01)
Generic Methodology Document (Calculation DC0780B-001)
Multi Compartment Fire Modeling Generic Methodology (Calculation DC0780C-001)
Structural Steel Methodology (Calculation DC0780A-001)
Fire Modeling Scoping Report Task 5.8, Revision 0

Fire Modeling Calculations

General Area 463' Elevation: DC0780B-027 Fire Modeling Fire Subzone AB01.21.02
Switchgear Room 436' Elevation: DC0780B-186 Fire Modeling Fire Zone IB22.02a
General Area 436' Elevation: DC0780B-192 Fire Modeling Fire Zone IB25.01.02
Lower Cable Spreading Room: DC0780B-086 Fire Modeling Fire Zone CB04
Relay Room: DC0780B-088 Fire Modeling Fire Zone CB06
Upper Cable Spreading Room: DC0780B-099 Fire Modeling Fire Zone CB15
MCR – Horseshoe Area: DC0780B-100 Fire Modeling Fire Zone CB17.01
MCR – Support Area: DC0780B-101 Fire Modeling Fire Zone CB17.02

during the audit. In addition, hard copies that were reviewed during the audit are presented in this enclosure.

At the conclusion of the audit, the audit team participated in a summary exit meeting with VCSNS staff and management on June 8, 2012. The NRC staff expressed its appreciation to the VCSNS staff for providing informative walkdowns and presentations for the regulatory audit team.

Docket No. 50-395
Facility Operating License No.: NPF-12

Enclosures:

1. Audit Schedule
2. Audit Participants
3. Audit Documents

cc w/encls: Distribution via Listserv

DISTRIBUTION:

PUBLIC LPL2-1 R/F	RidsNrrDssStsb Resource
RidsAcrs_AcnwMailCTR Resource	RidsNrrLASFiguroa Resource
RidsNrrDorIDpr Resource	RidsRgn2MailCenter Resource
RidsNrrDraAfpb Resource	RidsNrrPMSummer Resource
RidsNrrDraAhp Resource	SWilliams, NRR
RidsNrrDraApla Resource	

ADAMS Accession No. ML15041A168

OFFICE	NRR/DORL/PM	NRR/DORL/LPL2-1/LA	NRR/DORL/LPL2-1/BC	NRR/DORL/PM
NAME	SWilliams	SFiguroa	RPascarelli	SWilliams
DATE	02/12/15	02/12/15	02/12/15	02/13/15

Official Record Copy