South Carolina Electric and Gas
V. C. Summer Nuclear Station, Units 2 & 3
COL Application

COLA Table of Contents Navigation Page

Part 1 — General and Administrative Information

Part 2 — Final Safety Analysis Report

Part 3 — Applicant's Environmental Report–Combined License Stage

Part 4 — Technical Specifications

Part 5 — Emergency Plan

Part 7 — Departures and Exemptions

Part 9 — Withheld Information

Part 10 — Proposed License Conditions and ITAAC

Part 11 — COLA Enclosure 1 - Subsurface Reports

Part 12 — COLA Enclosure 2 - Seismic Technical Advisory Review Letter

Part 13 — COLA Enclosure 3 - QAPD

Part 14 — COLA Enclosure 4 - Mitigative Strategies Description and Plans

Part 15 — COLA Enclosure 5 - Cyber Security Plan

Part 16 — COLA Enclosure 6 - Special Nuclear Material (SNM) Material Control and Accounting Program Description

V. C. Summer Nuclear Station, Units 2 and 3

COL Application

Part 2

Final Safety Analysis Report

Revision 4

FSAR MASTER TABLE OF CONTENTS

Section | Title | Page

CHAPTER 1
INTRODUCTION AND GENERAL DESCRIPTION OF THE PLANT

1.1 INTRODUCTION 1.1-1
1.2 GENERAL PLANT DESCRIPTION 1.2-1
1.3 COMPARISONS WITH SIMILAR FACILITY DESIGNS 1.3-1
1.4 IDENTIFICATION OF AGENTS AND CONTRACTORS 1.4-1
1.5 REQUIREMENTS FOR FURTHER TECHNICAL INFORMATION 1.5-1
1.6 MATERIAL REFERENCED 1.6-1
1.7 DRAWINGS AND OTHER DETAILED INFORMATION 1.7-1
1.8 INTERFACES FOR STANDARD DESIGN 1.8-1
1.9 COMPLIANCE WITH REGULATORY CRITERIA 1.9-1
1.10 NUCLEAR POWER PLANTS TO BE OPERATED ON MULTI-UNIT SITES 1.10-1
APP. 1A CONFORMANCE WITH REGULATORY GUIDES 1A-1
APP. 1AA CONFORMANCE WITH REGULATORY GUIDES 1AA-1
APP. 1B SEVERE ACCIDENT MITIGATION DESIGN ALTERNATIVES 1B-1

CHAPTER 2
SITE CHARACTERISTICS

2.0 SITE CHARACTERISTICS 2.0-1
2.1 GEOGRAPHY AND DEMOGRAPHY 2.1-1
2.2 NEARBY INDUSTRIAL, TRANSPORTATION, AND MILITARY FACILITIES 2.2-1
2.3 METEOROLOGY 2.3-1
2.4 HYDROLOGIC ENGINEERING 2.4-1
2.5.0 GEOLOGY, SEISMOLOGY, AND GEOTECHNICAL ENGINEERING 2.5.0-1

CHAPTER 3
DESIGN OF STRUCTURES, COMPONENTS, EQUIPMENT AND SYSTEMS

3.1 CONFORMANCE WITH NUCLEAR REGULATORY COMMISSION GENERAL DESIGN CRITERIA 3.1-1
3.2 CLASSIFICATION OF STRUCTURES, COMPONENTS, AND SYSTEMS 3.2-1
3.3 WIND AND TORNADO LOADINGS 3.3-1
3.4 WATER LEVEL (FLOOD) DESIGN 3.4-1
3.5 MISSILE PROTECTION 3.5-1

FSAR MASTER TABLE OF CONTENTS (CONT.)

Section	Title	Page
3.6	PROTECTION AGAINST THE DYNAMIC EFFECTS ASSOCIATED WITH THE POSTULATED RUPTURE OF PIPING	3.6-1
3.7	SEISMIC DESIGN	3.7-1
3.8	DESIGN OF CATEGORY I STRUCTURES	3.8-1
3.9	MECHANICAL SYSTEMS AND COMPONENTS	3.9-1
3.10	SEISMIC AND DYNAMIC QUALIFICATION OF SEISMIC CATEGORY I MECHANICAL AND ELECTRICAL EQUIPMENT	3.10-1
3.11	ENVIRONMENTAL QUALIFICATION OF MECHANICAL AND ELECTRICAL EQUIPMENT	3.11-1
APP. 3A	HVAC DUCTS AND DUCT SUPPORTS	3A-1
APP. 3B	LEAK-BEFORE-BREAK EVALUATION OF THE AP1000 PIPING	3B-1
APP. 3C	REACTOR COOLANT LOOP ANALYSIS METHODS	3C-1
APP. 3D	METHODOLOGY FOR QUALIFYING AP1000 SAFETY-RELATED ELECTRICAL AND MECHANICAL EQUIPMENT	3D-1
APP. 3E	HIGH-ENERGY PIPING IN THE NUCLEAR ISLAND	3E-1
APP. 3F	CABLE TRAYS AND CABLE TRAY SUPPORTS	3F-1
APP. 3G	NUCLEAR ISLAND SEISMIC ANALYSES	3G-1
APP. 3H	AUXILIARY AND SHIELD BUILDING CRITICAL SECTIONS	3H-1
APP. 3I	EVALUATION FOR HIGH FREQUENCY SEISMIC INPUT	3I-1

CHAPTER 4
REACTOR

4.1	SUMMARY DESCRIPTION	4.1-1
4.2	FUEL SYSTEM DESIGN	4.2-1
4.3	NUCLEAR DESIGN	4.3-1
4.4	THERMAL AND HYDRAULIC DESIGN	4.4-1
4.5	REACTOR MATERIALS	4.5-1
4.6	FUNCTIONAL DESIGN OF REACTIVITY CONTROL SYSTEMS	4.6-1

CHAPTER 5
REACTOR COOLANT SYSTEM AND CONNECTED SYSTEMS

5.1	SUMMARY DESCRIPTION	5.1-1
5.2	INTEGRITY OF REACTOR COOLANT PRESSURE BOUNDARY	5.2-1
5.3	REACTOR VESSEL	5.3-1
5.4	COMPONENT AND SUBSYSTEM DESIGN	5.4-1

FSAR MASTER TABLE OF CONTENTS (CONT.)

Section Title Page

CHAPTER 6
ENGINEERED SAFETY FEATURES

6.0 ENGINEERED SAFETY FEATURES 6.0-1
6.1 ENGINEERED SAFETY FEATURES MATERIALS 6.1-1
6.2 CONTAINMENT SYSTEMS 6.2-1
6.3 PASSIVE CORE COOLING SYSTEM 6.3-1
6.4 HABITABILITY SYSTEMS 6.4-1
6.5 FISSION PRODUCT REMOVAL AND CONTROL SYSTEMS 6.5-1
6.6 INSERVICE INSPECTION OF CLASS 2, 3, AND MC COMPONENTS 6.6-1
APP. 6A FISSION PRODUCT DISTRIBUTION IN THE AP1000 POST-DESIGN BASIS ACCIDENT CONTAINMENT ATMOSPHERE 6A-1

CHAPTER 7
INSTRUMENTATION AND CONTROLS

7.1 INTRODUCTION 7.1-1
7.2 REACTOR TRIP 7.2-1
7.3 ENGINEERED SAFETY FEATURES 7.3-1
7.4 SYSTEMS REQUIRED FOR SAFE SHUTDOWN 7.4-1
7.5 SAFETY-RELATED DISPLAY INFORMATION 7.5-1
7.6 INTERLOCK SYSTEMS IMPORTANT TO SAFETY 7.6-1
7.7 CONTROL AND INSTRUMENTATION SYSTEMS 7.7-1

CHAPTER 8
ELECTRIC POWER

8.1 INTRODUCTION 8.1-1
8.2 OFFSITE POWER SYSTEM 8.2-1
8.3 ONSITE POWER SYSTEMS 8.3-1

CHAPTER 9
AUXILIARY SYSTEMS

9.1 FUEL STORAGE AND HANDLING 9.1-1
9.2 WATER SYSTEMS 9.2-1
9.3 PROCESS AUXILIARIES 9.3-1
9.4 AIR-CONDITIONING, HEATING, COOLING, AND VENTILATION SYSTEM 9.4-1

FSAR MASTER TABLE OF CONTENTS (CONT.)

Section	Title	Page
9.5	OTHER AUXILIARY SYSTEMS	9.5-1
APP. 9A	FIRE PROTECTION ANALYSIS	9A-1

CHAPTER 10
STEAM AND POWER CONVERSION

10.1	SUMMARY DESCRIPTION	10.1-1
10.2	TURBINE-GENERATOR	10.2-1
10.3	MAIN STEAM SUPPLY SYSTEM	10.3-1
10.4	OTHER FEATURES OF STEAM AND POWER CONVERSION SYSTEM	10.4-1

CHAPTER 11
RADIOACTIVE WASTE MANAGEMENT

11.1	SOURCE TERMS	11.1-1
11.2	LIQUID WASTE MANAGEMENT SYSTEMS	11.2-1
11.3	GASEOUS WASTE MANAGEMENT SYSTEM	11.3-1
11.4	SOLID WASTE MANAGEMENT	11.4-1
11.5	RADIATION MONITORING	11.5-1

CHAPTER 12
RADIATION PROTECTION

12.1	ASSURING THAT OCCUPATIONAL RADIATION EXPOSURES ARE AS-LOW-AS-REASONABLY ACHIEVABLE (ALARA)	12.1-1
12.2	RADIATION SOURCES	12.2-1
12.3	RADIATION PROTECTION DESIGN FEATURES	12.3-1
12.4	DOSE ASSESSMENT	12.4-1
12.5	HEALTH PHYSICS FACILITIES DESIGN	12.5-1
APP. 12AA	RADIATION PROTECTION PROGRAM DESCRIPTION	12AA-1

CHAPTER 13
CONDUCT OF OPERATIONS

13.1	ORGANIZATIONAL STRUCTURE OF APPLICANT	13.1-1
13.2	TRAINING	13.2-1
13.3	EMERGENCY PLANNING	13.3-1
13.4	OPERATIONAL PROGRAMS	13.4-1
13.5	PLANT PROCEDURES	13.5-1

FSAR MASTER TABLE OF CONTENTS (CONT.)

Section	Title	Page
13.6	SECURITY	13.6-1
13.7	FITNESS FOR DUTY	13.7-1
APP. 13AA	CONSTRUCTION-RELATED ORGANIZATION	13AA-1

CHAPTER 14
INITIAL TEST PROGRAM

14.1	SPECIFIC INFORMATION TO BE INCLUDED IN PRELIMINARY/ FINAL SAFETY ANALYSIS REPORTS	14.1-1
14.2	SPECIFIC INFORMATION TO BE INCLUDED IN STANDARD SAFETY ANALYSIS REPORTS	14.2-1
14.3	CERTIFIED DESIGN MATERIAL	14.3-1
14.4	COMBINED LICENSE APPLICANT RESPONSIBILITIES	14.4-1
APP. 14A	DESIGN ACCEPTANCE CRITERIA/ITAAC CLOSURE PROCESS	14A-1

CHAPTER 15
ACCIDENT ANALYSES

15.0	ACCIDENT ANALYSES	15.0-1
15.1	INCREASE IN HEAT REMOVAL FROM THE PRIMARY SYSTEM	15.1-1
15.2	DECREASE IN HEAT REMOVAL BY THE SECONDARY SYSTEM	15.2-1
15.3	DECREASE IN REACTOR COOLANT SYSTEM FLOW RATE	15.3-1
15.4	REACTIVITY AND POWER DISTRIBUTION ANOMALIES	15.4-1
15.5	INCREASE IN REACTOR COOLANT INVENTORY	15.5-1
15.6	DECREASE IN REACTOR COOLANT INVENTORY	15.6-1
15.7	RADIOACTIVE RELEASE FROM A SUBSYSTEM OR COMPONENT	15.7-1
15.8	ANTICIPATED TRANSIENTS WITHOUT SCRAM	15.8-1
APP. 15A	EVALUATION MODELS AND PARAMETERS FOR ANALYSIS OF RADIOLOGICAL CONSEQUENCES OF ACCIDENTS	15A-1
APP. 15B	REMOVAL OF AIRBORNE ACTIVITY FROM THE CONTAINMENT ATMOSPHERE FOLLOWING A LOCA	15B-1

FSAR MASTER TABLE OF CONTENTS (CONT.)

Section	Title	Page

CHAPTER 16
TECHNICAL SPECIFICATIONS

16.1	TECHNICAL SPECIFICATIONS	16.1-1
16.2	DESIGN RELIABILITY ASSURANCE PROGRAM	16.2-1
16.3	INVESTMENT PROTECTION	16.3-1

CHAPTER 17
QUALITY ASSURANCE

17.1	QUALITY ASSURANCE DURING THE DESIGN AND CONSTRUCTION PHASES	17.1-1
17.2	QUALITY ASSURANCE DURING THE OPERATIONS PHASE	17.2-1
17.3	QUALITY ASSURANCE DURING DESIGN, PROCUREMENT, FABRICATION, INSPECTION, AND/OR TESTING OF NUCLEAR POWER PLANT ITEMS	17.3-1
17.4	DESIGN RELIABILITY ASSURANCE PROGRAM	17.4-1
17.5	QUALITY ASSURANCE PROGRAM DESCRIPTION - NEW LICENSE APPLICANTS	17.5-1
17.6	MAINTENANCE RULE PROGRAM	17.6-1
17.7	COMBINED LICENSE INFORMATION ITEMS	17.7-1
17.8	REFERENCES	17.8-1

CHAPTER 18
HUMAN FACTORS ENGINEERING

18.1	OVERVIEW	18.1-1
18.2	HUMAN FACTORS ENGINEERING PROGRAM MANAGEMENT	18.2-1
18.3	OPERATING EXPERIENCE REVIEW	18.3-1
18.4	FUNCTIONAL REQUIREMENTS ANALYSIS AND ALLOCATION	18.4-1
18.5	AP1000 TASK ANALYSIS IMPLEMENTATION PLAN	18.5-1
18.6	STAFFING	18.6-1
18.7	INTEGRATION OF HUMAN RELIABILITY ANALYSIS WITH HUMAN FACTORS ENGINEERING	18.7-1
18.8	HUMAN SYSTEM INTERFACE DESIGN	18.8-1
18.9	PROCEDURE DEVELOPMENT	18.9-1
18.10	TRAINING PROGRAM DEVELOPMENT	18.10-1
18.11	HUMAN FACTORS ENGINEERING VERIFICATION AND VALIDATION	18.11-1
18.12	INVENTORY	18.12-1
18.13	DESIGN IMPLEMENTATION	18.13-1
18.14	HUMAN PERFORMANCE MONITORING	18.14-1

FSAR MASTER TABLE OF CONTENTS (CONT.)

Section | Title | Page

CHAPTER 19
PROBABILISTIC RISK ASSESSMENT

19.1 INTRODUCTION 19.1-1
19.2 INTERNAL INITIATING EVENTS 19.2-1
19.3 MODELING OF SPECIAL INITIATORS 19.3-1
19.4 EVENT TREE MODELS 19.4-1
19.5 SUPPORT SYSTEMS 19.5-1
19.6 SUCCESS CRITERIA ANALYSIS 19.6-1
19.7 FAULT TREE GUIDELINES 19.7-1
19.8 PASSIVE CORE COOLING SYSTEM - PASSIVE RESIDUAL HEAT REMOVAL 19.8-1
19.9 PASSIVE CORE COOLING SYSTEM - CORE MAKEUP TANKS 19.9-1
19.10 PASSIVE CORE COOLING SYSTEM - ACCUMULATOR 19.10-1
19.11 PASSIVE CORE COOLING SYSTEM - AUTOMATIC DEPRESSURIZATION SYSTEM 19.11-1
19.12 PASSIVE CORE COOLING SYSTEM - IN-CONTAINMENT REFUELING WATER STORAGE TANK 19.12-1
19.13 PASSIVE CONTAINMENT COOLING 19.13-1
19.14 MAIN AND STARTUP FEEDWATER SYSTEM 19.14-1
19.15 CHEMICAL AND VOLUME CONTROL SYSTEM 19.15-1
19.16 CONTAINMENT HYDROGEN CONTROL SYSTEM 19.16-1
19.17 NORMAL RESIDUAL HEAT REMOVAL SYSTEM 19.17-1
19.18 COMPONENT COOLING WATER SYSTEM 19.18-1
19.19 SERVICE WATER SYSTEM 19.19-1
19.20 CENTRAL CHILLED WATER SYSTEM 19.20-1
19.21 AC POWER SYSTEM 19.21-1
19.22 CLASS 1E DC & UPS SYSTEM 19.22-1
19.23 NON-CLASS 1E DC & UPS SYSTEM 19.23-1
19.24 CONTAINMENT ISOLATION 19.24-1
19.25 COMPRESSED AND INSTRUMENT AIR SYSTEM 19.25-1
19.26 PROTECTION AND SAFETY MONITORING SYSTEM 19.26-1
19.27 DIVERSE ACTUATION SYSTEM 19.27-1
19.28 PLANT CONTROL SYSTEM 19.28-1
19.29 COMMON CAUSE ANALYSIS 19.29-1
19.30 HUMAN RELIABILITY ANALYSIS 19.30-1
19.31 OTHER EVENT TREE NODE PROBABILITIES 19.31-1
19.32 DATA ANALYSIS AND MASTER DATA BANK 19.32-1
19.33 FAULT TREE AND CORE DAMAGE QUANTIFICATION 19.33-1
19.34 SEVERE ACCIDENT PHENOMENA TREATMENT 19.34-1
19.35 CONTAINMENT EVENT TREE ANALYSIS 19.35-1
19.36 REACTOR COOLANT SYSTEM DEPRESSURIZATION 19.36-1
19.37 CONTAINMENT ISOLATION 19.37-1
19.38 REACTOR VESSEL REFLOODING 19.38-1

FSAR MASTER TABLE OF CONTENTS (CONT.)

Section	Title	Page
19.39	IN-VESSEL RETENTION OF MOLTEN CORE DEBRIS	19.39-1
19.40	PASSIVE CONTAINMENT COOLING	19.40-1
19.41	HYDROGEN MIXING AND COMBUSTION ANALYSIS	19.41-1
19.42	CONDITIONAL CONTAINMENT FAILURE PROBABILITY DISTRIBUTION	19.42-1
19.43	RELEASE FREQUENCY QUANTIFICATION	19.43-1
19.44	MAAP4.0 CODE DESCRIPTION AND AP1000 MODELING	19.44-1
19.45	FISSION PRODUCT SOURCE TERMS	19.45-1
19.46	NOT USED	19.46-1
19.47	NOT USED	19.47-1
19.48	NOT USED	19.48-1
19.49	OFFSITE DOSE EVALUATION	19.49-1
19.50	IMPORTANCE AND SENSITIVITY ANALYSIS	19.50-1
19.51	UNCERTAINTY ANALYSIS	19.51-1
19.52	NOT USED	19.52-1
19.53	NOT USED	19.53-1
19.54	LOW POWER AND SHUTDOWN PRA ASSESSMENT	19.54-1
19.55	SEISMIC MARGIN ANALYSIS	19.55-1
19.56	PRA INTERNAL FLOODING ANALYSIS	19.56-1
19.57	INTERNAL FIRE ANALYSIS	19.57-1
19.58	WINDS, FLOODS, AND OTHER EXTERNAL EVENTS	19.58-1
19.59	PRA RESULTS AND INSIGHTS	19.59-1
APP. 19A	THERMAL HYDRAULIC ANALYSIS TO SUPPORT SUCCESS CRITERIA	19A-1
APP. 19B	EX-VESSEL SEVERE ACCIDENT PHENOMENA	19B-1
APP. 19C	ADDITIONAL ASSESSMENT OF AP1000 DESIGN FEATURES	19C-1
APP. 19D	EQUIPMENT SURVIVABILITY ASSESSMENT	19D-1
APP. 19E	SHUTDOWN EVALUATION	19E-1
APP. 19F	MALEVOLENT AIRCRAFT IMPACT	19F-1