

**Final Safety Evaluation Report for Combined Licenses for
Vogtle Electric Generating Plant, Units 3 and 4**

U.S. Nuclear Regulatory Commission
Office of New Reactors
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ABSTRACT

This final safety evaluation report¹ (FSER) documents the U.S. Nuclear Regulatory Commission (NRC) staff's technical review of the combined license (COL) application submitted by Southern Nuclear Operating Company (SNC or the applicant), for the Vogtle Electric Generating Plant (VEGP) Units 3 and 4. The SER also documents the NRC staff's technical review of the limited work authorization (LWA) activities for which SNC has requested approval.

By letter dated March 28, 2008, SNC, acting on behalf of itself and the proposed owners (Georgia Power Company (GPC), Oglethorpe Power Corporation (an electric membership corporation), Municipal Electric Authority of Georgia, and the City of Dalton, Georgia, an incorporated municipality in the State of Georgia acting by and through its Board of Water, Light and Sinking Fund Commissioners), submitted its application to the NRC for COLs for two AP1000 advanced passive pressurized-water reactors (PWRs) pursuant to the requirements of Sections 103 and 185(b) of the Atomic Energy Act of 1954, as amended; Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, "Licenses, certifications and approvals for nuclear power plants"; and the associated material licenses under 10 CFR Part 30, "Rules of general applicability to domestic licensing of byproduct material"; 10 CFR Part 40, "Domestic licensing of source material"; and 10 CFR Part 70, "Domestic licensing of special nuclear material." These reactors are identified as VEGP Units 3 and 4, and will be located on the existing VEGP site in Burke County, Georgia.

In October 2009, SNC supplemented its COL application to include a request for an LWA. The LWA, in accordance with 10 CFR 50.10(d), would authorize installation of reinforcing steel, sumps, drain lines, and other embedded items along with placement of concrete for the nuclear island foundation base slab.

The initial application incorporated by reference 10 CFR Part 52, Appendix D, "Design Certification Rule for the AP1000 Design," and the Westinghouse Electric Corporation's (Westinghouse's) application for amendment of the AP1000 design, as described in Revision 16 of the Design Control Document (DCD) (submitted May 26, 2007), as well as Westinghouse Technical Report (TR)-134, APP-GW-GLR-134, "AP1000 DCD Impacts to Support COLA Standardization," Revision 4 (which was submitted on March 18, 2008). The initial application also referenced the VEGP Early Site Permit (ESP) Application, Revision 4, dated March 28, 2008. Subsequent to the initial application, in its submittal dated December 11, 2009, SNC incorporated by reference the VEGP ESP Application, Revision 5, dated December 23, 2008, as approved by the NRC in the VEGP ESP and LWA (ESP-004), dated August 26, 2009. In a letter dated August 6, 2010, SNC incorporated by reference the three amendments issued (on May 21, 2010; June 25, 2010; and July 9, 2010) to the ESP. In a letter dated June 24, 2011 (submittal number 8), SNC incorporated by reference AP1000 DCD, Revision 19. The results of the NRC staff's evaluation of the AP1000 DCD are documented in NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design," and its supplements. The results of the NRC staff's evaluation related to the VEGP ESP are documented in NUREG-1923, "Safety Evaluation Report for Early Site Permit (ESP) at the Vogtle Electric Generating Plant (VEGP) ESP Site."

¹ This FSER documents the NRC staff's position on all safety issues associated with the combined license application. The Advisory Committee on Reactor Safeguards (ACRS) independently reviewed those aspects of the application that concern safety, as well as the advanced safety evaluation report without open items (an earlier version of this document), and provided the results of its review to the Commission in a report dated January 24, 2011. . This report is included as Appendix F to this SER.

This FSER presents the results of the staff's review of information submitted in conjunction with the COL application, except those matters resolved as part of the referenced ESP or design certification rule. In Appendix A to this FSER, the staff has identified certain license conditions and inspections, tests, analyses and acceptance criteria (ITAAC) that the staff recommends the Commission impose, should COLs be issued to the applicant. Appendix A includes the applicable permit conditions and ITAAC from the ESP. Therefore, Appendix A includes COL and ESP conditions, recognizing that should COLs be issued to the applicant, the ESP will be subsumed into the COLs. In addition to the ITAAC in Appendix A, the ITAAC found in the AP1000 DCD, Revision 19 Tier 1 material will also be incorporated into the COLs should COLs be issued to the applicant.

On the basis of the staff's review² of the application, as documented in this FSER, the staff recommends that the Commission find the following with respect to the safety aspects of the COL application: 1) the applicable standards and requirements of the Atomic Energy Act and Commission regulations have been met, 2) Required notifications to other agencies or bodies have been duly made, 3) there is reasonable assurance that the facility will be constructed and will operate in conformity with the license, the provisions of the Atomic Energy Act, and the Commission's regulations, 4) the applicant is technically and financially qualified to engage in the activities authorized, and 5) issuance of the license will not be inimical to the common defense and security or to the health and safety of the public.

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An environmental review was also performed of the COL application and its evaluation and conclusions are documented in NUREG-1947, "Final Supplemental Environmental Impact Statement for Combined Licenses (COLs) for Vogtle Electric Generating Plant Units 3 and 4."

CONTENTS

The chapter and section layout of this SER is consistent with the format of: (1) NUREG-0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)”; (2) Regulatory Guide 1.206, “Combined License Applications for Nuclear Power Plants”; and (3) the applicant’s final safety analysis report. Where applicable, references to other regulatory actions (design certifications, ESPs) are included in the text of the SER.

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EXECUTIVE SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52 include requirements for licensing new nuclear power plants.³ These regulations include the NRC's requirements for early site permit (ESP), design certification, and combined license (COL) applications. The ESP process (10 CFR Part 52, Subpart A, "Early Site Permits") is intended to address and resolve siting-related issues. The design certification process (10 CFR Part 52, Subpart B, "Standard Design Certifications") provides a means for a vendor to obtain NRC certification of a particular reactor design. Finally, the COL process (10 CFR Part 52, Subpart C, "Combined Licenses") allows an applicant to seek authorization to construct and operate a new nuclear power plant. A COL may reference an ESP, a certified design, both, or neither. As part of demonstrating that all applicable NRC requirements are met, a COL applicant referencing an ESP or certified design must demonstrate compliance with any requirements not already resolved as part of the referenced ESP or design certification before the NRC issues that COL.

This FSER describes the results of a review by the NRC staff of a COL application submitted by Southern Nuclear Operating Company (SNC or the applicant), acting on behalf of itself and the proposed owners (Georgia Power Company (GPC), Oglethorpe Power Corporation (an electric membership corporation), Municipal Electric Authority of Georgia, and the City of Dalton, Georgia, an incorporated municipality in the State of Georgia acting by and through its Board of Water, Light and Sinking Fund Commissioners), for two new reactors to be located at the Vogtle Electric Generating Plant (VEGP) site. The staff's review was to determine the applicant's compliance with the requirements of Subpart C of 10 CFR Part 52, as well as the applicable requirements under 10 CFR Parts 30, 40, and 70 governing the possession and use of applicable source, byproduct, and special nuclear materials. This FSER serves to identify the staff's conclusions with respect to the COL safety review.

The NRC regulations also require an applicant to submit an environmental report pursuant to 10 CFR Part 51, "Environmental protection regulations for domestic licensing and related regulatory functions." The NRC reviews the environmental report as part of the Agency's responsibilities under the National Environmental Policy Act of 1969, as amended. The NRC presents the results of that review in a final environmental impact statement (FEIS), which is a report separate from this FSER. The NRC staff previously prepared an FEIS as part of its review of the VEGP ESP, which is referenced in the VEGP COL application. NUREG-1872, "Final Environmental Impact Statement for an Early Site Permit (ESP) at the Vogtle Electric Generating Plant Site," was issued in August 2008, and can be accessed through the Agencywide Documents Access and Management System (ADAMS) at ML082260190.⁴

³ Applicants may also choose to seek a construction permit (CP) and operating license in accordance with 10 CFR Part 50, "Domestic licensing of production and utilization facilities," instead of using the 10 CFR Part 52 process.

⁴ Agencywide Documents Access and Management System (ADAMS) is the NRC's information system that provides access to all image and text documents that the NRC has made public since November 1, 1999, as well as bibliographic records (some with abstracts and full text) that the NRC made public before November 1999. Documents available to the public may be accessed via the Internet at <http://www.nrc.gov/reading-rm/adams/web-based.html>. Documents may also be viewed by visiting the NRC's Public Document Room at One White Flint North, 11555 Rockville Pike, Rockville, Maryland. Telephone assistance for using web-based ADAMS is available at (800) 397-4209 between 8:30 a.m. and 4:15 p.m., Eastern Time, Monday through Friday, except Federal holidays. The staff is also making this FSER available on the NRC's new reactor licensing public web site at <http://www.nrc.gov/reactors/new-reactors/col/vogtle/documents/ser-final.html>.

For a COL application that references an ESP, the NRC staff, pursuant to 10 CFR 51.75(c), prepares a supplement to the ESP environmental impact statement (EIS) in accordance with 10 CFR 51.92(e). NRC regulations related to the environmental review of COL applications are in 10 CFR Part 51 and 10 CFR Part 52, Subpart C. Pursuant to 10 CFR 51.50(c)(1), a COL applicant referencing an ESP need not submit information or analyses regarding environmental issues that were resolved in the ESP EIS, except to the extent that the COL applicant has identified new and significant information regarding such issues. In addition, under 10 CFR 52.39, "Finality of early site permit determinations," matters resolved in the ESP proceedings are considered to be resolved in any subsequent proceedings, absent identification of new and significant information. The staff issued a supplement to the ESP EIS, NUREG-1947, "Final Supplemental Environmental Impact Statement for Combined Licenses (COLs) for Vogtle Electric Generating Plant Units 3 and 4," for the COL on March 25, 2011, which can be accessed through ADAMS at ML11076A010.

In a letter dated March 28, 2008, the SNC, acting on behalf of itself and the proposed owners, submitted its application to the NRC for COLs for two AP1000 advanced passive pressurized-water reactors (PWRs) (ADAMS Accession No. ML081050133) to be located at the VEGP site. SNC identified the two units as VEGP Units 3 and 4. The VEGP site is located on a coastal plain bluff on the southwest side of the Savannah River in eastern Burke County, Georgia. The site is approximately 26 miles southeast of Augusta, Georgia, and 100 miles northwest of Savannah, Georgia. Directly across from the site, on the eastern side of the Savannah River, is the U.S. Department of Energy's (DOE's) Savannah River site in Barnwell County, South Carolina. The proposed VEGP Units 3 and 4 would be built on the VEGP site adjacent to two existing nuclear power reactors, VEGP Units 1 and 2, operated by SNC.

In October 2009, SNC supplemented its COL application to include a request for an LWA. The LWA, in accordance with 10 CFR 50.10(d), would authorize installation of reinforcing steel, sumps, drain lines, and other embedded items along with placement of concrete for the nuclear island foundation base slab.

The initial application incorporated by reference 10 CFR Part 52, Appendix D, "Design Certification Rule for the AP1000 Design," and the Westinghouse Electric Corporation's (Westinghouse's) application for amendment of the AP1000 design, as supported by Revision 16 of the Design Control Document (DCD) (submitted May 26, 2007) as well as Westinghouse Technical Report (TR)-134, APP-GW-GLR-134, "AP1000 DCD Impacts to Support COLA Standardization," Revision 4 (which was submitted on March 18, 2008). The initial application also referenced the VEGP Early Site Permit (ESP) Application, Revision 4, dated March 28, 2008. Subsequent to the initial application, in its submittal dated December 11, 2009, SNC incorporated by reference the VEGP ESP Application, Revision 5, dated December 23, 2008, as approved by the NRC in the VEGP ESP and LWA (ESP-004), dated August 26, 2009. In a letter dated August 6, 2010, SNC incorporated by reference the three amendments issued (on May 21, 2010; June 25, 2010; and July 9, 2010) to the ESP. In a letter dated June 24, 2011 (submittal number 8), SNC incorporated by reference AP1000 DCD, Revision 19. The results of the NRC staff's evaluation of the AP1000 DCD are documented in NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design," and its supplements. The results of the NRC staff's evaluation related to the VEGP ESP are documented in NUREG-1923, "Safety Evaluation Report for Early Site Permit (ESP) at the Vogtle Electric Generating Plant (VEGP) ESP Site." This FSER presents the results of the staff's review of information submitted in conjunction with the COL application, including any matters that were not already resolved as part of the referenced ESP or the referenced design certification, or subject to resolution in the pending design certification amendment proceeding.

The staff has identified in Appendix A to this FSER certain license conditions, and inspections, tests, analyses and acceptance criteria (ITAAC) that the staff recommends the Commission impose, should COLs be issued to the applicant. Appendix A includes the applicable permit conditions and ITAAC from the ESP. Therefore, Appendix A includes COL and ESP conditions, recognizing that should COLs be issued to the applicant, the ESP will be subsumed into the COLs. In addition to the ITAAC in Appendix A, the ITAAC found in the AP1000 DCD, Revision 19 Tier 1 material will also be incorporated into the COLs should COLs be issued to the applicant.

Inspections conducted by the NRC have verified, where appropriate, the conclusions in this FSER. The inspections focused on selected information in the COL application and its references. The FSER identifies applicable inspection reports as reference documents.

The NRC's Advisory Committee on Reactor Safeguards (ACRS) also reviewed the bases for the conclusions in this report. The ACRS independently reviewed those aspects of the application that concern safety, as well as the advanced safety evaluation report without open items earlier version of this document, and provided the results of its review to the Commission in a report dated January 24, 2011. Appendix F includes a copy of the report by the ACRS on the COL application, as required by 10 CFR 52.87, "Referral to the Advisory Committee on Reactor Safeguards (ACRS)."

ABBREVIATIONS

χ/Q	atmospheric dispersion
A2LA	American Association for Laboratory Accreditation
ac	alternating current
ACI	American Concrete Institute
ACP	access control parts
ACRS	Advisory Committee on Reactor Safeguards
ADAMS	Agencywide Documents Access and Management System
ADS	automatic depressurization system
AE	architect-engineer
AFFF	aqueous film forming foam
ALARA	as low as is reasonably achievable
ALI	annual limits on intake
ALWR	advanced light-water reactor
ANI	American Nuclear Insurers
ANS	American Nuclear Society
ANSI	American National Standards Institute
AOO	anticipated operational occurrence
AOV	air-operated valve
ARS	amplified response spectra
ASCE	American Society of Civil Engineers
ASE	advanced safety evaluation
ASLB	Atomic Safety and Licensing Board
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATE	advisory to evacuate
ATWS	anticipated transients without scram
AWWA	American Water Works Association
BBM	Blue Bluff Marl
BCEMA	Burke County Emergency Management Agency
BDBE	beyond-design basis event
BL	Bulletin
BLN	Bellefonte Nuclear Station
BOP	balance of plant
BPV	Boiler & Pressure Vessel Code (ASME BPV Code)
BTP	Branch Technical Position
BWR	boiling-water reactor
C	Celsius
C&C	command & control
CAS	central alarm station
CAV	cumulative absolute velocity
CCS	component cooling water system
CDA	critical digital asset
CDE	committed dose equivalent

CDF	core damage frequency
CDI	conceptual design information
CDM	certified design material
CECC	Central Emergency Control Center
CEUS	Central and Eastern United States
cfm	cubic feet per minute
CFR	<i>Code of Federal Regulations</i>
cGy	centiGray
cm	centimeters
CMT	core makeup tank
COL	combined license
COLA	combined license application
CP	construction permit
cpm	counts per minute
CR	control room
CRDM	control rod drive mechanism
CRDS	control rod drive system
CS	containment system
CS	core supports
CSA	control support area
CSC	Communication Support Center
CSDRS	certified seismic design response spectra
CSP	Cyber Security Plan
CST	cyber security team
CTA	critical target area analysis
CVCS	chemical and volume control system
CVS	portions of the chemical and volume control system
CWS	circulating water system
D/Q	dry deposition factor
DAC	derived air concentration
DAS	Diverse Actuation System
DBA	design-basis accident
DBT	design-basis threat
dc	direct current
DC	design certification
DCA	design certification amendment
DCD	design control document
DGP	Design Change Package
DCRA	design-centered review approach
DECT	Digital Enhanced Cordless Telecommunication
DEP	Departure
DG	diesel generator
DHEC	Department of Health and Environmental Control
DHS	Department of Homeland Security
DNBR	departure from nucleate boiling ratio
DOE	Department of Energy
DOT	Department of Transportation
D-RAP	Design Reliability Assurance Program
DTS	demineralized water treatment system
DWS	demineralized water system

EAB	exclusion area boundary
EAL	emergency action level
EAS	Emergency Alert System
ECCS	emergency core cooling system
ED	Emergency Director
EDMG	Extensive Damage Mitigation Guidelines
EIP	emergency implementing procedure
EIS	Environmental Impact Statement
EI.	Elevation
ELS	plant lighting system
EMA	Emergency Management Agency
ENC	Emergency News Center
ENN	Emergency Notification Network
ENS	Emergency Notification System
EOC	Emergency Operations Center
EOF	Emergency Operations Facility
EOM	Emergency Offsite Manager
EOP	emergency operating procedure
EP	Emergency Plan
EP	emergency planning
EPA	Environmental Protection Agency
EPAct	Energy Policy Act of 2005
EPC	Engineering, Procurement and Construction
EPI	Emergency Public Information
EPIO	Emergency Public Information Office
EPIP	emergency plan implementing procedures
EP-ITAAC	emergency planning-inspections, tests, analyses, and acceptance criteria
EPM	Emergency Plant Manager
EPOS	Emergency Plant Operations Supervisor
EPRI	Electric Power Research Institute
EPZ	emergency planning zone
EQ	environmental qualification
EQMEL	Environmental Qualification Master Equipment List
ER	Environmental Report
ERDS	Emergency Response Data System
ERF	emergency response facilities
ERO	emergency response officer
ERO	Emergency Response Organization
ESF	engineered safety feature
ESP	Early Site Permit
ESPA	Early Site Permit Application
ESSX	Electric Switch System Exchange
ETE	evacuation time estimate
ETS	Emergency Telecommunications System
F	Fahrenheit
FAA	Federal Aviation Administration
FAC	flow-accelerated corrosion
FBI	Federal Bureau of Investigation
FCEMS	Fairfield County Emergency Medical Services

FD1W	Feeder Ditch 1
FEIS	final environmental impact statement
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FFD	fitness-for-duty
FIFO	first-in-first-out
FIRS	foundation input response spectra
FIV	flow induced vibration
FMCRD	fine motion control rod drive
FMEA	failure mode and effects analysis
fps	feet per second
FPS	fire protection system
FR	<i>Federal Register</i>
FRS	floor response spectra
FSAR	final safety analysis report
FSER	final safety evaluation report
ft	feet
FTS	Federal Telecommunications System
GALL	Generic Aging Lessons Learned
GCC	Georgia Transmission Control Center
GDC	General Design Criteria (Criterion)
GEMA	Georgia Emergency Management Agency
GIS	Geographical Information System
GL	Generic Letter
GMRS	ground motion response spectra
GPC	Georgia Power Company
gpm	gallons per minute
GPSC	Georgia Public Service Commission
GSI	Generic Safety Issue
GSM	Global System for Mobile Communications
GSU	generator step-up
GTS	generic technical specification
GWMS	gaseous waste management system
h	hour
HCLPF	high confidence, low probability of failure
HCM	Highway Capacity Manual
HCU	hydraulic control unit
HDPE	high-density polyethylene
HEPA	high efficiency particulate air
HFE	human factors engineering
HICs	high integrity containers
HLD	heavy lift derrick
HP	health physics
HPN	Health Physics Network
HPS	Health Physics Society
HRA	human reliability analysis
HSI	human-system interface
HV	high voltage

HVAC	heating, ventilation, and air conditioning
Hz	Hertz
I&C	instrumentation and controls
IC	initiating conditions
ICM	Interim Compensatory Measures
ICMO	interim compensatory order
iDEN	Integrated Digital Enhanced Network
IDLH	immediate danger to life and health
IEC	International Electrotechnical Commission
IED	Interim Emergency Director
IEEE	Institute of Electrical and Electronic Engineers
IFR	interim findings report
IGSCC	intergranular stress corrosion cracking
IHP	integrated head package
IIS	incore instrumentation system
ILAC	International Laboratory Accreditation Cooperation
in.	inches
INPO	Institute of Nuclear Power Operations
IPEEE	Individual Plant Examination of External Events
IPSAC	Investment Protection Short-Term Availability Control
IPZ	Ingestion Pathway Emergency Planning Zone
IRWST	in-containment refueling water storage tank
ISA	Independent Safety Assessment
ISFSI	independent spent fuel storage installation
ISG	Interim Staff Guidance
ISI	inservice inspection
ISO	International Standardization Organization
ISRS	in-structure response spectra
IST	inservice testing
ITAAC	inspections, tests, analyses, and acceptance criteria
ITP	initial test program
JIC	joint information center
JOG	Joint Owners Group
JTWG	Joint Test Working Group
KI	radio-protective drugs
Kips	kilo pounds
km	kilometers
kPa	kilopascals
kV	kilovolt
kVA	kilovolt amps
kWe	kilowatt electric
LAN	Local Area Network
lb/ft ²	pounds per square foot
LBB	leak-before-break
LCEMS	Lexington County Emergency Medical Services
LCO	limiting condition for operation
LEFM	Leading Flow Edge Meter
LFL	lower flammability limit

LLEA	local law enforcement agency
LLHS	light-load handling system
LLNL	Lawrence Livermore National Laboratory
LLRW	low-level radioactive waste
LOA	Letters of Agreement
LOCA	loss-of-coolant accident
LOLA	loss of large areas
LOOP	loss of offsite power
lpm	liter(s) per minute
LPZ	low population zone
LRF	large release frequency
LSS	low strategic significance
LTOP	low-temperature overpressure protection
LWA	limited work authorization
LWMS	liquid waste management system
LWR	light-water reactor
m	meter(s)
MC	main condenser
MC&A	material control and accounting
MCL	Management Counterpart Link
MCR	main control room
MEAG	Municipal Electric Authority of Georgia
MEI	maximally exposed individual
MERT	Medical Emergency Response Team
mi	mile(s)
MIT	Massachusetts Institute of Technology
MN	Mega Newton
M-O	Mononobe-Okabe
MOU	Memorandum of Understanding
MOV	motor-operated valve
MOX	mixed-oxide
MPA	methoxypropylamine
mph	miles per hour
MR	Maintenance Rule
MRA	Mutual Recognition Arrangement
mrem	millirem
MSD	Mitigative Strategies Description
msl	mean sea level
MSLB	main steam line break
MSSS	main steam supply system
MST	Mitigative Strategies Table
mSv	millisievert
MT	magnetic particle
MUR	measurement uncertainty recapture
MVAR	mega volt amp reactive
MW	megawatt
MWe	megawatts electric
MWt	megawatts thermal

NDCT	natural draft cooling tower
NDL	nuclear data link
NDQAM	Nuclear Development and Construction Quality Assurance Manual
NEI	Nuclear Energy Institute
NEMA	National Electrical Manufacturers Association
NERC	North American Electric Reliability Corporation
NFPA	National Fire Protection Association
NI	nuclear island
NIRMA	Nuclear Information and Records Management Association
NIST	National Institute of Standards and Technology
NNR	non-nuclear safety
NOV	Notice of Violation
NPIR	Nuclear Plant Interface Requirement
NPPENF	Nuclear Power Plant Emergency Notification
NRC	U.S. Nuclear Regulatory Commission
NRO	Office of New Reactors
NS	nonseismic
NSSS	nuclear steam system supply
NUMARC	Nuclear Management and Resources Council
NVLAP	National Voluntary Laboratory Accreditation Program
NWS	National Weather Service
OBE	operating basis earthquake
OCA	owner controlled area
OCL	Operational Center Local
ODCM	Offsite Dose Calculation Manual
OE	operating experience
OER	operating experience review
OHLHS	overhead heavy-load handling system
OM	Operations and Maintenance (ASME OM Code)
OPC	Oglethorpe Power Corporation
OPRAA	operational phase reliability assurance activity
ORE	occupational radiation exposure
ORM	Onsite Radiation Manager
OSC	Operations Support Center
p.u.	per unit
PA	protected area
PAD	protective action decisions
PAG	protected area guidelines
PAR	protective action recommendations
PAZ	protective action zones
PC	Permit Condition
PCC	Power Coordination Center
PCCAWST	passive containment cooling ancillary water storage tank
PCCWST	passive containment cooling water storage tank
PCP	Process Control Program
PCS	passive containment cooling system
PDC	Personal Digital Cellular
PDP	procedure development program
PE	polyethylene

PGA	peak ground acceleration
PGP	procedures generation package
PM	preventive maintenance
PMCL	Protective Measures Counterpart Link
PMF	probable maximum flood
PMH	probable maximum hurricane
PMP	probable maximum precipitation
PMS	protection and safety monitoring
PMT	probable maximum tsunami
PMWP	probable maximum winter precipitation
PMWS	probable maximum wind storm
PNS	Prompt Notification System
POV	power-operated valve
ppm	parts per million
PRA	probabilistic risk assessment
PRHR	passive residual heat removal
psf	pounds per square foot
PSHA	probabilistic seismic hazard analysis
PSI	preservice inspection
psi	per square inch
psia	pounds per square inch absolute
psig	pounds per square inch gauge
PS-ITAAC	physical security-inspection, test, analysis, and acceptance criteria
PSO	power systems operations
PSP	Physical Security Plan
PSS/E	Power System Simulator for Engineering
P-T	pressure temperature
PT	liquid penetrant
PT&O	plant test and operations
PTLR	pressure-temperature limits report
PTS	pressurized thermal shock
PTS	plant-specific technical specifications
PWR	pressurized-water reactor
PWS	potable water system
PWSCC	primary water stress corrosion cracking
PXS	passive core cooling system
QA	quality assurance
QAPD	Quality Assurance Program description
QAPD	Quality Assurance Program Document
QATR	Quality Assurance Topical Report
QC	quality control
QDF	queue discharge flow
QG	quality group
RAI	request for additional information
RAP	reliability assurance program
RAT	reserve auxiliary transformer
RCCA	rod cluster control assembly
RCL	reactor coolant loop
R-COL	reference combined license

RCP	reactor coolant pump
RCPB	reactor coolant pressure boundary
RCS	reactor coolant system
REAC/TS	Radiation Emergency Assistance Center / Training Site
rem	roentgen equivalent man
REMP	radiological environmental monitoring program
REP	radiological emergency preparedness
RERP	radiological emergency response plan
RET	Radiological Emergency Team
RETS	radiological effluent technical specification
RG	regulatory guide
RIS	Regulatory Issue Summary
RLE	review-level earthquake
RMS	radiation monitoring system
RNS	normal residual heat removal system
RO	reactor operator
RPP	Radiation Protection Program
RPV	reactor pressure vessel
RRS	required response spectrum
RSCL	Reactor Safety Counterpart Link
RTDP	revised thermal design procedure
RT _{NDT}	nil-ductility reference transition temperature
RTNSS	regulatory treatment of nonsafety systems
RTP	rated thermal power
RT _{PTS}	pressurized thermal shock reference temperature
RV	reactor vessel
RVSP	reactor vessel surveillance capsule program
RWS	raw water system
RXS	reactor system
s	second
S&PC	steam and power conversion
SAMG	severe accident management guidance
SAR	safety analysis report
SAS	secondary alarm station
SASSI	system for analysis of soil structure interaction
SAT	systematic approach to training
SBAA	Southern Balancing Authority Area
SBO	station blackout
SC	steel concrete composite
SCBA	self-contained breathing apparatus
SCDPRT	South Carolina Department of Parks, Recreation and Tourism
SCE&G	South Carolina Electric and Gas Company
SCEMD	South Carolina Emergency Management Division
S-COL	subsequent combined license
SCP	Safeguards Contingency Plan
SCSN	South Carolina State Network
SCT	Southern Company Transmission
SE	safety evaluation
SECY	Secretary of the Commission, Office of the Nuclear Regulatory Commission
SER	safety evaluation report

SFP	spent fuel pool
SFS	spent fuel pool cooling system
SG	steam generator
SGI	safeguards information
SGTR	steam generator tube rupture
SMA	seismic margin analysis
SNC	Southern Nuclear Operating Company
SNM	special nuclear material
SOT	station orientation training
SP	Setpoint Program
SPDS	safety parameter display system
SR	surveillance requirement
SREC	standard radiological effluent control
SRM	Staff Requirements Memorandum
SRO	senior reactor operator
SRP	standard review plan
SRSS	square root sum of squares
SSAR	Site Safety Analysis Report
SSCs	structures, systems, and components
SSE	safe shutdown earthquake
SSEP	safety, security and/or emergency preparedness
SSI	soil structure interaction
SS-ITAAC	site-specific inspections, tests, analyses and acceptance criteria
STAC	short-term availability control
STD	Standard
STS	Standard Technical Specification
SUNSI	sensitive unclassified non-safeguard information
SUP	Supplement
Sv	Sievert
SWMS	solid waste management system
SWS	service water system
T&QP	Training and Qualification Plan
TCS	turbine building closed cooling water system
TDMA	Time Division Multiple Access
TEDE	total effective dose equivalent
TG	turbine-generator
TGS	turbine generator system
TLD	thermoluminescent dosimeter
TMI	Three Mile Island
TNT	trinitrotoluene
TR	technical report
TRS	test response spectrum
TS	Technical Specification
TSC	Technical Support Center
TSO	transmission system operator
TSTF	Technical Specification Task Force
TVA	Tennessee Valley Authority
UAT	unit auxiliary transformer
UBC	Uniform Building Code

UFL	upper flammability limit
UFM	ultrasonic flow meter
UHS	ultimate heat sink
UPS	uninterruptible power supply
USACE	U.S. Army Corps of Engineers
USE	upper shelf energy
USGS	United States Geological Society
UT	ultrasonic
V	volt
V&V	verification and validation
VAR	Variance
VBS	nuclear island non-radioactive ventilation system
Vdc	volts direct current
VEGP	Vogtle Electric Generating Plant
VES	main control room emergency habitability system
VFS	containment air filtration system
VHRA	very high radiation area
VOIP	Voice Over Internet Protocol
VPN	Virtual Private Network
WCAP	Westinghouse Commercial Atomic Power
WCS	Waste Control Specialist
WEC	Westinghouse Electric Company
WLS	liquid radioactive waste system
WLS	liquid radwaste system
WWRB	waste water retention basin
WWS	waste water system
YFS	yard fire water system
ZRS	offsite retail power system

1.0 INTRODUCTION AND INTERFACES

This chapter of the final safety evaluation report (FSER) is organized as follows:

- Section 1.1 provides an overview of the entire combined license (COL) application;
- Section 1.2 provides the regulatory basis for the COL licensing process;
- Section 1.3 provides an overview of the COL application principal review matters and where the staff's review of the 11 parts of the COL application is documented;
- Section 1.4 documents the staff's review of Chapter 1 of the final safety analysis report (FSAR); and
- Section 1.5 documents regulatory findings that are in addition to those directly related to the staff's review of the FSAR.

1.1 Summary of Application

In a letter dated March 28, 2008, the Southern Nuclear Operating Company (SNC), acting on behalf of itself and Georgia Power Company, Oglethorpe Power Corporation, Municipal Electric Authority of Georgia, and the City of Dalton, Georgia, an incorporated municipality in the State of Georgia acting by and through its Board of Water, Light and Sinking Fund Commissioners (Dalton Utilities), submitted its application to the U.S. Nuclear Regulatory Commission (NRC or the Commission) for COLs for two AP1000 advanced passive pressurized-water reactors (PWRs) pursuant to the requirements of Sections 103 and 185(b) of the Atomic Energy Act, Title 10 of the *Code of Federal Regulations* (10 CFR) Part 52, "Licenses, Certifications and Approvals for Nuclear Power Plants," and the associated material licenses under 10 CFR Part 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material," 10 CFR Part 40, "Domestic Licensing of Source Material," and 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material." These reactors would be identified as Vogtle Electric Generating Plant (VEGP) Units 3 and 4, and would be located on the existing VEGP site in Burke County, Georgia.

Unless otherwise noted, this FSER (also referred to as the SER or Advanced SER in later sections of this document) is based on Submittal 8 (Revision 5 of the FSAR) of VEGP's COL application, which was submitted via letter (ADAMS Accession Number ML11180A086) dated June 24, 2011.

As indicated in the applicant's June 24, 2011, Submittal 8, the application incorporates by reference 10 CFR Part 52, Appendix D, "Design Certification Rule for the AP1000 Design," and the Westinghouse Electric Corporation's (Westinghouse's) application for amendment to portions of the Design Control Document (DCD) Revision 19. The application also incorporates by reference the VEGP Early Site Permit (ESP) Application, Revision 5, dated December 23, 2008, as approved by the NRC in the Vogtle Early Site Permit and Limited Work Authorization (ESP-004), dated August 26, 2009, including three amendments that were subsequently issued (on May 21, 2010, June 25, 2010 and July 9, 2010) to the ESP Permit. In addition, in a letter dated October 2, 2009, SNC requested a second limited work authorization (LWA) as part of the COL application in accordance with 10 CFR 50.10(d), "Request for limited work authorization." The LWA request involves installing reinforcing steel, sumps and drain

lines and other embedded items in the NI foundation base slab, and placement of concrete for the Nuclear Island (NI) foundation base slab.

The AP1000 nuclear reactor design is a PWR with a power rating of 3400 megawatts thermal (MWt) and an electrical output of at least 1000 megawatts electric (MWe). The AP1000 design uses safety systems that rely on passive means, such as gravity, natural circulation, condensation and evaporation, and stored energy for accident prevention and mitigation.

In developing the FSER for VEGP Units 3 and 4, the staff reviewed the AP1000 DCD to ensure that the combination of the DCD and the COL application represents the complete scope of information relating to a particular review topic. Because of its reliance on both the AP1000 DCD and the DCD FSER, the staff did not issue the VEGP FSER chapter until the AP1000 design certification amendment (DCA) FSER was issued. This allowed the staff to review the AP1000 DCA FSER and identify any issues that could affect the review of the VEGP COL application.

There is an AP1000 DCA FSER chapter that has been issued that does not have a corresponding VEGP COL FSER chapter. Specifically, AP1000 DCA FSER Chapter 23, "Design Changes Proposed in Accordance with ISG-11," which has been issued, does not have a corresponding VEGP COL FSER chapter. Chapter 23 describes the staff's evaluation and findings for the information Westinghouse submitted after the submittal of DCD Revision 17, in order to address one or more of the criteria identified in Interim Staff Guidance (ISG), DC/COL-ISG-11, "Interim Staff Guidance Finalizing Licensing-basis Information." This information was subsequently incorporated into AP1000 DCD Revision 18. In the case where the information that is evaluated in AP1000 DCA FSER Chapter 23 affected the COL application, this issue was evaluated in the appropriate VEGP COL FSER chapter. Specifically, STD COL 5.2-3, associated with unidentified reactor coolant system leakage inside containment, was created as a result of changes evaluated in AP1000 DCA FSER Chapter 23. The staff's evaluation of the information in the VEGP COL application that addresses this COL information item is found in Chapter 5 of this FSER.

The VEGP Units 3 and 4 COL application is organized as follows:

- **Part 1 General and Administrative Information**

Part 1 provides an introduction to the application and includes certain corporate information regarding SNC pursuant to 10 CFR 50.33(a) – (d).

- **Part 2 Final Safety Analysis Report**

Part 2 includes information pursuant to the requirements of 10 CFR 52.79 and, in general, adheres to the content and format guidance provided in Regulatory Guide (RG) 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)."

- **Part 3 Environmental Report**

Part 3 includes environmental information pursuant to the requirements of 10 CFR 52.80 and 10 CFR 51.50(c).

- **Part 4 Technical Specifications**

Part 4 addresses how the AP1000 Generic Technical Specifications (GTS) and Bases are incorporated by reference into the VEGP Units 3 and 4 Plant-Specific Technical Specifications (PTS) and Bases. Specifically, Section A addresses completion of bracketed information. Section B provides a complete copy of the VEGP Units 3 and 4 PTS and Bases.

- **Part 5 Emergency Plan**

Part 5 incorporates the VEGP onsite emergency plan (included in Part 5 of the referenced VEGP ESP application), including supporting information (e.g., letters of agreements with offsite supporting governmental agencies and organizations). The offsite State and local emergency plans and evacuation time estimates (ETEs) for the VEGP plume exposure pathway were included in the ESP application.

- **Part 6 Limited Work Authorization**

On October 2, 2009, SNC and its four co-applicants submitted a request for a second limited work authorization (LWA) as part of its COL application. The requested activities under this LWA include:

Installation of reinforcing steel, sumps, and drain lines and other embedded items in the nuclear island (NI) foundation base slab, placement of concrete for the NI foundation base slab.

In addition, SNC provided supplemental environmental information pursuant to the requirements of 10 CFR 51.49, “Environmental report—limited work authorization.”

- **Part 7 Departures Report**

Part 7 includes information regarding “departures” and “exemptions.” SNC identified six departures related to: (1) administrative departure for organization and numbering for the FSAR sections; (2) potable water system (PWS) filtration; and (3) the relocation of emergency response facilities. SNC also identified one exemption from 10 CFR Part 52, Appendix D, Section IV.A.2.a, related to COL application organization and numbering. In a letter dated October 15, 2010, the applicant proposed to include a departure (Departure 4) from DCD Section 8.3.2.2 clarifying the current limiting feature of voltage regulating transformers. The AP1000 DCD states that, for applicants who choose to use the sprayed-on waterproofing membrane system for foundations, the waterproofing material will consist of 100-percent solid materials based on polymer-modified asphalt or polyurea. However, the applicant proposed a Tier 2 departure (Departure 6). Specifically, the applicant stated that the material chosen for VEGP Units 3 and 4 ESP application site safety analysis report (SSAR) is an elastomeric membrane material utilizing Methyl Methacrylate resins as the base material. The applicant provided a departure from the AP1000 DCD to address the design information regarding the mudmat. The AP1000 DCD states that the lower and upper mudmat are a minimum 6 inches thick of unreinforced concrete. However, the lower and upper mudmats chosen for the VEGP ESP SSAR consist of a 6-inch layer of non-reinforced concrete. In a letter dated November 23, 2010, the applicant requested an exemption from the requirements of 10 CFR 70.22(b); 10 CFR 70.32(c) and in turn, 10 CFR 74.31, “Nuclear material control and accounting for special nuclear material of low strategic significance”; 10 CFR 74.41, “Nuclear

material control and accounting for special nuclear material of moderate strategic significance”; and 10 CFR 74.51. “Nuclear material control and accounting for strategic special nuclear material.” The applicant requested the exemption so that the exceptions allowed in these regulations for nuclear reactors licensed under 10 CFR Part 50, “Domestic licensing of production and utilization facilities,” will also be applied to those licensed under 10 CFR Part 52.

Part 7 also includes 6 variances from the VEGP ESP SSAR.

- **Part 8 Security Plan**

Part 8 addresses the VEGP Units 3 and 4 Safeguards/Security Plan, which consists of the Physical Security Plan, the Training and Qualification Plan, and the Safeguards Contingency Plan. The Security Plan is submitted to the NRC as a separate licensing document in order to fulfill the requirements of 10 CFR 52.79(a)(35) and 10 CFR 52.79(a)(36). The Plan is categorized as Security Safeguards Information and is withheld from public disclosure pursuant to 10 CFR 73.21, “Protection of safeguards information: performance requirements.”

- **Part 9 Withheld Information**

Part 9 identifies sensitive information that is withheld from public disclosure under 10 CFR 2.390, “Public inspections, exemptions, requests for withholding.” The information in this part includes sensitive unclassified non-safeguards information. The information in this section includes figures from Part 2 of the application that meet the sensitive unclassified nonsafeguards information (SUNSI) guidance for withholding from the public. In addition, this part of the application includes the following information:

- The withheld portion of the Mitigative Strategies Description and Plans for loss of large areas of the plant due to explosions or fire, as required by 10 CFR 52.80(d), and
- VEGP Units 3 and 4 Cyber Security Plan, as required by 10 CFR 73.54, “Protection of Digital Computer and Communication Systems and Networks.”

- **Part 10 Proposed Combined License Conditions (Including ITAAC)**

Part 10 addresses VEGP Units 3 and 4 proposed license conditions including inspections, tests, analyses, and acceptance criteria (ITAAC) information in accordance with 10 CFR 52.80. A table of the proposed license conditions is provided in Part 10 of Section 1.3 of this SER.

The contents of the environmental protection plan (and associated license conditions) are not evaluated in this SER. Part 10 of the application incorporates by reference the AP1000 DCD Tier 1 information, including ITAAC. In addition, the application includes site-specific ITAAC (e.g., emergency planning and electrical).

- **Part 11 Enclosures**

Part 11 includes six enclosures submitted by the applicant in support of the VEGP Units 3 and 4. Specifically, these enclosures include:

- Enclosure 11A describes the SNC Nuclear Development Quality Assurance Manual (NDQAM). The NDQAM is the top-level policy document that establishes the quality

assurance (QA) policy and assigns major functional responsibilities for nuclear development activities conducted by or for SNC.

- Enclosure 11B includes mitigative strategies description and plans for loss of large areas of the plant due to explosions or fire, as required by 10 CFR 52.80(d). The SUNSI version of this enclosure is provided in Part 9 of the application.
- Enclosure 11C includes the cyber security plan. The SUNSI version of the cyber security plan is provided in Part 9 of the application.
- Enclosure 11D describes the VEGP Special Nuclear Material (SNM) Material Control and Accounting (MC&A) Program.
- Enclosure 11E describes the VEGP new fuel shipping plan.
- Enclosure 11F describes the supplemental information in support of 10 CFR Part 70 SNM application.

SNC organized and annotated its COL application to clearly identify: a) sections that incorporate by reference the AP1000 DCD; b) sections that are standard for COL applicants in the AP1000 design center; and c) sections that are site-specific and thus only apply to SNC/VEGP Units 3 and 4. The following notations have been used by the applicant for the departures from and/or supplements to the referenced DCD included in this COL application:

- STD – standard (STD) information that is identical in each COL referencing the AP1000
- VEGP – plant-specific information that is specific to this application
- DEP – departure (DEP) from the DCD
- COL – COL information item identified in the DCD
- SUP – information that supplements (SUP) information in the DCD
- CDI – design information replacing CDI included in the DCD but not addressed within the scope of the DCD review
- ESP – information addressed in the VEGP ESP
- VAR – information related to a variance (VAR) from the VEGP ESP

1.2 Regulatory Basis

1.2.1 Applicable Regulations

10 CFR Part 52, Subpart C, “Combined Licenses,” sets out the requirements and procedures applicable to Commission issuance of a COL for nuclear power facilities. The following are of particular significance:

- 10 CFR 52.79, “Contents of applications; technical information in final safety analysis report,” identifies the technical information for the FSAR.
- 10 CFR 52.79(d) provides additional requirements for a COL referencing a standard certified design.
- 10 CFR 52.80, “Contents of applications; additional technical information,” provides additional technical information outside of the FSAR (ITAAC and the environmental report).
- 10 CFR 52.81, “Standards for review of applications,” provides standards for reviewing the application.
- 10 CFR 52.83, “Finality of referenced NRC approvals; partial initial decision on site suitability,” provides for the finality of referenced NRC approvals (i.e., standard design certification (DC)).
- 10 CFR 52.85, “Administrative review of applications; hearings,” provides requirements for administrative reviews and hearing.
- 10 CFR 52.87, “Referral to the Advisory Committee on Reactor Safeguards (ACRS),” provides for referral to the ACRS.

The NRC staff reviewed this application according to the standards set out in

- 10 CFR Part 20, “Standards for Protection Against Radiation”
- 10 CFR Part 30
- 10 CFR Part 40
- 10 CFR Part 50
- 10 CFR Part 51, “Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions”
- 10 CFR Part 52
- 10 CFR Part 54, “Requirements for Renewal of Operating Licenses for Nuclear Power Plants”
- 10 CFR Part 55, “Operators’ Licenses”

- 10 CFR Part 70
- 10 CFR Part 73, “Physical Protection of Plants and Materials”
- 10 CFR Part 74, “Material Control and Accounting of Special Nuclear Material”
- 10 CFR Part 100, “Reactor Site Criteria”
- 10 CFR Part 140, “Financial Protection Requirements and Indemnity Agreements”

The staff evaluated the application against the acceptance criteria provided in the following:

- NUREG-0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)”
- NUREG-1555, “Standard Review Plans for Environmental Reviews for Nuclear Power Plants”
- NUREG-1577, “Standard Review Plan on Power Reactor Licensee Financial Qualifications and Decommissioning Funding Assurance”

In addition, the staff considered the format and content guidance in RG 1.206⁵ for the COL application.

1.2.2 Finality of Referenced NRC Approvals

In accordance with 10 CFR 52.83, if the application for a COL references a DC rule, the scope and nature of matters resolved in the DC for the application and any COL issued are governed by 10 CFR 52.63, “Finality of standard design certifications.” In addition, if the application for a COL references an ESP, the scope and nature of matters resolved in the ESP for the application and any COL issued are governed by 10 CFR 52.39, “Finality of early site permit determinations.”

The VEGP COL application references the VEGP ESP Site Safety Analysis Report, Revision 5. The ESP and LWA (ESP-004) were issued by the NRC on August 26, 2009.

Based on the finality afforded to referenced certified designs and ESPs, the scope of this COL application review, as it relates to the referenced certified design and ESP, is limited to items that fall outside the scope of the certified design (e.g., COL information items, design information replacing conceptual design information (CDI), and programmatic elements that are the responsibility of the COL) or the ESP.

⁵ 10 CFR Part 52, Appendix D, Section IV.A.2.a, requires the COL application to include a plant-specific DCD that describes the same type of information and uses the same organization and numbering as the generic DCD. The generic DCD used RG 1.70, “Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR Edition),” Revision 3 as a guide for the format and content. RG 1.206 was issued after the initial certification of the AP1000; thus, there are anticipated differences between the VEGP 3 and 4 COL application and the guidance of RG 1.206.

The certified AP1000 design currently incorporated by reference in 10 CFR Part 52, Appendix D, is based on the AP1000 DCD as amended through Amendment 15. This COL application also incorporates by reference the AP1000 DCA application. The results of the NRC staff's technical evaluation of the AP1000 DCA application are documented in NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design," and its supplements. Since the AP1000 DCA is not yet certified, the applicant has not incorporated the 10 CFR Part 52 – codified version of the DCA into its application. The incorporation of the AP1000 DCA into the VEGP COL application is **Confirmatory Item 1-1**.

Resolution of Standard Content Confirmatory Item 1-1

Confirmatory Item 1-1 involves a commitment by the applicant to make changes to the VEGP COL application to incorporate by reference the certified AP1000 design as documented in 10 CFR Part 52, Appendix D following the pending DCA. In a letter dated June 24, 2011, the applicant provided submittal number 8 related to the VEGP COL application. In this letter, the applicant noted that it was incorporating by reference AP1000 DCD, Revision 19. In a February 24, 2011, *Federal Register* (76 FR 10269), the NRC issued a notice of proposed rulemaking to codify the AP1000, as amended, in 10 CFR Part 52, Appendix D. As stated in the *Federal Register* notice, the basis for the proposed rulemaking is AP1000 DCD, Revision 18, which was submitted by Westinghouse on December 1, 2010. Subsequent to the issuance of AP1000 DCD, Revision 18, on June 13, 2011, Westinghouse provided AP1000 DCD, Revision 19, to the NRC. The staff has evaluated whether any changes in AP1000 DCD, Revision 19 (relative to Revision 18), should be incorporated as part of the DCA, and the staff's safety evaluation associated with Revision 19 was issued on August 5, 2011. If the Commission incorporates any of these changes into the DCA, then the codified version of the AP1000 DCD would be based on Revision 19.

This FSER is based on the applicant's submittal 8, which incorporates by reference AP1000 DCD Revision 19. As noted in VEGP COL FSAR Section 1.1, Appendix D to 10 CFR Part 52 is incorporated by reference into the VEGP COL application. Prior to issuing the VEGP COLs, the staff must verify that the certified version of the AP1000 DCD is incorporated by reference in the VEGP COL application. Although FSAR Section 1.1 does not specify AP1000 DCD Revision 19 as the basis for 10 CFR Part 52 Appendix D, this FSER assumes that the changes in Revision 19 will be incorporated and approved in the rulemaking. In that event, if the VEGP COLs are issued (assuming all other necessary findings can be made), AP1000 DCD Revision 19 will be incorporated into the COLs. However, the staff recognizes that if changes are required to either the AP1000 DCA FSER or to the VEGP COL FSER as a result of the AP1000 DCA rulemaking, supplements to these FSERs as appropriate will be prepared, and it may be necessary to re-verify that the certified design is properly incorporated. Based on this understanding, and based on the VEGP application dated June 24, 2011, which incorporates by reference AP1000 DCD, Revision 19, Confirmatory Item 1-1 is now closed.

While the reference version of the AP1000 design has been docketed but not certified, 10 CFR 52.55(c) allows an applicant, at its own risk, to incorporate by reference a design that is not certified. If the DCA rulemaking results in certification of the amended design, that will demonstrate compliance with 10 CFR 52.81 for the information incorporated by reference from the AP1000 DCD into the COL application. However, until 10 CFR Part 52, Appendix D is revised by rulemaking to incorporate the AP1000 DCA application, the provisions of 10 CFR 52.63 do not apply to this supplemental information.

The contents of the AP1000 COL application are specified by 10 CFR 52.79(a), which requires the submission of information within the FSAR that describes the facility, presents the design bases and the limits on its operation, and presents a safety analysis of the structures, systems, and components (SSCs) of the facility as a whole. For a COL application that references a DC, 10 CFR 52.79(d) requires the DCD to be included or incorporated by reference into the FSAR. A COL application that references a certified design must also include the information and analysis required to be submitted within the scope of the COL application, but which is outside the scope of the DCD. This set of information addresses plant- and site-specific information and includes all COL action or information items; design information replacing CDI; and programmatic information that was not reviewed and approved in connection with the DC rulemaking.

During its evaluation of the COL application, the staff confirmed that the complete set of information required to be addressed in the COL application was addressed in the DC or referenced VEGP ESP, the DC or ESP as supplemented by the COL application, or completely in the COL application. Following this confirmation, the staff's review of the COL application is limited to the COL-specific review items.

1.2.3 Overview of the Design Centered Review Approach

The design centered review approach (DCRA) is described in Regulatory Issue Summary (RIS) 2006-06, "New Reactor Standardization Needed to Support the Design Centered Licensing Review Approach." The DCRA is endorsed by the Commission's Staff Requirements Memorandum (SRM) SECY-06-0187, "Semiannual Update of the Status of New Reactor Licensing Activities and Future Planning for New Reactors," dated November 16, 2006. The DCRA, which is the Commission's policy intended to promote standardization of COL applications, is beyond the scope of information included in the DC. This policy directs the staff to perform one technical review for each standard issue outside the scope of the DC, and use this decision to support decisions on multiple COL applications. In this context, "standard" refers to essentially identical information. In some cases the staff has expanded the use of this standard approach to other areas with essentially identical information for regulatory purposes. For example, the quality assurance plan for the AP1000 COL applicants is essentially identical with the exception of title names being different. Other areas where this approach was used include cyber security, technical specifications, and loss of large area fire reviews and may include information provided by the applicant(s) to resolve plant-specific issues.

The first COL application submitted for NRC staff review is designated in a design center as the reference COL (R-COL) application, and the subsequent applications in the design center are designated as subsequent COL (S-COL) applications. The Bellefonte Nuclear Plant (BLN) Units 3 and 4 COL application was originally designated as the R-COL application for the AP1000 design center, and the staff issued an SER with open items that documented its review of both standard and site-specific information (for all chapters except Sections 3.7, 3.8, 13.6, 13.7, and 13.8 and Appendix 19A). In a letter dated April 28, 2009, the NuStart Energy Development, LLC, consortium informed the NRC that it had changed the R-COL designation for the AP1000 design center from BLN Units 3 and 4 to the VEGP Units 3 and 4. To effect this transition, SNC responded to all of the open items in the staff's BLN SER that related to standard content on behalf of the AP1000 design center and consistent with its new position as the R-COL for the AP1000 design center. Thus, this SER documents the staff's review of both standard and site-specific information and is the first complete SER for a COL application in the AP1000 design center.

To ensure that the staff's findings on standard content that were documented in the SER with open items issued for the BLN Units 3 and 4 COL application were equally applicable to the VEGP Units 3 and 4 COL application, the staff undertook the following reviews:

- The staff compared the BLN COL FSAR, Revision 1 to the VEGP COL FSAR. In performing this comparison, the staff considered changes made to the VEGP COL FSAR (and other parts of the COL application, as applicable) resulting from requests for additional information (RAIs) and open and confirmatory items identified in the BLN SER with open items.
- The staff confirmed that all responses to RAIs identified in the corresponding standard content (the BLN SER) evaluation were endorsed.
- The staff verified that the site-specific differences were not relevant.

Where there were differences between the information provided by the VEGP applicant and that provided by the BLN applicant regarding details in the application for the standard content material, the staff evaluated the differences and determined whether the standard content material of the BLN SER was still applicable to the VEGP application. These evaluations are in the SERs that reference the standard content.

This standard content material is identified in this SER by use of italicized, double-indented formatting. This SER also documents the staff's findings with respect to closure of all open items related to standard content, and will be used as the R-COL reference for other AP1000 S-COL application reviews. Finally, this SER documents the staff's findings with respect to site-specific issues, related only to the VEGP site.

1.3 Principal Review Matters

The staff's evaluations related to the COL application review are addressed as follows:

- **Part 1 General and Administrative Information**

The staff's evaluation of the corporate information regarding SNC pursuant to 10 CFR 50.33, "Contents of applications; general information," is provided in Section 1.5.1 of this SER.

- **Part 2 Final Safety Analysis Report**

The staff's evaluation of information in the VEGP COL FSAR is provided in the corresponding sections of this SER.

- **Part 3 Environmental Report**

The staff's evaluation of environmental information addressed in the Environmental Report pursuant to the requirements of 10 CFR 51.50(c) is provided in the Environmental Impact Statement (EIS); for the VEGP COL application, pursuant to the requirements of 10 CFR 51.92, "Supplement to the final environmental impact statement," this entails a supplement to the EIS prepared for the VEGP ESP.

- **Part 4 Technical Specifications**

Chapter 16 of this SER includes the staff's evaluation of the VEGP Units 3 and 4 plant Technical Specifications (PTS) and Bases (specifically completion of bracketed text).

- **Part 5 Emergency Plan**

Chapter 13 of this SER includes the staff's evaluation of the VEGP onsite Emergency Plan, including related ITAAC, and the offsite State and local emergency plans.

- **Part 6 LWA Request**

On October 2, 2009, SNC and its four co-applicants submitted a request for a second LWA as part of its COL application. The requested activities under this LWA are evaluated by the staff in the corresponding sections of this SER (pursuant to 10 CFR 50.10) and in the supplemental EIS (pursuant to 10 CFR 51.49, 10 CFR 51.76, and 10 CFR 51.92).

- **Part 7 Departures Report**

The staff's evaluation of the departures, exemptions and variances in Part 7 of the VEGP COL application is provided in the applicable chapter of this SER. The table below provides a description of the departure, exemption or variance and where the evaluation is addressed in this SER.

Departure Number	Description	Location of Evaluation in this Report
VEGP DEP 1.1-1	Administrative departure for organization and numbering of the FSAR sections	1.5.4
VEGP DEP 2.5-1	Lower and upper mudmat	2.5.4
VEGP DEP 3.4-1	Waterproofing Membrane Material	3.4.1, 3.8.5
STD DEP 8.3-1	Class 1E voltage regulating transformer current limiting features	8.3.2
VEGP DEP 9.2-1	PWS filtration	9.2.1
VEGP DEP 18.8-1	Emergency response facility locations	12.5, 13.3, and 18.8

Exemption Number	Description	Location of Evaluation in this Report
	Exemption from 10 CFR 52.93(a)(1) ⁶	1.5.4
	COL Application Organization and Numbering (10 CFR Part 52, Appendix D)	1.5.4
	Exemption from the requirements of 10 CFR 70.22(b), 10 CFR 70.32(c), 10 CFR 74.31, 10 CFR 74.41, and 10 CFR 74.51	1.5.4

ESP Variance Number	Description	Location of Evaluation in this Report
VEGP ESP VAR 1.6-1	Variance from VEGP ESP SSAR Section 1.6, "Material Incorporated by Reference"	1.4.4
VEGP ESP VAR 1.6-2	Variance from VEGP ESP SSAR Section 3.8.5, "Foundations"	3.8.5
VEGP ESP VAR 1.6-3	Variance from VEGP ESP SSAR Chapter 15, "Accident Analysis"	15
VEGP ESP VAR 1.2-1	Variance from VEGP ESP SSAR Section 1.2, "General Site Description," Section 13.3, "Emergency Planning," and VEGP ESP Part 5, "Emergency Plan"	13.3
VEGP ESP VAR 2.2-1	Variance from VEGP ESP SSAR Section 2.2.3.2, "Hazardous Chemicals," and VEGP ESP SSAR Table 2.3-6, "Potential Hazards"	2.2
VEGP ESP VAR 2.3-1	Variance from VEGP ESP SSAR Section 2.3.1.5, "Meteorology"	2.3

- **Part 8 Security Plan**

The staff's evaluation of the Safeguards and Security Plans is documented separately from this SER, and is withheld from the public in accordance with 10 CFR 73.21. A non-sensitive summary of the staff's evaluation of those plans is provided in Section 13.6 of this SER.

- **Part 9 Withheld Information**

The staff's evaluation of the withheld information occurs in the context of the specific subject being reviewed and is documented accordingly. In a letter dated August 6, 2010, the applicant proposed to include plans related to cyber security regulations. The staff's evaluation of the

⁶ Part 7 of the VEGP COL application does not include an exemption request related to the requirements found in 10 CFR 52.93(a)(1). As discussed in Section 1.5.4 of this report, the staff determined that an exemption from this regulation is necessary.

cyber security related plans is included in SER Section 13.8. In a letter dated November 12, 2010, the applicant provided information regarding the Mitigative Strategies Description and Plans for loss of large areas of the plant due to explosions or fire, as required by 10 CFR 52.80(d). A summary of the staff's evaluation of the Mitigative Strategies Description and Plans for loss of large areas of the plant due to explosions is provided in Appendix 19A of this SER. The staff's complete evaluation is documented separately from this SER and is withheld from the public in accordance with 10 CFR 2.390.

- **Part 10 Proposed Combined License Conditions (Including ITAAC)**

The staff's evaluation of the proposed COL conditions (including ITAAC) is provided in the applicable chapter of this SER. The table below provides a description of the proposed license conditions and where the evaluation is addressed in this SER. The staff has identified certain license conditions and ITAAC that it will recommend the Commission impose if a COL is issued to the applicant. Appendix A.1 (of Appendix A) to this SER lists those license conditions. Each license condition is sequentially numbered in individual chapters of this SER. The staff has provided an explanation of each license condition in the applicable section of the SER. These license conditions are based on the provisions of 10 CFR 52.97, "Issuance of combined license." This SER highlights the applicant's proposed ITAAC and the staff's review and acceptance of them. Appendix A.2 (of Appendix A) lists those ITAAC.

Proposed Combined License Condition	Location of Evaluation in this Report
ITAAC.	14.3 and throughout this SER
COL information items that cannot be resolved prior to issuance of a COL.	The proposed license conditions are evaluated throughout this SER.
Implementation requirements related to portions of operational programs identified in VEGP COL FSAR Table 13.4-201 on or before the associated milestones in Table 13.4-201.	The operational programs are evaluated throughout this SER.
Requirements for a fully developed set of site-specific emergency action levels (EALs) to be submitted to the NRC.	13.3
Requirements associated with revisions to the physical security plan.	13.6
Requirements associated with submittal schedules to the NRC related to the operation programs listed in VEGP COL FSAR Table 13.4-201.	The operational programs are evaluated throughout this SER
First-Plant-Only and first-Three-Plant-only Testing requirements.	14.2
Reporting requirements related to any changes made to the Initial Startup Test Program described in Chapter 14 of the VEGP COL FSAR.	14.2

Proposed Combined License Condition	Location of Evaluation in this Report
Power-ascension testing requirements.	14.2
License conditions associated with granting 10 CFR Part 30, 40, and 70 licenses governing the possession and use of applicable source, byproduct and special nuclear materials. ⁷	1.5.5
License condition associated with Special Nuclear Material Physical Protection Plan Change. ⁸	1.5.5
License condition associated with implementation and maintenance of mitigative strategies for responding to a loss of large areas of the plant due to explosions or fires. ⁴	19A
Inclusion of the Environmental Protection Plan.	Final Supplemental Environmental Impact Statement

- **Part 11 Enclosures**

The SNC NDQAM (Enclosure 11A) is the top-level policy document that establishes the QA policy and assigns major functional responsibilities for nuclear development activities conducted by or for SNC. The staff’s review of the NDQAM is documented in Chapter 17 of this SER. The staff’s review of Enclosure 11B of the VEGP COL application regarding mitigative strategies description and plans for loss of large areas of the plant due to explosions is provided in Appendix 19A of this SER. The staff’s complete evaluation is documented separately from this SER and is withheld as non-public in accordance with 10 CFR 2.390. Enclosure 11C of the application includes the cyber security plan and the staff’s evaluation of this plan is in Section 13.8 of this SER. Enclosure 11D of the application includes the SNM, MC&A program description. Enclosure 11E of the application includes the new fuel shipping plan, and Enclosure 11F of the application includes supplemental information in support of the 10 CFR Part 70 license. Enclosures 11D, 11E, and 11F of the application are evaluated in Section 1.5.5 of this SER.

Organization of SER

The staff’s SER is structured as follows:

- The SER adheres to the “finality” afforded to COL applications that incorporate by reference a standard certified design and the ESP. As such, this SER does not repeat any technical evaluation of material incorporated by reference; rather, it points to the corresponding review findings of NUREG-1793 and its supplements and NUREG-1923, “Safety Evaluation Report for Early Site Permit (ESP) at the Vogtle Electric Generating Plant (VEGP) ESP Site.” However, the referenced AP1000 DCD, the VEGP ESP SSAR

³ Part 10 of the VEGP COL application includes a proposed license condition associated with special nuclear material physical protection plan. The staff discusses this license condition as well as additional license conditions that are associated with granting of 10 CFR Part 30, 40, and 70 licenses in Section 1.5.5 of this report.

⁸ The VEGP COL application does not include the proposed license condition. The staff discusses this license condition in this SER as indicated in column “Location of Evaluation in this Report.”

and the VEGP COL FSAR are considered in the staff's safety evaluation to the extent necessary to ensure that the expected scope of information to be included in a COL application is addressed adequately in the DCD or ESP SSAR or COL FSAR, or in all the documents.

- For sections that were completely incorporated by reference without any supplements or departures, the SER simply points to the AP1000 DCD and/or VEGP ESP SSAR and related NUREG-1793 and its supplements and/or NUREG-1923, and confirms that all the relevant review items were addressed in the AP1000 DCD/or VEGP ESP SSAR and the staff's evaluation was documented in NUREG-1793 and its supplements and/or NUREG-1923.
- For subject matter within the scope of the COL application that supplements or departs from the DCD, this SER generally follows a six section organization as follows:
 - “Introduction” section provides a brief overview of the specific subject matter
 - “Summary of Application” section identifies whether portions of the review have received finality and clearly identifies the scope of review for the COL
 - “Regulatory Basis” section identifies the regulatory criteria for the information addressed by the COL application
 - “Technical Evaluation” section focuses on the information addressed by the COL application
 - “Post Combined License Activities” section identifies the proposed license conditions, ITAAC or FSAR information commitments that are post-COL activities
 - “Conclusion” section summarizes how the technical evaluation resulted in a reasonable assurance determination by the staff that the relevant acceptance criteria have been met

1.4 Staff Review of VEGP COL FSAR Chapter 1

1.4.1 Introduction

There are two types of information provided in Chapter 1 of the VEGP COL FSAR:

- General information that enables the reviewer or reader to obtain a basic understanding of the overall facility without having to refer to the subsequent chapters. A review of the remainder of the application can then be completed with a better perspective and recognition of the relative safety significance of each individual item in the overall plant description.
- Specific information relating to qualifications of the applicant, construction impacts and regulatory considerations that applies throughout the balance of the application (e.g., conformance with the acceptance criteria in NUREG-0800).

This section of the SER will identify the information incorporated by reference, summarize all of the new information provided, and document the staff's evaluation of the sections addressing regulatory considerations.

1.4.2 Summary of Application

The information related to COL/SUP items included in Chapter 1 of the VEGP COL FSAR encompasses the statements of fact or information recommended by RG 1.206. No staff technical evaluation was necessary where the statements were strictly background information. However, where technical evaluation of these COL/SUPs was necessary, the evaluation is not in this SER section, but in subsequent sections as referenced below.

Section 1.1 Introduction

Section 1.1 of the VEGP COL FSAR, Revision 5, incorporates by reference Section 1.1, "Introduction," of the AP1000 DCD, Revision 19 with the following supplements.

Section 1.1 of the VEGP COL FSAR also incorporates by reference the VEGP ESP SSAR with variances and/or supplements as noted. VEGP COL FSAR Table 1.6-202, "Cross Reference of SSAR Sections Incorporated by Reference into FSAR Sections," provides information regarding incorporation of SSAR information into the FSAR. In a letter dated November 11, 2010, the applicant added a discussion of incorporation of the proprietary information and safeguards information referenced in the AP1000 DCD.

- VEGP COL 1.1-1

The applicant provided the anticipated schedule for construction and operation of VEGP Units 3 and 4 in VEGP COL FSAR Table 1.1-203. VEGP COL 1.1-1 is related to COL Information Item 1.1-1 in AP1000 DCD Table 1.8-2. The applicant committed to provide a site-specific construction plan and startup schedule after issuance of the COL.

Related to this is VEGP DEP 1.1-1, "Administrative departure for organization and numbering of the FSAR sections," discussed in FSAR Section 1.8 and Part 7 of the COL application. The staff's evaluation of this departure is included in Section 1.5.4 of this SER.

- VEGP COL 2.1-1

The applicant provided additional information in VEGP COL 2.1-1 to address COL Information Item 2.1-1 (COL Action Item 2.1.1-1). Specifically, VEGP Units 3 and 4 are to be located on a 3,169-acre coastal plain bluff on the southwest side of the Savannah River in eastern Burke County, Georgia. An expanded discussion of VEGP COL 2.1-1 is included in VEGP COL FSAR Section 2.1.

- STD SUP 1.1-1

The applicant specified the incorporation of Revision 19 of the Westinghouse AP1000 DCD in all sections of the VEGP COL FSAR. Additionally, the applicant incorporated by reference Nuclear Energy Institute (NEI) technical reports as identified in Table 1.6-201 of the VEGP COL FSAR.

- VEGP SUP 1.1-2

The applicant clarified that the FSAR was being submitted to NRC by SNC under Section 103 of the Atomic Energy Act to construct and operate two nuclear power plants under the provisions of 10 CFR Part 52, Subpart C.

- STD SUP 1.1-3

The applicant provided additional information to describe annotations used in the left hand column of the VEGP COL FSAR to identify departures, supplementary information, COL items, and CDI.

- STD SUP 1.1-4

The applicant provided additional information to indicate how proprietary, personal or sensitive information withheld from public disclosure pursuant to 10 CFR 2.390 and RIS 2005-026, "Control of Sensitive Unclassified Nonsafeguards Information Related to Nuclear Power Reactors," is identified in the VEGP COL FSAR. Proprietary material was provided in Part 9 of the COL application.

- VEGP SUP 1.1-5

The applicant provided additional information to identify acronyms and system designations used in the VEGP COL FSAR that are in addition to those identified in the AP1000 DCD.

- STD SUP 1.1-6

The applicant identified that, while the VEGP COL FSAR generally follows the AP1000 DCD organization and numbering, there were some organization and numbering differences that were adopted, where necessary, to include additional material, such as additional content identified in RG 1.206.

- VEGP SUP 1.1-8

The applicant provided additional information to identify acronyms and system designations used in the VEGP COL FSAR that are in addition to those identified in the AP1000 DCD and are associated with ESP issues.

Section 1.2 General Plant Description

Section 1.2 of the VEGP COL FSAR, Revision 5, incorporates by reference Section 1.2, "General Plant Description," of the AP1000 DCD, Revision 19 and Section 1.2 of the VEGP ESP SSAR, Revision 5 with the following departure and supplements:

- VEGP DEP 18.8-1

The applicant stated that each Operations Support Center (OSC) is being moved from the location identified on AP1000 DCD Figure 1.2-8 to its respective Units 3 and 4 Control Support Area (shown on Figure 1.2-201), vacated by relocating the unit Technical Support Center (TSC)

to a common site TSC in a new Communication Support Center (CSC). This departure is addressed in SER Section 13.3.

- VEGP COL 2.1-1; VEGP COL 3.3-1; and VEGP COL 3.5-1

The applicant provided additional information on the site plan for VEGP Units 3 and 4 summarizing the principal structures and facilities, parking areas, roads, and transmission lines. The location and orientation of the power block complex are also described. These COL information items are expanded in other sections of the VEGP COL FSAR.⁹

Section 1.3 Comparisons with Similar Facility Designs

Section 1.3 of the VEGP COL FSAR, Revision 5, incorporates by reference Section 1.3, “Comparisons with Similar Facility Designs,” of the AP1000 DCD, Revision 15 with no supplements.

Section 1.4 Identification of Agents And Contractors

Section 1.4 of the VEGP COL FSAR, Revision 5, incorporates by reference Section 1.4, “Identification of Agents and Contractors,” of the AP1000 DCD, Revision 15 and Section 1.4 of the VEGP ESP SSAR, Revision 5 with the following supplements:

- VEGP SUP 1.4-1

The applicant provided additional information to identify SNC as the non-owner, operator, and contractor of VEGP Units 3 and 4. SNC is a wholly owned subsidiary of Southern Company.

- VEGP SUP 1.4-2

The applicant provided additional information to clarify the identification of additional participants. The applicant: 1) identifies the nuclear steam system supply (NSSS) vendor, architect engineer, and constructor; 2) describes their technical qualifications; and 3) describes the division of responsibility among them.

- VEGP SUP 1.4-3

The applicant provided additional information related to specialized consulting firms that assisted in preparing the COL application for VEGP.

Section 1.5 Requirements for Further Technical Information

Section 1.5 of the VEGP COL FSAR, Revision 5, incorporates by reference Section 1.5, “Requirements for Further Technical Information,” of the AP1000 DCD, Revision 19 with no departures or supplements. This section of the DCD provides information related to testing conducted during the AP600 conceptual design program to provide input into the plant design and to demonstrate the feasibility of unique design features. The DCD also describes the analyses performed to show that the AP600 and AP1000 exhibit a similar range of conditions such that the AP600 tests are sufficient to support the AP1000 safety analysis.

⁹ Table 1.8-202 of the VEGP COL FSAR provides a COL information item index of occurrences in the VEGP COL FSAR.

Section 1.5 of the VEGP COL FSAR also incorporates by reference Section 1.5, “Requirements for Further Technical Information,” of the VEGP ESP SSAR, Revision 5 with no variances or supplements.

Section 1.6 Material Referenced

Section 1.6 of the VEGP COL FSAR, Revision 5, incorporates by reference Section 1.6, “Material Referenced,” of the AP1000 DCD, Revision 19 with the following supplements:

- STD SUP 1.6-1

The applicant provided additional information to identify the technical documents incorporated by reference in the VEGP COL FSAR in addition to those technical documents incorporated by reference in the AP1000 DCD.

- VEGP SUP 1.6-2

The applicant provided additional information to provide a cross reference of VEGP ESP SSAR sections incorporated by reference into VEGP COL FSAR sections.

- VEGP ESP VAR 1.2-1

VEGP ESP SSAR Section 1.2 is incorporated by reference into VEGP COL FSAR Section 1.1.1 with the exception of Figures 1-4 and 1-5. Part 7 of the VEGP COL application requests a variance for VEGP ESP SSAR Section 1.2. VEGP ESP SSAR Section 13.3 is incorporated by reference into VEGP COL FSAR Section 13.3, with the exception of Figure 13.3-2. Part 7 of the VEGP COL application requests a variance for these VEGP ESP SSAR sections and is addressed in SER Section 13.3.

- VEGP ESP VAR 1.6-1

VEGP ESP SSAR Section 1.6 is not incorporated by reference in the VEGP COL FSAR. Part 7 of the VEGP COL application requests a variance for this VEGP ESP SSAR section and is addressed in SER Section 1.4.4.

- VEGP ESP VAR 1.6-2

VEGP ESP SSAR Section 3.8.5 is incorporated by reference into VEGP COL FSAR Section 3.8.5.1 with the exception of the first paragraph. This paragraph includes a reference to Revision 15 of the AP1000 DCD. Additionally, the first sentence of the second paragraph in VEGP ESP SSAR Section 3.8.5.1.1 is not incorporated by reference. Part 7 of the VEGP COL application requests a variance for this VEGP ESP SSAR section and is addressed in SER Section 3.8.5.

- VEGP ESP VAR 1.6-3

VEGP ESP SSAR Chapter 15 is not incorporated by reference into the VEGP COL FSAR. This chapter of the VEGP ESP SSAR provides accident release information that has been

superseded by the referenced AP1000 DCD. Part 7 of the VEGP COL application requests a variance for this VEGP ESP SSAR section and is addressed in SER Chapter 15.

- VEGP ESP VAR 2.2-1

VEGP ESP SSAR Section 2.2 is incorporated by reference into VEGP COL FSAR Section 2.2 with the exception of the last paragraph of VEGP ESP SSAR Section 2.2.3.2.3 and VEGP ESP SSAR Table 2.2-6. This information has been superseded by information addressed in Sections 2.2 and 6.4. Part 7 of the VEGP COL application requests a variance for this VEGP ESP section and table and is addressed in SER Section 2.2.

- VEGP ESP VAR 2.3-1

VEGP ESP SSAR Section 2.3 is incorporated by reference into VEGP COL FSAR Section 2.3 with the exception that the third from last and second from last paragraphs of VEGP ESP SSAR Section 2.3.1.5 are replaced by information described in the replacement paragraph, which is shown in Section 2.3.1.5. Part 7 of the VEGP COL application requests a variance for this VEGP ESP SSAR section and is addressed in SER Section 2.3.

Section 1.7 Drawings and Other Detailed Information

Section 1.7 of the VEGP COL FSAR, Revision 5, incorporates by reference Section 1.7, “Drawings and Other Detailed Information,” of the AP1000 DCD, Revision 15, and Section 1.4 of the VEGP ESP SSAR, Revision 5 with the following supplements:

- VEGP SUP 1.7-1

The applicant identified the site-specific system drawings. These are the circulating water system, raw water system, offsite power system one line diagram, and switchyard general arrangement.

Section 1.8 Interfaces for Standard Design

Section 1.8 of the VEGP COL FSAR, Revision 5, incorporates by reference Section 1.8, “Interfaces for Standard Design,” of the AP1000 DCD, Revision 19 with the following supplements:

- VEGP SUP 1.8-1

The applicant identified three departures in VEGP COL FSAR Table 1.8-201, “Summary of FSAR Departures from the DCD.” The departures are:

- VEGP DEP 1.1-1, related to numbering and organization of the VEGP COL FSAR sections to be consistent with RG 1.206 and NUREG-0800
- VEGP DEP 9.2-1, related to PWS filtration
- VEGP DEP 18.8-1, related to the location of the TSC and OSCs

In a letter dated October 15, 2010, the applicant proposed the Tier 2 departure related to a proposed revision to AP1000 DCD Section 8.3.2.2 (Class 1E voltage regulating transformer current limiting features).

As part of VEGP SUP 1.8-1, the applicant added to Section 1.8 that variances from the referenced VEGP ESP SSAR are identified in VEGP COL FSAR Table 1.6-202.

- VEGP SUP 1.8-2

The applicant provided a list of the COL information items in the AP1000 DCD. In VEGP COL FSAR Table 1.8-202, SNC provides the sections of the application addressing these issues. The table further identifies the AP1000 COL items as an “applicant” item, a “holder” item or both. An applicant item is completely addressed in the application. SNC’s definition of a COL holder item is an item that cannot be resolved prior to issuance of the COL. These items are regulatory commitments of the COL holder and will be completed as specified in the appropriate section of the referenced DCD and their completion is the subject of a COL license condition presented in Part 10 of this COL application.

- VEGP SUP 1.8-3

The applicant provided a list in VEGP COL FSAR Table 1.8-203 of the ESP COL action items and the corresponding VEGP COL FSAR section(s) that address these COL action items.

- VEGP SUP 1.8-4

The applicant provided in VEGP COL FSAR Section 2.0 demonstrations that the VEGP Units 3 and 4 site characteristics, design parameters, and site interface values fall within the site-related parameters for which the AP1000 was designed.

- VEGP SUP 1.8-5

The applicant provided in VEGP COL FSAR Table 1.8-204 a list of the ESP permit conditions (PCs) and the corresponding locations that address these PCs.

- VEGP SUP 1.8-6

The applicant addressed the interface items for the AP1000 in Table 1.8-205.

Section 1.9 Compliance with Regulatory Criteria

Section 1.9 of the VEGP COL FSAR, Revision 5, incorporates by reference Section 1.9, “Compliance with Regulatory Criteria,” of the AP1000 DCD, Revision 19 with the following supplements:

- STD COL 1.9-1

The applicant provided additional information in STD COL 1.9-1 (corresponding to COL Information Item 1.9-1) related to RGs cited in the VEGP COL FSAR. Table 1.9-201 identifies the RG revision and provides VEGP COL FSAR cross-references. In addition, Appendix 1AA, “Conformance with Regulatory Guides,” was developed by the applicant to supplement the

detailed discussion presented in Appendix 1A, “Conformance with Regulatory Guides,” of the referenced AP1000 DCD. Specifically, Appendix 1AA delineates conformance of design aspects as stated in the DCD and conformance with programmatic and/or operational issues as presented in the VEGP COL FSAR. In certain RGs design aspects were beyond the scope of the DCD and are also presented in the VEGP COL FSAR.

- VEGP COL 1.9-1

The applicant provided additional information in VEGP COL 1.9-1 (corresponding to COL Information Item 1.9-1) related to how Division 4 of the RGs applies to the Environmental Report and the topics addressed in the Environmental Report. In addition, the applicant provided additional information related how to certain Division 1 of the RGs apply to the VEGP ESP SSAR.

- STD COL 1.9-2

The applicant provided additional information in STD COL 1.9-2 (corresponding to the first un-numbered COL information item identified at the end of AP1000 DCD Table 1.8-2) related to operational experience. VEGP COL FSAR Table 1.9-204 provides a list of Bulletins and Generic Letters (GLs), the appropriate VEGP COL FSAR cross-references and whether the subject matter was addressed in the AP1000 DCD.

- STD COL 1.9-3

The applicant provided additional information in STD COL 1.9-3 (related to the second un-numbered COL information item identified at the end of AP1000 DCD Table 1.8-2) related to review of unresolved safety issues and generic safety issues (GSIs). Specifically, VEGP COL FSAR Table 1.9-203 lists Three Mile Island (TMI) Action Plan items, Task Action Plan items, New Generic Issues, Human Factors issues, and Chernobyl Issues and states how they were considered in the AP1000 DCD and COL application. In addition, the applicant provided discussion on four new generic issues: Issue 186 related to heavy load drops; Issue 189 related to susceptibility of certain containments to early failure from hydrogen combustion; Issue 191 related to PWR sump performance; and Issue 196 related to the use of Boral in long-term dry storage casks for spent reactor fuel.

- STD SUP 1.9-1

The applicant provided additional information related to conformance with NUREG-0800. Specifically VEGP COL FSAR Table 1.9-202 delineates conformance with NUREG-0800 for design aspects as stated in the AP1000 DCD and conformance for subjects beyond the scope of the DCD as presented in the VEGP COL FSAR.

- VEGP SUP 1.9-2

The applicant clarified that the severe accident mitigation design alternatives evaluation for the AP1000 in Appendix 1B to the DCD is not incorporated into the VEGP COL FSAR, but is addressed in the VEGP ESP Environmental Report.

- STD SUP 1.9-3

The applicant provided information related to station blackout (SBO) procedures and training for operators to include actions necessary to restore offsite power after 72 hours by addressing alternating current (ac) power restoration and severe weather guidance in accordance with NUMARC-87-00.

Section 1.10 Nuclear Power Plants to Be Operated On Multi-Unit Sites

The applicant provided an assessment of the potential impacts of construction of one unit on SSCs important to safety for an operating unit, in accordance with 10 CFR 52.79(a)(31). This section of the VEGP COL FSAR provides an assessment of potential construction activity hazards, SSCs important to safety for the operating unit and related limiting conditions for operation (LCOs) for the operating unit, potentially impacted SSCs and LCOs and applicable managerial and administrative controls to be used to provide assurance that the LCOs for operating units are not exceeded as a result of construction activities at the multi-unit sites.

- STD SUP 1.10-1

The applicant identified this as a new section in the VEGP COL application that was not part of the referenced AP1000 DCD.

- VEGP SUP 1.10-1

The applicant identified that the power blocks for VEGP Units 3 and 4 have a minimum separation of at least 800 feet between plant centerlines. In the standard portion of the application there is a discussion that the primary consideration in setting this separation distance is the space needed to support plant construction via the use of a heavy-lift crane.

License Conditions

- Part 10, License Condition 1, ITAAC

The applicant proposed that the ITAAC identified in the tables in Appendix B of Part 10 of the VEGP COL application be incorporated into the COL.

1.4.3 Regulatory Basis

The regulatory basis of the information incorporated by reference is addressed in NUREG-1793 and its supplements and in NUREG-1923.

In addition, the acceptance criteria associated with the relevant requirements of the Commission regulations for the introductory information in VEGP COL FSAR Chapter 1 are given in Section 1.0 of NUREG-0800.

The applicable regulatory requirements for the introductory information are as follows:

- 10 CFR 50.43(e), as it relates to requirements for approval of applications for a DC, COL, manufacturing license, or operating license that propose nuclear reactor designs that differ significantly from LWR designs that were licensed before 1997, or use

simplified, inherent, passive, or other innovative means to accomplish their safety functions.

- 10 CFR 52.77 and 10 CFR 52.79, as they relate to general introductory matters.
- 10 CFR 52.79(a)(17), as it relates to compliance with technically relevant positions of the TMI requirements.
- 10 CFR 52.79(a)(20), as it relates to proposed technical resolutions of those unresolved safety issues and medium- and high priority GSIs that are identified in the version of NUREG-0933, "Resolution of Generic Safety Issues (Formerly entitled 'A Prioritization of Generic Safety Issues')," current on the date up to 6 months before the docket date of the application and, which are technically relevant to the design.
- 10 CFR 52.79(a)(31), regarding nuclear power plants to be operated on multi-unit sites, as it relates to an evaluation of the potential hazards to the SSCs important to safety of operating units resulting from construction activities, as well as a description of the managerial and administrative controls to be used to provide assurance that the LCOs are not exceeded as a result of construction activities at the multi-unit sites.
- 10 CFR 52.79(a)(37), as it relates to the information necessary to demonstrate how operating experience insights have been incorporated into the plant design.
- 10 CFR 52.79(a)(41), as it relates to an evaluation of the application against the applicable NRC review guidance in effect 6 months before the docket date of the application.
- 10 CFR 52.79(d)(2), requires that for a COL referencing a standard DC, the FSAR demonstrate that the interface requirements established for the design under 10 CFR 52.47 have been met.
- 10 CFR 52.97(a)(1)(iv), regarding technical and financial qualifications.

The related acceptance criteria from NUREG-0800, Chapter 1 are as follows:

- For regulatory considerations, acceptance is based on addressing the regulatory requirements as discussed in FSAR Chapter 1 or in the referenced FSAR section. The NUREG-0800 acceptance criteria associated with the referenced section will be reviewed in the context of that review.
- For performance of new safety features, the information is sufficient to provide reasonable assurance that: (1) these new safety features will perform as predicted in the applicant's FSAR; (2) the effects of system interactions are acceptable; and (3) the applicant provides sufficient data to validate analytical codes. The design qualification testing requirements may be met with either separate effects or integral system tests; prototype tests; or a combination of tests, analyses, and operating experience.

For conformance with regulatory criteria, RG 1.206 states an applicant should perform a similar evaluation for conformance with RGs that were in effect six months prior to the submittal of the COL application.

1.4.4 Technical Evaluation

The NRC staff reviewed Section 1 of the VEGP COL FSAR and checked the referenced DCD and the VEGP ESP SSAR to ensure that the combination of the DCD, the VEGP ESP SSAR and the COL application represents the complete scope of information relating to this review topic.¹⁰ The NRC staff's review confirmed that the information in the application and incorporated by reference addresses the required information relating to this introduction. The results of the NRC staff's evaluation of the information incorporated by reference in the VEGP COL application are documented in NUREG-1793 and its supplements (regarding the AP1000 design) and in NUREG-1923 and NUREG-1872, "Draft Environmental Impact Statement for an Early Site Permit (ESP) at the Vogtle Electric Generating Plant Site," (regarding the VEGP ESP).

The staff reviewed the information in the VEGP COL FSAR:

VEGP COL FSAR Sections 1.1, 1.2, 1.3, and 1.7

There are no specific NUREG-0800 acceptance criteria related to the general information presented in Sections 1.1, 1.2, 1.3, and 1.7, and no specific regulatory findings. The information provides the reader with a basic overview of the nuclear power plant and the construct of the VEGP COL FSAR, itself.

Sections 1.1, 1.2, 1.3, and 1.7 of the referenced VEGP ESP SSAR are incorporated by reference. Some sections include variances and/or supplements and the variances and the supplemental information are evaluated in respective SER sections.

In the VEGP COL FSAR, VEGP COL 1.1-1 states that a site-specific construction plan and startup schedule will be provided to the NRC after issuance of the COL. This is identified as Commitment Number 1.4-1.

In a letter dated November 11, 2010, the applicant added a discussion of incorporation of the proprietary information and safeguards information referenced in the AP1000 DCD. This information is included to meet the requirements of 10 CFR Part 52, Appendix D, Section IV.A.3, which indicates the applicant must "include, in the plant specific DCD, the proprietary information and safeguards information referenced in the AP1000 DCD" and, therefore, is acceptable. The incorporation of the above information into a future revision of the VEGP COL FSAR is **Confirmatory Item 1.4-1**.

Resolution of Standard Content Confirmatory Item 1.4-1

Confirmatory Item 1.4-1 is an applicant commitment to revise FSAR Section 1.1 to include a discussion of incorporation of the proprietary information and safeguards information referenced in the AP1000 DCD. The staff verified that the VEGP COL FSAR was appropriately revised. As a result, Confirmatory Item 1.4-1 is now closed.

¹⁰ See Section 1.2.2 for a discussion of the staff's review related to verification of the scope of information to be included in a COL application that references a DC or ESP.

VEGP COL FSAR Section 1.4

- VEGP SUP 1.4-1, VEGP SUP 1.4-2, VEGP SUP 1.4-3

This evaluation is limited to SNC's technical qualification to hold a 10 CFR Part 52 license in accordance with 10 CFR 52.97(a)(1)(iv). The financial qualifications that are also a requirement of 10 CFR 52.97(a)(1)(iv) are evaluated in Section 1.5.1 of this SER.

The applicant identified SNC as the non-owner and operator of VEGP Units 3 and 4. The owner licensees are as follows: Georgia Power Company, Oglethorpe Power Corporation, Municipal Electric Authority of Georgia, and the City of Dalton, Georgia, an incorporated municipality in the State of Georgia acting by and through its Board of Water, Light and Sinking Fund Commissioners (Dalton Utilities). SNC is a wholly-owned subsidiary of Southern Company.

In Section 1.4 of the application, SNC provides justification for why it believes it is qualified to hold a 10 CFR Part 52 license. VEGP COL FSAR Section 1.4 states that SNC was formed for the purpose of operating nuclear facilities owned by other Southern Company subsidiaries. SNC operates the Edwin I. Hatch Nuclear Plant, Units 1 and 2, the VEGP Units 1 and 2, and the Joseph M. Farley Nuclear Plant, Units 1 and 2. The combined electric generation of the three plants is in excess of 5,900 MWe. Because SNC holds 10 CFR Part 50 licenses for nuclear power plants and has demonstrated its ability to build and operate these plants, the staff finds that SNC is qualified to hold a 10 CFR Part 52 license. This includes SNC's demonstrated ability to choose and manage oversight of NSSS vendors, architect engineers and constructors of nuclear related work. The staff notes that Section 17.5 of the VEGP COL FSAR discusses the QA program to be implemented at the receipt of the COL. This QA program includes requirements that will be implemented by SNC's NSSS vendor, architect engineer, and constructor. The staff's evaluation of Section 17.5 of the VEGP COL FSAR is in Section 17.5 of this SER. Based on SNC's experience with nuclear power plants and the staff's evaluation of SNC's QA program, the staff finds that SNC is technically qualified to hold a 10 CFR Part 52 license in accordance with 10 CFR 52.97(a)(1)(iv).

VEGP COL FSAR Section 1.5

10 CFR 50.43(e) requires additional testing or analysis for applications for a DC or COL that propose nuclear reactor designs that differ significantly from LWR designs that were licensed before 1997, or use simplified, inherent, passive, or other innovative means to accomplish their safety functions. This requirement was addressed in the AP1000 DCD. The COL application does not include any additional design features that require additional testing.

VEGP COL FSAR Section 1.6

There are no specific NUREG-0800 acceptance criteria related to the information presented in Section 1.6, (for STD SUP 1.6-1 and VEGP SUP 1.6-2) and no specific regulatory findings.

- VEGP ESP VAR 1.6-1

Section 1.6 of the VEGP ESP SSAR references Revision 15 of the AP1000 DCD as related to the limited work authorization activities approved in the ESP LWA. In this respect, Revision 15 has been superseded by Revision 19 of the AP1000 DCD, which is incorporated by reference into the VEGP COL FSAR. Revision 19 of the AP1000 DCD includes the most updated information, and the results of the staff's evaluation of the information incorporated by reference

in the VEGP COL application are documented in NUREG-1793 and its supplements. Therefore, the variance is acceptable.

VEGP COL FSAR Section 1.8

- VEGP SUP 1.8-1

As discussed in SER Section 1.4.2, the applicant identified three departures in Table 1.8-201 from the referenced AP1000 DCD and six variances from the VEGP ESP SSAR. In a letter dated October 15, 2010, the applicant proposed the Tier 2 departure related to a proposed revision to AP1000 DCD Section 8.3.2.2 (Class 1E voltage regulating transformer current limiting features). Section 1.3 of this SER provides a cross reference to where these departures and variances are discussed in this SER.

- VEGP SUP 1.8-2

In Sections 1.3 and 1.4.4 of the BLN SER, the staff identified a standard content **Open Item 1-2** related to the decision regarding which of the BLN COL FSAR commitments, if any, should become a license condition. On January 21, 2010, the NRC issued ISG-15, "Final Interim Staff Guidance on the Post-Combined License Commitments," ESP/DC/COL-ISG-15. This guidance discusses options regarding completion of COL items that cannot be completed until after issuance of the COL. The VEGP applicant identified that certain COL information items cannot be resolved prior to the issuance of a COL. The applicant has identified proposed License Condition 2 in Part 10 of the COL application to ensure these COL items will be completed by the identified implementation milestones through completion of the action identified. The determination that these COL information items cannot be resolved prior to issuance of a COL is discussed in the relevant SER section related to the topic. In addition, using the guidance of ISG-15, the staff has identified certain FSAR commitments in individual sections of this SER and these FSAR commitments are listed in Appendix A.3 of this SER. The staff considers **Open Item 1-2** is resolved.

- VEGP SUP 1.8-3

As discussed in SER Section 1.4.2, Table 1.8-203 identified the VEGP ESP COL action items and corresponding FSAR section(s) that addresses these COL action items. A cross reference to where these ESP COL action items are discussed in this SER is provided below.

ESP COL Item	Description	Location of Evaluation in this Report
2.2-1	Hydrazine Hazard from Onsite Storage Tanks	2.2.3
2.2-2	Other Chemicals Hazards from Onsite Storage Tanks	2.2.3
2.3-1	Ultimate Heat Sink Design	2.3.1
2.4-1	Chelating Agents	2.4.13
13.6-1	Access Control Measures to Address Existing Spur	13.6

- VEGP SUP 1.8-4

As discussed in SER Section 1.4.2, the applicant provided in VEGP COL FSAR Section 2.0 demonstrations that the VEGP Units 3 and 4 site characteristics, design parameters, and site interface values fall within the site-related parameters for which the AP1000 was designed. The VEGP SER Section 2.0 demonstrates that the characteristics of the site fall within the site parameters specified in the DCD.

- VEGP SUP 1.8-5

As discussed in SER Section 1.4.2, Table 1.8-204 identified the ESP permit conditions (PCs) and corresponding location that addresses these COL action items. PCs 1, 2 through 8 and 9 are evaluated in SER Sections 2.5, 13.3, and 2.0, respectively.

- VEGP SUP 1.8-6

AP1000 DCD Table 1.8-1 presents interface items for the AP1000. This section of the DCD identifies certain interfaces with the standard design that have to be addressed in accordance with 10 CFR 52.47(a)(1)(vii).¹¹ As required by 10 CFR 52.79(d)(2), the COL application must demonstrate how these interface items have been met. In the VEGP COL FSAR, the applicant initially did not explicitly identify how these interface items have been met. In response to RAI 1-2, the applicant provided a revised VEGP COL FSAR Table 1.8-205, which explicitly identifies the FSAR location of information addressing the interface items identified in Section 1.8 of the AP1000 DCD. The staff review of the identified FSAR locations confirmed that interface items are adequately addressed in the VEGP COL FSAR. The technical discussions related to specific interface requirements are addressed in related sections of this SER (e.g., SER Sections 8.2.4 and 11.3.2).

VEGP COL FSAR Section 1.9

In this section of the application, the applicant demonstrates conformance with RGs and NUREG-0800 and addresses unresolved and GSIs, TMI action items, and operating experience.

¹¹ Following the update to 10 CFR Part 52 (72 FR 49517), this provision has changed to 10 CFR 52.47(a)(25).

Section 1.2.3 of this SER provides a discussion of the strategy used by the NRC to perform one technical review for each standard issue outside the scope of the DC and to use this review in evaluating subsequent COL applications. To ensure that the staff's findings on standard content that were documented in the SER with open items issued for the BLN Units 3 and 4 COL application were equally applicable to the VEGP Units 3 and 4 COL application, the staff undertook the following reviews:

- The staff compared the BLN COL FSAR, Revision 1, to the VEGP COL FSAR. In performing this comparison, the staff considered changes made to the VEGP COL FSAR (and other parts of the COL application, as applicable) resulting from RAIs and open and confirmatory items identified in the BLN SER with open items.
- The staff confirmed that all responses to RAIs identified in the corresponding standard content (the BLN SER) evaluation were endorsed.
- The staff verified that the site-specific differences were not relevant.

The staff has completed its review and found the evaluation performed for the standard content to be directly applicable to the VEGP COL application. This standard content material is identified in this SER by use of italicized, double-indented formatting. There was one confirmatory item (Confirmatory Item 1.4-2) and one open item (Open Item 1.4-2) related to the standard content in the BLN SER. The resolutions of these items are addressed in this SER.

The following portion of this technical evaluation section is reproduced from Section 1.4.4 of the BLN SER:

AP1000 COL Information Item

- *STD COL 1.9-1*

Regarding RGs, the applicant provides in BLN COL FSAR Table 1.9-201 a cross-reference between the RG and where it is discussed in the application, and Appendix 1AA, "Conformance with Regulatory Guides," to supplement the detailed discussion presented in Appendix 1A, "Conformance with Regulatory Guides," of the referenced DCD. The technical discussions related to this appendix are addressed in the related technical sections of the BLN COL FSAR. In addition, BLN COL FSAR Table 1.9-201 provides a listing of all RGs, the specific revision, and provides BLN COL FSAR and DCD cross-references.

The staff issued three RAIs associated with how the RG information in Table 1.9-201 and Appendix 1AA of the BLN COL FSAR is presented. In addition, there were two specific RAIs associated with how an individual RG is discussed in Table 1.9-201 and Appendix 1AA. A description of the RAIs and their responses follows.

RAI 1-5

In RAI 1-5, the staff noted that BLN COL FSAR Appendix 1AA lists the later version of the RG when compared with DCD Table 1.9-1 but in some cases does

not discuss compliance with the later version. In other cases, exceptions to the RG were identified but not justified.

RAI 1-7

In RAI 1-7, the staff noted that not all RGs listed in Appendix 1AA provided a cross-reference to where they were discussed in accordance with the guidance in Section 1 of NUREG-0800.

RAI 1-11

In RAI 1-11, the staff noted that the information that TVA provided in response to RAIs 1-5 and 1-7 conflicted with information that TVA provided in response to another RAI. TVA was requested to reconcile these differences.

RAIs 1-1 and 1-10

These RAIs are associated with specific RGs and RAI 1-1 and RAI 1-10 are evaluated in Chapters 13 and 12, of this SER, respectively.

In TVA's response to RAIs 1-5 and 1-7, TVA committed to make changes to BLN COL FSAR Table 1.9-201 and Appendix 1AA to:

- Add an additional statement to Appendix 1AA that specifically addresses the later version of the RG.*
- Revise BLN COL FSAR Sections 1.9.1.1, 1.9.1.2, 1.9.1.3, and 1.9.1.4, to reflect that one method of identifying and justifying an alternative to an RG is the use of previous revisions of the RG for design aspects as stated in the DCD in order to preserve the finality of the certified design.*
- Revise BLN COL FSAR Table 1.9-201 to address the RG listed in Appendix 1AA, thereby providing a more complete cross reference of where each RG is discussed in the COL application.*

In response to RAI 1-11, TVA committed to revising BLN COL FSAR Table 1.9-201 and Appendix 1AA to ensure that they are consistent with commitments made in other RAI responses.

The staff's evaluation of the RGs is addressed in Chapters 2 through 19 of this SER as needed. At a minimum the NRC staff's FSER sections will discuss any RG that involves an exception.

The staff finds TVA's responses to RAIs 1-5 and 1-7 acceptable. However, the staff notes that BLN COL FSAR Table 1.9-201 and Appendix 1AA will most likely need additional changes based on the staff's evaluation of the RGs in this SER and TVA's response to RAI 1-11. The NRC staff is still evaluating TVA's response to RAI 1-11 and has not yet made a determination of whether the response is acceptable. This is Open Item 1.4-2. The updating of BLN COL FSAR Table 1.9-201 to reflect changes committed to by TVA in

response to RAI 1-11 and the updating of this information to reflect TVA's commitments in other RAI responses is Confirmatory Item 1.4-2.

Evaluation of Site-Specific Information Related to Standard Content (Responses to RAIs 1-5 and 1-7)

In a letter dated September 18, 2008, the applicant stated that as part of the COL application changes described in the BLN response to RAI 1-5, the confirmation statements for some of the regulatory guidance (RG 1.29; RG 1.76; RG 1.78, "Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release," Revision 1; and RG 1.112, "Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Light-Water-Cooled Power Reactors," Revision 1) addressed in the VEGP ESP SSAR are modified. The staff has already reviewed the RG conformance discussion included in the VEGP ESP SSAR and found it acceptable. The applicant inadvertently omitted RG 1.28, "Quality Assurance Program Criteria (Design and Construction)," Revision 4 in Appendix 1 AA of the VEGP COL FSAR. SNC endorsed the Tennessee Valley Authority (TVA) RAI 1-5 response that includes application changes for RG 1.28 into future revisions of the VEGP COL application. The staff verified that the VEGP COL FSAR was updated to reflect the above. The staff considers RAI 1-5 closed for VEGP.

In a letter dated October 1, 2008, the applicant stated that as part of the COL application changes (VEGP COL FSAR Table 1.9-201) described in the BLN response to RAI 1-7, the response partially applies to the VEGP Units 3 and 4 application. This is because the VEGP COL FSAR references the VEGP ESP SSAR for discussion of selected RGs in VEGP COL FSAR Table 1.9-201. The staff has already reviewed the RG conformance discussion included in the VEGP ESP SSAR and found it acceptable in NUREG-1923. The staff verified that the VEGP COL FSAR was updated to reflect the above information. The staff considers RAI 1-7 closed for VEGP.

Resolution of Standard Content Confirmatory Item 1.4-2

The NRC staff verified that VEGP COL FSAR Table 1.9-201 was updated to provide an acceptable cross reference of where each RG is discussed in the COL application. As a result, Confirmatory Item 1.4-2 is resolved for VEGP.

Resolution of Standard Content Open Item 1.4-2

In a letter dated September 21, 2009, the VEGP applicant provided clarification to a previously submitted response dated January 27, 2009 from the BLN applicant. Specifically, the applicant proposed to revise the discussion in the "General comment" portion related to preserving the finality of the certified design in VEGP COL FSAR Sections 1.9.1.1, 1.9.1.2, 1.9.1.3, 1.9.1.4 and Appendix 1AA Note (b); to clarify in VEGP COL FSAR Section 17.5 the "DCD scope" and the "remaining scope" discussion for QA-related RGs (including RG 1.28; RG 1.30, "Quality Assurance Requirements for the Installation, Inspection, and Testing of Instrumentation and Electric Equipment (Safety Guide 30)"; RG 1.33, "Quality Assurance Program Requirements (Operation)," Revision 2; RG 1.38, "Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage, and Handling of Items for Water-Cooled Nuclear Power Plants," Revision 2; RG 1.39, "Housekeeping Requirements for Water-Cooled Nuclear Power Plants," Revision 2; RG 1.94, "Quality Assurance Requirements for Installation, Inspection, and Testing of Structural Concrete and Structural Steel During the Construction Phase of Nuclear Power Plants," Revision 1; and RG 1.116, "Quality Assurance Requirements for Installation, Inspection, and

Testing of Mechanical Equipment and Systems”). In addition, the applicant proposed to revise the VEGP COL FSAR, Appendix 1AA Note (c) to clarify the purpose of a “General” entry under the column labeled “Section Criteria” discussion. It is stated that a “Criteria Section” entry of “General” indicates a scope for the conformance statement of “all regulatory guide positions related to programmatic and/or operational aspects.” Thus an associated conformance statement of “Conforms” indicates that the applicant “complies with all regulatory guide positions related to programmatic and/or operational aspects.” The proposed clarifications clearly provide the scope of conformance to the RGs and, therefore, they are acceptable. The staff verified that the VEGP COL FSAR was updated to reflect the above. The staff considers Open Item 1.4-2 resolved for VEGP.

- VEGP COL 1.9-1

The staff has already reviewed the RG conformance discussion included in the VEGP ESP SSAR and found it acceptable in NUREG-1923. Therefore, no further evaluation is needed for VEGP COL 1.9-1.

The following portion of this technical evaluation section is reproduced from Section 1.4.4 of the BLN SER:

- *STD SUP 1.9-1*

Regarding conformance with regulatory review criteria as required by 10 CFR 52.79(a)(41), BLN COL FSAR Table 1.9-202 provides the applicant’s review of conformance with the acceptance criteria of NUREG-0800. The technical discussions related to the specific acceptance criteria of NUREG-0800 are addressed in the related sections of the BLN COL FSAR and addressed in Chapters 2 through 19 of this SER as needed.

Site-specific Discussion for STD SUP 1.9-1

The technical discussions related to the specific acceptance criteria of NUREG-0800 are addressed in the related sections of the VEGP COL FSAR and addressed in Chapters 2 through 19 of this SER as needed.

- *STD COL 1.9-3*

Regarding consideration of new and generic safety issues as required by 10 CFR 52.79(a)(17) and 10 CFR 52.79(a)(20), BLN COL FSAR Table 1.9-203, provides a listing of the TMI Action Plan items, Task Action Plan items, New Generic Issues, Human Factors issues, and Chernobyl Issues and states how they were considered in the DCD and COL application. The technical discussions related to the specific safety issues are addressed in the related sections of the BLN COL FSAR.

In addition, the applicant provided discussion of four new generic issues: Issue 186 related to heavy load drops; Issue 189 related to susceptibility of certain containments to early failure from hydrogen combustion; Issue 191 related to PWR sump performance; and Issue 196 related to the use of Boral in long-term dry storage casks for spent reactor fuel.

The applicant identified that neither Issue 189 nor Issue 196 is applicable to the design or application and that therefore neither is addressed in the BLN COL FSAR. Issue 186 states that there are not any planned heavy load lifts outside those described in the DCD; nonetheless, special procedures to address heavy loads are discussed in Subsection 9.1.5.3. Related to Issue 191, the applicant provided a reference to the protective coatings program and containment cleanliness program in Subsections 6.1.2.1.6 and 6.3.8.1 of the BLN COL FSAR, respectively.

Issue 186 and Issue 196 are evaluated in Chapter 9 of this SER. Issues 189 and 191 are evaluated in Chapter 6 of this SER.

- STD SUP 1.9-3

This COL supplemental item is addressed as VEGP SUP 8.1-2 in SER Section 8.1.

- VEGP SUP 1.9-2

The applicant clarified that the severe accident mitigation design alternatives evaluation for the AP1000 in Appendix 1B to the DCD is not incorporated into the VEGP COL FSAR but is addressed in the VEGP ESP Environmental Report. The staff has already reviewed this discussion included in the VEGP ESP and found it acceptable in NUREG-1872. Therefore, no further evaluation is needed for VEGP SUP 1.9-2.

The following portion of this technical evaluation section is reproduced from Section 1.4.4 of the BLN SER:

- *STD COL 1.9-2 (related to the first un-numbered COL information item identified at the end of DCD Table 1.8-2)*

Regarding demonstration of operating experience from Bulletins and GLs, as required by 10 CFR 52.79(a)(37), BLN COL FSAR Table 1.9-204 provides a list of Bulletins and GLs, the appropriate BLN COL FSAR cross-references, and whether the subject matter was addressed in the DCD. The technical discussions related to the specific safety issues are addressed in the related sections of the BLN COL FSAR and are addressed in Chapters 2 through 19 of this SER as needed.

The evaluation of GSI 163, "Multiple Steam Generator Tube Leakage," is described below because otherwise its evaluation would be spread across several SER chapters.

GSI 163 identified a safety concern associated with the potential multiple steam generator (SG) tube leaks triggered by a main steam line break outside containment that cannot be isolated. The issue was evaluated as part of the AP1000 DCD review and was resolved for the AP1000 design. The evaluation was documented in NUREG-1793, Chapter 20. The evaluation states in part the following:

The staff agrees that the issue should be closed for the AP1000 design. Issue 163 concerns the possibility that a multiple steam generator tube rupture (SGTR), resulting from a main steam line break and degraded SG tubes, could result in core damage due to depletion of the reactor coolant and safety injection

fluid in the refueling water storage tank. For the AP1000 design, an SGTR is mitigated using the passive core cooling system, initially through the passive residual heat removal heat exchanger, and the core makeup tanks (CMTs). After the CMTs drain to the low level to actuate the automatic depressurization system, the reactor coolant depressurization would result in gravity injection from the in containment refueling water storage tank (IRWST), and eventually from the containment recirculation. The scenario that the safety injection from the refueling water storage tank, which is outside the containment in the existing plants, will be depleted to result in core damage is not likely for the AP1000 design because the IRWST and containment recirculation will continue to provide core cooling.

Since the resolution of Issue 163 is an ongoing NRC effort, any future requirements for the resolution of this issue will be required of the COL applicant, if applicable to the AP1000 design.

Subsequent to the original issuance of NUREG-1793, GSI 163 was closed via a July 16, 2009, memorandum. In the safety evaluation accompanying the closure of the issue, the following is stated:

the staff concludes that the technical specification requirements relating to SG tube integrity provide reasonable assurance that all tubes will exhibit acceptable structural margins against burst or rupture during normal operation and DBAs (including MSLB [main steam line break]), and that leakage from one or multiple tubes under DBAs will be limited to very small amounts, consistent with the applicable regulations for offsite and control room dose.

Therefore, in addition to the unique design features of the AP1000 cited in NUREG-1793 and its supplements as a basis for closure of the issue, the staff notes that for PWR designs in general the issue is resolved based on the technical specification requirements. The staff discusses these technical specification requirements in Section 5.4, "Component and Subsystem Design," of this SER. Based on the evaluation in NUREG-1793 and its supplements, and based on the staff's evaluation of the SG tube surveillance program in Section 5.4 of this SER, the staff considers GSI 163 resolved for VEGP.

VEGP COL FSAR Section 1.10

In this section of the application, the applicant provides an assessment of the potential hazards due to construction of one unit on SSCs important to safety for an operating unit, in accordance with 10 CFR 52.79(a)(31).

Section 1.2.3 of this SER provides a discussion of the strategy used by the NRC to perform one technical review for each standard issue outside the scope of the DC and use this review in evaluating subsequent COL applications. To ensure that the staff's findings on standard content that were documented in the SER with open items issued for the BLN Units 3 and 4 COL application were equally applicable to the VEGP Units 3 and 4 COL application, the staff undertook the following reviews:

- The staff compared the BLN COL FSAR, Revision 1, to the VEGP COL FSAR. In performing this comparison, the staff considered changes made to the VEGP COL

FSAR (and other parts of the COL application, as applicable) resulting from RAIs and open and confirmatory items identified in the BLN SER with open items.

- The staff confirmed that all responses to RAIs identified in the corresponding standard content (the BLN SER) evaluation were endorsed.
- The staff verified that the site-specific differences were not relevant.

The staff has completed its review and found the evaluation performed for the standard content to be directly applicable to the VEGP COL application. This standard content material is identified in this SER by use of italicized, double-indented formatting. There was two open items (Open Items 1.4-3 and 1.4-4) related to the standard content in the BLN SER. The resolutions of these items are addressed in this SER.

The following portion of this technical evaluation section is reproduced from Section 1.4.4 of the BLN SER:

- *STD SUP 1.10-1*

The NRC staff reviewed the information in BLN COL FSAR Table 1.10-201, identifying the potential hazards from construction activities, BLN COL FSAR Table 1.10-202 that cross-references the construction hazard with the impacted SSCs, and BLN COL FSAR Table 1.10-203, identifying the specific managerial and administrative controls to preclude or mitigate the construction hazard. There is the potential that review of other areas of the application could impact the hazards and management programs identified in the Bellefonte application. For example, site runoff from construction of Unit 4, if not properly controlled, could impact the operation of Unit 3. Site runoff is evaluated in Section 2.4 of this report. The staff has not yet completed its review of this application against the requirements of 10 CFR 52.79(a)(31). This is part of Open Item 1.4-3.

In the application, TVA stated that controls within Section 1.10 of the FSAR are not required unless there is an operating unit on the site. To clarify this FSAR commitment, the staff requests TVA to revise the application to positively state these programs will be in place when there is an operating unit on the site. This is Open Item 1.4-4.

Resolution of Standard Content Open Item 1.4-4

In a letter dated July 29, 2009, the applicant proposed to revise VEGP COL FSAR Section 1.10.3 to positively state that these programs will be in place when there is an operating unit on the site. The staff verified that the VEGP COL FSAR was appropriately updated to include the above. As a result, Open Item 1.4-4 is resolved.

- VEGP SUP 1.10-1

The supplemental information states that the power blocks for VEGP 3 and 4 have a minimum separation of at least 800 feet between plant centerlines and notes that new units SSCs important to safety are described in the VEGP COL FSAR Chapter 3, and the LCOs for VEGP 3 and 4 are identified in Part 4 of the COL application. VEGP Units 1 and 2 SSCs

important safety are described in Chapter 3 of the updated FSAR. In the standard portion of VEGP COL FSAR Section 1.10, there is a discussion that the primary consideration in setting the 800-foot separation distance is the space needed to support plant construction via the use of a heavy-lift crane.

The site-specific supplemental information is provided to supplement the standard information above and provides with specificity the location of the SSCs and LCOs required by 10 CFR 52.79(a)(31). The staff's review of this SUP item is included in resolution of Open Item 1.4-3.

Resolution of Standard Content Open Item 1.4-3

A new draft ISG-22 has been issued to assist the staff with the evaluation of COL applicants' compliance with the requirements of 10 CFR 52.79(a)(31). The above draft ISG document was made available to the public including the applicant and was discussed at a public meeting on August 26, 2010.

The regulation at 10 CFR 52.79(a)(31) requires, in part, that applicants for a COL intending to construct and operate new nuclear power plants on multi-unit sites provide an evaluation of the potential hazards to the SSCs important to safety for operating units resulting from construction activities on the new units. The requirement in 10 CFR 52.79(a)(31) can be viewed as having two subparts:

1. The COL applicant must evaluate the potential hazards from constructing new plants on SSCs important to safety for existing operating plants that are located at the site.
2. The COL applicant must evaluate the potential hazards from constructing new plants on SSCs important to safety for newly constructed plants that begin operation at the site.

The interim guidance recommends that the applicant provide a construction impact evaluation plan that includes:

- A discussion of the construction activity identification process and the impact evaluation criteria used to identify and evaluate the construction activities that may pose potential hazards to the SSCs important to safety for operating unit(s).
- A table of those construction activities and the potential hazards that are identified using that construction impact evaluation plan, the SSCs important to safety for the operating unit potentially impacted by the construction activity, and expected mitigation method.
- Identification of the managerial and administrative controls, such as proposed license conditions that may involve construction schedule constraints or other restrictions on construction activities, that are credited to preclude and/or mitigate the impacts of potential construction hazards to the SSCs important to safety for the operating unit(s).
- A discussion of the process for communications and interactions planned and credited between the construction organization and the operations organization to ensure appropriate coordination and authorization of construction activities and implementation of the prevention or mitigation activities as necessary.

- A memorandum of understanding or agreement (MOU or MOA) between the COL applicant and the operating unit(s) licensee as a mechanism for communications, interactions, and coordination to manage the impact of the construction activities.
- An implementation schedule corresponding to construction tasks or milestones to ensure the plan is reviewed on a recurring basis and maintained current as construction progresses.

The staff reviewed the VEGP COL FSAR Section 1.10, which provides information to address compliance with 10 CFR 52.79(a)(31). In order to complete the staff's review, in RAI 1.5-2, the staff requested that the applicant provide a construction impact evaluation plan that includes:

- A discussion of the process for communications and interactions planned and credited between the construction organization and the operations organization to ensure appropriate coordination and authorization of construction activities and implementation of the prevention or mitigation activities as necessary.
- A memorandum of understanding or agreement (MOU or MOA) between the COL applicant and the operating unit(s) licensee as a mechanism for communications, interactions, and coordination to manage the impact of the construction activities.
- An implementation schedule corresponding to construction tasks or milestones to ensure the plan is reviewed on a recurring basis and maintained current as construction progresses.

In addition, the applicant was requested to identify the managerial and administrative controls (VEGP COL FSAR Table 1.10-203) that are credited to preclude and/or mitigate the impacts of potential construction hazards to the SSCs important to safety for the operating units (VEGP Units 1 and 2).

In a letter dated November 2, 2010, the applicant stated:

- VEGP COL FSAR Sections 1.10.2 and 13AA will be revised to include the discussion of the process for communications and interactions planned and credited between the construction organization and the operations organization.
- The COL applicant and the operating unit(s) licensee are the same entity; thus, no MOU or MOA is considered necessary.
- VEGP COL FSAR Sections 1.10.3 and 13AA will be revised to include the discussion of the implementation schedule corresponding to construction tasks or milestones.
- VEGP COL FSAR will be revised to indicate that managerial and administrative controls are developed and implemented as work progresses on site. These controls are intended to preclude and/or mitigate the impacts of potential construction hazards to the SSCs important to safety for the operating units.

The proposed changes to the VEGP COL FSAR meet the draft guidance of ISG-22 and, therefore, meet the requirements of 10 CFR 50.79(a)(31). The incorporation of the above proposed changes into a future revision of the VEGP COL FSAR is **Confirmatory Item 1.4-2**.

Resolution of Standard Content Confirmatory Item 1.4-2

Confirmatory Item 1.4-2 is an applicant commitment to revise FSAR Sections 1.10.2 and 1.10.3 and Appendix 13A to address guidance included in ISG-22. The staff verified that the VEGP COL FSAR was appropriately revised. As a result, Confirmatory Item 1.4-2 is now closed.

License Conditions

- Part 10, License Condition 1, ITAAC

The applicant proposed that the ITAAC identified in the tables in Appendix B of Part 10 of the VEGP COL application be incorporated into the COL. The proposed license condition also states that after the Commission has made the finding required by 10 CFR 52.103(g), "Operation under a combined license," the ITAAC do not constitute regulatory requirements; except for specific ITAAC, which are subject to a hearing under 10 CFR 52.103(a), their expiration will occur upon final Commission action in such proceeding.

The ITAAC identified in tables in Appendix B of Part 10 of the VEGP COL application are evaluated throughout this SER. The remaining text of the proposed license condition is already covered by regulatory requirements of 10 CFR 52.103(h). Therefore, there is no need for a license condition.

1.4.5 Post Combined License Activities

For the reasons discussed in the technical evaluation section above, the following FSAR commitment is identified as the responsibility of the licensee:

- Commitment (1.4-1) - A site-specific construction plan and startup schedule will be provided after issuance of the COL.

1.4.6 Conclusion

The NRC staff reviewed the application and checked the referenced DCD. The NRC staff's review confirmed that the applicant addressed the required information relating to principal review matters, and there is no outstanding information expected to be addressed in the VEGP COL FSAR related to this section. The results of the NRC staff's technical evaluation of the information incorporated by reference in the VEGP COL application are documented in NUREG-1793 and its supplements and in NUREG-1923 and NUREG-1872.

1.5 Additional Regulatory Considerations

1.5.1 10 CFR 52.97(a)(1)(iv) Applicant Financial Qualifications and Evaluation of Financial Qualification in accordance with 10 CFR 50.33

BACKGROUND:

SNC has been authorized by the VEGP Units 1 and 2 owner, Georgia Power Company, (which acts as agent for the other VEGP Units 1 and 2 owners) to apply for two COLs for VEGP Units 3 and 4. SNC submits this application individually, and for the proposed owner licensees

that will be named on the VEGP Units 3 and 4 licenses, along with the proposed percentage ownership interest:

- (45.7 percent) Georgia Power Company (GPC)
- (30.0 percent) Oglethorpe Power Corporation (OPC)
- (22.7 percent) Municipal Electric Authority of Georgia (MEAG)
- (01.6 percent) The City of Dalton, Georgia (Dalton) - [an incorporated municipality in the State of Georgia acting by and through its Board of Water, Light and Sinking Fund Commissioners (Dalton Utilities)]

SNC is the applicant for the COL for VEGP Units 3 and 4, and will construct and operate these new units on behalf of the VEGP Unit 3 and 4 owners. However, SNC will not have any ownership interest in VEGP Units 3 and 4. GPC, as a proposed owner of VEGP Units 3 and 4, has entered into an agreement with the other owners to decide on the ownership percentages of VEGP Units 3 and 4 in the near future.

SNC has entered into agreements with GPC (and GPC with the other owners) to provide SNC the authority to apply for and hold the COLs as an operator licensee and, therefore, to operate the facilities on the owners' behalf. SNC will enter into similar agreements to construct the facilities. As such, SNC is granted the authority, on behalf of the owners, to manage all aspects of plant construction and operation, including but not limited to, management of the construction of the units, control of the exclusion area, security, and emergency planning.¹²

REGULATORY EVALUATION:

SNC's request for the NRC to issue two COLs under Section 103 of the Atomic Energy Act of 1954, as amended, for construction and operation is subject to, among other things, the requirements of the Atomic Energy Act of 1954, as amended; 10 CFR Part 52, Subpart C; 10 CFR Part 50; and 10 CFR Part 140. This safety evaluation reviews the following issues: financial qualifications, decommissioning funding assurance, foreign ownership, and nuclear insurance and indemnity. SNC has chosen to pursue this application under 10 CFR Part 52.

FINANCIAL QUALIFICATIONS:

Pursuant to 10 CFR 52.77, the application must include all of the information required by 10 CFR 50.33.

Construction:

Pursuant to 10 CFR 50.33(f)(1), "the applicant shall submit information that demonstrates that the applicant possesses or has reasonable assurance of obtaining the funds necessary to cover estimated construction costs and related fuel cycle costs. The applicant shall submit estimates of the total construction costs of the facility and related fuel cycle costs, and shall indicate the source(s) of funds to cover these costs."

¹² Additionally, SNC has implemented a 10 CFR Part 50, Appendix B QA program applicable to both construction and operation as part of its obligations.

Construction Cost Estimate:

Under 10 CFR Part 50, Appendix C, Section I.A.1:

Each applicant's estimate of the total cost of the proposed facility should be broken down as follows and be accompanied by a statement describing the bases from which the estimate is derived:

- (a) Total nuclear production plant costs; and
- (b) Transmission, distribution, and general plant costs; and
- (c) Nuclear fuel inventory cost for first core.

If the fuel is to be acquired by lease or other arrangement than purchase, the application should so state. The items to be included in these categories should be the same as those defined in the applicable electric plant and nuclear fuel inventory accounts prescribed by the Federal Energy Regulatory Commission [FERC] or an explanation given as to any departure there from.

In accordance with 10 CFR 50.33(f) and 10 CFR Part 50, Appendix C, SNC has estimated the construction costs for the two units of the proposed VEGP Units 3 and 4 facility, which are provided in Part 1 of the VEGP COL application. The costs are based upon a construction period for the project beginning in November 2011 and ending with Unit 3 commercial operation in April 2016, and Unit 4 commercial operation in April 2017. Other than the cost of financing, each of the owners will share in the costs of the facility in accordance with its ownership interest. Each owner will arrange for its financing and bear those costs individually.

According to SNC, the total cost of VEGP Units 3 and 4 consists of Engineering, Procurement and Construction (EPC) costs, owners' costs, and financing costs. The EPC costs were based on detailed cost estimates performed by Shaw and Westinghouse for the standard AP1000 design and the site-specific design referenced in the VEGP COL application. The EPC cost estimate looked in detail at equipment cost, commodities cost, and labor costs. Owners' costs were estimated by SNC. Those costs include cost of site development, licensing, owners' oversight activities, preparations of the plant operations staff, and other costs not covered by the EPC contract. The costs associated with financing were estimated by GPC.

Escalation of commodity prices or labor rates could increase the actual installed cost of the facility. The estimate is based on proprietary negotiations between SNC and GPC and a consortium comprising Westinghouse Electric Company, LLC, and Stone & Webster, Inc. Although no EPC contract for the facility has been executed at the time of the submission of the VEGP COL application, the total nuclear production plant costs reflect a reasonable estimate based on the contract negotiations. As the contract currently provides one price for both units, the table is structured in this manner.

Total nuclear production plant costs also include the general plant costs that owners will pay for activities outside the scope of the EPC contract, expressed in 2008 dollars. These costs include licensing, GPC and SNC organization, contract oversight, including QA and quality control (QC) oversight, site preparation, permits, plant buildings, and other miscellaneous costs.

The NRC staff reviews studies from independent sources and collects projected construction cost estimates from all COL applications, as they are submitted, for comparison and

reasonableness.¹³ According to these sources, the cost of constructing a plant comparable to VEGP Units 3 and 4 is approximately \$3,221/kilowatt electric (kWe) to \$5,072/kWe (Massachusetts Institute of Technology [MIT] Study) installed.¹⁴ As stated earlier, the applicants' overnight cost estimate can be calculated based on information in Part 1 of the VEGP COL application.

The applicant's overnight cost estimate is above the range derived from the studies developed from independent sources, and is also greater than construction cost estimates reviewed to date for comparable plants. Accordingly, the NRC staff finds the applicant's overnight cost estimate to be reasonable.

Sources of Construction Funds:

Pursuant to 10 CFR Part 50, Appendix C, Section I.A.2:

The application should include a brief statement of the applicant's general financial plan for financing the cost of the facility, identifying the source or sources upon which the applicant relies for the necessary construction funds, e.g., internal sources such as undistributed earnings and depreciation accruals, or external sources such as borrowings.

GPC's Source of Construction Funds

According to the applicant, GPC obtained approval of the facility from the Georgia Public Service Commission (GPSC) certifying the cost to construct. (The GPSC approved the building of VEGP Units 3 and 4 on Tuesday, March 17, 2009, by a vote of 4 to 1).

The sources of construction funds for GPC's portion of this facility will be a mixture of internally generated cash and external funding. The external funding will come from a mix of capital (debt, preferred, and equity). GPC plans to finance the construction of VEGP Units 3 and 4 utilizing a mixture of general obligation corporate debt and equity (i.e., GPC does not currently plan to incur project-specific financing for the units) that will maintain its overall capital structure, taking into consideration financial market conditions during construction, and the financial requirements of its other investment in new sources of generation.

Southern Company is the parent firm of GPC, Alabama Power Company, Gulf Power Company, Mississippi Power Company, Southern Power, and SNC as well as certain service and special purpose subsidiaries. GPC's common stock is held solely by Southern Company. Southern Company is investor owned, and had 102,903 common stockholders at year end 2007.

¹³ The staff's consideration of the cost information submitted by the applicant focuses on the estimated production plant cost and on the estimated cost of fuel, since the NRC clearly has oversight of the plant and fuel, and unreasonably low plant construction and fuel cost estimates may have a nexus to a possible reduction in safety. The NRC does not have regulatory authority over transmission and distribution assets, which do not raise radiological safety issues. Thus, any such cost estimate provided is deemed to be true and accurate under 10 CFR 50.9, "Completeness and accuracy of information," and no further assessment of that estimate is performed.

¹⁴ Update to the MIT 2003 Future of Nuclear Power, 2009.

As of 2007, GPC has a net utility investment of more than \$13.8 billion, of which approximately \$5.2 billion is invested in generating facilities including 156 generating units (38 fossil steam, 75 hydroelectric, 4 nuclear, 2 combined cycle, and 37 combustion turbine units). GPC has a total owned generating capacity of approximately 16,102 MWe and a total generating capacity of approximately 20,000 MWe; 71 percent of the energy supplied from owned units is from coal, 18 percent from nuclear, 3 percent from hydroelectric, and less than 8 percent from natural gas and oil. GPC currently has co-ownership of Edwin I. Hatch Nuclear Plant, Units 1 and 2 and VEGP Units 1 and 2 along with OPC, MEAG, and the City of Dalton.

The applicant states that GPC is subject to the jurisdiction of two rate regulatory authorities, the GPSC and the FERC. The output of VEGP 3 and 4 is expected to be sold to GPC retail customers; accordingly, GPC will include its proportionate share of the aforementioned costs as capital expenditure before the GPSC and will earn a return on prudently incurred costs from its customers.

OPC's Source of Construction Funds

The sources of construction funds for OPC's portion of this facility will be primarily external funding. OPC is an eligible borrower under the Rural Electrification Act and is seeking loan funds pursuant to the loan programs of the Rural Utilities Service. To the extent funds are not available from these loan programs, OPC will issue debt in the capital markets as necessary to finance its share of the cost of construction. In addition, OPC will issue tax-exempt financing for any portion of VEGP Units 3 and 4 that qualifies (such as sewage and solid waste disposal facilities).

OPC is owned by 38 retail electric distribution cooperative members (Members). OPC and the Members were each formed pursuant to the Georgia Electric Membership Corporation Act. OPC's principal business is providing wholesale electric power to the Members. As with cooperatives generally, OPC operates on a not-for-profit basis. OPC is the largest electric cooperative in the United States in terms of assets, kilowatt-hour sales and, through the Members, consumers served.

The Members are local consumer-owned distribution cooperatives providing retail electric service on a not-for-profit basis. In general, the customer base of the Members consists of residential, commercial and industrial consumers within specific geographic areas. The Members serve approximately 4.1 million people.

OPC has interests in 24 generating units. These units provide OPC with a total of 4,744 MWe of nameplate capacity, consisting of 1,501 MWe of coal-fired capacity, 1,185 MWe of nuclear-fueled capacity, 632 MWe of pumped storage hydroelectric capacity, 1,411 MWe of gas-fired capacity (206 MWe of which is capable of running on oil) and 15 MWe of oil-fired combustion turbine capacity. OPC purchases approximately 300 MWe of power pursuant to a long-term power purchase agreement.

MEAG's Source of Construction Funds

MEAG will participate in the ownership of the proposed additional VEGP Units 3 and 4 only to the extent that it first procures binding power sales contracts with those Participants electing to participate in the new project. MEAG will issue revenue bonds, supported by the power sales contracts with the Participants as well as any power purchase agreement between MEAG and a third party, to fund the construction costs relating to its ownership interest. MEAG currently

provides bulk electric power to 48 cities and one county in the State of Georgia (also referred to as the Participants). Under each such power sales contract, MEAG will agree to provide the Participant, and the Participant shall agree to take from MEAG, a specified percentage of the output and services thereof and to be responsible for a specified percentage of the related costs. The Participant's payment obligations under such power sales contracts are general obligations to the payment of which its full faith and credit are pledged. MEAG's remedies under such power sales contracts will include specific performance to compel the Participants to assess and collect an annual ad valorem tax sufficient to meet its obligations thereunder.

MEAG has the statutory authority to issue revenue bonds to pay for the costs associated with its ownership interest in the additional units. Such revenue bonds, and the power sales contracts as collateral for the payment of such bonds, will be validated in Georgia prior to issuance of the bonds. The bond proceeds will be the source of MEAG's payments of its share of the construction costs related to the additional units.

The MEAG was created by the State of Georgia for the purpose of owning and operating electric generation and transmission facilities to supply bulk electric power to political subdivisions of Georgia, which owned and operated electric distribution systems as of March 18, 1975. MEAG's power resources include ownership interests in 10 electric generating units, all of which have been placed in service, as well as power and energy obtained by MEAG through purchases from and exchanges with other bulk electric suppliers. MEAG also owns transmission facilities, which together with those of other utilities form a statewide integrated transmission system. MEAG's ownership interests in those 10 generating units represent 2,069 MWe of nominally rated generating capacity.

Dalton's Source of Construction Funds

The sources of construction funds for the portion funded by the City of Dalton, Georgia (Dalton) for VEGP Units 3 and 4 will be from a combination of internally generated funds, investment funds restricted for renewals and extensions, and a possible future debt financing. Currently, Dalton has total assets of \$890 million with \$71 million of outstanding bond debt.

Dalton is a municipal corporation organized under the laws of the State of Georgia. Dalton constructs and operates its public utilities through the Board of Water, Light and Sinking Fund Commissioners of the City of Dalton, Georgia, which was established in 1913 by an act of the Georgia legislature for the purpose of constructing and operating the public utilities for Dalton. Electric, natural gas, water, sewer, and information technology services are provided to customers of Dalton utilities within Dalton and certain other surrounding areas.

Dalton serves approximately 45,000 customers with the majority of its operating revenues coming from the carpet industry that is headquartered in northwest Georgia. It owns interests in electric generation facilities, the Georgia Integrated Transmission System, electric distribution, natural gas transmission and distribution, water and sewerage systems, and a retail/wholesale broadband system.

Dalton has utility plant investment approaching \$1 billion, of which \$350 million is invested in electric generating, transmission and distribution facilities. Dalton owns 118 MWe of electric generation through its joint ownership of Plants Scherer and Wansley, Edwin I. Hatch Nuclear Plant, and VEGP Units 1 and 2 (with GPC, OPC, and MEAG). According to SNC, the balance of Dalton's generating stack is provided by the Southeastern Power Administration and through

a wholesale power contract with Southern Power Company. Annual operating revenues exceed \$171 million with annual investment income of approximately \$9.5 million.

In consideration of the foregoing, the NRC staff finds that GPC, OPC, MEAG, and Dalton have demonstrated they possess or have reasonable assurance of obtaining the funds necessary to cover estimated construction costs and related fuel cycle costs. Therefore, the NRC staff finds that GPC, OPC, MEAG, and Dalton are financially qualified to provide funds to SNC. Therefore, the NRC staff finds that SNC is financially qualified to construct the facilities.

Financial Statements

Pursuant to 10 CFR Part 50, Appendix C, Section I.A.3:

The application should also include the applicant's latest published annual financial report, together with any current interim financial statements that are pertinent. If an annual financial report is not published, the balance sheet and operating statement covering the latest complete accounting year together with all pertinent notes thereto and certification by a public accountant should be furnished.

GPC's Financial Statements

GPC's reports and filings to the GPSC and the United States Securities and Exchange Commission may be found at <http://www.psc.state.ga.us/> and at <http://investor.southerncompany.com/sec.cfm>, respectively. In accordance with 10 CFR Part 50, Appendix C, Southern Company's 2007 10-K Reports may also be found at <http://investor.southerncompany.com/sec.cfm>.

GPC submitted, pursuant to 10 CFR Part 50, Appendix C, Section I.A.3, annual financial statements. The NRC staff did not identify anything in GPC's financial statements that warranted further inquiry.

OPC's Financial Statements

OPC's reports to the United States Securities and Exchange Commission may be found at www.sec.gov/cgi-bin/browse-edgar?action=getcompany&CIK=0000788816&owner=include&count=40.

OPC submitted, pursuant to 10 CFR Part 50, Appendix C, Section I.A.3, annual financial statements. The NRC staff did not identify anything in OPC's financial statements that warranted further inquiry.

MEAG's Financial Statements

MEAG's 2008 annual audit is expected to be available in early to mid-April 2009. MEAG's latest available financial statements may be found at <http://www.meagpower.org/NewsPublications/AnnualReports/tabid/82/Default.aspx> and <http://www.meagpower.org/NewsPublications/AnnualReports/tabid/84/Default.aspx>.

MEAG submitted, pursuant to 10 CFR Part 50, Appendix C, Section I.A.3, annual financial statements. The NRC staff did not identify anything in MEAG's financial statements that warranted further inquiry.

Dalton's Financial Statements

Dalton's latest available 2007 financial statements for the Board of Water, Light and Sinking Fund Commissioners were provided in Appendix 1C, of the VEGP COL application.

Dalton submitted, pursuant to 10 CFR Part 50, Appendix C, Section I.A.3, annual financial statements. The NRC staff did not identify anything in Dalton's financial statements that warranted further inquiry.

Operating License

Pursuant to 10 CFR 50.33(f)(3):

If the application is for a combined license under subpart C of part 52 of this chapter, the applicant shall submit the information described in paragraphs (f)(1) and (f)(2) of this section.

10 CFR 50.33(f) provides that each application shall state:

[e]xcept for an electric utility applicant for a license to operate a utilization facility of the type described in [10 CFR] § 50.21(b) or § 50.22, information sufficient to demonstrate to the Commission the financial qualification[s] of the applicant to carry out, in accordance with the regulations in this chapter, the activities for which the permit or license is sought.

10 CFR 50.2, "Definitions," states, in part, that an electric utility is:

Any entity that generates or distributes electricity and which recovers the cost of this electricity, either directly or indirectly, through rates established by the entity itself or by a separate regulatory authority.

GPC

According to SNC, GPC meets the definition of an "electric utility" as that term is defined in 10 CFR 50.2 in that GPC recovers the cost of electricity through rates established by the GPSC. Therefore, the NRC staff concludes that GPC is exempt from financial qualification review for the operating license pursuant to 10 CFR 50.33(f).

OPC

According to SNC, OPC meets the definition of an "electric utility" as that term is defined in 10 CFR 50.2 in that OPC recovers the cost of electricity through rates set by OPC itself. Therefore, the NRC staff concludes that OPC is exempt from financial qualification review for the operating license pursuant to 10 CFR 50.33(f).

MEAG

According to SNC, MEAG meets the definition of an “electric utility” as that term is defined in 10 CFR 50.2 in that MEAG recovers the cost of electricity through rates set by MEAG itself. Therefore, the NRC staff concludes that MEAG is exempt from financial qualification review for the operating license pursuant to 10 CFR 50.33(f).

Dalton

According to SNC, the City of Dalton, Georgia (Dalton) is a municipal corporation organized and existing under the laws of the State of Georgia. Dalton constructs and operates its public utilities through the Board of Water, Light and Sinking Fund Commissioners of the City of Dalton, Georgia (“Dalton Utilities”), which was established in 1913 by an act of the Georgia legislature for the purpose of constructing and operating the public utilities for Dalton. Electric, natural gas, water, sewer, and information technology services are provided to customers of Dalton Utilities within Dalton and certain other surrounding areas. Dalton Utilities sells to its retail customers, the residents of the City of Dalton, at rates set by its board of water and light. Thus, Dalton Utilities meets the definition of an “electric utility” as that term is defined in 10 CFR 50.2 in that the cost of electricity is recovered through rates. Therefore, the NRC staff concludes that Dalton Utilities is exempt from financial qualification review for the operating license pursuant to 10 CFR 50.33(f).

SNC Operating License, Operator, non-Owner

SNC was established as a company within the Southern Company for the purpose of consolidating personnel within the Southern Electric System engaged in nuclear-related activities into a single, integrated organization. Accordingly, SNC will be the constructor and licensed operator for VEGP Units 3 and 4. Agreements will be entered into for SNC with GPC to exercise this authority. SNC will be the exclusive entity authorized to construct and operate VEGP Units 3 and 4.

Related to construction, the following corporate and contractual relationships have been established. GPC, as agent for the owners of the new units, will enter into an EPC agreement with a consortium comprising of Westinghouse Electric Company, LLC and Stone & Webster, Inc. (“the Consortium”) for the construction of the units. The owners will make payment to the Consortium through GPC, as agent, for the costs under the EPC contract. SNC will administer the EPC contract on behalf of the owners.

GPC has contracted to reimburse SNC for all other funds necessary for the construction of the units. According to SNC responsibility for reimbursement of these costs will be absolute. The other owners (OPC, MEAG, and Dalton) have contracted to reimburse GPC for their proportionate shares of these costs.

GPC is subject to the jurisdiction of two rate regulatory authorities, the GPSC and the FERC. The output of VEGP Units 3 and 4 is expected to be sold to GPC retail customers; accordingly, GPC will include its proportionate share of the aforementioned costs as a capital expenditure before the GPSC and will earn a return on prudently incurred costs from its customers. According to the application, the other plant owners will recover their costs through rates and charges to their customers.

Related to operations, the following corporate and contractual relationships have been established. SNC will not have any ownership interest in the new units, the nuclear facilities, nor the fuel. On behalf of the owners, SNC will be authorized to exercise overall responsibility for plant operations, including exclusive responsibility for safety decisions. By contract, GPC and SNC will establish cost responsibility and allocation for the units. The costs experienced directly by SNC in the operation of VEGP Units 3 and 4 will be reimbursed by GPC pursuant to the operating agreement. Other expenses of SNC that are not direct charges to a specific plant will be allocated to GPC and others for whom such expenses are incurred, as appropriate. According to SNC, responsibility for reimbursement by GPC of these costs will be absolute. GPC will, in turn, be reimbursed by the other plant owners for their proportionate shares of these costs pursuant to existing agreements.

Because the plant owners are entitled to the entire electric generation from VEGP Units 3 and 4, and do not purchase electric generation from SNC, the costs will not be “rates” subject to regulatory review and approval except as items of costs to the plant owners.

GPC will recover its proportionate share of prudently incurred costs of operation of the units in rates charged to customers as authorized by the GPSC. According to the application, the other plant owners will recover their costs through rates and charges to their customers.

With SNC as the licensed plant operator, GPC has contracted to provide all funds necessary for the safe operation, construction, maintenance, repair, decontamination and decommissioning incurred or accrued by SNC. Thus, the various contractual obligations, and retention of full ownership interest by the plant owners as well as the owners’ entitlement to all electrical output from the plant, assure that the same level of financial qualification for the operating licensee will exist for VEGP 3 and 4 as for VEGP Units 1 and 2.

The plant owners will retain authority to direct, through their agent, GPC, that the plant be shut down in an orderly fashion by SNC (and in accordance with SNC’s safety judgment) rather than make specific capital modifications or other major expenditures.

This retained authority ultimately will limit SNC’s spending authority, but will not encumber SNC’s ability to make operational safety decisions and will have no impact on safe operation of the plant.

Based on the foregoing discussion the NRC staff finds that SNC is financially qualified to hold the licenses to the extent proposed.

DECOMMISSIONING FUNDING ASSURANCE:

Regulatory Requirements:

Pursuant to the requirements of 10 CFR 50.33(k)(1), an applicant for a COL for a production or utilization facility will state information in the form of a report, as described in 10 CFR 50.75, “Reporting and recordkeeping for decommissioning planning,” indicating how reasonable assurance will be provided that sufficient funds will be available to decommission the facility.

Under 10 CFR 50.75, the report must include a certification that the applicant will provide financial assurance for decommissioning using one or more of the methods allowed under the regulation at 10 CFR 50.75(e) no later than 30 days after the Commission publishes notice in the *Federal Register* (FR) under 10 CFR 52.103(a). In addition, the amount of the financial

assurance may be more, but not less, than the amount stated in the table in 10 CFR 50.75(c)(1), as adjusted under 10 CFR 50.75(c)(2). Under 10 CFR 50.75(b)(4), “a combined license applicant need not obtain a financial instrument appropriate to the method to be used or submit a copy of the instrument to the Commission.” (Once the COL is granted, the holder of a COL must submit an instrument as provided in 10 CFR 50.75(e)(3).)

Decommissioning Funding Estimate:

SNC has calculated the decommissioning funding assurance amount escalated to 2006 dollars, pursuant to the methodology set out in 10 CFR 50.75(c), using available regional labor and energy escalation factors from the Bureau of Labor Statistics, and escalation factors for waste burial from NUREG-1307, “Report on Waste Burial Charges: Changes in Decommissioning Waste Disposal Costs at Low-Level Waste Burial Facilities,” Revision 12, which is the most currently available revision at the time the application was submitted. The 1986 (year) boiling-water reactor (BWR) base decommissioning amount is premised on the best available estimate of the thermal rating of the new reactors of 3400 MWt per unit. SNC has calculated the decommissioning funding assurance amount assuming disposal of low-level radioactive waste (LLRW) using waste vendors. As of December 31, 2010, this calculation results in a decommissioning funding assurance amount of \$466,987,774 per unit.

The calculation of the decommissioning funding assurance amount assuming the use of waste vendors is set forth in Appendix 1D, Part 1 of the VEGP COL application. SNC will provide assurance of this amount through the owners, in proportion to their respective ownership shares.

The NRC staff calculated the minimum funding acceptable under 10 CFR 50.75(c), and found the applicants’ amounts to be acceptable.

Decommissioning Funding Mechanism:

SNC has provided a certification that financial assurance for decommissioning will be provided in accordance with 10 CFR 50.75(b). SNC states that the owners will deposit funds for the decommissioning of VEGP Units 3 and 4 using the external sinking fund as described in 10 CFR 50.75(e)(1)(ii). In accordance with 10 CFR 50.75(e)(3), SNC, after issuance of the licenses, will submit a report for each unit, no later than 30 days after the NRC publishes notice in the FR under 10 CFR 52.103(a), including a certification that financial assurance for decommissioning is provided in the amount specified in SNC’s most recent updated certification, including a copy of the financial instrument to be used.

Therefore, at this time, the NRC staff finds that the applicant, SNC, as agent for GPC, OPC, MEAG, and Dalton, has complied with applicable decommissioning funding assurance requirements.

ANTITRUST REVIEW:

The Energy Policy Act of 2005 (EPAAct) removed the antitrust review authority in Section 105.c of the Atomic Energy Act of 1954, as amended, regarding license applications for production or utilization facilities submitted under Sections 103 or 104.b of the Atomic Energy Act of 1954 after the date of enactment of the EPAAct. Accordingly, the NRC is not authorized to conduct an antitrust review in connection with this COL application.

FOREIGN OWNERSHIP, CONTROL, or DOMINATION:

Section 103 of the Atomic Energy Act of 1954 prohibits the Commission from issuing a license for a nuclear power plant under Section 103 to:

an alien or any corporation or other entity if the Commission knows or has reason to believe it is owned, controlled, or dominated by an alien, a foreign corporation or a foreign government.

GPC Foreign Ownership, Control, or Domination

GPC is a Georgia corporation with its principal office in Atlanta, Georgia. GPC is a wholly owned subsidiary of Southern Company, a Delaware corporation with its principal office also in Atlanta, Georgia. According to the application, Southern Company is not owned, controlled, or dominated by an alien, foreign corporation, or foreign government. The names and business addresses of GPC's directors and principal officers, all of whom are citizens of the United States, were listed in the application.

According to the application, GPC is not owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government.

The NRC staff does not know or have reason to believe otherwise.

OPC Foreign Ownership, Control, or Domination

OPC is a Georgia corporation with its principal office in Tucker, Georgia, a suburb of Atlanta, Georgia. The names and business addresses of OPC's directors and principal officers, all of whom are citizens of the United States, were listed in the application.

According to the application, OPC is not owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government.

The NRC staff does not know or have reason to believe otherwise.

MEAG Foreign Ownership, Control, or Domination

MEAG is a public corporation and an instrumentality of the State of Georgia, a body corporate and politic, created by the General Assembly of the State of Georgia in its 1975 Session (Official Code of Georgia Annotated, Title 46, Chapter 3, Article 3). The names and business addresses of MEAG's directors and principal officers, all of whom are citizens of the United States, were listed in the application.

According to the application, MEAG is not owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government.

The NRC staff does not know or have reason to believe otherwise.

Dalton Foreign Ownership, Control, or Domination

Dalton is a municipality within the State of Georgia. Acting by and through its Board of Water, Light and Sinking Fund Commissioners, doing business as Dalton Utilities, Dalton owns electric

generation capacity, transmission capacity and a distribution system. Dalton is a duly incorporated municipality under the laws of the State of Georgia.

Dalton is a duly incorporated municipality under the laws of the State of Georgia. Dalton acts by and through its Board of Water, Light and Sinking Fund Commissioners, which does business as Dalton Utilities. Dalton Utilities is not owned, controlled, or dominated by an alien, foreign corporation, or foreign government.

The names and business addresses of the City of Dalton's governing body (Mayor and Councilmen); the Board of Water, Light and Sinking Fund Commissioners of the City of Dalton; and Dalton Utilities' principal officers (President/Chief Executive Officer, Secretary and Chief Financial Officer), all of whom are citizens of the United States, were listed in the application.

According to the application, Dalton is not owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government.

The NRC staff does not know or have reason to believe otherwise.

SNC Foreign Ownership, Control, or Domination

SNC is a wholly owned subsidiary of Southern Company and is engaged in the operation of nuclear power plants on behalf of the Southern Electric System. SNC is a corporation organized and existing under the laws of the State of Delaware. SNC was formed for the purpose of operating nuclear facilities owned by other subsidiaries of Southern Company. Traditional electrical operating companies that are subsidiaries of Southern Company are GPC, Alabama Power Company, Gulf Power Company and Mississippi Power Company. SNC currently licensed to operate the Edwin I. Hatch Nuclear Plant, Units 1 and 2; and VEGP Units 1 and 2, for GPC, OPC, MEAG, and the City of Dalton (i.e., Dalton Utilities), (the owners). SNC also operates the Joseph M. Farley Nuclear Plant, Units 1 and 2, for Alabama Power Company. The combined electric generation of the three facilities is in excess of 6,000 MWe.

SNC is a Delaware corporation that is headquartered in Birmingham, Alabama. SNC is a wholly-owned subsidiary of Southern Company, a Delaware corporation, with its principal office in Atlanta, Georgia. According to the application, neither SNC, nor its parent, Southern Company, is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government. The names and business addresses of SNC's directors and principal officers, all of whom are citizens of the United States, were listed in the application.

The NRC staff does not know or have reason to believe otherwise.

NUCLEAR INSURANCE and INDEMNITY:

The provisions of the Price-Anderson Act (Section 170 of the Atomic Energy Act of 1954) and the Commission's regulations at 10 CFR Part 140 require that the current indemnity agreement with respect to GPC, OPC, MEAG and Dalton's current facilities reflect that GPC, OPC, MEAG and Dalton will be the licensees for VEGP Units 3 and 4 after the proposed licenses are issued.

GPC, OPC, MEAG and Dalton will be required to maintain the financial protection required by 10 CFR Part 140 and the property insurance required by 10 CFR 50.54(w), "Conditions of licenses." Upon issuance of the licenses, the NRC staff will issue to GPC, OPC, MEAG and

Dalton an amended indemnity agreement to include VEGP Units 3 and 4. This is SER Commitment 1.5-1.

CONCLUSION:

Based on the foregoing, the NRC staff finds reasonable assurance that SNC, GPC, OPC, MEAG and Dalton are financially qualified to engage in the proposed activities regarding VEGP Units 3 and 4, and that there are no problematic decommissioning funding assurance issues, foreign ownership issues, and nuclear insurance and indemnity issues.

1.5.2 Nuclear Waste Policy Act

Section 302(b) of the Nuclear Waste Policy Act of 1982, as amended, states, “The Commission, as it deems necessary or appropriate, may require as a precondition to the issuance or renewal of a license under Section 103 or 104 of the Atomic Energy Act of 1954 [42 U.S.C. 2133, 2134] that the applicant for such license shall have entered into an agreement with the Secretary for the disposal of high-level radioactive waste and spent nuclear fuel that may result from the use of such license.”

In a letter dated December 16, 2008, SNC stated that on November 5, 2008, it signed contracts with the Department of Energy (DOE) establishing the terms and conditions applicable to the DOE’s responsibility for disposal of spent nuclear fuel and high-level radioactive waste generated at the proposed VEGP Units 3 and 4. The DOE contract numbers that are referenced in SNC’s letter are DE-CR01-09RW09005 for VEGP Unit 3 and DE-CR01-09RW09006 for VEGP Unit 4. Because SNC has entered into contracts with the DOE for the disposal of high-level radioactive waste and spent nuclear fuel for VEGP Units 3 and 4, the staff considers that the applicable requirements of Section 302(b) of the Nuclear Waste Policy Act of 1982 are met.

1.5.3 Consultation with Department of Homeland Security and Notifications

1.5.3.1 Consultation with Department of Homeland Security

In accordance with Section 657 of the *Energy Policy Act of 2005*, the NRC consulted with the Department of Homeland Security.

1.5.3.2 Notifications

As required by Section 182c. of the Atomic Energy Act of 1954, as amended and 10 CFR 50.43(a), on March 2, 2011, the NRC notified the U.S. Department of Agriculture Rural Utilities Service, the U.S. Securities and Exchange Commission, the FERC, and the GPSC of the VEGP application. In addition, in October 2006 and October 2007, the NRC published a notice of the application in *The Aiken Standard*, *The Augusta Chronicle*, and *The True Citizen* serving Burke County and Waynesboro County. In accordance with Section 182c., the staff also published a notice of the application in the *Federal Register* on March 3, 10, 17, and 24, 2011 (76 FR 11822, 13241, 14699, and 16645).

Based on the staff's completion of notifications to regulatory agencies and the public notices described above, the staff concludes that, for the purpose of issuing COLs for VEGP Units 3 and 4, any required notifications to other agencies or bodies have been duly made.

1.5.4 Evaluation of Departures and Exemption Associated with Numbering in the Application and Exemption Associated with Special Nuclear Material (SNM) Material Control and Accounting (MC&A) Program

Evaluation of Departures and Exemption Associated with Numbering in the Application

In VEGP DEP 1.1-1, the applicant renumbered the VEGP COL FSAR sections to include content consistent with RG 1.206 and NUREG-0800. The applicant identified the affected FSAR sections in Part 7 of the COL application. The departure and the exemption associated with the numbering scheme of the FSAR are closely related. The departure provided in Part 7 of the COL application provides the specific sections of the VEGP COL FSAR that deviate from the DCD numbering scheme.

Pursuant to 10 CFR 52.7, "Specific Exemptions," and 10 CFR 52.93, "Exemptions and Variances," the applicant requested an exemption from 10 CFR Part 52, Appendix D, Section IV.A.2.a, to include "a plant specific DCD containing the same type of information and using the same organization and numbering as the generic DCD for the AP1000 design...." In Part 7, "Departures and Exemptions," of the VEGP COL application, the applicant states that the exemption will not result in any significant departures from the expected organization and numbering of a typical FSAR, and the information is readily identifiable to facilitate an NRC review. The applicant states that the subject deviations are considered to be purely administrative to support a logical construction of the document. Further, the revised organization and numbering generally follows the guidance provided in RG 1.206 and NUREG-0800.

Pursuant to 10 CFR 52.7, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR Part 52. 10 CFR 52.7 further states that the Commission's consideration will be governed by 10 CFR 50.12, "Specific exemptions," which states that an exemption may be granted when: (1) the exemptions are authorized by law, will not present an undue risk to public health or safety, and are consistent with the common defense and security; and (2) special circumstances are present. Special circumstances are present whenever, according to 10 CFR 50.12(a)(2)(ii), "Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule."

Before considering whether this numbering exemption should be granted, the staff needed to address a threshold question regarding the review standard applicable to the request. Under 10 CFR 52.93(a)(1), if a request for an exemption is from any part of a design certification rule, then the Commission may grant the exemption if the exemption complies with the appropriate change provision in the referenced design certification rule, or if there is no applicable change provision, if the exemption complies with 10 CFR 52.63. Here, there is no applicable change provision in the referenced design certification rule, so according to 10 CFR 52.93(a)(1), the exemption must meet 10 CFR 52.63. However, the standards of the appropriate provision of 10 CFR 52.63 applicable to requests for exemptions from a design certification rule in 10 CFR 52.63(b)(1), by their terms, also do not apply to this change. Specifically, 10 CFR 52.63(b)(1) applies to changes to "certification information," and not administrative or procedural design certification rule provisions such as this one under consideration. In the

Statements of Consideration for 10 CFR 52.63, the Commission stated that it used the “phrase ‘certification information’ in order to distinguish the rule language in the DCRs from the design certification information (e.g., Tier 1 and Tier 2) that is incorporated by reference in the DCRs.” 72 Fed. Reg. 49,444. The exemption requested from the AP1000 DCD numbering scheme is an exemption from rule language, not Tier 1 or Tier 2 information; therefore, 10 CFR 52.63 should not be used to analyze this exemption.

Because there is not an applicable change provision in the referenced design certification, and because 10 CFR 52.63(b)(1) does not apply to this exemption, the exemption cannot comply with the plain language of 10 CFR 52.93(a)(1). In this situation, the language of 10 CFR 52.93(a)(1) does not appear to serve the underlying purpose of the regulation as described by the Commission in the Statements of Consideration to the rule, in which the Commission stated that only changes to certification information must meet 10 CFR 52.63. Instead, this exemption should have fallen under 10 CFR 52.93(a)(2), and, thus, be analyzed under the requirements in 10 CFR 52.7. Therefore, the staff finds that, pursuant to 10 CFR 52.7, an exemption to 10 CFR 52.93(a)(1) should be granted. This exemption is warranted because it meets the requirements in 10 CFR 50.12. First, because this is an administrative change regarding what exemption regulation applies, the exemption to 10 CFR 52.93(a)(1) is authorized by law, will not present an undue risk to public health or safety, and is consistent with the common defense and security. Additionally, application of the regulation in this case is not necessary to achieve the underlying purpose of the rule. The underlying purpose of the rule is to maintain the safety benefits of standardization by requiring any exemption from certification information to meet the requirements in 10 CFR 52.63(b)(1). This underlying purpose does not apply to this exemption, because the form and organization of the application does not affect the safety benefits of standardization of the certification information. Therefore, for the purpose of determining the standards applicable to the exemption related to VEGP DEP 1.1-1, the staff finds an exemption to 10 CFR 52.93(a)(1) to be acceptable for the review of the exemption related to VEGP DEP 1.1-1.

Pursuant to the exemption described above, the NRC staff has reviewed the exemption related to VEGP DEP 1.1-1 to determine whether it meets the requirements in 10 CFR 52.7. This exemption would allow the applicant to provide an FSAR with numbering and topics more closely related to NUREG-0800 and RG 1.206., and the staff finds that this administrative change of minor renumbering will not present an undue risk to the public health and safety and is consistent with the common defense and security. In addition, this exemption is consistent with the Atomic Energy Act and is authorized by law. Further, the application of the regulation in these particular circumstances is not necessary to achieve the underlying purpose of the rule. Therefore, the staff finds that the exemption to 10 CFR Part 52, Appendix D, Section IV.A.2.a is justified. Finally, for the same reasons the staff is granting the exemption request, the staff also finds the departure from the numbering scheme in the VEGP COL FSAR to be acceptable.

Exemption Associated with Special Nuclear Material (SNM) Material Control and Accounting (MC&A) Program

In a letter dated November 23, 2010, the applicant requested an exemption from the requirements of 10 CFR 70.22(b), 10 CFR 70.32(c) and, in turn, 10 CFR 74.31, 10 CFR 74.41, and 10 CFR 74.51. The provision of 10 CFR 70.22(b) requires an application for a license for SNM to include a full description of the applicant’s program for MC&A of SNM under 10 CFR 74.31; 10 CFR 74.33, “Nuclear material control and accounting for uranium enrichment facilities authorized to produce special nuclear material of low strategic significance”;

10 CFR 74.41; and 10 CFR 74.51¹⁵. 10 CFR 70.32(c) requires a license authorizing the use of SNM to include and be subjected to a condition requiring the licensee to maintain and follow an SNM MC&A program. However, 10 CFR 70.22(b), 10 CFR 70.32(c), 10 CFR 74.31, 10 CFR 74.41, and 10 CFR 74.51 include exceptions for nuclear reactors licensed under 10 CFR Part 50. The regulations applicable to the MC&A of SNM for nuclear reactors licensed under 10 CFR Part 50 are provided in 10 CFR Part 74, Subpart B, 10 CFR 74.11 through 10 CFR 74.19, excluding 10 CFR 74.17. The applicant stated that the purpose of this exemption request is to seek a similar exception for this COL under 10 CFR Part 52, such that the same regulations will be applied to the SNM MC&A program as nuclear reactors licensed under 10 CFR Part 50. In addition, the applicant stated that the exemption request is evaluated under 10 CFR 52.7, which incorporates the requirements of 10 CFR 50.12. As stated previously, that section allows the Commission to grant an exemption if: 1) the exemption is authorized by law; will not present an undue risk to the public health and safety; and is consistent with the common defense and security; and 2) special circumstances are present as specified in 10 CFR 50.12(a)(2). The criteria in 10 CFR 50.12 encompass the criteria for an exemption in 10 CFR 70.17(a) and 10 CFR 74.7, the specific exemption requirements for 10 CFR Part 70 and 10 CFR Part 74, respectively. Therefore, by demonstrating that the exemption criteria in 10 CFR 50.12 are satisfied, this request would also demonstrate that the exemption criteria in 10 CFR 52.7, 10 CFR 70.17(a), and 10 CFR 74.7 are satisfied.

The applicant stated that the subject exemption would allow nuclear reactors licensed under 10 CFR Part 52 to be explicitly excepted from the requirements of 10 CFR 70.22(b), 10 CFR 70.32(c), 10 CFR 74.31, 10 CFR 74.41, and 10 CFR 74.51. There is no technical or regulatory basis to treat nuclear reactors licensed under 10 CFR Part 52 differently than reactors licensed under 10 CFR Part 50 with respect to the MC&A provisions in 10 CFR Part 74. As indicated in the Statement of Considerations for 10 CFR 52.0(b) (72 Federal Register 49352, 49372, 49436 (August 28, 2007)), applicants and licensees under 10 CFR Part 52 are subject to all of the applicable requirements in 10 CFR Chapter I, whether or not those provisions explicitly mention a COL under 10 CFR Part 52. This regulation clearly indicates that plants licensed under 10 CFR Part 52 are to be treated no differently than plants licensed under 10 CFR Part 50 with respect to the substantive provisions in 10 CFR Chapter I (which includes 10 CFR Part 70 and 10 CFR Part 74). In particular, the exception for nuclear reactors licensed under 10 CFR Part 50, as in 10 CFR 70.22(b), 10 CFR 74.31, 10 CFR 74.41, or 10 CFR 74.51, should also be applied to reactors licensed under 10 CFR Part 52.

The staff agrees with the applicant's justification that nuclear reactors licensed under 10 CFR Part 52 should be treated the same as the reactors licensed under 10 CFR Part 50 regarding the MC&A for SNM.

Pursuant to 10 CFR 70.17(a), the Commission may, upon application of any interested person or upon its own initiative, grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest.

In addition, pursuant to 10 CFR 74.7, the Commission may, upon application of any interested person or upon its own initiative, grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not endanger life or property or the common defense and security, and are otherwise in the public interest.

¹⁵ While not including an explicit exception for 10 CFR Part 50 reactors, 10 CFR 74.33 applies only to uranium enrichment facilities and thus is not directly implicated in this exemption request.

Pursuant to 10 CFR 52.7, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR Part 52. 10 CFR 52.7 further states that the Commission's consideration will be governed by 10 CFR 50.12, "Specific exemptions," which states that an exemption may be granted when: (1) the exemptions are authorized by law, will not present an undue risk to public health or safety, and are consistent with the common defense and security; and (2) when special circumstances are present. Special circumstances are present whenever, according to 10 CFR 50.12(a)(2)(ii), "Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule."

The NRC staff reviewed the subject exemption, which will allow the applicant to have a similar exception for the COL under 10 CFR Part 52, such that the same regulations will be applied to the SNM MC&A program as nuclear reactors licensed under 10 CFR Part 50, and determined that this requested exemption will not present an undue risk to the public health and safety and is otherwise in the public interest. In addition, this exemption is consistent with the Atomic Energy Act and is authorized by law. Therefore, granting this exemption will not adversely affect the common defense and security. Further, the application of the regulation in these particular circumstances is not necessary to achieve the underlying purpose of the rule. Since the exemption criteria in 10 CFR 50.12 are satisfied, the staff considers that this request also demonstrates that the exemption criteria in 10 CFR 52.7, 10 CFR 70.17(a), and 10 CFR 74.7 are satisfied. Therefore, the staff finds that the exemption from 10 CFR 70.22(b), 10 CFR 70.32(c) and, in turn, 10 CFR 74.31, 10 CFR 74.41, and 10 CFR 74.51, is justified.

1.5.5 Receipt, Possession, and Use of Source, Byproduct and Special Nuclear Material Authorized by 10 CFR Part 52 Combined Licenses

In SNC's letter dated May 22, 2009, and in Part 1, "General and Financial Information," of the VEGP COL application, SNC requested material licenses for receipt, possession and use of source, byproduct and SNM in accordance with Commission regulations in 10 CFR Parts 30, 40, and 70. The reviews conducted for compliance with the requirements of 10 CFR Part 52 to support the issuance of the COLs encompass those necessary to support granting 10 CFR Parts 30, 40, and 70 licenses. In this respect, the 10 CFR Part 52 COLs for VEGP will be consistent with the approach to 10 CFR Parts 30, 40, and 70 licensing followed for operating licenses for nuclear power plants licensed in accordance with 10 CFR Part 50. The staff considered the following standard license provisions for the VEGP COLs, as it relates to authorization pursuant to regulations in 10 CFR Parts 30, 40, and 70:¹⁶

Subject to the conditions and requirements incorporated herein, the Commission hereby licenses SNC:

- (1) (i) pursuant to the Act and 10 CFR Part 70, to receive and possess at any time, special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, described in the final safety analysis report (FSAR), as supplemented and amended;

¹⁶ These proposed standard license conditions that the staff considered were based on similar license conditions found in SECY-00-0092, "Combined License Review Process," dated April 20, 2000.

- (ii) pursuant to the Act and 10 CFR Part 70, to use special nuclear material as reactor fuel, after the finding in Section 2.D(1) of this license has been made ((note: 2D(1) is a reference to the 10 CFR 52.103(g) finding), in accordance with the limitations for storage and amounts required for reactor operation, and described in the FSAR, as supplemented and amended;
- (2) pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use, at any time, any byproduct, source, and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;
- (3) pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use in amounts as required, any byproduct, source, or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated with radioactive apparatus or components; and
- (4) pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

The staff notes that VEGP COL FSAR Table 13.4-201, "Operational Programs Required by NRC Regulations," provides milestones for the implementation of various operational programs. Important milestone dates for various operational programs that support issuance of the license and requirements relative to 10 CFR Parts 30, 40, and 70 include the following:

- Radiation Protection Program (including as low as is reasonably achievable [ALARA] principles) – prior to initial receipt of byproduct, source, or SNMs (excluding exempt quantities as described in 10 CFR 30.18, "Exempt quantities")
- Fire Protection Program – prior to initial receipt of byproduct, source, or SNMs (excluding exempt quantities as described in 10 CFR 30.18, "Exempt quantities")
- Security Program including physical security, safeguards contingency programs, training and qualification program – prior to receipt of fuel onsite (protected area)
- Non-licensed plant staff training program associated with receipt of the radioactive material – prior to initial receipt of byproduct, source, or SNMs (excluding exempt quantities as described in 10 CFR 30.18, "Exempt quantities")

In a letter dated November 23, 2010, the applicant proposed to revise the VEGP COL FSAR Table 13.4-201 to add information (milestones and requirements) related to the SNM MC&A program. In addition, in letters dated July 29, 2009, July 9, 2010, October 15, 2010, and November 23, 2010, the applicant identified the portions of the application that demonstrate compliance with the requirements of 10 CFR Parts 30, 40, 70, and 74. Also, in a letter dated November 23, 2010, the applicant requested an exemption from the requirements of 10 CFR 70.22(b), 10 CFR 70.32(c) and, in turn, 10 CFR 74.31, 10 CFR 74.41, and 10 CFR 74.51. This exemption request is addressed in Section 1.5.4 of this SER.

Section 1.2.3 of this SER provides a discussion of the strategy used by the NRC to perform one technical review for each standard issue outside the scope of the DC and use this review in evaluating subsequent COL applications. To ensure that the staff's findings on standard content that were documented in the SER with open items issued for the BLN Units 3 and 4 COL application were equally applicable to the VEGP Units 3 and 4 COL application, the staff undertook the following reviews:

- The staff compared the BLN COL FSAR, Revision 1, to the VEGP COL FSAR. In performing this comparison, the staff considered changes made to the VEGP COL FSAR (and other parts of the COL application, as applicable) resulting from RAIs and open and confirmatory items identified in the BLN SER with open items.
- The staff confirmed that all responses to RAIs identified in the corresponding standard content (the BLN SER) evaluation were endorsed.
- The staff verified that the site-specific differences were not relevant.

The staff has completed its review and found the evaluation performed for the standard content to be directly applicable to the VEGP COL application. This standard content material is identified in this SER by use of italicized, double-indented formatting. There was one open item (Open Item 1.5-1) related to the standard content in the BLN SER. The resolution of this item is addressed in this SER.

The following portion of this technical evaluation section is reproduced from Section 1.5.6 of the BLN SER:

In addition to the evaluation of the implementation milestones noted above, the staff's evaluation of the radiation protection program that supports the issuance of the 10 CFR Parts 30, 40, and 70 licenses is addressed in Chapter 12 of this SER. Additional staff evaluations that support the issuance of the 10 CFR Part 70 license are addressed in Chapter 9 of this SER (i.e., new fuel storage, spent fuel storage, and fire protection programs) and in the staff's evaluation of TVA's security program. The staff finds that the information in the Bellefonte COL application to support granting of the 10 CFR Part 70 license mentioned as part of the license above is sufficient, pending resolution of the open items in this report related to new and spent fuel, fire protection program, security program, and the implementation of the fire protection and security programs. However, TVA needs to provide a discussion of which parts of its COL application other than the reference to the radiation protection program provide sufficient information to support compliance with the applicable portions of 10 CFR Part 30 and 40, prior to the 10 CFR 52.103(g) finding. This is Open Item 1.5-1.

Resolution of Standard Content Open Item 1.5-1

In letters dated July 29, 2009, July 9, 2010, and October 15, 2010, the applicant provided additional information related to source, byproduct and SNM and its purposes, radiation safety personnel, personnel training, facilities and equipment, waste management, and the radiation safety program in general.

Subsequent to the issuance of the SER with open items for the BLN application, the staff performed an additional review associated with granting the 10 CFR Parts 30, 40 and 70 licenses. For the 10 CFR Part 70 license, the staff considered SNM associated with the fuel (including security requirements) and SNM associated with non-fuel material (i.e., fission chambers). The staff also considered emergency plan requirements associated with SNM (fuel and non-fuel material). Based on these reviews, standard content Open Item 1.5-1 is resolved. These reviews are described below.

Review of Parts 30 and 40 Materials

In a letter dated March 3, 2011, the applicant provided information regarding specific types of sources and byproduct material, the chemical or physical form, and the maximum amount at any time for the requested material licenses under 10 CFR Parts 30 and 40. The applicant also stated that SNM shall be in the form of reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the VEGP COL FSAR. Byproduct material and source material shall be in the form of sealed neutron sources for reactor startup and sealed sources for reactor instrumentation, radiation monitoring equipment, calibration, and fission detectors in amounts as required. The applicant also committed that no 10 CFR Part 40 specifically licensed source material, including natural uranium, depleted uranium and uranium hexafluoride will be received, possessed, or used during the period between issuance of the COL and the Commission's 10 CFR 52.103(g) finding for each of the VEGP Units 3 and 4. The applicant also stated that the quantity of any byproduct material with atomic numbers 1 through 93 would not exceed 100 millicuries for a single source and 5 Curies total. The maximum quantity for Americium-241 would not exceed 300 millicuries for single source and 500 millicuries total. Following the 10 CFR 52.103(g) finding for each of the VEGP Units 3 and 4, byproduct material, source material, and SNM in amounts as required, without restriction to chemical forms or physical form, would be used for the following:

- Sample analysis,
- Instrument and equipment calibration, and
- Associated with radioactive apparatus or components.

With respect to the requirements of 10 CFR Parts 30, 40, and 70 that are related to radiation protection (including administrative controls), the applicant provided information (in letters dated July 9, and November 23, 2010) on the purpose, storage and security of sources in VEGP COL FSAR Sections 12.2 and 12.5. Information related to the radiation protection program itself, including procedures for the use of these sources, is also described in VEGP COL FSAR Chapter 12. In addition, VEGP COL FSAR Section 13.4 states that the radiation protection program will be implemented according to the milestones listed in VEGP COL FSAR Table 13.4-201, Item 10. These milestones ensure that those portions of the program necessary to comply with the requirements of 10 CFR Parts 20, 30, 40, and 70, are implemented prior to the receipt of byproduct, source, SNM, or fuel, onsite.

The staff finds that the information provided by the applicant that describes the radiation protection measures (Chapter 12 of the VEGP COL FSAR) that will be implemented prior to receipt of byproduct, source or SNM, conforms to the applicable guidance in NUREG-1556, "Consolidated Guidance about Materials Licenses," and is, therefore, acceptable. The radiation protection program milestones included in the VEGP COL FSAR Table 13.4-201 are evaluated in Section 12.5 of this SER.

In a letter dated July 9, 2010, the applicant provided supplemental information relative to Item 14, Emergency Planning, in VEGP COL FSAR Table 13.4-201. In addition, the applicant proposed to revise the term 'portions applicable to SNM' to 'portions applicable to radioactive materials' for Item 14; Item 8, Fire Protection Program; Item 11, Non-Licensed Plant Staff Training Program; and Item 15, Physical Security Program. In addition, the applicant proposed to correct the references to regulatory citations of 10 CFR 30.32, "Application for specific licenses"; 10 CFR 40.31, "Application for specific licenses"; and 10 CFR 70.22, "Contents of applications." It also proposed to revise the "Requirements" column for Item 14 of the VEGP COL FSAR Table 13.4-201 to reference 10 CFR 30.32(i)(1), 10 CFR 40.31(j)(1), and 10 CFR 70.22(i)(1). It also proposed to revise Part 10 of the VEGP COL application, Proposed License Condition 3, "Operational Program Implementation," Section C, "Receipt of Materials," to include implementation of the portions of the emergency planning program applicable to SNM. In addition to the evaluation of the implementation milestones noted above, the staff's evaluation that supports the issuance of the 10 CFR Parts 30 and 40 licenses is addressed in Chapter 9 (the fire protection program).

The operational programs are specific programs that are required by regulations. VEGP COL FSAR Table 13.4-201 lists each operational program, the regulatory source for the program, the section of the FSAR in which the operational program is described, and the associated implementation milestone(s). The applicant proposed a license condition in Part 10, License Condition 3, Item C.3 of the VEGP COL application, which provides the milestones for implementing the portions of the non-licensed plant staff training program applicable to receipt of the radioactive material. However, Table 13.4-201 specifies implementation requirements (10 CFR 30.32(a), 10 CFR 40.31(a), and 10 CFR 70.22(a)) for the non-licensed plant staff training program associated with receipt of the radioactive material. Therefore, the staff determined that Item C.3 of proposed License Condition 3 is not needed because the implementation milestones for the non-licensed plant staff training program associated with receipt of radioactive material are governed by the applicable regulations.

The applicant proposed a license condition in Part 10 of the VEGP COL application to provide a schedule to support the NRC's inspection of operational programs, including the non-licensed plant staff training program applicable to receipt of the radioactive material. The proposed license condition is consistent with the policy established in SECY-05-0197, "Review of Operational Programs in a Combined License Application and Generic Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria," for operational programs and is acceptable.

In response to RAI 1.5-1, the applicant stated, in a letter dated October 15, 2010, that no byproduct material will be received, possessed, or used at AP1000 units of a physical form that is in unsealed form, on foils or plated sources, or sealed in glass, that exceeds the quantities in Schedule C of 10 CFR 30.72. Since the quantities do not exceed Schedule C, an emergency plan that meets the requirements of 10 CFR 30.32(i)(3) is not required. As such, the implementation of the emergency plan prior to the receipt of byproduct material will be removed from VEGP COL FSAR Table 13.4-201 and from Part 10 proposed License Condition 3, Item C.4. The request for a 10 CFR Part 40 license does not involve authorization to receive, possess, or use uranium hexafluoride in excess of 50 kilograms in a single container or 1000 kilograms total. However, in a letter dated March 3, 2011, the applicant revised the request for a 10 CFR Part 40 license to state that no 10 CFR Part 40 specifically-licensed source material, including natural uranium, depleted uranium and uranium hexafluoride (UF₆), will be received, possessed, and used during the period between issuance of the COL and the Commission's 10 CFR 52.103(g) finding for each of the VEGP Units 3 and 4. Since the above

quantities are not exceeded, an emergency plan for responding to the radiological hazards of an accidental release of source material and to any associated chemical hazards related to the material is not required. As such, the implementation of the emergency plan prior to the receipt of source material will be removed from VEGP COL FSAR Table 13.4-201. This applicant's proposal meets the requirements of 10 CFR 30.32 and 10 CFR 40.31 and is, therefore, acceptable. The incorporation of changes into a future revision of the VEGP COL FSAR is **Confirmatory Item 1.5-1**.

Resolution of Standard Content Confirmatory Item 1.5-1

Confirmatory Item 1.5-1 is an applicant commitment to revise FSAR Table 13.4-201. The staff verified that the VEGP COL FSAR Table 13.4-201 was appropriately revised. As a result, Confirmatory Item 1.5-1 is now closed.

The applicant also proposed an FSAR commitment to address the limitations during the period prior to the implementation of the emergency plan. In a letter dated March 16, 2011, the applicant stated that it has no plans to process UF₆ at the plant site at any time following the Commission's 10 CFR 52.103(g) finding, and consequently does not expect the requested 10 CFR Part 40 license to include receipt, storage, or use of UF₆ at the plant site. However, using the guidance of DC/COL-ISG-15, "Post-Combined License Commitments", the staff has determined that the commitment is not sufficient and instead the staff is proposing to add a restriction in the license condition related to 10 CFR Parts 30 and 40 (See License Condition 1-1,c(ii)).

Review of Part 70 Materials

The staff reviewed information related to nuclear fuel as SNM included in the VEGP COL application including the AP1000 DCD against 10 CFR Part 70 requirements. Specifically, the staff's review included:

- General information—financial qualification, site description, hydrology, geology, meteorology, the nearby population, and potential effects of natural phenomena (Part 1 of the application, FSAR Section 1.1 and Chapter 2, Section 4.1 and Table 4.1-1 of the AP1000 DCD against the requirements of 10 CFR 70.22(a)(1) through (a)(4));
- Organization and Administration—the responsibilities and associated resources for the receipt, possession, inspection, and storage of the SNM in the form of fresh fuel assemblies (Part 1 of the application, Quality Assurance Program included in Part 11 (Enclosure 11A) of the application, VEGP COL FSAR Section 13.1 for organization against the requirements of 10 CFR 70.22(a)(6) and (a)(8));
- Radiation Protection—Radiation protection program implementation, organization and personnel qualification, written procedures, ALARA, radiation survey and monitoring (AP1000 DCD Section 9.1 and Chapter 12 of VEGP COL FSAR against the requirements of 10 CFR 70.22(a)(6) through (a)(8));
- Nuclear Criticality Safety—use of area radiation monitors in lieu of criticality accident alarms (AP1000 DCD Sections 9.1.1.3 and 11.5.6 against the requirements of 10 CFR 70.22(a)(6) through (a)(8) and 10 CFR 50.68(b));

- Fire safety—fire protection program (VEGP COL FSAR Section 9.5.1 and Table 13.4-201 against the requirements of 10 CFR 70.22(a)(6) through (a)(8));
- Emergency Preparedness— emergency preparedness program for the VEGP site (VEGP COL FSAR Section 13.3 and Table 13.4-201 and the Emergency Plan against the requirements of 10 CFR 70.22(i));
- Environmental Protection—organization, procedures and controls that ensures that the environment is protected during the conduct of activities (i.e., receipt, possession, inspection, and storage of SNM) (VEGP COL FSAR Section 11.5 and AP1000 DCD Sections 9.1.1 and 11.5 against the requirements of 10 CFR 70.22(a)(7) and (a)(8)); and
- MC&A Program and Security (MC&A program included in the application against requirements of 10 CFR 70.22(b) and 10 CFR Part 74, and the Physical Security Plan (PSP) against the requirements of 10 CFR 73.67, “Licensee fixed site and in-transit requirements for the physical protection of special nuclear material of moderate and low strategic significance”).

As indicated above, the applicant’s compliance with several applicable 10 CFR Part 70 requirements regarding radiation protection, nuclear criticality safety, and environmental protection is already encompassed by the design information incorporated by reference from the AP1000 DCD and evaluated by the staff as part of the design certification proceeding. As explained further below, with respect to other applicable 10 CFR Part 70 requirements to be addressed by the COL applicant, the staff finds that the information provided regarding general information, organization and administration, radiation protection, nuclear criticality safety, fire safety, emergency preparedness, and environmental protection to support receipt, storage, and possession of SNM conforms to the applicable guidance in NUREG-1520 and NUREG-0800 and, therefore, is acceptable. First, however, the staff’s review of information regarding the MC&A program (10 CFR 70.22(b) and 10 CFR Part 74) and the PSP (10 CFR 73.67) is provided below.

MC&A Program for SNM (Fuel)

In RAI 1.5-3, the staff requested the applicant to review the requirements of 10 CFR 70.22(b) for the program addressing the control and accounting of SNM and provide descriptions of how the applicable requirements for material accounting and controls under 10 CFR Part 74 will be met for the possession and storage of SNM during construction and prior to the operation of the nuclear power plant. In addition, the staff requested the applicant to provide a proposed license condition to clearly establish full implementation of the MC&A program meeting the applicable requirements of 10 CFR Part 74 prior to receipt of SNM, consistent and concurrent with the proposed license condition for implementing the applicable security (i.e., physical protection) requirements of 10 CFR Part 73.

In response to RAI 1.5-3, the applicant, in a letter dated November 23, 2010, stated that all non-irradiated SNM for the AP1000 units is identified as Category III, SNM of low strategic significance, as defined in 10 CFR 74.4, “Definitions.” No SNM at an AP1000 nuclear facility will exceed an uranium-235 isotope enrichment of 10 percent. The quantity of SNM will be documented, controlled, and communicated to the NRC as required in 10 CFR 74.13, “Material status reports”; 10 CFR 74.15, “Nuclear material transaction reports”; and 10 CFR 74.19, “Recordkeeping.”

In its response to RAI 1.5-3, the applicant also described the SNM MC&A program and stated that this program will be provided as an enclosure in the VEGP COL application, Part 11. The SNM MC&A program will be developed for control and accounting of SNM in accordance with the applicable requirements of 10 CFR Part 74, Subparts A and B. This program will be consistent with guidance of American National Standards Institute (ANSI) 15.8-2009, "Material Control Systems – Special Nuclear Material Control and Accounting Systems for Nuclear Power Plants." The SNM MC&A program will be implemented prior to receipt of SNM at the plant site and will remain in effect until the SNM is shipped from the plant site. The procedures constituting the SNM MC&A program will delineate the requirements, responsibilities, and methods of SNM control necessary to address the following programmatic elements:

1. Establish, maintain, and follow written MC&A procedures to account for SNM.
2. Maintain adequate records of the initial receipt or current inventory of SNM, including records of isotopic content, material received, material shipped, and material lost (material balance reports and physical inventory listing reports).
3. Develop adequate inventory procedures and maintain adequate perpetual inventory records.
4. Inventory SNM within the 12-month prescribed frequency.
5. Report SNM inventories on the applicable forms.
6. Establish an individual responsible for the control and accountability of SNM.
7. Report the loss of or inability to find SNM items in a timely manner.
8. Control access to SNM.
9. Control the shipping and transfer of SNM.

The applicant proposed to add a new FSAR Section 13.5.2.2.9, which will summarize the use of plant procedures to address MC&A of SNM. The applicant also stated that VEGP COL FSAR Table 13.4-201 will be revised to provide information related to implementation of the SNM MC&A program.

In order to address the applicable 10 CFR Part 74 MC&A requirements prior to power operation, the applicant proposed a license condition that will require implementation of a MC&A program prior to receipt of SNM on site. Implementation of the SNM MC&A program prior to SNM receipt will also address the SNM possession and storage requirements during construction and prior to operation of the nuclear power plant.

The applicant's MC&A program for SNM is consistent with ANSI 15.8 and meets reporting and recordkeeping requirements of 10 CFR 74.11, "Reports of loss or theft or attempted theft or unauthorized production of special nuclear material"; 10 CFR 74.13; 10 CFR 74.15; and 10 CFR 74.19. The documentation, submitted by the applicant, for a program addressing the control and accounting of SNM provided descriptions of how the applicable requirements for material accounting and controls under 10 CFR Part 74 are met and, therefore, is acceptable, subject to the proposed revision to the VEGP COL application and the VEGP COL FSAR (this

has been tracked as **Confirmatory Item 1.5-2**). In addition, the proposed license condition includes a provision to provide a schedule to support the NRC's inspection of the MC&A program for the SNM. This is consistent with the policy established in SECY-05-0197 and is thus acceptable.

Resolution of Standard Content Confirmatory Item 1.5-2

Confirmatory Item 1.5-2 is an applicant commitment to revise FSAR Sections 13.4, 13.5 and Parts 7 and 11 (Enclosure 11D) of its application to address the SNM MC&A program. The staff verified that the VEGP COL FSAR and Parts 7 and 11 (Enclosure 11D) of its application were appropriately revised. As a result, Confirmatory Item 1.5-2 is now closed.

Security Review for 10 CFR Part 70 Materials

In accordance with 10 CFR 73.55(a)(4), current applicants for an operating license under 10 CFR Part 50, or a COL under 10 CFR Part 52 who have submitted their applications to the Commission prior to the effective date of this rule must amend their applications to include security plans consistent with this section.

The Commission worded 10 CFR 73.55(a)(4) to require implementation of 10 CFR 73.55, "Requirements for physical protection of licensed activities in nuclear power reactors against radiological sabotage," "before fuel is allowed onsite (protected area)." The Commission explained this provision as follows:

This paragraph establishes when an applicant's physical protection program must be implemented. The receipt of special nuclear material (SNM) in the form of fuel assemblies onsite, (*i.e.*, within the licensee's protected area) is the event that subjects a licensee or applicant to the requirements of this rule, and it is the responsibility of the applicant or licensee to complete the preliminary and preparatory actions required to implement an effective physical protection program at the time SNM is received onsite (within the protected area).
74 FR 13926, 13960 (Mar. 27, 2009)

Further guidance is provided in the form of RGs to support implementation of this Rule. The following guidance is provided in RG 5.76, "Physical Protection Programs at Nuclear Power Reactors":

Except for mixed-oxide (MOX) fuel assemblies, the Commission requirements of 10 CFR 73.67, "Licensee Fixed Site and In-Transit Requirements for the Physical Protection of Special Nuclear Material of Moderate and Low Strategic Significance," apply and must be met until fuel assemblies are received inside an operational protected area. Consistent with 10 CFR 73.55(a)(4), applicants for an operating license under the provisions of 10 CFR Part 50, or holders of a COL under the provisions of 10 CFR Part 52, shall implement the requirements of 10 CFR 73.55 before special nuclear material (SNM) in the form of fuel assemblies are allowed on site (in the protected area).

In a letter dated March 15, 2011, the NRC staff asked the applicant to provide its plan regarding the protection of new fuel as SNM at the VEGP Units 3 and 4 plant site prior to declaration of an operational protected area (PA) and implementation of the requirements of 10 CFR 73.55, as described in the SNM MC&A Program description. In addition, the staff also requested that the

applicant consider the applicability of the substantive provisions of interim compensatory orders (ICMO) that were issued to Category III Fuel Cycle Facilities to ensure adequate protection when SNM is on site prior to the activation of the PA. In response to the staff's questions, in a letter dated March 16, 2011, the applicant provided a physical protection plan in accordance with 10 CFR 73.67(f) and (g). This plan was included as an annex to the PSP. This plan includes transportation security provisions. The applicant also stated that once the PA is declared operational in accordance with 10 CFR 73.55(a)(4), the annex would no longer be required and could be removed in accordance with 10 CFR 50.54(p). Then, no separate transportation security provisions would be necessary for future new fuel shipments. The staff raised a question regarding the licensee's ability to receive new fuel and return new fuel rods/assemblies to the fuel manufacturer. In a letter dated May 6, 2011, the applicant proposed to revise its FSAR Section 13.5.2.2.8 to include the New Fuel Shipping Plan that addresses the applicable 10 CFR 73.67 requirements in the event that unirradiated new fuel assemblies or components are returned to the supplying fuel manufacturer(s) facility. The New Fuel Shipping Plan summarizes the procedures and the written agreement that the applicant will have in place prior to shipment of new fuel back to the fuel manufacturer, and this plan will be included in Part 11, Enclosures of its application. The staff finds this New Fuel Shipping Plan acceptable because it meets the applicable requirements of 10 CFR 73.67(g). The staff verified that the VEGP FSAR Section 13.5 and Part 11 (Enclosure 11E) are appropriately updated.

In the RAI response dated March 16, 2011, the applicant addressed the Order imposing fingerprinting and criminal history records check requirements for unescorted access to radioactive material or other property dated April 30, 2007. In accordance with Section 5.4 of the PSP annex, the applicant committed to utilizing the access authorization program as outlined in Section 14.1 of the PSP. The access authorization program in Section 14.1 is in accordance with 10 CFR 73.56, "Personnel Access Authorization Requirements for Nuclear Power Plants," based on implementing guidance as provided by RG 5.66, "Access Authorization Program for Nuclear Power Plants," Revision 1 and Section 652 of the Energy Policy Act of 2005 (EP Act).

The applicant conducted a critical target area analysis (CTA), and determined that a CTA would not exist. Because there is no CTA at the facility, there is no need to address security issues related to CTAs. In addition, the applicant has adequately addressed security issues related to; security response procedures, coordination with local law enforcement for response support, storage of hazardous materials on-site, review of emergency shutdown/cool down procedures, supplementing of the Emergency Actions Levels, site accountability and evacuation strategies, emergency communications, evaluation of computer and communications networks for vulnerabilities, capabilities to provide fire suppression, evaluation of the need for offsite medical support, emergency support, and access to Federal support, and limiting public access to sensitive plant information. However, the staff has determined that the commitment included in the RAI responses is not sufficient and instead the staff is proposing to add a license condition to ensure adequate protection prior to implementation of the requirements of 10 CFR 73.55. This license condition (1-5) will preclude changes to the security plan provisions related to these issues without prior NRC approval until such matters fall under the new reactor security requirements of 10 CFR 73.55.

The staff's review of the applicant's PSP for the protection of SNM of low strategic significance (LSS) includes information that has been marked as "Safeguards Information" by the applicant, pursuant to 10 CFR 2.390. The NRC staff reviewed the applicant's PSP for fixed site physical protection of SNM-LSS and chemicals of concern. The methods and procedures outlined in the PSP satisfy the performance objectives, systems capabilities, and reporting requirements

specified in 10 CFR 73.67. The PSP for the facility is acceptable and provides reasonable assurance that the requirements for the physical protection of SNM-LSS and chemicals of concern will be met. The staff also verified that the PSP is appropriately updated.

Non-Fuel SNM

In a letter dated June 22, 2011, the applicant provided information regarding the name, amount, and specifications (including the chemical and physical form and, where applicable, isotopic content) of the non-fuel SNM (Fission Chambers) the applicant proposes to use (10 CFR 70.22(a)(4)). The letter also provided information to confirm that the applicable design and programmatic elements provided in the licensing basis will satisfy the requirements in 10 CFR 70.22(a)(6) through (8) prior to receipt of non-fuel SNM.

10 CFR Part 70 Requirements – Other than MC&A (10 CFR 70.22(b) and 10 CFR Part 74) and Security (10 CFR 73.67) – for Fuel and Non-Fuel Material

As noted above, in addition to MC&A and security, the staff also examined the applicant's compliance with 10 CFR Part 70 requirements regarding general information, organization and administration, radiation protection, nuclear criticality safety, fire safety, emergency preparedness, and environmental protection to support receipt, storage, and possession of SNM.

The staff's analysis follows with respect to those other requirements not already resolved via the applicant's incorporation of the AP1000 DCD. For the reasons described in Section 1.4.4 of this FSER, the staff agrees that the applicant is technically qualified to engage in the proposed activities associated with this license, based on the applicant's ongoing experience in the safe operation of nuclear power plants, as presented in Section 1.4.1 of the VEGP COL FSAR. Likewise, the applicant's financial qualifications and ownership structure meet the requirements of 10 CFR 70.22 for the same reasons described above in Section 1.5.1. Similarly, the applicant has explained the anticipated amounts, types, and uses of 10 CFR Part 70 materials at the site are consistent with the provisions of 10 CFR 70.22. The VEGP COL FSAR and Part 1 of the application provide adequate description of the VEGP Units 3 and 4 facility and the proposed activities related to 10 CFR Parts 30, 40 and 70 material. In addition the VEGP COL FSAR provides information regarding regional hydrology, geology, meteorology, the nearby population, and potential effects of natural phenomena that could occur at the facility. The applicant has described the responsibilities and associated resources (see Part 1, "General and Administration Information," and Enclosure 11A, "Nuclear Development Quality Assurance Manual" of the application) for the receipt, possession, inspection, and storage of the 10 CFR Part 70 material (fuel and non-fuel). Therefore, it meets the requirements of 10 CFR 70.22(a)(1). Furthermore, as indicated in VEGP COL FSAR Table 13.4-201, applicable portions of the Radiation Protection Program will be implemented prior to initial receipt of byproduct, source, or SNMs. In accordance with VEGP COL FSAR Table 13.4-201, Item 10, Implementation Milestone #1, and the NRC-approved template, Nuclear Energy Institute (NEI) 07-03A, "Generic FSAR Template Guidance for Radiation Protection Program Description," which is incorporated by reference into VEGP COL FSAR Appendix 12AA (see SER Section 12.5), the appropriate radiation protection program elements associated with organization, facilities, instrumentation and equipment, procedures (e.g., procurement, receipt, inventory, labeling, leak testing, surveillance, control, transfer, disposal, storage, issuance, and use of radioactive sources), and training will be in place prior to initial receipt of byproduct, source, or special nuclear materials, thereby satisfying the requirements of 10 CFR 70.22(a)(4), (6), (7), and (8). VEGP COL FSAR Section 12.2 includes the requirements for written

procedures that address leak-testing of radioactive sources. The leak-test will be consistent with 10 CFR 20.1501, "General," survey and monitoring requirements for evaluating the quantities of radioactive material and the potential radiological hazard of the radioactive source.

The fission chambers will be disposed of consistent with the operating procedures that specify the processes to be followed to ship waste that complies with the waste acceptance criteria (WAC) of the disposal site, the waste classification and characteristics requirements of 10 CFR 61.55, "Waste classification," and 10 CFR 61.56, "Waste characteristics," and the requirements of third party waste processors as applicable. This process is identified in VEGP COL FSAR Section 11.4.6.1.

With respect to fire safety, prior to installation, the new fission chambers (along with the new fuel) will be stored in the Auxiliary Building fuel handling area, which is an area protected by the fire protection program and fire protection system, as discussed in the AP1000 DCD Section 9A.3.1.3.1.2. Temporary storage of these non-combustible sealed sources is not specifically addressed in the AP1000 fire protection analysis in DCD Appendix 9A; however, the approach to extinguishing fires and containing material releases associated with the fission chambers would be similar to, and bounded by, the approach considered for the fuel handling area in general. The fuel handling area has been evaluated and determined acceptable for the storage of SNM in a full core load of new fuel. The hazards imposed by the relatively small quantity of SNM associated with the fission chambers (less than 100 grams), is not expected to be a challenge to the existing fire protection analysis for the new fuel storage (see Section 9.5.1 of this SER). The VEGP COL FSAR Section 12.2 includes the requirements for written procedures that address leak testing of radioactive sources (byproduct, source, and devices that contain SNM, as appropriate). Further, the fission chambers that contain the non-fuel SNM are sealed sources that are tested periodically to confirm their leak-tightness. Therefore, it is expected that the capabilities of the fire protection program and the fire protection equipment servicing this area are sufficient to meet the requirements of 10 CFR 70.22(a)(7) and 10 CFR 70.22(a)(8).

Emergency Plan (SNM, Fuel and Non-Fuel)

The applicant will be storing the new fuel in the new fuel rack (stored dry) or in the spent fuel racks prior to loading into the reactor. The safety analysis included in AP1000 DCD Sections 9.1.1.3 and 9.1.2.3 provides safety analysis that indicates that: (1) the design of new fuel rack is such that K_{eff} remains less than or equal to 0.95 with full density unborated water and less than equal to 0.98 with optimum moderation and full reflection conditions; and (2) the design of spent fuel rack is such that K_{eff} remains less than or equal to 0.95 under design basis conditions. This criticality evaluation meets the requirements of 10 CFR 50.68(b). Therefore, a criticality accident alarm system to meet the requirements of 10 CFR 70.24, "Criticality accident requirements," is not required. As a result, an emergency plan (to receive and possess) pursuant to 10 CFR 70.22(i) is also not required. In addition, an emergency plan for the fission chambers (to receive and possess) pursuant to 10 CFR 70.22(i) is not required due to the small quantity of SNM (less than 100 grams) associated with the fission chambers.

Conclusion

Based on the above, the staff finds that the information regarding general information, organization and administration, radiation protection, nuclear criticality safety, fire safety, emergency preparedness, and environmental protection to support receipt, storage, and

possession of fuel and non-fuel SNM (Fission Chambers), conforms to the applicable guidance in NUREG-1520 and NUREG-0800 and, therefore, is acceptable.

For the reasons discussed above, the staff proposes to include the following license conditions for the VEGP COL, as they relate to authorization pursuant to regulations in 10 CFR Parts 30, 40, and 70:

- License Condition (1-1) - Subject to the conditions and requirements incorporated herein, the Commission hereby licenses SNC:
 - (a) (i) Pursuant to the Act and 10 CFR Part 70, to receive and possess at any time, special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, described in the final safety analysis report (FSAR), as supplemented and amended;
 - (ii) Pursuant to the Act and 10 CFR Part 70, to use special nuclear material as reactor fuel, after a Commission finding under 10 CFR 52.103(g) has been made, in accordance with the limitations for storage and amounts required for reactor operation, and described in the FSAR, as supplemented and amended.
 - (b) (i) Pursuant to the Act and 10 CFR Parts 30, and 70, to receive, possess, and use, at any time, before a Commission finding under 10 CFR 52.103(g), such byproduct, and special nuclear material as: sealed neutron sources for reactor startup; sealed sources for reactor instrumentation and radiation monitoring equipment, calibration; and fission detectors in amounts as required;
 - (ii) Pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use, after a Commission finding under 10 CFR 52.103(g), any byproduct, source, and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment, calibration, and as fission detectors in amounts as required;
 - (c) (i) Pursuant to the Act and 10 CFR Parts 30, and 70, to receive, possess, and use, before a Commission finding under 10 CFR 52.103(g), in amounts not exceeding those specified in 10 CFR 30.72, any byproduct, or special nuclear material that is (1) in unsealed form; (2) on foils or plated surfaces, or (3) sealed in glass, for sample analysis or instrument calibration or other activities associated with radioactive apparatus or components;
 - (ii) Pursuant to the Act and 10 CFR Parts 30, 40, and 70, to receive, possess, and use, after a Commission finding under 10 CFR 52.103(g), in amounts as required, any byproduct, source, or special nuclear material without restriction as to chemical or physical form, for sample analysis or instrument calibration or other activity associated with radioactive apparatus or components, but not uranium hexafluoride; and

(d) Pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.

- License Condition (1-2) - Prior to initial receipt of special nuclear materials (SNM) onsite, the licensee shall implement the SNM Material Control and Accounting (MC&A) program. No later than 12 months after issuance of the COL, the licensee shall submit to the Director of Office of New Reactors (NRO) a schedule that supports planning for and conduct of NRC inspections of the SNM Material Control and Accounting program. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until the SNM Material Control and Accounting program has been fully implemented.
- License Condition (1-3) – No later than 12 months after issuance of the COL, the licensee shall submit to the Director of NRO a schedule that supports planning for and conduct of NRC inspection of the non-licensed plant staff training program. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until the non-licensed plant staff training program has been fully implemented.
- License Condition (1-4) – Prior to initial receipt of SNM on site, the licensee shall implement the SNM physical protection program. No later than 12 months after issuance of the COL, the licensee shall submit to the Director of NRO a schedule that supports planning for and conduct of NRC inspection of the SNM physical protection program. The schedule shall be updated every 6 months until 12 months before scheduled fuel loading, and every month thereafter until the SNM physical protection program has been fully implemented.
- License Condition (1-5) – The licensee shall not revise or modify the provisions of Sections 5.3, 5.4, 5.6, 5.9 and 5.10 of the Special Nuclear Material (SNM) Physical Protection Plan until the requirements of 10 CFR 73.55 are implemented.