Southern Nuclear Operating Company

ND-20-0164

Enclosure 2

Vogtle Electric Generating Plant Units 3 and 4

Updated Flex Plan Nuclear Regulatory Commission Order EA-12-049 Strategies for Beyond Design Basis External Events

(Non-Proprietary)

(This enclosure consists of 57 pages including this cover page)

UPDATED FLEX PLAN

NUCLEAR REGULATORY COMMISSION

ORDER EA-12-049

STRATEGIES FOR BEYOND DESIGN BASIS

EXTERNAL EVENTS

VOGTLE ELECTRIC GENERATING PLANT

Units 3 and 4

April 2020

Introduction

In response to Nuclear Regulatory Commission (NRC) Order EA-12-049 "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond Design Basis External Events," (Reference 1),the Vogtle Electric Generating Plant (VEGP) Units 3 and 4 Diverse and Flexible Mitigation Capability (FLEX) Overall Integrated Plan (OIP) was initially submitted to the NRC August 22, 2013 (Reference 2). This initial VEGP Units 3 and 4 OIP submittal, developed in accordance with the guidance for defining and deploying strategies that will enhance the ability to cope with conditions resulting from beyond-design-basis external events, consisted of Westinghouse report APP-GW-GLR-170, "AP1000 FLEX Integrated Plan", (Reference 3) and the VEGP Units 3 and 4 specific Milestone Schedule.

During the June 12, 2019 Category I public meeting, the NRC staff and Southern Nuclear Operating Company (SNC) discussed SNC's proposed plan for implementation of the Commission Order with Regard to Mitigation Strategies for Beyond-Design-Basis External Events (BDBEE) and the associated 10 CFR 50.155 rulemaking for Vogtle Electric Generating Plant (VEGP) Units 3 and 4. As discussed with the NRC staff during this public meeting, SNC is providing in an updated FLEX OIP, in a format similar to that of the final integrated plans (FIP) for the SNC fleet, containing specific guidance on VEGP Units 3 and 4 compliance with NRC Order EA-12-049 Phase 3 requirements. Since this updated OIP is a supplement to SNC's August 22, 2013 OIP (Reference 2), the original OIP (Reference 2) may be needed for reference for certain proprietary information.

Nuclear Energy Institute (NEI) implementation guide NEI 12-06 Rev. 4 (Reference 4) includes the boundary conditions for establishing site-specific FLEX strategies, specifically that BDBEE occurrence impacts all units at a site. VEGP Units 3 and 4 are located in close proximity to currently operating VEGP Units 1 and 2. As VEGP Units 3 and 4 are completed, the current VEGP Units 1 and 2 protected area (PA) will be extended from VEGP Units 1 and 2 to encompass VEGP Unit 3 and then VEGP Unit 4, forming one single PA for all four operating units. Based on the NEI 12-06 guidance that all units at a site are impacted by BDBEE, this updated VEGP Units 3 and 4 OIP is based on the premise that VEGP Units 3 and 4 will be combined with VEGP Units 1 and 2 to form one single site for FLEX classification and response. The updated OIP for VEGP Units 3&4 addresses the use of the debris clearing and diesel-driven pumps and generators refueling equipment stored in the Vogtle FLEX dome.

NRC Order EA-12-049 requires Part 52 combined license (COL) holders to complete full implementation of the requirements in Attachment 3 to the Order prior to initial fuel load (Reference 1). VEGP Units 1 and 2 fully comply with EA-12-049 (References 8, 9) and will not require any re-analysis resulting from the VEGP Units 3 and 4 implementation of

EA-12-049 requirements and eventual formation of a single site for FLEX classification and response.

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1.0 Background

The Fukushima Dai-ichi accident in Japan in March of 2011 was the result of a tsunami that exceeded the Fukushima plant's design basis and flooded the site's emergency power supplies and electrical distribution system. An extended loss of power severely compromised the key safety functions of core cooling and containment integrity and ultimately led to core damage in three reactors. The events at Fukushima Dai-ichi showed that extreme phenomena beyond what is accounted for in the design basis, though unlikely, could present challenges to accident prevention and mitigation and emergency preparedness at nuclear power plants. The NRC determined that additional requirements must be imposed to mitigate beyond-design basis external events. Guidance and strategies must be available if a loss of power, motive force and normal access to the Ultimate Heat Sink (UHS) needed to prevent fuel damage in the reactor and spent fuel pool (SFP), affected all units at a site simultaneously.

On March 12, 2012, the NRC issued EA-12-049, Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events. The Order is based on Recommendation 4.2 of SECY-11-0093, Recommendations for Enhancing Reactor Safety in the 21st Century, the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident (Reference 1), which was determined to be a high priority (Tier 1) action. Order EA-12-049 applies to all applicable power reactor licensees, holders of construction permits and COL holder reactor sites.

NRC Order EA-12-049 Attachment 2 requires a three-phased approach for mitigating BDBEE for Part 50 licensees. The initial phase requires the use of installed equipment and resources to maintain or restore core cooling, containment integrity, and SFP inventory. The transition phase requires providing sufficient, portable, onsite equipment and consumables to maintain or restore these functions until they can be accomplished with resources brought from offsite. The final phase requires obtaining sufficient offsite resources to sustain those functions indefinitely.

2.0 Combined Licenses (COLs) under 10 CFR Part 52

NRC Order EA-12-049 Attachment 3 requires Vogtle Units 3 and 4 to address the following requirements relative to the final phase:

(4) Licensees must be capable of implementing the strategies in all modes.

(5) Full compliance shall include procedures, guidance, training, and acquisition, staging, or installing of equipment needed for the strategies.

The design bases of VEGP Units 3 and 4 includes passive design features that provide core, containment and SFP cooling capability for 72 hours, without reliance on alternating current (AC) power. These features do not rely on access to any external water sources since the containment vessel and the passive containment cooling system serve as the safety-related ultimate heat sink. The NRC staff reviewed these design features prior to issuance of the combined licenses for these facilities and certification of the AP1000 design referenced therein. The AP1000 design also includes equipment to maintain required safety functions in the long term (beyond 72 hours to 7 days) including capability to replenish water supplies. Connections are provided for generators and pumping equipment that can be brought to the site to back up the installed equipment. The staff concluded in its final safety evaluation report for the AP1000 design (Reference 5) that the installed equipment (and alternatively, the use of transportable equipment) is capable of supporting extended operation of the passive safety systems to maintain required safety functions in the long term. As such, NRC Order EA-12-049 requires VEGP Units 3 and 4 to address the requirements of the final phase: obtaining sufficient offsite resources to sustain core, containment, and SFP cooling capability indefinitely.

2.1 Baseline Coping Capability

The Vogtle baseline coping capability was established based on the assumed set of plant initial and boundary conditions associated with a BDBEE as described in NEI 12-06, Appendix F.3.1, Establishing Baseline Coping Capability:

2.1.1 Initial Plant Conditions

1. Prior to the event, the reactor has been operating at 100 percent rated thermal power for at least 100 days or has just been shut down from such a power history as required by plant procedures in advance of the impending event.

2. At the time of the postulated event, the reactor and supporting systems are within normal operating ranges for pressure, temperature, and water level for the appropriate plant condition. All plant equipment is either normally operating or available from the standby state as described in the plant design and licensing basis.

2.1.2 Event Initial Conditions

1. No specific initiating event is applied. The initial condition is assumed to be a loss of off-site power (LOOP) for the entire plant site affecting all Vogtle units simultaneously. The LOOP is assumed to result from an external event that affects the off-site power system either throughout the grid or at the plant with no prospect for recovery of off-site power for an extended period.

2. All design basis installed sources of emergency on-site AC power and SBO alternate AC power sources are assumed to be not available and not imminently recoverable. Station batteries and associated DC buses along with AC power from buses fed by station batteries through inverters remain available.

3. Cooling and makeup water inventories contained in systems or structures with designs that are robust with respect to seismic events, floods, and high winds, and associated missiles are available.

4. Fuel for FLEX equipment stored in structures with designs which are robust with respect to seismic events, floods and high winds and associated missiles, remains available.

5. The spent fuel pool (SFP) is intact, and thus SFP spray capability is not required. Permanent plant equipment that is contained in structures with designs that are robust with respect to seismic events, floods, and high winds, and associated missiles, are available.(Structural design requirements (1) seismic (Reference 36), (2) floods (Reference 41), (3) high winds (Reference 42), and (4) missiles (Reference 43)

6. Other equipment, such as portable AC power sources, portable back up DC power supplies, spare batteries, and equipment for (formerly) 50.54(hh)(2) now 50.155(b)(2), may be used provided it is reasonably protected from the applicable external hazards and has predetermined hookup strategies with appropriate procedural guidance and the equipment is stored in a relatively close vicinity of the site.

7. The installed Class 1E electrical distribution systems, including inverters and battery chargers, that are protected consistent with current station design are available.

8. No additional events (including security events) or failures are assumed to occur immediately prior to or during the BDBEE.

9. The fire protection system ring header as a water source is acceptable only if the header is robust for the applicable hazard(s).

2.2 Strategies

2.2.1 Approach

VEGP Units 3 and 4 OIP was submitted to the NRC August 22, 2013 (Reference 2). The OIP submittal consisted of the VEGP Units 3 and 4 milestone schedule and the Westinghouse authored AP1000 FLEX Integrated Plan (Reference 3). VEGP Units 3 and 4 specific guidance for

compliance with EA-12-049 Phase 3 requirements is provided in Appendix F to NEI 12-06 (Reference 4) as endorsed by the NRC in Reference 7.

NEI 12-06 includes the boundary conditions to apply for establishing the site specific FLEX strategies. NEI 12-06 indicates the BDBEE occurs and impacts all units at a site. VEGP Units 3 and 4 are being constructed in close proximity to the currently operating VEGP Units 1 and 2. As VEGP Units 3 and 4 are completed, the protected area (PA) will be extended from just VEGP Units 1 and 2 to encompass Unit 3 and then Unit 4, to form one single PA for all four operating units. Because NEI 12-06 indicates all units at a site are affected by the BDBEE, this update is prepared under the premise that VEGP Units 3 and 4 will be combined with VEGP Units 1 and 2 to form one single site for FLEX classification and response. Reference 1 requires full implementation prior to initial fuel load for VEGP Units 3 and 4. The VEGP Units 1 and 2 final integrated plan (FIP) was submitted to the NRC May 23, 2016 (Reference 8). FLEX deployment at VEGP Units 1 and 2, including access to all equipment contained within the FLEX dome for Phase 2 responses, has been accepted by the NRC. The NRC issued the safety evaluation report for VEGP Units 1 and 2 November 14, 2016 (Reference 9).

VEGP Units 3 and 4 passive safety systems have a substantial impact on the level of effort required for FLEX response compared with the rest of the operating fleet. As a result, there is limited on site equipment needs and minimal off site equipment requirements.

To integrate all four units into one site, evaluations of the identified external hazards for VEGP Units 1 and 2 for applicability to VEGP Units 3 and 4 was performed (Step 2 of NEI 12-06, Appendix F) to determine if additional actions are required for Phase 3 VEGP Units 3 and 4 FLEX response.

From NEI 12-06, Appendix F:
By nature of the passive safety approach and its licensing basis, AP1000 is designed to provide a significant coping period for a station blackout. Hence, the focus on this guidance is to define the required review of the AP1000 design relative to the transition from passive systems operation and their initial coping capabilities (i.e., 72 hr.), to indefinite, long term operation of

the passive cooling systems with support using off-site equipment and resources.

The principles identified in this appendix thus discuss the extension of the passive systems operation indefinitely during an extended loss of AC power (ELAP) and the loss of ultimate heat sink makeup (LUHS). These principals have been applied during the design and development of the AP1000 and thus, the extended coping strategies are accomplished with existing passive safety and coping systems within the standard design utilizing existing connection points for FLEX equipment. Specifically, coping with extended loss of AC power in the AP1000 is covered by design and by post-72 hour procedures described in Section 1.9.5.4 of the AP1000 Design Control Document (DCD), Revision 19.

The use of passive systems with their extended coping times is an important difference because whereas active plants are expected to show primary and diverse connection points for maintaining core cooling, AP1000 core cooling is maintained by the passive safety systems without reliance on AC power. The passive safety systems, however, should have the ability to have their operation extended indefinitely. The standard design licensing basis demonstrates safety-related means of providing core cooling, containment cooling, and SFP cooling for at least 72 hours. The standard design also demonstrates primary and alternate means of extending passive safety system cooling indefinitely as part of the baseline capability assessment as described in Section 1.9.5.4 of the Design Control Document (DCD), Revision 19.

The assessment of the AP1000 design is expected to be the same as for the site specific evaluation and is documented by this process:

- Step 1: Establish standard design baseline coping capability considering design basis hazards.
- Step 2: Apply beyond-design-basis (BDB) external hazards and perform margin assessment, and confirm the capability to extend core, containment and spent fuel pool cooling also under beyond-design-basis conditions.
- Step 3: Identify any enhancements to baseline capability to address BDB scenarios, if applicable."

2.3 Assessment

It is understood that the FLEX Phase 1 and 2 actions / requirements are satisfied for VEGP Units 3 and 4 by the 72-hour passive coping design of the AP1000. However, this report includes a brief synopsis of the baseline coping capabilities of the VEGP Units 3 and 4 AP1000 passive coping capabilities which have been approved by the NRC when the AP1000 DCD was approved and safety evaluation issued (Reference 5.)

2.4 AP1000 Three Phase Approach

As stated in NEI 12-06, Appendix F.3, "For the AP1000, the underlying strategies for coping with extended loss of AC power events involve a three phase approach:"

2.4.1 Passive 0-72 hours

"Initial coping is through installed plant equipment, without any AC power or makeup to the UHS. For the AP1000 this phase is already covered by the existing licensing basis. This covers the 0 to 72-hours basis for passive systems performance for core, containment and spent fuel pool cooling."

The AP1000 Standard passive nuclear power plant design includes safety-related passive systems and equipment that automatically establish and maintain safe shutdown conditions following a prolonged station blackout with the most limiting single failure. For the first 3 days after an accident, the Class 1E batteries provide power for post-accident monitoring as described in Reference 37. The Class 1E DC and UPS System (IDS) is designed with four independent, Class 1E 250 VDC divisions (A, B, C, and D). All four divisions have one 24-hour battery bank. Divisions B and C also each have one 72-hour battery bank. Passive heat sinks provide cooling of the main control room (MCR) and the instrumentation and controls (I&C) rooms. The initial water supply in the passive containment cooling water storage tank (PCCWST) provides for at least 3 days of passive containment cooling system (PCS) cooling. The initial water volume in the spent fuel pool normally provides for 7 days of spent fuel cooling.

The AP1000 plant design provides the passive core cooling system (PXS), PCS, and spent fuel pool cooling system (SFS), which provide coping capabilities with an extended loss of AC power for core, containment and

spent fuel cooling. The BDBEE response capabilities for these systems are described in their respective system specification documents for PXS, PCS and SFS (References 10, 11 and 12).

2.4.2 3-7 days

"Following the 72-hour passive system coping time, support is required to continue passive system cooling. This support can be provided by installed plant ancillary equipment or by off-site equipment installed to connections provided in the AP1000 design. The installed ancillary equipment is capable of supporting passive system cooling from 3 to 7 days."

Permanently installed plant equipment is available for use as directed in the series of post-72 hour procedures. The installed equipment (or alternately offsite equipment) maintains the following functions for the AP1000:

A. Supply power to the post-accident monitoring instrumentation for the reactor, containment and the spent fuel pool.
B. Provide makeup water supply to the passive containment cooling water storage tank (PCCWST) or PCS distribution bucket for containment cooling water flow.
C. Provide makeup water to the spent fuel pool to maintain shielding and cooling of the spent fuel.
D. Provide MCR and I&C room ventilation.
E. Provide a vent path from the fuel handling area to the outside environment to vent water vapor generated by the spent fuel pool.

Additionally, a compliance assessment was performed by Westinghouse (Reference 18) to identify reference documents for the AP1000 plant design compliance as well as identify required modifications made to the VEGP Units 3 and 4 design since the original issuance of NUREG-1793 (Reference 5).

The primary FLEX strategy is to utilize the permanently installed equipment. Two ancillary diesels per unit are provided for the loss of power to Class 1E 72 hr. battery loads as described in Reference 30. These diesels are in the annex building and provide AC power for Class

1E post-accident monitoring, MCR lighting, MCR and I&C room ventilation, and pump power to refill the PCCWST and the SFS, when all other power sources are not available. A fuel tank is in the same room as the ancillary diesels to allow operation from hour 72 to day 7 after the initiating BDBEE. The primary connection for use of the ancillary diesel generators is through the distribution panel located in the same room (Reference 55.)

The ancillary diesels and fuel tank are not utilized for normal plant operation and are nonsafety related components, seismic category II (Reference 36), and installed in the annex building. The annex building is classified seismic category II. Seismic category II building structures are designed for the safe shutdown earthquake using the same methods and design stress limits as are used for seismic category I structures. Additional evaluations for FLEX tornado missile generations were performed and demonstrate the annex building is unaffected (Reference 20.)

Power to the ancillary fans to provide post-72-hour ventilation of the MCR and the I&C rooms is supplied from divisions B and C regulating transformers through two series fuses for isolation. The fuses protect the regulating transformers from failures of the non-1E fan circuits.

One passive containment cooling auxiliary water storage tank (PCCAWST) is provided per unit for filling the PCCWST, SFP or PCS water distribution bucket using the PCS recirculation pumps during an extended loss of both offsite and onsite AC power sources for more than 72 hours. The PCCAWST contains adequate water volume using the recirculation pumps (two per unit) to provide required flow from hour 72 to day 7 after the initiating BDBEE. The PCCAWST and recirculation pumps are seismic category II to ensure their ruggedness and availability. The PCCAWST is in the yard adjacent to the auxiliary building. Additional evaluations for FLEX tornado missile generation were performed and demonstrate the PCCAWST will remain intact and available (Reference 19.) The recirculation pumps are located inside the seismic category I auxiliary building.

The post-accident monitoring system (PAMS) is powered by the ancillary diesels post 72-hours. The system provides the following key parameters for monitoring the status of the unit post BDBEE as described in References 53 and 54:

Table 2.4-1
Parameters Monitored

Instrumentation	Function	Div B Instrument	Div C Instrument
Neutron flux, source range	Reactivity control	RXS-NE001B	RXS-NE001C
RCS wide range pressure	RCS integrity, core cooling	RCS-PT140B-Q	RCS-PT140C-Q
RCS wide range temperature, hot leg (T-hot)	RCS integrity, core cooling	RCS-TE135A (HL1)	RCS-TE135B (HL2)
Containment water level	RCS integrity	PXS-LT051	PXS-LT052
Containment pressure	RCS integrity, containment	PCS-PT006-Q	PCS-PT007-Q
Pressurizer level	RCS inventory	RCS-LT195B	RCS-LT195C
Hot leg level	RCS inventory	RCS-LT160B	RCS-LT160A
Core exit temperature (CET)	Core cooling	(CETs in PMS-JD-QDPB01)	(CETs in PMS-JD-QDPC01)
Passive residual heat removal (PRHR) flow	Heat sink	PXS-FT049B	PXS-FT049A
PRHR outlet temperature	Heat sink	N/A	RCS-TE161
PCCWST water storage tank level	Heat sink	PCS-LT011	PCS-LT010
PCS water flow rate	Heat sink	PCS-FT-002	PCS-FT001
SFP level	Spent fuel cooling	SFS-LT019B	SFS-LT019C

2.4.3 Beyond 7 days

The AP1000 Preliminary FLEX Capability Summary is provided in Table F.3.2-1 of NEI 12-06. This summary indicates VEGP Units 3 and 4 beyond 7 day coping requirements include a portable diesel generator, a portable pump, diesel fuel oil, and required hoses, couplings, electrical cabling to connect the offsite equipment. Communications equipment is available immediately with hand-held satellite phones and augmented within the first 24 hours with both RapidCase and RapidCom units.

The PCS has a safety related connection on the exterior of the auxiliary building for portable pump connection as described in Reference 11, and a non-safety connection on the PCCASWT drain/overflow line as described in Reference 31.

Offsite support to be provided by equipment delivery from SAFER (Strategic Alliance for FLEX Emergency Response) and additional personnel resources. The current SAFER response plan (Reference 17) for the Vogtle site will be updated to include Units 3 and 4 prior to initial fuel load. The SAFER plan details the deployment of SAFER equipment to the Vogtle site for use. It includes contingencies and alternate deployment paths to ensure equipment can be delivered within 24 hours from SAFER notification. This delivery time ensures resources will be available for VEGP Units 3 and 4 use when required after the initial 72 hour passive coping phase.

Protected connections for SAFER equipment have been included at VEGP Units 3 and 4 to support containment pressure and temperature control, spent fuel pool water level and power for required I&C and ventilation.

2.5 Extreme External Hazards

The hazards applicable to VEGP Units 3 and 4 are seismic, high wind, ice, and extreme heat. Evaluations of external hazards and debris removal for site access during FLEX activities are contained in References 33 and 34 and are summarized below.

2.5.1 Seismic

The Vogtle Ground Motion Response Spectra (GMRS), geotechnical conditions, and ground material have differences from the design analyses performed for the AP1000 seismic analyses so that site specific analysis is required. The AP1000 Certified Seismic Design Response Spectra (CSDRS) has peak ground accelerations for the safe shutdown earthquake equal to 0.30g for the AP1000 design. The vertical peak ground acceleration is conservatively assumed to equal the horizontal value of 0.30g. These response spectra are based on Regulatory Guide (RG) 1.60 with an additional control point specified at 25 Hz. The spectral amplitude at 25 Hz is 30 percent higher than the Regulatory Guide 1.60 spectral amplitude. The AP1000 CSDRS are applied at the foundation level in the free field at hard rock sites, and at the finished grade for the other soil generic conditions. (Appendix 2.5E of Reference 21)

For the AP1000 standard design, the seismic margin assessment (SMA) demonstrates the robustness of the passive safety systems and the associated structures to beyond design basis conditions and is already included in the AP1000 licensing basis for design certification. The SMA demonstrated margin over the safe shutdown earthquake of 0.3g through confirmation that the plant high confidence, low probability of failures (HCLPFs) is at least 0.5g peak ground acceleration. (References 22 and 23)

Coincident with the issuance of Order EA-12-049, on March 12, 2012 the NRC issued a request for information in accordance with 10 CFR 50.54(f) (referred to as the "50.54(f) letter," Reference 24) instructing licensees to reevaluate flood and seismic hazards. Interim Staff Guidance JLD-ISG-2012-01, Revision 2 (Reference 7), Section 6 instructs licensees

to reevaluate flood and seismic hazards in accordance with Revision 4 of the NEI 12-06 guidance.

In compliance with NRC endorsed Electric Power Research Institute (EPRI) guidance, SNC submitted the response to the 50.54(f) letter on March 31, 2014 (Reference 25) for VEGP Units 1 and 2. The NRC accepted the updated seismic evaluations by letter dated April 20, 2015 (Reference 26.)

SNC submitted updated ground motion spectra and foundation input response spectra for VEGP Units 3 and 4 December 5, 2014 (Reference 27) in response to a request from the NRC dated November 5, 2014 (Reference 28.)

By letter, the NRC staff assessment dated August 12, 2015 (Reference 29), "The staff agrees that the use of the VEGP Units 1 and 2 GMRS for VEGP Units 3 and 4 is appropriate given the proximity and similarity of subsurface conditions." Therefore, utilization of the VEGP Units 1 and 2 GMRS for FLEX evaluations is acceptable.

2.5.2 External flooding

The design basis flood for the VEGP site was determined by selecting the maximum flood elevation on the Savannah River obtained by considering all flooding scenarios applicable to the location, including an approximate estimate of the probable maximum flood (PMF), flooding due to probable maximum precipitation (PMP) over local drainage courses, and potential dam failures coincident with wind set-up and wave run-up. Flood surge from ocean storms and tsunami-caused flooding were not considered because the VEGP site is approximately 151 river miles inland.

The controlling event for the VEGP site was determined to be from the breach of the upstream dams, using the Standard Project Flood discharge as a starting condition, including wind set-up and wave run-up. The design basis flooding level derived from this event, including wave setup, is El. 178.10 ft mean sea level (msl), which is 41.9 ft below the site grade elevation of 220.0 ft msl.

2.5.2.1 VEGP Unit 3 in operation with VEGP Unit 4 still under construction

A probable maximum precipitation flood analysis for the interim configuration of VEGP Unit 3 in operation with VEGP Unit 4 still under construction. The calculation determines the maximum flood elevation remains below the 220.0 ft msl and does not affect VEGP Unit 3 operation. (Reference 67)

2.5.3 Severe Storms with High Winds

VEGP Units 3 and 4 are located at approximately 33°09' N latitude and 81°46' W longitude. The AP1000 design basis is included in in the general design criteria document (Reference 32) and summarized in Table 2.0-201 of the VEGP Units 3 and 4 UFSAR. The approved design of the AP1000 envelope the VEGP Units 3 and 4 site-specific BDBEE values for the post 72-hour passive coping period.

	AP1000 DCD Site Parameter	VEGP Units 3 and 4 Site Parameter
Operating Basis Wind Speed	145 mph (3 second gust) Importance factor 1.15 (safety) 1.0 (non-safety) Exposure C Topographic factor 1.0	104 mph (3 second gust) Exposure C Topographic factor 1.0 (Importance factor is not a property of the wind speed)
Tornado Wind	300 mph	300 mph 2.0 lb/in^2

2.5.4 Snow, Ice, Extreme Cold

The AP1000 post 72-hour passive coping equipment design basis is included in in the general design criteria document (Reference 32) and summarized in Table 2.0-201 of the VEGP Units 3 and 4 UFSAR. The approved design of the AP1000 envelope the VEGP Units 3 and 4 site-specific BDBEE values for the post 72-hour passive coping period.

Air Temperature	AP1000 DCD Site Parameter	VEGP Units 3 and 4 Site Parameter
Minimum Safety	-40°F	-8°F
Minimum Normal	-10°F	21°F

The guidelines provided in NEI 12-06 generally exclude the need to consider extreme snowfall at plant sites in the southeastern U.S. below the 35th parallel.

The Vogtle Units 1, 2, 3, and 4 are located at approximately 33° N latitude and thus the capability to address hindrances caused by extreme snowfall with snow removal equipment need not be provided. In the unlikely event that an ELAP event occurred concurrent with a BDBEE snowfall, snow removal could be accomplished with debris removal equipment stored in the FLEX dome in accordance with NEI 12-06 F.8 [Section8.3.2].

The Vogtle site is located within the region characterized by EPRI as ice severity level 5. As such, the Vogtle site is subject to severe icing conditions. In accordance with NEI 12-06 guidance, the FLEX dome is designed to maintain the indoor temperature between 50°F and 100°F (Reference 35) to ensure equipment stored in the FLEX dome is available for use during extreme weather conditions in accordance with NEI 12-06 F.8 [Section 8.3.2]. FLEX support equipment stored in the FLEX dome is able to deploy along the haul paths in snowy or icy conditions.

VEGP Units 3 and 4 UFSAR Section 2.4.7.1 states, "it is very unlikely that surface or frazil ice formation would occur in the Savannah River in the vicinity of the proposed VEGP Units 3 and 4 river intake structure." The

Savannah River is the makeup water source for VEGP Units 3 and 4, and therefore will be available as a source with the SAFER equipment deployment.

2.5.5 Extreme Heat

The AP1000 post 72-hour passive coping equipment design basis is included in in the general design criteria document (Reference 32) and summarized in Table 2.0-201 of the VEGP Units 3 and 4 UFSAR. The approved design of the AP1000 envelope the VEGP Units 3 and 4 site-specific BDBEE values for the post 72-hour passive coping period.

Air Temperature	AP1000 DCD Site Parameter	VEGP Units 3 and 4 Site Parameter
Maximum Safety	115°F	115°F
Maximum Normal	101°F	97°F

In accordance with NEI 12-06 guidance, the FLEX dome is designed to maintain the indoor temperature between 50° F and 100° F (Reference 35) to ensure equipment stored in the FLEX dome (debris clearing equipment and haul vehicles for Vogtle 3 & 4) is available for use during extreme weather conditions in accordance with NEI 12-06 F.9 [Section 9.3.2].

Extreme high temperatures are not expected to impact the ability of personnel to implement the required FLEX strategies and deploy support equipment from the FLEX dome to VEGP Units 3 and 4. For equipment deployment activities required within the auxiliary building, Reference 58 determines temperatures will remain below 110°F. Site industrial safety procedures currently address activities with a potential for heat stress to prevent adverse impacts on personnel.

SAFER equipment is generically designed to operate in deployments all across the contiguous United States, where temperatures in excess of 120°F have been recorded. However, the SAFER equipment for VEGP Units 3 and 4 are site specific and not part of the generic equipment procured to the abovementioned temperature. VEGP Units 3 and 4 SAFER

equipment is specified to operate up to 110°F, which envelopes the normal maximum temperatures of 97°F.

Note: The FLEX Dome is not used for storing VEGP Units 3 and 4 major equipment. This equipment will be housed at the National SAFER Response Center (NSRC) in Phoenix.

2.6 Haul Path Description and Analysis

VEGP Units 1, 2, 3, and 4 are considered one site and all units are affected by the BDBEE. All four units enter FLEX response procedures following established emergency protocols. The Vogtle 3 and 4 haul paths are a continuation of the Vogtle 1 and 2 Haul paths. Refer to Figure 1 of this document.

The Vogtle 3 and 4 haul paths have been analyzed for liquefaction. Analyses indicate that there are potentially liquefiable soils below the design groundwater level, and that some settlement may occur along the travel paths following an earthquake. The magnitude of the settlement expected to occur is not anticipated to make the road impassable for the selected haul vehicles and wheeled loader. Equipment deployment will take advantage of the earlier VEGP Units 1 and 2 deployment plan and path clearing due to the substantial coping time allotted by the 72 hour passive coping period. Additional analysis was not required for the Vogtle 1 and 2 haul paths to support Vogtle 3 and 4.

FLEX haul routes utilized for VEGP Units 1 and 2 will be cleared within 4 hours with equipment stored in the FLEX dome following the BDBEE and be available for use to access VEGP Units 3 and 4. All required equipment for VEGP Units 1 and 2 response for clearing haul paths and transporting trailers and refueling activities will be made available for VEGP Units 3 and 4 once Units 1 and 2 activities are complete.

VEGP Units 1 and 2 FLEX response is implemented in accordance with the strategies accepted by the NRC by Safety Evaluation Report (SER) dated November 14, 2016 (Reference 9) and require no additional evaluations to support VEGP Units 3 and 4 FLEX response.

The tow vehicles utilized to transport FLEX response equipment for VEGP Units 3 and 4 are the same vehicles utilized for VEGP Units 1 and 2 FLEX response. All paths to all units will be suitably cleared for operation of tow vehicles and trailers.

Tow vehicles and trailers stored in the FLEX dome, or delivered from off site (SAFER), are designed to withstand small debris punctures and razor wire cuts / penetrations (i.e., large commercial / military grade, run-flat, non-pneumatic tires).

2.6.1 Debris Assessment and Clearing

Based on walkdowns of the current construction site and reviews of plant drawings, the primary and alternate haul paths for VEGP Units 3 and 4 can support a minimum of two lanes of vehicular traffic. This decreases the likelihood of either route being completely blocked by debris for all scenarios, except the seismic event of complete building 302 collapse in a North direction which would result in a large debris pile on the primary haul path. Because of the low likelihood of the haul routes being completely blocked by debris, and the substantial time delay from the initiating BDBEE to placement of additional FLEX equipment (72 hours), any debris required to be removed to allow passage of tow vehicles and trailers can be accomplished with the onsite debris removal equipment such that a single passable lane is established.

In all locations along the VEGP Units 3 and 4 haul paths, the ability to move off the roadway exists except for the crossing over the spillway between VEGP Units 1 and 2 and VEGP Units 3 and 4. There are no significant debris sources located in close proximity to the crossing so deposition of debris should be minimal, and any possible debris can be cleared with onsite debris removal equipment if necessary.

Additional evaluations of the VEGP Units 1 and 2 haul road are not required, as the design has been reviewed and deemed unaffected as part of the VEGP Units 1 and 2 FLEX response. The VEGP Units 3 and 4 haul road will be the same type/construction and is acceptable for continued use as part of the FLEX response for VEGP Units 3 and 4.

2.7 FLEX Capabilities

The AP1000 passive coping design allows for a significantly reduced FLEX deployment than traditional units. The passive design effectively removes the Phase 1 and Phase 2 equipment and deployment activities allowing for a significantly longer coping period before activation of required equipment connections. NSRC will provide equipment for the complete VEGP Units 1, 2, 3, and 4 once the site contacts the SAFER center per procedures at any unit. It is recognized that deployment activities at VEGP Units 3 and 4 will be staged with the requirements of VEGP Units 1 and 2, which have substantially more required actions for Phase 1 and Phase 2 response. All required equipment for VEGP Units 1 and 2 response for clearing haul paths and transporting trailers and refueling activities will be made available for VEGP Units 3 and 4 once Units 1 and 2 activities are complete.

2.8 Protection of FLEX Equipment

Equipment utilized for VEGP Units 3 and 4 FLEX response beyond the passive response is very limited. The permanently installed ancillary diesels, recirculation pumps and the PCCAWST are the primary components required. The protection of these SSCs has been discussed above. Backup Phase 2 and Phase 3 equipment, generator, pumps, etc. will be stored at the NSRC which is sufficient distance from the site such that it would not reasonably be subject to the same hazards.

Note:
The VEGP Units 1 and 2 FLEX Phase 2 equipment, communications trailers, debris clearing equipment and trucks / trailers, etc. are stored in the Vogtle FLEX dome. The FLEX dome is designed (Reference 35) to provide adequate protection

for equipment stored for BDBEE FLEX response. The VEGP 3 and 4 RapidCom communications trailer is also stored in the dome.

2.9 Maintain Core Cooling, Containment Cooling, and Spent Fuel Pool Inventory

2.9.1 Installed and Portable Equipment (Phases 1 & 2)

The design basis of the AP1000 plant includes passive design features that provide core, containment, and spent fuel cooling capability for 72 hours, without reliance on AC power. These features do not rely on access to any external water sources since the containment vessel and the passive containment cooling system serve as the safety-related ultimate heat sink. The NRC staff reviewed these design features prior to issuance of the combined licenses for these facilities and certification of the AP1000 design referenced therein. The AP1000 design also includes equipment to maintain the required safety functions in the long term (beyond the 72 hours to 7 days timeframe), including capability to replenish water supplies. Connections are provided for generators and pumping equipment that can be brought to the site to back up the installed equipment. The NRC staff concluded in its final safety evaluation report for the AP1000 design that the installed equipment (and alternatively, the use of transportable equipment) is capable of supporting extended operation of the passive safety systems to maintain required safety functions in the long term.

For these reasons, further consideration of Phases 1 and 2 is not necessary.

2.9.2 Portable (Offsite) Equipment Phase 3

2.9.2.1 Primary Strategy

The primary strategy is use of the installed recirculation pumps through installed piping in accordance with post 72 hour procedures. Beyond 72 hours, additional inventory for the PCS and spent fuel pool can be supplied from the onsite passive containment cooling ancillary water storage tank (PCCAWST) using the onsite PCS recirculation pumps, powered using the onsite ancillary diesel generators or offsite replacement generators. This flowpath can be seen in Figure 2 of

Reference 2. Note that the PCS recirculation pumps, the onsite ancillary diesel generators, and the PCCAWST are non-safety-related components. However, these components are rugged components located in nuclear seismic structures with seismic category II anchorage and are likely to be available or easily repairable following a beyond-design-basis event. The PCS recirculation pumps are located in the seismic category I auxiliary building. The onsite ancillary diesel generators are located in the seismic category II annex building. The PCCAWST is a seismic category II tank in the yard.

For indefinite coping after 7 days, Phase 3 equipment includes a self-powered pump (PCCAWST makeup pump) and appropriate connection materials to refill the PCCAWST from the Savannah River.

2.9.2.2 Alternate Strategy (modified from original)

In the unlikely event that both PCS recirculation pumps are unavailable, the self-powered PCS recirculation pump equivalent, will take suction from the PCCAWST via the connection added to the overflow/drain line (Reference 66). Instead of the portable pump supply coming from the closest, river, lake, or ocean source, and discharging to a safety-related, seismically-qualified flange (References 48 and 49) using fire hose, a separate PCCAWST makeup pump will draw water from the Savannah River and provide makeup to the PCCAWST. This allows makeup to the SFP and the passive containment cooling water storage tank (PCCWST) as highlighted on Figure 2 of Reference 2. The minimum required head and maximum pump discharge head for the PCS recirculation pump equivalent is documented in Table 3-1 Section 11 of Reference 18. The SAFER pumps will meet these criteria.

2.10 Safety Functions Support – I&C

2.10.1 Installed and Portable Equipment (Phases 1 & 2)

The design basis of the AP1000 plant includes passive design features that provide core, containment, and spent fuel cooling capability for 72 hours,

without reliance on AC power sources. Required post-accident I&C is powered by four safety-related DC battery banks for the first 24 hours, and by two safety-related DC battery banks through 72 hours. One of these 72 hour safety-related trains is powered through division B, and the other is powered through division C. The AP1000 design also includes AC power equipment to maintain the required safety functions in the long term (beyond 72 hours to 7 days) including capability to power post-accident I&C. Connections are provided for generators and pumping equipment that can be brought to the site to back up the installed equipment. The NRC staff concluded in its final safety evaluation report for the AP1000 design that the installed equipment (and alternatively, the use of transportable equipment) is capable of supporting extended operation of the passive safety systems to maintain required safety functions in the long term.

For these reasons, further consideration of Phases 1 and 2 is not necessary.

2.10.2 Portable (Offsite) Equipment Phase 3

Beyond the initial 72 hours, instrument power can be supplied by the use of onsite permanently installed ancillary diesel generators or offsite portable generators with quick and accessible connection points. Permanently installed onsite ancillary diesel generators located in the annex building are capable of providing power for Class 1E post-accident monitoring, MCR lighting, MCR and I&C room ventilation, and power to refill the PCCWST using the PCS recirculation pumps. This capability is described in FSAR Section 8.3.1.1.1 Each ancillary diesel generator output is connected to a distribution panel in the same room as the ancillary diesel generators. The distribution panel contains outgoing feeder circuit breakers directly connected to the division B and division C voltage regulating transformers that power the post-accident monitoring loads, the lighting in the MCR, and the ventilation in the MCR and division B and C I&C rooms. This configuration is depicted in FSAR Figures 8.3.1-3 and 8.3.2-2 The post 72-hour procedures include provisions to start and connect the ancillary diesel generators.

2.10.2.1 Primary Strategy

The primary strategy is to use the onsite ancillary diesel generators, in accordance with post 72 hour procedures if they are available post event or offsite portable generators if the permanently installed ancillary diesel generators are unavailable. The AP1000 design does not require that the ancillary diesel generators be safety related. Their operation is not required following a loss of all AC power for 72 hours because they are easily replaced with offsite portable generators, which are capable of being connected to the distribution panel in the same room or to a safety-related connection as described in Westinghouse AP1000 DCD Revision 19, Section 1.9.5.4 and as referenced in FSAR Section 1.9.5.4. This section of the Westinghouse AP1000 DCD states: "the AP1000 design includes both onsite equipment and safety-related connections for use with transportable equipment."

2.10.2.2 Alternate Strategy (modified from original)

[ ]a,c

[ ]a,c

2.11 MCR and I&C Rooms Ventilation

2.11.1 Installed and Portable Equipment (Phases 1 & 2)

The design basis of the AP1000 plant includes appropriate design features to provide ventilation of the MCR and division B and C I&C rooms for 72 hours, without reliance on AC power sources. These features do not rely on external power sources – cooling is performed through passive heat sinks. The NRC staff concluded in its final safety evaluation report for the AP1000 design that the installed equipment (and alternatively, the use of transportable equipment) is capable of supporting extended operation of the passive safety systems to maintain required safety functions in the long term.

For these reasons, further consideration of Phases 1 and 2 is not necessary for the AP1000 design.

2.11.2 Portable Equipment Phase 3

The AP1000 design provides habitability systems with the capability to maintain the MCR environment suitable for occupancy for at least 72 hours, as well as provisions for maintaining appropriate temperatures in the division B and C I&C rooms.

2.11.2.1 Primary Strategy

Beyond the initial 72 hours, MCR habitability and I&C room cooling can be maintained using offsite replacement portable generators (see above I&C strategy), and permanently installed or offsite replacement ancillary fans for the MCR and I&C rooms. Ancillary diesel generators located in the annex building are capable of providing power for MCR and I&C room ancillary fans. This capability

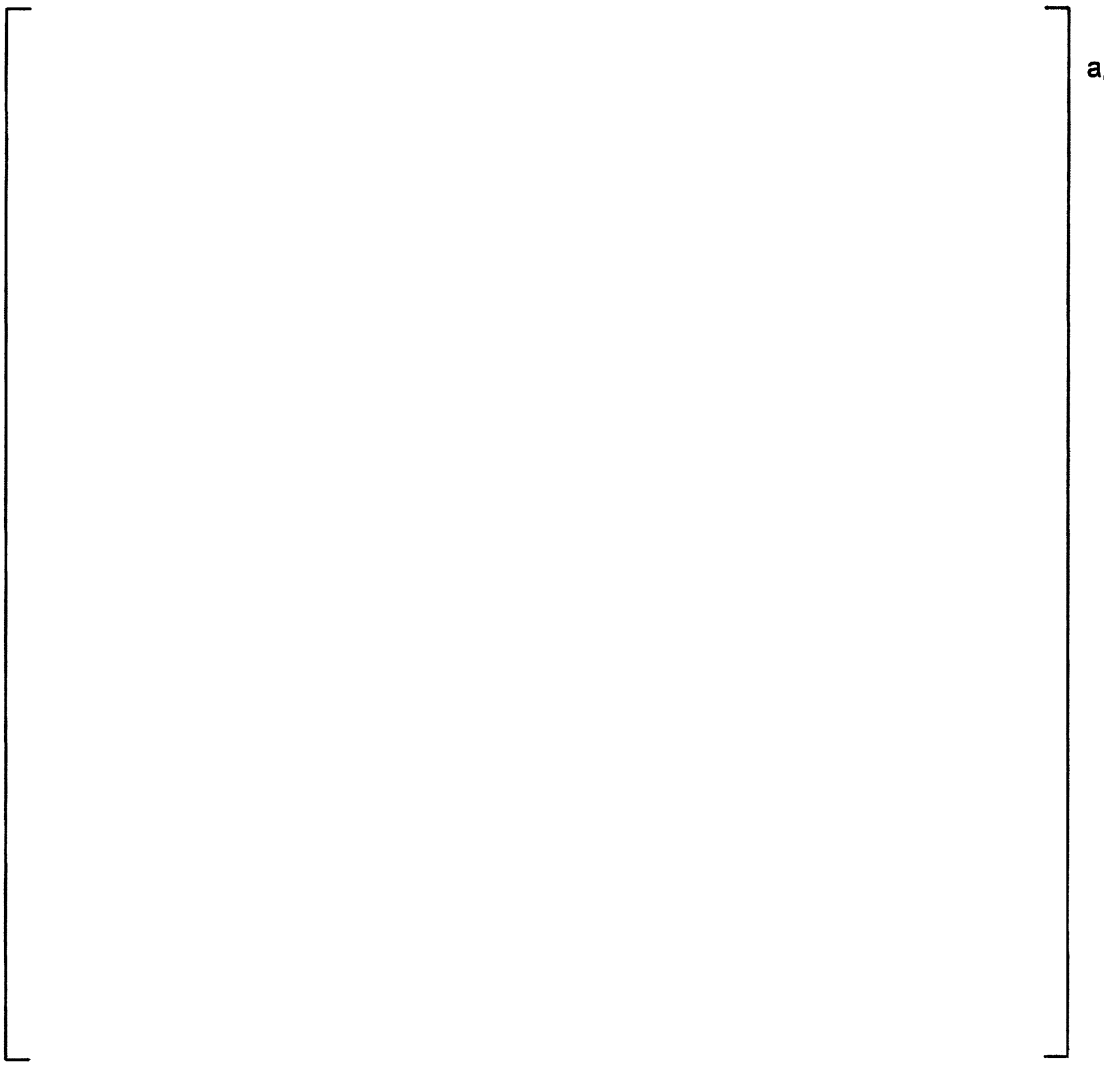
is described in Westinghouse AP1000 DCD Revision 19, Section 8.3.1.1.1 and as referenced in the FSAR Section 8.3.1.1.1.

Each ancillary diesel generator output is connected to a distribution panel in the same room as the ancillary diesel generators. The distribution panel contains outgoing feeder circuit breakers directly connected to the division B and C voltage regulating transformers that power the ventilation in the MCR and division B and C I&C rooms. This configuration is depicted in Westinghouse AP1000 DCD Revision 19, and in FSAR Figures 8.3.1-3 and 8.3.2-2. The onsite, installed MCR ancillary fans direct outside air from the nuclear island nonradioactive ventilation system (VBS) air intake opening and the VBS supply duct. The warm air from the MCR is vented to the annex building. See Figure 4 and Figure 5 of Reference 2 for sketches of this air flow path. This configuration is depicted in Westinghouse AP1000 DCD Revision 19, Figure 9.4.1-1 (sheet 5) and described in FSAR Section 9.4.1.2.3.1. The onsite, installed ancillary fans located in the division B and C I&C rooms can maintain room temperature below the qualification temperature of the I&C equipment.

The outside air pathway to the I&C room ancillary fans is through the VBS outside air intake and vented to the annex building. This configuration is described in Westinghouse AP1000 DCD Revision 19, Section 9.4.1.2.3.2 and as referenced in the FSAR 9.4.1.2.3.2. See Figure 6, Figure 7, and Figure 8 of Reference 2 for sketches of this air flow path. The post 72-hour procedures include provisions to replace, start, and connect the ancillary diesel generators and initiate the respective ancillary fans as a primary strategy for post 72-hour ventilation.

2.11.2.2 Alternate Strategy

[ ]a,c



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2.12 Habitability and Operations

2.12.1 Equipment Operating Conditions

Following a BDBEE and subsequent ELAP event at VEGP, ventilation providing cooling to occupied areas and areas containing FLEX strategy equipment could be lost. Per the guidance given in NEI 12-06, FLEX strategies must be capable of execution under the adverse conditions (unavailability of installed plant lighting, ventilation, etc.) possible following a BDBEE resulting in an ELAP/LUHS. The primary concern with regard to ventilation is the

Summary: Temperatures within rooms requiring entry during FLEX scenarios with a loss of AC power are expected to be habitable for an indefinite period of time (30 days) when opening the Auxiliary Building room doors listed in Appendix A of Reference 58 to the atmosphere.

2.14 Lighting

Power to normal and emergency lighting in the main control room and in the remote shutdown room is supplied from the redundant divisions of Class 1E DC and UPS system through two series fuses for isolation. The fuses protect the batteries from failures of the non-1E lighting circuits. The Class 1E batteries provided in the Class 1E DC and UPS system are capable of powering the emergency lighting in these rooms for 72 hours when the normal AC sources are not available.

Following the 72 hour period after a loss of all AC power sources, the lighting in the main control room is powered from two ancillary AC generators.

Provisions are also made to power the post-accident monitoring systems and the main control room lighting loads in divisions B and C from ancillary AC generators during the post 72-hour period as described in FSAR Subsection 8.3.2.1.1.2.

In order to validate the adequacy of supplemental lighting and the adequacy and practicality of using portable lighting to perform FLEX strategy actions, all operators are required to have flashlights (Reference 70). In addition, the MCR and Maintenance Shop include a stock of flashlights and batteries to further assist the staff responding to aBDBEE event during low light conditions.

2.15 Communications

(Excerpts from Reference 76)
Sufficient hand-held, portable satellite telephones will be procured and deployed enabling use by either unit's Main Control Room (MCR) or the Technical Support Center (TSC) until either the RapidCase or RapidCom

heat buildup which occurs with the loss of forced ventilation in areas that continue to have heat loads.

A loss of ventilation analyses was performed to quantify the maximum steady state temperatures expected in specific areas related to FLEX implementation to ensure the environmental conditions remain acceptable for personnel habitability or accessibility and within equipment limits. (Reference 58)

2.12.2 Heat Tracing/Freeze Protection

The PCCWST is constructed to provide sufficient thermal inertia insulation to prevent freezing and ensure water delivery to the containment can be accomplished following system actuation even with loss of the recirculation heater.

The PCCWST recirculation lines L004 and L046 shall have flow from PCCWST recirculation during sub-freezing environmental conditions. Portions of these lines are located within the walls of the Shield Building with no heat tracing because of inaccessibility, thus freezing is likely.

The PCCWST recirculation lines are drained as necessary during freezing environmental conditions while they are not in use during the first 72 hours after an accident. The recirculation piping will be required for post-72 hour containment cooling. In cold environmental conditions, the recirculation piping will have water flow to avoid freezing of the PCCWST and pipe contents. However, during a loss of site power, this is not possible and draining may be required if freezing conditions exist.

The supply line to the water distribution bucket from the post-72 hour makeup flanged connection is maintained dry by layout requirements and leaving drain valve V015 open. Also, the non-safety piping between the PCCAWST and the Auxiliary Building is maintained dry by layout requirements.

Electrical heating source shall be provided to the following by the Special Process Heat Tracing System (EHS):

- Between the PCCAWST and tank isolation valves V037, V048

The PCCAWST is insulated such that, should the heater fail, the insulation and thermal inertia of the tank and contents will assure that the contents will prevent freezing for seven days.

PCCAWST nozzles are insulated to prevent freezing within 72 hours at minimum normal temperatures. After 72 hours the PCS recirculation pumps can be used to circulate the water to prevent freezing of PCCAWST nozzles.

Heat tracing will be installed on the accessible portions of PCCAWST outlet recirc lines L063, L064, L068, and L069 that could be exposed to freezing temperatures. Those portions of the aforementioned piping embedded in concrete within the Shield Building will not have heat tracing due to inaccessibility.

2.13 Personnel Habitability

An analytical model of the auxiliary building was developed using the GOTHIC computer code. The purpose of the model is to provide a study of best estimate maximum Auxiliary Building temperatures during a loss of AC power event for an indefinite period of time (30 days) for use as supporting information in the development of the beyond design basis scenario FLEX program. The model is geared towards analysis of the room temperatures following a long-term loss of air conditioning (LOAC.) The LOAC disables operation of the normal heating, ventilating and air-conditioning (HVAC) systems, leading to increasing temperatures throughout the building. The model includes doorways and other features that could be used by the plant operators to promote air circulation through the building and thereby limit the temperatures in the rooms requiring operator access. (Reference 58)

The model is used to examine the viability of accomplishing specific actions in FLEX scenarios due to the environmental conditions of a long-term LOAC. The desired limit for environmental conditions related to FLEX scenarios is temperatures in accessed areas remaining below 110°F. This is based on the assumed maximum temperature for efficient human performance as described in NUMARC 87-00. While not specifically an acceptance criterion for the analysis performed (Reference 58) comparison of the results to this temperature value is used.

systems are deployed. Two of the handheld satellite phones will be located in each MCR, and one will be maintained in the TSC. Internal batteries and external AC/DC power sources can be used to power these hand-held portable devices.

A rapidly deployable communications kit, RapidCase (one for Unit 3 and one for Unit 4), and a mobile communication system, RapidCom, will be procured and deployed which each have the capability to supply multiple satellite phone lines within the TSC and the MCR. The RapidCom system will also supply a UHF/VHF capability supporting multiple radio stations in the TSC and in each MCR.

The RapidCase will be expected to be deployed within six hours from the start of the extended loss of all AC power. These units will be stored in reasonably protected locations at the Vogtle site which are expected to survive the initial Large Scale External Event (LSEE.) Specific locations are to be determined when allowed by the completion of construction activities. The RapidCom can be deployed within six hours after a debris path has been cleared.

Site communications equipment is deployed as required for coordination efforts across the VEGP Units 1, 2, 3, and 4. ComLab RapidCases are provided in VEGP Units 3 and 4 in Fire Brigade locker in the annex building and are able to be deployed by two people. The RapidCase has an internal 8 hour UPS with back up from a propane powered generator. The RapidCom trailer for VEGP Units 3 and 4 is stored in the FLEX dome and can be deployed once the FLEX haul path from VEGP Units 1 and 2 to VEGP Units 3 and 4 has been cleared adequately. RapidCom generator runs about 72 hours using three propane tanks stored on the trailer.

Open Items:

- Procurement of Satellite phones
- Transfer of company assets to Vogtle 3 and 4 (One RapidCom and one RapidCase)
- Upgrade hardware and software for these units as required
- Procure a RapidCase for Unit 4

2.16 Water Sources

Makeup water will be required for the beyond 7 days coping period. Table 2.16-1 provides a comprehensive list of on-site makeup water sources considered for PCCAWST makeup. it includes each source's design robustness with respect to seismic events, floods, high winds, and associated missiles and each source's water quality (relative to reactor water chemistry requirements). Only the Savannah River meets the qualification guidelines of NEI 12-06 for an injection source that can be credited for the ELAP/LUHS event. Other tanks and basins are included in the table to provide a comprehensive list of site water sources. These non-creditable water sources, depending on the cause of the event may be available for injection and although are not credited, could be considered for use during an actual event.

Table 2.16-1 On-Site Makeup Water Sources

Water Source	Minimum Normal Volume (gallons)	Water Chemistry	Source Qualification
Savannah River	Continuous Source	Raw	Credited
Condensate Storage Tank (Reference 13)	656,000 (one per unit)	Clean	Non-Seismic
Demineralized Water Tank (Reference 13)	126,000 (one per unit)	Clean	Non-Seismic
Fire Water Tank (Reference 14)	300,000 (minimum) 504,000 (maximum) (two per unit)	Raw	Non-Seismic
Service Water System Cooling Tower Basin (Reference 15)	230,000 (one basin per unit)	Raw (but chemically treated normally)	Non-Seismic
Circulating Water System Cooling Tower Basins (Reference 16)	6,395,000 (one basin per unit)	Raw (but chemically treated normally)	Non-Seismic

2.17 Shutdown and Refueling Analysis

The basic strategies are identical for all modes with minor differences in parameters (e.g., required passive containment cooling system and spent fuel pool makeup flow depending on location of fuel). Refer to Table 3.4 of Reference 11 for Reactor Decay Heat Loads, Spent Fuel Pool Decay Heat Loads, Containment Cooling Makeup Water Source Requirements and Spent Fuel Pool Makeup Water Source Requirements. Plant procedures provide the necessary instructions to provide Core/Containment Cooling and Spent Fuel Cooling during all modes of operation including Shutdown and Refueling.

2.18 Not Used

2.19 Programmatic Elements

2.19.1 Overall Program Document

Southern Nuclear Operating Company's (SNC) program for Diverse and Flexible Coping Strategies (FLEX) in response to a BDBEE is described in two documents:

- The program description - for common elements applicable to all SNC sites (Reference 73)
- A program document specific f o r VEGP Units3 and 4 is provided as (NMP-GM-038-004 (Reference 74).
- Together, the two documents describe the FLEX program for Vogtle Units 3 and 4.

Open Items: Completion of NMP-GM-038 and NMP-GM-038-004

Key elements of the VEGP FLEX program include:

- A summary of FLEX strategies including validation methods
- A description of FLEX equipment including:
- Quality attributes
- Maintenance and testing
- Availability tracking

- Storage
- Requirements for deployment

A description of SNC's FLEX procedure development including:

- Procedure interfaces
- Procedure maintenance
- Application of procedures during emergencies
- Plant Configuration Control:
- Changes to FLEX strategies
- Configuration Management
- Activities that Potentially Affect FLEX Strategies
- Plant Configuration Control Processes during Emergencies
- A summary of personnel related items including staffing and training

Permanently installed ancillary equipment is classified in accordance with the AP1000 graded approach (Reference 44). The AP1000 design has a graded approach to quality based on the relative importance of the structure, system or component (SSC) (Reference 45). The quality assurance applied to SSCs is defined in Reference 46. The AP1000 plant design reliability assurance program applies short-term availability controls to equipment (Reference 47).

The Technical Requirements Manual (TRM) (Reference 40) provides for testing requirements of permanently installed equipment at VEGP Units 3 and 4 in compliance with the design reliability assurance program (Reference 47).

- Requirement for testing / surveillance of the PCCAWST and the recirculation pumps: TRM 3.6.1, "PCCAWST and Spent Fuel Pool Makeup – Long Term Shutdown"

- Requirements for testing / surveillance of MCR ancillary fan: TRM 3.7.5 "MCR Cooling – Long Term Shutdown"

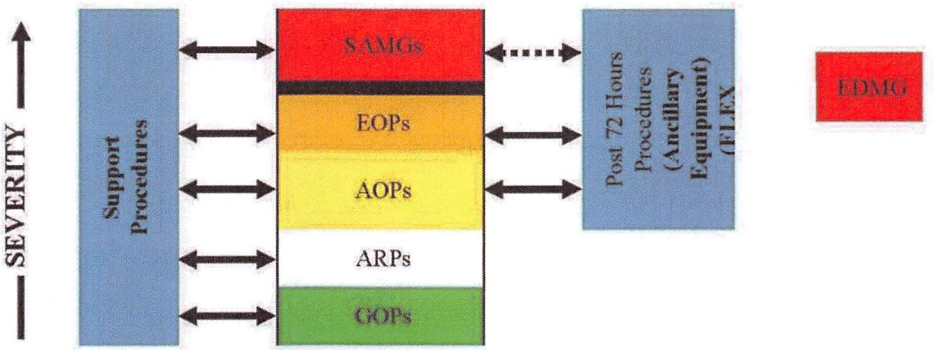
- Requirements for testing / surveillance of I&C ancillary fan: TRM 3.7.6 "I&C Room Cooling – Long Term Shutdown"

- Requirements for testing / surveillance of ancillary diesel: TRM 3.8.3 "AC Power Supplies – Long Term Shutdown"

SAFER equipment is be procured, tested, and maintained in accordance with the SAFER services agreement.

2.19.2 Procedural Interfaces

NEI 12-06 Figure F.11-1 provides an overview of the AP1000 operating procedures hierarchy and the relationships to the post 72 hour (P72) procedures:



The AP1000 design and licensing basis as described in AP1000 DCD Section 1.9.5.4 provides a set of procedures (referred to as "Post-72 Hour Procedures") that address the actions that would be necessary 72 hours subsequent to an extended loss of all AC power (extended SBO) to maintain core, containment, and spent fuel cooling for an indefinite period of time.

The following procedures are the Vogtle 3 and 4 versions of the generic AP1000 P72 procedures:

Post 72-Hour Procedures (Ancillary Equipment)

Document Number	Title
3-ECS-P72-001	Post 72-Hour Operations of Ancillary Diesels

Document Number	Title
3-PCS-P72-001	Post 72-Hour Operations of Passive Containment Cooling
3-RNS-P72-001	Post 72-Hour Operations of Containment Makeup
3-SFS-P72-001	Post 72-Hour Operations of Spent Fuel Cooling
3-VBS-P72-001	Post 72-Hour Operations of Main Control Room Ventilation
4-ECS-P72-001	Post 72-Hour Operations of Ancillary Diesels
4-PCS-P72-001	Post 72-Hour Operations of Passive Containment Cooling
4-RNS-P72-001	Post 72-Hour Operations of Containment Makeup
4-SFS-P72-001	Post 72-Hour Operations of Spent Fuel Cooling
4-VBS-P72-001	Post 72-Hour Operations of Main Control Room Ventilation

Entry into the Post 72-Hour Procedures

- Vogtle 3-4 AOP-302, Loss of AC Power, is the controlling procedure for entry into the Vogtle Post 72-hour (P72 series) procedures. The Post 72-hour procedures are used to perform actions not covered by normal operating procedures, abnormal operating procedures (AOPs), or emergency operating procedures (EOPs) and are independent of the severe accident management guidelines (SAMGs).

- 3/4-ECS-P72-001 (Operations of Ancillary Diesel Generators)
  This procedure provides instructions for providing limited on-site emergency power during an extended loss of off-site power and the on-site auxiliary generators are unavailable. This includes operation of the installed ancillary diesels and electrical distribution of that power. Additionally, includes instructions for establishing limited power using portable generators and cabling.

- 3/4-VBS-P72-001 (Operations of Main Control Room Ventilation)
  This procedure provides instructions for providing Control Room ventilation during an extended loss of off-site power and when normal

ventilation is unavailable. It also provides instructions for placing I&C Room Division B and C Ancillary Fans in service.

- 3/4-PCS-P72-001 (Operations of Passive Containment Cooling)
  This procedure provides instructions for normal operation of the Post 72-Hour Operations of Passive Containment Cooling. This procedure provides instructions for the connection of externally stored or procured pumps and water sources to add water to the PCCWST and/or the SFP.

- 3/4-SFS-P72-001 (Operations of Spent Fuel Pool Cooling)
  This procedure provides instructions for makeup to the Spent Fuel Pool with electrical power unavailable due to volume loss caused by a loss of SFP cooling. Also provides instructions on operation of the Fuel Handling Area Relief Damper to limit SFP Area temperature increases.

- 3/4-RNS-P72-001 (Operations of Containment Makeup)
  This procedure provides instructions for emergency makeup to Containment during an extended loss of offsite power and normal makeup methods are unavailable.

The Post 72-hour procedures provide directions for mitigating an ELAP event that includes the potential for depletion of the 24- and 72-hour batteries and maintaining the following required functions:

- The critical safety functions of subcriticality, core cooling, heat sink, and containment
- The function of main control room (MCR) habitability
- The function of SFP cooling
- Post accident monitoring from the MCR

After the initial safety-related cooling period of 72 hours, the AP1000 standard passive design includes both onsite equipment in the form of the ancillary diesel generators, as well as safety-related connections, non-safety connections as additional defense-in-depth, designed to interface with transportable emergency equipment that can provide cooling water and address the needs of

required plant functions through at least 7 days.

During an ELAP, when a loss of all AC occurs due to an external event, the operating crew would need to determine if there is confidence in restoration of power within 72 hours, if not, an ELAP should be declared as soon as possible and the Emergency Offsite Facility notified to contact SAFER. The sooner this call is made, the sooner equipment begins to travel to site. If Vogtle 1 and/or 2 have declared an ELAP as Vogtle Units 1 and 2 procedures have this determination made within the first hour. Once SAFER is contacted, all of the equipment for the site (Vogtle Units 1-4) will be dispatched. There is guidance in Reference 73 related to the Vogtle site for implementation of FLEX strategies in the event of an Extended Loss of AC Power.

The following Flex Support Guidelines and Strategy Implementing Guidelines are developed for V34:

Refer to Figure 2.19-1 for Procedure Interfaces.

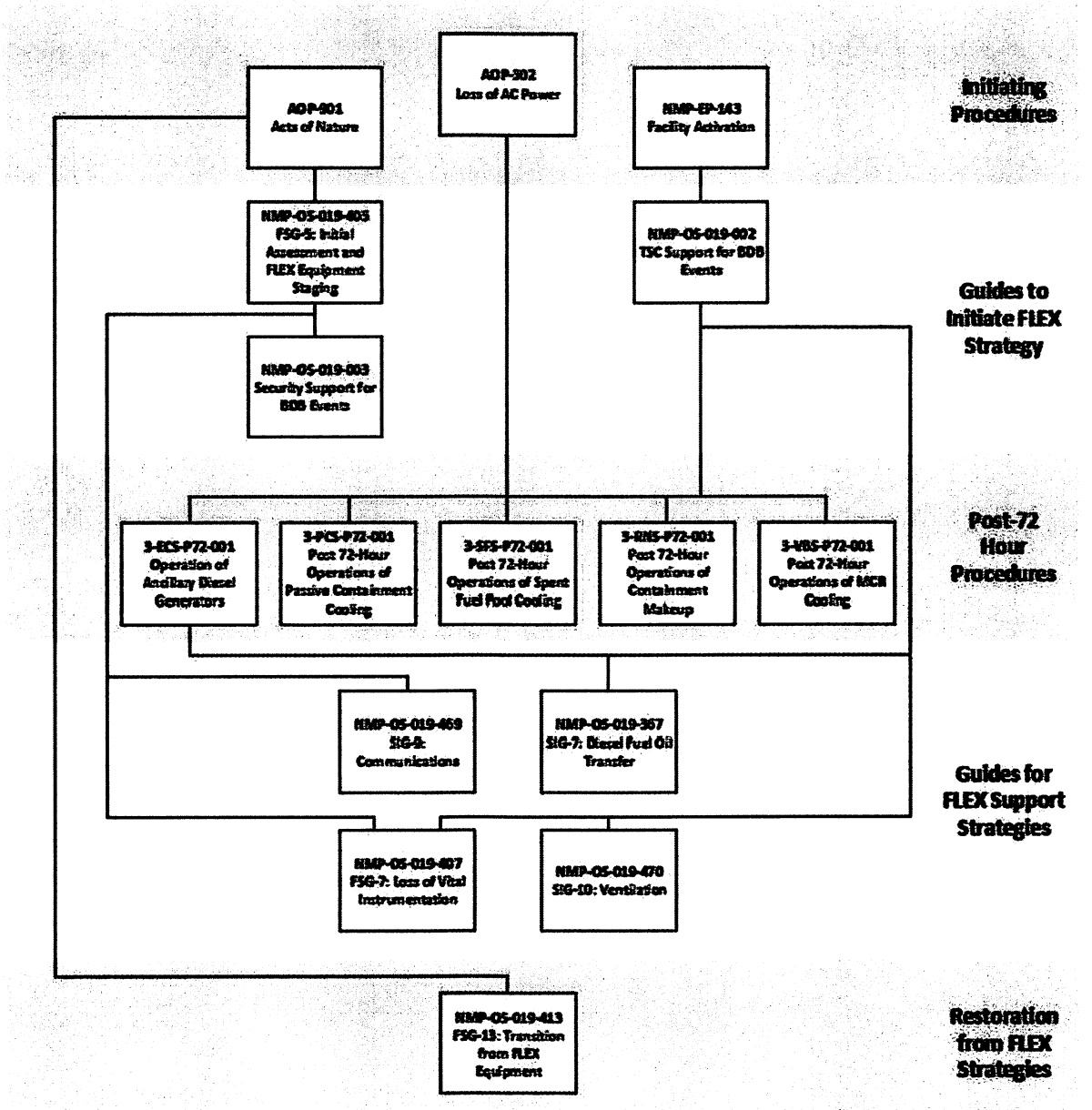
FLEX Support Guidelines

Document Number	Title
NMP-OS-019-405	Vogtle Unit 3 FSG-5, Initial Assessment and FLEX Equipment Staging
NMP-OS-019-407	Vogtle Unit 3 FSG-7, Loss of Vital Instrumentation or Control Power
NMP-OS-019-413	Vogtle Unit 3 FSG-13, Transition from FLEX Equipment
NMP-OS-019-425	Vogtle Unit 4 FSG-5, Initial Assessment and FLEX Equipment Staging
NMP-OS-019-427	Vogtle Unit 4 FSG-7, Loss of Vital Instrumentation or Control Power
NMP-OS-019-433	Vogtle Unit 4 FSG-13, Transition from FLEX Equipment

Strategy Implementation

Document Number	Title
NMP-OS-019-367	Vogtle Unit D SIG-7, Diesel Fuel Oil Transfer
NMP-OS-019-469	Vogtle Units 3-4 SIG-9, Communications
NMP-OS-019-470	Vogtle Units 3-4 SIG-10, Ventilation

Figure 2.19-1
Procedure Interface



Open Items:

- Issuing Procedures as Version 1.0

2.19.3 Staffing

Using the methodology of NEI 12-01, Guideline tor Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities, assessments of the capability of the Vogtle 3 and 4 on-shift staff and ERO to respond to a BDBEE have been performed for Phase 1 and for Phase 2 for Unit 3.

Open Items:

- Complete 12-01 staffing study for Units 3 and 4.

2.19.4 Training

Training will primarily consist of the typical objective-based procedure training that operators receive on these procedures and guidelines that integrate these hypothetical events. The training for the FLEX aspects of the AP1000 design will build upon the training that is already required for the post 72-hour operational requirements. Training material is being developed in accordance with the systems approach to training (SAT) as delineated in 10 CFR 55.4. This includes the development of the following:

1. Objective-based training for the procedures
2. Objective-based training on the integration of the AP1000 design and operator responses and operator tasks for these beyond design basis events
3. Exam items for this training as appropriate

The SNC general population is trained using NANTeL courses provided by the Emergency Response Training Development (ERTD) Working Group (INPO facilitated). The ERTD conducted a job analysis to identify common training topics and coordinated the design and development of common training materials. All station personnel are required to take basic NANTeL Diverse and Flexible Coping Strategy (FLEX) computer-based training (CBT), S-EP-10700. New employees are included in this population. Key ERO personnel are required to take advanced NANTeL FLEX CBT, S-EP-10701.

SNC staff responsible for the implementation of the FSGs will complete additional training developed and delivered using the SAT process. The

training conducted by SNC will satisfy the applicable requirements of NEI 12-06, Section 11.6.

Emergency response leaders are those site and corporate emergency response personnel assigned leadership roles, as defined by the Emergency Plan, for managing emergency response to design basis and beyond-design-basis plant emergencies will receive additional training on directing actions and implementing strategies following a BDBEE.

Deviations from Original OIP: Simulator scenarios are not part of the operator training for FLEX implementation. Simulator scenarios may be used to identify and declare that an ELAP has occurred This information was provided to NRC in Reference 68.

Open Items:

- Complete development of training modules
- Training provided and documented IAW siteprocedures

2.19.5 FLEX Equipment List

Vogtle 3 and 4 is currently working with SAFER to select and procure the needed equipment for Vogtle 3 and 4 FLEX Phase III equipment and for inclusion in Vogtle SAFER Response Plan. The equipment necessary for the implementation of the FLEX strategies in response to a BDBEE at VEGP Units 3 and 4 will be developed based on the final sizing and selection of the FLEX generator, pumps and associated cabling, hoses connectors, fittings, etc. Due to the design of the AP1000, no phase 1 or backup phase 2 equipment will be stored on-site.

Open Items:

- Contract with SAFER
- Revise Vogtle SAFER Plan to include Vogtle 3 and 4

Note: All equipment to be stored at NSRC has been sized/quantified and procurement process started.

Equipment for both units will be procured at the same time and the SAFER Plan revised once to include Units 3 and 4 rather than staggering the procurement and Plan revision.

2.19.6 N+1 Equipment Requirement

For an AP1000, a single response center is acceptable per NEI 12-06, Appendix F.3.2: "Use of more than one storage location is not necessary as long as the storage site is far enough away from the site(s) such that the same extreme hazard could not affect both the plant(s) and the storage location."

N+ 1 will be procured for a single response center. Consistent with NEI 12-06, Section 3.2.2.16, 3 pieces of portable equipment will be provided when a separate train is needed for each unit (portable generator and PCCWST Makeup Pump) and two pieces will be provided when a single train can supply both units (ultimate makeup from the Savannah River, the credited source for VEGP Units 3and 4). This equipment will be stored at the regional response center in Phoenix, AZ.

2.19.7 Equipment Maintenance and Testing

FLEX equipment (including support equipment) is subjected to initial acceptance testing and to periodic maintenance and testing utilizing the guidance provided in INPO AP-913, Equipment Reliability Process, to verify proper function.

The standard EPRI industry PM process (similar to the Preventive Maintenance Basis Database) is used to establish the maintenance and testing actions for FLEX equipment. This provides assurance that stored or pre-staged FLEX equipment is being properly maintained and tested.

EPRI FLEX maintenance templates (where provided) were used to develop the specific maintenance and testing guidance for the associated FLEX equipment. In the absence of an EPRI FLEX template, existing maintenance templates (where available) were used to develop the specific maintenance and testing guidance. For all other equipment not covered by a maintenance template, manufacturer OEM or industry standards were used to determine the recommended maintenance and testing.

The PM Templates include activities such as:

- Functional Test and Inspection
- Fluid Filter Replacement
- Fluid Analysis
- Generator Load Test
- Component Operational Inspection
- Standby Walkdown

2.19.8 FLEX Equipment Unavailability Tracking

The unavailability of FLEX equipment and applicable connections that directly perform a FLEX mitigation strategy for core, containment, and SFP is managed such that risk to mitigating strategy capability is minimized. Maintenance/risk guidance conforms to the guidance of NEI 12-06.

The unavailability of FLEX equipment and connections is controlled using the tracking application in the Shift Operations Management System (eSOMS) (Reference 69.)

FLEX equipment and connections will not normally be used for purposes other than emergency response. It is permissible, however, to pre-stage and/or use FLEX equipment and connections provided the following requirements are met:

- Permission is received from the Shift Manager or Emergency Director.
- The proper action to restore the equipment to an available status is determined and the status of the affected equipment and/or connection is tracked per NMP-OS-019-013.

2.20 Off-Site Resources

2.20.1 Utilization of SAFER

The industry has established two (2) NSRCs to support utilities during BDBEEs. SNC has established contracts for Vogtle Units 1 and 2 with the

Pooled Equipment Inventory Company (PEICo) to participate in the process for support of the NSRCs as required. The contracts will be revised to include Vogtle Units 3 and 4 once FLEX equipment selection is finalized.

For an AP1000, a single response center is required per NEI 12-06, Appendix F.3.2:

"Use of more than one storage location is not necessary as long as the storage site is far enough away from the site(s) such that the same extreme hazard could not affect both the plant(s) and the storage location."

N+1 will be procured for a single response center. Consistent with NEI 12-06, Section 3.2.2.16, three pieces of portable equipment will be procured when a separate train is needed for each unit (portable generator and PCCWST Makeup Pump) and two pieces will be procured when a single train can supply both units (ultimate makeup from the Savannah River, the credited source for VEGP Units 3 and 4).

This equipment will be stored at the regional response center in Phoenix, AZ to minimize the probability of a single external event affecting both Plant Vogtle and the response center. In the event of a BDBEE and subsequent ELAP, equipment will be moved from an NSRC to a local assembly area established by the SAFER team. FLEX Strategy requests to the NSRC will be directed by FSG-5.

For Vogtle, the local assembly area (Staging Area "C") is the Barnwell Regional Airport, South Carolina. From there, equipment can be delivered to the Vogtle site by helicopter if ground transportation routes are not available. Communications will be established between the Vogtle plant site and the SAFER team via satellite phones. First arriving equipment will be delivered to the site within 24 hours from the initial request. The order at which equipment is delivered is identified in the Vogtle SAFER Response Plan.

NSRC personnel will commence delivery of a pre-selected equipment set from the NSRC upon notification by the plant site. Plans are to deliver equipment from offsite sources via truck or air lift. Typically, deliveries will

go by truck using preselected routes and with any necessary escort capabilities to ensure timely arrival at the plant site staging area or to an intermediate staging area approximately 25 miles from the site. The delivery of equipment from the intermediate staging area will use the same methodology. These areas are designed to accommodate the equipment being delivered from the NSRC.

Depending on time constraints, equipment can be flown commercially to a major airport near the plant site and trucked or air lifted from there to the staging areas. The use of helicopter delivery is typically considered when routes to the plant are impassable and time considerations for delivery will not be met with ground transportation. Multiple pre-selected routes are one method to circumvent the effects of seismic events, floods, etc. and these routes will consider potentially impassible areas such as bridges, rivers, heavily wooded areas and towns. The drivers will have the routes marked and will be in communication with the NSRC to ensure that the equipment arrives on time.

SAFER equipment deployment will take advantage of the earlier VEGP Units 1 and 2 deployment plan and path clearing due to the substantial coping time allotted by the 72 hour passive coping period. Deployment from VEGP Units 1 and 2 over to the VEGP Units 3 and 4 paths are shown in Figure 1.

Evaluations of the acceptability of the haul paths has been performed (References 63 and 64.) SAFER equipment being supplied (pumps, diesel generators, cables, and hoses) has been evaluated and found acceptable for use at VEGP Units 3 and 4 by References 51, 59, 61, and 62.

2.21 Plant Modifications to Support FLEX Strategies

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A design change was developed to add an engineered means of using the PCCAWST as a water source for the FLEX pumps. A 5" Storz connection will be added to the drain/overflow line to allow for an easy connection for a portable FLEX pump. (Reference 66)

3.0 References

1. U.S. Nuclear Regulatory Commission (NRC), Order EA-12-049, *"Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events,"* March 12, 2012 (ML12054A735)

2. ND-13-1702, *"Vogtle Electric Generating Plant Units 3 and 4 Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049),"* August 22, 2013 (ML13235A228)

3. APP-GW-GLR-170, Revision 0, *"AP1000 FLEX Integrated Plan (Proprietary Version)"* July 16, 2013

4. NEI 12-06, Revision 4, *"Diverse and Flexible Coping Strategies (FLEX) Implementation Guide,"* December 2016 (ML16354B421)

5. NUREG-1793, "Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design," September 2004, including: Supplement 1, December 2005 and Supplement 2, September 2011

6. Not used

7. JLD-ISG-2012-01, Revision 2, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," February 2017 (ML17005A188)

8. NL-16-0228, "Vogtle Electric Generating Plant – Units 1 and 2, Notification of Full Compliance of Required Action for NRC Order EA-12-049 Mitigation Strategies for Beyond-Design-Basis External Events," May 23, 2016 (ML16146A607)

9. "Vogtle Electric Generating Plant, Units 1 and 2 – "Safety Evaluation Regarding Implementation of Mitigating Strategies and Reliable Spent Fuel Pool Instrumentation Related to Orders EA-12-049 and EA-12-051 (CAC NOS. MF0714, MF0715, MF0723, and MF0724)," November 14, 2016 (ML16301A419)

10. APP-PXS-M3-001, Revision 9, "Passive Core Cooling System, System Specification Document," August 2017

11. APP-PCS-M3-001, Revision 11, "Passive Containment Cooling System – System Specification Document," November 2018.

12. APP-SFS-M3-001, Revision 12, "AP1000® Spent Fuel Pool Cooling System – System Specification Document," October 2018

13. APP-DWS-M3-001, Revision 2, "Demineralized Water Transfer and Storage (DWS), System Specification Document Safety Classification B", June 2016

14. APP-FPS-M3-001, Revision 0, "AP1000 Fire Protection System (FPS) – System Specification Document"

15. APP-SWS-M3-001, Revision 3, "AP1000 Service Water System – System Specification Document"

16. SV0-ME71-Z0-001, Revision 3, "Supply and Erection of Natural Draft Cooling Tower Vogtle Units 3 and 4," December 2012

17. 38-9238015-001, "SAFER Response Plan for Vogtle Electric Generating Plant," January 8, 2019

18. SV0-GW-GLR-724, Revision 0, "APP-GW-GLR-170 Compliance Assessment for Vogtle 3 & 4 AP1000 Units," March 2019

19. APP-MT04-S2C-003, Revision 0, "PCCAWST Tornado Missile Analysis for Diverse and Flexible Coping Strategies (FLEX)"

20. APP-4000-CCC-006, Revision 0, "AP1000 Annex Building Tornado Missile Analysis for Diverse and Flexible Coping Strategies (FLEX)"

21. VEGP 3 and 4 UFSAR, Revision 8, March 21, 2019

22. CN-RRA-02-05, Revision 1, "AP1000 PRA Seismic Margins Evaluation," May 2002

23. APP-PRA-GSC-027, Revision 2, "AP1000 PRA-Based Seismic Margin Assessment Update," February 2011

24. "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 10 CFR 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Daiichi Accident, dated March 12, 2012," November 12, 2012 (ML12053A340)

25. NL-14-0344, "Vogtle Electric Generating Plant – Units 1 and 2, Seismic Hazard and screening Report for CEUS Sites," March 31, 2014 (ML14092A019)

26. "Vogtle Electric Generating Plant, Units 1 and 2 – Staff Assessment of Information Provided Pursuant to Title 10 of the Code of Federal

Regulations Part 50, Section 50354(f), Seismic Hazard Reevaluations Relating to Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident (TAC NOS. MF3770 and MF3771)," April 20, 2015 (ML15054A296)

27. ND-14-1863, "Vogtle Electric Generating Plant – Units 3 and 4, Response to Request for Submittal of Updated Ground Motion Spectra and Foundation Input Response Spectra," December 5, 2014 (ML14339A849)

28. "Request for Submittal of Updated Ground Motion Spectra and Foundation Input Response Spectra," November 5, 2014 (ML14302A180)

29. "Vogtle Electric Generating Plant Units 3 and 4 – Updated Ground Motion Response Spectra (TAC No. RP0411)," August 12, 2015 (ML15139A516)

30. APP-ECS-E8-001, Revision 3, "Main AC Power System – System Specification Document"

31. APP-PCS-GEF-152, Revision 0, "Modification to PCCA WST Drain/Overflow Line for Post 72-Hour Equipment Connection"

32. APP-GW-G1-001, Revision 4, "AP1000 Plant Design Criteria"

33. 23162-000-30R-M10R-00004, Version 0.0, "FLEX External Hazards Evaluation Vogtle Electric Generating Plant Units 3 and4"

34. 23162-000-30R-M10R-00003, Version 0.0, "FLEX Debris Evaluation Vogtle Electric Generating Plant Units 3 and 4"

35. FHC-S-13-001 / X1AR50, Version 2.0, "Procurement Specification for FLEX Equipment Storage Building for Alvin W. Vogtle Electric Generating plant – Units 1 & 2, Edwin I. Hatch Nuclear Plant – Units 1 & 2, Joseph M. Farley Nuclear Plant – Units 1 & 2"

36. APP-GW-G1-003, Revision 7, "AP1000 Seismic Design Criteria"

37. APP-IDS-E8-001, Revision 5, "Class 1EDC and UPS System Specification Document"

38. Not Used

39. Not Used

40. Vogtle Units 3 and 4 Technical Requirements Manual (TRM), Revision 12

41. APP-GW-N1-007, Revision 5, "AP1000 Design Criteria for Protection from Flooding"

42. APP-GW-C1-001, Revision 5, "AP1000 Civil/Structural Design Criteria"

43. APP-GW-N1-008, Revision 1, "AP1000 Design Criteria and Guidelines for Protection from Tornado and Hurricane-Generated Missiles"

44. APP-GW-G1-014, Revision 9, "AP1000 Plant Nuclear Safety Classification and Seismic Requirement Methodology"

45. APP-GW-GAH-010, Revision 10, "Project Quality Assurance Program Interface for Domestic AP1000 Projects"

46. APP-GW-GAH-020, Revision 6, "AP1000 Plant Systems, Structures, and Components Quality Requirements"

47. APP-GW-GRR-009, Revision 3, "AP1000 Design Reliability Assurance Program"

48. APP-PCS-M6-002, Revision 11, "Piping and Instrumentation Diagram Passive Containment Cooling System"

49. APP-PCS-M6-001, Revision 12, "Piping and Instrumentation Diagram Passive Containment Cooling System"

50. Not Used

51. 23162-000-30R-M10R-00005, Version 0.0, "FLEX Portable Pump Evaluation for PCCWST and SFS Makeup for Vogtle Electric Generating Plant Units 3 and 4"

52. Not Used

53. APP-PMS-J7-001, Revision 2, "AP1000 Protection and Safety Monitoring System – System Specification Document"

54. APP-GW-M3R-008, Revision 0, "Post Accident Monitoring System (PAMS) Design Basis Document"

55. APP-1020-P2-0011, Revision 6, "Nuclear Island Auxiliary Bldg Area 1 & 2 General Arrangement Plan at Elev 82'-6" "

56. APP-FSAR-GEF-043, Revision 0, "Connection Addition to IDS for Post 72-Hour FLEX"

57. Not Used

58. APP-GW-GLR-726, Revision 0, "Auxiliary Building Best Estimate Temperatures during a Loss of AC Power Results"

59. 23162-000-30R-M10R-00006, Version 0.0, "FLEX Water Makeup from Savannah River for Vogtle Electric Generating Plant Units 3 and 4"

60. 23162-000-M0-00V-00001, Version 1.0, "VEGP Units 3 and 4 FLEX Deployment Pathways Drawing"

61. 23162-000-30H-E01G-00001, Version 1.0, "FLEX Diesel Generator Sizing"

62. 23162-000-30H-E01G-00002, Version 1.0, "FLEX Cable Sizing"

63. Not Used

64. Not Used

65. Not Used

66. APP-PCS-GEF-152 Revision 0, "Modification to PCCAWST Drain/Overflow Line for Post-72 Hour FLEX Equipment Connection"

67. SV0-0000-X7C-800002, Version 1.0 Vogtle Units 3 and 4 Local Probable Maximum Precipitation Flood Analysis –Interim Construction Condition – Unit 3 Operational

68. ND-19-0880, "Vogtle Electric Generating Plant - Units 3 and 4 Twelfth Six-Month Status Report of the Implementation of the Requirements of the Commission Order with Regard to Mitigation Strategies for Beyond- Design-Basis External Events (EA-12-049)," dated August 27, 2019 (ML19239A334).

69. NMP-OS-013-019-GL04, Vogtle 3 and 4 FLEX Equipment Unavailability Guideline

70. NMP-OS-007-001, Conduct of Operations Standards and Expectations

71. 3-ECS-P72-001, Post 72-Hour Operations of Ancillary Diesels

72. NMP-OS-019-001, EOF Support for Beyond Design Basis Events

73. NMP-GM-038, Diverse and Flexible Coping Strategies (FLEX) Program

74. NMP-GM-038-004, "VEGP 3-4 Diverse and Flexible Coping Strategies (FLEX) Program Document"

75. Not Used

76. ND-19-0753, "Vogtle Electric Generating Plant - Units 3 and 4 Emergency Preparedness Communications Assessment Requested by NRC Letter, Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident dated March 12, 2012" dated August 16, 2019 (ML19240A069, ML19240A071)

Westinghouse Non-Proprietary Class 3

Figure 1
Vogtle Units 3 and 4 Haul Paths
Security-Related Information, Withheld Under 10 CFR 2.390d

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