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August 31, 2006

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTN: Mr. Robert E. Martin

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
LICENSE AMENDMENT REQUEST - LAR 05-3666
ALTERNATE AC POWER SUPPLY
REVISION TO SUBMITTED TECHNICAL SPECIFICATON PAGES AND
RESPONSE TO VERBAL REQUEST FOR ADDITIONAL INFORMATION

Reference: J. B. Archie to R. E. Martin, "LAR 05-3666, Alternate AC Power Supply," dated October 28, 2005, RC-05-0180

South Carolina Electric & Gas Company (SCE&G), acting for itself and as agent for South Carolina Public Service Authority, hereby submits a response to your verbal requests for information from July 14, 2006, and July 23, 2006, related to the above referenced amendment request. The revised pages do not affect the No Significant Hazards Determination provided with the above referenced letter.

If you have any questions or require additional information, please contact Mr. Robert G. Sweet at (803) 345-4080 at your convenience.

I certify under penalty of perjury that the foregoing is true and correct.

8/31/06
Executed on

Jeffrey B. Archie

PAR/JBA/dr
Attachments:
I. Response to Request for Additional Information
II. Revised TS marked up pages
III. Revised TS pages
IV. Revised Calculation Pages
V. List of Commitments

c:	K. B. Marsh	W. D. Travers	NSRC
	S. A. Byrne	NRC Resident Inspector	RTS (C-05-3666)
	N. S. Carns	P. Ledbetter	File (813.20)
	J. H. Hamilton	K. M. Sutton	DMS (RC-06-0160)
	R. J. White	T. P. O'Kelley	

A001

Request for Additional Information

TECHNICAL SPECIFICATIONS 3.8.1, AC SOURCES - OPERATING, EXTENSION OF THE EMERGENCY DIESEL GENERATOR ALLOWED OUT OF SERVICE TIME

VIRGIL C. SUMMER NUCLEAR STATION (VCSNS)

QUESTION #1

In response to the question pertaining to the type of cable being used from the Parr Hydro plant up to the VCSNS, in section 6.2 of Calculation DC08010-025, the cable is an underground residential distribution cable with jacketed concentric neutral and EPR insulation. This cable will be used at conductor temperatures not to exceed 105 °C. The emergency temperature rating will be 140 °C for periods which shall not exceed 100 hours per year. Such 100-hour overload periods shall not exceed five. The short circuit temperature rating is 250 ° C.

These cable conductor operating temperature ratings were corrected to 105 °C in Calculation DC08010-025 Revision 1, issued on June 22, 2006. The ampacity values in the Sections 6.2.2 - 6.2.5 tables for both revision 0 and revision 1 were for a 105 °C conductor operating temperature.

QUESTION #2

In response to the question pertaining to the minimum voltage available to start motors, Table 7 of calculation DC08010-025 presents calculated voltage values, expressed as a percentage of nominal voltage values, at different locations of the Alternate AC (AAC) source's distribution system for Case 1A and Case 3A of the motor starting analysis. The table header identifies the assumed bus voltage at the Parr Station as 13.8 kV. Attachment 4 provides the computer generated data sheets for Cases 1A, 3A, 5A, 7A and 8A defined in Section 5.16 of the calculation.

For example, Attachment 4, Case 1A, page 3 is for time T=0.00+, and provides the basis for the information shown in the Table 7 column labeled Case 1A. The following provides the explanation for the Table 7, Case 1A voltage values:

- XTF-5052H represents the high side of Transformer XTF5052 where the calculated voltage was 86.7% of the nominal 13,800 volts assumed at the Parr Station.
- XTF-5052X represents the low side of Transformer XTF5052 where the calculated voltage was 83.4% of the VCSNS Switchgear Bus' nominal 7,200 volts.
- XSW1DX-ES, XSW1DA, XSW1DB, XSW1EA and XSW1EB represent the various VCSNS Switchgear Busses where the calculated voltages were 82.8%, 82.8%, 99.1%, 82.8%, and 99.1%, respectively, of the VCSNS Switchgear Bus' nominal 7,200 volts.
- SI Pump A Terminal represents the terminals of the 900 HP Charging SI Pump A, the largest "A" train motor, where the calculated voltage on Attachment 4, Case 1A, page 3 was 82.7% of the VCSNS Switchgear Bus' nominal 7,200 volts. This calculated value

was then adjusted to 86.4% of the motor's nominal 6900 volt rating (82.7% X 7200V/6900V) and provided in Table 7.

The Table 7 calculated voltage values for Case 3A were determined in a similar manner as those for Case 1A.

Additionally, while performing this review it was discovered that the note under Table 7 contained a typographical error in the identification of the Parr Station nominal bus voltage as 13.2 kV instead of 13.8 kV. The 13.8 kV value listed in the Header for Table 7 and used in the computer generated analysis provided in Attachment 4 of the calculation is correct.

QUESTION #3
In response to the question pertaining to the location to the equipment at Parr, all equipment for the AAC system, with the exception of the keep warm diesel generator, is located within the Parr Hydro generating building. The Parr Hydro generating building was built from concrete and brick. The diesel generator has an integral enclosure which is IBC rated and protects the diesel generator and its fuel tanks.

QUESTION #4
In response to the question inquiring which version of the National Electric Code (NEC) was utilized in the design, as identified in Calculation DC08010-025 Section 3.9, the calculation was based on NFPA 70 - "National Electric Code" -2002, in effect at the time revision 0 of the calculation was prepared. Since the NEC cable ampacity tables referenced in the calculation did not change in the 2005 addition, the Section 3.9 reference was still applicable and was not changed in revision 1 of the calculation.

QUESTION #5
No additional pictures of equipment exposed to the elements can be transmitted at this time as the remaining equipment has not been installed.

An additional phone conference was conducted on July 31, 2006, to discuss prior responses to questions associated with the Alternate AC LAR. (Questions 6 and 7)

QUESTION #6
The reviewer questioned the cable voltage drop calculation results between the plant safety bus and the motor terminals for the worst case documented in calculation DC-08010-025. The results were shown to be approximately 8 volts using the ETAP and SKM computer programs while the reviewer's hand calculation shows approximately 35 volt voltage drop. The difference between these two methods was not clear. The reviewer questioned if the cable impedance values were on a per unit basis.

During the telephone discussion on July 31, 2006, VCSNS personnel misunderstood what the NRC reviewer was asking, however, when the manual calculation was performed on site it was confirmed that the cable impedance is indeed presented in a per unit basis. Page 10 of 15 from the VCSNS e-mail to the NRC dated July 28, 2006, identified the impedance of the cable as 0.064 + j0.037 Ohms per thousand feet.

A manual calculation was performed on site using the same equation and parameters used by the reviewer. The calculated voltage drop with a PF of 0.15 is 8.276 volts and with a PF of .296 is 9.73 volts. Therefore, the manual method of calculating the voltage drop is consistent with the ETAP and SKM computer programs and is appropriate for this application.

QUESTION #7
The reviewer requested clarification on how the ESF Bus would be loaded in the event that a LOOP occurred while the AAC source was available.

Bus loading will be manually accomplished from the AAC source in the event of a LOOP. An existing plant procedure using preexisting voltage and frequency limits will be used to provide plant operators with their operating band. The loads will be manually loaded onto the safety bus with voltage and frequency being manually adjusted at the generator. Therefore, the impact of loading on the bus should be minimized as the voltage and frequency will have to be within the limits before loading additional motors on the bus.

ATTACHMENT II

PROPOSED TECHNICAL SPECIFICATION CHANGES (INCLUDING REVISED MARK-UP)

Attachment to License Amendment No. XXX
To Facility Operating License No. NPF-12
Docket No. 50-395

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages	Insert Pages	
Index XIV	Index XIV	**NEW**
3/4 8-2	3/4 8-2	**REVISED**
3/4 8-4	3/4 8-4	
B 3/4 8-1	B 3/4 8-1	**REVISED**
B 3/4 8-2	B 3/4 8-2	**REVISED**
B 3/4 8-3	B 3/4 8-3	
new	B 3/4 8-4	

SCE&G -- EXPLANATION OF CHANGES

Page	Affected Section	Bar #	Description of Change	Reason for Change
Index XIV	Bases 3/4.8-4	1	Changed page number for Bases TS 3/4.8-4.	Page number change due to pagination.
3/4 8-2	Action 3.8.1.1.b.3	1	Revise the 2 hour verification to a 4 hour verification.	Provide additional time to verify Operability and opportunity to resolve minor problems.
3/4 8-2	Action 3.8.1.1.b.4	2	Replace 72 hour AOT with 14 day AOT.	Provide risk informed AOT to permit online maintenance of EDG.

Page	Affected Section	Bar #	Description of Change	Reason for Change
3/4 8-4	SR 4.8.1.1.2.g.1	1	Delete the requirement for vendor recommended maintenance frequency.	Recommendation from FMOG and ITS. Maintenance Rule will assure maintenance is completed based on performance.
B3/4 8.1	B 3/4.8	1	Add detail to Bases section.	Update Bases section resulting from this LAR. Note: Applicable Amendment numbers have been moved to the appropriate pages.
B3/4 8.2	B 3/4.8	1	Repaginate	
B3/4 8.3	B 3/4.8	1	Repaginate	
B3/4 8.4	B 3/4.8	1	Repaginate	

Insert 1

4. Restore the EDG to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours, unless the following condition exists:

   a) The requirement for restoration of the EDG to OPERABLE status within 72 hours may be extended to 14 days if the Alternate AC (AAC) power source is or will be available within 1 hour, as specified in the Bases, and

   b) If at any time the AAC availability cannot be met, either restore the AAC to available status within **the remainder of the** 72 hours **in 4.a** (not to exceed 14 days from the time the EDG originally became inoperable), or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the next 30 hours.

Insert 2

The requirement for restoring the EDG to OPERABLE status within 72 hours may be extended up to 14 days to perform either extended preplanned maintenance (both preventative and corrective) or extended unplanned corrective maintenance work.

To reduce the risk of performing extended EDG maintenance activities of up to 14 days while online, a non-safety related alternate AC power (AAC) source will be relied on. The AAC is designed to provide back-up power to either ESF bus whenever one of the EDGs is out of service, particularly in Modes 1 through 4 operation. The AAC is verified available and an operational readiness status check is performed when it is anticipated that one of the EDGs will be inoperable for longer than the allowed outage time of 72 hours. The design of the AAC is capable of providing the required safety and non-safety related loads in the event of a total loss of offsite power and if both EDGs fail to start and load. During these events it is assumed that there is no seismic event or an event that requires safeguards actuation, e.g., safety injection, containment spray, etc. Although the AAC is not designed for DBA loads, it is capable of supplying sufficient power to mitigate the effects of an accident. The AAC is not credited in the safety analysis.

The AAC consists of a minimum of three units at the Parr Hydro. A **keep warm** diesel **generator** is installed at Parr Hydro to provide for initial excitation and switching. For scheduled maintenance, Parr personnel will be at their workstations 24 hours a day. For unscheduled maintenance or an event, Parr personnel will have the units running within 1 hour of notification.

During normal operation with both EDGs OPERABLE, the AAC availability is demonstrated by performance of periodic testing. An operational readiness check is performed in addition to the periodic testing when the AAC is relied upon as the back up power source. This check includes verification of the readiness of the **keep warm** diesel to automatically start and Parr to energize the selected ESF bus and verifying alignment to the selected ESF bus. This check will be performed at least once per 72 hours following the initial availability verification. Should the AAC become unavailable during the 14-day AOT and cannot be immediately restored to available status, the EDG AOT reverts back to **the remainder of the** 72 hours. The 72 hours begins with the discovery of the AAC unavailability, not to exceed a total of 14 days from the time the EDG initially became inoperable.

The extended EDG AOT is based on the Probabilistic Safety Analysis (PRA) evaluation to perform the online maintenance when the AAC is available. The results of the evaluation demonstrate that the AAC is capable of mitigating the dominant core damage sequences and provides a significant overall risk reduction for station operation. The AAC alone is adequate to supply electrical power to affect a safe shutdown of the plant.

The AOT to verify redundant equipment is intended to allow the operator time to evaluate and repair any discovered inoperabilities. The AOT only begins on discovery that both an inoperable EDG exists and a required feature on the other train is inoperable. If at any time during the existence of this condition (one EDG is inoperable), a required feature subsequently becomes inoperable, this AOT would then begin to be tracked. Four hours from the discovery of these events existing concurrently is acceptable because it minimizes risk while allowing time for restoration before subjecting the plant to transients associated with shutdown.

ACTION: (Continued)

3. Within ~~2~~ 4 hours, verify that required systems, subsystems, trains, components and devices that depend on the remaining EDG as a source of emergency power are also OPERABLE and in MODE 1, 2, or 3, that the Turbine Driven Emergency Feed Pump is OPERABLE. If these conditions are not satisfied within ~~2~~ 4 hours be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

4. ~~Restore the EDG to OPERABLE status within 72 hours or be in at least HOT STANDY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.~~ INSERT 1

c. With one offsite circuit and one EDG inoperable:

1. Demonstrate the OPERABILITY of the remaining offsite A.C. source by performing Surveillance Requirement 4.8.1.1.1 within one hour and at least once per 8 hours thereafter, and

2. *If the EDG became inoperable due to any cause other than preplanned preventative maintenance or testing:
   a) determine the OPERABLE EDG is not inoperable due to a common cause failure within 8 hours, or
   b) demonstrate the OPERABILITY of the remaining EDG by performing Surveillance Requirement 4.8.1.1.2.a.3 within 8 hours,
   and

3. Within 2 hours, verify that required systems, subsystems, trains, components and devices that depend on the remaining EDG as a source of emergency power are also OPERABLE and in MODE 1, 2, or 3, that the Turbine Driven Emergency Feed Pump is OPERABLE. If these conditions are not satisfied within 2 hours be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

4. Restore one of the inoperable sources to OPERABLE status within 12 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours, and

5. Restore the other A.C. power source (offsite circuit or diesel generator) to OPERABLE status in accordance with the provisions of Section 3.8.1.1 Action Statement a. or b., as appropriate, with the time requirement of that Action Statement based on the time of initial loss of the remaining inoperable A.C. power source.

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* Completion of Action c.2 is required regardless of when the inoperable EDG is restored to OPERABILITY.

c) A flash point equal to or greater than 125°F; and

d) A clear and bright appearance when tested based on the applicable ASTM standard.

2. By verifying within 30 days of obtaining the sample that the specified properties are met when tested based on the applicable ASTM standard.

e. At least once every 31 days by obtaining a sample of fuel oil based on the applicable ASTM standard, and verifying that total contamination is less than 10 mg/liter when checked based on the applicable ASTM standard.

f. At least once per 184 days by:

1. Verify each EDG starts from standby conditions and:
   a) In less than or equal to 10 seconds, achieves a voltage greater than 6480 volts (7200 - 720 volts) and a frequency greater than 58.8 Hz (60 - 1.2 Hz).
   b) Achieve a steady state voltage greater than 6480 volts but less than 7920 volts and a steady state frequency greater than 58.8 Hz but less than 61.2 Hz.

   The EDG shall be started for this test by using one of the following signals:
   a) Simulated loss of offsite power by itself.
   b) Simulated loss of offsite power in conjunction with an ESF actuation test signal.
   c) An ESF actuation test signal by itself.
   d) Simulated degraded offsite power by itself.
   e) Manual.

2. The generator shall be manually synchronized, loaded to an indicated 4150-4250 kW** in less than or equal to 60 seconds, and operate for at least 60 minutes.

g. At least once every 18 months by:

1. ~~Subjecting the diesel to an inspection in accordance with procedures prepared in conjunction with its manufacturer's recommendations for this class of standby service.~~ deleted

2. Verifying that on rejection of a load of greater than or equal to 729 kW, the voltage and frequency are maintained at 7200 ± 720 volts and frequency at 60 ± 1.2 Hz.

3. Verifying the generator capability to reject a load of 4250 kW without tripping. The generator voltage shall not exceed 7920 volts during and following the load rejection.

** This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band shall not invalidate the test.

3/4.8.1, 3/4.8.2 AND 3/4.8.3 A.C. SOURCES, D.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS

The OPERABILITY of the A.C. and D.C power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety related equipment required for 1) the safe shutdown of the facility and 2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant A.C. and D.C. power sources and distribution systems satisfy the requirements of General Design Criterion 17 of Appendix "A" to 10 CFR 50.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the safety analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss of offsite power and single failure of the other onsite A.C. source. The A.C. and D.C. source allowable out-of-service times are based on Regulatory Guide 1.93, "Availability of Electrical Power Sources," December 1974. When one diesel generator is inoperable, there is an additional ACTION requirement to verify that all required systems, subsystems, trains, components and devices, that depend on the remaining OPERABLE diesel generator as a source of emergency power, are also OPERABLE, and that the steam-driven auxiliary feedwater pump is OPERABLE. This requirement is intended to provide assurance that a loss of offsite power event will not result in a complete loss of safety function of critical systems during the period one of the diesel generators is inoperable. The term verify as used in this context means to administratively check by examining logs or other information to determine if certain components are out-of-service for maintenance or other reasons. It does not mean to perform the surveillance requirements needed to demonstrate the OPERABILITY of the component.

INSERT 2 →

If it can be determined that the cause of the inoperable diesel generator does not exist on the OPERABLE diesel generator, then Surveillance 4.8.1.1.2.a.3 does not have to be performed. If the cause of the initial inoperable diesel generator cannot be confirmed not to exist on the redundant diesel generator, performance of Surveillance Requirement 4.8.1.1.2.a.3 suffices to provide assurance of continued OPERABILITY of that diesel generator. This allows for reduced start testing of the diesel generators, which has been shown to be a factor in engine degradation.

In the event that the inoperable diesel generator is restored to OPERABLE status prior to completing either the evaluation of cause or performing the surveillance requirement, the CER program will continue to evaluate the common cause possibility. This continued evaluation, however, is no longer under the 24 hour constraint imposed by the action statement. According to Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," 24 hours is reasonable to confirm that the OPERABLE diesel generator is not affected by the same problem as the inoperable diesel generator.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that 1) the facility can be maintained in the shutdown or refueling condition for extended time periods and 2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status.

A.C. SOURCES. D.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS
(Continued)

The Surveillance Requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guides 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, and 1.137, "Fuel-Oil Systems for Standby Diesel Generators," Revision 1, October 1979, as modified by the NRC's review and approval of South Carolina Electric & Gas Company's June 10, 1985, December 6, 1985, and November 10, 2000 amendment requests.

The Surveillance Requirement that assures the diesel generator is capable of performing its design function follows the guidance of NUREG 1366 and NUREG 1431, Rev 2. The surveillance tests the capability of the diesel generator to start and close its breaker in the required 10 seconds to support the accident analysis, and carry the required electrical load while maintaining the voltage and frequency limits necessary to assure OPERABILITY of the loads.

In addition to the Surveillance Requirements, the time for the diesel generator to reach steady state operation, unless the modified start method is utilized, is periodically monitored and the trend evaluated to identify degradation of the governor and voltage regulator performance.

The fuel storage system minimum volume of fuel to demonstrate operability of the diesel generators was based on fuel consumption determined from the development of time dependent loads following a design basis accident and a loss of off-site power utilizing FSAR Table 8.3-3 for seven days.

All safety-related portions of the VCSNS diesel engine fuel oil storage and transfer system, are Seismic Category I, Safety Class 2b, and designed to ANSI Standard N195-1976 with the provision listed below:

VCSNS will maintain at least 2% margin above the minimum calculated seven day required volume during Modes 1-4. This is an exception to ANSI N195-1976, "Fuel Oil Systems for Standy Diesel Generators," Section 5.4, during Modes 1-4. EDG fuel replenishment is available from multiple sources, including off-site suppliers, on-site non safety storage in the Auxiliary Boiler Fuel Tank, and the ability to provide fuel from the opposite train EDG Fuel Oil Storage Tank via the fuel oil and transfer system cross-tie.

The 10% fuel margin as recommended in Regulatory Guide 1.137, Revision 1, "Fuel-Oil Systems for Standby Diesel Generators," position C.1.c.(2) will be met during Modes 5 and 6.

The Surveillance Requirement for demonstrating the OPERABILITY of the Station batteries are based on the recommendations of Regulatory Guide 1.129, "Maintenance Testing and Replacement of Large Lead Storage Batteries for Nuclear Power Plants," February 1978, and IEEE Std 450-1987, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations."

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery terminal voltage and float charge, connection resistance values and the performance of battery service and discharge tests ensures the effectiveness of the charging system, the ability to handle high discharge rates and compares the battery capacity at that time with the rated capacity.

A.C. SOURCES. D.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS
(Continued)

Table 4.8-2 specifies the normal limits far each designated pilot cell and each connected cell for electrolyte level, float voltage and specific gravity. The limits for the designated pilot cells float voltage and specific gravity, greater than 2.13 volts and .015 below the manufacturer's full charge specific gravity or a battery charger current that had stabilized at a low value, is characteristic of a charged cell with adequate capacity. The normal limits for each connected cell for float voltage and specific gravity, greater than 2.13 volts and not more than .020 below the manufacturer's full charge specific gravity with an average specific gravity of all the connected cells not more than .010 below the manufacturer's full charge specific gravity, ensures the OPERABILITY and capability of the battery.

Operation with a battery cell's parameter outside the normal limit but within the allowable value specified in Table 4.8-2 is permitted for up to 7 days. During this 7 day period: (1) the allowable values for electrolyte level ensures no physical damage to the plates with an adequate electron transfer capability; (2) the allowable value for the average specific gravity of all the cells, not more than .020 below the manufacturer's recommended full charge specific gravity, ensures that the decrease in rating will be less than the safety margin provided in sizing; (3) the allowable value for an individual cell's specific gravity, ensures that an individual cell's specific gravity will not be more than .040 below the manufacturer's full charge specific gravity and that the overall capability of the battery will be maintained within an acceptable limit; and (4) the allowable value for an individual cell's float voltage, greater than 2.07 volts, ensures the battery's capability to perform its design function.

3/4.8.4 ELECTRICAL EQUIPMENT PROTECTIVE DEVICES

Containment electrical penetrations and penetration conductors are protected by either deenergizing circuits not required during reactor operation or by demonstrating the OPERABILITY of primary and backup overcurrent protection circuit breakers during periodic surveillance.

The surveillance requirements applicable to lower voltage circuit breakers provide assurance of breaker reliability by testing at least one representative sample of each manufacturer's brand of circuit breaker. Each manufacturer's molded case and metal case circuit breakers are grouped into representative samples which are then tested on a rotating basis to ensure that all breakers are tested. If a wide variety exists within any manufacturer's brand of circuit breakers, it is necessary to divide that manufacturer's breakers into groups and treat each group as a separate type of breaker for surveillance purposes.

The surveillance requirements of the circuit breakers for non-Class 1E cables located in trays which do not have cable tray covers and which provide protection for cables that, if faulted, could cause failure in both adjacent, redundant Class 1E cables ensures that the integrity of Class 1E cables is not compromised by the failure of protection devices to operate in the non-Class 1E cables.

ATTACHMENT III

PROPOSED TECHNICAL SPECIFICATION CHANGES (RETYPED)

INDEX

BASES

ACTION: (Continued)

3. Within 4 hours, verify that required systems, subsystems, trains, components and devices that depend on the remaining EDG as a source of emergency power are also OPERABLE and in MODE 1, 2, or 3, that the Turbine Driven Emergency Feed Pump is OPERABLE. If these conditions are not satisfied within 4 hours be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

4. Restore the EDG to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours, unless the following condition exists:

   a) The requirement for restoration of the EDG to OPERABLE status within 72 hours may be extended to 14 days if the Alternate AC (AAC) power source is or will be available within 1 hour, as specified in the Bases, and

   b) If at any time the AAC availability cannot be met, either restore the AAC to available status within the remainder of the 72 hours in 4.a (not to exceed 14 days from the time the EDG originally became inoperable), or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the next 30 hours.

c. With one offsite circuit and one EDG inoperable:

1. Demonstrate the OPERABILITY of the remaining offsite A.C. source by performing Surveillance Requirement 4.8.1.1.1 within one hour and at least once per 8 hours thereafter, and

2. *If the EDG became inoperable due to any cause other than preplanned preventative maintenance or testing:
   a) determine the OPERABLE EDG is not inoperable due to a common cause failure within 8 hours, or
   b) demonstrate the OPERABILITY of the remaining EDG by performing Surveillance Requirement 4.8.1.1.2.a.3 within 8 hours,

   and

3. Within 2 hours, verify that required systems, subsystems, trains, components and devices that depend on the remaining EDG as a source of emergency power are also OPERABLE and in MODE 1, 2, or 3, that the Turbine Driven Emergency Feed Pump is OPERABLE. If these conditions are not satisfied within 2 hours be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

4. Restore one of the inoperable sources to OPERABLE status within 12 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours, and

5. Restore the other A.C. power source (offsite circuit or diesel generator) to OPERABLE status in accordance with the provisions of Section 3.8.1.1 Action Statement a. or b., as appropriate, with the time requirement of that Action Statement based on the time of initial loss of the remaining inoperable A.C. power source.

* Completion of Action c.2 is required regardless of when the inoperable EDG is restored to OPERABILITY.

c) A flash point equal to or greater than 125°F; and

d) A clear and bright appearance when tested based on the applicable ASTM standard.

2. By verifying within 30 days of obtaining the sample that the specified properties are met when tested based on the applicable ASTM standard.

e. At least once every 31 days by obtaining a sample of fuel oil based on the applicable ASTM standard, and verifying that total contamination is less than 10 mg/liter when checked based on the applicable ASTM standard.

f. At least once per 184 days by:

1. Verify each EDG starts from standby conditions and:
   a) In less than or equal to 10 seconds, achieves a voltage greater than 6480 volts (7200 - 720 volts) and a frequency greater than 58.8 Hz (60 - 1.2 Hz).
   b) Achieve a steady state voltage greater than 6480 volts but less than 7920 volts and a steady state frequency greater than 58.8 Hz but less than 61.2 Hz.

   The EDG shall be started for this test by using one of the following signals:
   a) Simulated loss of offsite power by itself.
   b) Simulated loss of offsite power in conjunction with an ESF actuation test signal.
   c) An ESF actuation test signal by itself.
   d) Simulated degraded offsite power by itself.
   e) Manual.

2. The generator shall be manually synchronized, loaded to an indicated 4150-4250 kW** in less than or equal to 60 seconds, and operate for at least 60 minutes.

g. At least once every 18 months by:

1. Deleted

2. Verifying that on rejection of a load of greater than or equal to 729 kW, the voltage and frequency are maintained at 7200 ± 720 volts and frequency at 60 ± 1.2 Hz.

3. Verifying the generator capability to reject a load of 4250 kW without tripping. The generator voltage shall not exceed 7920 volts during and following the load rejection.

** This band is meant as guidance to avoid routine overloading of the engine. Loads in excess of this band shall not invalidate the test.

3/4.8.1, 3/4.8.2 AND 3/4.8.3 A.C. SOURCES, D.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS

The OPERABILITY of the A.C. and D.C power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety related equipment required for 1) the safe shutdown of the facility and 2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant A.C. and D.C. power sources and distribution systems satisfy the requirements of General Design Criterion 17 of Appendix "A" to 10 CFR 50.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the safety analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss of offsite power and single failure of the other onsite A.C. source. The A.C. and D.C. source allowable out-of-service times are based on Regulatory Guide 1.93, "Availability of Electrical Power Sources," December 1974. When one diesel generator is inoperable, there is an additional ACTION requirement to verify that all required systems, subsystems, trains, components and devices, that depend on the remaining OPERABLE diesel generator as a source of emergency power, are also OPERABLE, and that the steam-driven auxiliary feedwater pump is OPERABLE. This requirement is intended to provide assurance that a loss of offsite power event will not result in a complete loss of safety function of critical systems during the period one of the diesel generators is inoperable. The term verify as used in this context means to administratively check by examining logs or other information to determine if certain components are out-of-service for maintenance or other reasons. It does not mean to perform the surveillance requirements needed to demonstrate the OPERABILITY of the component.

The requirement for restoring the EDG to OPERABLE status within 72 hours may be extended up to 14 days to perform either extended preplanned maintenance (both preventative and corrective) or extended unplanned corrective maintenance work.

To reduce the risk of performing extended EDG maintenance activities of up to 14 days while online, a non-safety related alternate AC power (AAC) source will be relied on. The AAC is designed to provide back-up power to either ESF bus whenever one of the EDGs is out of service, particularly in Modes 1 through 4 operation. The AAC is verified available and an operational readiness status check is performed when it is anticipated that one of the EDGs will be inoperable for longer than the allowed outage time of 72 hours. The design of the AAC is capable of providing the required safety and non-safety related loads in the event of a total loss of offsite power and if both EDGs fail to start and load. During these events it is assumed that there is no seismic event or an event that requires safeguards actuation, e.g., safety injection, containment spray, etc. Although the AAC is not designed for DBA loads, it is capable of supplying sufficient power to mitigate the effects of an accident. The AAC is not credited in the safety analysis.

The AAC consists of a minimum of three units at the Parr Hydro. A keep warm diesel generator is installed at Parr Hydro to provide for initial excitation and switching. For scheduled maintenance, Parr personnel will be at their workstations 24 hours a day. For unscheduled maintenance or an event, Parr personnel will have the units running within 1 hour of notification.

A.C. SOURCES. D.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS
(Continued)

During normal operation with both EDGs OPERABLE, the AAC availability is demonstrated by performance of periodic testing. An operational readiness check is performed in addition to the periodic testing when the AAC is relied upon as the back up power source. This check includes verification of the readiness of the keep warm diesel to automatically start and Parr to energize the selected ESF bus and verifying alignment to the selected ESF bus. This check will be performed at least once per 72 hours following the initial availability verification. Should the AAC become unavailable during the 14-day AOT and cannot be immediately restored to available status, the EDG AOT reverts back to the remainder of the 72 hours. The 72 hours begins with the discovery of the AAC unavailability, not to exceed a total of 14 days from the time the EDG initially became inoperable.

The extended EDG AOT is based on the Probabilistic Safety Analysis (PRA) evaluation to perform the online maintenance when the AAC is available. The results of the evaluation demonstrate that the AAC is capable of mitigating the dominant core damage sequences and provides a significant overall risk reduction for station operation. The AAC alone is adequate to supply electrical power to affect a safe shutdown of the plant.

The AOT to verify redundant equipment is intended to allow the operator time to evaluate and repair any discovered inoperabilities. The AOT only begins on discovery that both an inoperable EDG exists and a required feature on the other train is inoperable. If at any time during the existence of this condition (one EDG is inoperable), a required feature subsequently becomes inoperable, this AOT would then begin to be tracked. Four hours from the discovery of these events existing concurrently is acceptable because it minimizes risk while allowing time for restoration before subjecting the plant to transients associated with shutdown.

If it can be determined that the cause of the inoperable diesel generator does not exist on the OPERABLE diesel generator, then Surveillance 4.8.1.1.2.a.3 does not have to be performed. If the cause of the initial inoperable diesel generator cannot be confirmed not to exist on the redundant diesel generator, performance of Surveillance Requirement 4.8.1.1.2.a.3 suffices to provide assurance of continued OPERABILITY of that diesel generator. This allows for reduced start testing of the diesel generators, which has been shown to be a factor in engine degradation.

In the event that the inoperable diesel generator is restored to OPERABLE status prior to completing either the evaluation of cause or performing the surveillance requirement, the CER program will continue to evaluate the common cause possibility. This continued evaluation, however, is no longer under the 24 hour constraint imposed by the action statement. According to Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," 24 hours is reasonable to confirm that the OPERABLE diesel generator is not affected by the same problem as the inoperable diesel generator.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that 1) the facility can be maintained in the shutdown or refueling condition for extended time periods and 2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status.

The Surveillance Requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guides 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, and 1.137, "Fuel-Oil

A.C. SOURCES. D.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS
(Continued)

Systems for Standby Diesel Generators," Revision 1, October 1979, as modified by the NRC's review and approval of South Carolina Electric & Gas Company's June 10, 1985, December 6, 1985, and November 10, 2000 amendment requests.

The Surveillance Requirement that assures the diesel generator is capable of performing its design function follows the guidance of NUREG 1366 and NUREG 1431, Rev 2. The surveillance tests the capability of the diesel generator to start and close its breaker in the required 10 seconds to support the accident analysis, and carry the required electrical load while maintaining the voltage and frequency limits necessary to assure OPERABILITY of the loads.

In addition to the Surveillance Requirements, the time for the diesel generator to reach steady state operation, unless the modified start method is utilized, is periodically monitored and the trend evaluated to identify degradation of the governor and voltage regulator performance.

The fuel storage system minimum volume of fuel to demonstrate operability of the diesel generators was based on fuel consumption determined from the development of time dependent loads following a design basis accident and a loss of off-site power utilizing FSAR Table 8.3-3 for seven days.

All safety-related portions of the VCSNS diesel engine fuel oil storage and transfer system, are Seismic Category I, Safety Class 2b, and designed to ANSI Standard N195-1976 with the provision listed below:

VCSNS will maintain at least 2% margin above the minimum calculated seven day required volume during Modes 1-4. This is an exception to ANSI N195-1976, "Fuel Oil Systems for Standy Diesel Generators," Section 5.4, during Modes 1-4. EDG fuel replenishment is available from multiple sources, including off-site suppliers, on-site non safety storage in the Auxiliary Boiler Fuel Tank, and the ability to provide fuel from the opposite train EDG Fuel Oil Storage Tank via the fuel oil and transfer system cross-tie.

The 10% fuel margin as recommended in Regulatory Guide 1.137, Revision 1, "Fuel-Oil Systems for Standby Diesel Generators," position C.1.c.(2) will be met during Modes 5 and 6.

The Surveillance Requirement for demonstrating the OPERABILITY of the Station batteries are based on the recommendations of Regulatory Guide 1.129, "Maintenance Testing and Replacement of Large Lead Storage Batteries for Nuclear Power Plants," February 1978, and IEEE Std 450-1987, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations."

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery terminal voltage and float charge, connection resistance values and the performance of battery service and discharge tests ensures the effectiveness of the charging system, the ability to handle high discharge rates and compares the battery capacity at that time with the rated capacity.

A.C. SOURCES. D.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS
(Continued)

Table 4.8-2 specifies the normal limits for each designated pilot cell and each connected cell for electrolyte level, float voltage and specific gravity. The limits for the designated pilot cells float voltage and specific gravity, greater than 2.13 volts and .015 below the manufacturer's full charge specific gravity or a battery charger current that had stabilized at a low value, is characteristic of a charged cell with adequate capacity. The normal limits for each connected cell for float voltage and specific gravity, greater than 2.13 volts and not more than .020 below the manufacturer's full charge specific gravity with an average specific gravity of all the connected cells not more than .010 below the manufacturer's full charge specific gravity, ensures the OPERABILITY and capability of the battery.

Operation with a battery cell's parameter outside the normal limit but within the allowable value specified in Table 4.8-2 is permitted for up to 7 days. During this 7 day period: (1) the allowable values for electrolyte level ensures no physical damage to the plates with an adequate electron transfer capability; (2) the allowable value for the average specific gravity of all the cells, not more than .020 below the manufacturer's recommended full charge specific gravity, ensures that the decrease in rating will be less than the safety margin provided in sizing; (3) the allowable value for an individual cell's specific gravity, ensures that an individual cell's specific gravity will not be more than .040 below the manufacturer's full charge specific gravity and that the overall capability of the battery will be maintained within an acceptable limit; and (4) the allowable value for an individual cell's float voltage, greater than 2.07 volts, ensures the battery's capability to perform its design function.

3/4.8.4 ELECTRICAL EQUIPMENT PROTECTIVE DEVICES

Containment electrical penetrations and penetration conductors are protected by either deenergizing circuits not required during reactor operation or by demonstrating the OPERABILITY of primary and backup overcurrent protection circuit breakers during periodic surveillance.

The surveillance requirements applicable to lower voltage circuit breakers provide assurance of breaker reliability by testing at least one representative sample of each manufacturer's brand of circuit breaker. Each manufacturer's molded case and metal case circuit breakers are grouped into representative samples which are then tested on a rotating basis to ensure that all breakers are tested. If a wide variety exists within any manufacturer's brand of circuit breakers, it is necessary to divide that manufacturer's breakers into groups and treat each group as a separate type of breaker for surveillance purposes.

The surveillance requirements of the circuit breakers for non-Class 1E cables located in trays which do not have cable tray covers and which provide protection for cables that, if faulted, could cause failure in both adjacent, redundant Class 1E cables ensures that the integrity of Class 1E cables is not compromised by the failure of protection devices to operate in the non-Class 1E cables.

ATTACHMENT IV

REVISED PAGES TO CALCULATION DC-08010-025

Subject Code 801	SOUTH CAROLINA ELECTRIC AND GAS COMPANY CALCULATION RECORD			Page 1 of 21
Calculation Title: Parr Hydro Alternate Power Source System Study		Calculation Number: DC08010-025	Revision: 1	Status
Parent Document: ECR50555	System: ES	Safety Class: ☒ NN ☐ QR ☐ SR	☒ Partial Calc. Revision ☐ Complete Calc. Revision	
Originator: NE Reifsnyder	Discipline: EE	Organization: WorleyParsons	Date: 06-01-06	XREF Number

CALCULATION INFORMATION

Content Description: Determine the technical design requirements for a new 13.2 – 7.2 kV transformer feeding VC Summer Nuclear Station from the Parr Hydro facility.

Affected Components/Calculations/Documents:
7.2kV ESF System

Piping Reconciliation Completed per QA-CAR-0089-18: ☐ This Revision ☐ Previous Revision ☒ N/A

Contains Preliminary Data/Assumptions: ☒ No ☐ Yes, Affected Pages: _____

Computer Program Used: ☒ No
☐ Yes, Validated per _____ (vendors name) computer program validation process (others)
☐ Yes, Validated in accordance with SAP-1040/ES-413 (ref. 3.4 & 3.5)
☐ Yes, Validated [ES-412]
☐ Computer Program Validation Calculation

VERIFICATION ☐ Continued, Attachment

Scope:

Verification shall consist of a detailed check of the technical completeness, consistency, and correctness of the calculation revision.

Verifier: D. Sterner
Assigned by: CE Hannan

CE Hannan 6/12/06
Engineering Personnel /Date

6/13/06
Verifier/Date

Approval/Date

RECORDS

To Records Management: _____
Initials/Date

Distribution: Calc File (Original)

SOUTH CAROLINA ELECTRIC & GAS COMPANY REVISION SUMMARY	Page 2 of 21

Calculation Number
DC08010-025

Revision Number.	Summary Description
0	Initial Issue
1	Updated Section 3.0, Codes and Standard, Section 4.0, Information Sources, and Section 5.0, Design Inputs/Design Bases. Clarified Section 6.1.2. Corrected conductor operating temperature and RHO values in Sections 6.2.2 – 6.2.5. Corrected column headings of table in Section 6.2.5. Clarified wording in Sections 6.2.5 3) and 6.3.3. Corrected Section 6.3.5, Table 5, Case 4 rounding for XTF-5025H. Corrected Section 6.4.1, Table 9 Transformer MVA ratings basis from input MVA to output MVA. Clarified column headings in Section 6.5.4 Tables 10 and 11. Clarified wording in Section 7.4.1.

3.0 CODES AND STANDARDS

3.1 IEEE Standard 141-1993 (Red Book), *"IEEE Recommended Practice for Electric Power Distribution for Industrial Plants"*, Chapter 3, Voltage Consideration, Chapter 4, Short-circuit Current Calculations and Chapter 15, Coordination Studies. 1

3.2 IEEE Standard 399-1997 (Brown Book), *"IEEE Recommended Practice for Power Systems Analysis"*, Chapter 6, Load Flow Studies and Chapter 7, Short-circuit Studies

3.3 IEEE Standard C37.010-1999, *"IEEE Application Guide for AC High-Voltage Circuit Breakers Use on a Symmetrical Current Basis"*. 1

3.4 (DELETED)

3.5 IEEE Standard C37.13. -1990, *"IEEE Standard for Low-Voltage AC Power Circuit Breaker Used in Enclosures"*.

3.6 IEEE Standard C37.20.1-2002, *"IEEE Standard for Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear"*. 1

3.7 IEEE Standard C37.20.2-1999, *"IEEE Standard for Metal-Clad Switchgear"*.

3.8 ANSI/NEMA Standard C84.1-1995, *"Electric Power Systems and Equipment – Voltage Ratings (60 Hertz)"*.

3.9 NFPA 70 – *"National Electrical Code"* – 2002.

4.0 INFORMATION SOURCES

4.1 V.C. Summer Nuclear Station Continuing Services Scope Document dated September 8, 2004.

4.2 V.C. Summer Nuclear Station Design Basis Document for Electrical Power System (ES).

4.3 SCE&G's V.C. Summer Nuclear Station Engineering Services Procedures.

4.4 VCS electrical drawings: E-206-005, E-206-012, and E-206-022.

4.5 Calculation No. DC08360-006 Rev. 9 for loading table information of the 7.2 kV busses.

4.6 Transformer test reports and nameplate data for transformers XTF31, XTF4, and XTF5.

4.7 Kerite Underground Distribution Cable Impedance Data.

4.8 PE&C Design Input EC 50555 Rev. 0 for new alternate AC power source to VCS. 1

5.0 DESIGN INPUTS/DESIGN BASES

5.1 Results of the existing load flow, short circuit, and voltage drop analysis are detailed in DC08220-010 Rev 3.

5.2 The continuous kW rating of the Diesel Generators (DG/A and DG/B) is 4250 kW per calculation DC08360-006 Rev. 9. 1

5.3 Conservative values for both the 230 kV and 115 kV 3-phase short-circuit contributions are 63 kA and 61 kA respectively, per calculation DC08220-010 Rev. 3.

5.4 Transformer impedance data for XTF31, XTF4, and XTF5 is detailed on drawings E-206-011 Rev. 18 and E-206-012 Rev. 27 and calculation DC08220-007 Rev. 1. The X/R ratios are typical values based on ANSI standards.

5.5 VCS voltage regulation for ESF 7.2 kV switchgear/busses and 1DX 7.2 kV switchgear/busses ranges from 93.8% to 102.85% of the rated voltage per calculation DC08360-008 Rev. 4. These values are the design basis for required voltage regulation limits. 1

5.6 The estimated kVA and kW loads for ESF 7.2 kV switchgear/busses are based on the loading tables detailed in calculation DC08360-006, Rev. 9.

5.7 The new 13.2 - 7.2 kV, 7.5 MVA transformer, XTF-5052, will have a 65°C rise and OA class rating. The design impedance used in calculations is 6.5-percent with an X/R ratio based on ANSI C57 standards, and includes the +/- ANSI design tolerance.

5.8 The new 13.2 - 7.2 kV transformer is designed to either supply the "A" train busses or the "B" train busses, but not both simultaneously.

5.9 Power cable derating calculations for concentric neutral underground distribution cable, rated 750 MCM, 61 strand, 25 kV aluminum, are based on typical positive, negative, and zero sequence cable impedance values. This cable will be used for both the 13.2 kV and 7.2 kV direct burial installations.

5.10 The distance from the Parr Hydro 13.8 kV tie-in to the VC Summer 7.2 kV switchgear is based on a 3.4 mile circuit length. This circuit length will be confirmed with a surveyed field length value.

5.11 Bus voltage regulation at Parr Hydro ranges from a minimum value of 13.2 kV to a nominal value of 13.8 kV.

5.12 The maximum available fault current on the 13.8 kV bus at Parr Hydro is 275.15 MVA and is based on the offsite 23 kV - 13.8 kV power source connected and in service. The minimum available fault current is 9.2 MVA based on design input ECR5055 Rev. 0. The minimum value is based on the offsite 23 kV – 13.8 kV power source disconnected and not in service.

5.13 The cable supplying Charging Pump SI A from the XSW-1DA bus, circuit CSM1A, is a 3/C copper, 8 kV, 4/0 cable with a circuit length of 273 feet.

5.14 The use of one (1) generator with a 3.1 MVA rating (9.2 MVA short circuit rating) has insufficient capacity to carry the "A" train loading at VC Summer Nuclear Station calculated at 5.71 MVA. Two (2) operating generators at Parr Hydro have sufficient capacity based on the plant-operating load; however, three (3) generators are required to support the worst-case motor starting analysis. Based on three (3) 3100 kVA generators with assumed sub-transient reactance of 15% operating at Parr Hydro, the calculated available short-circuit MVA is 62 MVA_{sc}. To provide the most flexibility at VC Summer Nuclear Station, all load flow and motor starting analysis will utilize a 62 MVA_{sc} source impedance rating with no contributions from the Diesel Generators.

TABLE 2

Interrupting Duty Analysis

Bus	Attachment #1 Results			% Rated Duty	
	Device Capability	Case- Normal	Case- SC1	Case- Normal	Case- SC1
XSW1DX-ES	37.813kA	20.073kA	10.863kA	53.1%	28.7%
XSW 1DA	37.813kA	20.073kA	10.863kA	53.1%	28.7%
XSW 1DB	37.813kA	31.040kA	31.040kA	82.0%	82.0%
XSW 1EA	37.813kA	20.073kA	10.863kA	53.1%	28.7%
XSW 1EB	37.813kA	31.040kA	31.040kA	82.0%	82.0%

6.1.2 The short-circuit analysis is performed based on the following study criteria:

- A pre-fault voltage of 1.05 p.u. in accordance with reference 3.1 and ANSI Standard's C37.5 (reference 3.4) and C37.010 (reference 3.3).
- A fixed machine X/R ratio for both motors and generators.
- Circuit breaker calculated short-circuit duties are based on the device maximum through fault current and are adjusted based on "C37.010-1979 and Older" (Symmetrical Current Rating Basis). 1

6.1.3 Cable and bus taps are not faulted, since there are no circuit breakers connected directly to these busses for a comparison of equipment ratings with calculated fault duties.

6.1.4 The medium voltage momentary duty or closing and latching duty study calculates the current flowing through the medium voltage system at one-half cycle after the fault occurs in accordance with the ANSI Standard calculation methodology. The calculated asymmetrical rms and asymmetrical peak values are then directly compared with the established medium voltage equipment momentary device capability rating by the ETAP PowerStation software program.

6.1.5 The medium voltage interrupting duty study calculates the current flowing through the medium voltage system for two, three, five and eight cycle breakers in accordance with the ANSI Standard calculation methodology. ANSI C37.010 is used for breakers manufactured and rated under the Symmetrical Current Rated Standard. The style breaker used at V.C Summer Nuclear Station has an interrupting rating of 33 kA at a rated voltage of 8.25 kV that is confirmed by manufacturer data sheets. The calculated adjusted interrupting short-circuit currents are directly compared with the established medium voltage equipment interrupting duty device capability rating by the ETAP PowerStation software program.

ATTACHMENT V

LIST OF REGULATORY COMMITMENTS

The AAC system Maintenance Rule scoping will be completed and approved by the expert panel prior to implementing the TS change.

In accordance with the provisions in 10 CFR 50.65 (a)(4), the following compensatory measures will be implemented when utilizing the extended 14-day AOT:

VCSNS will not utilize the 14-day AOT unless the AAC will be available within 1 hour after the EDG is declared inoperable.

The AAC will be declared available prior to being used as the AAC source.

Should the AAC become unavailable after the EDG is inoperable, the plant will revert back to the 72-hour AOT.

The AAC will not be connected to an ESF bus unless the EDG and the normal source for that bus are inoperable.

The design of the AAC meets the requirements of NUMARC 8700, Appendix B.

Preplanned EDG maintenance will not be scheduled when adverse weather is expected.

Elective maintenance will not be performed on the AAC system while it is considered available as the AAC source.

Elective maintenance will not be performed on the offsite sources normally supplying power to the ESF buses.

The system dispatcher will be contacted prior to removing an EDG from service and an extended AOT will not be entered to perform elective maintenance when grid stress conditions are considered high.

Maintenance of the AAC power source will not be scheduled to run concurrently with maintenance on either EDG.

The cable from Parr to VCSNS will be used at conductor temperatures not to exceed 105°C. The emergency temperature rating will be 140 °C for periods which shall not exceed 100 hours per year. Such 100 hour overloads shall not exceed 5 over the lifetime of the plant.

Voltage and frequency will be manually adjusted at the generator during the manual loading process.