

Jeffrey B. Archie  
Vice President, Nuclear Operations  
803.345.4214



April 25, 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 - RESPONSE TO REQUEST FOR  
ADDITIONAL INFORMATION

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 questions, discussed over the telephone on November 8, 2005; November 17, 2005; December 1, 2005; and December 8, 2005, related to the above referenced amendment request.

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.

4/25/06  
Executed on

Jeffrey B. Archie

PAR/JBA/dr  
Attachments

c: N. O. Lorick  
S. A. Byrne  
N. S. Carns  
J. H. Hamilton (w/o Attachments)  
R. J. White  
W. D. Travers  
R. E. Martin  
NRC Resident Inspector  
P. Ledbetter  
K. M. Sutton  
T. P. O'Kelley  
RTS (C-05-3666)  
File (813.20)  
DMS (RC-06-0045)

A001

**Subject: Response to Request for Additional Information related to  
LICENSE AMENDMENT REQUEST - LAR 05-3666  
Alternate Offsite Power Supply**

*Has the severe weather database been updated since the IPE was reviewed and has the database been updated in the past 6 or 8 months? Specifically the portions pertaining to the Southeast and the Gulf of Mexico regions are of interest.*

The IPE high winds analysis has not been updated since it was performed. The discussion below explains how high winds were qualitatively considered in the assessment of the proposed Alternate AC (AAC) power supply.

The AAC is designed to minimize the effects of weather, including high winds. Most of the system is underground. One component that is not underground is the surge protection (at 3 locations) for the new line. Tornado data current through 2003 was used to qualitatively assess the possibility of the same tornado damaging both the surge protection for the proposed new line from Parr Hydro station and the VCSNS switchyard. Surge suppressors for the new Parr line are located away from transmission towers to limit the possibility of one of these towers falling on them. Surge suppressors are also surrounded by concrete barriers to limit impacts from other hazards such as falling trees. The possibility of the same tornado damaging both surge suppressors and the VCSNS switchyard was judged to be unlikely based on tornado area, direction and time on ground data.

A report on South Carolina Hurricanes from 1973 was used to estimate hurricane tracks. The average track of the most "memorable" hurricanes from this report was from the south-south west to the north-north east. Hurricanes on this average track would pass east of Columbia and would have crossed more than 200 miles inland before reaching that point.

Hurricanes entering the state from the east heading west would be expected to spawn tornadoes along the same track (southeast to northwest). Such hurricanes are less frequent (based on our communication with the local television weather forecaster) in South Carolina, but this would be the shortest distance from the coast to VCSNS. The tornado track from such hurricanes would be perpendicular to the line between VCSNS and Parr Hydro and would therefore be unlikely to disable both sources.

Of recent hurricanes, Hurricane Hugo (1989) brought the most damaging winds to South Carolina. This hurricane passed east of the plant and brought winds of 50-55 miles per hour to the station.

It is also noted that the proposed power supply from Parr Hydro is being built according to the International Building Code to withstand winds of 100 miles per hour (with margin).

*Is the availability of the Parr Hydro Electric Generating Station (Parr) based on actual data or calculated? What is the best estimate number for availability and how is it determined?*

The attached spread sheet contains unavailability data for Parr Hydro and the formula used to convert this into percent availability. This was used to justify the statement in the submittal that "the availability of at least four units has been established as at least 97%."

However, for the PRA, the maintenance unavailability was assumed to be 5% based on a requirement from NUMARC 87-00. This assumption was slightly conservative compared to the actual data in the spread sheet.

*Was the plant aware of the magnitude 2.9 earthquake that occurred in the vicinity in February 2005?*

The plant was made aware of the earthquake by hearing about it from offsite personnel and family. The earthquake is known as the Irmo earthquake and was felt most strongly in the Irmo and Harbison areas, (approximately 15 miles away from the plant site). The earthquake was not felt at the plant and seismic instrumentation did not detect any movement.

*Are there fault lines in the vicinity where the underground line will be installed as part of this project?*

There are no known active faults in the immediate VCS vicinity. The closest fault of interest is approximately 15 miles away and is classified as a non-active fault zone per the NRC rules. The Parr station is approximately 3 miles away.

*The internal flooding analysis was identified as a Peer Review Level B Fact and Observation (F&O). This F&O is also not fully resolved. How is this F&O being dispositioned and what is the status?*

The remaining 'A' or 'B' level peer review Fact and Observation (F&O) is related to internal flooding. Work is currently underway at VCSNS to address this F&O with an analysis. EPRI is also working on PRA internal flooding issues generically and the VCSNS PRA will review this work when it becomes available.

The 'B' level internal flooding F&O does not affect the power supply from Parr Hydro because this supply enters the Turbine Building at elevation 436'. The line then rises in a cable tray up to the underside of elevation 463' where it ties into bus 1DX. Since 436' is grade level, the proposed new power supply is not subject to internal flooding concerns. Also, the buried cable from Parr to the VCSNS is qualified for a wet environment.

*An earthquake was detected in the vicinity of the plant in February of 2005. Was this earthquake detected at the plant and if not, why not?*

The plant did not detect this earthquake as it was too small and far away. Plant seismic instruments are strong motion detectors with a setpoint of 0.01 G acceleration. At the distance from the epicenter to the plant, the 2.9 magnitude (Richter scale) earthquake was not powerful enough to have reached the threshold and triggered the onsite seismic instruments, nor was it strong enough to be felt by humans on site.

The state seismic monitoring system has detectors throughout the state which are sensitive enough to detect all ground motion. The state network detected this motion event even though it was only felt by humans in the close vicinity to Irmo and Harbison.

*Is there a commitment with the EDGs having to remain operable if the AAC source becomes inoperable?*

No, the intention is that the EDG AOT revert back to the current 72 hour AOT should the AAC source be discovered inoperable. Even if work is underway on an EDG at the time of discovery, the AOT would immediately revert back to 72 hours (from time of discovery of the inoperable AAC source). This is addressed in the LAR request in the new TS action 3.8.1.b.4 and Bases page 3/4 8-1.

*Are there controls in place that would prevent performing EDG maintenance if we knew severe weather was coming?*

Existing plant programs would prevent this maintenance from starting with knowledge of severe weather approaching. Due to the location of the plant, the most significant severe weather is from a hurricane. Icing is not a major concern as most winter weather outages occur due to tree limbs breaking under the weight of ice or snow and landing on the distribution lines. There do not seem to be many instances where ceramic or glass insulators failing are the cause of a loss of power event. Therefore, the plant will typically plan on performing online EDG maintenance between the months of December and May to eliminate the impact of hurricanes. (This paragraph was revised since the NRC reviewer saw the response. The maintenance activities would occur during the time period of December to May, instead of the original timeframe of December to March.)

Additionally, the program established onsite to implement the 10 CFR 50.65 (a)(4) requirements (EOOS) would identify the increase in risk of planning to commence EDG maintenance with severe weather predicted to strike the vicinity of the plant. Plant procedure, Operations Administrative Procedure (OAP) 102.1, Conduct of Operations Scheduling Unit, requires awareness of weather conditions and impact of the weather on planned or in progress work activities.

*Is there any intention of having firewatches during the EDG maintenance to preclude a fire from disabling multiple sources of AC power?*

There is no intention of utilizing firewatches during the EDG maintenance specifically to prevent a fire from disabling multiple sources of power. Plant design has the EDGs each in its separate fire rated room. The location of the AAC source (1DX switchgear) is on the other side of the plant, separated by the turbine building. As such, a fire in any of these areas will disable at most the equipment in that immediate area, leaving the other sources undamaged.

*Please discuss the communication between VCSNS and the Parr station regarding maintenance.*

VCSNS and the Parr Hydroelectric station are both operated by SCE&G. An agreement has been verbally agreed upon and will soon be implemented, once a diesel generator is installed at the Parr station. The agreement establishes the protocols to be used for scheduled and/or emergent maintenance on the EDGs. Some of the installed equipment at the Parr station is being incorporated into the VCSNS equipment database to allow for maintenance tracking. The Parr station will be staffed 24 hours a day during planned online EDG maintenance activities and will be able to be staffed on short notice for emergent EDG work, if needed.

*A brief listing of commitments being made was requested.*

- 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 of 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 AC 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 87-00, Appendix B.
  - Preplanned EDG maintenance will not be scheduled when adverse weather is expected.
  - Elective maintenance will not be performed on the AAC 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 of either EDG.

This list does not include controls already in place.

*Please explain why VCSNS would not perform switchyard maintenance during an EDG maintenance evolution.*

Per the procedure that implements the requirements of 10 CFR 50.65(a)(4), OAP 102.1, performance of switchyard work at the same time as EDG maintenance would have to be evaluated prior to allowing work to commence. However, from the plant's PRA, the combination of these two activities would increase the plants core damage frequency. Plant programs would permit concurrent EDG and switchyard activities with appropriate levels of management approval. However, this is not a situation that would typically occur unless emergent conditions required immediate action.

*Is there an analysis at Parr hydroelectric station that shows the increase in plant reliability with the addition of the blackstart diesel?*

No analysis has been performed or is planned. However, the Parr station will be considered as an unsupported startable station once the diesel is installed onsite. This diesel will provide the capability to start up the required units without any other source of electrical power as long as the minimum staffing is present. Since the Parr station is not typically staffed 24-hours a day or remotely operated, the station cannot be considered as a blackstart plant per FERC requirements. For the purpose of supporting the needs of VCSNS in the Alternate AC implementation, it can be considered as a blackstart plant due to the 24-hour manning being a commitment while an EDG is inoperable for greater than 72 hours.

*What kind of dam is located at the Parr station and are there any seismic concerns.*

The Parr dam is a concrete on rock dam. Although it was built long before seismic construction was common, there are no concerns with the seismic adequacy of the dam.

Parr Dam and Parr Hydro Plant were constructed 1912-1914 by J. G. White Engineering Corporation for the Parr Shoals Power Company. In 1971, the Parr Hydroelectric Project was initiated. The existing Parr Reservoir on the Broad River was planned for use as the lower reservoir for the Fairfield Pumped Storage Facility, with Monticello Reservoir serving as the upper impoundment. To provide required capacity,

Parr Reservoir was enlarged in 1974 by adding nine (9) feet to the existing Parr Dam by installing Bascule (hydraulic controlled) gates along the entire 2,000' spillway crest. For this project, nine (9) borings were drilled at Parr Dam to evaluate the existing abutment conditions, structural concrete conditions, and subsurface conditions at depths of 25' – 60' into the underlying foundation rock. Detailed geologic and seismologic evaluations were conducted to ensure that there were no geologic features at or near the site which would preclude satisfactory construction and operation.

*What is the failure rate for the transmission system insulators and why do they fail?*

A data base for transmission system insulator failures does not exist. However, a discussion with corporate transmission engineering (35 years of continuous experience) yields no recalled failure of insulators due to ice loading or water ingress. There were insulator failures due to salt spray in the past although all of those were in Atlantic coastal areas of SCE&G's service area and greater than 75 miles from VCSNS.

The insulators on the 115KV line were designed for ¼ inch radial ice, and are 7,500 pound working load insulators. The insulators on the 230KV line are 10,000 pound working load insulators. In either case, the ultimate failure load is a minimum factor of two times the working load.

*What is the likelihood of having salt spray driven by hurricane winds impact the switchyard?*

Salt spray related to severe weather (hurricanes) is not a concern at VCSNS. The plant is a minimum of 120 miles away from the coastline.

Parr Hydro Availability 2001-2004

$$\% \text{ Availability} = \frac{[(\text{Period Hours} - \text{Scheduled Outage Hours} - \text{Forced Outage Hours}) / (\text{Period Hours})] \times 100}{1}$$

Note: YTD values are through December, so they reflect the full year.

**2004** # of hours in year. 8784

	Scheduled Outage Hrs.		Forced Outage Hrs.	% Avail.
	YTD		YTD	YTD
Parr-CC480				
Unit #1	0		48	99.45
Unit #2	0		20	99.77
Unit #3	0		216	97.54
Unit #4	0		0	100.00
Unit #5	0		0	100.00
Unit #6	0		0	100.00
<b>TOTAL</b>	<b>0</b>		<b>284</b>	<b>99.60</b>

**2003** # of hours in year. 8760

	Scheduled Outage Hrs.		Forced Outage Hrs.	% Avail.
	YTD		YTD	YTD
Parr-CC480				
Unit #1	0		2965	66.15
Unit #2	0		0	100.00
Unit #3	0		434	95.05
Unit #4	0		0	100.00
Unit #5	0		0	100.00
Unit #6	0		0	100.00
<b>TOTAL</b>	<b>0</b>		<b>3399</b>	<b>95.15</b>

**2002** # of hours in year. 8760

	Scheduled Outage Hrs.		Forced Outage Hrs.	% Avail.
	YTD		YTD	YTD
Parr-CC480				
Unit #1	0		0	100.00
Unit #2	0		0	100.00
Unit #3	0		0	100.00
Unit #4	0		0	100.00
Unit #5	0		0	100.00
Unit #6	0		0	100.00
<b>TOTAL</b>	<b>0</b>		<b>0</b>	<b>100.00</b>



2001

# of hours  
in year.

8760

	Scheduled Outage Hrs.		Forced Outage Hrs.	% Avail.
	YTD		YTD	YTD
Parr-CC480				
Unit #1	0		195	97.77
Unit #2	0		0	100.00
Unit #3	0		0	100.00
Unit #4	30		1178	86.21
Unit #5	0		0	100.00
Unit #6	0		0	100.00
TOTAL	30		1373	98.00