Entergy

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Jerry C. Roberts
Director
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GNRO-2002/00061

July 17, 2002

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

SUBJECT: Grand Gulf Nuclear Station, Unit 1
Docket No. 50-416
Supplement to Amendment Request
Response to Request for Additional Information Concerning High Pressure Core Spray Testing

Dear Sir or Madam:

By letter GNRO-2002/0006 dated February 19, 2002, Entergy Operations, Inc. (Entergy) proposed a change to the Grand Gulf Nuclear Station, Unit 1 (GGNS) Technical Specifications (TSs) to remove the mode restriction for testing the High Pressure Core Spray Emergency Diesel Generator.

Entergy and members of your staff held a call to discuss specific questions regarding the performance of these tests. As a result of the call, three questions were determined to need formal response. Entergy's response is contained in Attachment 1.

There are no technical changes proposed. The original no significant hazards considerations included in reference 1 is not affected by any information contained in the supplemental letter. There are no new commitments contained in this letter.

If you have any questions or require additional information, please contact Bill Brice at 601-368-5076.

A001

I declare under penalty of perjury that the foregoing is true and correct. Executed on July 17, 2002.

Sincerely,

JCR/WBB/amt

Attachment:
1. Response to Request for Additional Information

cc: Mr. Ellis W. Merschoff
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Mr. T. L. Hoeg, GGNS Senior Resident
Mr. D. E. Levanway (Wise Carter)
Mr. L. J. Smith (Wise Carter)
Mr. N. S. Reynolds
Mr. H. L. Thomas

Attachment 1

To

GNRO-2002/00061

Response to Request for Additional Information

Response to Request for Additional Information Regarding Proposed Changes to Remove Mode Restrictions for Performing High Pressure Core Spray Diesel Generator Testing

(Ref. GNRO-2002/0006 dated February 19, 2002)

1. Describe how SRs 3.8.1.11, 3.8.1.12, 3.8.1.16 and 3.8.1.19 are performed and state why performing these SRs during power operation does not cause any significant perturbation to the electrical distribution. In addition, describe how LOOP and SI signals are generated without disturbing operation.

Response:

The layout of the electrical distribution system and it's interconnection to the grid/switchyard can be seen on the GGNS Main One-Line diagram in UFSAR Chapter 8 (Figure 8.1-001). References to breaker numbers, transformer numbers and bus numbers etc., used in the discussions below can be better understood by reviewing this drawing.

SR 3.8.1.11 is a simulation of a Loss of Offsite Power (LOOP). This test is performed with the bus lined up to ESF 21 with breaker 152-1705 closed. The HPCS pump is started and recirculates back to the Suppression Pool. A LOOP is simulated by tripping open the offsite power feeder breaker (152-2902). The Division III Diesel Generator (D/G) starts and restores bus voltage in less than 10 seconds. Flow is then adjusted to establish maximum current. All HPCS auxiliaries required during an emergency are verified to be operating. The HPCS pump is stopped after five minutes have elapsed.

SR 3.8.1.12 is a simulation of a Loss of Coolant Accident (LOCA). This test can be performed lined up to any of the ESF transformers. The LOCA signal is inserted by arming and depressing the HPCS Manual Initiation Pushbutton. This causes the HPCS pump, the D/G and all associated auxiliaries to start. The pump is verified to run for >5 minutes. The HPCS pump and D/G are then secured.

SR 3.8.1.19 simulates a LOOP in conjunction with a LOCA. This test is performed with bus 17AC lined up to ESF transformer 12 and with breaker 152-1704 closed. A signal simulating a LOCA (high drywell pressure) is inserted into the HPCS logic by use of an NSSS vendor supplied test switch. The offsite feeder breaker 152-1904 is simultaneously tripped to complete the LOOP/LOCA simulation. The HPCS auxiliaries required during an emergency are verified to be running. The HPCS pump is then overridden off to allow valve logic testing. The LOCA signal is reset and cleared. Another LOCA signal is then inserted into the HPCS logic using the test switch (Low Reactor Water level). The HPCS pump is verified to restart. After all required testing is completed the HPCS pump and D/G are secured.

SR 3.8.1.16 verifies that upon restoration of offsite power, the D/G can be synchronized to the offsite power while loaded with emergency loads, the loads can be transferred to the offsite power source, and D/G returns to a ready to load condition. This is performed following the LOOP test of SR 3.8.1.11. After the D/G has started and accepted load following the LOOP test, the D/G is synchronized to the offsite power. The D/G load is reduced to about 350 KW, effectively transferring the loads to the offsite power source. The D/G output breaker is then tripped open and the D/G is verified not to trip. The parameters required to demonstrate a ready to load condition are then verified and the D/G is secured.

For any of the above SRs, the LOOP and LOCA signals are generated only in the HPCS logic and only on the HPCS AC power supply (bus 17AC). The divisional logic trains prevent any interaction with the Division I and II trains. The LOOP signals generated by de-energizing bus 17AC do not affect the other two ESF trains. The Division III (HPCS) bus is completely independent from Division I and II buses, and the stability of the grid ensures that when the 17AC bus is perturbed, the other division electrical systems are not affected.

The system is separated from the other two divisions both physically and electrically. All controls, wiring and other components are separated to prevent common cause failures and cross divisional damage due to external influences such as fires, pipe ruptures, falling objects, etc (UFSAR 6.3.1.1.3). The HPCS diesel generator supplies only the HPCS pump, support equipment and associated auxiliaries.

Each ESF bus can be lined up to any of three offsite sources, or all three ESF busses can be aligned to any one offsite source as needed. This provides the flexibility to perform testing with the other divisions lined up to a different offsite source, to minimize any anticipated transients or perturbations that may occur.

Voltage transients on busses during on-line testing will likely be less significant than those experienced during plant shutdowns. During power operations, the voltage at the ESF buses is near nominal or slightly above. One reason for this is the relatively low loading factor for the Station Service Transformers. These transformers are only loaded to about ½ their capacity. The UFSAR minimum anticipated grid voltage for the 500 kV sources is 0.992 per unit. This establishes margin between the available bus voltages and the degraded voltage trips at 90% for the other divisions. The time delay features of the Division I and II undervoltage sensors (9 seconds for 90% degraded voltage) are designed to allow small, brief perturbations to settle out well before actual trips would occur. Any transients resulting from the performance of a load rejection test would be expected to be less than 2 seconds in duration and less than 2% in magnitude (Reference GNRO 2002-0032).The HPCS pump starting load while testing on-line would not be significantly different from the starting load for our quarterly IST testing. The SR 3.8.1.12 operation of the HPCS pump is very similar to the testing of the HPCS pump for the quarterly IST surveillance. This surveillance is routinely performed online without disturbing plant operation. The HPCS pump is the main load on the Division III bus and represents greater than 94% of the total Division III LOCA loads (reference UFSAR table 8.3-3).

2. SRs 3.8.11 and 3.8.19 requires verification on a actual or simulated LOOP signal and an actual or simulated LOOP in conjunction with an actual or simulated emergency core cooling system (ECCS) initiation signal, respectively, that HPCS EDG supplies permanently connected and auto-connected loads for $\geq$ 5 minutes. Describe how HPCS pump will be operated during these tests without disturbing plant operation.

Response:

During these tests HPCS is operated on either the minimum flow line and/or the test return line. Both of these lines return to the Suppression Pool. This is not an abnormal mode of operation as the system was designed to allow full flow testing in any operational mode (UFSAR 6.3.4.2.1, 7.3.1.1.1.3.9 and 7.3.2.1.2.3.1.10).

HPCS is tested quarterly to meet Inservice Testing (IST) surveillance requirements. During this quarterly test the pump is run at full flow (approximately 7200 GPM) conditions for approximately 20 minutes. When performing SRs 3.8.19 and 3.8.12 online, the actual injection of the HPCS system into the reactor during the online test will be prevented, most likely by opening the breaker to the HPCS injection valve E22-F004. During performance of SR 3.8.11 the HPCS system does not get an injection signal. A control room operator is typically assigned to run the surveillance. The operator is cognizant of and directs all activities associated with this testing in accordance with the appropriate surveillance procedure. The restoration of all safety related functions, including restoration of the injection valve to operable, are independently verified.

As stated earlier, the HPCS bus is a virtually independent power supply dedicated to the HPCS pump and the associated auxiliaries. The full load of the HPCS bus is relatively small and therefore grid perturbations are minimized during this testing.

3. SR 3.8.1.12 required that on an actual or simulated ECCS initiation signal emergency loads be auto-connected to the offsite power system. Describe how HPCS pump will be operated from offsite power system without disturbing plant operation.

Response:

The entire emergency load for the HPCS bus is less than three megawatts. This size of loading would be normal for the power grid and starting and stopping of a pump this size would be a normal load. The effect on the power grid would be very similar to effects of the quarterly IST testing. The normal power sources for the HPCS system are connected to the grid via the station service transformers upstream of the main generator output breakers and do not use the generator output directly. There are no startup transformers or any need for fast bus transfers (GGNS does not use fast bus transfers). The service transformers are only loaded to about ½ their capacity of which the 3 megawatt load of HPCS is only a small portion (< 2%). As such the load is very much like any other load on the grid and does not directly affect other onsite loads. A more complete discussion of the anticipated voltage transients and their effects is provided in the response to question 1. Therefore, this testing can be done without disturbing plant operation. As discussed in the response to question 2, the operation of the HPCS pump for SR 3.8.1.12 would be very similar to the quarterly IST surveillance with respect to bus loading.