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GNRO-2005/00044

August 11, 2005

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Subject: "Comments on Preliminary Accident Sequence Precursor (ASP) Analyses"
Grand Gulf Nuclear Station, Unit 1
Docket No. 50-416
License No. NPF-29

Dear Sir or Madam:

This letter provides comments on Preliminary Accident Sequence Precursor (ASP) Analyses related to an operational event which occurred at Grand Gulf during the fiscal year 2003. As requested Grand Gulf peer review comments are attached.

Sincerely,

CAB/MLC/amt
Attachment: Comments on Preliminary Precursor Analysis
cc: (See Next Page)

cc: NRC Senior Resident Inspector
Grand Gulf Nuclear Station
Port Gibson, MS 39150

U. S. Nuclear Regulatory Commission
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Mr. D. E. Levanway (Wise Carter)
Mr. L. J. Smith (Wise Carter)
Mr. N. S. Reynolds
Mr. J. N. Compton

Attachment 1

GNRO-2005/00044

**Comments on Preliminary Precursor Analysis
Automatic Reactor Scram Due to Loss of Offsite Power With
Condenser Vacuum Pump Inoperable and
Subsequent Failure of Instrument Air**

Comments on Preliminary Precursor Analysis
Automatic Reactor Scram Due to Loss of Offsite Power With
Condenser Vacuum Pump Inoperable and
Subsequent Failure of Instrument Air

It is estimated that incorporation of the following comments would result in at least a 2.6E-07 reduction in the point estimate CCDP. (The 2.6E-07 is from removal of the contribution from sequences LOOP 41-04 and LOOP 05. Incorporation of other comments would also reduce the remaining CCDP.) The overall point estimate CCDP would be less than 7.4E-07.

1. Event Summary, 2nd paragraph—Bus undervoltage on the Division I, II and III ESF buses was caused by the loss power from both ST21 and ST 11. The loss of ST21 caused undervoltage on the Division II and III ESF buses. The Division I bus, which was connected to ST 11, was carried for a short period of time by the plant generator until J5232 opened.

2. Event Summary, 4th paragraph—Instrument Air is not required for fire water makeup to the RPV since there is a motor operated bypass valve which can be opened (manually, if necessary) to supply firewater to the auxiliary building. Also, firewater and CRD are considered level control systems, not decay heat removal systems.

3. Analysis Results, Dominant Sequences, 2nd paragraph (sequence LOOP 41-04)—This sequence is not a realistic depiction of the GGNS response. It includes a dependency between containment heat removal and continued operation of ECCS pumps that does not exist. The HPCS pump (as well as the LPCI and LPCS pumps) can pump saturated water and GGNS has concluded that the HPCS system will not fail as a result of containment failure.

4. Analysis Results, Dominant Sequences, 4th paragraph (sequence LOOP 40)—The list of important system and component failures is not consistent with the event tree sequence. The event tree sequence includes failure of depressurization and CRD and it does not include failure of containment spray and containment venting. Note also that GGNS does not consider that CRD can be successful unless some other high pressure system has controlled level for approximately 5 hours.

5. Analysis Results, Dominant Sequences, 5th paragraph (sequence LOOP 5)—See comment 3 above. This sequence also includes a non-realistic dependency between containment heat removal and continued operation of HPCS and is not applicable to GGNS.

6. Modeling Assumptions, Analysis Type, 3rd paragraph—At GGNS any or all of the 3 ESF buses can be connected to any combination (even, only one) of the three ESF transformers. Note also, that once power was restored to the East bus no operator actions were required to restore power to the ESF 11 transformer. In addition the ESF 12 transformer (powered for 115 kv Port Gibson line) was never lost. So with this set of circumstances there would only be operator actions to transfer the ESF buses to either ESF 11 or 12. This is a very simple manipulation (i.e., one switch for each ESF bus) that can be performed in the control room.

7. Modeling Assumptions, Analysis Type, 4th paragraph—This states that mission run times have been adjusted consistent with the "time it took" to re-energize the ESF buses. Later in the Key modeling assumptions, it is stated that the diesel generator fail to run and common cause failure to run probabilities were adjusted to reflect the run time of the first diesel (5.07 hrs). The statement in the 4th paragraph implies that it "takes" 5.07 hours to re-energize the ESF buses, while the actual time to re-energize a bus is much less than that. This should be revised to state the mission run times were adjusted to be consistent with actual diesel generator run times for the event.

8. Modeling Assumptions, Key Modeling Assumptions, 5th bullet, (b)—While it is true that there are air operated valves associated with the fire water RPV makeup, there are also motor operated valves, which can be opened manually, that bypass the air operated valves. Procedures for fire water makeup note that the bypass valves (both remote operation and local manual operation) may have to be utilized.

9. Modeling Assumptions, Key Modeling Assumptions, 5th bullet, (c)—This is slightly misleading. Instrument air provides air to the S/RVs for their opening. If air is lost, then it is necessary in the long term to connect bottled air to ensure continued operation of the ADS valves. All of the S/RVs have accumulators that will allow a number of valve cycles. The ADS S/RVs have, in addition, larger receiver tanks that allow more valve cycles for the ADS valves. Thus, the S/RVs have adequate air to operate for a period of time without the bottles connected.

10. Modeling Assumptions, Key Modeling Assumptions, 5th bullet, (f)—Note that the instrument air/service air compressors are cooled by turbine building cooling water (TBCW). Note also that instrument air compressor cooling can be cross-tied from TBCW to standby service water B (SSW B).

11. Modeling Assumptions, Basic Event Probability Changes, 2nd paragraph (OEP-XHE-XL-NR30M & OEP-XHE-XL-NR01H and associated Appendix D worksheet)—This paragraph indicates that the time required to reconnect offsite power to a bus (assuming a ESF bus) is on the order of the available time. This is not true for a station blackout condition. With a dead bus (i.e., diesels failed to start or load) the only action required is to close one switch in the control room for each ESF bus. The action time for this is seconds or a couple of minutes at most. Therefore, the multiplier utilized in Appendix D for Available Time should be at most 0.1 (>5x time required) instead of a multiplier of 10. This would change the probability for these events to 2E-04 instead of 2E-02.

12. Modeling Assumptions, Basic Event Probability Changes, 2nd paragraph (OEP-XHE-XL-NR04H, OEP-XHE-XL-NR08H, and OEP-XHE-XL-NR10H and associated Appendix D worksheet)—Same basic comment as comment number 11 above. In this case the multiplier for Available Time should be 0.01 instead of 0.1. This would result in a probability for these events of 2E-05 instead of 2E-04.

13. Table 3a., Minimum Cut Sets for LOOP Sequence 41-04— As indicated in comment 3 above, this sequence includes a non-realistic dependency between containment heat removal and continued operation of HPCS and is not applicable to GGNS.

14. Table 3a., Minimum Cut Sets for LOOP Sequence 44-03-14—These cut sets do not include credit for recovery of offsite power. Credit for recovery of off site power is appropriate since offsite power recovery to either the Division I or II bus would make other mitigating equipment available. This appears to be true for all of the displayed cut sets. Most of the LCI1 (one train of low pressure coolant injection) failures appear to be the result of SSW failures. It should be noted that none of the LPCI or LPCS pumps have a direct dependency on SSW. The LPCS pump will fail at approximately 10 to 12 hours due to lack of room cooling although the HPCS DG cross-tie procedure does not allow the use of the LPCS pump if the HPCS DG has been cross-tied to the Div 1 ESF bus. LPCI A and B will automatically switch to containment spray mode on high containment pressure (~9 psig) and there is not a procedure to bypass the automatic realignment. This will occur in approximately 6 to 8 hours if SSW or venting is not available for containment cooling. LPCI C should be able to continue to run even if the containment fails. The bottom line for this sequence is unless there is a failure to start of the low pressure pump for the selected division, there is significant time available to recover offsite

15. Table 3a., Minimum Cut Sets for LOOP Sequence 05— As indicated in comment 5 above, this sequence includes a non-realistic dependency between containment heat removal and continued operation of HPCS and is not applicable to GGNS.

16. Table 3a., Minimum Cut Sets for LOOP Sequence 44-39—Shouldn't there be recovery of offsite power events in these cutsets? Even with a stuck open relief valve, no HPCS and no RCIC there is approximately 30 minutes available to recover offsite power. More time is available for the RCIC fail to run events.

17. Table 3a., Minimum Cut Sets for LOOP Sequence 44-39—Several of the cut sets include a failure of operator to establish room cooling event (RCI-XHE-XM-RCOOL). This is not a failure at GGNS. RCIC does not require room cooling for continued operation for the PRA mission time.

18. Appendix A, April 24, 2003, 09:49:48—East 500 kV line should be East 500 kV bus.

Comments on Attachment 1 to June 10 Memo from Nilesh C. Chokshi
To Ledyard B. Marsh
Summary of Preliminary ASP Analyses for Peer Review

1. Condition summary, 1st paragraph—Instrument Air is not required for fire water makeup to the RPV since there is a motor operated bypass valve which can be opened (manually, if necessary) to supply the firewater to the auxiliary building. Also, firewater and CRD are considered level control systems, not decay heat removal systems.