Entergy

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Jerry C. Roberts
Director
Nuclear Safety Assurance

GNRO-2002/00077

August 22, 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 2 to Amendment Request
Response to Request for Additional Information Concerning New Special Operations Limiting Condition for Operation Suppression Pool Makeup-MODE 3 (LDC 2002-006)

Dear Sir or Madam·

By letter GNRO-2002/00011 dated February 25, 2002, Entergy Operations, Inc (Entergy) proposed a change to the Grand Gulf Nuclear Station, Unit 1 (GGNS) Technical Specifications (TS) to add a new Special Operations Limiting Condition for Operation (LCO) (Suppression Pool Makeup-MODE 3). This LCO would allow installing Upper Containment Pool (UCP) gates and draining the reactor cavity pool portions of the UCP while still in MODE 3, "Hot Shutdown," with the reactor pressure less than 230 pounds per square inch gauge (psig). The request would also modify the applicability of the UCP gates surveillance requirement to allow installation of UCP gates in MODE 1, "Power Operation," MODE 2 "Startup," or MODE 3. The proposed change would allow early gate installation and allow draining of the pool while holding the plant in MODE 3 to facilitate starting of certain outage functions.

Entergy and members of your staff held a call to discuss specific questions regarding this submittal. As a result of the call, certain clarifications 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 the referenced GNRO 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.

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I declare under penalty of perjury that the foregoing is true and correct. Executed on August 22, 2002.

Sincerely,

JCR/WBB/amt
Attachment:
1. Response to Request For Additional Information

cc: U. S. Nuclear Regulatory Commission
ATTN: Mr. Ellis W. Merschoff
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U. S. Nuclear Regulatory Commission
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Dr. E. F. Thompson
State Health Officer
State Board of Health
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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-2002/00077

Response to Request for Additional Information

Question:
Describe in detail the deviations that the MODE 3 Loss of Coolant Accident (LOCA) dose analysis made from the MODE 1 analysis. Confirm that the existing approved methodology was utilized in the MODE 3 evaluation.

Response:
The MODE 3 LOCA dose analysis applied the MODE 1 analytical model with a few changes to reflect the MODE 3 nature of the accident. This analysis applied the same methodology as utilized in the GGNS alternative source term analyses, which was approved by the Staff in Amendment 145 to the GGNS Operating License, dated March 14, 2001.

The changed parameters for MODE 3 are noted on the attached tables of inputs to the MODE 1 analysis presented in the UFSAR. These changes can be categorized into three general topics are described below.

1. **No credit is taken for spray operation.**

   Without containment spray, the increased mixing rates between the unsprayed and sprayed regions during spray operation are not credited. In lieu of containment spray, only natural deposition is credited in the containment which has removal rates (lambdas) that are significantly less than the 9.5 hr^{-1} generated by containment spray.

2. **A decay time of 3 hours is assumed before the LOCA.**

   Three hours represents the earliest time at which the draindown of the upper containment pool can begin based on the proposed Technical Specification (3.10.9) in the License Amendment Request. This decay time results in a significant reduction in the short-lived isotopes before the release begins.

3. **The reduced peak containment pressure associated with a MODE 3 LOCA was credited for reducing containment leakage.**

   As reported in the License Amendment Request, the peak containment pressure for the MODE 3 LOCA is calculated to be 5.94 psig, which is significantly less than the 11.5 psig calculated for the MODE 1 LOCA. The current containment and Main Steam Isolation Valve (MSIV) leakage rates of 0.385%/ day and 100 scfh (per steam line) are based on this 11.5 psig pressure. For the MODE 3 LOCA radiological analysis, a bounding containment pressure of 7.5 psig was assumed since any pressure greater than this value would automatically initiate containment spray. This reduced pressure would reduce the assumed containment and MSIV leakage rates from 0.385%/ day and 100 scfh (per steam line) to 0.311%/day and 80.8 scfh, respectively. These reduced leakage rates were applied in the MODE 3 LOCA dose analysis.

Consistent with the MODE 1 LOCA analysis, this MODE 3 analysis reviewed 2 cases: single failure of an electrical division and single failure of an MSIV. The case of the failed MSIV resulted in the limiting radiological consequences as in the MODE 1 LOCA analysis.

As shown in Table 3, the MODE 3 LOCA dose results meet the acceptance criteria in 10 CFR 50.67 and are bounded by the results of the MODE 1 scenario.

TABLE 1

CONTAINMENT LEAKAGE
DOSE MODEL PARAMETERS

	Design Basis Assumptions
I. Data and assumptions used to estimate radioactive source term from postulated accidents	
A. Power level	3910 MWt
B. Core source terms	See Table 15.6-9
C. Release fractions	See Table 15.6-10
D. Halogen chemical species	
(1) Organic	0.15%
(2) Elemental	4.85%
(3) Particulate	95%
E. Decay Time (hours)	**3**
II. Data and assumptions used to estimate activity released from containment pathway	
A. Node volumes (ft^3)	
(1) Drywell	2.7E5
(2) Sprayed Containment	8.4E5
(3) Unsprayed Containment	5.6E5
(4) Secondary Containment (based on 50% mixing efficiency)	3.0E5
B. Flows between nodes (cfm)	
(1) Drywell to Unsprayed Containment	
(a) 0 hours - 2 hours	3.0E3
(b) 2 hours	Well mixed
(2) Unsprayed Containment to Drywell	
(a) 0 hours - 2 hours	0
(b) 2 hours	Well mixed
(3) Unsprayed Containment to Sprayed Containment	
(a) 0 hours - 30 min	1.87E5
(b) 30 min - 24 hours	**1.87E5**
(c) 24 hours - 30 days	1.87E5
(4) Sprayed Containment to Unsprayed Containment	
(a) 0 hours - 30 min	1.87E5
(b) 30 min - 24 hours	**1.87E5**
(c) 24 hours - 30 days	1.87E5
C. Primary containment leak rate (%/day)	
(1) 0-24 hours	**0.311**
(1) 24 hours - 30 days	**0.311**

TABLE 1 (cont.)

CONTAINMENT LEAKAGE
DOSE MODEL PARAMETERS

	Design Basis Assumptions
D. Spray Removal - **NOT CREDITED**	
(1) Aerosols	**0** per hour
Time to reach DF of 50	**N/A**
(2) Elemental	**0** per hour
Time to reach DF of 200	**N/A**
E. Elemental plateout removal rate (per hour)	
(1) Drywell (0-7 hours)	0.866
(2) Lower Containment (0-2.8 hours)	1.092
(3) Upper Containment (0-2.8 hours)	0.682
F. Aerosol natural deposition removal rate in drywell **and containment** (per hour)	
0 - 0.5 hours	0.7474
0.5 - 2.0 hours	0.2983
2.0 - 5.0 hours	1.055
5.0 - 8.3 hours	0.6390
8.3 - 12 hours	0.5571
12 - 19.4 hours	0.5236
19.4 - 24 hours	0.5068
24 hours - 30 days	0.0
G. Secondary Containment	
(1) SGTS Flow	4000 cfm
(2) Filter Train Removal Efficiency	
(a) Organic Iodine	99%
(b) Elemental Iodine	99%
(c) Particulates	99%
(3) Bypass Flow	1 cfm
III. Dispersion Data	See Table 15.6-12
IV. Breathing Rates (m^3/s)	
(1) 0-8 hours	3.5E-4
(2) 8-24 hours	1.8E-4
(3) 1 day - 30 days	2.3E-4
V. Dose Conversion Factors	Federal Guidance Reports 11 and 12

TABLE 2

MSIV LEAKAGE
ADDITIONAL DOSE MODEL PARAMETERS

	Design Basis Assumptions
I. Data and assumptions used to estimate activity released from MSIV pathway	
A. Leakage Rates	
(1) MSIV on steamline with stuck-open MSIV	
(a) 0 hours - 24 hours	**80.8** scfh
(b) 24 hours - 30 days	**80.8** scfh
(2) Total for all remaining steamlines	
(a) 0 hours - 24 hours	**121.2** scfh
(b) 24 hours - 30 days	**121.2** scfh
B. Release pathway for leakage past outboard MSIV	
(1) 0 - 20 minutes	To environment
(2) 20 minutes - 30 days	To secondary containment

TABLE 3

LOSS-OF-COOLANT-ACCIDENT
OFFSITE AND CONTROL ROOM PERSONNEL DOSES

DOSES (Rem)	TEDE
Site boundary (EAB) [696 m] (3.9 - 5.9 hrs)	5.2
Low Population Zone (LPZ) [3219 m] (0-30 days)	3.5
CONTROL ROOM PERSONNEL (0-30 days)	3.4