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August 18, 1983

NUCLEAR PRODUCTION DEPARTMENT

U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, D. C. 20555

Attention: Mr. Harold R. Denton, Director

Dear Mr. Denton:

SUBJECT: Grand Gulf Nuclear Station
Unit 1
Docket No. 50-416
License No. NPF-13
File 0272/L-860.0
Control Room Inleakage
AECM-83/0470

AECM-83/0333, dated June 16, 1983, transmitted a revised control room dose assessment based on modified meteorological assumptions and a control room inleakage rate of 590 cfm. In a letter from A. Schwencer to J. P. McGaughy, Jr., dated August 1, 1983, the NRC found Mississippi Power & Light's (MP&L's) proposal unacceptable since it was not in compliance with the guidance given in Section 6.4 of the Standard Review Plan (SRP) (NUREG-0800).

A meeting was held on August 4, 1983, between representatives of MP&L, the NRC's Division of Licensing (DL) and Accident Evaluation Branch (AEB) and Bechtel to discuss the NRC concerns with the revised analysis. During this discussion, a presentation on the conservatisms in the modified meteorological assumptions was made by MP&L (reference Attachment 1).

In concluding the meeting, the NRC representatives indicated the revised dose assessment submitted to the NRC via AECM-83/0333 remained unacceptable. This conclusion was based on the NRC's evaluation that the meteorological methodology, as presented in the MP&L letter, was not an acceptable alternative to NRC approved techniques described in Section 6.4 of the SRP. It is MP&L's understanding that the NRC acknowledges certain conservatisms in the MP&L proposed meteorological methodology. However, the NRC considers that there is sufficient uncertainty in the handling of the unique Grand Gulf building configuration as to warrant additional analysis and/or testing to verify proper meteorological modeling. In addition, the NRC indicated that the proposed method of handling the meteorological data was not an acceptable alternative to the NRC approved method, endorsed in SRP 6.4. MP&L committed to addressing these concerns in a later submittal. The schedule for this submittal is discussed below.

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As noted earlier MP&L also presented in the August 4, 1983 meeting, information on other conservatisms pertaining to the dose assessment. These conservatisms are listed in Attachment 2. It was agreed that these conservatisms, if quantified, evaluated in conjunction with the original FSAR meteorological methodology, and found to generate acceptable dose results, constitute adequate justification for interim operation until the above NRC concerns could be resolved.

As discussed in the meeting, the most readily quantifiable conservatism is the use of actual containment leak rate in the dose calculations (as opposed to the analysis assumption of using design containment leakage.) The actual Grand Gulf containment leak rate, obtained through plant testing, was determined to be 0.072 volume percent per day. The original FSAR dose analysis and the revised dose analysis (AECM-83/0333) assumed the design leak rate of 0.35 volume percent per day for dose calculations.

As a result of the subject meeting, the dose analysis was revised, using the actual containment leak rate and the original FSAR meteorological methodology. This re-analysis assumes, of course, a control room inleakage rate of 590 cfm, proposed in AECM-83/0333. The details of this re-analysis are presented in Attachment 3. The most limiting operator dose was that to the thyroid and was determined to be slightly less than 24 Rem. All calculated doses were well within those values allowed by 10 CFR 50 for the design basis loss of coolant accident. These acceptable results were arrived at without taking advantage of other conservatisms listed in Attachment 2. Based on this information, MP&L considers that interim operation is justified.

In order to determine an appropriate duration for interim operation, a survey was conducted to judge the stability of containment leak tightness. Information on this survey and MP&L's evaluation are presented in Attachment 4. Based on this information, MP&L concludes that containment leak rates are quite stable from test to test, and thus there is assurance that the acceptable dose results of the re-analysis presented in Attachment 3, based on the latest measured containment leak rate, will remain valid through the first regularly scheduled refueling outage. While it was clear that the NRC Staff suggested six months as a "reasonable" amount of time for interim operation, MP&L considers that the stability of the containment leak rate, the margin of the re-analysis dose results to 10 CFR 50 limits, and other conservatisms in the dose assessment (Attachment 2), all substantiate the safe operation of Grand Gulf through the first refueling outage.

However, consistent with the NRC Staff's recommendation, MP&L commits to supplying the additional information, addressing the NRC's concerns discussed above, within six months of this date. The preliminary work to accomplish this is underway at this time. MP&L intends to keep the Staff informed of the progress of this effort.

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In that resolution of this issue is required prior to exceeding 1% power (Attachment 1 to the Grand Gulf Operating License), formal acceptance of this justification for interim operation is requested as soon as possible to prevent impact to the restart schedule for Grand Gulf.

Yours truly,

L. F. Dale
Manager of Nuclear Services

MLC/JGC:sap
Attachments

cc: Mr. J. B. Richard (w/o)
Mr. R. B. McGehee (w/o)
Mr. T. B. Conner (w/o)
Mr. G. B. Taylor (w/o)

Mr. Richard C. DeYoung, Director (w/a)
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Conservatisms in the Revised Grand Gulf X/Q Methodology

A revised methodology for determining X/Q values based on Halitsky's "block" wind tunnel test data was presented to the NRC in AECM-83/0333, dated June 16, 1983. This methodology was formally rejected by the NRC in a letter from A. Schwencer to J. P. McGaughy, Jr., dated August 1, 1983. An informal meeting was held between representatives of the NRC, MP&L, and Bechtel to discuss the reasons for this rejection and to present arguments for the appropriateness of and conservatisms in this methodology.

A summary of the conservatisms in this methodology are discussed below.

1. Use of Halitsky's "block" wind tunnel data resulted in an extrapolated concentration coefficient (K) of 1.0. A margin of 50 percent was added to cover any errors in extrapolation of the data to yield a "K" value of 1.5.

2. Halitsky's test data is based on wind speeds (u) measured at the release point. The SGTS release point is located on top of the auxiliary building (133 feet above grade). The "u" at the SGTS release point was not adjusted to correspond to the test data point. Instead, wind speeds measured 33 feet above grade were used. This results in a lower wind speed and less dispersion of the release than would actually occur. The results are, therefore, more conservative.

3. Grand Gulf is a low wind site. Forty-six percent of the annual winds are less than three mph. At these low speeds, the wind has a tendency to shift or fluctuate in direction. This wind "meander" was not accounted for and, therefore, adds additional conservatism to the methodology.

4. No credit was taken for the buoyancy associated with the SGTS exhaust caused by its high temperature of 162°F (reference FSAR Figure 6.5-4). This buoyancy tends to cause the release to rise and pass over the control building instead of dropping approximately 60 feet from the SGTS exhaust elevation to reach the control building as was assumed.

5. Field tests have shown that the Halitsky "K" factor isopleths based on wind tunnel test data result in an additional factor of conservatism of 5 to 10 in X/Q values.

Conservatisms in the Grand Gulf Dose Calculations*

- A release from Unit 2 was assumed. This case is more conservative than a Unit 1 release due to 1) the unit vent for Unit 2 being closer to the Control Building and 2) less dispersion of the release plume being caused by the enclosure building wake.

- A containment leak rate of 0.35 volume percent per day was assumed. The actual tested leak rate is 0.07 volume percent per day.

- No credit was taken for holdup of the release in the enclosure building during the first two minutes of the accident.

- All leakage into the Control Building was assumed to enter through the exposed west wall. In actuality, little inleakage is expected through this wall since all penetrations are isolated. Inleakage will occur at the Auxiliary/Control Building interface. However, this inleakage will be diluted by the Auxiliary Building volume.

* Presented by MP&L in the meeting with the NRC held August 4, 1983, on Control Room Inleakage.

Revised FSAR Control Room Dose Calculations

The FSAR control room operator doses cited in Table 15.6-14 are based on the assumptions described in Section 15.6.5. These assumptions include:

1. A design basis primary containment leak rate of 0.35 volume percent per day for the duration of the accident;

2. A design basis MSIV leakage of 25 scfh from each line (100 scfh total). Leakage was assumed to begin 20 minutes into the accident from one line and 1.61 hours into the accident from the other three;

3. A SGTS exhaust flow rate of 2300 cfm;

4. A control room inleakage rate of 263 cfm; and

5. The X/Q values cited in Table 15.6-12.

As a result of a meeting with the NRC on August 4, 1983, the FSAR analysis has been revised. This revised analysis modified assumptions 1, 3, and 4 above. The new assumptions are described below.

1. A primary containment leak rate of 0.072 volume percent per day is assumed for the duration of the accident. This revised leak rate corresponds to the value measured during the containment integrated leak rate test (ILRT) performed on January 5, 1982.

3. The SGTS exhaust flow rate has been assumed to be 4500 cfm. This flow rate conservatively envelopes the flow rate of 4000 cfm ± 10% as stated in GGNS Technical Specification 4.6.6.3.

4. Control room inleakage is assumed to occur at a rate of 590 cfm. This inleakage rate is consistent with the rate reported in AECM-83/0333, dated June 16, 1983.

The revised assumptions stated above, in conjunction with the other assumptions in the FSAR, resulted in the operator doses shown in Page 2 of this attachment. These doses are well under 10 CFR 50, Appendix A, GDC 19 limits.

Control Room Doses

Type	Calculated Dose (Rem)	Allowable Dose (Rem)
Thyroid	23.82	30.0
Beta-Skin	17.13	30.0
Whole Body	1.07	5.0

Justification for Interim Operation

The revised FSAR control room dose analysis discussed in Attachment 3 to this letter takes credit for the measured containment leak rate to justify interim operation for six months. To determine if containment leak tightness degrades significantly over time periods of a year or more, a survey was done of plants that have conducted more than one ILRT. A tabulation of plants surveyed and their ILRT results is shown on Page 2 of this attachment. Of the seven plants surveyed, only one reported any degradation in leak tightness. The others showed a marked improvement in leak tightness. These results indicated that, in general, the containment leak rate does not increase significantly between ILRTs.

The Grand Gulf ILRT conducted on January 5, 1982, measured a leakage rate of 0.072 volume percent per day. This measured value would result in a limiting thyroid dose of 23.82 Rem as described in Attachment 3 to this letter. This dose is below the 10 CFR 50, Appendix A, GDC 19 limit of 30 Rem. As shown in Figure 1, the containment leakage would have to degrade to approximately 0.125 volume percent per day (excluding MSIV leakage) before this dose limit is exceeded. This is an increase of 74 percent over the measured leak rate.

Based on the information presented above, it can be concluded that 1) in general, the containment leak rate does not increase significantly between ILRTs, and 2) sufficient margin exists in the Grand Gulf dose calculations to allow for an increased containment leak rate. Therefore, interim operation for at least six months is justified.

Integrated Leak Rate Test Results

Plant	Date of Test	Measured Leakage (V/O per day)
Fitzpatrick	1978	0.29
	1982	0.20
Millstone 1	1976	0.61
	1981	0.30
Palisades	1978	0.01
	1982	0.20
Pilgrim	1980	0.42
	1982	0.20
Surry 2	1980	0.04
	1981	0.02
TMI I	1978	0.06
	1981	0.02
Turkey Point 3	1979	0.10
	1981	0.03

Figure 1

Thyroid Doses vs. Containment Leakage