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SUBJECT: Provides addl info supporting review of proposed mod to plant emergency power sys.

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DUKE POWER

May 31, 1995

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

Subject: Oconee Nuclear Station
Emergency Power Modification Request For Additional Information

During a May 25, 1995 conference call between Duke Power and the NRC, the NRC requested that Duke Power provide additional information to support the review of a proposed modification to the Oconee emergency power system. Specifically, the NRC requested information regarding how Keowee would be addressed under the Maintenance Rule. In addition, reliability data for Keowee is based on previous operating history. Historical data indicates that both Keowee units generate to the grid approximately three percent of the time. The NRC suggested that additional Keowee reliability sensitivity studies be performed if Duke Power plans to operate both Keowee units in excess of the historical values.

Attached is additional information to address the two items that were discussed during the May 25, 1995 conference call.

Very truly yours,

J. W. Hampton

cc: Mr. S. D. Ebneter, Regional Administrator
U. S. Nuclear Regulatory Commission, Region II

Mr. L. A. Wiens, Project Manager
Office of Nuclear Reactor Regulation

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Senior Resident Inspector
Oconee Nuclear Station

A001

Request For Additional Information on NSM ON-52966

Maintenance Rule Information on Keowee

Duke Power has included both Keowee units in its Maintenance Rule program. Keowee is considered a risk significant system in the scope of the Maintenance Rule. Keowee is divided as follows:

- Keowee Unit 1 with well-defined subsystems
- Keowee Unit 2 with well-defined subsystems
- Keowee underground path
- Keowee overhead path
- Keowee auxiliary power system

Keowee performance is monitored and trended against established performance criteria on availability, reliability, and maintenance preventable functional failures. The Keowee performance criteria are based on the Oconee PRA. Continued monitoring of Keowee under the Maintenance Rule assures that the assumptions of the PRA remain valid and Keowee reliability remains high.

Keowee Reliability Sensitivity Study

Approval and implementation of the modification under review by the NRC would allow both Keowee units to generate to the grid. Historically, both units generate to the grid simultaneously approximately three percent of the time. Table 1 summarizes historical Keowee Hydro Station generation data between 1980 and 1992.

Grid operation of Keowee Hydro Station is constrained by several considerations. For example, Duke Power has a commitment to the Army Corps of Engineers to transfer so many acre-feet of water from Lake Keowee to Lake Hartwell. The quantity of water to be passed through Keowee Hydro Station to meet this commitment is calculated weekly based on lake levels in Lake Jocassee, Lake Keowee, and Lake Hartwell. Keowee Hydro Station is also operated to meet peak generation needs for the Duke Power grid. Also, Keowee Hydro Station may be operated if the lake level for Lake Keowee must be reduced due to excessive precipitation. Pumped storage facilities upstream of Lake Keowee are another reason why Keowee operation has been historically limited. In addition, the lake level in Lake Keowee must be maintained to meet regulatory commitments for Oconee Nuclear Station. Based on the above considerations, it is Duke Power's expectation that future generation of both units to the grid will not deviate significantly from the historical data.

Table 1 indicates that generation of both Keowee units to the grid will fluctuate from year to year, with a long term average of approximately three percent. Duke Power has recently completed a sensitivity calculation to address the impact of grid operation on Keowee reliability. The Keowee PRA was reanalyzed assuming that both units generate

to the grid at an unrealistic value of thirty percent of the time. This sensitivity case will be included in the final documentation of the Keowee PRA, which will be submitted to the NRC. The results of the sensitivity calculation indicate that Keowee reliability is not measurably impacted if generation of both units to the grid is increased from three percent to thirty percent. A brief summary of this sensitivity calculation is provided below.

The Keowee unit aligned to the underground path is currently administratively restricted from generating to the grid. Approval and implementation of the proposed modification under review by the NRC would allow the underground unit to generate to the grid. The Keowee reliability analysis indicates that, assuming a mission time of 24 hours, the Keowee units are more likely to fail during the 24 hour run than at the time of the start demand. Therefore, a change in the start failure probability has a smaller impact on overall Keowee reliability than a change in the run failure probability. The run failure probability is independent of whether or not the unit was generating to the grid at the time the start demand is received.

The start failure probability for the underground unit does not change significantly whether the unit is in standby or generating to the grid. The main contributors to the start failure probability from the standby condition are the components of the generator excitation system. These include the field, supply, and field flashing breakers and the voltage regulator components. No demands are placed on the generator output breakers from this condition. When the unit is generating to the grid, the start failure probability is dominated by the generator output breaker failures. These breaker failures are ACB1 failing to open or ACB3 failing to open or failing to reclose. However, the potential failures for the generator excitation system are not applicable since the unit is already running and these failures no longer contribute. The net effect is essentially no increase in the start failure probability from these two initial conditions.

In summary, increased grid generation has a negligible impact on the start failure probability, and the run failure probability is independent of grid generation. Therefore, although significant changes from historical generation data are not expected in the future, it is concluded that grid generation in excess of the historical values would not adversely impact the reliability of Keowee.

Table 1

Keowee Operating Data

Year	Rainfall (inches)	Keowee 1 and 2 Concurrent Operating Time (hours)	(percent)
1980	55.4	398.5	4.55
1981	36.3	93.6	1.07
1982	51.9	180.7	2.06
1983	56.1	343.5	3.92
1984	56.0	391.7	4.47
1985	56.7	262.2	2.99
1986	39.4	230.9	2.64
1987	58.3	334.8	3.82
1988	41.9	201.5	2.30
1989	72.2	227.3	2.60
1990	59.5	324.8	3.71
1991	64.1	336.0	3.84
1992	85.8	240.9	2.75
Average	56.4	274.3	3.13