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 Office of Nuclear Reactor Regulation, Director

SUBJECT: Forwards comments on 830908 evaluation re 830801 degraded voltage event. Util should have recognized 100-volt reset deadband & transformer 11 should have been considered in 810130 voltage adequacy analysis.

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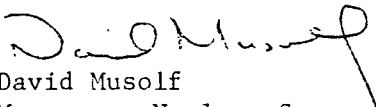
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Washington, DC 20555

MONTICELLO NUCLEAR GENERATING PLANT
Docket No. 50-263 License No. DPR-22

Comments Related to NRR Review of August 1, 1983
Monticello Degraded Voltage Event

In a letter dated September 8, 1983 we were provided with a Safety Evaluation prepared by the Office of Nuclear Reactor Regulation related to the August 1, 1983 degraded voltage event which took place at the Monticello Nuclear Generating Plant. The purpose of this letter is to provide, for the information of the NRC Staff, the results of our review of this evaluation.

A page by page review of the September 8, 1983 evaluation is attached. Please contact us if you have any questions related to our comments.


David Musolf
Manager - Nuclear Support Services

DMM/bd

c: Regional Administrator-III, NRC
J F Streeter, Region III
Resident Inspector, NRC
NRR Project Manager, NRC
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Attachment

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Director of NRR, NRC
November 15, 1983
Attachment

Review of September 8, 1983, Letter from Domenic B Vassallo, Chief, Operating Reactors Branch #2, USNRC, "Monticello Operating Event of August 1, 1983: Degraded Voltage Relay Trip and Unexpected Loss of Offsite Power".

NSP COMMENTS

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An EG&G reviewer accompanied NRR on the joint NRR/Region III plant visit on August 11-12, 1983. A report prepared by EG&G is included with the NRC letter. Because the EG&G representative was flying in from Idaho, he did not arrive on site until major portions of the meeting on August 11th had been concluded. Little or no additional information was discussed during the August 12, 1983 meeting which was basically an "exit" statement. It would have been beneficial to discuss the details of the analysis and the August 1, 1983 event with EG&G.

The report states that the August 1, 1983 was, "...the direct result of inadequate communications between the licensee's corporate-level licensing staff and its plant operating staff." We believe there is no basis for this statement. Much of the information presented by NSP on August 11, 1983 to the NRR/Region III joint inspection team showed that communications between the corporate licensing staff and the plant technical staff on this issue were very good.

The report states that, "...the plant had been operating non-conservatively outside the bounds of the safety analysis." We disagree. The August 1, 1983 event resulted from reduced voltage while operating on the station auxiliary transformer (No. 11). This transformer was not analyzed as an off-site source in our January 30, 1981 analysis of station distribution system voltage adequacy.

The report states that Bechtel performed the analysis submitted on January 30, 1981. They did not. The analyses were performed by the NSP Power Supply Planning Department using NSP load flow computer codes.

The report states that, "...it is not clear who established the six assumptions used in the analysis..." We stated during the meeting and at other times, that these assumptions were developed jointly by the NSP Power Supply Planning Department and the NSP Superintendent of Electric Plant Maintenance. They were developed as being characteristic of a degraded grid condition. They were clearly not applicable to the grid condition on August 1, 1983 when the system was lightly loaded and stable and the system dispatcher was using available generation to reduce voltages in the system.

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The report implies that 4025 volts is the minimum acceptable voltage on the safeguards buses. It is not. This voltage was the lowest steady state voltage reported in Table 4 of our analysis (actually 0.967 pu or 4023 volts). This voltage was compared in our report to the degraded voltage setpoint of 3885 and it was concluded the analysis was acceptable since the setpoint would not be reached. Analyses performed in conjunction with the degraded voltage protection logic modification (separate from the voltage adequacy analysis submitted 1/30/81) concluded the minimum acceptable voltage for starting safeguard loads was 3885 volts. In our view, there is no other significance to the value of 4025 (or 4023) volts.

The reports states that, "...if the ESF system had been called upon during conditions of this type, the offsite power system may not have been able to start and operate them." This is not correct. The August 1, 1983 event represented a case where the Monticello generator was being used for system voltage control and was receiving reactive load. The only concern that can be raised is the spurious actuation of the logic when running heavy in-plant electrical loads while at the same time reducing generator terminal voltage to receive VARS - precisely what happened on August 1, 1983. Two loops of torus cooling were placed into service when the August 1, 1983 event took place. This is a more severe loading condition than ECCS actuation. Analyses submitted on August 24, 1983 show that substation voltages of 340.5 kv on the 345 kv system and 117.4 kv on the 115 kv system are adequate to carry safeguards loads without actuating the degraded voltage protection logic and transferring these loads to the diesel generators. Substation voltages on August 1, 1983 were above these levels.

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The report states that, "...increased dependence on the onsite power sources would not be unsafe" until revised analysis are completed and reviewed. We believe that the August 1, 1983 event has not brought into question the ability of the offsite sources to satisfy their safety related function. As noted above, and in our August 24, 1983 analysis, the performance of these sources for ECCS loading has not been brought into question.

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The report states that, "...a design that inherently precludes access to the other sources of offsite power is not consistent with a design objective to provide redundant access circuits to the grid." We would agree that this feature may not be desirable. The Monticello design conforms, however, with section B.1.d of Enclosures (1) to a letter dated June 3, 1977 from the NRC (Staff Positions Relate to Emergency Power Systems for Operating Reactors). This Staff position requires: "The voltage monitors shall automatically initiate the disconnection of offsite power sources whenever the voltage set point and time delay limits have been exceeded."

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The report states, "...the licensees actions in reponse to this Bulletin (79-27) may not have been adequate." As stated in our letter dated October 28, 1983, the Bulletin was concerned with loss of protection system power supplies. The August 1, 1983 event was a case of a degraded power supply. We believe our initial response to Bulletin 79-27 was complete and accurate. Our August 24, 1983 letter, however, expanded the investigation specified in the Bulletin to address degraded supplies also.

The report concludes that the, "...cause of the event was plant operation at a voltage non-conservatively below the analyzed range of acceptable voltages." We disagree. The August 1, 1983 event was, as described above, a case that was not considered in our analysis. There were no implications related to adequacy of safeguards loading.

CONCLUSIONS

Our investigation has led us to the following conclusions related to the causes of the August 1, 1983 event. These are:

- A. A reset deadband of approximately 100 volts existed in the relays selected to perform the degraded voltage detection function. This reset deadband should have been recognized by NSP in designing and testing this logic.
- B. We failed to consider the No. 11 transformer as an offsite source in our analysis of station distribution system voltage adequacy submitted on January 30, 1981.
- C. We failed to recognize that the operation of two torus cooling loops during normal plant operation is a more severe load case than ECCS actuation. The use of two loops to rapidly cool the torus water below the Technical Specification limit is a relatively recent operating practice as is the practice of running both RHR service water loops in shutdown cooling to assure that both heat exchangers have a dp to prevent leakage.

An analysis will be completed and submitted for NRC Staff review which includes the No. 11 transformer as an off site source. Acceptable switchyard voltages will be determined taking into account generator reactive loading. In addition, this analysis will be performed for the other off site sources (1R and 1AR transformers) in such a manner that ranges of acceptable switchyard voltages will be determined. These ranges will be applied as limits. The grid voltage assumptions used in the January 30, 1981 analysis were never intended to be applied in this manner.