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AUTH.NAME AUTHOR AFFILIATION
DOLAN,J.E. Indiana & Michigan Electric Co.
RECIP.NAME RECIPIENT AFFILIATION
DENTON,H.R. Office of Nuclear Reactor Regulation, Director

SUBJECT: Forwards info requested re grid degraded voltage for operation of 69 kV alternate offsite power source transformer,per 800528 ltr.

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# INDIANA & MICHIGAN ELECTRIC COMPANY

P. O. BOX 18
BOWLING GREEN STATION
NEW YORK, N. Y. 10004


January 27, 1981
AEP:NRC:00268C

Donald C. Cook Nuclear Plant Unit Nos. 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
Grid Degraded Voltage

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Denton:

The attachment to this letter contains the information requested by members of your staff concerning grid degraded voltage and supplements our letter of May 28, 1980 (AEP:NRC:00268B) for operation of the 69 kV alternate offsite power source.

Very truly yours,

John E. Dolan

John E. Dolan
Vice President

cc: R. C. Callen
G. Charnoff
R. S. Hunter
R. W. Jurgensen
D. V. Shaller - Bridgman
Region III Resident Inspector at Cook Plant - Bridgman

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ATTACHMENT TO AEP:NRC:00268C

The voltage taps on the 69/4 kV alternate offsite power source transformer 1-EP and its standby 2-EP were changed from Tap 4 (67.0/4 kV) to Tap 3 (68.8/4 kV) on July 21, 1980. This tap change resulted from the initial evaluations of the alternate offsite power source as committed to in our letter of December 17, 1979, No. AEP:NRC:00268.

The loading limitations of the 69 kV alternate offsite power source were reviewed utilizing worst case conditions. The previously submitted analysis results reviewed the application of 2 safety trains of one unit under accident conditions to transformer 1-EP. The previously submitted results were satisfactory for meeting the minimum requirements. However, due to the NRC requirement that we impose technical specification limitations on the loading of the 69/4 kV transformer (1-EP), we have reanalyzed the 69 kV alternate offsite power source to justify our proposed Technical Specification for loading the transformer based on measured bus voltage $\geq$ 90% of rated voltage and not limiting the number of safety trains.

Additional studies of the alternate offsite power source were conducted to evaluate its performance under more severe loading conditions. Cases C4 and C5 of the Attachment to our letter AEP:NRC:0268, where both safety trains of one unit under accident conditions, and one safety train of the opposite unit under shutdown conditions are connected to transformer 1-EP were studied. Case C4 evaluated the steady state conditions and C5 evaluated the voltage conditions during the starting of the last and largest motor. The results are tabulated below:

| Case | Source | Bus | Base Voltage | Per Unit Voltage |
|---|---|---|---|---|
| C4 | TR.EP-1 | T11A<br>T11B<br>T11C<br>T11D<br>T21A<br>T21B | 4 kV | 0.97 |
| | | 11A<br>11B<br>11C<br>11D<br>21A<br>21B | 575 V | 0.95 |
| C5 | TR.EP-1 | T11A<br>T11B<br>T11C<br>T11D<br>T21A<br>T21B | 4 kV | 0.94 |

| Case | Source | Bus | Base Voltage | Per Unit Voltage |
|---|---|---|---|---|
| | | 11A | | |
| | | 11B | | |
| | | 11C | 575 V | 0.92 |
| | | 11D | | |
| | | 21A | | |
| | | 21B | | |

The results of the above studies made during the lowest anticipated 69 kV voltage conditions demonstrate that 3 safety trains can be connected to the alternate offsite power source without degrading the bus voltages to an unacceptable level under steady state conditions as indicated in Case C4 or during worst case motor starting conditions as indicated in Case C5. The voltage study supports the loading limitation of $\geq$ 90% rated voltage previously submitted in our proposed Technical Specification with 3 safety trains connected to the 69 kV alternate offsite power source under worst case voltage conditions. We suggest that the proposed Technical Specification be re-worded in such a manner as to administratively limit the loading of the alternate offsite power source in such a manner as to maintain at least 90% of rated voltage under steady state conditions but not to exceed the safety bus loading corresponding to any 3 safety trains.