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MEMORANDUM FOR: F. J. Miraglia, Acting Chief, Licensing Branch, DL
FROM: R. J. Bosnak, Chief, Mechanical Engineering Branch, DE
SUBJECT: INTERROGATORIES FOR UNDERGROUND PIPING IN THE RANDOLPH FILL AREA AT THE MIDLAND NUCLEAR PLANT

Please find enclosed pages 1 and 2 of the Enclosure to ETEC letter DEETEC-DRF-4465 transmitting interrogatories for Consumer's Power Company. These questions are submitted in connection with the discovery period related to the upcoming hearings on the "Order Modifying Construction Permits (CPD-81 and 82)". We will require a rapid response to these questions so that an evaluation can be made prior to the hearings.

R. J. Bosnak, Chief
Mechanical Engineering Branch
Division of Engineering

Enclosure: 1 is stated

- cc: J. B. Knight, DE
- W. L. Grazier, DE
- F. C. Cherny, DE
- D. Hood, DL
- W. Paton, ELD
- J. Kane, DE
- L. Heller, DE
- F. Rinaldi, DE
- R. Gonzales, DE

Contact: A. Cappucci, DE:MEB, x29474

XA

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POOR ORIGINAL

OFFICE	DE:MEB	DE:MEB	DE:MEB
SIGNATURE	A. Cappucci	W. L. Grazier	R. J. Bosnak
DATE	11/3/80	11/7/80	11/5/80

QUESTIONS FOR CONSUMERS POWER COMPANY CONCERNING
THE DEFORMATIONS OF BURIED PIPING DUE TO
DIFFERENTIAL SOIL SETTLEMENT AT MIDLAND PLANT UNITS 1 AND 2

Reference Responses to the NRC 10 CFR 50.54(f) Request Regarding Plant Exit for Midland Plant Units 1 and 2, Consumers Power Company, Docket Numbers 50-329 and 50-330.

- 1) What were the criteria for determining which of the Category 1 buried lines were to be profiled and what was the justification for these criteria?
- 2) It appears that in some sections of the profiled lines the stresses are considerably higher than those listed in the reference. What is the method used to calculate the stresses in these lines due to the differential soil settlement?
- 3) There are sections of the profiled lines where the slope changes rather rapidly. This would indicate high local bearing loads. What are the magnitudes of these loads, type of load and their probable cause?
- 4) The sections of line where the slope changes rapidly could have high bearing loads and also high bending stresses. What assurance is there that local buckling will not occur in these areas?
- 5) What action is contemplated for buried pipes if the stresses due to the ground settlement are greater than the Code allowable for $3 S_c$?
- 6) What assurance is there that the deformed lines do not induce high nozzle or component loads? Some of the profiled lines have considerable slope at attachment points to other pipes, tanks etc., and at building penetrations. If these lines were forced into position to make the final closure weld on the settlement occurred mainly after the final closure welds were made, high stresses could be induced into the piping, components, and supports.

- 7) Have methods for measuring in situ stresses in the deformed piping been investigated or tried? If not, why not? This may be the only method of determining the stresses in some areas where the final closure welds have been made before the major portion of the settlement occurred or where there is a concentrated load due to some unknown phenomenon.
- 8) If the stresses in the profiled lines exceed code allowables, how will this be related to the non-profiled lines?
- 9) Current profiles reflect present settlement only. How do you plan to account for the additional settlement that occurs over the life of the plant?
- 10) What are the criteria for the minimum rattle space of Category I piping at building penetrations and do all the Category I piping penetrations meet these criteria? If not, what corrective action is proposed?
- 11) Due to the slope of some of the lines at building penetrations it appears that there could be clearance on one side of the penetration and contact on the other. What assurance is there that there is sufficient clearance over the length of the penetration to accommodate the differential settlement between the pipe and the building and the expected seismic excitations?
- 12) The accuracy (and reliability) of the method used to profile the pipes should be clarified.