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Dalwyn R. Davidson
VICE PRESIDENT
SYSTEM ENGINEERING AND CONSTRUCTION

October 3, 1979

Mr. James G. Keppler
Director, Region III
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

RE: Perry Nuclear Power Plant
Interim Report on Natural Gas
Pipeline Break Analysis

Dear Mr. Keppler:

In accordance with 10CFR50.55(e) this letter provides our interim report on the deficiency concerning the analysis of the effect of a postulated break of the natural gas pipeline on the structural integrity of the plant buildings. This item was first reported as a potential significant deficiency in a telephone conversation between Mr. M. R. Edelman of The Cleveland Electric Illuminating Company and Mr. J. Konklin of your office on September 7, 1979.

Description of Deficiency

During the early design phase of the Perry Nuclear Power Plant an evaluation was made of potential hazard imposed on the plant from an accidental rupture of the 16 inch (diameter) natural gas (99% methane) pipeline which transversed the site. Based on assumptions of adverse meteorology and, a delayed ignition of the methane cloud it was determined that the gas line should be relocated to about 3,200 feet away from the nearest plant structure. This work was performed in 1975. This distance was arrived at by the methodology and assumptions presented in Section 2.2.3.2.2.1 of the Perry PSAR. The basic approach used was to establish a minimum separation distance which would preclude a posulated explosion overpressure of plant structures from exceeding 1.2 psig. The 1.2 psig was chosen as $\frac{1}{2}$ of the tornado wind pressure design criteria of 2.4 psig, thus allowing for a maximum dynamic load factor of 2.0.

The portion of the line which was relocated was increased in size to 20 inches. It was determined that the line size increase would not change the original conclusions regarding a safe separation distance, therefore the final analysis of the line was deferred to the FSAR phase of licensing. We have recently begun this reevaluation of the potential gas line hazard and our preliminary calculations indicate that the posulated double-ended guillotine rupture and, subsequent ignition produce overpressures which are substantially greater than presented in the PSAR. This inconsistency is apparently due to certain non-conservative assumptions used in the original evaluation.

Method of Resolution

The calculated overpressure is directly related to the posulated gas flow from the rupture and therefore break size. Since the double-ended guillotine rupture is the most conservative of all ruptures more realistic break sizes may be justifiable. We are currently developing the basis for establishing a more realistic break size based upon a mechanistic approach commonly used for analysis of seismic category piping. The intial step in this effort is to complete a seismic integrity analysis of the gas line to determine if the as-built pipe will maintain its integrity under the site seismic design loadings.

If the analysis concludes that the line will not experience gross failure, the hazards analysis for the FSAR will be prepared using a break size for the line consistent with the criteria applied to moderate energy piping in the plant. This criteria is applicable to the gas line based on information from the gas company that the maximum pressure the line has been operated at, and will be operated at in the foreseeable future, is less than 250 psig.

If the line, as currently installed, cannot be shown to remain intact by the seismic analysis, a study will be undertaken to investigate the feasibility of modifying the line to provide assurance that it will not fail. This could be accomplished by providing flexible couplings at required locations to accommodate the design loadings.

Once the integrity of the line is guaranteed there is a high degree of confidence that a crack break based on the existing criteria would result in a gas release rate which would not have any potential adverse effects on the operation or safety of the Perry Plant.

Schedule of Resolution

Our plans are to complete the analysis of the pipeline in time for inclusion in our FSAR, which is scheduled for submittal in January 1980. In addition to this submittal, we will keep your office informed of the outcome of our analysis or our progress on it in a future final and/or interim report.

Very truly yours,

Dalwyn R. Davidson

Dalwyn R. Davidson
Vice President
System Engineering and Construction

cc: Victor Stello, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555