Docket No. 50-346

License No. NPF-3

Serial No. 1044

April 13, 1984

TOLEDO EDISON

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Director of Nuclear Reactor Regulation
Attention: Mr. John F. Stolz
Operating Reactors Branch No. 4
Division of Operating Reactors
United States Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Stolz:

This is in response to your letter dated March 26, 1984 (Log No. 1472) requesting additional information on the tornado missile protection for the chlorine detectors for the Davis-Besse Nuclear Power Station Unit No. 1. Your letter requested three (3) items of additional information. These items are addressed below:

Item 1: The missiles considered for the tornado analysis are those contained in Table 2 of the Standard Review Plan (SRP), Section 3.5.3.

Response: The missiles which were considered for the tornado analysis are those which are described in Table 3.5-2, of the Davis-Besse FSAR/USAR and reviewed by the Staff in Section 3.5.2 of the Davis-Besse SER (NUREG-0136) Section 3.5.2, which is the licensing criteria for the unit, includes all of the missiles contained in Table 2 of SRP Section 3.5.3. Only minor differences, in missiles parameters, most likely due to conversion from english to metric units, are noted; except that the velocity of the automobile in Table 2 has been increased to approximately 132 mph versus our design of 50 mph.

Item 2: The methodology of analysis of the tornado generated missiles is in accordance with the SRP, Section 3.5.3.

Response: Section 3.5.3 of the SRP requires analyses for local and overall damage prediction which are addressed as follows:

a) Local Damage Prediction: The chlorine detector building is constructed of concrete having a specified compressive strength of 4000 psi at 28 days. All structural elements, i.e. walls and roof which are exposed to possible missile strikes have a thickness of twenty-four inches. Therefore, the design exceeds the requirements of Table 1, Section 3.5.3 of the SRP for local perforation damage for Region 1.

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b) Overall Damage Prediction: The analyses considered plastic collision upon impact of the missiles listed in Table 3.5-2 of the FSAR/USAR. Only two of the missiles listed, namely the automobile and the telephone pole, were found to have sufficient energy to affect the overall structural response of the building.

Due to the building proportions of 10 feet x 12 feet x 11.5 feet in height, it was idealized as a single degree of freedom rigid body supported by a non-linear soil resistance function. The overall response was evaluated for the most critical missiles using both energy balance and time-history techniques. The soil resistance function was obtained by considering its nonlinear geometric and material characteristics. Mass and inertia properties of the building were considered constant.

The energy balance approach equated the missile kinetic energy to the structural system potential energy in order to determine maximum building motion. The time-history approach transformed the missile dynamic characteristics into an equivalent force-time function and computed the building response utilizing a numerical integration technique.

Item 3: Only one of the largest credible missile having the kinetic energy of 2.7×10^3 ft-lb, could damage the chlorine detectors.

Response: Only two of the missiles listed in Table 3.5-2 of the FSAR/USAR will cause rotation of the chlorine detector building which in turn may damage the chlorine detectors. These missiles are the automobile and the telephone pole which have initial kinetic energies of 3.36×10^5 ft-lbs and 7.69×10^5 ft-lbs respectively. Other missiles listed are not significant to overall structural response because of energy reduction upon plastic collision.

Please advise us if you or your staff have any questions concerning this additional information.

Very truly yours,

RPC:CLM:jsh

cc: DB-1 NRC Resident Inspector