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TO: B.C. RUSCHE

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LETTER

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DESCRIPTION

LTR. SUMMARIZING THE EXTENSIVE INVESTIGATION THAT LED TO THE SELECTION OF A 0.15g ACCELERATION MAXIMUM POSSIBLE EARTHQUAKE(SAFE SHUTDOWN EARTHQUAKE) AT BEDROCK FOR THE DESIGN.....

ENCLOSURE

DO NOT REMOVE
ACKNOWLEDGED

(3P)

PLANT NAME: DAVIS BESSE

SAFETY

FOR ACTION/INFORMATION

ENVIRO

SAB 3/7/77

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Docket No. 50-346

Serial No. 227

February 24, 1977

Mr. Benard C. Rusche, Director
Office of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Washington, D. C. 20555

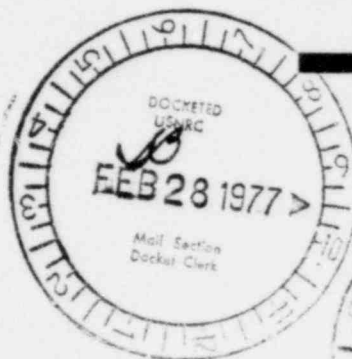
Dear Mr. Rusche:

During the 201st Advisory Committee on Reactor Safeguards (ACRS) meeting at which the application by The Toledo Edison Company and The Cleveland Electric Illuminating Company for a license to operate the Davis-Besse Nuclear Power Station Unit 1 was reviewed, considerable discussion took place between the NRC staff members and the ACRS concerning seismic design bases. The ACRS letter of January 14, 1977 reporting the results of their review contained a paragraph concerning seismic design bases stating:

"Because of changes in the regulatory approach to selection of seismic design bases, the Committee believes that an acceleration of 0.20g would be more appropriate for the SSE acceleration at a site such as this in the Central Stable Region. The Applicant presented the results of preliminary calculations concerning the safety margins of the plant for an SSE acceleration of 0.20g. The Committee recommends that the NRC Staff review this aspect of the design in detail and assure itself that significant margins exist in all systems required to accomplish safe shutdown of the reactor and continued shutdown heat removal, in the event of an SSE at this higher level."

Based on the discussions at the 201st ACRS meeting and the ACRS letter of January 14, 1977, we submitted to you under date of January 27, 1977, a "Report of Seismic Design Review" which provided this detailed analysis for a Seismic Event of 0.20g acceleration.

In this Report, we summarized the extensive investigation that led to the selection of a 0.15g acceleration Maximum Possible Earthquake (Safe Shutdown Earthquake) at bedrock for the Davis-Besse Unit 1 design. This summary was included to show that this is a very conservative seismic design basis since the Maximum Possible Earthquake was modeled conservatively after the maximum historic earthquake within the site region (the strong intensity MM VII Anna earthquake of 8 March 1937) even though available evidence indicates that



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the Anna earthquakes are caused by local structural features in the Anna area, and thus should not be transposed to the Davis-Besse site. This conservatism was emphasized because logical analysis of existing data supports a strong intensity MM VI as being an appropriate design basis earthquake for the Davis-Besse site.

We also showed that using the Trifunac and Brady (1975) approach relating acceleration to intensity, that the calculated horizontal vibratory acceleration for a strong intensity MM VII earthquake is 0.187g and not the value of 0.20g discussed in the 201st ACRS meeting and contained in the ACRS letter of January 14, 1977.

The discussion at the 201st ACRS meeting concerning a 0.20g horizontal acceleration as a seismic design bases for Davis-Besse Unit 1 was all within the context of this acceleration being applied at the ground surface in free field with deconvolution down to foundation rock level. Our detail analysis of a 0.20g Seismic Event contained in our Report was based on this premise as was our preliminary calculations presented at the 201st ACRS meeting which the ACRS referenced in their letter of January 14, 1977.

The letter of February 17, 1977 from Mr. R. F. Fraley, ACRS Executive Director, to you now states that this seismic design review of the detail design of the Davis-Besse Unit 1 should be based on a Seismic Event of 0.20g horizontal acceleration applied directly at the bedrock foundation level. We feel that this only adds another layer of redundant conservatism heaped upon an already unnecessary redundancy of conservatism.

It is our understanding that at the extensive discussions and presentations at the February 8 and 9, 1977 ACRS Seismic Activity Subcommittee meeting there were some who challenged the applicability of deconvolution at sites where there is a shallow soil profile such as at the Davis-Besse site. We believe this is what has led the ACRS to change, what was clearly inferred by us in their January 14, 1977 letter, as a 0.20g horizontal acceleration at the ground surface in free field with deconvolution to bedrock foundation level, to a 0.20g horizontal acceleration applied directly to the bedrock foundation level.

If there is any credence to accept as a seismic design bases, the transposition of the Anna March 8, 1937 earthquake directly to the Davis-Besse site (which we strongly feel a disciplined scientific approach would not allow) then it should result in the corresponding rock "outcrop" motion at Davis-Besse being the same as that at Anna. Consequently, if such transposition is required, we have examined a more realistic approach to arrive at the rock motion corresponding to that at Anna. This, however, does not diminish our belief that the Anna earthquakes are caused by local structural features in the Anna area, and thus should not be transposed to the Davis-Besse site.

The geologic profile in the epicentral region of the Anna earthquakes consists of a bedrock valley filled with over 200 ft. of alluvial and fluvial deposits. The geologic profile at the Davis-Besse site consists of 25 ft. of stiff glacial deposits and compacted fill over flat-lying bedrock.