

November 4, 1997

Mr. Lew W. Myers
Vice President - Nuclear, Perry
Centerior Service Company
P.O. Box 97, A200
Perry, OH 44081

SUBJECT: AMENDMENT NO. 90 TO FACILITY OPERATING LICENSE NO. NPF-58 -
PERRY NUCLEAR POWER PLANT, UNIT 1 (TAC NO. M99447)

Dear Mr. Myers:

The Commission has issued the enclosed Amendment No. 90 to Facility Operating License No. NPF-58 for the Perry Nuclear Power Plant, Unit 1. This amendment is in response to your application dated August 14, 1997 (PY-CEI/NRR-2200L), as supplemented by letters dated September 26 (PY-CEI/NRR-2221L) and October 1, 1997 (PY-CEI/NRR-2224L).

This amendment changes the design basis as described in the Updated Safety Analysis Report by adding a description of the methodology utilized for determining the systems and components that are considered to require protection from tornado missiles.

A copy of the Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's next biweekly Federal Register notice.

Sincerely,

Original signed by:

Douglas V. Pickett, Senior Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-440

Enclosures: 1. Amendment No. 90 to
License No. NPF-58
2. Safety Evaluation

cc w/encls: See next page

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UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

November 4, 1997

Mr. Lew W. Myers
Vice President - Nuclear, Perry
Centerior Service Company
P.O. Box 97, A200
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Sincerely,

A handwritten signature in cursive script, reading "Douglas V. Pickett".

Douglas V. Pickett, Senior Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-440

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L. Myers
Centerior Service Company

cc:

Jay E. Silberg, Esq.
Shaw, Pittman, Potts & Trowbridge
2300 N Street, NW.
Washington, DC 20037

Mary E. O'Reilly
Centerior Energy Corporation
300 Madison Avenue
Toledo, OH 43652

Resident Inspector's Office
U.S. Nuclear Regulatory Commission
P.O. Box 331
Perry, OH 44081-0331

Regional Administrator, Region III
U.S. Nuclear Regulatory Commission
801 Warrenville Road
Lisle, IL 60532-4531

Lake County Prosecutor
Lake County Administration Bldg.
105 Main Street
Painesville, OH 44077

Sue Hiatt
OCRE Interim Representative
8275 Munson
Mentor, OH 44060

Terry J. Lodge, Esq.
618 N. Michigan Street, Suite 105
Toledo, OH 43624

Ashtabula County Prosecutor
25 West Jefferson Street
Jefferson, OH 44047

Henry L. Hegrat
Regulatory Affairs Manager
Cleveland Electric Illuminating Co.
Perry Nuclear Power Plant
P.O. Box 97, A210
Perry, OH 44081

Perry Nuclear Power Plant
Unit Nos. 1 and 2

James R. Williams
Chief of Staff
Ohio Emergency Management Agency
2855 West Dublin Granville Road
Columbus, OH 43235-2206

Mayor, Village of Perry
4203 Harper Street
Perry, OH 44081

Roy P. Lessy, Jr.
Akin, Gump, Strauss, Hauer
and Feld, L.L.P.
1333 New Hampshire Ave., NW.
Suite 400
Washington, DC 20036

Radiological Health Program
Ohio Department of Health
P.O. Box 118
Columbus, OH 43266-0118

Ohio Environmental Protection
Agency
DERR--Compliance Unit
ATTN: Mr. Zack A. Clayton
P.O. Box 1049
Columbus, OH 43266-0149

Chairman
Perry Township Board of Trustees
3750 Center Road, Box 65
Perry, OH 44081

State of Ohio
Public Utilities Commission
East Broad Street
Columbus, OH 43266-0573

William R. Kanda, Jr., Plant Manager
Cleveland Electric Illuminating Co.
Perry Nuclear Power Plant
P.O. Box 97, SB306
Perry, OH 44081

cc: (continued)

Donna Owens, Director
Ohio Department of Commerce
Division of Industrial Compliance
Bureau of Operations & Maintenance
6606 Tussing Road
P.O. Box 4009
Reynoldsburg, OH 43068-9009

Mayor, Village of North Perry
North Perry Village Hall
4778 Lockwood Road
North Perry Village, OH 44081

Attorney General
Department of Attorney General
30 East Broad Street
Columbus, OH 43216



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

CLEVELAND ELECTRIC ILLUMINATING COMPANY, ET AL.

DOCKET NO. 50-440

PERRY NUCLEAR POWER PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

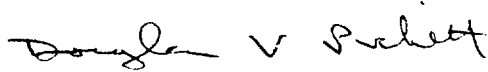
Amendment No. 90
License No. NPF-58

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by the Cleveland Electric Illuminating Company, Centerior Service Company, Duquesne Light Company, Ohio Edison Company, OES Nuclear, Inc., Pennsylvania Power Company, and Toledo Edison Company (the licensees) dated August 14, 1997, as supplemented by letters dated September 26 and October 1, 1997, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended to authorize revision of the Updated Safety Analysis Report (USAR) as set forth in the application for amendment by the licensee, dated August 14, 1997, as supplemented by letters dated September 26 and October 1, 1997. The licensee shall update the USAR to change the design basis as described in the USAR by adding a description of the methodology utilized for determining the

systems and components that are considered to require protection from tornado missiles, as authorized by this amendment and in accordance with 10 CFR 50.71(e).

3. This license amendment is effective as of its date of issuance and shall be implemented not later than 90 days after issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Douglas V. Pickett, Senior Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV
Office of Nuclear Reactor Regulation

Date of issuance: November 4, 1997



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 90 TO FACILITY OPERATING LICENSE NO. NPF-58

CLEVELAND ELECTRIC ILLUMINATING COMPANY, ET AL.

PERRY NUCLEAR POWER PLANT, UNIT 1

DOCKET NO. 50-440

1.0 INTRODUCTION

By letter dated August 14, 1997, Centerior Energy Power Generator Group (the licensee), submitted a request for changes to the Perry Nuclear Power Plant (PNPP), Unit 1, licensing basis. The requested change allows for the application of the TORMIS methodology for tornado missile risk analysis of specific plant features that are currently unprotected. Specifically, the licensee proposes to amend its Updated Safety Analysis Report (USAR) for the use of the TORMIS methodology when evaluating the need for positive missile protection of unprotected components or portions of systems. The existing USAR requires tornado missile protection for all equipment required to operate after a tornado in accordance with Regulatory Guide (RG) 1.117.

Additional clarifying information was submitted by letters dated September 26 and October 1, 1997. This additional information did not significantly change the Federal Register notice dated September 16, 1997 (62 FR 48674).

Standard Review Plan (SRP) Section 3.5.1.4 includes procedures for users to estimate the probability per year of damage to the total of all important structures, systems, and components due to a specific design basis natural phenomena capable of generating missiles. If the probability is greater than the acceptable probability stated in RG 1.117, then specific design provisions must be provided to reduce the estimate of damage probability to an allowable level. RG 1.117 states that the likelihood of a creditable tornado strike varies from about 10^{-7} per year to values several orders of magnitude higher. SRP Section 2.2.3 supports this probability and identifies an acceptance criteria of 10^{-6} for the expected rate of occurrence of potential exposures in excess of 10 CFR Part 100 guidelines per year when combined with reasonable qualitative arguments that show that the realistic probability is lower.

In the Safety Evaluation dated October 26, 1983, regarding the TORMIS methodology proposed in Electric Power Research Institute (EPRI) Report NP-2005, the staff concluded that the methodology is well conceived, well developed, versatile, and utilizes state-of-the-art probabilistic Monte Carlo techniques. At the same time, the staff concluded that the methodology had limitations for its use and that applicants and licensees using this methodology must consider five plant specific points and provide appropriate information

regarding its use. This evaluation addresses the licensee's response concerning the applicability of the TORMIS code methodology and the licensee's use of the results.

In addition to the plant specific information, limitations for the application of the TORMIS methodology were prescribed in the NRC Safety Evaluation. These limitations state that the use of the EPRI PRAs or any tornado missile probabilistic study be limited to the evaluation of specific plant features where additional costly tornado missile protective barriers or alternative systems are under consideration, and that the user demonstrate that the probability of damage to unprotected essential safety-related features is sufficiently small.

The five plant-specific points to be considered by applicants and licensees using the EPRI methodology are:

- 1) Data on tornado characteristics should be employed for both broad regions and small areas around the site. The most conservative values should be used in the risk analysis or justification provided for those values selected.
- 2) The EPRI study proposes a modified tornado classification, F'-scale, for which the velocity ranges are lower by as much as 25 percent than the velocity ranges originally proposed in the Fujita, F-scale. Insufficient documentation was provided in the studies in support of the reduced F'-scale. The F-scale tornado classification should, therefore, be used in order to obtain conservative results.
- 3) Reductions in tornado wind speed near the ground due to surface friction effects are not sufficiently documented in the EPRI study. Such reductions were not consistently accounted for when estimating tornado wind speeds at 33 feet above grade on the basis of observed damage at lower elevations. Therefore, users should calculate the effects of assuming velocity profiles with ratios V_0 (speed at ground level)/ V_{33} (speed at 33 feet elevation) higher than that in the EPRI study. Discussion of the sensitivity of the results to changes in the modeling of the tornado wind speed profile near the ground should be provided.
- 4) The assumptions concerning the locations and numbers of potential missiles presented at a specific site are not well established in the EPRI studies. However, the EPRI methodology allows site specific information on tornado missile availability to be incorporated in the risk calculation. Therefore, users should provide sufficient information to justify the assumed missile density based on site specific missile courses and dominant tornado paths of travel.
- 5) Once the EPRI methodology has been chosen, justification should be provided for any deviations from the calculational approach.

Based on the results of the TORMIS analysis and the revised licensing basis, the licensee proposes not to provide tornado missile protection for the unprotected components or portions of the systems required to operate after a tornado.

2.0 EVALUATION

The limitation that the TORMIS methodology be used for specific plant features where additional costly tornado missile protective barriers or alternative systems are under consideration was addressed by the licensee in its September 26, 1997, letter. The licensee identified that the questionable systems under review are the emergency service water system, the Division 1 motor control center switchgear room, the diesel generators, the control room, Division 1 and 2 cable chases, and the spent fuel pool. The licensee states that these systems may have short portions of piping located outside of the Seismic Category I building, or are located near a doorway or a pipe penetration. To be in compliance with its existing licensing basis, additional tornado missile protection would need to be added. The licensee committed to include the specific components or portions of systems in its USAR. Two items associated with the condensate storage tank (CST), the level instrumentation, and a suction line were identified in a recent NRC inspection as not being appropriately missile-protected. The licensee did not propose to include these items in its total plant configuration probability. Rather, the licensee will use administrative controls that require the suction for the reactor core isolation cooling and high pressure core spray systems be transferred from the CST to the suppression pool when a tornado warning is initiated. In a letter dated, October 1, 1997, the licensee committed to revise its procedure for tornado or high winds to reflect these actions upon initiation of a tornado warning. Also, the USAR, including Table 3.5-7, will be revised for the piping and instrumentation portion that is not protected for tornado missiles.

To meet the criteria that the user demonstrate that the probability of damage to unprotected essential safety-related features is sufficiently small, and to meet the acceptance criteria of SRP Section 2.2.3 that identifies an acceptance criteria of 10^{-6} for the expected rate of occurrence of potential exposures in excess of 10 CFR Part 100 guidelines per year when combined with reasonable qualitative arguments that show that the realistic probability is lower, the licensee provided qualitative arguments that the probability was conservative. These arguments included, in part, that a failure was assumed when components are simply struck by a tornado missile and any damage resulted in release values in excess of 10 CFR Part 100 guidelines. The staff finds the acceptance criteria of 10^{-6} , when combined with the licensee's qualitative arguments, to be acceptable.

The licensee will ensure that both the total probability of tornado missiles striking each target and the total probability of tornado missiles striking all of the targets for the entire plant will remain below 10^{-6} . In its September 26, 1997, letter, the licensee states that the total plant

probability value is calculated by determining specific system or component probabilities using TORMIS and then summing all of the probabilities together. This summation must be below the acceptance criteria of 10^{-6} . The licensee's proposed change to the USAR includes the statement that the plant configuration equals or exceeds PNPP's 10^{-6} acceptance criteria. The staff finds the licensee's use of the TORMIS results to be acceptable.

The licensee addressed the five plant specific points for the application of TORMIS in its submittal.

Point 1

The NRC Safety Evaluation for TORMIS specifies that broad and local regions near the site be evaluated and to use the most conservative value. In the original submittal, the licensee states that it uses the most conservative value of two possible values. These values were the plant's USAR tornado probability value, using local data, and a TORMIS generated value, using broad regional data. The USAR value is 3.11×10^{-4} per year. The TORMIS value was determined to be 4.25×10^{-4} per year. In its September 26, 1997, letter, the licensee includes another value, 5.8×10^{-4} per year, from WASH-1300, "Technical Basis for Interim Regional Tornado Criteria." The licensee will use the value of 5.8×10^{-4} for its analysis. The staff finds this to be conservative and, therefore, acceptable.

Point 2

The licensee uses the F-scale tornado classification for the FO through F5 intensities, and a wind speed range of 313 to 360 mph for the F6 intensity. The staff finds this to be acceptable.

Point 3

To address the reductions in tornado wind speed near the ground due to surface friction effects that are not sufficiently documented in the EPRI study, the licensee states that for PNPP potential missiles are injected into the tornado windfield using a height range where the lower end of the height range corresponds to rotational wind speeds greater than or equal to 246 mph. This provides V_0/V_{33} ratio = $246/300 = 0.82$. The ratio of 0.82 was previously approved for another plant in the same tornado intensity region. The staff finds this to be acceptable.

Point 4

The licensee performed a site walkdown to identify the type and number of missiles for the plant. The walkdown included the contents and construction of warehouses, office buildings, sheds, trailers, parking lots, and switchyards. Additionally, conservatisms such as assuming a full parking lot and adding 10 percent to account for increased missiles during outage periods were included. The licensee will use approximately 74,000 missiles in its TORMIS

analysis. This is a higher missile density compared to some other plants (25,000 - 69,000) that use the TORMIS methodology, however, many plants have a more limited application of the TORMIS methodology. The staff considers this missile density to be acceptable.

Point 5

The licensee states that no deviations occur from EPRI NP-2005, except as noted in Points 1 through 4 above. The staff finds this to be acceptable.

The staff concludes that the licensee's use of the methodology and its results are appropriate. Additionally, the staff concludes that the licensee includes qualitative conservatism such that the acceptance criteria of 10^{-6} for all tornado missiles striking all unprotected systems or components required to operate following a tornado is appropriate.

Based on the above, the staff concludes that the use of TORMIS to analyze tornado missiles for limited portions of the plant that are unprotected and are identified by the licensee in its USAR meets the acceptance criteria of SRP Sections 3.5.1.4 and 2.3.3 for tornado missiles and satisfactorily addresses the items in the NRC Safety Evaluation related to the TORMIS methodology. The staff further concludes that the proposed changes to the licensing basis meet the requirements of General Design Criteria 2 and 4, with respect to protection against tornado-generated missiles for specific plant equipment.

As described in the licensee's letter dated August 14, 1997, following NRC approval, the licensee will update the USAR to change the design basis as described in the USAR by adding a description of the methodology utilized for determining the systems and components that are considered to require protection from tornado missiles, as authorized by this amendment and in compliance with 10 CFR 50.71(e).

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Ohio State official was notified of the proposed issuance of the amendment. While the State official had no formal comments, clarification was requested in two specific areas.

The first area focused on the licensee's long-term use of the TORMIS methodology. The licensee's submittal was prompted by recent NRC inspection findings that identified safety-related components that do not have tornado missile protection as described in the USAR. While the methodology will be immediately applied to the identified components, the licensee is authorized to incorporate this methodology with future applications provided the summation of the probabilities remain below the acceptance criteria of 10^{-6} .

The second area focused on the following statement made on page 5 of 7 of Attachment 1 to the licensee's letter of August 14, 1997:

There are no missiles that can directly impact on irradiated fuel, even on the spent fuel stored in the Fuel Handling Area of the Intermediate Building. Any missiles

postulated to enter this area either miss the pools entirely, are stopped by internal walls, or strike the far side of the pool above the level of the fuel.

The State official asked whether the NRC had verified the above statement. The State was informed that an NRC inspector had closely examined this issue and concurred with the licensee that any missile entering the Intermediate Building via the metal roll-up doors would not directly impact irradiated fuel.

4.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluent that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding (62 FR 48674). Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

5.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Diane Jackson

Date: November 4, 1997