February 5, 1985

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	
THE CLEVELAND ELECTRIC	)	Docket Nos. 50-440
ILLUMINATING COMPANY, ET AL.	)	50-441
	)	
(Perry Nuclear Power Plant,	)	
Units 1 and 2)	)	

APPLICANTS' STATEMENT OF MATERIAL FACTS
AS TO WHICH THERE IS NO GENUINE
ISSUE TO BE HEARD ON ISSUE NO. 15

Pursuant to 10 C.F.R. § 2.749(a), Applicants state, in support of their Motion for Summary Disposition of Issue No. 15, that there is no genuine issue to be heard with respect to the following material facts:

1. Issue No. 15 states that Applicants are not prepared to prevent, discover, assess and mitigate the effects of steam erosion at PNPP. Memorandum and Order (Concerning Ohio Citizens for Responsible Energy's Late-Filed Contentions 21-26), LBP-82-98, 16 N.R.C. 1459, 1471 (1982). Issue No. 15 is based on IE Information Notices No. 82-22 (July 9, 1982) and 82-23 (July 16, 1982), which identified steam erosion as the cause of certain failures in steam and steam line drain piping and Main Steam Isolation Valves ("MSIVs"). LBP-82-98, 16 N.R.C. at 1469.

2. Steam erosion in steam and steam line drain piping systems is the degradation of piping due either to the high velocity impingement of condensed steam droplets on the piping (erosion-corrosion), or the repeated growth and collapse of steam bubbles in the process fluid (flashing fluid erosion). Affidavit of Richard A. Pender ("Pender Affidavit"), at ¶¶ 7-8.

3. Only steam piping systems with certain combinations of low quality steam, low temperatures (within a narrow range), and high velocities are subject to the erosion-corrosion type of steam erosion. Id. at ¶¶ 9-14, 22. In addition, because steam erosion is a relatively slow process, continuous flow for substantial periods of time is considered a minimum condition of steam erosion. Id. at ¶ 22.

4. Flashing fluid erosion normally occurs downstream of control valves in steam line drain systems, where pressure in the system usually is below the saturation pressure. This causes flashing of some of the condensate to steam. In addition to flashing fluid erosion, if a significant portion of the steam condensate vaporizes to steam, erosion-corrosion can occur at areas of flow discontinuity (high velocity). Id. at ¶ 16.

5. The only steam line drain systems at PNPP are the N22, N25 and N26 systems. Id. at ¶ 18.

6. To mitigate the potential effects of steam erosion in the N25 and N26 systems, a criterion was established early in the design process which stated that directional changes in piping downstream of the control valves should be avoided. Id. at ¶ 19.

7. Where this criterion could not be followed, pipe tees with stainless steel target plates and tell tale valves were used instead of 90 degree elbows. (Because the N22 piping is mostly small bore, it was not practical to use pipe tees and target plates in this system.) There have been no failures in steam drain lines with the target plate design feature for the more than 20 years that CEI has implemented this design feature at certain of its fossil fueled plants. Id. at ¶¶ 19-20.

8. In addition, the piping downstream of the control valves in all three steam line drain systems was replaced with an A335, grade P11 or P22 material, which contains a minimum of 1% chromium - 1/2% molybdenum. Tests, as well as industry experience, have found that piping materials with these levels of alloying elements reduce steam erosion by a factor of four to five over unalloyed carbon steel pipe. Id.

9. Applicants also have performed a comprehensive review of the steam piping systems at PNPP. Applicants have identified the N36 system and the high pressure turbine exhaust portions of the N11 system as steam systems in which there may be a potential for significant erosion-corrosion.
Id. at ¶¶ 22-23.

10. In order to assure the timely discovery of steam erosion before a pipe failure can occur, Applicants will implement an inspection program for portions of those systems in which there is a potential for significant steam erosion. The

inspection program includes portions of the steam line drain systems (N22, N25 and N25) in which design features to minimize steam erosion have been incorporated, as well as portions of the N11 and N36 systems. Id. at ¶¶ 5, 25.

11. The steam erosion inspection program is based on a prioritization of potential inspection locations to assure periodic inspection of those locations where steam erosion, should it occur, is likely to be most severe. Id. at ¶ 26.

12. For the steam line drain systems, inspection points are identified downstream of selected control valves. The inspections are expected to confirm the effectiveness of the design features incorporated in these systems to mitigate steam erosion. Id. at ¶ 27.

13. Inspection locations for the two steam systems (N11 and N36) are based on predicted erosion-corrosion rates using the Keller Equation. Id. at ¶¶ 29-33.

14. Inspection points are selected which represent the worst case locations for steam erosion. Should inspection indicate significant steam erosion rates at these locations, the inspection locations will be expanded, as appropriate, to ensure maximum coverage of susceptible areas of pipe within the system. Id. at ¶ 34.

15. Prior to fuel load, an inspection will be conducted to provide baseline information on actual pipe wall thicknesses. Id. at ¶ 36.

16. The first operational inspection will be conducted within the first three years after plant start-up. This inspection interval will assure that any steam erosion effects are detected before significant degradation can occur. Id. at ¶ 37.

17. For subsequent inspections, the inspection interval will be based on the results of the previous inspection. Inspection intervals will be rounded down to correspond to the nearest refueling outage. In no case will an inspection interval exceed the expected life of a piping system. Id. at ¶ 38.

18. The method used to determine pipe wall thickness for the steam erosion inspection program is ultrasonic inspection. In defining the procedures for applying the ultrasonic inspection technique, Applicants take into account factors such as grid spacing and the limitations of the test instrument. Id. at ¶ 35.

19. The locations inspected will be considered acceptable if the pipe exceeds the minimum wall thickness required by the applicable piping code, and the expected life of the piping is greater than the time until the next scheduled inspection. Id. at ¶ 39, 31 at n.5.

20. If necessary, piping will be repaired or replaced to ensure that wall thickness is at least as great as the minimum allowable wall thickness. Id. at ¶ 39. Repairs will be performed in accordance with the applicable piping code. Id.

21. Even if a piping failure due to steam erosion were to occur at PNPP, industry experience has shown that such failures do not pose a threat to plant safety systems or otherwise affect the health or safety of the public. Id. at ¶ 24.

22. The PNPP Steam Erosion Hazards Analysis, an extensive study which evaluated the design of PNPP in order to determine effects of postulated piping failures due to steam erosion on the ability of the plant to achieve and maintain safe shutdown, confirms that steam erosion at PNPP is not a concern with respect to the public health or safety. Affidavit of Donald H. Stevens ("Stevens Affidavit"), at ¶ 3.

23. The Steam Erosion Hazards Analysis reviewed all safety-related systems and components in plant areas containing steam and steam line drain piping. Id. at ¶¶ 3-5. In each area identified, piping failures were postulated which were assumed to prevent the safety-related systems and components within the area from performing their safety functions. Id. at ¶ 6.

24. The Steam Erosion Hazards Analysis demonstrates that, for each system and component reviewed, either (1) failure of the item could not prevent safe shutdown or maintenance of safe shutdown at PNPP, or (2) the pipe failure postulated for the item was not a credible event. Id. at ¶¶ 6-8.

25. Thus, the design of PNPP assures the ability of the plant to achieve and maintain a safe shutdown condition in the

event of any credible failure resulting from the effects of steam erosion. Id. at ¶ 3.

26. A comprehensive study by the BWR Owners Group on MSIV Leakage has determined that steam erosion is not a contributing factor to MSIV leakage. Pender Affidavit at ¶ 41.

27. The conclusion of the Owners Group study is consistent with the conditions to which the MSIVs will be exposed at PNPP. Id. at ¶ 42.

28. In addition, those portions of the valves which will be subjected to steam flow are overlayed with Stellite, an erosion-resistent material. Id.

29. Steam erosion is not expected to have any significant effects on the MSIVs at PNPP. Id.

Respectfully submitted,

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