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January 31, 1983

UNITED STATES OF AMERICA NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board \*83 FEB -7 A11:07 In the Matter of CLEVELAND ELECTRIC ILLUMINATING COMPANY, Et Al. (Operating License) (Perry Nuclear Power Plant, Units 1 and 2)

## OHIO CITIZENS FOR RESPONSIBLE ENERGY NINTH SET OF INTERROGATORIES TO APPLICANTS

Ohio Citizens for Responsible Energy ("OCRE") hereby propounds its ninth set of interrogatories to Applicants, pursuant to the Licensing Board's Orders of July 28, 1981 (LBP-81-24, 14 NRC 175), October 29, 1982 (LBP-82-98, 16 NRC \_\_\_), and January 5, 1983 (made during the conference call).

#### Issue #13

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Statement of Purpose: The following interrogatories are designed to ascertain the factual bases for Applicants' line of defense concerning the degree of protection against damage from -urbine missiles afforded by the Perry design.

9-1. Identify and produce all documents in the possession of Applicants or any of their agents, including A/E Gilbert Associates and NSSS and turbine supplier General Electric, pertaining to turbine missile hazards, including but not limited to those documents listed as references in GAI Report No. 1848, "An Analysis of Low Trajectory Turbine Missile Hazards, Perry Nuclear Power Plant, Units 1 and 2," October 1976 ("Gilbert Heport"). Trajector

- 9-2. Identify all documents Applicants intend to present as evidence or use in cross-examination of Intervenor and/or NRC Staff witnesses on Issue #13. Produce any such documents not identified in the response to the previous interrogatory.
- 9-3. Identify all persons Applicants intend to call as witnesses on Issue #13.
  - (a) For each person so identified, state the person's address, title, employer, and educational and professional qualifications.
  - (b) State the subject matter, including the substance of facts and opinions, on which each such person is expected to testify. Identify and produce any documents to be relied upon by each such person in his/ her testimony.
- 9-4. Have Applicants or any of their agents prepared any revisions, addenda, supplements, or updates to the Gilbert Report since October 1976? If so, produce same,
- 9-5. Have there been any changes to any assumptions, data, or dimensions (e.g., design changes or differences between the design and as-built conditions) used in the Gilbert keport? If so, identify each such change and the portion of the Gilbert Report thus affected.
- 9-6. Have Applicants or any of their agents at any time considered any differing designs of the Perry facility with regard to arrangement of turbine-generators and the containment, control complex, and auxiliary building? If so, produce all such designs, and explain why they were not

utilizied. Were any such designs contemplated specifically to reduce the hazard of turbine missiles?

- 9-7. Have Applicants incorporated or considered any structures, equipment, or components (e.g., barriers or shielding of safety-related targets) to lessen the risk of turbine missile damage to the Perry facility? If so, produce any such plans or designs and indicate which have been or will be incorporated into the Perry facility; for those designs not so utilizied, explain why.
- 9-8. List every reason why Applicants consider the risk of turbine missile damage at the Perry facility acceptable.
  - (a) What do applicants consider to be an acceptable risk with regard to turbine missile hazards" Provide the basis, including any experimental data, for this opinion.
  - (b) For every reason identified above as to why Applicants consider the risk of turbine missile damage acceptable, provide any bases, including any experimental data, supporting this view.
  - (c) To what extent are these opinions based on engineering judgement?
- 9-9. (a) Have the turbine-generators, overspeed control systems, and turbine stop and control valves (or any other associated systems or components) been subject to any tests or inspections, either by vendors or Applicants or their agents?

(b) If so, describe any such tests or inspections.

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- (c) If not, indicate when such tests or inspections will be performed. If no tests or inspections are planned, explain why not.
- (d) Have any tests or inspections as described above revealed any flaws, defects, deficiencies, nonconformances, or other anomalies in any system, equipment, or component identified in subpart (a) above? Describe any such anomalies in detail.
- (e) For each such flaw, defect, deficiency, nonconformance, or anomaly described above, state when and how the deficiency will be resolved, and describe the technical bases for the resolution chosen.
- 9-10. Have any of the equipment or components listed in Interrogatory 9-9(a) above been previously operated or used (other than in testing) in any other application or facility? If so, provide the complete operational history of any such component and explain why a new unit was not utilized instead.
- 9-11. Have the turbine-generators of the size and type to be utilized at PNPP been used in any other application (both nuclear and fossil fuel, and test/prototype applications)? (a) If so, state the name, location, and type of facility
  - where such a turbine-generator is (or was) in use.
  - (b) Give the complete operational history of each turbinegenerator at each application identified above, including date of initial operation, number of turbineyears in operation, and any failures, incidents, or accidents involving the turbine-generators.

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- (c) Provide a complete description of any turbine failures identified above, including causes identified, corrective actions taken, and the consequences of any turbine failures; i.e., were missiles produced, and, if so, describe the number and size distribution and the degree of damage they caused and range of missile trajectory.
- 9-12. Provide an estimate of the cost required to change the orientation and placement of the Perry turbine-generators from the tangential arrangement presently incorporated to a radial arrangement (with respect to the containment and other safety-related targets). Provide the bases for this cost estimate.
- 9-13. Do Applicants in their defense on Issue #13 intend to take credit for:
  - (a) quality standards used in the manufacture of turbine discs or other components the failure of which could produce turbine missiles;
  - (b) inservice inspection and maintenance programs for turbine discs and other components the fai of which could produce turbine missiles;
  - (c) turbine overspeed protection systems?
  - (d) If the answer to any of the above is affirmative, state the exact nature of the defense to be used and provide the applicable quality standards, inservice inspection programs, etc.
- 9-14. The Gilbert Report only considers the low-pressure stage turbines as missile sources. Why has the high-pressure

stage not been considered? Provide all bases for the answer.

- 9-15. Table 2-2 of the Gilbert Report presents "allowable impact momenta on final barriers." Define the term "allowable" as used in that table. I.e., does "allowable" mean the missile does not penetrate the barrier, or that the missile does not cause spallation?
- 9-16. It is stated at p. 9 of the Gilbert Report that GE data on turbine missiles is "reportedly" based on experimental disc-bursting studies performed by the turbine manufacturer. Produce this experimental data and describe the methodology used in the studies.
- 9-17. Provide detailed drawings of the turbine low-pressure stages, showing and identifying the turbine discs and "wheel groups" of Table 2-4 of the Gilbert Report.
- 9-18. It is stated at p. 25 of the Gilbert Report that D fragments are excluded from analysis because they are assumed to be of minimal threat to the plant. Provide the basis of that assumption. What effect would the inclusion of the D fragments in the analysis have on the final probability calculation?
- 9-19. It is stated at p. 25 of the Gilbert Report that all missiles are assumed to be generated with equal independent probabilities in all directions. Provide the basis of this assumption.
- 9-20. (a) Does the direction of turbine rotation have any bearing on missile trajectory? Explain the bases of the answer.

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- (b) What is the direction of rotation (e.g., clockwise or counter-clockwise from the perspective of an observer stationed between the two cooling towers facing plant west) of the Unit 1 turbines? Of Unit 2?
- 9-21. It is stated at p. 23 of the Gilbert Report that a uniform velocity distribution is assumed for each fragment, reflecting the uncertainty in velocity data in previous turbine failures. Provide the basis for this assumption and demonstrate its conservatism.
- 9-22. It is stated at p. 32 of the Gilbert Report that in evaluating all targets, triple impact P<sub>3</sub> values were assumed to be equal to control room values given in Table 3-5 because of the relatively small effect on P<sub>4</sub>, with the exception of containment vessel targets. State the basis of this assumption and demonstrate its conservatism.
- 9-23. Section 10.2.1 of NUREG-0887, the Perry SER, states that the Staff's final acceptance of the inservice inspection plan for disc bores and keyways as recommended by the turbine manufacturer is contingent on a documented commitment by Applicants. When will Applicants submit this documentation? Produce any draft or final inservice inspection plans for disc pores and keyways.
- 9-24. For what steam environment (temperature, pressure, pH, purity, etc.) is the turbine designed? What assurance is there that the design steam environment will be maintained?

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- 9-25. Section 10.2 of JUREG-0887, the Perry SER, states that applicants' inservice inspection program for turbine steam valves requires the exercising of the main steam stop and control, reheat stop, and intercept valves at least once a week.
  - (a) How many such valves are present on each turbine to be used at PNPP?
  - (b) Does the exercising of any of these values affect the power output of the generator? By what amount?
  - (c) Is it not true that any load reductions necessary for valve exercising will create a disincentive for such inspections? If not, why not?
  - (d) What assurance is there that the inspection schedule will be adhered to?

# Issue #14

Statement of Purpose: The following interrogatories are designed to ascertain the factual bases of Applicants' opposition to the incorporation of in-core thermocouples at PNPP.

- 9-26. Identify and produce all documents in the possession of Applicants or any of their agents pertaining to the use of in-core or core-exit thermocouples in boiling water reactors.
- 9-27. Identify all documents Applicants intend to present as evidence or use in cross-examination of Intervenor and/or NRC Staff witnesses on Issue #14. Produce any such documents not identified in the response to the previous interrogatory.

- 9-28. Identify all persons Applicants intend to call as witnesses on Issue #14.
  - (a) For each person so identified, state the person's address, title, employer, and educational and professional qualifications.
  - (b) State the subject matter, including the substance of facts and opinions, on which each such person is expected to testify. Identify and produce any documents to be relied upon by each such person in his/ner testimony.
- 9-29. State every reason, including bases, why Applicants oppose the use of in-core or core-exit thermocouples at PNPP as an indication of inadequate core cooling.
- 9-30. State every reason, including bases, why Applicants oppose the use of in-core or core-exit thermocouples at PNPP as a redundant and diverse indication of reactor vessel water level.
- 9-31. Have Applicants at any time developed any plans or designs (including draft or preliminary plans) for using in-core or core-exit thermocouples at PNPP? If so, produce all such plans and any supporting or related documentation.
- 9-32. Do Applicants believe that the incorporation of in-core or core-exit thermocouples at PNPP could provide information useful for detecting propagating core damage? Explain why or why not, and include the bases for your answer.
- 9-33. Do Applicants believe that the incorporation of in-core or core-exit thermocouples could provide useful, unambiguous

and definitive information following a loss of water inventory with no normal, emergency, or alternate makeup systems available to replenish coolant inventory? Explain wny or why not, and include the bases for your answer.

- 9-34. Provide a cost estimate for installing in-core thermocouples at PNPP (assuming 4 thermocouples per quadrant, as recommended in Regulatory Guide 1.97). Provide the bases for the estimate.
- 9-35. Describe in detail the vessel level monitoring capabilities and instrumentation at PNPP and explain why Applicants believe these are sufficient.
- 9-36. What capabilities and instrumentation do Applicants intend to use at PNPP to detect inadequate core cooling?
- 9-37. It is stated in Section 1.11 of NUREG-0887, the Perry SER, that, as a license condition, a final report analyzing inadequate core cooling instrumentation requirements for TMI Action Plan Item II.F.2 should be submitted by July 1982.
  - (a) Has this report been submitted yet? If not, state when the report is expected to be submitted.
  - (b) Produce this report.

### Issue #15

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Statement of Purpose: The following interrogatories are designed to ascertain Applicants' plans for protecting PNPP from the effects of steam erosion.

9-38. Identify and roduce all documents in the possession of Applicants or any of their agents pertaining to steam

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erosion and measures that may be taken to prevent, detect, assess, or mitigate the effects of same.

- 9-39. Identify all documents Applicants intend to present as evidence or use in cross-examination of Intervenor and/or NRC Staff witnesses on Issue #15. Produce any such documents not identified in the response to the previous interrogatory.
- 9-40. Identify all persons Applicants intend to call as witnesses on Issue #15.
  - (a) For each person so identified, state the person's address, title, employer, and educational and professional qualifications.
  - (b) State the subject matter, including the substance of facts and opinions, on which each such person is expected to testify. Identify and produce any documents to be relied upon by each such person in his/ her testimony.
- 9-41. List every component, system, item of equipment, etc. at PNPP which is subject to steam flow. For each it m identified, give the applicable ASME classification.
- 9-42. For each item identified above, state whether Applicants believe it is vulnerable to damage from steam erosion, and provide the bases for the answer.
- 9-43. For each item identified above, produce Applicants' inservice inspection program.
- 9-44. Describe in detail any plans, provisions, designs, criteria, standards, etc. which Applicants may have for preventing steam erosion and the effects thereof.

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- 9-45. Describe in detail any plans, provisions, programs, etc. which Applicants may have for detecting and assessing steam erosion or the effects thereof.
- 9-46. Describe in detail any plans, provisions, procedures, etc. which Applicants may have for mitigating steam erosion or the effects thereof. Include any procedures for the repair or replacement of any affected components.
- 9-47. What is the vendor/manufacturer of the MSIVs to be used at PNPP?
- 9-48. It is stated in IE Information Notice 82-22 that the Oconee licensee (Duke Power Co.) theorized that reduced power operation and resultant lower quality steam contributed to accelerated steam erosion.
  - (a) Define the term "steam quality."
  - (b) Explain how steam quality is related to level of power operation.
  - (c) Explain how steam quality influences the degree of steam erosion.
  - (d) In the responses to the above subparts, include the bases of the answers.
- 9-49. Do Applicants in their defense on Issue #15 intend to take credit for any other PNPP systems (e.g., MSIV leakage control system)? If so, identify each such system and state how it prevents or mitigates steam erosion or the effects thereof. Include the bases for your answer.
- 9-50. Do Applicants in their defense on Issue #15 intend to take credit for any inservice inspection programs? If so,

- (b) state when it is to be submitted;
- (c) identify any codes, standards, regulatory requirements or guides to which it complies;
- (d) produce the inservice inspection program when available.
- 9-51. For each item identified in the response to Interrogatory 9-41 above, give the pressure and steam flow rate expected in normal operation and the maximum pressure and steam flow rate for which the item is rated.

## General Interrogatory

9-52. For each interrogatory above, identify the person(s) responsible for the response and provide the professional qualifications for each such person. If any documents were relied upon in responding which were not previously identialed, identify and produce these documents.

Respectfully submitted,

Jusan Thatt

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### CERTIFICATE OF SERVICE

This is to certify that copies of the foregoing OHIO CITIZENS FOR RESPONSIBLE ENERGY NINTH SET OF INTERROGATORIES TO APPLICANTS were served by deposit in the U.S. Mail, first class, postage prepaid, this 3/ day of January to those on the service list pelow.

Susan L. Hatt

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