

September 27, 1982

DOCKETED  
USNRCUNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

'82 SEP 30- P1

Before the Atomic Safety and Licensing Board

In the Matter of	)	
	)	
CLEVELAND ELECTRIC ILLUMINATING	)	Docket Nos. 50-440
COMPANY, <u>Et Al.</u>	)	50-441
	)	(Operating License)
(Perry Nuclear Power Plant,	)	
Units 1 and 2)	)	

OHIO CITIZENS FOR RESPONSIBLE ENERGY  
SIXTH SET OF INTERROGATORIES TO APPLICANTS

Ohio Citizens for Responsible Energy ("OCRE") hereby propounds its sixth set of interrogatories to Applicants, pursuant to the Licensing Board's Memorandum and Order of July 28, 1981 (LBP-81-24, 14 NRC 175).

Issue #4

Statement of Purpose: The following interrogatories pertaining to Issue #4 constitute a follow-up on various matters addressed in the request for admissions.

- 6-1. Have Applicants considered the effects on core spray distribution and/or flow due to the thermal properties of hydrogen (high specific heat and thermal conductivity) which might be present following a LOCA? If so, provide all such analyses. If not, why not?
- 6-2. In the December 11, 1981 memorandum for the Shoreham ASLB from R. Tedesco, Division of Licensing, concerning Japanese core spray distribution tests, it is stated that "(t)here is some possibility that the new data contradict conclusions from 360° air-water tests in the U.S. for a

BWR/6 configuration." Do Applicants agree? Why or why not?

- 6-3. Is it not true that the only way in which the adequacy of BWR ECCS core spray flow and/or distribution will be known with certainty is to conduct tests on a large, operating reactor in a situation where there is a true demand on the ECCS (i.e., an actual accident)? Explain why this is or is not true.
- 6-4. Explain how "two-phase froth buildup eliminates the need for core spray distribution" (Response to Request for Admission 6). Is two-phase froth buildup the same as the Counter-Current Flow Limiting (CCFL) phenomenon?
- 6-5. Define the design range of steam flow rates for the ECCS core spray systems (see Response to Request for Admission 9).
- 6-6. Explain the apparent discrepancy between the Response to Request for Admission 11, in which it is stated that the BWR/6 core spray system is not designed to operate in pressures exceeding 73.5 psia, and FSAR Table 6.3-1, which states that, for the LPCS, flow may commence at 289 psid (vessel to drywell) and reaches 6000 gpm at 122 psid, and for the HPCS, flow may commence at 1177 psid (vessel to pump suction) and reaches 6000 gpm at 200 psid.
- 6-7. Produce the following documents:
  - (a) Letter and attachments, NFN 093-78, A.J. Levine to Darrell G. Eisenhut, "Core Spray Distribution Program," March 1, 1978.
  - (b) APED-5529, "Core Spray and Core Flooding Heat Transfer

Effectiveness in a Full-Scale Boiling Water Reactor Bundle," June 1978.

- 6-8. Assuming that the SLCS is actuated and borated water is injected through the HPCS sparger, would the presence of boron in the spray affect the core spray flow and/or distribution? Provide documentation supporting the answer.

Issue #6

Statement of Purpose: The following interrogatories concerning Issue #6 constitute a follow-up on previously addressed matters pertaining to ATWS mitigation.

- 6-9. Produce SOP-C41, pertaining to the use of the SLCS.
- 6-10. Where is the key for the SLCS actuation switch to be kept? Demonstrate that it will always be readily available. How many duplicate keys are available, and where are they to be kept?
- 6-11. Are reactor operators informed of the financial disincentives to SLCS operation? Are they specifically instructed to use the SLCS only as a last resort? Produce any instructions or training materials to this effect.
- 6-12. Does the suppression pool stainless steel clad sensitization fissuring problem (see March 15, 1982 letter from D. Davidson, CEI to J. Keppler, NRC Region III) have any effect on Applicants' policy on use or actuation of the SLCS (boron carry-over into suppression pool might accelerate intergranular stress corrosion cracking)? If so, explain.

- 6-13. What portions of the SLCS have been installed in PNPP Unit 1? Give % complete. In Unit 2?
- 6-14. Will reactor operators require any supervisory or management approval before they can initiate the SLCS? If so, explain why and provide copies of all such instructions to that effect.
- 6-15. In their responses to IE Bulletin 80-17 some BWR licensees stated that parallel two pump operation of the SLCS is not feasible due to problems in NPSH, piping system design, boron mixing, excessive degree of modification required, general disagreement, possible reductions in safety, etc. Do Applicants agree? If so, explain each objection to parallel two pump operation.
- 6-16. Assuming failure of the RPT, can the SLCS pump head overcome the high RPV pressure and make the reactor subcritical? Document your answer.
- 6-17. The analyses given in NEDO-24222 assume an automatic SLCS with a two minute time delay. Explain why this time period was chosen. Has any other actuation logic (with little or no delay) been considered? With what results (i.e., why was this not chosen)?
- 6-18. According to the "Electric Utilities' Petition for Rule-making on ATWS" (PRM-50-29), the implementation of an automatic, high capacity SLCS at BWRs would require that the Automatic Depressurization System (ADS) be inhibited. Do Applicants agree? Explain why this would or would not be needed. If an ADS inhibit is required, would this have any safety implications?

- 6-19. Produce a list of documents in the possession of Applicants pertaining to ATWS and/or the SLCS, including all correspondence and transcripts.
- 6-20. Produce the following documents:
- (a) NEDO-20626, "Studies of BWR Designs for Mitigation of Anticipated Transients Without Scram" (October 1974) and all amendments.
  - (b) "General Electric ATWS Report" (June 30, 1976) (OCRE is aware that this is a proprietary document and is willing to sign a protective agreement to obtain same.)
  - (c) September 28, 1976 supplement to the above report.
  - (d) Proprietary portions of NEDO-24222, again under protective agreement.
  - (e) NEDO-19349, "Analysis of Anticipated Transients Without Scram" (March 1971)
  - (f) "BWR Scram System Reliability Analysis" September 30, 1976. (Proprietary portions as well, under protective agreement)
- 6-21. Are scrams considered to be undesirable and to be avoided if possible? If so, why? Are power ramps caused by scrams likely to contribute to fuel damage?
- 6-22. State and explain every reason why Applicants are opposed to the use of an automatic SLCS at PNPP. Give legal and factual bases for your arguments.
- 6-23. Have Applicants completed the detailed systematic review of the common cause failure potential between the poison injection system (SLCS, permissive logic, and auxiliary

- systems) and the scram system (see NEDO-24222, Vol. 1, p. 6-4)? Produce the results of this analysis.
- 6-24. Has the use of the auto SLCS logic to initiate the BWR/6 containment isolation circuitry been reviewed (see NEDO-24222, Vol. 1, p. 6-4)? If so, with what results?
- 6-25. What is the total length of the 1½" SLCS discharge piping? What is the transport delay time through this piping?
- 6-26. Describe in detail all provisions for operator override of the automatic SLCS circuitry as described in NEDO-24222. Include any instructions or operating procedures dealing with override, and describe the describe the physical means necessary to accomplish override. E.g., are there any interlocks which must be bypassed, what type of switch is used (push-button, rotary, key-locked), etc.
- 6-27. Does the NEDO-24222 analysis use the ODYN code or the REDY code? If both have been used, state which portions of the analysis used which code.
- 6-28. For each of the documents listed in Interrogatory 6-20 state which codes or computer simulation models were used.
- 6-29. For the IORV ATWS event analyzed in NEDO-24222, what assurance is there that the operator will either manually scram the reactor or manually initiate the ATWS protection system (ARI and SLCS) in a timely fashion?
- 6-30. What changes would occur in the outcome of the IORV event analyzed in NEDO-24222 if, prior to actuating the SLCS,



the operator manually trips the recirculation pumps? To what degree would this reduce the boron mixing efficiency? Is the assumption that recirculation flow is still available when the SLCS is actuated non-conservative?

- 6-31. Describe in detail the operator actions necessary to actuate: (a) manual RPT and (b) manual ATWS protection (ARI and SLCS). Include any instructions or operating procedures, and describe the hardware (switches) used.
- 6-32. Are there provisions at PNPP for manually scrambling individual control rods? Describe in detail all such capabilities, and all operator actions necessary. Explain when this capability might be used, and produce all instructions or operating procedures dealing with this capability.
- 6-33. What is the probability of failure of the automatic RPT, actuated upon high RPV pressure or low water level? Document the bases for your answer.
- 6-34. Have Applicants performed any analyses pertaining to ATWS since NEDO-24222? If so, produce same.
- 6-35. Provide documentation for the cost estimates for the cleanup of an inadvertant SLCS actuation given in the response to Interrogatory 23 of Sunflower's Second Set. Explain how the figure of  $\$ \frac{1}{2}$  to 1 million for cleanup was obtained and why there is such a large discrepancy between Applicants' estimate and the Staff's estimate (\$18,000, as given in response to Interrogatory 15 of Sunflower's Second Set).

- 6-36. Provide documentation for the cost estimate for the one week's downtime associated with the inadvertant operation of the SLCS, given in the response to Interrogatory 23 of Sunflower's Second Set.
- 6-37. The NRC Staff, in response to Interrogatory 15 of Sunflower's Second Set, indicates that Perry has a diversity of liquid treatment systems, e.g., RWCS, condensate cleanup demineralizers, radwaste system demineralizers, and evaporators. Does the estimate given in the response to Interrogatory 23 of Sunflower's Second Set correspond to the use of the evaporators? Provide cost estimates, with proper documentation, for the use of each of the other systems suggested by the Staff for the cleanup of an inadvertant SLCS actuation.
- 6-38. The August 13, 1982 letter from D. Davidson, CEI to A. Schwencer, NRC concerning the SLCS states that the increase in flow rate from 43 gpm to 86 gpm will be accomplished by increasing the size of the pump suction lines. Will the PNPP design require simultaneous parallel two-pump operation of the SLCS? Describe any other changes to the SLCS design.
- 6-39. Have Applicants (or GE) performed any sensitivity studies for all transients analyzed in NEDO-24222 concerning the consequences (including effect on containment and fuel integrity and offsite radiological doses) of delaying boron injection (or failure of boron injection) beyond the 240 seconds assumed in NEDO-24222? If so, produce this analysis.



- 6-40. Have Applicants (or GE) performed any sensitivity studies for all transients analyzed in NEDO-24222 concerning the consequences (including effect on containment and fuel integrity and offsite radiological doses) of delaying RPT (or failure of same) beyond the 1 second assumed in NEDO-24222? If so, produce this analysis.
- 6-41. Have any multiple sensitivity analyses, involving the worst-case values for any combination of the following parameters (boron delay, boron mixing, HPCS/RCIC flow, RHR delay, void coefficient, Doppler coefficient, RPT delay, pool size and temperature) been performed to assess the consequences of ATWS, including effects on fuel and containment integrity and offsite radiological doses? If so, produce these analyses.
- 6-42. Does the BWR Scram System Reliability Summary given in Appendix 7.3 of Vol. 1 of NEDO-24222 include an analysis of operating experience, especially the Kahl and Browns Ferry 3 incidents? If not, why not? What effect would the inclusion of these incidents have on GE's estimate of scram system reliability?

Respectfully submitted,

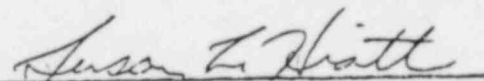
*Susan L. Hiatt*  
Susan L. Hiatt  
OCRE Representative  
8275 Munson Rd.  
Mentor, OH 44060  
(216) 255-3158

CERTIFICATE OF SERVICE

DOCKETER  
USNRC

This is to certify that copies of the foregoing OHIO CITIZENS FOR RESPONSIBLE ENERGY SIXTH SET OF INTERROGATORIES TO APPLICANTS were served by deposit in the U.S. Mail, first class, postage prepaid, this 27th day of September 1982 to those on the service list below.

OFFICE OF SECRETARY  
DOCKETING & SERVICE  
BRANCH

  
Susan L. Hiatt

SERVICE LIST

Peter B. Bloch, Chairman  
Atomic Safety and Licensing Board  
U.S. Nuclear Regulatory Comm'n  
Washington, D.C. 20555

Daniel D. Wilt, Esq.  
P.O. Box 08159  
Cleveland, OH 44108

Dr. Jerry R. Kline  
Atomic Safety and Licensing Board  
U.S. Nuclear Regulatory Comm'n  
Washington, D.C. 20555

Ronald G. Wiley  
CEI - PNPP  
P.O. Box 97  
Perry, OH 44081

Frederick J. Shon  
Atomic Safety and Licensing Board  
U.S. Nuclear Regulatory Comm'n  
Washington, D.C. 20555

Docketing and Service Section  
Office of the Secretary  
U.S. Nuclear Regulatory Comm'n  
Washington, D.C. 20555

Stephen H. Lewis, Esq.  
Office of the Executive  
Legal Director  
U.S. Nuclear Regulatory Comm'n  
Washington, D.C. 20555

Jay Silberg, Esq.  
1800 M Street, N.W.  
Washington, D.C. 20036

Atomic Safety and Licensing Appeal Board Panel  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555