October 29, 1982

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

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

APPLICANTS' ANSWERS TO OHIO CITIZENS FOR RESPONSIBLE ENERGY SIXTH SET OF INTERROGATORIES TO APPLICANTS ON ISSUE NO. 6

Applicants for their answers to the Sixth Set of Interrogatories to Applicants filed by Ohio Citizens for Responsible Energy ("OCRE") on September 27, 1982, state as follows:

Applicants hereby respond to the interrogatories concerning Issue No. 6. (Applicants' answers to interrogatories concerning Issue No. 4 were filed on October 12, 1982.) All documents supplied to OCRE for examination will be produced at Perry Nuclear Power Plant ("PNPP"). Arrangements to examine the documents can be made by contacting Ms. Eileen Buzzelli of The Cleveland Electric Illuminating Company at (216) 259-3737 extension 5606. Applicants will provide copies of any of the

produced documents or portions thereof, which OCRE requests, at Applicants' cost of duplication. Arrangements for obtaining copies can be made with Ms. Buzzelli.

On October 29, 1982, Applicants' counsel conferred by telephone with Ms. Sue Hiatt, OCRE's representative, concerning Applicants' objections as set forth herein. No agreement was reached concerning the scope of Issue No. 6.

RESPONSES:

6-9. Produce SOP-C41, pertaining to the use of the SLCS.

Response:

SOP-C41 was a draft system operating procedure addressing pre-operational testing and post-initiation operation of Applicants' original SLCS design. It did not address the initiation criteria, procedures or methodology for SLCS. Applicants therefore object to this interrogatory as irrelevant and beyond the scope of Issue No. 6. See 10 C.F.R. §2.740(b)(1).

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?

Response:

The key will be located in the control room and will be readily available to the operators at all times. The precise location of the key, and location and number of duplicate keys,

will be specified in the system operating instructions,1/ which are in preparation.

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.

Response:

Applicants' procedures and training on Plant Emergency Instructions regarding SLCS initiation, currently in preparation, will not inform the operators of the financial disincentives of SLCS operation. Although operators have been informed of the financial implications of inadvertent initiation of the SLCS under normal operating conditions, the decision process for the initiation of SLCS under abnormal operating conditions is based solely on plant safety considerations. Cost is not a factor in determining when to initiate SLCS. Operators are not instructed to use the SLCS only as a last resort, therefore there are no 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.

1/ Applicants are redesignating all previously designated "system operating procedures" (SOP) as "system operating instructions" (SOI). Emergency operating procedures (EOP) at Perry will be designated as "plant emergency instructions" (PEI).

Response:

No. The suppression pool stainless steel clad sensitization fissuring issue discussed in the March 15, 1982 letter from D. Davidson, CEI to J. Keppler, NRC Region III, and the final resolution of the issue, will not affect Applicants' policy on the use and actuation of SLCS.

6-13. What portions of the SLCS have been installed in PNPP Unit 1? Give % complete. In Unit 2?

Response:

SLCS installation is approximately 60% complete for Unit 1 and is 0% complete for 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.

Response:

No.

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.

Response:

No, Applicants do not agree with respect to Perry.

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.

Response:

Failure of the RPT is not a design assumption, since the ATWS-RPT for Perry is safety grade and single failure proof. However, under the hypothetical assumption of RPT failure, the safety-relief valves would begin to relieve reactor vessel pressure above approximately 1100 psig. See Perry FSAR Table 15.0-1. The SLCS pumps are capable of operating up to 1400 psig. See Perry FSAR §9.3.5.2. Thus, the safety-relief valves have the capacity to sufficiently lower reactor vessel pressure below the discharge pressure of the SLCS pumps, thereby assuring availability of the SLCS. The SLCS is designed to make the reactor subcritical.

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)?

Response:

The automatic initiation of SLCS described in NEDO-24222 includes a two minute delay before SLCS injection. During this period, the operator has additional time to attempt to insert the control rods thus mitigating the ATWS event. Further, during this period the operator will continue to monitor the power levels to confirm that SLCS actuation was not the result of a spurious signal. The two minute period was selected as a conservative time period after which there would still be adequate margin for the SLCS to operate so as to assure that

the 185-degree design value of the suppression pool would not be exceeded. Other SLCS actuation times have been analyzed in the sensitivity studies documented in NEDO-24222, §3.3.4, p. 3-244. These studies demonstrate that a shorter time delay provides no significant reduction in peak suppression pool temperatures. On the other hand, a 100% increase in the delay period (i.e., four minutes) results in only a minimal increase in the peak suppression pool temperature, which would still remain below the design value of 185 degrees.

6-18. According to the "Electric Utilities' Petition for Rulemaking 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?

Response:

Applicants' automatic depressurization system (ADS) would be operated in the same manner, regardless of whether the Perry SLCS is manually or automatically initiated. Applicants therefore object to the question as irrelevant to Issue No. 6, which concerns the differential advantages and disadvantages of manual as opposed to automatic SLCS initiation at Perry. See 10 C.F.R. §2.740(b)(1).

6-19. Produce a list of documents in the possession of Applicants pertaining to ATWS and/or the SLCS, including all correspondence and transcripts.

Response:

Applicants have previously supplied for examination documents, and a list of documents, pertaining to SLCS initiation, in response to Interrogatory 2 of Sunflower's Second Set of Interrogatories. See Applicants' Answer to Sunflower Alliance, Inc. et al., Second Set of Interrogatories to Applicants, dated August 20, 1982. Applicants object to that portion of the interrogatory not related to SLCS initiation. See 10 C.F.R. §2.740(b)(1).

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 (sic, 10349), "Analysis of Anticipated Transients Without Scram" (March 1971)

(f) "BWR Scram System Reliability Analysis" September 30, 1976. (Proprietary portions as well, under protective agreement)

Response:

With the exception of item f above, the documents will be supplied for examination at Perry, upon completion of an appropriate protective agreement. Item f only relates to normal scram systems and does not address any SLCS system. Applicants therefore object to producing this report, which is irrelevant and beyond the scope of Issue No. 6. See 10 C.F.R. §2.740(b)(1).

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?

Response:

No, scrams are not considered to be undesirable or to be avoided if possible when predesignated safety parameter limits are reached. Power ramps caused by scrams do not contribute to fuel damage for BWR plants. The effect of scrams has been considered in the fatigue evaluation of the fuel design.

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.

Response:

See Applicants' Response, dated February 5, 1982, to Interrogatory 67 of Sunflower's First Round Discovery Requests. At this time there are no applicable legal considerations.

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.

Response:

Subsequent to the publication of NEDO-24222, Volume 1, it was determined that a detailed systematic review of the common cause failure potential between the SLCS and the scram system was not required. The design requirements for the Perry SLCS provide independence and diversity from the Perry scram systems, thus providing assurance of adequate protection from the potential for common cause failure. Design reviews by GE subsequent to NEDO-24222 showed that no likely common mode failures exist between SLCS and the Perry scram systems.

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?

Response:

Yes. For the automatic SLCS circuitry described in NEDO-24222, it was concluded that current containment isolation circuitry provides adequate independence and diversity with respect to the rod insertion systems so that the use of an automatic SLCS logic to initiate the BWR/6 containment isolation circuitry is not necessary. See NEDO-24222, Vol. 2, Section 4.5, p. 4-9.

6-25. What is the total length of the 1-1/2" SLCS discharge piping? What is the transport delay time through this piping?

Response:

The total length of the 1-1/2 inch SLCS discharge piping is 116.3 feet. The transport delay time through this piping will be less than one minute.

6-26. Describe in detail all provisions for operator override of the automatic SLCS circuitry as described in NEDO-2422. Include any instructions or operating procedures dealing with override, and describe the physical means necessary to accomplish override. E.g., are there any interlocks which must [sic] bypassed, what type of switch is used (push-button, rotary, key-locked), etc.

Response:

Instructions or operating procedures dealing with override are the responsibility of individual utilities which use automatic systems, and are not addressed in NEDO-24222. Applicants do not plan to utilize automatic circuitry, and have therefore not developed instructions or operating procedures dealing with override.

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.

Response:

The NEDO-24222 analyses used the REDY code. In the case of the NEDO-24222 analyses of MSIV isolation and turbine trip initiated scenarios (using the REDY code), analyses were also performed for comparative purposes using the ODYN code. The results using the REDY code were essentially the same but slightly more conservative than those using the ODYN code. See NEDO-24222, Section 3.4, p. 3-374.

6-28. For each of the documents listed in Interrogatory 20 state which codes or computer simulation models were used.

Response:

The transient simulation models used in the documents listed as items a, b, c and e in Interrogatory 20 were earlier versions of the REDY code. The analysis in the document listed as item d, NEDO-24222, used the current version of the REDY code. Applicants have objected to producing the document listed as item f, for the reasons stated in Applicants' response to Interrogatory 20.

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?

Response:

Applicants' symptom-based emergency operating instructions now in preparation will clearly specify those plant safety parameters at Perry requiring initiation by the operator of the manual scram or manual SLCS. Training of Perry operators to these instructions will assure that the systems will be timely activated when predesignated safety limits are reached.

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 nonconservative?

Response:

In answer to the first hypothetical question, tripping the RPT under the scenario given would lower reactor power and pressure, and extend the time before which manual SLCS would have to be initiated.

The second and third questions relate solely to post-SLCS initiation conditions, and are unrelated to Issue No. 6, which concerns the differential advantages and disadvantages of a manual as opposed to an automatic SLCS. Thus, the questions are irrelevant and beyond the scope of Issue No. 6. See 10 C.F.R. §2.740(b)(1).

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.

Response:

The Perry design has an automatic, single failure proof RPT, therefore no operator manual actions are required. Similarly, ARI is an automatic function at Perry and no operator action will be required. The only manual operator action required for ATWS protection in the Perry design is the operator action required to initiate SLCS. The operator actions necessary to initiate the SLCS at Perry would consist of turning both two-position, key-locked switches corresponding to Perry's two SLCS pumps. The switches are identical to those pictured in photograph 3 of the "Summary Report of the Human

Factors Design Review of the Perry Control Room," referenced by OCRE in its September 20, 1982 Motion To Compel (relating to Issue No. 6). The Perry Plant Emergency Instructions now in preparation will cover the decision process and actions relating to SLCS system initiation.

6-32. Are there provisions at PNPP for manually scramming 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.

Response:

The capability of the Perry design with respect to manual scram of individual control rods is unrelated to the design or initiation of the Perry SLCS. Applicants object to the interrogatory as irrelevant and beyond the scope of Issue No. 6 which relates to the differential advantages and disadvantages of a manual as opposed to automatic SLCS initiation at Perry. See 10 C.F.R. §2.740(b)(1).

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.

Response:

Applicants object to the interrogatory as irrelevant and beyond the scope of Issue No. 6, which concerns the differential advantages and disadvantages of manual as opposed to automatic SLCS initiation at Perry. The probability of failure of the automatic RPT has no bearing on this issue.

6-34. Have Applicants performed any analyses pertaining to ATWS since NEDO-24222? If so, produce same.

Response:

Applicants have previously made available documents relevant to SLCS initiation, in response to Interrogatory 2 of Sunflower's Second Set of Interrogatories. To the extent Interrogatory 6-34 is asking about analyses not related to SLCS initiation, Applicants object to the Interrogatory as irrelevant and beyond the scope of Issue No. 6. See 10 C.F.R. §2.740(b)(1).

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 $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).

Response:

No precise calculations were performed, and no documentation is available. The figure of one-half to one million dollars was an estimate, based on approximated costs for cleanup following inadvertent SLCS initiation, after considering costs associated with resin replacement, reactor water cleanup and radwaste system operation, spent resin solidification, water chemistry monitoring and inspection, and total labor costs. This is a best estimate in the absence of prior industry experience with post-SLCS cleanup. Applicants have no knowledge of the basis of the NRC Staff estimate.

6-36. Provide documentation for the cost estimate for the one week's downtime associated with the inadvertent operation of the SLCS given in the response to Interrogatory 23 of Sunflower's Second Set.

Response:

In Applicants' previous response to Interrogatory 23, which estimated approximately one week's downtime for cleanup, Applicants only counted the time required to remove the borated water from the vessel. The answer did not include subsequent downtime after cleaning the water, such as for subsequent radwaste processing, water chemistry monitoring, and followup inspections, which would have to be performed prior to restart. If this downtime were included, Applicants estimate that the total downtime would actually be a minimum of four weeks.

The one and one-half million dollar per day estimate for the cost of downtime (in 1984 dollars) was based on estimated costs of purchasing replacement power. It includes fuel costs and overhead and maintenance costs. The figure was based on an August 4, 1981 letter from D. Davidson to A. Starr (Department of Energy), a copy of which will be provided for inspection at PNPP.

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.

Response:

Applicants' estimate in response to Interrogatory 23 of Sunflower's Second Set of Interrogatories considered the diversity of liquid treatment systems available at Perry, and was based on the most effective and efficient cleanup methods including, in part, the use of evaporators, as stated in Applicants' response to Interrogatory 24 of Sunflower's Second Set. Applicants do not have cost estimates or documentation relating to other cleanup methods, as asked for in Interrogatory 6-37.

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.

Response:

Yes, the PNPP design change from 43 gpm to 86 gpm capability will require simultaneous parallel two-pump operation of the SLCS. As stated in the August 13, 1982 letter, the details of the SLCS design change relating to increasing flow capacity from 43 gpm to 86 gpm will be submitted as an amendment to the Perry FSAR by January 1983. No other changes to the Perry SLCS design are planned.

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.

Response:

No such studies have been performed since NEDO-24222. Prior to NEDO-24222, GE did perform some analyses of some of the transients discussed in NEDO-24222, using different assumptions. Applicants will make available documentation of the results of these analyses at PNPP.

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.

Response:

The potential consequences of delaying RPT (or failure of same) are not relevant to the issue of the relative advantages and disadvantages of manual as opposed to automatic SLCS initiation at Perry. Applicants therefore object to the interrogatory as irrelevant and beyond the scope of Issue No. 6. See 10 C.F.R. §2.740(b)(1).

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, RHH 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.

Response:

No multiple sensitivity analyses beyond those set forth in NEDO-24222 have been performed.

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?

Response:

Applicants have previously objected on relevancy grounds to providing a copy of the "BWR Scram System Reliability Analysis," requested in Interrogatory 6-20, item f, since the document does not address any SLCS system. The Summary requested in Interrogatory 6-42 is a summary of the report described in Interrogatory 6-20, item f. Applicants object to providing the requested Summary, which is irrelevant and beyond the scope of Issue No. 6. See 10 C.F.R. §2.740(b)(1).

Respectfully submitted,

SHAW, PITTMAN, POTTS & TROWBRIDGE

By: _____

Jay E. Silberg, P.C.
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Counsel for Applicants
1800 M Street, N.W.
Washington, D.C. 20036

(202) 822-1000

Dated: October 29, 1982

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

CLEVELAND, OHIO

Eileen M. Buzzelli, being duly sworn according to law, deposes that she is Licensing Engineer, of The Cleveland Electric Illuminating Company and that the facts set forth in the foregoing Applicants' Answers to Ohio Citizens for Responsible Energy Interrogatories 6-9 through 6-15, 6-18 through 6-20, 6-22, 6-25, 6-26, 6-29, 6-31, 6-32, and 6-34 through 6-38 dated September 27, 1982, are true and correct to the best of her knowledge, information and belief.

Eileen M. Buzzelli

Sworn to and subscribed before me this 24th day of October, 1982.

Joanne Jelinskas

JOANNE JELINSKAS, Notary Public
State of Ohio - Lake County
My comm. exp. Nov. 12, 1983

October 29, 1982

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CERTIFICIATE OF SERVICE

This is to certify that copies of the foregoing "Applicants' Answers to Ohio Citizens for Responsible Energy Sixth Set of Interrogatories to Applicants on Issue No. 6" were served by deposit in the United States Mail, First Class, postage prepaid, this 29th day of October, 1982, to all those on the attached Service List.

JAY E. SILBERG

DATED: October 29, 1982

UNITED STATES OF AMERICA

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