10/25/82

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
CLEVELAND ELECTRIC ILLUMINATING COMPANY, ET AL.	)	Docket No. 50-440 OL 50-441 OL
	)	
(Perry Nuclear Power Plant, Units 1 and 2)	)	

NRC STAFF ANSWERS TO OCRE SEVENTH
SET OF INTERROGATORIES TO NRC STAFF

On September 27, 1982 Ohio Citizens for Responsible Energy (OCRE) filed "Ohio Citizens for Responsible Energy Seventh Set of Interrogatories to NRC Staff." By letter dated October 22, 1982 NRC Staff counsel advised OCRE's Representative that, except for Nos. 7-1, 7-2, 7-4, 7-5, 7-6, 7-15, 7-16, 7-18, 7-26 and 7-27, the Staff would not voluntarily respond to OCRE's "Seventh Set of Interrogatories to the NRC Staff" because the Staff viewed them to be objectionable.

The Staffs answers (with the affidavits of their preparers) to OCRE's Interrogatories Nos. 7-1, 7-2, 7-4, 7-5, 7-6, 7-15, 7-16, 7-18, 7-26 and 7-27 are attached.

Respectfully submitted,

James M. Cutchin IV
Counsel for NRC Staff

Dated at Bethesda, Maryland
this 25th day of October, 1982.

DESIGNATED ORIGINAL

Certified By DSO7

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ANSWERS TO CERTAIN INTERROGATORIES OF OCRE'S SEVENTH SET OF INTERROGATORIES TO NRC STAFF

Interrogatory No. 7-1

Have there ever been any instances in operating BWR's (both foreign and domestic) in which the ECCS core spray flow and/or distribution has been insufficient? If so, provide all details.

Answer

No.

Interrogatory No. 7-2

Has the ECCS ever been subject to a true system demand in which inadequate core spray flow and/or distribution might become apparent? If so, provide all details.

Answer

No.

Interrogatory No. 7-4

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." Explain the bases of the statement, and generally indicate the relevance of the Japanese tests to Perry. Provide any further information on the Japanese tests that is available.

Answer

As indicated in the memorandum from R. Tedesco (NRC) to the Shoreham ASLB dated December 11, 1981,

> "The Lynn data (from the 30° sector steam tests performed in Task Action Plan A-16) are believed to be atypical of a BWR 360° configuration. This conclusion is based on known design atypicalities on data from air-water tests of a BWR/6 360° configuration and data from tests with other variously sized sectors which have shown that BWR/6 spray overlaps in the center of the core causing high flow of central bundles.

> This overlap does not occur in a sector test since the nozzles from the opposite sector which would provide the overlapping flow are not available. We would expect the Japanese 60° sector test to suffer the same deficiency."

In the memorandum, it further stated that

> "Although no specific data are available, we have also been told that the 360° tests by the Japanese with 5/6 of the spray nozzles blocked give similar results to the 60° sector tests (low central bundle flow). This could be interpreted to infer that our previous conclusion concerning the atypicality of low central bundle flow are incorrect."

The Japanese tests are designed to simulate a BWR/5. Since a BWR/6 reactor has a similar spray nozzle design to a BWR/5 reactor, we, therefore, indicated in the memorandum that "There is also some possibility that the Japanese data contradict conclusion from 360° air-water tests in U.S. for a BWR/6 configuration." The staff has obtained the Japanese test data, which is proprietary to the Japanese, and is obligated not to discuss it in public. The Lynn data included in NEDO-24712 is the core spray test data for a BWR/6 configuration and is relevant to Perry.

Recently, the staff has evaluated the Lynn 30° sector steam test data for the spray distribution and the Two-Loop-Test-Apparatus data for heat transfer coefficient at low spray flow condition for a BWR/6 reactor. As a result the staff concludes that the core spray distribution is of no safety concern and that the application of the GE ECCS Evaluation Model to Perry is acceptable. (See Staff's Responses to Nos. 2 and 20 of Sunflower's requests for admissions on Issue #4).

Interrogatory No. 7-5

Describe Counter-Current Flow Limiting (CCFL) phenomenon (mentioned in the response to Request for Admissions) and its causes, duration, and effects on core spray flow and/or distribution.

Answer

CCFL is a phenomenon wherein the downward flow of liquid is limited by an upward flow of vapor in a geometrically restricted area. CCFL can occur in a number of locations in the BWR vessel after a postulated LOCA. The most important locations are the top of the core at the fuel upper tie plates, and the bottom of the core at the fuel side entry orifices. While CCFL at the top can delay the downflow of the core spray injected water through the core, CCFL at the bottom has the effect of decreasing the drainage from the fuel assemblies and holding up inventory in the core.

Interrogatory No. 7-6

Is it 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.

Answer

No. Experiments can be designed to evaluate the adequacy of BWR ECCS core spray flow distribution without duplication of conditions which would be present in a reactor core following a LOCA. Many parameters will affect the core spray flow distribution during a LOCA. Experiments performed in scaled test facilities are used to evaluate the accuracy of the core spray distribution for the various conditions following a LOCA. The 30° sector steam tests performed in Task Action Plan A-16 and other tests to construct a core spray distribution model are such experiments to confirm the core spray methodology. The design of the 30° sector steam test facility and the methodology for determining

the spray distribution in a BWR with a steam environment are briefly described in the NRC Staff's responses to Nos. 6 and 7 of Sunflower's requests for admissions on Issue #4. As indicated in the evaluation report (letter from R. Tedesco (NRC) to G. Sherwood dated January 31, 1981), the staff concludes that 30° sector steam tests are adequate for the purpose of verification of the core spray design methodology.

Interrogatory No. 7-15

NUREG-0460 Vol. 4 at 21 states that the automatic actuation circuitry for the SLCS may include a two minute time delay to decrease the frequency of false actuations. Why does the Staff consider this delay acceptable? Show proof that a two minute delay (a) does not provide an opportunity for operators to deactivate the SLCS when it is truly needed, and (b) does not lead to unacceptable offsite radiological consequences in any ATWS event.

Answer

ATWS rulemaking is before the Commission. This rulemaking supersedes the recommendations in NUREG-0460. Once the ATWS rule is promulgated, PNPP will be required to comply with the rule.

Interrogatory No. 7-16

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. Does the Staff agree? Explain why this would or would not be needed. If an ADS inhibit is required, would this have any safety implications?

Answer

Yes, ADS inhibit would be required. ADS inhibit would be required to simplify control of the reactor water and power levels while boron is being injected.

Although ADS actuation may be required for some LOCA events, the symptoms of a LOCA are sufficiently different from those of ATWS that the operator can reasonably be expected to differentiate between the two events. Emergency procedures caution the operator against interfering with the automatic safety functions unless he has multiple indications that they are not needed. There are safety implications for the ADS inhibit; but they are minimal.

Interrogatory No. 7-18

Has General Electric submitted the additional information sought by the staff as listed in Section 2.4.3 of Vol. 4 of NUREG-0460? If so, has the submittal met the staff's requirements?

Answer

No.

Interrogatory No. 7-26

Does the staff consider power oscillations, such as are described on p. A-67, Vol. 4, NUREG-0460, to be more likely or more severe in a BWR with a manual rather than an automatic SLCS? If so, describe the effects of power oscillations on fuel and containment integrity and any other affected system at PNPP.

Answer

The Staff does not know whether power oscillations, such as are described on p. A-67, Vol. 4, NUREG-0460, will be more likely or more severe in a BWR with a manual rather than an automatic SLCS because it has not made any calculations.

Interrogatory No. 7-27

In the proposed rule on ATWS (46 FR 57521, November 24, 1981), in proposed 10 CFR 50.60(b)(3), it is stated that ATWS mitigating systems must be automatically initiated unless it can be demonstrated that the operator would have adequate information and would reasonably be expected within the time available to take the proper corrective action. Does the staff feel that any BWR licensees or applicants would be able to demonstrate this for the SLCS? If so, explain why, listing any criteria the staff may have for proving such a demonstration.

Answer

Operator actions during an ATWS are being considered by the staff as a part of final rulemaking process. The staff has not reached a conclusion on this subject.

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	)	
(Perry Nuclear Power Plant, Units 1 and 2)	)	

AFFIDAVIT OF GEORGE THOMAS

I, George Thomas, being duly sworn, state as follows:

1. I am a Nuclear Engineer in the Reactor Systems Branch, Division of Systems Integration, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission.

2. I am the NRC Staff member responsible for the answers to Nos. 7-1, 7-2, 7-5, 7-15, 7-16, 7-18, 7-26 and 7-27 of "Ohio Citizens for Responsible Energy Seventh Set of Interrogatories to NRC Staff."

3. These responses are true and accurate to the best of my knowledge and belief.

George Thomas

Subscribed and sworn to before me
this 27th day of October, 1982.

Patricia Fischetti
Notary Public

My commission expires: 7/1/86

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AFFIDAVIT OF SUMMER B. K. SUN

I, Summer B. K. Sun, being duly sworn, state as follows:

1. I am a Nuclear Engineer in the Thermal Hydraulics Section, Core Performance Branch, Division of Systems Integration, Office of Nuclear Reactor Regulation.

2. I am the NRC Staff member responsible for the answers to Nos. 7-4 and 7-6 of "Ohio Citizens for Responsible Energy Seventh Set of Interrogatories to NRC Staff."

3. The answers are correct and accurate to the best of knowledge and belief.

Summer B. K. Sun

Subscribed and sworn to before me
this 25th day of October, 1982.

Patricia Fischetti
Notary Public

My commission expires: 7/1/86

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CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF ANSWERS TO OCRE SEVENTH SET OF INTERROGATORIES TO NRC STAFF" in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class, or, as indicated by an asterisk, by deposit in the Nuclear Regulatory Commission's internal mail system, this 25th day of October, 1982:

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Administrative Judge
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