

3/30/81



UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
PENNSYLVANIA POWER AND LIGHT CO.)
 AND)
ALLEGHENY ELECTRIC COOPERATIVE, INC.)
(Susquehanna Steam Electric Station,)
 Units 1 and 2))

Docket Nos. 50-387
 50-388

NRC STAFF RESPONSE SUPPORTING APPLICANTS'
MOTION FOR SUMMARY DISPOSITION OF CONTENTION 12

I. INTRODUCTION

On March 9, 1981, "Applicants' Motion for Summary Disposition of Contention 12" (Motion) was served on the NRC Staff. In that Motion, Applicants move the Board for summary disposition in its favor on Contention 12 which alleges that the design of the Susquehanna Steam Electric Station "fails to solve the problem of flow-induced vibrations in the core, thereby creating in-vessel sparger failure." Contention 12 further alleges that this design violates the NRC standards for protection against radiation in 10 CFR §§ 20.1 and 20.105(a) and creates an unreasonable risk of harm to the public health and safety. Applicants assert that Contention 12 presents no genuine issue of material fact and that thus Applicants are entitled to a decision in their favor as a matter of law.

The NRC Staff supports Applicants' Motion. The Staff concludes that Applicants' Motion and its supporting documentation clearly demonstrate the

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absence of any genuine issue of material fact with regard to feedwater sparger failure caused by flow-induced vibrations in the core. Thus, the Staff believes the Board should dismiss Contention 12 as a matter of law.

Section II of this pleading will discuss generally the law applicable to motions for summary disposition. Section III will set forth the Staff's reasons for concluding that Contention 12 raises no genuine issue of material fact.

II. GENERAL POINTS OF LAW

The Commission's Rules of Practice provide for summary disposition of certain issues on the pleadings where the filings in the proceeding show that there is no genuine issue as to any material fact and that the movant is entitled to a decision as a matter of law. 10 CFR § 2.749. As the Commission's summary disposition rule is analogous to Rule 56 of the Federal Rules of Civil Procedure (summary judgment), Federal court decisions interpreting Rule 56 may be relied on for an understanding of the operation of the summary disposition rule.^{1/} Thus, in Adickes v. Kress & Co., 389 U.S. 144, 157 (1970), the Supreme Court held that the party seeking summary judgment has "the burden of showing the absence of a genuine issue as to any material fact."^{2/} To meet this burden, the movant must eliminate any real doubt as to the existence of any genuine issue of material fact.^{3/} To

^{1/} Alabama Power Company (Joseph M. Farley, Units 1 and 2), ALAB-182, 7 AEC 210, 217 (1974).

^{2/} See also Cleveland Electric Illuminating Co. (Perry, Units 1 and 2), ALAB-433, 6 NRC 741, 752 - 54 (1977).

^{3/} Poller v. Columbia Broadcasting Co., 368 U.S. 464, 468 (1962); Sartor v. Arkansas Natural Gas Corp., 321 U.S. 620, 627 (1944).

further this goal, the summary disposition rule provides that all material facts, set out in the statement mandatorily accompanying summary disposition motions, will be deemed to be admitted unless controverted by the opposing party. 10 CFR § 2.749(a).

Any other party may serve an answer supporting or opposing the motion for summary disposition. 10 CFR § 2.749(a). Attached to a motion opposing summary disposition must be a separate, short, and concise statement of the material facts as to which it is contended that there exists a genuine issue to be heard. 10 CFR § 2.749(a). The opposing party need not show that it would prevail on the issues but only that there are genuine issues to be tried.^{4/} Furthermore, the record and affidavits supporting and opposing the motion must be viewed in the light most favorable to the party opposing the motion.^{5/} Finally, the proponent of a motion for summary disposition must meet its burden of establishing that it is entitled to judgment as a matter of law even if the opponent of such a motion fails to submit evidence controverting the conclusions reached in documents submitted in support of the motion.^{6/}

III. STAFF ARGUMENT IN SUPPORT OF APPLICANTS' MOTION

Contention 12 states, in essence, that the design of the Susquehanna facility fails to solve the problem of flow-induced vibration in the core,

^{4/} American Manufacturers Mut. Ins. Co. v. American Broadcasting - Paramount Theaters, Inc., 388 F.2d 272, 280 (2d Cir. 1976).

^{5/} See Public Service Co. of New Hampshire (Seabrook Station, Units 1 and 2), LBP-74-35, 7 AEC 877 (1974).

^{6/} Cleveland Electric Illuminating Co., (Perry, Units 1 and 2), ALAB-443, 6 NRC 741, 753 - 54 (1977).



thereby creating in-vessel sparger failure which the contention's sponsor contends will lead to violations of the NRC standards for protection against radiation in Part 20. The problem propounded by the intervenor, feedwater sparger failure caused by flow-induced vibration in the core, has never happened. (Affidavit of Shou-nien Hou at 2). While feedwater spargers did crack in early operating boiling water reactors (BWRs), feedwater spargers are not located within the reactor core. They are located within the reactor pressure vessel but outside the core. (Hou at 2).

Based on its evaluation of studies since 1973, the Staff has concluded that these cracks resulted from the loose fit of the feedwater sparger in the feedwater nozzle. (Hou at 3). This looseness permitted a leakage flow of feedwater through the gap between the thermal sleeve and the nozzle safe end, inducing vibratory stress which gradually caused cracks in the tee box junctions and wear of the sparger arm end pins, brackets, and thermal sleeves. (Hou at 3).

Furthermore, the Staff has concluded that this problem has been acceptably resolved by feedwater spargers of improved design, such as the GE triple-sleeve feedwater sparger to be used at the Susquehanna facility. (Hou at 3). The new design has modified the tee box junction by using a forged tee, which provides less flow restrictions and less local stress concentrations. (Hou at 3). This improved feedwater sparger also uses triple sleeves, double piston ring seals, and improved interference fit which effectively eliminates leakage flows. Results of full scale flow tests and actual experience in several operating reactors using this type

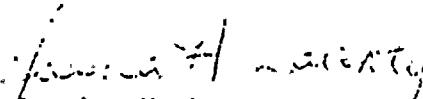
of sparger have demonstrated that the vibration levels are acceptably low for all flow and load variations. (Hou at 4).

Finally, the Staff requires routine visual inspections of sparger integrity during reactor refueling outages. (Hou at 4). Thus, cracks and wear of spargers should be easily detectable. (Hou at 3-4). In the very unlikely event that a complete severance of a sparger should occur, such an occurrence could be detected through instrumentation as stated in the Affidavit of H. T. Watanabe. (Hou at 4).

IV. CONCLUSION

Based on the foregoing, the NRC Staff believes it is clearly demonstrated that there is no genuine issue as to any material fact regarding feedwater sparger failure caused by flow-induced vibrations in the core. Thus, the Staff believes that summary disposition of Contention 12 in favor of the Applicants should be granted as a matter of law in accordance with 10 CFR § 2.749.

Respectfully submitted,


Jessica H. Lavery
Counsel for NRC Staff

Dated at Bethesda, Maryland
this 30th day of March, 1981.

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PENNSYLVANIA POWER & LIGHT COMPANY) Docket No. 50-387 O.L.
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AFFIDAVIT OF SHOU-NIEN HOU

I, Shou-nien Hou, being duly sworn, dispose and state:

- Q. By whom are you employed, and describe the work you perform?
- A. I am a Principal Mechanical Engineer in the Mechanical Engineering Branch, Division of Engineering, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission. A copy of my professional qualifications is attached to this Affidavit.
- Q. Have you read "Applicants' Motion for Summary Disposition of Contention 12," filed March 9, 1981, and the documents attached thereto, including the affidavit of Howard T. Watanabe?
- A. Yes.

Q. Would you describe the scope of the subject matter addressed in your affidavit?

A. I have been asked to evaluate the technical accuracy and validity of the Applicants' motion and to provide information and comments, as necessary, regarding the safety implications of feedwater spargers installed in the reactors of the Susquehanna nuclear power plant, Units 1 and 2.

Q. Has flow-induced vibration in the core, the sole concern of Contention 12, ever caused sparger failure in any operating boiling water reactor (BWR) plant?

A. No. The feedwater spargers are located inside the reactor pressure vessel but outside the reactor core. Flow-induced vibration in the core has made no contribution to past sparger failures.

Q. Since feedwater spargers did crack in the early operating BWRs, what may be considered an acceptable explanation to the NRC staff regarding the cause of failure?

A. The Mechanical Engineering Branch has participated in monitoring and reviewing (1) events involving spargers, (2) various design modifications, and (3) testing programs since 1973. This effort has consisted

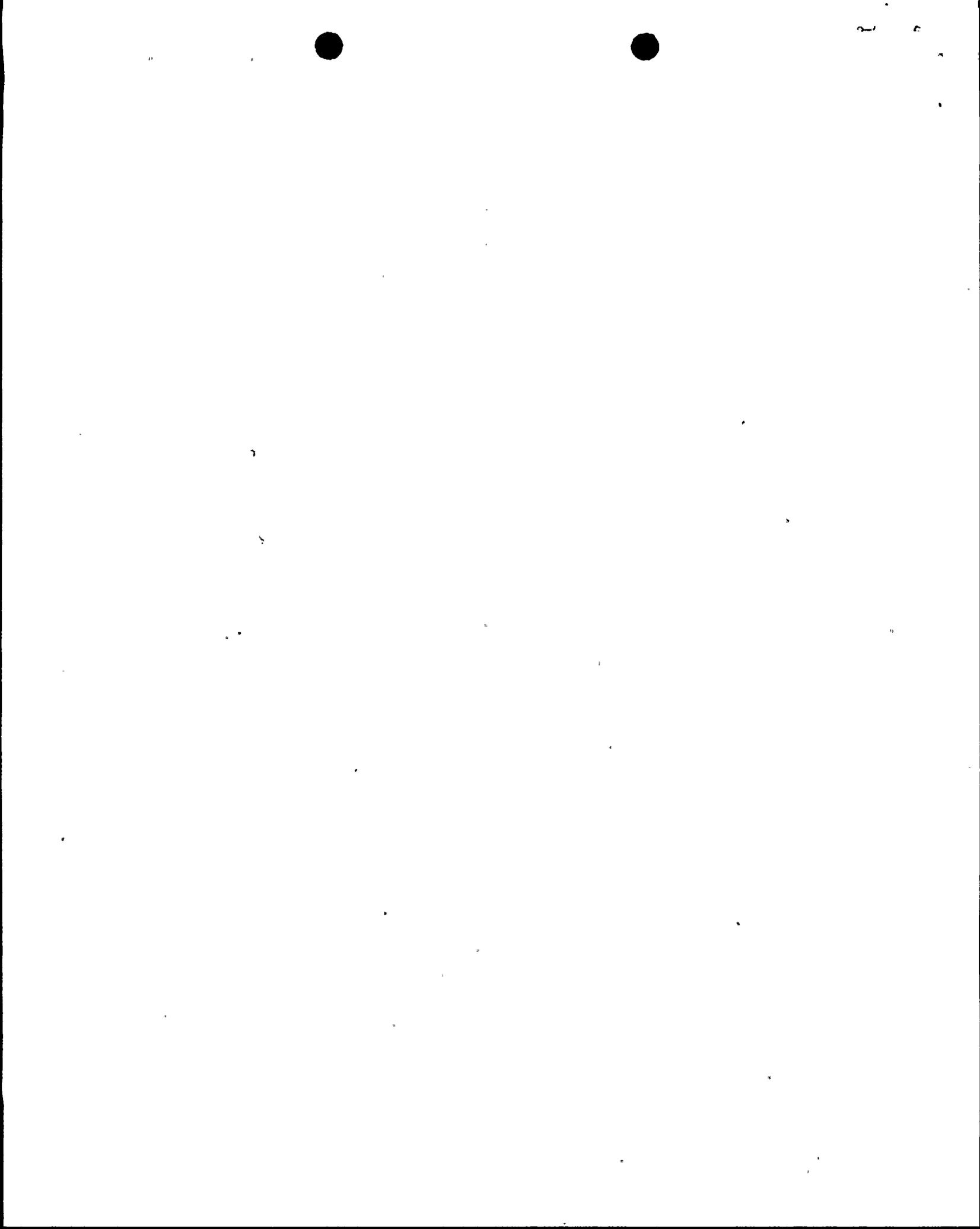
of a sparger specific investigation (Reference 1) and an overall investigation of flow induced vibration of the reactor internals (Reference 2). We concluded that the leakage flow of feedwater through the gap between the thermal sleeve and the nozzle safe end had induced vibratory stresses which resulted in the sparger cracking, since spargers used in the early BWRs did not fit tightly into the nozzle. This conclusion concurs with the explanation provided in the Affidavit of H. T. Watanabe.

Q. What kind of sparger failures occurred in the early operating BWRs?

A. Gradually-developed cracks occurred at the vicinity of the tee box junction between the thermal sleeve and sparger arms, and wear occurred on sparger arm end pins, brackets and thermal sleeves. The type of failures that have occurred are not instant and catastrophic and can be detected prior to the complete failure of the sparger.

Q. On what basis has the NRC staff accepted the design of feedwater spargers used in the Susquehanna plant, Units 1 and 2?

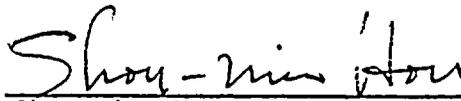
A. Feedwater spargers of improved design, the GE triple-sleeve type, are used in the Susquehanna plant, Units 1 and 2. The new design has modified the tee-box junction by the use of the forged tee, which provides less flow restriction and less local stress concentration. The use of triple sleeves, double piston ring seals and improved interference fit have effectively eliminated the leakage flow. Results of full scale



flow tests and performance in several operating reactors using this type of sparger have demonstrated that the vibration levels of the triple-sleeve sparger were acceptably low for all flow and load variations experienced. Thus, the probability of a feedwater sparger failure occurring in the Susquehanna plant, Units 1 and 2 will be acceptably low.

Q. What might happen if feedwater spargers do fail in Susquehanna plant; would the health and safety of the general public be endangered?

A. Feedwater sparger failure has never caused in the past, and is not expected to result in, any radiation hazard to the public. In Reference 1, a staff requirement to conduct routine visual inspection of sparger integrity during the reactor refueling outage is delineated. The inspection interval is based on the length of time experienced for developing cracks in early BWRs and the effectiveness of various type spargers in preventing cracks. Furthermore, in the very unlikely circumstance that a complete severance of sparger should occur, such occurrence could be detected through instrumentation as stated in the Affidavit of H. T. Watanabe. Thus, the health and safety of the public would not be endangered.


Shou-nien Hou

Dated at Bethesda, Maryland
this 27th day of March, 1981

Subscribed and sworn to before me
this 27th day of March, 1981


Notary Public
MY COMMISSION EXPIRES JULY 1, 1982

REFERENCES

1. NUREG-0619, "BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking." Resolution of NRC Generic Technical Activity A-10, September 1980.
2. NRC Evaluation Report of GE Topical NEDE-24057 and Amendment 1 and 2, "Assessment of Reactor Internals Vibration in BWR/4 and BWR/5 Plants," August 1980.