

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING APPEAL BOARD

DOCKETED
USNRC

'84 AGO 10 A11:23

In the Matter of)
LOUISIANA POWER AND LIGHT COMPANY)
(Waterford Steam Electric Station,)
Unit 3))

Docket No. 50-382

OFFICE OF SECRETARY
OF ENERGY
& SERVICE
BRANCH

AFFIDAVIT OF DENNIS M. CRUTCHFIELD

Q.1. Please state your name, title, and by whom you are employed.

A.1. My name is Dennis M. Crutchfield. I am employed as Assistant Director for Safety Assessment, Division of Licensing, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission. A statement of my professional qualifications is attached.

Q.2. What is the purpose of this affidavit?

A.2. The purpose of this affidavit is to provide an overview of the NRC Staff's review and evaluation of the adequacy of the foundation base mat at Waterford Steam Electric Station, Unit 3 ("Waterford"), in light of the observed concrete cracking and related allegations that have been made.

Q.3. Please describe your responsibilities in this regard.

A.3. Since March 1984, I have been assigned lead responsibility for coordinating the NRC Staff's review and resolution of outstanding issues pertaining to Waterford Unit 3, including issues related to the facility's foundation base mat.

Q.4. Please describe the events which led to your being assigned lead responsibility for the Staff's review of the Waterford Unit 3 base mat.

A.4. As has previously been reported, in May 1983, hairline cracks and water seepage were discovered in the reinforced concrete foundation base mat at Waterford Unit 3; this was documented in IE Inspection Report No. 83-18 (June 30, 1983) and was discussed in a special Inquiry Team Report issued on July 14, 1983 (Board Notification BN-83-133, September 15, 1983). Subsequent evaluation and review of the Applicant's submittals in this regard, including reports by Harstead Engineering Associates, Inc. (HEA), led the Staff initially to conclude that the cracking and water seepage do not present a challenge to the structural integrity of the foundation base mat and do not raise a significant safety or environmental issue; nonetheless, the Staff determined that an appropriate surveillance program is required to assure the continuing structural integrity of the base mat in the event of future changes in loads or environmental conditions. These conclusions were submitted to the Atomic Safety and Licensing Appeal Board in affidavits by John S. Ma, Raman Pichumani and Raymond O. Gonzales, filed on November 28, 1983.

Thereafter, on December 10, 1983, an article appeared in Gambit (a weekly newspaper), which reported, in part, that "[m]assive records deficiencies including apparently forged signatures, missing records and manufactured inspection reports point to possible flaws in the construction of the foundation" at Waterford Unit 3. The article further asserted that the Staff's reviewers were unaware of these deficiencies when the Staff filed its affidavits in November 1983, and it claimed that if "that information been made available to . . . [the Staff or HEA] Gambit's sources believe, they might have come to a different conclusion, or at least withheld judgment until the structural implications of the deficiencies had been examined in detail." On December 12, 1983, the Joint Intervenors filed a motion to reopen the proceeding, to which they attached the Gambit article in support of their assertion that HEA and the Staff had relied on "falsified documents for their basic assumptions."

Following publication of the Gambit article, the Staff initiated an inquiry and review of the allegations referred to therein, under the lead of NRC Region IV in conjunction with the Office of Investigations. As part of this review, interviews were conducted with various allegeders and a review of documents was initiated by Region IV personnel at the Waterford site.

As the Staff's review of the allegations progressed further, it gradually became apparent that the breadth and complexity of the allegations would require additional resources and coordination among several different Offices within the Commission. Accordingly, on March 12, 1984, the Executive Director for Operations issued a memorandum establishing a

program for treating outstanding issues which require resolution before the Staff's licensing decisions for the Waterford facility could be made. The EDO directed the Office of Nuclear Reactor Regulation, under the lead of Mr. Darrell Eisenhut, Director, Division of Licensing, to manage all necessary NRC actions in order to assure the overall coordination and integration of these issues, and to assure that the issues are resolved on a schedule to satisfy hearing and licensing decision needs; this program was to encompass all licensing, inspection, hearing, and allegation issues. At Mr. Eisenhut's direction, I was assigned lead responsibility for coordinating this review effort, including issues relating to the foundation base mat.

Q.5. Please describe the means by which you organized the Staff's review of outstanding issues related to the Waterford foundation base mat.

A.5. Two groups were formed to review outstanding base mat-related issues. One of these groups assembled at the Waterford site to gather information and review documentation concerning civil/structural allegations related to construction, including allegations related to the base mat, as part of an effort to assess the validity, safety significance and generic implications of the allegations. This team was comprised of some eight individuals, and formed one component of a larger, 40-person special team which assembled at the Waterford site to gather and review all of the outstanding allegations concerning the Waterford facility. The civil/structural allegation review team was directed by Lawrence Shao, Deputy Director, Division of Engineering Technology, Office

of Nuclear Regulatory Research, and was guided on a day-to-day basis by Robert E. Shewmaker, Senior Structural Engineer, Office of Inspection and Enforcement. In addition, the civil/structural review team received technical assistance from Robert E. Philleo, an independent consulting engineer who is a former president of the American Concrete Institute and former Chief of the Structures Branch, U. S. Army Corps of Engineers (Mr. Philleo's report was submitted to the Appeal Board on June 15, 1984). As part of its duties, the civil/structural allegation review team assessed the adequacy of the base mat's construction to determine whether the problems that occurred during construction had rendered the design assumptions invalid.

The second group assigned to review base mat-related matters performed an evaluation of certain design issues which arose as a result of information obtained by the Region IV/OI investigation. The senior member of this team was James P. Knight, Assistant Director for Components and Structures Engineering, Division of Engineering, Office of Nuclear Reactor Regulation; the team also included several individuals employed in the Structural and Geotechnical Engineering Branch of the Division of Engineering, and was assisted by consultants retained from the Structural Analysis Division, Department of Nuclear Engineering, Brookhaven National Laboratory.

Q.6. Has the civil/structural allegation review team reached a conclusion as to whether the allegations they reviewed may affect the safety of the facility?

A.6. Yes. As set forth in the affidavit of Robert E. Shewmaker, dated August 7, 1984, the civil/structural allegation review team has

concluded that four items relating, in part, to the foundation base mat, have potential safety significance, and that further efforts on the part of the Applicant are required to satisfactorily resolve these matters; these items were identified in a letter from Darrell G. Eisenhut to the Applicant, dated June 13, 1984, as Items 7, 10, 11, and 19. An additional item, listed as Item 20 in Mr. Eisenhut's letter, also relates in part to the base mat and has been identified as an item having potential safety significance. However, notwithstanding the identification of these items as having potential safety significance, the Staff has determined that satisfactory resolution of these items may be anticipated such that they may be considered to be confirmatory in nature, and these items are unlikely to affect the safety of the facility. Further details concerning these matters and the bases for the Staff's conclusions may be found in Mr. Shewmaker's affidavit.

Q.7. Has the Staff's design review resulted in a conclusion as to whether the cracks in the foundation base mat may affect the safety of the Waterford facility?

A.7. Yes. As set forth in the affidavit of James P. Knight, dated August 7, 1984, the Staff's review of base mat design issues, and analyses performed by BNL at the Staff's request, have led the Staff to conclude that the base mat cracks are unlikely to affect the safety of the facility even under design basis earthquake (SSE) conditions. At the same time, the Staff has determined that certain refinements in the Applicant's design analysis should be performed, although these refinements are not expected to alter the Staff's conclusions as to the adequacy of

the base mat's design. Accordingly, the Staff has confirmed the validity of its previous fundamental finding that the cracks in the Waterford foundation base mat do not affect the safety of the facility, as presented in the Staff's affidavits of November 28, 1983. Further details concerning these matters may be found in Mr. Knight's affidavit.

Q.8. Has the Staff considered the environmental consequences of the concrete cracks?

A.8. Yes. The base mat cracks were previously found to have no adverse environmental consequences, as discussed in the affidavit of Raymond O. Gonzales, dated November 28, 1983. The Staff's current evaluation does not alter this conclusion, as set forth in Mr. Knight's affidavit. Similarly, the Staff has considered whether the cracks that have been observed in the vertical walls of the shield building and cooling tower may pose adverse environmental consequences; for the reasons discussed in Mr. Knight's affidavit, no such adverse environmental impact has been identified.


Q.9. Has the Staff reached a conclusion as to whether the concrete cracks and related allegations raise a significant safety or environmental issue?

A.9. Yes. For the reasons described above and the affidavits of James P. Knight and Robert E. Shewmaker, the Staff has determined

that the concrete cracks and related allegations do not present a significant safety or environmental issue.


Dennis M. Crutchfield

Subscribed and sworn to before me
this 7th day of August, 1984


Malinda S. McDonald
Notary Public

My Commission expires: 7/1/86.

DENNIS M. CRUTCHFIELD

DIVISION OF LICENSING

U. S. NUCLEAR REGULATORY COMMISSION

PROFESSIONAL QUALIFICATIONS

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OFFICE OF SECRETARY
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BRANCH

My name is Dennis M. Crutchfield. I am the Assistant Director for Safety Assessment in the Division of Licensing. My duties entail supervising the safety and environmental licensing aspects of operating reactors, the review of some older operating reactors against current criteria, standardization and special projects reviews, and short-term technical evaluation of operating reactors.

I hold a Bachelor of Mechanical Engineering Degree from the Catholic University of America and have also completed 18 credits of graduate study toward an advanced degree in Nuclear Engineering at the same university.

I have had more than 20 years of professional experience in the nuclear field. For over two and one half years I was employed at Fort Belvoir by the United States Army Engineers Reactors Group as a mechanical engineer in the Engineering Department. During my employment at Fort Belvoir, I was responsible for performing a variety of tests, preliminary designs and analyses of pressurized water and test reactors, including the design review of the barge mounted pressurized water reactor, the MH-1A. I also participated in the operational support and testing of other Army and Air Force nuclear plants.

In 1967, I accepted a position as a project manager with the regulatory staff of the Atomic Energy Commission and have participated in the safety reviews of several power reactors from construction permit issuance through operation of both pressurized and boiling water reactors.

I have also served as a Technical Coordinator on the Staff of an NRR Division Director and subsequently as the Chief of the Technical and Administrative Support Branch for the Director of the Office of Nuclear Reactor Regulation. In these positions, I was responsible for the formulation of technical policies as well as the coordination with other NRC offices, of those technical issues that could affect the agency.

Prior to my current assignment, I was Chief of Operating Reactors Branch No. 5. I was responsible for the supervision and coordination of technical reviews by personnel within the Branch and by technical consultants, including the preparation of safety evaluations, hearing testimony and other reports, as necessary. Responsibilities also included continuous review of the operating history and performance of all assigned operating reactors and for special reviews, determinations regarding backfit, and determinations regarding items of non-compliance and safety. I was also assigned lead responsibility for coordinating the NRC Staff's review and resolution of all outstanding issues pertaining to the Waterford Unit 3 facility; included in this responsibility were the completion of FSAR review actions, completion of remaining inspection efforts, resolution of allegations, and preparation of responses to hearing motions.

In my current position, I plan and direct the activities of Operating Reactors Branch No. 5 as well as three other Branches. One of these Branches is responsible for the agency's program to review the older operating reactors against current licensing criteria and make balanced backfitting decisions based on those reviews. Another Branch provides interdisciplinary technical support to operating reactors projects in the processing of relatively routine, short-duration licensing actions; it also provides rapid initial evaluation of unanticipated events and defines needed support from the other NRR Divisions. The remaining Branch performs the overall safety and environmental project management for assigned preliminary and final standard design approval, early site approval, topical report approval, research and test reactor and critical facility applications; it performs similar functions for Naval reactors, advanced reactor concepts and DOE- and DOD-owned facilities exempt from licensing, and provides NRR interface and coordination with NMSS on reactor safeguards matters.