UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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In The Matter of	)	
	)	
COMMONWEALTH EDISON COMPANY	)	Docket Nos. 50-454 OL
	)	50-455 OL
	)	
(Byron Nuclear Power Station, Units 1 & 2)	)	

SUMMARY OF RICHARD FRENCH'S TESTIMONY
ON CONTENTION 1
(REINSPECTION PROGRAM)

I. Richard French is a partner at Sargent and Lundy and Manager of the Electrical Department. He has extensive experience in the basic design and engineering of the electrical systems for power stations.

II. For the Byron Reinspection Program, Mr. French directed the engineers who performed evaluations of discrepancies associated with electrical construction work.

III. Hatfield installed all the components, materials and equipment associated with the electrical systems at Byron. Hatfield also installed concrete expansion anchors.

IV. Mr. French's testimony is concerned with the results of the original and supplemental reinspections of objective Hatfield construction attributes.

V. Of 66,981 inspections of these attributes, 2,311 discrepancies were identified. Mr. French describes the various methods by which Sargent and Lundy engineers evaluated the Hatfield discrepancies. The results of the evaluations demonstrated that none of the evaluated discrepancies had design significance.

VI. Based on the S&L evaluations of objective attribute discrepancies identified in the Reinspection Program and in the Supplemental Reinspections, Mr. French concludes that the quality of the Hatfield work reinspected is adequate.

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TESTIMONY OF RICHARD X. FRENCH

Q.1. Please state your full name and place of employment for the record.

A.1. Richard X. French, Sargent & Lundy, 55 East Monroe Street, Chicago, Illinois.

Q.2. Please describe your job responsibilities.

A.2. As a Partner in the firm and Manager of the Electrical Department, I am responsible for and coordinate all the electrical engineering and design for nuclear and fossil power plants and for transmission lines and substations for Sargent & Lundy. I initiate, review and authorize all Electrical Department standards, procedures, and reports, including those pertaining to technical administration and quality assurance. I am also responsible for and coordinate all power system analytical work.

Q.3. Please describe your educational background and work experience.

A.3. I graudated from Illinois Institute of Technology in 1948 with a B.S. degree in Electrical Engineering followed by graduate level courses in electrical and nuclear engineering. I have 36 years of experience in designing and engineering electrical systems for fossil and nuclear power plants, substantions, and transmission lines and in making power system engineering studies.

I am a registered Professional Engineer in 17 states, including Illinois and in Alberta, Canada. Presently, I am a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE) and current Past Chairman of the Power System Engineering Committee of the Power Engineering Society. I was formerly a member of the IEEE Rotating Machinery Working Group.

I have had extensive experience in the basic design and engineering of the electrical systems for power plants and substations. This work involved developing the basic electrical diagrams, determining requirements for specifications, analyzing proposals, and making recommendations for purchase and liaison with the client and suppliers. Projects on which I have worked include major power stations; large inter-connections, substations, and transmission lines.

I have written numerous technical papers and am the author of the Bulk Power Supply Economics section of the Mc Graw-Hill Standard Handbook for Electrical Engineers.

Q.4. Are you familiar with the Byron Reinspection Program?

A.4. Yes. That program was an effort by Commonwealth Edison Company to establish the qualification of certain Quality Control Inspectors who were employed at the construction site of the Byron Station. The results were also used as a basis for judgments on the quality of the construction work. The Reinspection Program is documented in a report which was issued by Edison in February, 1984.

Q.5. Were you involved in the preparation of the report?

A.5. My involvement consisted of directing the activities of engineers who work for me at Sargent & Lundy. They evaluated the design significance of various discrepancies associated with electrical construction work. However, I had no direct involvement in the preparation of these engineering evaluations.

Q.6. What is the purpose of your testimony?

A.6. My testimony addresses a portion of the engineering evaluation prepared as a part of the Reinspection Program by Sargent & Lundy engineers with respect to various discrepancies

identified during the reinspections of objective attributes of work performed by Hatfield Electric Company.

Q.7. Since your involvement in the Reinspection Program was minimal, how is it you are able to testify with respect to this matter?

A.7. I am a qualified electrical engineer with many years of experience in the engineering and design of the electrical features of both fossil and nuclear power stations. In this instance, I have read the Reinspection Program report. I have been thoroughly briefed with respect to the engineering evaluations performed by my people, and I have studied the underlying calculations and data. I understand and adopt that work. It represents highly competent work. It serves as the basis for my testimony.

Q.8. What work was performed by Hatfield Electric Company at Byron Station?

A.8. Hatfield installed all the components, materials and equipment associated with the electrical systems at Byron, including the installation of electrical equipment, cable tray and conduit and the pulling and terminating of cable. Hatfield also installed concrete expansion anchors which were initially inspected and reinspected by Pittsburgh Testing Laboratory (PTL). The evaluation of discrepancies identified for these anchors is included in my discussion of the Hatfield work.

Q.9. How was this work classified for reinspection?

A.9. The Hatfield work was divided into separate groups called attributes. These attributes included conduit installation, cable termination, cable tray and cable tray hanger installation, equipment modification, conduit as-built reconciliation, A-325 bolting and visual weld inspection. As explained in Mr. Del George's testimony, these attributes, which are described in Attachment B of his testimony, were then divided into objective and subjective attributes depending upon the degree of qualitative judgment inherent in the inspection activity. Visual weld inspection, which was the only attribute categorized as subjective, is discussed in the testimony of Mr. McLaughlin.

Q.10. How many reinspections of Hatfield objective attributes were conducted as part of the Reinspection Program?

A.10. There were 63,085 inspections of objective attributes performed as part of the reinspection program. Of these, 2840 were associated with concrete expansion anchors inspected by PTL.

Q.11. What were the results of these inspections?

A.11. There were 2153 discrepancies identified. Thirty-eight of these discrepancies were associated with concrete expansion

anchors. Most of the discrepancies were associated with conduit as-built reconciliation. These discrepancies consisted primarily of differences between the installed locations of conduit, conduit supports and junction boxes and the locations shown on the installation drawings.

Q.12. How were the discrepancies associated with the objective attributes evaluated?

A.12. For the 2,153 observed discrepancies, 1,713 evaluations were performed. The number of evaluations was less than the total number of discrepancies because some evaluations covered more than one discrepancy. The discrepancies were first compared with current design parameters and tolerances. This involved a comparison of installed component locations and dimensions with the corresponding locations, dimensions, and tolerances shown on the design drawings. The discrepancies found to be outside of design tolerances were evaluated either by engineering judgment or by engineering calculations.

Engineering judgment evaluations were performed in two ways, either a review of the component design function to determine whether the function of the component was affected by the discrepancy, or a comparison of the discrepancy to the current design to determine whether the discrepancy had design significance. Engineering calculations were used to resolve the remaining discrepancies.

Q.13. How many of the discrepancies were evaluated by comparison to the design parameters and tolerances?

A.13. Of the 1,713 evaluations, 1,244 were found to be within current design parameters and tolerances. The reason the reinspectors identified these as discrepancies was that the acceptance tolerances established for the Reinspection Program were more stringent than the tolerances indicated on the installation drawings.

Q.14. How many of the discrepancies were evaluated using engineering judgment?

A.14. Eighty evaluations of discrepancies were deemed acceptable by engineering judgment. Approximately two-thirds of these evaluations involved a review of the component design function to determine whether the function was impaired by the existence of the discrepancy. None of these discrepancies impaired component design function. The balance of the evaluations involved a comparison of the discrepancy to current design requirements to determine significance. None of the discrepancies were significant.

Q.15. How many of the discrepancies were evaluated using engineering calculations?

A.15. Of the 1,713 evaluations, 389 were analyzed by

revising the conduit support, junction box loading, and mounting detail design calculations. The variations in support locations and associated variations in loads were found to be acceptable.

Q.16. What does the engineering evaluation of the discrepancies identified in the Hatfield objective attributes demonstrate?

A.16. None of the evaluated discrepancies had design significance and therefore, they had no safety significance.

Q.17. What does the term "design significance" mean?

A.17. Design significance is a term referring to whether or not a discrepancy would cause a component or system to perform in a manner that is unacceptable relative to the design criteria. If the discrepancy would not cause a deviation beyond the design requirements, then it is said to not have design significance. For instance, a wiring discrepancy which did not alter the functioning of a control circuit would not have design significance. As I indicated, none of the Hatfield discrepancies discussed above had design significance.

Q.18. Were any additional reinspections conducted with respect to objective attributes of Hatfield Electric Company's work?

A.18. A supplemental program was established for the reinspection of certain Hatfield attributes and elements, namely, equipment setting, equipment modification, A-325 bolt installation and conduit support bolting. This program was established to provide further assurance that work in these areas was properly done and to complete the data base for attributes where the reinspection program samples were too small to permit meaningful reliability calculations.

Q.19. What was the nature of the supplmental reinspection program for equipment setting?

A.19. The settings of 50 randomly selected pieces of safety-related electrical equipment, out of a total of approximately 250, were inspected. There were 778 inspections associated with the 50 pieces of equipment, which identified 34 discrepancies. An evaluation of the discrepancies determined that none had design significance. The majority of the discrepancies consisted of equipment anchoring details with weld length and weld spacing deviations. The equipment anchoring details were determined to be adequate because of the conservatism used in the determination of design anchorage loads.

Q.20. What was the nature of the supplemental reinspection program for equipment modification?

A.20. Equipment modification work refers to changes in the wiring and components within electrical panels and switching equipment. There are numerous changes in the wiring of this equipment made by the owner and the manufacturer as well as by Hatfield. It would be very difficult to determine those discrepancies attributable to Hatfield. Therefore the supplemental reinspection covered all work done by the owner, the manufacturer and by Hatfield.

A 100% wiring inspection was performed for 50 pieces safety-related equipment. These were randomly selected from a population of approximately 250. This wiring inspection included all of the elements of wiring installation. Inspection was performed on 1,850 elements associated with the 50 pieces of equipment and 44 discrepancies were identified. An evaluation of the discrepancies determined that none has design significance. The discrepancies were minor wiring variations that do not affect the functioning of the equipment.

Q.21. What was the nature of the supplement reinspection program for A-325 bolting?

A.21. A-325 bolts are used in the assembly of cable tray

riser supports. Out of a total of 169 supports using A-325 bolts, a sample of 50 supports was reinspected. A total of 295 bolts were inspected and 46 discrepancies were identified. The discrepancies represent bolts with torque less than the acceptance criteria. The design of the associated connections was reviewed and it was determined that the connections were structurally sound despite the lack of complete bolt torque. Therefore, the discrepancies were determined to have no design significance. However, all A-325 bolted connections were retorqued because of the unsatisfactory discrepancy rate.

Q.22. What was the nature of the supplement reinspection for conduit support bolting?

A.22. Out of approximately 25,000 conduit supports, 305 were randomly selected. These supports were reinspected for bolt torque. There were 34 discrepancies identified from a total of 1,008 conduit support bolts. The discrepancies were evaluated and determined to have no design significance.

Two missing conduit clamps were detected during the inspection. These missing clamps, upon evaluation, had no design significance. However, because these clamps were missing and a missing clamp at a critical location could have design significance, a walk-down was performed of all 8,532 critical clamp locations. Ten locations were found with

missing bolts or clamps. An evaluation of 9 of these cases showed that the discrepancies had no design significance. The remaining case is still under evaluation. Based on these results, a walk-down of the remaining accessible conduit clamps and bolts will be conducted.

Q.23. What conclusion about the reinspected Hatfield work can you draw from the evaluation of objective attribute discrepancies identified in the Reinspection Program and in the supplemental reinspections undertaken?

A.23. There were 66,981 inspections performed. These inspections covered an even greater number of individual items. Although 2,311 discrepancies were identified, none of the observed discrepancies had design significance. The quality of the work reinspected is adequate.

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RELATED CORRESPONDENCE

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July 3, 1984

BY MESSENGER

Mr. Joshua Levin
BPI
109 N. Dearborn St.
Room 1300
Chicago, IL 60602

Re: In the Matter of Commonwealth Edison Company
(Byron Nuclear Power Station, Units 1 and 2)
Docket Nos. 50-454 and 455

Dear Josh:

This letter constitutes Edison's formal response to Interrogatory 24 of Intervenors' First Set of Interrogatories. Interrogatory 24 requests that we identify all witnesses who will testify on Edison's behalf at the reopened hearing and provide a summary of each witnesses' testimony. Edison's witnesses will be the following:

Louis Del George	A. K. Singh
Richard Tuetken	Richard French
John Hansel	Wallace Behnke
Robert Laney	Brad Maurer
Malcolm Somsag	Louis Johnson
Walter Snewski	George Marcus
John McLaughlin	Ken Kostal
Donald Leone	Robert Treece
	James Binder

Please note that most of the witnesses named above were disclosed to you informally more than two weeks ago, some as definite witnesses and some as tentative witnesses. The three witnesses not previously disclosed are Ken Kostal, Richard French and A. K. Singh. These witnesses were selected only within the last few days.

A summary of each witness' testimony is attached to his written testimony. Written testimony for all witnesses except Messrs. Johnson, Marcus, Kostal and Maurer has now been served on all parties.

Very truly yours,

Bruce Becker

Bruce D. Becker
One of the Attorneys for
Commonwealth Edison Company

BDB:reg
cc: Service List