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May 11, 1983

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Denton:

In view of the concerns involving design control at other plants, Commonwealth Edison has conducted a detailed review of the procedures and practices used in the control of design and construction of its Byron Station. The principal managers responsible for Byron's design and quality assurance have reviewed the work done on the project with senior project management and their staffs to verify that proper design control practices were utilized. This review has reinforced our confidence that Byron Station has been designed and constructed with adequate controls and can be operated safely. This letter will document the completion of this review and highlight the important findings. Statements of these managers which summarize this review are enclosed.

Summary

Commonwealth Edison has extensive experience in nuclear power plant design, construction and operation. Additionally, the Company has employed an architect-engineer with extensive nuclear power plant design experience. Edison has a strong corporate commitment to quality assurance and the auditing of the Byron Project has been extensive, including detailed technical audits of the architect-engineer and the NSSS vendor. Several major recent evaluations, including an Independent Design Verification of the LaSalle County station and an INPO self-evaluation of Byron Station, have shown that Commonwealth Edison and its principal contractors effectively control the overall design process and construction activities of our nuclear stations. Edison's Department of Nuclear Safety is performing an independent design review of several critical safety-related areas in order to verify the design assures the protection of the health and safety of the public.

Byron is now almost entirely constructed. The operating licensing hearings are nearly complete; a decision from the licensing board and fuel loading is projected within six months. The NRC, testifying at Byron's operating licensing hearings stated that it had found Byron's quality assurance program provided a reasonable assurance that the plant would operate without undue risk to public health and safety. It characterized Edison as a capable utility, willing to institute corrective action for any deficiencies which may occur.

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Byron's inspection history by the NRC bears out these observations. Never, in Byron's entire history, has it received a civil fine for any reason. During the past year, it has undergone extensive scrutiny by the NRC. In 1982 alone, 2,547 NRC inspector hours were spent at the site. This includes a special Construction Assessment Inspection which evaluated Edison's quality assurance program, compliance history, corrective action system, design control, material traceability, electrical work activities, in process inspections, weld rod control and quality control inspector effectiveness. The inspection team found Edison's quality assurance program at Byron to be effective. Although several deficiencies were identified, they were deemed isolated occurrences, most "of minor significance", the rest "not of major concern at all".

Finally, an extensive two-week design audit by I&E Region IV is already in progress at the architect-engineer's office, and we expect that it will provide additional assurance that proper design controls are in place for the Byron project.

Highlights of Review

The following paragraphs highlight some of the significant features of the design control practices utilized on Byron Station which support our confidence in the project.

1. Commonwealth Edison Company has conducted an INPO self-initiated evaluation of the Byron Station

A special intensive evaluation of the Byron project was performed in late October, 1982. The basis for the evaluation was the Institute of Nuclear Power Operations performance objectives and criteria. Commonwealth Edison Quality Assurance coordinated the self-initiated evaluation which was carried by a twenty man team. The team consisted of senior management personnel with broad backgrounds in construction, engineering, and operation along with five consultants. The team looked, in depth, at the plant facilities, work under construction, construction practices, design input, design output, and design review. The Byron project was found to measure up well against the INPO criteria. Corrective action for the deficiencies identified by the team was promptly undertaken. It is felt that this industry evaluation adds considerable creditability to the view that the Byron Station facilities are adequately designed and constructed and are of good quality.

2. Commonwealth Edison's Nuclear Safety Department is conducting an independent design review of Byron Station's critical areas

The Director of Edison's Department of Nuclear Safety has established an independent team of experienced engineers from within his department to perform a design review of the Byron project. This team is supplemented by personnel from other departments in specific areas for

examinations in depth where necessary. Members of the review team have extensive experience and expertise in station operations, plant engineering, mechanical systems, nuclear engineering, instrumentation and controls, and electrical design. A similar design review was performed for the Director of Nuclear Safety on LaSalle County Station. The results of the LaSalle review were presented as an attachment to Mr. Cordell Reed's January 4, 1982 letter to Harold Denton regarding design control practices utilized on the LaSalle County Station.

The Byron review is designed to examine the breadth of work done by the design agents to assure the availability of emergency power, the ultimate heat sink, and the ability to deliver water to the reactor when needed. The review will be completed prior to the Unit 1 fuel load. The topics selected for review are those in the critical safety-related areas.

The review is being performed under the direction of members of the Nuclear Safety Department. A separate scope of review has been prepared for each area of the design review. The review is examining design criteria, FSAR equipment descriptions, pre-operational and startup procedures, operating procedures, Zion modifications, industry event reports and similar documents, and the installed equipment at Byron. From this review and examination, a list of questions is being developed for discussion with the station, engineering, Sargent & Lundy and Westinghouse. A list of recommendations and observations will be developed from any items which can not be resolved.

The review is being focused on the ability to remove heat from the core during both cooldown and emergency conditions. Examples of items being evaluated include:

- Ultimate heat sink
- Refueling water storage tank
- Essential service water (including ultimate heat sink)
- High pressure safety injection
- Auxiliary feedwater
- Charging System
- Residual heat removal system
- Power supplies to selected instrumentation
- Cable loading to the major ECCS pumps
- Control power for automatic throwover

The Byron design review has been in progress since March, 1983, and is expected to be completed in July, 1983. If any significant items of concern are found they will be brought to Project Management immediately to obtain resolution. A report will be issued upon conclusion of the design review summarizing any recommendations.

3. Commonwealth has recently had an Independent Design Verification review conducted at our LaSalle County Station

A limited independent design review for LaSalle County Station was conducted in 1982 by Teledyne Engineering Services. This review verified that adequate controls and documentation were in place to demonstrate that the system reviewed was constructed in accordance with approved design documents, procedures, and FSAR commitments. The NRC determined from their review of the IDVP that Commonwealth Edison and its principal contractors "did effectively control the overall program and construction activities"; and that "the interdisciplinary review and interface control, including the internal and external transmittal distribution and use of design data among and within all interfacing organizations" was adequate. Since the same controls are in place for Byron Station as for LaSalle Station, we believe it is reasonable to assume that an independent third party review on Byron would reach a similar conclusion. Such a review would only result in the expenditure of substantial time, money, and personnel resources by Commonwealth Edison while reaching the aforementioned conclusion that the design control process is adequate.

4. Commonwealth Edison is directly involved in the design control process.

Commonwealth Edison's Engineering Department, working with the architect-engineer, nuclear steam supply vendor and other vendors, actually reviews the overall design and the implementation of the plant design to assure that the plant can function adequately and safely. Edison directly controls the issuance of the specifications, release of many design documents, and purchase of all major equipment for the plant. This involvement by Edison in design control has been an integral part of the construction of the Company's other nuclear plants, such as Zion and LaSalle, and even of our fossil-fired generating plants. (See attachments for more details.)

5. Commonwealth Edison has an experienced Engineering Project Group.

Edison's Engineering Project Group is staffed with eighteen engineers, many of whom have more than ten years of nuclear experience at Commonwealth Edison. The Byron Project Engineering Manager has over 31 years of power plant experience at Edison which includes over 16 years as Project Engineer for the Zion Project and as Project Engineering Manager for the Byron and Braidwood Projects. The Byron Project Engineer has nine years of nuclear experience at Edison, over 8 of which were as Project Engineer on Byron. He also has over 14 years of non-Edison nuclear experience. Four other engineers in the Project Group have worked in the project group from five to ten years. (See attachments for more details.)

6. Commonwealth Edison's Engineering Project Group has received ASME certification for adequate design control.

It is significant that Edison was one of the first utilities to obtain the ASME Code Stamp (N-Stamp) which is the certification by the American Society of Mechanical Engineers (ASME) that an engineering organization has adequate design control to perform engineering, purchasing and construction of a nuclear power plant in accordance with ASME's standards. This certification was first obtained in 1974 for the Engineering Department and includes the Byron/Braidwood Projects as well as the Dresden/Quad Cities, Zion, and LaSalle County Projects. Additional audits by ASME, conducted in 1977 and 1980 in connection with the renewal of the certification, have covered all phases of work done by the Engineering Department. The certification has been awarded on the basis of the strong quality assurance (QA) program followed by the Engineering Department and the detailed engineering procedures which expand upon the corporate QA procedures. The engineering procedures discuss in depth how our design review process is implemented and contain interface procedures and memorandums of understanding between our various engineering departments. Thirty-nine technical and quality procedures cover specific steps in the design review process such as: review of NSSS documents; review of balance-of-plant items; review of specifications; field change requests; and non-conformance reports. (See attachments for more details.)

7. Commonwealth Edison's Quality Assurance organization is completely independent of Engineering, Construction, and Operations

Commonwealth Edison has a strong commitment to quality assurance. The Quality Assurance organization is completely independent of the Engineering, Construction and Operating organizations with freedom to identify quality problems and it reports directly to senior management. Since 1973, the Quality Assurance organization has been headed by a senior manager who currently has 35 years of experience with Commonwealth Edison in engineering and construction. He reports to the Vice Chairman of the Company, who does not have responsibility for engineering, construction or operations.

At the Byron construction site the Edison Quality Assurance organization functions under the direction of the Site QA Superintendent independently of the construction site organization. The Site QA Superintendent reports off-site to the Director of Quality Assurance (Engineering and Construction) who reports in turn to the Manager of Quality Assurance. The Byron Quality Assurance organization has expanded over the years to keep pace with the construction and station pre-operational activities, and currently consists of about twenty-seven qualified people augmented with an Independent Testing Agency contractor.

The Independent Testing Agency contractor, with a workforce of about fifty qualified inspector-type technicians, performs normal independent inspections, tests and examinations of contractor work at Byron under the direct control of Edison's Site Quality Assurance Group. Site Quality Assurance also uses the Independent Testing Agency to perform special inspections as deemed prudent or necessary to check work performed and inspected by contractors.

8. The Manager of Quality Assurance has and exercises stop-work authority

The Manager of Quality Assurance has responsibility and authority to stop unsatisfactory work or to stop further processing of unsatisfactory materials during design and construction of nuclear plants such as Byron. Quality Assurance personnel are required to promptly report conditions adverse to quality which need immediate action but which cannot be resolved at the respective locations to the Manager of Quality Assurance or his designated alternate for action. There have been nine cases of stop-work by the Manager of Quality Assurance at Byron ranging from a very short time to many weeks. The extended stop-work cases involve, for the most part, welding, inspection and/or procedure problems. (See attachments for more details).

9. Commonwealth Edison's Quality Assurance auditing has been extensive

The auditing by the Quality Assurance organization of the Byron Project has been extensive. Since the start of construction, the Site Quality Assurance Group has performed over 410 audits of site construction and design activities which identified about 1,250 deficiencies which for the most part have been corrected.

In addition to the audits, Edison's Site Quality Assurance Group performs regular surveillances of construction activities and, as previously stated, uses an Independent Testing Agency Contractor to perform inspections, tests and examinations of contractor work. Surveillances are less formal than audits in that they are not conducted to approved checklists but rather involve checking to ensure adherence to some specific documented requirement such as procedures, specifications, drawings or standards. Surveillances, which are documented, are performed frequently between audits to assure that construction and other activities continue to be correctly performed. Surveillances cover the same types of activities and items as those involved in audits. An item found deficient in a surveillance must be corrected in a timely manner or it will be elevated to an audit citation. To date, in excess of 4,100 documented surveillances have been performed at the Byron Project, and Quality Assurance is currently performing such surveillances at the rate of about 800 a year.

10. Detailed technical audits have been performed on the architect-engineers and NSSS vendor

Audits of the architect-engineer's and NSSS vendor's design activities are given special attention by Edison Corporate Quality Assurance management. All such audits are conducted under the immediate direction of either the Manager of Quality Assurance or the Director of Quality Assurance for Engineering and Construction. These audits cover all aspects of the quality assurance program and in many cases go into considerable depth in specialized design areas and into subtier design activities.

Audits of the architect-engineers were performed by independent consultants and by senior Edison engineering people who have design experience. When it was deemed necessary to augment the Edison audit teams, technically capable independent design personnel with technical expertise in a particular design activity were assigned to the audit team as consultants. In addition to the basic quality assurance requirements, the scope of the design audits covered such items as: (1) technical review and evaluation of calculations; (2) performance of work; (3) computer program validation and usage; (4) design analysis; (5) controlling and processing design changes; (6) stress analysis; (7) design support activities by other design organizations; (8) competency verification of design and engineering personnel; (9) incorporation of design criteria and design documents; (10) design interface and data control with other design organizations; (11) technical aspects of electrical, mechanical and structural design including instrumentation and controls; (12) design of supports, hangers, snubbers and restraints including application of loadings; (13) seismic and environmental qualification requirements; (14) effectiveness of design control and design review including data verification; and (15) overall design review. (See attachments for a more detailed explanation of the audit coverages by Commonwealth Edison and the independent Consultant organizations).

Forty-five audits have been performed of the architect-engineer, site architect engineering organizations and the NSSS vendor. 233 deficiencies were found which for the most part have been corrected (See attachments for more detail.)

11. Independent checks are made of Edison's Quality Assurance activities

Another layer of quality assurance audits is performed by the corporate Quality Assurance staff on all Byron site activities including Edison's construction department, all site contractors and the site Quality Assurance organization activities. At least two audits have been conducted each year since 1975. 217 deficiencies have been identified and essentially all are closed. (See attachments for more details.)

Finally, a periodic management audit is performed on the entire scope of Edison's quality assurance activities by an outside consultant. This consultant's report assesses the strengths and weaknesses of Edison's quality assurance activities and is sent to the Vice Chairman of the Company. The management audits, of which four have been conducted since 1975 (the last three involving the Byron Site), gives us additional confidence that our corporate quality assurance activities are effective. The latest audit, which included a review of quality assurance as it relates to the Byron Project, concluded:

The Commonwealth Edison Quality Assurance Program is overall the most complete and comprehensive program [the consultant] has seen in the industry.

(See attachments for more details)

12. Commonwealth Edison has employed an architect-engineer with extensive nuclear power plant design experience for the Byron Project.

Sargent & Lundy was employed as the architect-engineer for the Byron Project prior to the award of the NSSS contract. Sargent & Lundy has extensive experience in design of nuclear power plants, including the design of Edison's Dresden, Quad Cities, Zion, and LaSalle County nuclear power plants. The lead engineers assigned to the Byron Project average 11 years of nuclear power plant design experience.

13. Commonwealth Edison has exercised complete control over all design activities for balance-of-plant.

Organizations outside Sargent & Lundy were, and are being, utilized for various tasks associated with the piping analysis and support design on the Byron Project. These organizations are basically of two types: (a) technical and professional service contractors and (b) vendors. Technical and professional service contractors work directly for and at the specific direction of either Edison or Sargent & Lundy. Vendors provide their services to Edison with Sargent & Lundy acting as Edison's agent under the technical guidance outlined in specifications prepared by Sargent & Lundy.

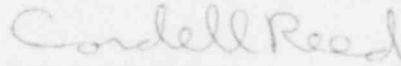
The magnitude and scheduling of the piping analysis and support design work was such that Sargent & Lundy employed an outside consultant, Nuclear Power Services Corporation (NPS) to perform a portion of this design work. NPS was provided with all the documentation and control procedures that Sargent & Lundy used, in addition to a detailed design specification for the work. All design procedures and manuals prepared by NPS were reviewed by Sargent & Lundy for acceptability and consistency. Technical and quality assurance audits were conducted by Sargent & Lundy, Edison and NPS. Frequent trips were made to the NPS offices for the purpose of resolving technical issues, assuring consistency and

monitoring status. The technical basis of the work performed by NPS is identical to that of Sargent & Lundy. (See attachments for more details.) Also, Edison has employed Westinghouse for the piping analyses and support design primarily for the piping in the containment. The scope of responsibility and actual working interfaces have been carefully controlled by Edison. Westinghouse has moved an analytical staff and computer/computer graphic facilities to the Byron site. They employ actual, current physical data from walk downs as input to their analyses and coordinate closely with on-site Sargent & Lundy and Edison engineers in their work.

Conclusion

In view of the above, the Company believes that the Byron Station has been designed and constructed in a way that will assure it meets the requirements of the Final Safety Analysis Report (FSAR) and the Safety Evaluation Report (SER) (NUREG-0876 and its supplements).

Very truly yours,



Cordell Reed
Vice-President
Nuclear Operations

cc: J. G. Keppler
R. DeYoung

LIST OF ATTACHMENTS

1. Memorandum from J. D. Deress, Project Engineering Manager, to Cordell Reed, dated April 28, 1983, with Exhibits 1 through 3.
2. Statement of W. J. Shewski, Manager of Quality Assurance, dated April 19, 1983, with Exhibits A through P.
3. "Report on the INPO Self-Initiated Evaluation for Byron and Braidwood Nuclear Station Construction Projects," November 17, 1982.
4. "Design Evaluation Report of Sargent & Lundy for Commonwealth Edison Company," Emergency Incorporated, April 4, 1983.
5. "System Design Review Report," Sargent & Lundy, July 16, 1980.