



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TEXAS 76011

ATTACHMENT II

8 0 APR 1981

Docket No. 99900404

Westinghouse Electric Corporation
Nuclear Technology Division
ATTN: Dr. R. J. Slember
General Manager
P.O. Box 355
Pittsburgh, Pennsylvania 15230

Gentlemen:

A series of Nuclear Regulatory Commission (NRC) inspections have been conducted to review your implementation of the Quality Assurance Program applicable to NRC applicants or licensees who have contracted for services from the Westinghouse Electric Corporation, Nuclear Technology Division. These inspections consisted of selective examination of procedures and representative records, interviews of personnel and direct observation by the inspectors. As a result of these inspections, the NRC Office of Inspection and Enforcement (IE) has concluded that the QA program described in Topical Report WCAP-8370, Revision 9A, is being implemented satisfactorily. Neither this conclusion nor the remainder of this letter applies to any activities conducted at reactor sites.

Licensees and applicants that have referenced the above Topical Report in their Safety Analysis Reports (or have adopted the total quality assurance program described in that Topical Report) may at their option use this letter to fulfill their obligation under 10 CFR Part 50, Appendix B, Criterion VII, that requires them to perform initial source evaluation/selection audits and subsequent periodic audits to assess the quality assurance program implementation.

The NRC expression of satisfaction with the implementation of your QA program does not assure that a specific product or service offered by you to your customer is of acceptable quality, nor does it relieve the applicant or licensee from the general provision of Criterion VII which requires verification that purchased material equipment or services conform to the procurement documents. It is recognized that in some cases this assurance can be made by the applicant or licensee without audits or inspections at your facility.

Continuing acceptability of implementation of your QA program is contingent upon your maintaining a satisfactory level of program implementation, verified through periodic IE inspection, throughout all corporate organization units and nuclear projects encompassed by your program.

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PDR ADDCK 05000373
P PDR

Westinghouse Electric Corporation
Docket No. 99900404

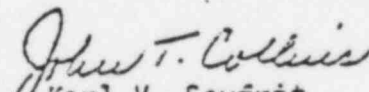
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Should your program implementation at any time be found unacceptable you will be notified by letter, and requested to correct the deficiencies promptly. In the event you fail to correct the deficiencies promptly, or if the record of deficiencies is such as to indicate generally poor program implementation, you and the applicants and licensees who have referenced your QA program will be notified that the generic implementation of your program is no longer acceptable to the NRC. All of the audit/inspection requirements of Criterion VII, Appendix B, 10 CFR 50, must then be implemented by the applicants or licensees. The NRC will reinstate its letter of acceptability of implementation of your QA program only after our inspectors have concluded, based on reinspection, that you have again demonstrated full compliance.

Except as noted above, the conclusions expressed in this letter will be effective for three years from the date of issue of the letter. At that time program performance over the previous three year period will be evaluated and this letter reissued, if appropriate.

The results of our inspections are published quarterly in the Licensee Contractor and Vendor Inspection Status Report (NUREG 0040), which is made available to NRC facility applicants, licensees, contractors and vendors, as well as to members of the public.

Sincerely,


Karl V. Seyfrit
Director



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

FEB 13 1981

Mr. T. M. Anderson, Manager
Nuclear Safety Department
Westinghouse Electric Corporation
Box 355
Pittsburgh, PA 15230

Dear Mr. Anderson:

SUBJECT: AMENDMENT #1 TO REVISION 9A OF WCAP 8370

In your letter dated January 22, 1981, you submitted Amendment 1 to Revision 9A of WCAP 8370, presenting the Westinghouse position on Regulatory Guide 1.146 and Revision 1 of Regulatory Guide 1.58. Supporting justification was also submitted.

We have reviewed your letter and find the Westinghouse position presented therein acceptable. Please proceed as you indicated in your letter, i.e., incorporate Amendment 1 formally in Revision 9A of WCAP 8370.

Sincerely,

Walter P. Haass

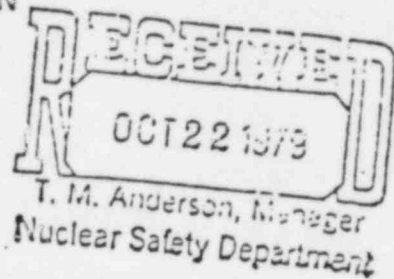
Walter P. Haass, Chief
Quality Assurance Branch
Division of Engineering

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OCT 16 1979



Mr. T. M. Anderson, Manager
Nuclear Safety
Westinghouse Electric Company
P.O. Box 355
Pittsburgh, PA 15230

Dear Mr. Anderson:

SUBJECT: NRC ACCEPTANCE OF WESTINGHOUSE TOPICAL REPORT ON QUALITY ASSURANCE, (WCAP-8370, REVISION 9)

By your letter of October 15, 1979, you submitted Revision 9 of the Westinghouse Topical Report, WCAP-8370. Revision 9 revises the topical report to reflect organizational, programmatic, and editorial changes, including commitments to the current revisions of QA Regulatory Guides. The programmatic changes are essentially for clarifying purposes and are not intended to dilute the controls previously approved. Revision 9 reflects proposed changes resulting from our review of your August 15 and October 12, 1979 QA topical report draft submittals.

We find that Revision 9 of the topical report describes an acceptable quality assurance program for the design, procurement, and fabrication activities within the Westinghouse Water Reactor Divisions' scope of work for nuclear power plants. Therefore, your revised report is acceptable and you may implement it upon issuance of the revision.


For the Westinghouse quality assurance program description, applicants need only reference this topical report in Chapter 17 of license applications. We do not plan to rereview this topical report unless changes occur.

Should regulatory criteria or regulations change such that conclusions about this topical report are invalidated, we will notify you. You will be given the opportunity to revise and resubmit it should you so desire. Programmatic changes by Westinghouse to this topical report are to be submitted to NRC for review prior to implementation. Organizational changes are to be submitted no later than 30 days after announcement.

Please replace our previous acceptance letter and its enclosure of September 16, 1977 on Revision 8 with this letter and our evaluation in each report, renumber the report WCAP-8370, Rev. 9A, and resubmit 36 copies to the NRC. In your transmittal letter, indicate to which plants Revision 9A will be applicable.

Should you have any questions regarding our review or if we can provide assistance, please feel free to contact me or Mr. Fred Liederbach on (301) 492-7741.

Sincerely,


Walter P. Haass, Chief
Quality Assurance Branch

~~79-230930~~

TOPICAL REPORT EVALUATION

Report Number: WCAP-8370 (Rev. 9A), Nonproprietary
Report Title: Quality Assurance Plan - Westinghouse Water Reactor Divisions
Report Date: October 1979
Originating Organization: Westinghouse Electric Corporation
Reviewed By: Quality Assurance Branch

SUMMARY OF TOPICAL REPORT

Topical Report WCAP-8370 (Rev. 9A) describes the quality assurance (QA) program which the Westinghouse Water Reactor Divisions apply to those design, procurement, and fabrication activities involving safety-related structures, systems, and components of nuclear power plants within the Westinghouse scope of work. WCAP-8370 (Rev. 9A) commits Westinghouse to comply with the requirements of Appendix B to 10 CFR Part 50 and to comply with the Regulatory Position provided by the NRC (with some exceptions which have been found acceptable by NRC) in Regulatory Guides 1.26-Rev. 3 (February 1976), 1.28-Rev. 2 (February 1979), 1.29-Rev. 2 (September 1978), 1.37-Rev. 0 (March 1973), 1.38-Rev. 2 (May 1977), 1.58-Rev. 0 (August 1973), 1.64-Rev. 2 (June 1976), 1.70-Rev. 3 (November 1978), 1.74-Rev. 0 (February 1974), 1.88-Rev. 2 (October 1976), 1.94-Rev. 1 (April 1976), 1.116-Rev. 0-R (May 1977), and 1.144-Rev. 0 (January 1979). Westinghouse has provided for our evaluation a detailed description of organizations and groups involved in implementing activities required by the QA program and a delineation of duties, responsibility, and authority of those organizational elements involved in the QA program. WCAP-8370 (Rev. 9A) contains a description of the measures used to carry out the Westinghouse QA program activities and describes how the applicable requirements of Appendix B to 10 CFR Part 50 will be satisfied by the administration and implementation of these measures.

SUMMARY OF REGULATORY EVALUATION

We have evaluated the QA program and the organizations responsible for QA functions as described in WCAP-8370 (Rev. 9A). We find that QA policy and direction originate at an acceptably high management level and are effectively communicated to other parts of the organization. Those performing QA functions have responsibility and authority commensurate with their duties in implementing the QA program. We also find that measures have been established, to be implemented by written procedures and instructions, which address each of the criteria of Appendix B in an acceptable manner.

Based on our review and evaluation of WCAP-8370 (Rev. 9A), we conclude that:

1. The organizations and persons performing QA functions within Westinghouse have the required independence and authority to effectively implement the QA program without undue influence from those directly responsible for costs and schedules, and

2. The Westinghouse QA program contains the requirements and controls which, when properly implemented, comply with the requirements of Appendix B to 10 CFR Part 50 and the applicable regulatory guides and standards contained in Chapter 17 of the NRC Standard Review Plan.

ATTACHMENT III

LIST OF NRC INSPECTIONS OF NTD/PWRSD

- * a) 99900404/82-02 NRC Inspection of NTD/NSID accepted by NRC Letter (U. Potapovs) to W (Dr. R. J. Slember) dated 12/17/82.
- * b) 99900404/82-01 NRC Inspection of NTD accepted by NRC Letter (U. Potapovs) to W (Dr. R. J. Slember) dated 8/11/82.
- * c) 99900404/81-03 NRC Inspection of NTD accepted by NRC Letter (U. Potapovs) to W (Dr. R. J. Slember) dated 9/28/81.
- * d) 99900404/81-02 NRC Inspection of NTD accepted by NRC Letter (U. Potapovs) to W (Dr. R. J. Slember) dated 6/29/81.
- * e) 99900404/81-01 NRC Inspection of NTD accepted by NRC Letter (U. Potapovs) to W (Dr. R. J. Slember) dated 4/23/81.
- * f) 99900404/80-04 NRC Inspection of NTD accepted by NRC Letter (U. Potapovs) to W (Dr. W. M. Jacobi) dated 9/26/80.
- g) 99900404/80-03 NRC Inspection of NTD accepted by NRC Letter (U. Potapovs) to W (Dr. W. M. Jacobi) dated 9/25/80.
- * h) 99900404/80-02 NRC Inspection of NTD accepted by NRC Letter (U. Potapovs) to W (Dr. W. M. Jacobi) dated 6/05/80.
- i) 99900404/80-01 NRC Inspection of NTD accepted by NRC Letter (U. Potapovs) to W (Dr. W. M. Jacobi) dated 6/06/80.
- * j) 99900404/79-03 NRC Inspection of NTD accepted by NRC Letter (U. Potapovs) to W (Dr. W. M. Jacobi) dated 8/28/79.
- * k) 99900404/79-02 NRC Inspection of NTD accepted by NRC Letter (U. Potapovs) to W (Dr. W. M. Jacobi) dated 4/26/79.
- * l) 99900404/79-01 NRC Inspection of NTD accepted by NRC Letter (U. Potapovs) to W (Dr. W. M. Jacobi) dated 3/19/79.
- * m) 99900404/78-04 NRC Inspection of PWRSD accepted by NRC Letter (U. Potapovs) to W (Dr. W. H. Arnold) dated 12/11/78. Close-out Letter (U. Potapovs) to W (Dr. W. H. Arnold) dated 1/19/79.
- n) 99900404/78-03 NRC Inspection of PWRSD accepted by NRC Letter (U. Potapovs) to W (Dr. W. H. Arnold) dated 10/11/78.
- * o) 99900404/78-02 NRC Inspection of PWRSD accepted by NRC Letter (U. Potapovs) to W (Dr. W. H. Arnold) dated 8/21/78.
- * p) 99900404/78-01 NRC Inspection of PWRSD accepted by NRC Letter (U. Potapovs) to W (Dr. W. H. Arnold) dated 6/22/78.

- * q) 99900404/77-03 NRC Inspection of PWRSD accepted by NRC Letter (D. M. Hunnicutt) to W (Dr. W. H. Arnold) dated 10/17/77.
- r) 99900404/77-02 NRC Inspection of PWRSD accepted by NRC Letter (J. H. Tillou) to W (Dr. W. H. Arnold) dated 10/17/77.
- * s) 99900404/77-01 NRC Inspection of PWRSD accepted by NRC Letter (J. H. Tillou) to W (Dr. W. H. Arnold) dated 3/30/77.
- t) 99900404/76-04 NRC Inspection of PWRSD accepted by NRC Letter (J. H. Tillou) to W (Dr. W. H. Arnold) dated 12/23/76. Follow-up accepted by NRC Letter (J. H. Tillou) to W (Dr. W. H. Arnold) dated 2/04/77.
- u) 99900404/76-03 NRC Inspection of PWRSD accepted by NRC Letter (J. H. Tillou) to W (Dr. W. H. Arnold) dated 7/28/76. Follow-up accepted by NRC Letter (J. H. Tillou) to W (Dr. W. H. Arnold) dated 9/08/76.
- v) 99900404/76-02 NRC Inspection of PWRSD accepted by NRC Letter (J. H. Tillou) to W (Dr. W. H. Arnold) dated 4/28/76.
- w) 99900404/76-01 NRC Inspection of PWRSD accepted by NRC Letter (J. H. Tillou) to W (Dr. W. H. Arnold) dated 1/19/76.
- x) 99900404/75-07 NRC Inspection of PWRSD accepted by NRC Letter (J. H. Tillou) to W (Dr. W. H. Arnold) dated 9/22/75.
- y) 99900404/75-06 NRC Inspection of PWRSD accepted by NRC Letter (J. H. Tillou) to W (Dr. W. H. Arnold) dated 6/19/75.
- * z) 99900404/75-01 NRC Inspection of PWRSD accepted by NRC Letter (J. H. Tillou) to W (Dr. W. H. Arnold) dated 2/04/75.

* Denotes Design Control Inspection



THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

Certificate of Authorization

ATTACHMENT IV

Number **N** - 1149

This is to accredit

WESTINGHOUSE ELECTRIC CORPORATION
NUCLEAR TECHNOLOGY DIVISION
NORTHERN PIKE
MONROEVILLE, PENNSYLVANIA 15230

as authorized to use the



symbol of The American Society of Mechanical Engineers for CONSTRUCTION OF SECTION III, DIVISION 1 ITEMS FOR WHICH OVERALL RESPONSIBILITY IS RETAINED WITH ENGINEERING, PROCUREMENT & QUALITY ASSURANCE AT NORTHERN PIKE; MONROEVILLE, PENNSYLVANIA; PENN CENTER; PITTSBURGH, PENNSYLVANIA AND FOREST HILLS; PITTSBURGH, PENNSYLVANIA AND FOR WHICH FABRICATION & INSTALLATION OF SECTION III, DIVISION 1 ITEMS IS SUBCONTRACTED TO APPROPRIATE CERTIFICATE OF AUTHORIZATION HOLDERS

in accordance with the applicable rules of the Boiler and Pressure Vessel Code of The American Society of Mechanical Engineers. The use of the Code symbol and the authority granted by this certificate of authorization are subject to the provisions of the agreement set forth in the application. Any construction stamped with this symbol shall have been built strictly in accordance with the provisions of the Boiler and Pressure Vessel Code of The American Society of Mechanical Engineers.

THIS AUTHORIZATION expires on JUNE 16, 1984

Authorized on JUNE 5, 1981 for

REVISED: SEPTEMBER 27, 1982

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
by the BOILER AND PRESSURE VESSEL COMMITTEE

Chairman *Walter L. Harding*

Secretary *LM Eisenberg*

Director,
Accreditation *Harriet Outman*



ATTACHMENT V

CECO AUDITS OF WRD - MARCH 1974 TO PRESENT

<u>AUDIT DATES</u>	<u>W FACILITY</u>	<u>AUDIT SCOPE</u>
March 27-29, 1974	MNC	NSSS Vendor Qualifications, PWRSD Audit Program, Procurement
February 13-14, 1975	MNC	Quality Control Programs
March 16-18, 1975	MNC	Design Control, QA Program, Nonconforming Items, Audit Program, Document Control
April 16-18, 1975	MNC	Design Control, QA Program
August 28, 1975	MNC	Quality Release, Data Packages, Documentation Storage
April 20-22, 1976	MNC	Design Review, Design Verification, Quality Releases
February 22-24, 1977	MNC	Quality Releases, Data Packages, Design Review
January 31 - February 2, 1978	MNC	Design Control, Design Review, Quality Programs, Data Packages
January 31 - February 2, 1978	Pensacola	Route Sheets, Personnel Qualifications, Procedures, Drawings
February 5-9, 1979	MNC	Design Control, Seismic Designs, Quality Programs
February 5-9, 1979	Tampa	Quality Programs, Personnel Qualifications
February 5-9, 1979	Pensacola	Quality Programs, Personnel Qualifications
January 29-31, 1980	MNC	Quality Assurance Records
April 29-30, 1980	MNC	Design Control
September 10, 1980	SAMU	Design Control, Personnel Qualifications, Interfaces, Procedures

AUDIT DATES	W FACILITY	AUDIT SCOPE
March 23-25, 1981	MNC	Design Control, Qualifications, Quality Programs, Documentation
May 28 - June 1, 1981	SAMU	Design Control, Quality Programs, Personnel Qualifications, Interfaces
November 2-4, 1981	SAMU	Design Control, Nonconformances, Quality Programs, Interfaces
February 24-26, 1982	MNC	Design Control, Qualification of Personnel, Document Control, Procurement, Quality Releases, Audits, Nonconforming Items, Traceability of Materials
March 8-10, 1982	SAMU	Design Control, Personnel Qualifications, Audit Programs, Nonconforming Items
May 19-20, 1982	SAMU	Design Control
May 27-28, 1982	MNC	Design Control
September 14-17, 1982	SAMU	Design Control, Personnel Qualifications
November 8-10, 1982	SAMU	Design Control
February 15-17, 1983	MNC	Design Control, Interfaces, Audit Program, Quality Programs

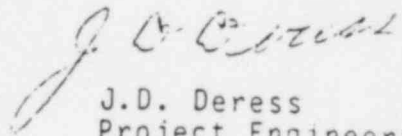
April 28, 1983

To: Mr. Cordell Reed

Subject: Design Control at Byron Station

Enclosed is my statement regarding design control, which is comprised of a description of Edison engineering's role in design control. Also included are statements from Sargent & Lundy and Westinghouse which describes their design control on the Byron Project. A statement from Nuclear Power Services is included since they were a subcontractor to Sargent & Lundy for a portion of the piping analysis and support design work. Also included is the interface document between Sargent & Lundy, Westinghouse and Edison which covers the piping analysis and support design work which Edison contracted to Westinghouse.

As concluded in the statement and to the best of my knowledge, I believe that Byron's design basis is adequate and sound and no significant design problem exists that could affect the health and safety of the public.


J.D. Deress
Project Engineering
Manager

JDD/sb/2888b

cc: J.J. O'Connor
J.J. Maley
V.I. Schlosser
J.T. Westermeier
R.E. Jortberg
W.J. Shewski
D.L. Leone (S&L)
W.E. Kortier (W)
A.P. Stone (NPS)

A. INTRODUCTION

Design control at Commonwealth Edison (Edison) is an engineering management function. The purpose of this paper is to discuss the Edison Project Engineering Department (Engineering) responsibilities for design control. Engineering, working with the architect-engineer, the nuclear steam supply system vendor and other vendors, reviews the overall design and the implementation of the plant design to assure that the plant can function adequately and safely. In addition, Edison directly controls the issuance of the specifications, release of many design documents, and purchase of all the major equipment for the plant. This Edison engineering involvement in design control has been an integral part of the construction of its other plants such as Zion and even of our fossil fired generating plants. The design control process for Byron Station is more formal and more thoroughly documented than at Edison fossil plants and early nuclear plants.

An architect engineer was selected on Byron prior to the award of the Nuclear Steam Supply System (NSSS) contract. That architect engineer was Sargent & Lundy. Early selection of the architect engineer prior to purchasing the basic nuclear steam supply system allows the architect engineer to be involved in the plant conceptual design and bid evaluation process related to selection of the NSSS vendor. After the award of a NSSS contract and subsequent

A. INTRODUCTION (Cont'd)

finalization of the basic NSSS scope of supply, a detailed scope of work was developed for the project activities associated with the architect engineer. This scope of work delineates the basic areas of architect engineer responsibility and defines specific tasks to be performed within each area. It also highlights interface areas between the NSSS supplier and the architect engineer. Specific analytical tools for selected types of evaluations are also defined in the scope of work. Lastly, the scope of work defines, in broad terms, the conceptual design of the plant including the type of containment, safety features to be included and major balance of plant features. Once this document is prepared, the architect engineer begins work on plant design criteria, the Preliminary Safety Analysis Report (PSAR) and major component specifications.

Edison implements its design review process with the architect engineer and the NSSS vendor with several documents. Building upon our corporate Quality Assurance (QA) program, we have developed corporate QA procedures to provide the basic ground rules for the design review. In addition, Engineering procedures expand on these corporate QA procedures. These Engineering procedures discuss in more depth how our design review process is implemented, and contain interface procedures and memos of understanding between our various engineering departments. Thirty-nine technical and quality

A. INTRODUCTION (Cont'd)

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
Non-Conformance Reports

The remainder of this paper will discuss in further detail the design process, how Engineering controls contractors, certain design deficiencies, their resolution, and responses to NRC inspections. Before those discussions, however, two separate items will be briefly covered. Both items reinforce our confidence that design control procedures at Byron have been adequately implemented.

First, although not required by the NRC, Engineering has obtained the ASME Code Stamp (N-Stamp) which is the Certification by the American Society of Mechanical Engineers (ASME) that an engineering organization has the ability to perform engineering purchasing and construction of a Nuclear Power Plant in accordance to their standards. This certification is based on an audit performed by ASME of an organization's quality assurance program and procedures to insure they are followed and meet the ASME Code Requirements. This audit is done once every three years and lasts from two to three days. It covers all phases of the work done by the engineering organization.

A. INTRODUCTION (Cont'd)

As a requirement of the N-Stamp the engineering organization is audited yearly by an inspector authorized by the State of Illinois. The authorized inspector also insures that the quality assurance program, and all code requirements are being followed.

Second, a significant contribution to the quality of the design control process for Byron has been made by the staffing of Engineering in large measure with personnel experienced in the design and operation of nuclear facilities. This staffing practice has been maintained throughout the development of the Byron design; the relevant nuclear experience of the current Byron Engineering Group is detailed in Exhibit 1. As a final step, to ensure procedures are properly followed, annual training classes are scheduled for all engineering personnel.

B. DESIGN PROCESS

1. Original Design

The design process for Byron Station began in 1974 with the preliminary purchase order to Sargent & Lundy authorizing initial site investigation and development work and the development of a bid specification for the NSSS. Edison provided direct input to the bid specification to insure that experience on our Zion and LaSalle projects was properly considered. The NSSS contract was

1. Original Design (Cont'd)

awarded to Westinghouse and defines the basic scope of the NSSS package in terms of hardware and in terms of requisite engineering, QA, and interface control work.

The Scope of Work document issued by Sargent & Lundy on behalf of Engineering for the Byron project includes sections describing general project information, project description, economic evaluation and cost estimating factors and a scope of responsibility. The scope of responsibility supplements the NSSS contract and specifically reflects responsibility among Edison, Sargent & Lundy and vendors, including Westinghouse.

Engineering maintained control of the plant design throughout the course of the project. The procedures followed in initiating, processing and obtaining approvals of the Byron original design fall generally in the following areas:

- A. Planning Activities
- B. Preparation and Review of Reference Design Requirements
Including the Development of Design Criteria
- C. Review of Drawings, Specifications and Related Documents
- D. Award Contracts for Nuclear Station Equipment, Material
and Services

1. Original Design (Cont'd)

Engineering developed preliminary site plans and a detailed construction schedule for engineering, licensing, permitting, purchasing, construction and testing. Preliminary site plans and schedules were commented on by various Commonwealth Edison departments as appropriate, and ultimately issued by Engineering. The preparation and approval of the detailed budget for Byron followed similar review and approval steps.

The initial phase of design was divided between the development of Byron's design criteria, Preliminary Safety Analysis Report and various Balance of Plant (BOP) specifications. The specifications, were in most cases design and purchase specifications. Preparation of specifications involves a draft specification being prepared by Sargent & Lundy. These draft specifications were reviewed by Engineering, other Edison departments, and, in interface areas, by Westinghouse. This review concluded with meetings involving other Edison departments such as Operating, Construction, Station Electrical and Quality Assurance. From these meetings specification revisions were proposed to Sargent & Lundy. Engineering remained the final arbiter of the specifications. Sargent & Lundy then issued the specification which became the basis for bid awards. The development of the NSSS design proceeded in parallel with the BOP design. Westinghouse submitted, for review and comment, a broad spectrum of design documents including criteria, specifications, drawings and interface requirements. Edison and Sargent & Lundy

1. Original Design (Cont'd)

reviewed these documents and provided comments to Westinghouse. Edison retained final authority for the resolution of review comments.

The award of contracts for BOP equipment, material and services is handled by the Purchasing Department, and is based upon a technical and partial economic evaluation of the proposals by the engineering department and by Sargent & Lundy. After award of contracts, Engineering and Sargent & Lundy coordinate with vendors to establish drawing and technical data submittal schedules, to review such materials, seismic analysis and stress reports, and to coordinate the review of contractors' quality control procedures and documentation.

The review of Byron design drawings, specifications and related documents is the responsibility of the Commonwealth Edison Project Engineer. Upon receipt from Sargent & Lundy, information such as General Arrangement Drawings, Piping and Instrument One-line Drawings, and Electrical Diagrams is reviewed by Engineering for conformance to the design requirements in accordance with Commonwealth Edison QA/QC procedures applicable at the time of review. Similar reviews are conducted for NSSS information supplied by Westinghouse.

2. Design Revisions

Requests to revise the original design may be initiated by the architect-engineer, off-site contractors/suppliers, on-site contractors, or by Commonwealth Edison personnel in the Engineering, Construction, Operating and Nuclear Safety Departments. Procedures have been generated to ensure that all design revisions are properly documented and that all revisions receive the same level of review as the original design. Changes to the original design are implemented by the architect-engineer through the generation of an Engineering Change Notice (ECN) or through the issuance of revised drawings and design documents and by the NSSS supplier through the use of similar media.

Changes to the original design initiated by Engineering, not by the architect-engineer, are documented in writing. Requests for changes to the original design which are initiated by off-site contractors/suppliers may be in the format of a form, letter, memorandum, marked-up drawing, or revised drawing. These revisions receive Engineering approval.

Changes to the original design requested by Edison's Construction Department (Construction) are submitted on Field Change Request (FCR) forms, which are reviewed and processed in accordance with approved procedures. The FCR form has been in use at Byron since construction work was initiated. FCR's generally are used to resolve fit and interference problems. Request for changes to the original design

2. Design Revisions (Cont'd)

which are initiated by site contractors are submitted to Edison Construction and thereafter are documented and processed in a manner identical to those changes originated by Construction.

Although design documents issued for comment have been routinely distributed to the Commonwealth Edison Operating Department (Operating) for comments, a method was also established by which Operating could initiate requests for design changes during the construction phase of the project. This method provides a pathway for feedback from our operating stations and broadens the base of our design review to incorporate the operating experience and expertise of the Byron Operating Staff. To this end, the Follow Up Engineering Item (FUEI) letter program was initiated. Changes to the original design initiated by this program were documented by letter and in periodically published meeting notes, similar to design changes initiated by Engineering.

Additionally, Byron has an ongoing program of examining and evaluating the modification requests originating at Edison's Zion plant. The Byron design is very similar in many respects to that of Zion. This review program therefore provides a valuable design input to insure that lessons learned from a similar operating plant are considered for Byron. Those modifications judged to be appropriate are incorporated into the Byron design.

3. Design Verification

A comprehensive construction, preoperational and initial startup test program will be successfully completed at Byron. Construction tests, the responsibility of Construction, ensure correct installation and functional operability of equipment.

Preoperational tests of systems are conducted prior to plant operation by Operating, with the responsibility for the management, control and acceptance vested in Engineering. Startup tests are conducted after fuel load by Operating, with approval and acceptance authority again vested in Engineering. The final responsibility for the evaluation of the overall testing program results lies with Engineering.

The overall testing program recognizes and provides for testing successive levels of plant features for achieving safety of the facility. This is to provide for a systematic approach to the "defense-in-depth" concept. This concept requires that Byron be designed, constructed and tested to provide for safe normal operation, to ensure that, should off-normal conditions occur, the consequences are limited to defined and acceptable levels; and to ensure that an adequate safety margin exists even for those events of extremely low probability. All structures, systems and components important to safety will be tested to quality standards commensurate with the importance of the safety functions to be performed. Both Westinghouse and Sargent & Lundy provide input to engineering during that departments evaluation of the test work.

C. CONTROL OF DESIGN CONTRACTORS

1. NSSS - Westinghouse

Design control for the NSSS started before any supplier was evaluated as a potential bidder for the work. A bid specification was prepared by Sargent & Lundy listing desired station operating parameters; acceptable materials; desired system and operating characteristics; applicable codes standards and regulatory requirements; required design document transmittals and required quality assurance activities. This specification had been reviewed by Edison before issuance for bids. The vendor bids were evaluated to insure that adequate responses to specification requirements were included.

Upon selection of Westinghouse as the NSSS Supplier, this bid specification was incorporated, in part, into an NSSS contract. A Documentation Distribution Matrix was established by Engineering to control both Westinghouse and Sargent & Lundy documents as to type and individuals receiving them.

NSSS design documents are reviewed both by Edison departments including Engineering, and by Sargent & Lundy for suitability and conformance to contract requirements. This review also identifies key engineering interface areas. The types of documents reviewed are: system design specifications, purchase specifications, piping and instrument diagrams (P&ID), electrical schematics, erection

1. NSSS - Westinghouse

instructions, material specifications and quality assurance records for Westinghouse purchased items. Changes to the Westinghouse design occurring during installation are documented by the Westinghouse design revision form system. These documents receive the same review as the original documents. Westinghouse also conducts reviews of similar Sargent & Lundy documents to insure that key interface requirements are being met.

Yearly audits of Westinghouse are performed by Edison's Quality Assurance Department with reference to the 18 criteria of Appendix B. Audit teams consist of qualified auditors and a technical representative from Engineering. Audit reports are reviewed by Engineering to insure open audit items are closed. Random audits of the Westinghouse design process have also been conducted by Regions III and IV. A design control statement by Westinghouse is attached as Exhibit 2.

2. Sargent & Lundy

Sargent & Lundy design activities are controlled by procedures in the Edison QA Manual and the Edison approved Sargent & Lundy QA Manual. Functional design documents such as P&ID's, Control & Instrumentation Details, General Arrangement Drawings, Logic Block Diagrams, Electrical One-Line Diagrams and Electrical Schematics are routinely reviewed by Engineering and other Edison departments. Changes to these documents must be reviewed and authorized by

2. Sargent & Lundy (Cont'd)

Engineering. The responsibility for the review of detailed design drawings in other categories (such as Piping Single-Line, Composite Piping, Architectural and Structural, Wiring and Connection, Cable Pan Routing, Hanger and HVAC Duct Routing) has been delegated to Sargent & Lundy.

Audits are made by Edison's Quality Assurance Department to verify compliance with Sargent & Lundy's Quality Assurance Program. These audits are performed by qualified auditors with assistance from Engineering as requested.

Audit reports are reviewed by Engineering to monitor findings and to insure adequate response to open audit items. Region III & IV inspectors also audit Sargent & Lundy's design program. A design control statement by Sargent & Lundy is attached as Exhibit 3.

D. DESIGN DEFICIENCIES & CONCERNS

Because Byron is a large complex project, some design deficiencies and problems have been identified. These deficiencies, such as the Steam Generator tube vibration problem and other items covered by IOCFR50.55(e) reports have been or are in the process of being resolved and documented.

E. Conclusion

To the best of my knowledge Byron has been adequately designed. This conclusion from my personal experience with Byron is based upon several factors including Engineering's:

1. Early and long involvement with Byron's design;
2. Development and use of formal procedures to control design and design implementation;
3. Control of the functional design and purchase of equipment;
4. Obtaining of an ASME "N" certification
5. Staffing with qualified and experienced engineering personnel;
6. Use of operating experience from our and other plants as appropriate;
7. Involvement and leadership in the Steam Generator Owners Groups and,
8. Monitoring and review of the design work performed by Sargent and Lundy

I believe that Byron's design basis is adequate and sound and that no significant design problem exists that could affect the health and safety of the public.

Exhibit 1

K.A. Ainger

3 1/2 years Tech Staff, Zion Station Primary Group.

- ECCS Surveillance Testing
- RCP Seal Maintenance, Modifications, Troubleshooting
- Diesel Generator Surveillance Testing, Maintenance, Modifications, Troubleshooting
- Containment Integrated Leak Rate Tests

2 1/2 years Byron/Braidwood Project Engineering Department

- Administer NSSS Contract
- Resolve Licensing Issues With NRC (NRR and Region III)
- Technical Interface With Lawyer For Byron ASLB Hearing
- Review Pre-Op/Startup Tests

W.R. Blanford 5 years Test Engineering in Operational Analysis
Department in Chicago Central Division

1/2 years Engineer in Relay Group of Distribution Group
of Distribution Engineering Department

4 years Site Test Engineer in Operational Analysis
Department of Fisk Station (Fossil Fired, in
Operation)

2 years Test Engineer in Operational Analysis
Department in Chicago Central Division (work
assignments included of service to Sears Tower
Building)

1 1/2 years Lead Test Engineer in Startup of Powerton
Unit 6

7 years Electrical Design Engineer for Byron and
Braidwood Units 1 & 2

P.A. Boyle

- 1 year Technical Services Nuclear - Chemistry and
Computer Programming at Radioanalytical
Facility in Maywood
- 1 year Zion Station, Rad-Chem Department - Radiochemist
- 2 1/2 Byron Station Rad-Chem Department and
years Technical Staff - Chemistry, Pre-Operational
Test Writing, and Licensing activities
- 1 year Byron/Braidwood Project Engineering Department
- Preoperational Test Review, Licensing, and
Steam Generator Activities

J.P. Brynildssen 6 Years U.S. Navy

1 1/2 Years -Basic "A" school, Submarine School, Conventional Sub Duty, S.S. Qualified

1 1/2 Years -Nuclear Power School, Prototype Training, Engineering Laboratory Technician School.

1 Year Polaris Submarine, E.L.T. and Engineering duties

2 Years New Construction, Nuclear Fast Attack Submarine

2 1/2 Years CECo M&S, Zion Design Group, Nuclear and Mechanical Contracts

11 1/2 Years CECo SNED/PED, Byron and Braidwood Design Group, Mechanical Contracts

<u>D.P. Christiana</u>	1 Year	Engineer following Byron and Braidwood for Technical Serviced Nuclear Department
	2 Years	Design for Byron and Braidwood for Project Engineering Department

R.E. Cultice

8 Months Zion Techn Staff

2 Years SNED-Zion

1 Year Byron/Braidwood Project Engineering

John J. Dennehy

B.S. degree in Electrical Engineering from Illinois Institute of Technology. Professional Engineers License from State of Illinois. Member of Authors Group for IEEE 622-1979 "Electrical Heat Training for Nuclear Plants" and IEEE 622A-1983 "Design and Installation of Control and Alarm System for Electrical Heat Tracing"

16 years Substation Operator - Operated all types of Substations (Rotary, Railway, Network, Transmission) the Last Assignment was Watch Operator in a 138 KV Transmission Substation

5 years Operation Analysis - Provided testing and Start-Up Assistance during the construction of Sawyer and Ford City 138KV Substations, also during the conversion of Front Ave. 1500 Volt D.C. Illinois Control Railway Substation from rotary convertors to solid state rectifiers. Provided troubleshooting and technical assistance to Construction during restoration of power due to equipment failure at various locations

5 years Station Electrical Engineering Electrical design for Dresen #2 and #3 during construction. Design of the extension of 345KV switchyard at Kincaid Station. Design of various electrical modifications at Dixon Station. Electrical design of Zion #1 and #2 during construction

9 years Station Nuclear and Project Engineering Electrical design of Byron and Braidwood Units #1 and #2

J.D. Deress

1 year	Construction Engineers at Fisk Statin Fossil Plant
3 years	Engineer in Fossil Power Plant Design
11 years	Project Engineer for Fossil Power Plants
14 years	Project Engineer for Zion Byron and Braidwood Stations
2 1/2 years	Project Engineering Manager Byron and Braidwood Stations

Willem P. Dijstelbergen

2 1/2
Years

Field Engineer - Zion Station and Waukegan Station

3 1/2
Years

Technical Staff Engineer - Zion Station

1 Year

Engineer, SNED (Zion Project Group)

2 Years

Start-up Foreman - Byron Station

1/2 Year

SCRE Byron Station

2 Years

Operating Engineer, Byron Station

1/2 Year

Project Engineering - Field Engineer - Byron Station

Paul Donavin

- 1 Year Station Construction-Field Engineer
Responsible for review of contractor procedures and review of material delivery and control systems.
- 3 Years Station Construction-Field Engineer
Responsible for directing contractor forces doing modification and maintenance work at the Zion Nuclear Plant.
- 2 1/2
Years Project Engineering-Mechanical Engineer
Responsible for design review of piping, supports and major mechanical components
- 1/2 Year Project Engineering-Field Engineer-Byron Station

R.C. Harding

3 1/2
Years

Design for Powerton 5 & 6

2 1/2
Years

Modifications for Zion 1 & 2

3 Years

Design for Byron/Braidwood

2 1/2
Years

Buyer for Purchasing Department

1 1/2
Years

Design for Byron/Braidwood

G.T. Klopp

4 1/2 Years	Design, Licensing, and Preoperational testing of Zion Station
2 Years	Project Engineer on Byron and Braidwood Stations
1 1/2 Years	Operating Engineer in Radioactive Waste Disposal at Dresden
2 Years	Project Engineer for SNED Reliability and Design Group
2 Years	Project Engineer on Carrol County Station
2 Years	Technical Director on Zion Probabilistic Safety Study
1/2 Year	Engineer in charge of Licensing, Preoperational Testing and NSSS on Byron and Braidwood

R.F. Roethel

All Assignments are with Commonwealth Edison Company

1 Year	Revenue Accounts Department Clerical Work
3 1/2 Years	Service and Repair Department Various types of electrical repair and new electrical work for residential and commercial customers
7 Years	Substation Construction Department Various types of electrical construction, new and maintenance type in substations, transmission substations and generating stations
26 Years	Station Electrical Engineering Department (23 years in project section and 3 years in Design Development Section) <u>Project Work</u> Design and installation of electrical equipment at all voltage levels including 345KV major project was TSS 38 Humboldt Park new transmission substation with four 138-12.5KV, 50MVA transformers and associated equipment in a new building including building light and power, heating and ventilation. Also installed four 12.5-4KV transformers and connections to 4K bus. Design Development Setting ultimate development, environmental impact and estimating projects for bulk power stations.
1 1/2 Years	Project Management Engineering Department Responsible for electrical design various equipment for Byron and Braidwood Stations. Coordinate electrical requirements for Construction Power and Station Support Buildings.

W.F. Segersell

- 3 Years Operating (Efficiency) Fisk, Ridgeland and Will County Stations
- 5 Years Mechanical and Building Engineering
Structural Design on Fisk Station, Unit 19;
State Line Station, Unit 4
- 10 Years Transmission Engineering Design of 138KV
underground pipe type cable installation
- 11 Years Station Nuclear Engineering preliminary
design for Carroll County Station

Design for Byron/Braidwood Stations,
Units 1 & 2

G.E. Watson

26 Years

Electrical Design Work associated with high voltage transmission substations (138 KV to 765 KV)

3 1/2
Years

Electrical Project Work on various transmission related items

1 1/2
Years

Electrical Project Work at Byron/Braidwood dealing with station security and communications

T.D. Weis

- 6 Years U.S. Navy Nuclear Power Program
- 3 Years Instrument Department Zion Station, Initial Startup Group
- 3 1/2 Years Operating Department - Zion Station SRO Licensed Foreman
- 2 Years Braidwood Tech Staff - Initial Station Manning, Maintained Zion SRO License
- 2 Years Byron/Braidwood Project Engineering, Licensing Activities, Startup Testing

<u>J.T. Westermeier</u>	2 Years	Operation, Maintenance, Operator Training, Experimental Work on SL-1 Nuclear Power Plant, National Reactor Testing Station, Idaho
	2 Years	Engineering, Construction, Initial Operation of PM-1 Nuclear Power Plant, Sundance, Wyoming
	1/2 Year	Conceptual Design and Field Siting of Reactor Systems for Deep Underground support Center
	3 Years	Field Engineering Support for PM-1 Nuclear Power Plant, Sundance, Wyoming and PM-3A Nuclear Power Plant, McMurdo Sound, Antarctica; Conceptual Development and Initial Testing of Terrestrial Unattended Reactor Power System; Test Work in Nuclear Weapons Effects
	2 Years	Classified Intelligence Work Related to Foreign Nuclear Capabilities
	5 Years	Regulatory and Inspection/Enforcement Activities Associated with Spacecraft Isotopic Generators, Military Power and Research Reactors, and Nuclear Weapons Facilities
	1/2 Year	Construction Engineer, Zion Unit 2
	9 Years	Design, Engineering Licensing Activities for Carroll County and Byron/Braidwood