U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
REGION IV

Report No. 99900404/80-02 Program No. 51100

Company: Westinghouse Electric Corporation
Nuclear Technology Division
Post Office Box 355
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Inspection Conducted: May 12-16, 1980

Inspectors: R. H. Brickley 6/3/80
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Approved by: C J Hale 6-4-80
C. J. Hale, Chief Date
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Inspection Summary

Inspection on May 12-16, 1980 (Docket No. 99900404/80-02)

Areas Inspected: 10 CFR 21 and 10 CFR 50, Appendix B in the areas of design inputs, design interfaces, design corrective action, and follow up on three (3) Regional office requests. The inspection involved sixty-four (64) inspector-hours on site by two (2) NRC inspectors.

Results: There were no deviations or unresolved items identified.

DETAILS SECTION I

(Prepared by R. H. Brickley)

A. Persons Contacted

F. M. Bordelon, Manager, Engineering Administration and Coordination
J. F. Broz, Regional Product Assurance Manager
S. Kellman, Manager, Safeguards Reliability and Application
*P. T. McManus, Senior Engineer, Product Assurance
B. S. Monty, Engineer, Safeguards Analysis I
R. W. Skoff, Engineer, Data Management and Control

*Denotes attendance at the exit interview

B. Defects in Component Cooling Water Heat Exchanger

This item is a follow-up to a 10 CFR 50.55(e) report by the licensee (Carolina Power and Light Co.) that six (6) of eight (8) heat exchangers on site were found to have porosity, gouges, and slag inclusions in the shell side welds. These heat exchangers were manufactured and supplied in 1976 by the Westinghouse Heat Transfer Division, Orange, California.

1. Objectives

The objectives of this area of the inspection were to:

a. Examine the results of the evaluation of this item to determine that a proper evaluation was performed.

b. Determine whether this item is generic or plant unique.

2. Method of Accomplishment

The preceding objectives were accomplished by an examination of:

a. IOM (Review of Radiographs of eight (8) Component Cooling Heat Exchangers) dated March 21, 1980.

b. Westinghouse letter (CCW Heat Exchangers) dated April 24, 1980, to Carolina Power and Light Company.

3. Findings

a. General

(1) The Westinghouse Heat Transfer Division has been acquired by another company and is now known as the Marley Corporation. All records of the former division have been transferred to Westinghouse, Sunnyvale, California.

(2) In March 18, 1980, a Westinghouse Level III individual examined the radiographs of all eight (8) heat exchangers and found seven (7) acceptable. One was found that had a lack of penetration in a nozzle weld seam but acceptable in other areas. There were no indications as to why the lack of weld penetration had not been previously identified and corrected.

(3) Westinghouse also performed a metallurgical evaluation to assess the behavior and effect of flaws that may be present in the welds but are presently undetected. They determined that the minimum critical flaw size was six (6) inches i.e. a size, if exceeded, could lead to a rapid failure of the material. Their conclusion, based on the thermal and pressure transients that the heat exchanger would see, was that they would not expect the flaw size to increase.

(4) Westinghouse attributed the difference in findings between them and CP&L was due to CP&L using the criteria of paragraph UW-51 of Section VIII, Division I of the Code rather than paragraph UW-52 which they should have used. The inspector could not determine which paragraph had been imposed by the procurement documents.

(5) Westinghouse identified two (2) other facilities (Byron and Braidwood) as having heat exchangers made by the Heat Transfer Division. Westinghouse management stated that they examined the data packages and reread the radiographs and found the items acceptable.

b. Deviations and Unresolved Items

None Identified

c. Follow-Up Items

None identified

C. Reactor Component Holddown Springs

This item is a follow-up to a potential construction deficiency report reporting the possibility of cracking of reactor component hold down springs. Westinghouse had reported to the licensee (TVA) that they had found cracks in 31 out of 132 of these springs in a foreign reactor.

1. Objectives

The objectives of this area of the inspection were to:

a. Examine the results of the evaluation of this item to determine that a proper evaluation was performed.

b. Determine whether this item is generic or plant unique.

2. Method of Accomplishment

The preceding objectives were accomplished by an examination of:

a. IOM NFD Safety Review Committee (SRC), dated April 16, 1980.

b. IOM No. EAC-80-031 (SRC Meeting No. 11 OHI Component Springs) dated April 24, 1980.

c. IOM No. EAC-80-032 (SRC Meeting No. 11 OHI Core Component Springs) dated April 30, 1980.

3. Findings

a. General

(1) The foreign reactor that had experienced these failures had the Upper Head Injection (UHI) system therefore these springs had been modified to accommodate it. These springs are used to hold down plugging devices, burnable poison rods, and sources to prevent movement during operation.

(2) The results of the Westinghouse investigation revealed that about five (5) failures occurred in the center and the remainder in the two (2) end turns. All pieces of the failed springs had been located. All failed springs were found to have been manufactured from the same receiving lot. Their review of the design and manufacturing process did not indicate any anomalies. In addition their test and analysis program did not indicate the cause of the failures.

(3) Westinghouse performed a safety analysis assuming that all springs were broken and concluded:

(a) The drag forces and tight clearances are expected to be sufficient to prevent vibration. They confirmed this by an examination of the components at OHI.

(b) Plugging device movement is insufficient to cause an increase in by pass flow, therefore DNB limits are met.

(c) There are negligible changes in pressure distribution and lift forces.

(d) There is no possibility of loose parts because the failures occur at least one turn from the end and loose coils are retained on the spring guide.

(e) There are no adverse effects from possible small changes in the axial location of burnable poisons. All nuclear limits are met.

(f) The effect of the most adverse failures on UHI performance is negligible.

(4) Based on the above results, the committee concluded that the item was not reportable per 10 CFR 21 and therefore not reportable to the WRD Safety Review Committee.

(5) Westinghouse identified McGuire 1 and 2, Catawba 1 and 2, Sequoyah 1 and 2, and Watts Bar 1 and 2 as the domestic plants with the UHI system.

b. Deviations and Unresolved Items

None identified.

c. Follow-up Items

None identified.

D. Error in ECCS Analysis

This item is a follow-up to a 10 CFR 50.55(e) report by the licensee (Florida Power and Light) that Westinghouse had notified them that the Westinghouse correction of an error in the input data to the code for ECCS analysis would reduce the allowable total peaking factor from 2.10 to 1.90.

1. Objectives

The objectives of this area of the inspection were to:

a. Examine the results of the evaluation of this item to determine that a proper evaluation was performed.

b. Determine whether this item is generic or plant unique.

2. Method of Accomplishment

The preceding objectives were accomplished by an examination of:

a. Westinghouse letter No. PLN-LI-79-414 to NRC/RII dated November 15, 1979.

b. Florida Power and Light letter to Westinghouse dated March 6, 1980, transmitting a report (08.04.WNSD.80.1) of an audit conducted March 4-5, 1980.

c. Safeguards Engineering Standards (SES) 2.07 (System Pressure Drops for Non-UHI SATAN) Revision 1, and LB-0.06 (Steam Generator Tube Plugging) Revision 0.

3. Findings

a. General

(1) There are two methods, utilizing pressure drops, used for input to the computer code SATAN. One is a standard and the other is used for steam generator tube plug analyses when only plugging input is changed. Since the analyses did not involve a plugging input change the first method should have been used instead of the latter which was used.

(2) One SES has been revised and a new one has been issued to prevent recurrence of this type error.

(3) Responsible engineering management stated that they had checked other analyses that had been performed and found no other errors therefore this item appears unique to Turkey Point 3 and 4.

b. Deviations and Unresolved Items

None identified

c. Follow-up Items

None identified

E. Design Inputs

1. Objectives

The objectives of this area of the inspection were to determine that:

a. Procedures have been established and are being implemented that prescribe the system for control of those criteria, parameters, bases, or other design requirements upon which detailed final design is based.

b. Design inputs are specified on a timely basis, their selection reviewed and approved, incorporated into the design documents, and changes in input are justified, reviewed, and approved.

c. Commitments are properly translated into design inputs, as applicable to the following:

(1) Basic functions

(2) Performance requirements

(3) Regulatory requirements, codes, and standards

(4) Design conditions

(5) Loads

(6) Environmental conditions.

d. Design requirements are specified, when applicable, relating to interfaces, materials, mechanical, structural, hydraulic, chemistry, electrical, instrumentation and control, redundancy, accessibility, fire protection, and other requirements that prevent undue risk to the health and safety of the public.

2. Method of Accomplishment

The preceding objectives were accomplished by an examination of:

a. Section 5.4.7 (Residual Heat Removal System) of the project FSAR.

b. Policy/Procedures No. WRD-OPR-3.0 (Design Control) Revision 0, dated July 19, 1979; WRD-OPR-3.5 (Project Master Document (PMD) Revision 1, dated December 18, 1979; WRD-OPR-3.6 (Standard Information Package (SIP) Revision 0, dated November 6, 1979;

WRD-OPR-3.7 (Project Information Package (PIP) Revision 0, dated November 6, 1979; WRD-OPR-3.9 (Component Specifications) Revision 0, dated November 6, 1979; WRD-OPR-23.1 (NTD Charter) Revision 0, dated September 7, 1979; and WRD-OPR-23.2 (NED Charter) Revision 0, dated September 7, 1979 of the Water Reactor Divison Policy/Procedure Manual.

c. Design control procedures No. NTD-DPP-1A (Scope and Applicability Revision 1, dated February 15, 1980; NTD-DPP-13 (Department Charters) Revision 0, dated April 9, 1980; NTD-DPP-2A (Principal Design Documentation) Revision 0, dated February 15, 1980; NTD-DPP-2B (Design Basis Documentation) Revision 1, dated February 15, 1980; NTD-DPP-4A (Intra-Divisional Design Interface) Revision 1, dated February 15, 1980; and NTD-DPP-4B (Inter-Divisional Design Interface) Revision 1, dated February 15, 1980, for the NTD Design Control Manual.

d. The Project Master Document, Revision 4, dated April 1, 1979.

e. The Project Information Package (PIP)

f. System description No. SD-SNP-283 (Residual Heat Removal System Description) Revision 1, dated August 23, 1978.

g. The Master Index for the PIP.

h. Addendum Equipment Specification No. 952529 (Code Class 2 Pumps and Motors) Revison 2, dated July 8, 1979 and appplicable Interim Changes No. 2, 5, 6, 7, and 8. (This is an addendum to Specifications No. 678815 and 677474).

i. Equipment Specification No. 678815 (Class 2 Pumps - Based on ASME B&PV Code Section III - Rules for Construction of Nuclear Power Plant Components) Revision 2, dated September 6, 1973.

j. Equipment Specification No. 677474 (Aux. Pump Motors) Revision 0, dated March 13, 1972.

k. Equipment Specification No. G-679150 (Aux. Heat Exchangers General Specification - ASME Sections III and VIII) Revision 1, dated October 16, 1974 and its Addendum (Residual Heat Exchangers) Revision 1, dated October 29, 1974.

l. Equipment Specification No. G-679154 (Addendum to E Specification G-679150) Revision 1, dated October 29, 1974.

m. Equipment Specification No. 679065 (Aux. Pressure Vessel, General Specification - ASME Section III, Class 2) Revision 3, dated March 18, 1974.

n. Equipment Specification No. 952824 (Addendum to E. Specification 979065) Revision 0, dated February 17, 1975.

3. Findings

a. General

(1) Westinghouse utilizes a standard plant design, associated SSAR, and Standard Information Package (SIP) as modified by the contract to establish the project unique design requirements. The Project Master Document (PMD) serves as the base line scope and administrative control document for the project. The base line for this document is the standard plant and the associated standard plant control documents.

(2) A Project Information Package (PIP) is developed from the preceding documents and contains standard documents (system descriptions, specifications, data sheets, etc.) and their project unique modifiers i.e. addendum, interim changes, etc. The Project Master Index to the PIP controls and defines the applicable document and its modifier.

(3) The documents identified in paragraph E.2.b and c above satisfy objective E.1. a above.

(4) The documents identified in paragraphs E.2.d through n above satisfied objectives E.1.b through d above

b. Deviations and Unresolved Items

None identified

c. Follow-up Items

None identified

F. Exit Interview

An exit interview was held with management representatives on May 16, 1980. In addition to those individuals indicated by an asterisk in paragraph A of each Details Section those in attendance were:

H. H. Brunko, Product Assurance Manager, NTD
E. J. Hampton, Manager, Product Assurance Section (PAS)
E. J. Kreh, QA Consultant
L. E. Race, Senior Engineer, Product Assurance
M. M. Rhoades, Associate Engineer, PAS
R. B. Sterrmon, Product Assurance Manager, NED
R. A. Wiesemann, Manager, Regulatory and Legal Affairs

The inspector summarized the scope and findings of the inspection. Management comments were generally for clarification only or acknowledgement of the statements by the inspector.

DETAIL SECTION II

(Prepared by J. R. Agee)

A. Persons Contacted

A. E. Blanchard - Manager Environmental Qualification
A. H. Imagawa - Manager Electrical Power Group
L. M. Potochnik - Engineer Environmental Qualification
R. Seid - Principal Engineer
*M. H. Shannon - Quality Assurance Engineer
W. R. Spezialetti - Manager Plant Licensing
D. G. Theriault - Process Control Engineer

*Attended the exit interview.

B. Design Interfaces

1. Objectives

The objectives of this area of the inspection for both internal and external interfaces were to determine that procedures have been established and implemented that:

a. Require that design organizations identify, in writing, their interfaces for managing the flow of design information.

b. Define and document the responsibilities of each organizational unit for the preparation, review, approval, distribution, and revision of documents involving design interfaces.

c. Establish methods for systematically communicating needed design information, including changes thereto, across design interfaces as work progresses.

d. Require documentations of information transmitted between organizations which identified the status of the design information or documents and incomplete items which require further evaluation, review or approval.

e. Require that design information transmitted orally or by other informal means is promptly documented, and the documentation confirmed and controlled.

f. Identify the external organizations providing criteria, designs, specifications, and technical direction.

g. Identify the positions and titles of key personnel in the communications channel and their responsibilities for decision making, problem resolution, providing and reviewing information.

2. Method of Accomplishment

The preceding objectives were accomplished by an examination of the following documents:

a. WCAP 9550, NSSS WRD Policies and Procedures Manual,

(1) Section WRD-OPR-20.0, NSSS Core Interface Agreement, Revision 0, September 12, 1979.

(2) Section WRD-OPR-3.0, Design Inputs, Subsection, Interface Control, Revision 0, July 19, 1979.

(3) Section WRD-OPR-3.6, Standard Information Package (SIP), Revision 0, November 6, 1979.

(4) Section WRD-OPR-3.7, Project Information Package (PIP), Revision 0, November 6, 1979.

(5) Section WRD-OPR-3.5, Project Master Document (PMD), Revision, December 18, 1979.

b. Electrical System Engineering Manual, Sections:

(a) EFP-ES-001, Control and Electrical Systems Standards, Preparation and Application, Revision 2, November 30, 1978.

(b) EFP-ES-010, E-Spec. Preparation, Review and Signoff, Revision 1, July 29, 1976.

(c) EFP-ES-014, Design Verification Process, Revision 0, January 1, 1977.

(d) EFP-ES-018, Safety Related Design Interface, Revision 4, February 1, 1979.

(e) EFP-ES-022, Prototype, Qualification, or Design Verification Tests, Revision 0, April 28, 1978.

(f) EFP-ES-NCS, Preparation and Revision of PWRSD Drawings, Revision 0, March 21, 1977.

(g) EFP-ES-300, Preparation of Electrical Power Design Documents, Revision 3, September 27, 1978.

c. Nuclear Equipment Division (NED) Quality Assurance Manual, Section 4.0, Design and Document Control, Revision 0, January 14, 1980.

d. Design Criteria Manuals for the standard plant.

e. C&ES Standard 2.17, Three-Train Solid State Protection System, Original Issue.

f. PSAR Sections 3.10, Seismic Design of Category I Instrumentation and Electrical Equipment, and 3.11, Environmental Design of Mechanical and Electrical Equipment.

3. Findings

a. General

(1) The inspector, examined the project documentation for a project whose construction permit (CP) was issued in 1973, placed in a contractural hold position for several months, then released for continuation of design, procurement and construction activities. During the period July 1973 to February 1980, electrical and instrumentation and controls (I&C) activities were completed in compliance with electrical system engineering procedures with the identification prefix of EFP-ES. Subsequent to February 1980 design and engineering procedural activities have been conducted in compliance with the NSSS WRD Policies and Procedures Manual and the NTD Design Control Manual. The concensus of the engineering personnel contacted was that greater than ninety-five (95) percent of the electrical and I&C design and procedural activities on this project were completed in compliance with the EFP-ES procedures.

(2) The design and procedures manuals that were reviewed revealed that Westinghouse maintained continuity of electrical and I&C design program activities during the organizational and identity changes in early 1980. Currently all design activities are completed in compliance with the NSSS WRD Policies and Procedures Manual and the NTD Design Control Manual which contains the same material as the EFP-ES procedures, examples:

(a) EFP-ES-001 Control & Electrical Systems Standards, Preparation and Application and EFP-ES-010 E-Spec Preparation, Review and Signoff, contains the same data as the procedure WRD-OPR-3.9, Component Specifications, in the NSSS WRD Policies and Procedures Manual.

(b) EFP-ES-014, Design Verification Process, and EFP-ES-018, Safety Related Design Interface, contain the same data as the procedure WRD-OPR-3.0, Design Control.

(3) ANSI N45.2.11 paragraph 5.2 requires organizations performing work affecting quality of design to identify in writing its internal design interfaces for managing the flow of design information between organizational units. Responsibilities shall be defined and documented to cover preparation, review, approval, distribution, and revision of documents involving design interfaces. Procedure WRD-OPR-20.1 NED/NTD/NFD, NSSS Core Design Interface Agreement, Revision 0, September 12, 1979, satisfies that ANSI requirement by defining on a divisional level the respective responsibilities among the Nuclear Fuel Division (NFD), the Nuclear Technology Division (NTD) and the Nuclear Equipment Division (NED) for the NSSS core design and analysis interface.

WRD-OPR-20.2, NED-NTD-NCOD-WNI Technicial Interface Agreement, Revision 0, October 8, 1979, identifies the technical interface areas and corresponding responsibilities for the NTD, NED, Nuclear Commercial Operations Division (NCOD) and Westinghouse Nuclear International (WNI) as related to the NSSS design and associated hardware.

(4) The inspector determined that methods had been implemented for systematically communicating needed design information, including changes thereto, across interfaces as work progressed. An example of an external organization that provided criteria, design specifications, and technical direction was the A/E review of the On-Line Safeguards Test Cabinets. In this review the A/E provided inputs concerning balance-of-plant (BOP) signals that required testing by the On-Line Safeguards Test System during operation of the plant. Technical interface information was exchanged by informal communiques and the A/E review and mark-up of Westinghouse drawing 8765-D-08, Revision 1, Sheets 1 through 23. All memos exchanged with the A/E that affected the final system design drawings become a part of the project documentation to be microfilmed for retention for the life of the project.

(5) The inspector examined several types of documents including, procedures, drawings, specifications, purchase orders, and deviation notices. All had been signed-off, dated and approved by cognizant engineering and management personnel.

b. Deviations and Unresolved Items

None identified in this area of the inspection.

c. Follow-up Item

None were identified.

C. Design Corrective Action

1. Objectives

The objectives of this area of the inspection were to examine and verify that:

a. Procedures have been established and implemented for identifying deficiencies of a significant or recurring nature, determining the cause of the deficiencies, and initiating corrective action to prevent recurrence.

b. Deficiencies and the corrective action are reported to appropriate levels of management.

c. Followup action is taken to assure timely completion of corrective action of a deficiency when resolution is not completed immediately.

d. The design process and verification procedures are reviewed and modified as necessary where a significant design change is necessary due to incorrect design, or in the case of recurring deficiencies.

2. Method of Accomplishment

The preceding objectives were accomplished by:

a. Examination of the NED Quality Assurance Program Manual, Sections 10.0, Corrective Action, Revision 0, January 14, 1980, and 9.0, Control of Nonconforming Items of Services.

b. Examination of NSSS WRD Policies and Procedures Manual Sections WRD-OPR

(1) 3.4, Field Change Notice Processing System, Revision 0, July 17, 1979.

(2) 15.0, Nonconforming Materials, Parts or Components, Revision 0, July 19, 1979.

(3) 15.1, Field Deficiency Reporting System: Pre-Operational Plants (FDR), Revision 1, July 19, 1979.

(4) 15.2, Deviation Notices, Revision 0, July 19, 1979.

(5) 16.0, Corrective, Revision 0, July 19, 1979.

c. Examination of NTD Design Control Manual, Section NTD-OPP-7A, Experience Reports, Revision 1, February 15, 1980.

d. Examination of Procedure EFP-ES-004, Engineering Action on Deviation Notices, Revision 1, April 29, 1977.

e. Examination of Procedure EFP-ES-021, Revision 0, September 30, 1977.

3. Findings

a. General

The inspector found that procedures had been established for identifying deficiencies, determining the causes of the deficiencies and initiating corrective action to prevent recurrence.

Procedure NTD-DPP-7A provides for review and evaluation of experience reports and establishes corrective action to preclude repetition of nonconformances. Typical of the experience reports are DNs, Field Deficiency Reports, Operating Plant Deficiency Reports and Licensee Event Reports. Trend analysis reports are compiled from data taken from these reports.

The DN Trend Analysis Report has only been issued for two (2) years' accumulation of DNs. Reviews of the report have not resulted in changes to design process and verification procedures since there have been no significant deficiencies identified.

b. Deviations and Unresolved Items

None were identified.

c. Follow-up Items

None are identified.