

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-358/83-07

Docket No. 50-358

License No. CPPR-88

Licensee: Cincinnati Gas and Electric Company
139 East 4th Street
Cincinnati, OH 45201

Facility Name: Wm. H. Zimmer Nuclear Power Station

Inspection At: Wm. H. Zimmer Site, Moscow, OH

Inspection Conducted: January 17-21, February 14-18, and April 11-15, 1983

Inspectors: *[Signature]*
C. H. Scheibelhut

6/28/83
Date

[Signature]
R. N. Gustafson

6/28/83
Date

Approved By: *[Signature]*
W. F. Christianson, Senior
Resident Inspector, Zimmer

6/28/83
Date

[Signature]
D. R. Hunter, Chief
Section 1, Zimmer

6/28/83
Date

Inspection Summary

Inspection during the period of January 17-21, February 14-18, and April 11-15, 1983 (Report No. 50-358/83-07(OSC))

Areas Inspected: Routine inspection by NRC personnel of quality records of safety related components, safety related electrical cables, and plant tours. This inspection involved a total of 144 inspector-hours onsite by two NRC inspectors.

Results: Of the three areas inspected, one item of noncompliance (Paragraph 2d and 2f - lack of inspection activities during installation and testing activities) and seven unresolved items were identified.

DETAILS

1. Persons Contacted

Cincinnati Gas and Electric Company

- *J. C. Herman, Technical Coordinator
- *W. P. Cooper, Nuclear Engineering Division, Director
- *B. K. Culver, Generation Construction Department, Manager
D. C. Hallenbeck, QCP Task 6 Coordinator
- *F. S. Hoover, Generation Construction Department, Lead Mechanical Engineer, NSSS
- *H. R. Sager, QA Manager
- *J. F. Shaffer, Quality Confirmation Program, Director
- *J. J. Seibert, Generation Construction Department, Electrical Engineer

And others of the station and construction project staffs.

*Attended the exit interview on February 18, 1983.

2. Review of Quality Related Work and Inspection Records

The inspector reviewed the quality related work and inspection records associated with the HPCS and RHR-B pumps. In addition, the qualifications of the various inspectors and the manufacturer's data packages for the pumps were reviewed including the following:

a. Receiving Inspection

- (i) Pumps - Receiving inspection was in accordance with Plan QAW 111, Revision 0, dated February 4, 1974, addressing identification, damage, loss, and documentation. The RHR-B pump was received on material receiving report (MRR) 8337 dated March 11, 1974. The HPCS pump was received on MRR 24806 dated April 2, 1976. A document deficiency notice dated March 12, 1974 was written against MRR 8337 (per QACMI G3.1.5 R1) because the required General Electric product quality certification document (PQC) was missing. This was cleared on receipt of the PQC and a copy of the PQC inserted in the receiving file.
- (ii) Motors - Receiving inspection was in accordance with Plan QAW 111, Revision 1 dated April 4, 1976 addressing identification, damage, loss, and documentation. The HPCS motor was received on MRR 25060 dated April 12, 1976. The RHR-B motor was received on MRR 8336 dated March 11, 1974. No nonconforming conditions were noted on receipt.

b. Warehouse Storage and Maintenance

- (i) Pumps - The pumps were stored and maintained in accordance with the manufacturer's requirements (Ingersoll Rand CQCP-1088,

Revision 2) including inside heated storage and maintenance of the as-received condition. Monthly inspections were made for damage, rust, and corrosion. The maintenance records appear to be complete and in accordance with the requirements.

The HPCS pump initial inspection was made April 2, 1976. The shell only was issued to the field on May 5, 1976 per DC #16421. The pump was issued to the field on May 27, 1977 per DC #27846. The RHR-B pump "initial inspection" was made March 12, 1974. The shell only was issued to the field May 16, 1975 per DC #7125. The pump was issued to the field March 14, 1977 per DC #36103.

- (ii) Motors - The motors were stored and maintained in accordance with the manufacturer's requirements (General Electric Spec. 261A3283) including inside unheated storage with periodic checks for damage, bearing oil level, heater operation, and insulation resistance. The maintenance records appear to be complete and in accordance with the requirements.

The HPCS motor initial inspection was made April 20, 1976. The motor was issued to the field July 25, 1977 per DC #36102. The RHR-B motor initial inspection was made March 15, 1974. The motor was issued to the field March 9, 1977 per DC #36076.

c. Pump Shipping and Receiving

As a result of Nonconformance Report No. E733 dated June 7, 1977, which identified the presence of water in the pump bowls, the HPCS pump was returned to the manufacturer for inspection on June 30, 1977 per shipping order 3214. The pump was prepared for shipping by use of an approved plan. Upon return on July 21, 1977 (MRR 39357), it underwent receiving inspection according to the plan and was sent directly to the field for installation.

d. Pump and Motor Installation

The pumps and motors appear to have been installed in accordance with the vendor's manuals and Field Construction Procedures (FCPs) 2-121, "Installation Procedure of RHR Pumps, LPCS and HPCS Pumps," Revision 0 dated April 8, 1977 and 4-16, "Installation Instructions for GE Vertical Induction Motors," Revision 0 dated April 4, 1977. These procedures were approved. However, on the face of the FCPS was a question - QA procedures required, yes or no - the "No" box was checked in both cases. No QA/QC involvement was required. The vendor manuals included storage, installation, test, and maintenance instructions and were approved by GE and Sargent and Lundy for these purposes. The equipment grouting was performed using a construction inspection plan that was properly approved and filled out by QC. Grouting for the RHR-B pump was done April 12, 1977; for the HPCS pump August 25, 1977. However, except for the grouting, the pumps and motors were installed and aligned without objective

evidence of QA involvement. The mechanical construction test procedure, MC-1, Revision 1 dated April 5, 1977, in effect at the time of installation contained a "Mechanical Equipment Inspection List", form MC-1-A. The completed form was signed in the "inspected by" columns by the KEI millwright superintendent and the CG&E construction engineer.

The record review revealed that GE Field Disposition Instruction (FDI) No. 95/63000 dated March 29, 1979, required the removal of the RHR pump motors for rework. A seismic review by General Electric indicated that the RHR pump motors would not withstand the required horizontal seismic loadings. Therefore, the motors had to be removed and have their rotors reduced in diameter to meet the requirements. When these motors were reinstalled in early June of 1979, the alignment and bolt torquing were done using an approved construction inspection plan (CIP No. M00IC, Revision 0). The record review revealed that the activities were witnessed by qualified quality control personnel.

10 CFR 50, Appendix B, Criterion X, requires that "a program for inspection of activities affecting quality shall be established and executed by or for the organization performing the activities to verify conformance with the documented instructions, procedures, and drawings for accomplishing the activity. Such inspections shall be performed by individuals other than those who performed the activity being inspected." 10 CFR 50, Appendix B, Criterion V requires that "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings." Revision 15 dated May 6, 1977 of the CG&E quality assurance manual was in effect at the time of the installation. Section 1.9.6, QA Performance, of the manual states, "KEI is responsible for providing QA to assure that performance of construction personnel, procedures, qualification or similar operations comply with specifications, codes, and other directives or requirements."

Contrary to the above, Chapter 10 of the CG&E QA manual, in effect at the time of installation, did not require QA/QC involvement (review and inspection) in the installation and test activities. The KEI manual, in effect at the time, did not contain written instructions (QACMIs) covering installation and test activities. No objective evidence of QA/QC involvement was found. Discussion revealed that QA/QC was not involved in these activities. (Also see subparagraph f of this section.) This is in noncompliance with 10 CFR 50, Appendix B, Criterion X, which states that a program for inspection of activities affecting quality shall be established and executed to verify conformance with documented instructions, procedures, and drawings. (358/83-07-01(A))

e. Installed Equipment Maintenance (KEI)

A review of the Kaiser Engineers, Inc. maintenance instruction sheets revealed that they were based on the approved manufacturer's instruction manuals. The maintenance instruction and record sheets were approved and completed and included verification of items such as oil levels, nitrogen purge pressures, and motor heater operation.

f. Construction Test

The HPCS pump was tested on November 10, 1977. The RHR-B pump was tested on February 24, 1978. The tests were conducted in accordance with the approved vendor's manuals. The results were recorded under the mechanical construction procedure, MC-1, as indicated in subparagraph d. Pump and Motor Installation, above. As with the installation, no QA/QC involvement was required and there was no objective evidence of QA/QC involvement with the testing. Discussion revealed that QA/QC was not involved in this activity. This matter is considered to be an item of noncompliance. (358/83-07-01(B))

g. Equipment Turnover

After the construction test, the equipment was transferred to the owner in accordance with CG&E procedure SU. PRP. 01 Revision 3 dated September 14, 1978, entitled "System Release and Turnover." The procedure was approved. The HPCS pump was turned over on January 31, 1979 and the RHR-B pump was turned over on April 25, 1979.

h. Installed Equipment Maintenance (CG&E)

(i) Motors - The drive motors have been maintained in accordance with an approved plan by the operating division. This includes monitoring bearing oil levels and rotating the shaft by hand. The records appear to be complete and continuous.

(ii) Pumps - The pumps have been rotated by hand along with the motors as noted above, to determine freedom of rotation.

(iii) Discussion revealed that the emergency core cooling systems and components were frequently transferred between CG&E and KEI for work activities. Discussion revealed that dry instrument air is used where possible to purge the systems and partial systems. The control of the condition of the pumps and piping during these periods is considered an unresolved item pending further inspection to determine that the systems are in a condition to fulfill their safety functions. (358/83-07-02)

i. QC Inspector Qualifications

The dossiers of the five inspectors involved in the receiving, maintenance, and installation of the pumps were examined. The inspection revealed that the receiving inspector had not been qualified by onsite testing or training and had not been certified. Discussions revealed that the licensee has implemented a program to resolve this generic situation. This matter is unresolved pending further review of the program. (358/83-07-03)

j. Field Deviations, Field Instructions, and Corrective Actions

Sixteen field deviation disposition requests (FDDR), three field disposition instructions (FDIs), and the associated equipment trouble reports (ETRs) or nonconformance reports (NRs) were reviewed. Established procedures were followed. The records were legible, complete, reviewed/approved and controlled. The attached Table I indicates the details of the documents that were reviewed.

k. Data Reports

The manufacturer's records confirming the quality of the pumps were reviewed. They contained the data required by the draft ASME Code for Nuclear Pumps and Valves (later included in Section III of ASME) that was used in the procurement of the pumps. The pumps were also required to meet the requirements of Section III of the ASME Boiler and Pressure Vessel Code (1968) for pressure retaining parts and head flange bolting. The procurement specifications required the manufacturer to submit for approval, prior to fabrication, the design calculations, seismic loading calculations, and the Code calculations for pressure-retaining parts. No calculations were available for review. This is considered an unresolved item pending further review. (358/83-07-04)

3. Plant Tours

The plant tour was conducted to observe the physical status of the HPCS pump, the RHR pumps and any other items of interest.

a. RHR Pumps A, B, and C

The pumps were inspected to determine physical condition and conformance to the drawings. The shafts were easily rotated by hand and the equipment appeared to be in good physical condition.

The three RHR pumps each have a shaft seal cooler installed. The coolers have "UM" stamps indicating fabrication under Section VIII of the ASME Boiler and Pressure Vessel Code. Table 3.2-1 of the FSAR indicates that these coolers are installed in systems that fall under the requirements of Section III of the Code. This is considered an unresolved item pending further inspection of the discrepancies, including the ASME Sections III and VIII requirements and the seismic Category I criteria and calculations. (358/83-07-05)

b. HPCS Pump and LPCS Pump

The pumps were inspected to determine physical condition and conformance to the drawings. The shafts were easily rotated by hand and the equipment appeared to be in good physical condition. No anomalies were noted.

c. Standby Liquid Control System (SLCS) Pumps

These pumps were inspected to determine their ASME Code status. The inspection revealed that the pumps are not "N" stamped.

These pumps are part of a safety related reactivity control system. Table 3.2-1 of the FSAR indicates that pumps were ordered in February 1972. Table 3.2-2 of the FSAR indicates that pumps ordered at that time would fall under the rules of Section III of the ASME Code, 1971 Edition, and would therefore require an "N" stamp. The procurement documents were examined and showed that the pumps were ordered in June 1971, before the 1971 edition of the Code was in effect. This is considered an unresolved item pending further inspection of the discrepancy in the dates and the review of the pump data package including the seismic requirements of the pump, speed reducer, and drive motor. (358/83-07-06)

4. Review of Quality Records for Power Cables

Quality records were reviewed for two power cables: cable no. HP-010 for the HPCS pump motor, and RH-120 for the RHR pump B motor.

a. Records regarding receipt of materials were as follows:

- (i) S&L purchase specifications, Cable Spec. No. H-2160A. This document specified production tests, and in detail, the cable flame tests and DBE, design-basis-event (in this case a loss-of-coolant-accident, LOCA) tests. These tests were modeled after tests specified in Draft IEEE 383, published later as Standard 383-1974.
- (ii) Kaiser Purchase Order No. 25103. Item 9 specified cable HP-010 material and Item 12 specified cable RH-120 material.
- (iii) Material Received Reports MRR-18995 and MRR-18526. MRR-18995 included receipt of material for cable HP-010 and MRR-18526 for cable RH-120. These two reports described receipt of the above cables, and were each stamped by a certified inspector, whose file of credentials was reviewed.
- (iv) Receiving Inspection Plan No. 25103. Each of the above MRRs included a copy of the P.O. 25103 Inspection Plan with the inspector's stamp on each item of

procedure that certified visual inspection items as well as receipt of test documentation. For each of the above MRRs there is also a transmittal of the documents to Kaiser QA document center and receipt acknowledgement by a KEI QA representative. Each MRR also included a Documentation Check List signed by a QA & Standards engineer, that certified that the documentation was complete and acceptable.

- (v) Kerite Company Factory Tests--to Sargent and Lundy.
All cable tests specified in H-2160A were described in a Kerite Company letter of August 28, 1975 to S&L for P.O. 25103 Item 9, used for cable HP-010, except for the flame tests and the DBE (LOCA) tests. A similar letter of August 8, 1975 described these tests for Item 12, used for cable RH-120. These certified test documents were acceptable. Generic tests for the specified flame and DBE tests were accepted. They are described below.
- (vi) Generic Fire Test Report by Kerite.
A letter of June 25, 1976 transmitted both a LOCA Qualification Report, Item (vii) below, and three Fire Test Reports to S&L. These fire test reports are generic, on various cables of the same insulation material, and are dated June 20, 1974, March 6, 1975, and May 15, 1975. The tests, as certified by Kerite, meet the flame test specifications.
- (vii) Generic LOCA Tests by Kerite.
LOCA tests, generic, are described in a document from the Franklin Institute Research Laboratories called Qualification Tests of Electrical Cables Under Simulated Post-Accident Reactor Containment Service Conditions, Final Report F-C 2737, prepared for the Kerite Company, April 15, 1970, and transmitted by the Kerite Company to S&L in letter of September 6, 1974.

Examination of this test report indicates all test specifications were met with one exception. Megger readings, performed after all simulated test environments were substituted for voltage withstand tests for 5 minutes at a potential of 80 V/mil ac or 240 V/mil dc. The S&L review also noted this deficiency and required that tests be performed in accordance with the specifications. The new test report was not available during the record review.

This item is considered unresolved until the new report is reviewed. (358/83-07-07)

- b. Records regarding cable installations were as follows:
 - (i) Direct Charge Issues.
No. 33098 issued 500' of 3/c 750 MCM, 5-kV cable (Cable HP-010) on Reel #73 for installation on September 7, 1977. Issue

No. 33702 returned 232' of this on Reel #73 back to the wire compound on October 10, 1977. Similar issues were made for 3/c, 2/o cable for cable RH-120.

(ii) Field Construction Procedure.

Foothill Electrical Corporation Field Construction Procedure, FEC-INI-007, dated May 3, 1977, directly transmits and uses Kaiser's "Quality Assurance - Construction Methods Instruction (QACMI)" entitled "Electrical Installation Procedure - Cable Pulling"--QACMI No. E-7, Revision 4, dated April 29, 1977. This instruction was reviewed. From it, Construction Inspection Plan, Spec./Dwg. No. H-2173, "Elect. Installation - Cable Pulling" was prepared.

(iii) Construction Inspection Plan H-2173.

CIP No. CP 10/6/77-B was used by inspector no. 65 on October 6, 1977 to certify that all procedures for pulling cable no. HP-010 were proper.

A review of the file on inspector no. 65 revealed that although he had a B.S degree and had had several inspector training courses on cable pulling and was, in part, in charge of all essential cable pulling, he had a "no-level" rating as an electrical inspector. He was certified as Level II for welding. He was color blind--had had this waived on January 5, 1976 but reconsidered as unsatisfactory on January 27, 1977.

His lack of formal certification as a cable-pull inspector is an unresolved item pending further review. (358/83-07-08)

(iv) Cable Routing.

Cable routing was studied and verified on drawings E-1005, and pull cards. The routing was visually checked in walk-down verification for both cables and found correct. Design document changes were made where necessary. Termination connection inspectors were checked for proper credentials and were properly certified.

A minor detail on the HP-010 cable pull card was noted during the review. An error on the card shows a 500 MCM cable instead of 750 MCM. The card indicated the proper 750 MCM elsewhere and the correct reel number; it appears to be an isolated typographical error.

5. Unresolved Items

Unresolved Items are matters about which information is required in order to ascertain whether they are acceptable items, items of non-compliance, or deviations. Unresolved items are addressed in paragraphs 2.h.(iii), 2.i, 2.k, 3.a, 3.c, 4.a.(vii), and 4.b(iii).

6. Exit Interview

The inspectors met with licensee representatives (denoted in paragraph 1) at the conclusion of the inspection on February 18 and April 15, 1983, and summarized the scope and findings of the inspection activities. The licensee acknowledged the inspectors findings.

Attachment: Table I

TABLE I

Field Deviation Disposition Requests, Field Disposition Instructions

FDDR No.	Source	Equipment	Problem	Disposition
KN-1-69 3-18-77	KEI requested change thru GE site office	All ECCS Pumps	KEI proposed substitution of of N ₂ purge for electrical cable heating for maintenance of installed pumps	Approved substitution
KN-1-74 9-25-77	NR No. E 773 6-7-77	HPCS Pump	Two gallons of water found in pump	FDDR - superseded by FDDR KN-1-82
KN-1-82	See KN-1-74	HPCS Pump	See KN-1-74	Pump returned to vendor for disassembly and inspection
KN-1-91 7-27-77	GE site sur- veillance and KEI notifica- tion	HPCS Pump	Seal flush line broken at the seal flange	Repair to original condi- tion
KN-1-130 11-10-77	NR E 7083 10-27-77	HPCS Motor	Broken thermocouple lead	Repair per instructions
KN-1-141 2-2-78	GE site sur- veillance	RHR A and B Pump Motors	Motor couplings not perpendicular to shafts	Remachine coupling face to bring within tolerance
KN-1-151 3-1-78	FDDR KNI-141 and site sur- veillance	RHR B Pump and Motor	Pump and motor shaft TIR slightly out of tolerance	Accept as is
KN-1-158 3-27-78	TEBZ-215-78 and site sur- veillance	HPCS Motor	Motor exposed to a large water spillage	Inspect and dry per in- structions
KN-1-192 6-6-78	GE site surveillance	RHR B Pump	Seal cooler piping mechanically distorted	Rework per instructions
KN-1-322 12-18-78	KEI requested change thru GE site office	RHR A, B, and C Pumps	Request to use substitute bolting material for flange joints	Approved substitution and specified acceptable substitutes

FDDR No.	Source	Equipment	Problem	Disposition
KN-1-348 2-5-79	KEI notification and GE site surveillance	RHR B Pump	Hydro test of discharge pipe exposed pump case to 650 psi. Design pressure is 220 psi	Engineering calculations showed developed stress to be less than the allowable stress. Accept as is and check gasketed joint during preoperational testing
KN-1-361 3-26-79	KEI notification and GE site surveillance	RHR A, B, and C Pumps	Seal piping orfices missing	Fabricate new orfices per drawing and install
KN-1-376 5-16-79	FDI 95/63000	RHR A, B, and C Pump Motors	See FDI 95/63000	This FDDR was required to implement the FDI
KN-1-470 2-23-81	GE site surveillance	All ECCS Pumps	Undersize tab lock washers installed under nuts and capscrews of the head to shell flange bolting	Drawings and specs did not require lock washers. Leave as is
KN-1-482 3-24-81	KEI notification	RHR A, B, and C Pumps	Specification called for seal welding of all screwed piping joints. This would preclude disassembly of seal cooler	Allow all threaded flanges to be assembled without seal welds
KN-1-490 10-1-80	KEI notification and GE site surveillance	HPCS Pump	Damaged lock tabs on discharge head bolting	Replace damaged lock tabs per sketch and instructions

FDI No.	Source	Equipment	Problem	Disposition
84/63000 8-17-78	GE engineering San Jose, CA	RHR A, B, and C Pumps	Seal cooler heat exchangers not rated for cooling water system operating pressure	Replace heat exchanger shell and base plate with components of the proper pressure rating
95/63000 4-12-79	GE engineering San Jose, CA	RHR A, B, and C Pumps	Motors could not withstand required horizontal seismic loads	Remove rotors and turn down to increase stator-rotor gap
106/63000 11-9-79	GE engineering San Jose, CA	All ECCS Pumps	Data needed for GE Operability Assurance/New Loads analyses	Obtained as-built dimensions of concrete support pedestals and foundation