

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

REGION III

Report No. 50-358/78-22

Docket No. 50-358

License No. CPPR-88

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

Facility name: Zimmer, Unit 1

Inspection at: Zimmer 1 Site, Moscow, Ohio

Inspection conducted: September 28-29, 1978

Inspectors: *I. Yin*  
I. T. Yin

10/23/78

*E. J. Gallagher*  
E. J. Gallagher

10/23/78

Reviewed by: *D. H. Danielson*  
D. H. Danielson, Chief  
Engineering Support Section 2

10/23/78

Inspection Summary

Inspection on September 28-29, 1978 (Report No. 50-358/78-22)

Areas Inspected: Followup inspection of problem areas relative to the safety related hangers, restraints, and concrete expansion anchor bolts installation which were identified during previous RIII inspections. The inspection involved 28 inspector-hours onsite by two NRC inspectors.

Results: No items of noncompliance or deviations were identified.

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## DETAILS

### Persons Contacted

#### Principal Licensee Employees

- \*W. W. Schwiars, Principal QA and Standards Engineer
- \*J. F. Weissenberg, QA and Standards Engineer
- \*B. K. Culver, Project Manager
- \*D. C. Kramer, Quality Assurance Engineer

#### Kaiser Engineer, Inc. (KEI) Employee

- \*R. E. Turner, QA Manager

The inspector also contacted other employees and craftsmen during the inspection, including representatives of General Electric Company, and Kaiser Engineers, Incorporated.

\*Denotes those present at the Exit Interview.

#### Licensee Action on Previously Identified Items

(Closed) Unresolved Item (358/78-01): Environment qualification hydraulic snubber seals. The inspector reviewed the subject concern and determined that no seal materials in the market to date can withstand the radiation and operation environment conditions inside the power reactor containment for 40 years of service life. It is a common practice for the hydraulic snubber vendors to select the best seal materials available through laboratory testing and plant operating experience, and to provide service and replacement procedures in case of material deterioration identified. The present control and selection of seal materials by the major snubber vendors are considered acceptable.

(Open) Noncompliance Item (358/78-10-01): Inadequate specification for procuring mechanical snubbers. The inspector reviewed Supplement 5 to Specification H-2259, dated June 6, 1978, and considered it inadequate. This was based on the fact that unit activation parameters were addressed but no mention of (1) the unit bleed rate of the hydraulic snubbers, and (2) equivalent load relieving characteristics of the mechanical snubbers. Further, the inclusion of cold position settings for the snubbers in the S & L installation drawings will not be completed until November 1, 1978. In addition, the inspector stated that although snubber hot position setting (HPS) is not required during installation, the HPS should be verified during system hot functional testing.

(Closed) Unresolved Item (358/78-10-02): Purchase specification for E-System hydraulic snubbers. The inspector reviewed S & L Spec. H-2897, "Hydraulic Snubbers for Reactor Recirculation and Main Steam Piping" dated April 5, 1978, and consider it acceptable.

(Open) Noncompliance Item (358/78-10-04): Installation of INC mechanical snubbers without adequate installation and inspection procedures. The inspector reviewed: (1) Kaiser Engineers, Inc. (KEI) Procedure 2-126, "Installation of Mechanical Shock and Vibration Arrestors", Rev. 0, dated July 26, 1978, and (2) KEI Procedure 2-127, "Installation of Hydraulic Shock and Sway Arrestors", Rev. 0, dated August 1, 1978, and considered them acceptable. The item remains open because (1) the update of KEI, QACMI, M-12 has not been reviewed and approved for use, and (2) the re-inspection of the installed mechanical snubbers based on the latest procedure has not been initiated.

(Closed) Unresolved Item (358/78-10-05): Qualification test reports for the ITT-Grinnell hydraulic snubbers. During a licensee audit of General Electric Company, (GE), San Jose, CA on June 5-7, 1978 (Audit Report 78-04), the Acton Environmental Test Corporation reports 12215-1 (dated January 31, 1976, relative to the environmental testings) and 12215-5 (dated February 17, 1976, relative to the seismic testings) on a 2 1/2" bore by 5" stroke snubber was reviewed by the licensee and considered acceptable. The Test Report 12215-4, dated April 21, 1976, relative to the largest snubber provided under GE Spec. 21A9422 was also reviewed and accepted by the licensee.

(Closed) Unresolved Item (358/78-10-06): E-System hydraulic snubber qualification reports. The inspector reviewed the technical reports issued by E-System and considered them acceptable. For details see Section I, Paragraph 2.

(Open) Unresolved Item (358/78-10-07): International Nuclear Safeguards Corporation (INC) mechanical snubber environmental transient and performance tests. The INC Report No. 116, "Summary of Design Data, Operational Characteristics and Test Results of the Mechanical Shock and Vibration Arrestor", Rev. 1, dated June 16, 1976, was reviewed by the inspector. The dynamic functional characteristics of the A, AS, D, and DS type snubbers, the preventive measures for jamming up, and the applicability of the general type report to the specific purchase specification were not apparent. A meeting with INC in their engineering office arranged through licensee to discuss these issues was requested by the inspector.

(Closed) Noncompliance Item (358/78-10-10): Inadequate indoctrination and training records. The inspector reviewed the training records dated September 15, 1978, for installation of mechanical and hydraulic snubbers, and considered it acceptable.

(Open) Unresolved Item (358/78-18-05): Design review for safety related pipe suspension. The licensee performed an audit in S & L office and identified several problems. For details, see Section I, Paragraph 1.

Functional or Program Areas Inspected

Functional and program areas inspected are documented in Section I and Section II of this report.

## SECTION I

Prepared by I. T. Yin

Reviewed by D. H. Danielson, Chief  
Engineering Support  
Section 2

### 1. Design Review for Safety Related Pipe Suspension

The adequacy of the subject matter was questioned by the inspector during an investigation on August 9-11, and 15-16, 1978 (RIII Report 78-18). Subsequently, the licensee performed an audit relative to the concerns at the S & L office, Chicago, on September 6-7, 1978. The inspector reviewed the Audit Report No. 78/07, and considered some of the findings to be significant. These included:

- a. Insufficient implementation of document review procedures.
- b. Re-evaluation of the hangers inside the auxiliary building was scheduled for completion by September 28, 1978.
- c. Re-analysis of hangers inside the containment was scheduled for completion by November 30, 1978.
- d. S & L has not maintained a record of support design calculations. Many of the support designs resulted in torsional stresses which were higher than the allowables.
- e. Inadequate review for Design Document Changes (DDC's).

A followup licensee audit in the same areas will be conducted at S & L office on October 16-17, 1978. The inspector noted that he would like to observe the audit.

No items of noncompliance or deviations were identified.

### 2. Review of E-System Hydraulic Snubber Qualification Test Reports

During the visit, the inspector reviewed the following technical test reports submitted by the vendor to the licensee. No problem areas were identified during the review.

- a. No. 152000-600, "Test Report on Non-Metallic Seal Material for use in Snubbers", Rev. A, dated October 12, 1977.

- b. No. 152000-620, Volume 1 of 9, "Summary Report, Product Qualification Test Report, GE Pipe Suspension Snubber", Rev. B, dated January 20, 1978.
- c. No. 152000-620, Volume 2 of 9, "Administrative Data, Production Qualification Test Report, GE Pipe Suspension Snubber", Rev. A, dated December 8, 1977.
- d. No. 152000-620, Volume 4 of 9, "Test Data, 20 Kip Snubbers, Qualification Test Report, GE Pipe Suspension snubber", Rev. A, dated December 8, 1977.
- e. No. 152000-620, Volume 6 of 9, "Test data, 50 Kip Snubber, Qualification Test Report, GE Pipe Suspension Snubber", Rev. A, dated December 8, 1977.
- f. No. 152000-620, Volume 7 of 9, "Test Data, 70 Kip Snubber, Qualification Test Report, GE Pipe Suspension Snubber", Rev. A, dated December 8, 1977.

## SECTION II

Prepared by E. J. Gallagher

Reviewed by R. L. Spessard, Chief  
Engineering Support  
Section 1

### 1. Status of Work on Installation of Anchorage of Pipe Supports and Restraints

Subsequent to the IE investigation conducted at the Zimmer plant on August 9-11, 15-16, 1978, CG&E issued a stop-work order No. 78-02 after a number of deficiencies were identified related to the use, installation and inspection of concrete expansion anchors used to anchor safety-related pipe supports and restraints.

This stop-work order was lifted effective September 7, 1978, based on the corrective action taken, in particular, the initiation of procedures for installation and inspection of expansion bolts, training of craftsmen installing the bolts, identification of quality assurance requirements for the procurement of the product and the application of a length identification stamp on the head of each bolt using a permanent die stamp.

### 2. Review of Specification and Procedures for Installation of Concrete Expansion Anchor Bolts

The inspector reviewed the following specification and procedures being used for the installation and inspection of concrete expansion anchor bolts used for anchorage of safety-related (essential) supports and pipe restraints:

- a. DDC No. SLS-315 (August 31, 1978) and attached Sargent and Lundy specification entitled, "Concrete Expansion Anchors: Installation and Inspection Procedure," Rev. 2 dated August 31, 1978.
- b. QACMI M-12 Rev. 1 entitled, "Inspection Instructions for Pipe Hangers and Support Installation."
- c. Field Construction Procedure FCP 2-128 Rev. 4 dated August 31, 1978.
- d. QACMI M-15 Rev. 1 entitled, "Concrete Expansion Anchor Post-Installation Procedure".

The inspector was informed that QACMI M-15 will be used to inspect expansion anchor bolts installed prior to the issuance of DDC SLS-315 (August 31, 1978) and FCP 2-128 (August 31, 1978) and that DDC SLS-315, QACMI M-12 and FCP 2-128 will be used for the installation and inspection of expansion anchor bolts installed after August 31, 1978.

QACMI M-15 requires an inspection to be performed on bolts installed prior to August 31, 1978, and includes ultrasonic testing to determine the length of the installed anchors as well as inspecting bolt spacing, edge distance and embedment depth for all bolts and inspecting the applied torque on a frequency of one bolt per hanger. If this one bolt is unacceptable, the procedure requires testing of all bolts for that particular hanger. In addition, all bolts that have been saw cut or show excessive projection shall be checked for torque and embedment depth.

The following items relative to the specification and procedures were discussed and were not able to be resolved during this inspection:

- a. S & L specification, Section 2.2.3, Table E lists the minimum testing torque requirements which are much less than the installation requirements in Table D, e.g., a 3/4 inch bolt is required to be installed to 125 to 175 foot-pounds and tested to 81 foot-pounds. The inspector requested the engineering justification for the established values. The licensee agreed to make this information available during the follow-up inspection.
- b. QACMI M-15, Rev. 1, Section 3.6 states that, "bolts installed out-of-plumb by greater than 5° shall be unacceptable." S & L specification for installation does not include a tolerance or requirement for installation plumbness. Craftsmen are being trained in accordance with S & L spec. This requirement is under evaluation by the licensee.

The above items are considered unresolved until the information is made available at a subsequent inspection, (358/78-22-01).

3. Calibration of Torque Wrenches Used for Installation of Expansion Anchors

S & L specification for concrete expansion anchors, Rev. 2, Section 2.2.1 requires torque wrenches to be used for inspection



and to be calibrated on a weekly basis, if using snap-type torque wrenches. The inspector reviewed the records of five of the eight torque wrenches to be used by the craftsmen and found the calibration records to be satisfactory.

4. Procurement Documents for Concrete Expansion Anchors

The inspector reviewed purchase requisition No. 25333 dated September 13, 1978, for concrete expansion anchor bolts manufactured by Hilti Fastener Systems. The purchase order identified the quality assurance requirements, in particular, the requirement for the supplier to issue a certificate of conformance for material properties and a requirement for a length identification marker to be stamped on the head of each bolt. This stamp is in the form of a letter, e.g., "L" which corresponds to a length of 4 3/8 " or "R" (6 1/4"). The inspector observed in the warehouse a supply of anchor bolts with the length identification marker applied.

5. Training of Craftsmen on the Installation of Expansion Anchors

Field Construction procedure FCP 2-128, Rev. 4, Section 3.1.1 requires the craft superintendent to instruct the craftsmen in accordance with installation procedures and maintain a record log of the qualified craftsman. The inspector reviewed this log with the craft superintendent, and he as interviewed two craftsmen installing the anchors in the field. Discussion with these craftsmen indicated that a training session had been performed and that they were familiar with the installation requirements of the procedure. Torque wrenches were not being used as they were in for calibration.

No items of noncompliance were identified in the above areas inspected.

Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance or deviations. One unresolved item disclosed during the inspection is discussed in Section II, Paragraph 2.

Exit Interview

The inspectors met with site staff representatives (denoted in the Persons Contacted paragraph) at the conclusion of the inspection on September 29, 1978. The inspectors summarized the purpose and findings of the inspection. The licensee acknowledged the findings reported herein.