

THE CINCINNATI GAS & ELECTRIC COMPANY



CINCINNATI, OH 45202-4003

January 30, 1984  
LOZ-84-0014

Docket No. 50-358

U.S. Nuclear Regulatory Commission  
Region III  
799 Roosevelt Road  
Glen Ellyn, Illinois 60137

Attention: Mr. J. G. Keppler  
Regional Administrator

| PRINCIPAL STAFF                          |                 |
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Gentlemen:

RE: WM. H. ZIMMER NUCLEAR POWER STATION - UNIT 1  
DRAFT IE INFORMATION NOTICE: REACTOR CONTROLS  
INCORPORATED CONSTRUCTION DEFICIENCIES  
W.O. 57300, JOB E-5590, FILE 956C

This letter constitutes our response to your October 17, 1983 letter requesting comments on the Reactor Controls, Incorporated (RCI) September 15, 1983 response to the draft information notice.

The attachment includes both the NRC draft IE Information Notice and the RCI response and provides CG&E's comments.

Please note that the November 4 due date requested in your letter was modified to November 22 per discussions with your Messrs. W. L. Forney and T. P. Gwynn, and was later extended an additional 60 days as requested in our letter LOZ-83-0237 dated November 22, 1983.

We trust that the attached comments will be of use to you in finalizing the information notice.

Very truly yours,

THE CINCINNATI GAS & ELECTRIC COMPANY

By *J. Wagner*  
J. WAGNER ASSISTANT VICE PRESIDENT  
NUCLEAR ENGINEERING

DJC/cse

Attachment

cc: NRC Office of Inspection & Enforcement  
Washington, D.C. 20555  
NRC Resident Site Supervisor  
ATTN: W. M. Hill  
NRC Zimmer Project Inspection, Region III  
ATTN: E. R. Schweibinz

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## GENERAL OVERVIEW

In December 1973, CG&E CCD Contract H-2832 was awarded to Reactor Controls, Inc. (RCI) to furnish the Control Rod Drive (CRD) hydraulic system piping and drain lines, to design and install the CRD hydraulic system piping and supports, and to install the Reactor Pressure Vessel (RPV) internals.

In December 1980, a stop work order directed that all work on materials, equipment, or supports, furnished or installed by RCI, be discontinued, pending verification of the adequacy of RCI's design, procedures, and documentation, and the performance of field verification of installed hardware. A letter from the NRC dated December 24, 1980 directed that further work by RCI not be allowed until the NRC has reviewed corrective actions and has determined that such actions were satisfactorily completed. In July 1981, the responsibility for the design of the CRD tubing was transferred from RCI to S&L.

Except for the removal of various type S-7, S-8, and S-9 hangers, and work performed on the CKDM work platform (see CG&E response to Item 1), no modifications have been made to the equipment listed in the draft IE Notice.

A preliminary walkdown, planned for scoping the completion of work, was completed January 6, 1984. The walkdown results were used to aid in our evaluation of statements made by RCI in their September 15, 1983 letter to the NRC. A detailed walkdown will be conducted as part of the Plan to Verify the Quality of Construction (PVQC).

CG&E's comments on both the draft IE Notice and the RCI response are provided as follows. For your convenience, we have included the verbatim text of each item in the draft IE Notice, followed by the verbatim RCI response for that item, followed by the corresponding CG&E comments.

1. Control Rod Drive Mechanism (CRDM) Work Platform (Approximate el 523 ft)

This platform furnished by the nuclear steam supply system (NSSS) vendor was supported by a circular assembly of structural steel on which is mounted a circular steel track. The work platform rotates on this track. An examination of the support assembly showed the following:

- a. Tie plates from one section of the circular beam to another in four locations did not have washers under the bolting as required by the design specification. The minimum bolt hole-to-edge distance of at least two of the tie plates was not maintained. In one case, the web thickness appeared to be 1/4 in. compared with the required 11/16 in. (See Table 1.16.5 of AISC Specification "Design, Fabrication and Erection of Structural Steel for Buildings," 7th Edition, AISC Manual).
- b. The bolts holding the circular beam to the seats which were welded to wall embedment plates were installed through irregular holes. These holes significantly exceed AISC requirements for enlarged holes and consequently require plates or plate washers for assembly. Such plates were not used. Bearing surfaces for washers used were inadequate and the workmanship was unacceptable. This condition was common to all eight supports.
- c. The rail was bolted to the circular beam using A-307 machine bolts through clamping pieces fitted to the flange of the rail. No filler pieces were used to raise the clamping pieces to the minimum flange thickness in accordance with the suggested practice of AISC (pp. 1-140, 7th Edition, AISC Manual). This resulted in a significant eccentric load on the bolt heads which exceeded the maximum permissible slope of 1:20, as stated in the governing 1969 AISC specification.
- d. The rails were spliced with plates which were jammed between the flange and the underside of the upper rail section. These splice plates did not seat properly in the web of the rail, leaving an excessive gap of more than 3/8 in. between the plates and the web. This resulted in less than full-thread engagement between the track bolts and the nuts. The condition was common to all eight plates (four splices).

RCI RESPONSE:

Item 1 - Control Rod Drive Mechanism (CRDH) (sic) Work Platform

a,b,c & d At anytime during installation of the customer supplied equipment, of which this item is one example, when the work could not be completed in accordance with drawings and/or specification requirements, the customer or his agent were contacted to provide resolution. Any and all deviations were approved by the customer or his agent through issuance of a Field Deviation Disposition Request (FDDR). Reactor Controls, Inc. did not supply any material or items for this installation, and any deviations from the AISC Manual or other specifications, were the responsibility of the equipment designer and supplier. RCI did not provide any of the materials or items installed. Everything was provided to RCI by the owner except welding materials, which RCI did provide.

RCI can accept as fact that the items as reported during the recent examination may be true. However, we strongly point out that in the years since RCI left that jobsite a lot of disassembly, reassembly and modifications may have been performed. Therefore, to suggest that the present status is the work of RCI is presumptuous.

Comment: At the time of installation, the CRD Work Platform was considered temporary due to interferences preventing proper operation and future modification would be required to enable proper operation. RCI did the work in accordance with the customer instructions as the platform was necessary to perform other installation operations. The rework of the platform was not performed by Reactor Controls, Inc. and possibly has been reworked since RCI left the jobsite.

CG&E COMMENTS:

The only work which has been done on the CRDM Work Platform since RCI left the site was performance of load testing, adjustment of brakes, and replacement of cables.

GE Drawing No. SEI 10170 R3 Sheet 3 of 5 provides a list of material supplied by GE and details of splices. RCI did not conform to the design.

GE Drawing No. 761E259 states the following:

"Only the parts listed and identified by vendors name and identification numbers have been approved. A substitute shall not be used without prior approval by APED engineering."

A review of the available documentation found no record of correspondence from RCI regarding missing parts or other deficiencies noted by the NRC regarding the CRDM Work Platform. This suggests that the deficiencies noted in parts 1a through 1d were the responsibility of RCI. In addition, GE Drawing No. 761E259 requires the platform to conform to AISC, AWS, ANSI, SSPC, and OSHA standards. RCI did not meet these requirements.

NRC DRAFT IE NOTICE:

2. CRDM Lateral Restraint Beam (Approximate el 533 ft)

This beam surrounded the lower CRDM housings and restrained CRDM lateral movement. It was bolted to eight seats which were welded to embedment plates in the wall of the reactor cavity. Each connection was made by eight 1-in., A-325 structural steel bolts.

- a. The bolting of the beam to the supports was found to be loose. Two bolts were finger tight. Three others checked with a torque wrench were found to be only snug tight. Gaps in the faying surfaces indicated that the condition was common to all eight supports.
- b. The frame itself was assembled with tie plates which did not have washers on the structural steel bolts. This condition was common to all eight plates. On one tie plate it was found that three common machine bolts had been substituted for the high-strength structural steel bolts.

RCI COMMENTS:

Item 2 - CRDH (sic) Lateral Restraint Beam

- a. During installation of the beams, all bolts were tightened with wrenches without reference to specific torquing values (sic). RCI did not receive specific torque value requirements for any bolting installations for the period of time work was performed. Later, Sargent & Lundy Engineers did prepare and issue a torquing procedure titled Concrete Fastener Installation Procedure (CFIP) but it was not issued to Reaator Controls, Inc. It is likely, others have performed work in these areas since RCI left the site as it has been determined all bolts were tight when installation was complete.
- b. The use or non use of washers during installation cannot be determined from information available to RCI. The use of common machine bolts by RCI is unlikely as RCI did not provide any equipment or material during installation.

Comment: Attached please find a copy of a CG&E Field Work Order No. RCI-1 dated August 22, 1975. This is typical of the manner in which RCI was directed to perform operations which did not initially meet drawing or specification requirements. RCI does not have copies of the FDDRs as CG&E issued Field Work Orders to direct RCI performance of work outlined in the FDDRs.

CG&E COMMENTS:

Item 2

The CFIP procedure referenced in RCI's response applies to concrete expansion anchors, not high strength bolting. Therefore, this is an incorrect reference. Torque requirements for high strength structural bolting is provided in the AISC Code, as referenced in S&L Specification H-2832.

Our review indicates that the GE design called for washers to be installed and that no FDDRs were implemented on the lateral restraint beams. In addition, there were no work orders issued to RCI for modifications to the lateral restraint beams.



NRC DRAFT IE NOTICE:

3. CRDM Housing Support Assembly

This device was assembled in an apparently temporary fashion. The assembly was reported to conform to NSSS drawings. The following apparent anomalies existed between drawings and the installed assembly:

- a. The assembly had sharp angular faces resting against flat washers in a fashion contrary to accepted practice.
- b. The assembly had two different surface treatments of the parts contrary to the drawings which specified Carbo-Zinc paint only.
- c. Examination of the upper support beams which spanned the reactor cavity and support the CRDM housing support assembly, showed that the west end of beam No. 3 was locked into the wall socket by a fillet weld. This fillet (sic) weld was cracked.

The applicant has asked the NSSS vendor to provide definitive procedures and drawings for this assembly. Design document changes (DDCs) issued against this assembly were for field changes only and thus could not affect the design of the assembly itself.

RCI COMMENTS:

Item 3 - CRD Housing Support Assembly

- a. This assembly was installed as designed and supplied. Attached are pictures of this type of assembly in the Hatch Nuclear Power Plant which is identical to Zimmer. A check of the G.E. Co. installation drawing revealed this is normal for this installation and the installation was in accordance with the drawing. A check with the component designer, G.E. Co., indicated this is the actual design of the component.
- b. RCI had no responsibility for surface treatment of the components. The supplier of the equipment provided the surface treatment.
- c. Keeping in mind RCI has been off site since 1979, the fact a fillet weld is cracked at this time is not evidence it was cracked at time of installation or that inadequate techniques were employed to perform the welding.

CG&E COMMENTS:

- 3a. RCI is correct. G.E. parts 7 and 8 shown on drawing 761E740 Rev. 4 are designed to have 10 degree cuts on both ends. Drawing 761E740 Rev. 6 changed parts to the later configuration; the parts used are correct as installed (Reference FDDR No. KN-1-1055 Revision 0).
- 3b. The statement by RCI is correct. The steel for this assembly was supplied with a prime coat of carbo-zinc per the design drawing. The top coat of Phenoline was applied subsequent to RCI installation in accordance with S&L Specification 9-4.
- 3c. Since the beams have not yet been exposed to the design dynamic loading, it is unlikely that a crack could have been initiated and propagated in the period since RCI left the site. It is more likely that non-destructive examination performed by RCI failed to discover the fillet weld crack.

NRC DRAFT IE NOTICE:

4. Reactor Lower Head Insulation Frame

Three circumferential joints were examined to determine conformance of bolting with the reference specification. It was found that:

- a. Bolting for this frame was assembled without washers.
- b. At one location nuts did not show sufficient thread engagement.

RCI COMMENTS:

Item 4 - Reactor Lower Head Insulation Frame

This work was not in the scope of the RCI contract as evidenced by S&L Specification H-2832, page 1-9, paragraph 17.

CG&E COMMENTS:

RCI's statement is correct.

NRC DRAFT IE NOTICE:

5. Scram Discharge Volume Level Switch Supports

Numerous deficiencies resulting from inspection of two RCI supports (1RD177SR and BP-4) were identified. These support deficiencies included: self-drilling anchor bolts used instead of the wedge type, threaded rod substituted for bolting, a slugged weld, threaded rod tack welded to the back of the base plate as an anchor bolt substitute, connection details not in accordance with the drawing, oversized bolt holes in base plates, use of "hardware store" quality nuts and washers, and U-bolt supports formed from threaded rod. In addition, weld rod was found stuffed into a tubular support member for 1RD177SR.

RCI COMMENTS:

Item 5 - Scram Discharge Volume Level Switch Supports

The use of self drilling anchor bolts was common practice at the time of installation. The system design specification was supplied by Sargent & Lundy Engineers and it was not until issuance of IE Bulletin 79-02 that emphasis was given to anchor bolts. The action taken by S&L at that time was given to anchor bolts. The action taken by S&L at that time was the issuance of CFIP (Concrete Fastener Installation Procedure) and it was issued to other contractors on the Zimmer jobsite but was not included in the design specification for the RCI scope of work. The use of threaded rod being substituted for bolting is not a normal RCI practice and was apparently performed without Site personnel knowledge.

The use of "hardware store" quality nuts & bolts is a condition we cannot comment on as we do not have knowledge of what that is or where the bolts were used. The use of threaded rod for a U-bolt was an approved design condition indicated on the installation drawing.

To comment on weld rod being stuffed into a tubular support member would be preassumptious to assume it was RCI filler material. All filler material issued by RCI was documented out and in and a record of all transactions is on file.

The other items identified here may or may not have been performed by RCI during installation. Again, keep in mind that RCI work has been modified by others since RCI left the site.

CG&E COMMENTS:

The use of self-drilling anchors was acceptable at the time of installation. All self-drilling type anchors on the CRD System will be reviewed for adequacy. The other deficiencies (i.e., threaded rod substituted for bolting, slugged weld, threaded rod tack welded to the back of the base plate as an anchor bolt substitute, connection details not in accordance with the drawing, oversized bolt holes in base plates, and use of hardware store quality nuts and washers) are AISC & AWS code violations and remain the responsibility of RCI.

As noted in the general overview, the only work performed on any CRD supports subsequent to RCI leaving the site was the removal of various type S-7, S-8, and S-9 hangers. No other modifications have been made to supports furnished or installed by RCI.