

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

DOCKET

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In the Matter of  
CINCINNATI GAS & ELECTRIC COMPANY  
(William H. Zimmer Nuclear  
Power Station)

SERVED NOV 12 1982

Docket No. 50-358  
Construction Permit No. CPPR-88  
EA 82-129

ORDER TO SHOW CAUSE AND  
ORDER IMMEDIATELY SUSPENDING CONSTRUCTION  
(CLI-82-33)  
I.

The Cincinnati Gas and Electric Company (CG&E) holds Construction Permit No. CPPR-88 which was issued by the Commission in 1972. The permit authorizes the construction of the William H. Zimmer Nuclear Power Station Unit 1, a boiling water reactor to be used for the commercial generation of electric power. The Zimmer plant is located on the licensee's site in Moscow, Ohio.

II.

A. Initial Identification of QA Problems

In early 1981 the NRC conducted an investigation into allegations made by present and former Zimmer site employees and by the Government Accountability Project. The NRC investigation revealed a widespread breakdown in CG&E's management of the Zimmer project as evidenced by numerous examples of non-compliance with twelve of the eighteen quality assurance Criteria of

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Appendix B to 10 CFR Part 50. Consequently, CG&E paid a civil penalty of \$200,000 for the failure to implement an acceptable quality assurance program, false quality assurance documents, and intimidation and harassment of quality control inspectors. (See Notice of Violation and Proposed Imposition of Civil Penalties, dated November 24, 1981 and Investigation Report No. 50-358/81-13.) In addition CG&E agreed to take actions to correct identified QA failures and prevent their recurrence and to determine quality of completed construction work.

1. Actions to Correct Identified QA Failures and Prevent Recurrence

A meeting was conducted by Region III on March 31, 1981, and the utility agreed to implement ten actions to correct quality assurance failures identified during the January - March 1981 investigation and to preclude their recurrence. These actions included: (1) increasing the size and technical expertise of the CG&E QA organization; (2) taking action to assure independence and separation of the QA/QC function performed by Kaiser from the construction function; (3) conducting 100% reinspections of the quality control (QC) inspections performed after that date by Kaiser and other contractors; (4) reviewing for adequacy, and revising as appropriate, all QC inspection procedures; (5) training QA/QC personnel on new and revised procedures; (6) reviewing for adequacy, and revising as appropriate, the procedures governing the identification, reporting, and resolution of deviations from codes and Final Safety Analysis Report (FSAR) statements; (7) reviewing for adequacy the procedures governing nonconformance reporting and justifying the disposition of each voided nonconformance

report; (8) establishing an adequate program for control of QA and QC records; (9) performing a 100% review of all future surveillance and non-conformance reports written by contractor personnel; and (10) reviewing and revising the CG&E audit program so that it included technical audits of construction work and more comprehensive and effective programmatic audits. These commitments were confirmed in an Immediate Action Letter to the licensee on April 8, 1981.

2. Actions to Determine Quality of Completed Construction Work

Following the identification in 1981 of significant quality assurance problems and related management breakdowns, CG&E agreed to establish a comprehensive program to determine the quality of the completed construction work. The Quality Confirmation Program (QCP) was submitted to the NRC by the licensee on August 21, 1981. The QCP addressed problems identified by the investigation in the following areas: (1) structural steel; (2) weld quality; (3) traceability of heat numbers on piping; (4) socket weld fitup; (5) radiographs; (6) electrical cable separation; (7) nonconformance reports; (8) design control and verification; (9) design document changes; (10) subcontractor QA programs; and (11) audits.

3. Results of Actions Taken by the Licensee to Determine the Quality of Completed Construction Work

Many construction deficiencies have been identified by the licensee during the conduct of the QCP and other quality reviews and reported to

the NRC pursuant to 10 CFR 50.55(e) which could have been prevented or identified in a timely manner by the licensee and its contractors had there been a properly managed QA program. Major construction deficiencies identified to date by the quality reviews are listed in order of identification and include the following:

- . Welds performed using an unqualified welding procedure for welds greater than 0.864 inches.
- . Unauthorized stamping of fittings and use of "high-stress" stamps.
- . ASME structural weld and welder qualification deficiencies.
- . Welds performed and welders not qualified for weld thickness range per ASME requirements.
- . Approximately 2400 feet of small bore piping identified with questionable heat treatment.
- . Welder qualifications with a substantial number of documentation discrepancies.
- . Carbon steel weld rod may have been used for a portion of several stainless steel recirculation line welds.

- . Electrical cable tray installation and inspection deficiencies.
- . Hangers installed for the control rod drive system are of indeterminate quality.
- . Both weld and radiograph quality deficiencies for sacrificial shield welds and radiograph deficiencies identified for the containment monorail and the ventilation stack.
- . Deficiencies in the H. J. Kaiser procurement program for structural steel and other materials.
- . Inadequate design control by Sargent & Lundy (architect engineer) for electrical separation.
- . Inadequate weld preparation prior to radiography (ripples not removed) which caused masking of discontinuities in some welds.
- . Reactor control, reactor protection, and neutron monitoring panels, including field installed wiring do not, in some cases, conform to design drawings with regard to cable separation.
- . Inadequate engagement of "gamma plugs" in large-bore piping and lack of heat number traceability of the "gamma plugs." (During radiography of a pipe weld, a gamma source is sometimes inserted through a small

hole in the side of the pipe. After radiography the hole is plugged to provide a pressure boundary.)

- . Inadequate inspection program and installation procedures for "Nelson stud" installation for cable tray hangers.
- . Concrete and steel coating program not in accordance with the QA Program and the Sargent & Lundy specification requirements.
- . Design changes made to the Fire Protection System piping in the cable spreading room in 1979 were inadequately controlled.
- . The Sargent & Lundy (architect engineer) dynamic stress analysis of small bore piping is questionable.
- . Cable separation problem with regard to division separation between non-essential cables being bundled with essential cables of different divisions.
- . Pipe support installation procedures did not contain seismic clearance criteria between pipe supports and cable trays or conduit and associated supports as required by the specification.

These deficiencies represent those which the staff considers most significant. There were additional 10 CFR 50.55(e) reports made by the licensee and the licensee has identified a large number of

nonconformances (which could reflect construction or other types of deficiencies). As of September 30, 1982 the licensee's continuing quality confirmation program reviews had identified approximately 4,200 nonconformances of which about 800 have been "dispositioned", i.e., the licensee had made a determination as to resolution. (Inspection Report No. 50-358/82-12, report pending.) The large number of nonconformance reports and the significance of the matters being identified corroborate the staff's 1981 finding of significant breakdown in the licensee's quality assurance program.

B. Findings Subsequent to Licensee Actions Taken to Correct QA Failures and Prevent Recurrence

Since the Immediate Action Letter was issued on April 8, 1981 and quality assurance and management deficiencies were brought to the attention of the licensee, hardware and programmatic QA/QC problems have been identified by the NRC and the National Board of Boiler and Pressure Vessel Inspectors. These problems are discussed in the following paragraphs and indicate the licensee and the constructor are still having difficulty implementing satisfactory QA/QC programs:

During an inspection conducted the latter part of 1981 and the early part of 1982 (Inspection Report No. 50-358/82-01, issued on June 24, 1982) three items of noncompliance were identified. The findings concerned (1) the failure to clearly establish and document the authorities and duties of all QA Department personnel, (2) the failure to provide

adequate certification of qualifications of all QA Department personnel, and (3) the failure to provide adequate procedures. The licensee failed to adequately address the provisions of Regulatory Guide 1.58 (ANSI N45.2.6-1978) concerning personnel in the QA Department. Additionally, inadequately qualified personnel were reviewing and approving quality procedures controlling electrical activities, which contained deficiencies.

Furthermore, as a result of the licensee reviews it was revealed that some weld inspectors involved in the QCP Task I, Structural Steel, were not adequately certified and the task was stopped. The task was restarted following upgrade of the inspectors through training provided by additional certified weld inspectors.

During an inspection conducted in March and April 1982 (Inspection Report No. 50-358/82-05, issued on July 1, 1982) two items of noncompliance were identified. The findings concerned the lack of implementation and timeliness of corrective actions and the failure to adequately review and document potentially reportable matters.

During an inspection conducted in April, May, and June of 1982 (Inspection Report No. 50-358/82-06, issued on November 2, 1982) two items of noncompliance were identified. The findings concerned (1) the performance of quality activities required of the welding engineers by inadequately qualified clerks and (2) the failure to perform required calibrations



during a critical quality activity, Induction Heating Stress Improvement (IHSI) program.

A recent inspection conducted during June and July of 1982 (Inspection Report No. 50-358/82-10, report pending) identified a number of significant concerns. These concerns were discussed with the licensee on July 9, July 15, August 15, and October 19, 1982. Four significant items of concern (potential items of noncompliance) were identified:

- (1) the inadequate control and documentation of welder qualifications;
- (2) the failure to take corrective actions following the identification of inadequate records to support welder qualifications;
- (3) the unauthorized correction, supplementation, and alteration of quality records; and
- (4) the failure to follow procedures controlling weld filler metal control, logging and control of requests for information/evaluation, and imposition of reporting requirements on contractors.

The NRC findings concerning welder qualifications resulted in the requalification of approximately 100 active onsite welders and the need for the licensee to develop a program to evaluate the previous work of the welders whose qualifications were not adequately documented.

An inspection was conducted following notification of the Region III Office that a CG&E Stop Work Order (SWO) had been initiated on August 5, 1982, pertaining to Catalytic, Inc. (CI) activities in the area of the control rod drive system hangers and supports. CI is a contractor of the licensee performing construction work

including rework activities identified by the QCP program. During this inspection conducted during August and September of 1982 (Inspection Report No. 50-358/82-13, report pending), significant concerns were identified regarding the implementation of CG&E's quality assurance program and its management program established to control and monitor the activities of Catalytic, Inc. (CI).

The concerns involved the areas of (1) the description of organization and functional interfaces, (2) training of CI personnel, (3) design control measures, (4) procedure content and implementation, (5) document control, (6) inspection and surveillance activities, (7) nonconforming conditions, (8) corrective actions, (9) records, and (10) audits. The findings were discussed with the licensee on August 12, September 10 and 17, and October 19, 1982.

As a result of the inspection findings and subsequent discussions with the licensee, Stop Work Orders were issued by the licensee, stopping all essential work by CI on October 11, 1982, pending resolution of the programmatic problems identified by the NRC and licensee reviews.

The licensee has initiated Stop Work Orders in addition to those affecting CI due to inadequate quality assurance in the areas of application of coatings (October 12, 1982), electrical cable installation (October 12, 1982), and special process procedures (November 1, 1982). The Stop Work Orders involve ongoing activities. The November 1, 1982 Stop Work Order involved procedures not meeting requirements notwithstanding that the procedures had been specifically

reviewed by CG&E for adequacy subsequent to the issuance of the April 8, 1981 Immediate Action Letter.

Additionally, during the week of October 10, 1982, the Authorized Nuclear Inspector (ANI) for the M-stamp holder (H. J. Kaiser) recalled ASME work packages then being used in the field because of the performance of ASME code work (hanger attachment removal and piping cutouts) was outside the approved QA Program procedures. The ASME code work was being controlled and performed utilizing an H. J. Kaiser administrative memo which bypassed the ANI's required involvement in the code activities. The NRC was apprised of the required corrective actions during a meeting involving CG&E and H. J. Kaiser on October 15, 1982. The corrective actions taken and planned were considered acceptable by the Authorized Nuclear Inspector.

The National Board of Boiler and Pressure Vessel Inspectors, at the request of the State of Ohio, have been onsite since March 1, 1982. The National Board has issued three interim reports documenting findings regarding ASME code activities. The National Board findings include deficiencies in the following areas regarding on-going ASME code activities: design control, procurement, procedures, special processes, nonconforming conditions, and corrective actions. The findings are generally consistent with past and present NRC findings.

C. Rework Activities

As a result of the information obtained from the licensee's reviews of plant quality, the licensee is proceeding, prior to completion of the relevant QCP tasks, to initiate rework activities. A major example of rework activities is the area of structural steel welding. The reinspection and rework of structural steel welds located in a number of areas of the plant have been in process for a number of months.

Approximately 70 percent of the structural welds are being reworked to make the welds acceptable. In the case of these welds, rework is being undertaken prior to the completion of the quality reviews to determine the acceptability of all structural steel welds and beam/hanger materials. The rework of these welds prematurely may result in the addition of new weld material over unacceptable weld material or beam/hanger materials. Following completion of the quality reviews unacceptable areas may require additional rework activities. This approach to rework activities indicates a lack of a comprehensive management program to address rework activities and the safety impact of those activities on the facility.

III.

The foregoing information indicates that: 1) the Zimmer facility has been constructed without an adequate quality assurance (QA) program to govern construction and to monitor its quality, resulting in the construction of a facility which currently is of indeterminate quality; 2) substantial efforts are underway to determine the quality of past construction activities and numerous construction deficiencies have been

identified and are continuing to be identified such that both reanalysis and rework will be required to bring the facility into conformance with the application and regulatory standards on the basis of which the construction permit was originally issued; and 3) rework of deficiencies identified by the Quality Confirmation Program (QCP) has been undertaken prior to completion of other relevant QCP tasks and other reviews, resulting in the potential for additional reworking of the same item if further deficiencies are found, as has been the case, by the quality reviews. Consequently, the NRC presently lacks reasonable assurance that the Zimmer plant is being constructed in conformance with the terms of its construction permit and 10 CFR Part 50, Appendix B, and that there is adequate management control over the Zimmer project to ensure that NRC requirements are being met.

The verification of the facility's quality and appropriate actions to correct deficiencies in construction are of utmost importance to the public health and safety should the licensee receive a license to operate the facility. Moreover, the licensee must be in a position to assure that its construction activities have been properly carried out in accordance with Commission requirements, as the Commission inspectors are not able to personally verify every individual aspect of construction that may impact on safety. In view of the importance to safety of construction verification and corrective actions and the past pattern of quality assurance deficiencies, the Commission has concluded that safety-related construction, including rework activities, should be suspended until there is reasonable assurance that future construction activities will be appropriately managed to assure that rework activities and all other construction activities will be conducted in

accordance with 10 CFR Part 50, Appendix B, and other Commission requirements. The Commission has further determined that in light of the foregoing considerations the public health, safety and interest require suspension of construction, effective immediately pending further authorization.

IV.

Accordingly, pursuant to sections 103, 161i, 182 and 186 of the Atomic Energy Act of 1954, as amended, and the Commission's regulations in 10 CFR Parts 2 and 50, IT IS HEREBY ORDERED THAT:

- A. Effective immediately, safety-related construction activities, including rework of identified deficient construction, shall be suspended.
- B. The licensee shall show cause why safety-related construction activities, including reworking activities, should not remain suspended until the licensee:
  - (1) Has obtained an independent review of its management of the Zimmer project, including its quality assurance program and its quality verification program, to determine measures needed to ensure that construction of the Zimmer plant can be completed in conformance with the Commission's regulations and construction permit.
    - (a) The independent organization conducting this review shall be knowledgeable in QA/QC matters and nuclear plant construction and shall be acceptable to the Regional Administrator. The independent organization shall make

recommendations to the licensee regarding necessary steps to ensure that the construction of the facility can be completed in conformance with the Commission's regulations and the construction permit. A copy of the independent organization's recommendations and all exchanges of correspondence, including drafts, between the independent organization and CG&E shall be submitted to the Regional Administrator at the same time as they are submitted to the licensee. In making recommendations, the independent organization shall consider at a minimum the following alternatives for management of the Zimmer project and shall weigh the advantages and disadvantages of each alternative:

1. Strengthening the present CG&E organization.
2. Creation of an organizational structure where the construction management of the project is conducted by an experienced outside organization reporting to the chief executive officer of CG&E.
3. Creation of an organizational structure where the quality assurance program is conducted by an experienced outside organization reporting to the chief executive officer of CG&E.
4. Creation of an organizational structure with both quality assurance and construction project management conducted by an experienced outside

organization reporting to the chief executive officer of CG&E.

- (b) The licensee shall submit to the Regional Administrator the licensee's recommended course of action on the basis of this independent review. In evaluating the recommendations of the independent organization, the licensee shall address why it selected particular alternatives and rejected others. The licensee's recommendations and its schedule for implementation of those recommendations shall be subject to approval by the Regional Administrator.
- (2) Following the Regional Administrator's approval in accordance with section IV B(1)(b),
- (a) Has submitted to the Regional Administrator an updated comprehensive plan to verify the quality of construction of the Zimmer facility and the Regional Administrator of NRC Region III has approved such plan. In preparing this updated comprehensive plan, the licensee shall review the ongoing Quality Confirmation Program to determine whether its scope and depth should be expanded in light of the hardware and programmatic problems identified to date. The updated plan shall include an audit by a qualified outside organization, which did not perform the activities being audited, to verify the adequacy of the quality of construction; and



(b) Has submitted to the Regional Administrator a comprehensive plan, based on the results of the verification program, for the continuation of construction, including reworking activities, and the Regional Administrator has confirmed in writing that there is reasonable assurance that construction will proceed in an orderly manner and will be conducted in accordance with the requirements of the Commission's regulations and the Construction Permit No. CPPR-88.

(3) The Regional Administrator may relax all or part of the conditions of section IV.B for resumption of specified construction activities, provided such activities can be conducted in accordance with the Commission's regulations and the provisions of the construction permit.

V.

Within 25 days of the date of this order, the licensee may show cause why the actions described in section IV should not be ordered by filing a written answer under oath or affirmation that sets forth the matters of fact and law on which the licensee relies. As provided in 10 CFR 2.202(d), the licensee may answer by consenting to the order proposed in section IV of this order to show cause. Upon the licensee's consent, the terms of

section IV.B of this order will become effective. Alternatively, the licensee may request a hearing on this order within 25 days after the issuance of this order. Any request for a hearing or answer to this order shall be submitted to the Secretary, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. A copy of the request or answer shall also be sent to the Director, Office of Inspection and Enforcement, and to the Executive Legal Director at the same address, and to the Regional Administrator, NRC Region III, 799 Roosevelt Road, Glen Ellyn, Illinois 60137. A request for a hearing shall not stay the immediate effectiveness of section IV.A of this Order.

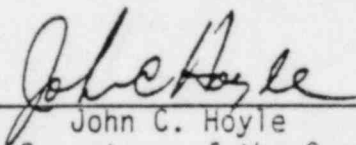
If the licensee requests a hearing on this order, the Commission will issue an order designating the time and place of hearing. If a hearing is held, the issues to be considered at such a hearing shall be whether the facts set forth in sections II and III of this order are true and whether this order should be sustained.

Commissioners Ahearne and Roberts dissent from this decision. Their dissenting views are attached.

It is so ORDERED.

For the Commission



  
John C. Hoyle  
Acting Secretary of the Commission

Dated at Washington, D.C.  
this 12th day of November, 1982.

DISSENTING VIEWS OF COMMISSIONER AHEARNE

I agree with both the substance and the direction for change described in this order. However, I would have simply issued a Show Cause Order and would not have made it immediately effective.

DISSENTING VIEW OF COMMISSIONER ROBERTS

I disagree with the action taken by the Commission majority on several grounds. First, I believe the Commission's action in immediately suspending construction at the Zimmer facility is precipitous. Earlier this year, Cincinnati Gas and Electric Company (CG&E) made substantial changes in its management structure in order to manage more effectively construction activities and to monitor more carefully quality assurance programs. Despite the fact that this new organizational structure is relatively untested, the Commission is now suspending effective immediately all construction and corrective actions at the site. Additionally, the NRC Staff admits that CG&E's enhanced Quality Confirmation Program (QCP) and large quality control staff is effectively identifying existing construction problems. Moreover, to the extent that actual construction deficiencies have been found, CG&E's management has demonstrated its willingness to take strong remedial actions by issuing stop work orders in those areas where construction deficiencies have been found. In a plant that is approximately 98 percent complete, the Commission is requiring the relatively few remaining construction activities and the ongoing corrective actions necessitated by the QCP to stop immediately while additional organizational changes are implemented.

Second, I believe the Commission's action does not comport with its own practice. In Licensees Authorized to Possess . . . Special Nuclear Materials, CLI-77-3, 5 NRC 16, 20 (1977), the Commission said that "[a]vailable information must demonstrate the need for [such] emergency

actions and the insufficiency of less drastic measures" (emphasis added). See also Consumers Power Co. (Midland Plant, Units 1 & 2), CLI-73-38, 6 AEC 1082, 1083 (1973). I believe that, in this case, some of the less drastic alternatives proposed by the Staff would be adequate to resolve the problems at this facility. For example, the Commission could send CG&E a letter indicating that at this time the Commission does not have sufficient information to conclude that Zimmer has been constructed in substantial conformance with the construction permit. The Commission could request the provision of information on the part of CG&E which, if available, would provide the Commission with the necessary assurance. See 10 CFR 50.54(f).

Third, in the absence of willfulness, the Commission may suspend construction effective immediately in accordance with Section 9b of the Administrative Procedures Act and the Commission's regulations only if the Commission finds that the public health, safety, or interest requires such action. I do not believe that the concerns listed in the Commission's Order show that the public health and safety requires immediate suspension of all construction and corrective actions at the Zimmer site. Indeed, Mr. James Keppler, the Region III Administrator, has stated that CG&E's QCP has been successful in identifying existing construction problems. Transcript of Public Meeting on the Status of Zimmer, October 28, 1982 at 5. Additionally, most of the NRC inspection findings arising out of the QCP point to administrative or procedural deficiencies, rather than to actual material or construction errors. While the NRC's level of confidence in the adequacy of the plant

construction has been reduced, it has not been shown by the NRC that problems exist which require immediate resolution to protect the public health and safety. Moreover, I do not believe this action is in the public interest.

I am also concerned that the Order has been approved without consideration for the Applicant's proposal to correct management and construction problems. That proposal, outlined in a letter to the Commissioners dated November 10, 1982, contained all of the essential elements approved by this Order. Specifically, the proposal calls for obtaining new project management, stopping all rework on quality confirmation matters, and an independent third party review to confirm the acceptability of selected safety systems. In view of the voluntary agreement by CG&E to such drastic measures, I feel that this Order is primarily punitive in nature and does little to correct problems in the interest of public health and safety.

Finally, I disagree with the Commission's Order because of the potential for delay inherent in this procedure. CG&E has an absolute right to a hearing on the Commission's Order. If CG&E avails itself of this right, then other "interested persons" will be entitled to demand a hearing. Once started, the hearing would be difficult to bring to an expeditious close. Even if the Staff and CG&E were to reach agreement on the corrective actions to be taken, litigation of the requirements imposed by the Commission Order would continue. Consumers Power Co. (Midland Plant, Units 1 & 2), ALAB-315, 3 NRC 101 (1976); Dairyland Power Cooperative (LaCrosse Boiling Water Reactor), LBP-81-7, 13 NRC 257, 264-65 (1981).