

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

SYSTEMATIC ASSESSMENT OF LICENSEE PERFORMANCE

Cincinnati Gas and Electric Company

WILLIAM H. ZIMMER NUCLEAR POWER STATION

Docket No. 50-358

Report No. 50-358/82-08

Assessment Period

October 1, 1980, to March 31, 1982

10-5010

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I. INTRODUCTION

The NRC has established a program for the Systematic Assessment of Licensee Performance (SALP). The SALP is an integrated NRC Staff effort to collect available observations and data on a periodic basis and evaluate licensee performance based upon those observations. SALP is supplemental to normal regulatory processes used to ensure compliance to the rules and regulations. SALP is intended from a historical point to be sufficiently diagnostic to provide a rational basis: (1) for allocating future NRC regulatory resources, and (2) for providing meaningful guidance to licensee management to promote quality and safety of plant construction and operation.

A NRC SALP Board composed of managers and inspectors who are knowledgeable of licensee activities met on June 16, 1982, to review the collection of data and performance observations and to assess the licensee's performance in selected functional areas.

This report is the SALP Board's assessment of the licensee safety performance at Cincinnati Gas and Electric Company's William H. Zimmer Nuclear Power Station for the period October 1, 1980, to March 31, 1982. NRC inspection and investigative activities identified a major breakdown in the licensee's Quality Assurance Program (QAP) during the assessment period. As a result, on April 8, 1981, the NRC issued an Immediate Action Letter (IAL) requiring significant licensee actions to improve the breadth, depth, and technical adequacy of the QAP. Recognizing the potential impact of the QAP breakdown on past work, the NRC required the licensee to establish a Quality Confirmation Program (QCP) to determine the quality of plant systems important to nuclear safety. To emphasize the redirection of NRC inspection activities following identification of the major breakdown in the QAP, this report has been developed to highlight the periods prior to and subsequent to the April 8, 1981 Immediate Action Letter.

The results of the SALP Board's assessments in the selected functional areas were presented to the licensee at a meeting held June 29, 1982.

II. CRITERIA

The licensee's performance is assessed in selected functional areas depending on whether the facility is in a construction, preoperational, or operating phase. Each functional area normally represents areas significant to nuclear safety and the environment, and are normal programmatic areas. Some functional areas may not be assessed because of little or no licensee activities or lack of meaningful observations. Special areas may be added to highlight significant observations.

One or more of the following evaluation criteria were used to assess each functional area:

1. Management involvement in assuring quality
2. Approach to resolution of technical issues from safety standpoint
3. Responsiveness to NRC initiatives
4. Enforcement history
5. Reporting and analysis of reportable events
6. Staffing (including management)
7. Training effectiveness and qualification

However, the SALP Board is not limited to these criteria and others may have been used where appropriate.

Based upon the SALP Board assessment, each functional area evaluated is classified into one of three performance categories. The definition of these performance categories is:

Category 1. Reduced NRC attention may be appropriate. Licensee management attention and involvement are aggressive and oriented toward nuclear safety; licensee resources are ample and effectively used such that a high level of performance with respect to operational safety or construction is being achieved.

Category 2. NRC attention should be maintained at normal levels. Licensee management attention and involvement are evident and are concerned with nuclear safety; licensee resources are adequate and are reasonably effective such that satisfactory performance with respect to operational safety or construction is being achieved.

Category 3. Both NRC and licensee attention should be increased. Licensee management attention or involvement is acceptable and considers nuclear safety, but weaknesses are evident; licensee resources appear to be strained or not effectively used such that minimally satisfactory performance with respect to operational safety or construction is being achieved.

III. SUMMARY OF RESULTS

<u>Functional Area Assessment</u>	<u>Category 1</u>	<u>Category 2</u>	<u>Category 3</u>
1. Soils and Foundations		Not Rated ¹	
2. Containment and Other Safety-Related Structures		Not Rated ²	
3. Piping Systems and Supports		Not Rated ²	
4. Safety-Related Components		Not Rated ³	
5. Support Systems		Not Rated ²	
6. Electrical Power Supply and Distribution		Not Rated ²	
7. Instrumentation and Control Systems		Not Rated ²	
8. Licensing Activities		X	
9. Radiological Controls		X	
10. Emergency Preparedness		X	
11. Security and Safeguards		X	
12. Quality Assurance			X
13. Quality Confirmation Program		X	

- Notes: ¹ No licensee or NRC activities performed in this area; therefore, there was no basis for a rating.
- ² Investigation results revealed significant problems in these areas. Areas were not individually rated. Instead, identified problems were considered in arriving at the rating of functional area 12. This approach was taken to highlight the underlying cause (widespread Quality Assurance Program breakdown) of the problems in these areas.
- ³ Insufficient inspection activity to form a basis for a rating.

IV. PERFORMANCE ANALYSES

1. Soils and Foundations

The licensee is not rated in this area. No inspections were performed in this area during this assessment period. All major work in this area has been completed.

2. Containment and Other Safety-Related Structures

a. Analysis

Construction work during this assessment period included primary containment structural modifications, TMI modifications, and implementation of other engineering change requests. One NRC inspection was conducted during this assessment period prior to April 8, 1981, and included inspection of welding and QC activities related to embeds in the floor and walls of the suppression pool. No non-compliances were identified during this inspection. In addition, an NRC investigation was conducted which looked at some activities in this functional area. An overall breakdown in the implementation of the licensee's Quality Assurance Program was identified during the investigation (see Section IV.12). As a result of this breakdown, the NRC issued an Immediate Action Letter on April 8, 1981, specifying the requirements for ongoing and future construction work. In addition, the licensee was required to perform a Quality Confirmation Program (QCP) to ensure that previously completed work was in accordance with specifications and requirements.

Most NRC inspection activities have focused on implementation of the IAL (discussed in Section IV.12) and the QCP (discussed in Section IV.13). No inspection activity has specifically addressed this area since April 8, 1981.

b. Conclusion

The licensee is not rated in this area. No specific inspections of this area have been made since issuance of the IAL.

c. Board Recommendations

Licensee activities in this area are inspected as part of the followup of the April 8, 1981, IAL and Quality Confirmation Program.

3. Piping Systems and Supports

a. Analysis

Construction work during this assessment period included post-TMI modifications, extensive redesign and modification of piping system hangers and supports, punchlist item

completion, and implementation of other engineering change requests. Three NRC inspections were conducted during this assessment period prior to April 8, 1981, and included inspection of Safety Relief Valve and downcomer bracing in the suppression pool; safety-related hangers, restraints, snubbers, and related QA/QC program provisions; and the safety-related suspension system design and construction program for the Control Rod Drive (CRD) system. Nine items of noncompliance relating to the program for design and installation of the CRD system supports were identified as follows:

- (1) Severity Level IV, 10 CFR 50, Appendix B, Criterion III: Sargent and Lundy specification did not provide design and acceptance criteria, design methods, and design interface. (358/80-25-01)
- (2) Severity Level IV, 10 CFR 50, Appendix B, Criteria I and II: Reactor Controls Incorporated (RCI) Quality Assurance Manual did not identify and describe organizational interfaces and personnel authorities and responsibilities. (358/80-25-02)
- (3) Severity Level IV, 10 CFR 50, Appendix B, Criterion V: There were incomplete procedures, instructions, and drawings for installing the CRD suspension system. (358/80-25-03)
- (4) Severity Level IV, 10 CFR 50, Appendix B, Criterion X: RCI QC procedures and records of the CRD suspension system were inadequate. The inadequate QC inspection of safety-related suspension systems was a previous non-compliance; however, the licensee's corrective action was not extended to the CRD system. (358/80-25-04)
- (5) Severity Level IV, 10 CFR 50, Appendix B, Criterion IX: There was no authorized ASME code welding procedure for work involving Unistrut P-1000 supports and restraints. (358/80-25-05)
- (6) Severity Level IV, 10 CFR 50, Appendix B, Criterion XVI: Corrective action system related to safety-related suspension design and installation was inadequate. (358/80-25-07)
- (7) Severity Level IV, 10 CFR 50, Appendix B, Criterion XV: Voiding of Nonconformance Reports (NRs) by issuing design document changes was not in accordance with Kaiser procedural requirements, and was a repeat of a similar noncompliance. (358/80-25-09)
- (8) Severity Level V, 10 CFR 50, Appendix B, Criterion V: Voiding of NRs by the Kaiser QC Manager was not in

accordance with Kaiser procedural requirements.
(358/80-25-08)

- (9) Severity Level V, 10 CFR 50, Appendix B, Criterion XVIII:
There was inadequate auditing of RCI's activities in the
area of the CRD suspension system. (358/80-25-06)

As a result of these identified noncompliances, an Immediate Action Letter was issued on December 24, 1980, confirming a licensee Stop Work Order regarding RCI work activities. Specifics of this IAL are described in Section V.F.3 of this report. An enforcement conference was held with the licensee on January 28, 1981. At that time, the NRC stated that the licensee's Quality Assurance Program relating to the design and installation of the CRD system was not effective. The licensee's corporate management confirmed its intent to correct all matters responsibly and comprehensively and to upgrade their Quality Assurance Program.

In addition to the above noncompliances, two deviations from licensee corrective action commitments in the response to a notice of violation were identified as follows:

- (1) DDC No. M-10744 was not followed up with written request for approval. (358/80-22-01)
- (2) Sargent and Lundy did not provide appropriate design guidance on installing shims on excessive restraint gaps. (358/80-22-02)

Failure of the licensee to meet commitments is also discussed in Section IV.12 of this report.

In addition to inspection activities, the major ongoing NRC investigation looked at activities in this area. The investigation revealed further evidence of the significant breakdown in the implementation of the licensee's overall Quality Assurance Program.

As a result of this breakdown, the NRC issued an IAL on April 8, 1981, specifying the requirements for ongoing construction work. In addition, the licensee was required to perform the QCP to ensure that previously completed work was in accordance with specifications and requirements. Since April 8, 1981, most NRC inspection activities have focused on implementation of the IAL and QCP. Two portions of inspections were performed in this area and included review of safety-related piping suspension system procedures, the upgraded piping suspension system installation and inspection program, and inspection of GE recirculation loop piping design control and snubber qualification test data. No items of noncompliance were identified; however, the inspection activities again identified a problem with

licensee commitments not being implemented in a timely manner. As noted above, failure to meet commitments is also discussed in Section IV.12 of this report.

b. Conclusion

The licensee is not rated in this area. The findings in this area were considered in rating functional area 12. This approach was taken to highlight the underlying cause (widespread Quality Assurance Program breakdown) of the problems in this area.

c. Board Recommendations

Licensee activities in this area are observed as part of the followup of the April 8, 1981 IAL and Quality Confirmation Program. Additional inspections should be performed in the area of piping system supports as a result of the extensive redesign.

4. Safety-Related Components

The licensee is not rated in this area. The one inspection performed in this area was of limited scope (leak detection from primary coolant system valves inside containment) and does not provide a sufficient basis for an overall rating. Investigation activities were also conducted in this area but no significant problems were identified. Licensee activities in this area are observed as part of the followup of the April 8, 1981 IAL and Quality Confirmation Program.

5. Support Systems

The licensee is not rated in this area. Licensee activities in this area are essentially complete. No inspections were specifically performed in this area; however, it was examined as part of the ongoing NRC investigation. Problems identified during the investigation are discussed in Section IV.12 of this report. This area is observed as part of the followup of the April 8, 1981 IAL and Quality Confirmation Program.

6. Electrical Power Supply and Distribution

The licensee is not rated in this area. No inspections were specifically performed in this area; however, it was examined as part of the ongoing NRC investigation. Problems identified are discussed in Section IV.12 of this report. This area is observed as part of the followup of the April 8, 1981 IAL and Quality Confirmation Program.

7. Instrumentation and Control Systems

The licensee is not rated in this area. The one inspection performed in this area was of limited scope (remote shutdown

capability) and does not provide a basis for an overall rating. Investigation activities were also conducted in this area, and deficiencies identified during the investigation are discussed in Section IV.12 of this report. Licensee activities in this functional area are observed as part of the followup of the April 8, 1981 IAL and Quality Confirmation Program.

8. Licensing Activities

a. Analysis

Zimmer management was involved in discussions with NRC staff on technical submittals. The licensee was cooperative and provided technically capable personnel to deal with the NRC on resolution of safety issues. When necessary, the licensee called on contractors (such as Sargent and Lundy for structural engineering) to support them.

The licensee was fairly responsive to NRC initiatives. While the licensee exhibited some resistance to changing positions with regard to air testing of valves, a satisfactory technical resolution of the issue was forthcoming. On other issues the licensee has been responsive and prompt.

The licensee's ability to analyze events with a risk assessment/systems overview approach was not satisfactory. Although such an activity has been planned for some time, the licensee has been unable to staff his engineering analysis group assigned this function.

The licensee's ability to staff certain lower level positions seems to be less than desired; however, upper management was strengthened with additional nuclear experience.

For non-operator staff, the licensee is comparable in their training and qualifications programs to other utilities at this stage of construction; however, the licensee ranks as one of the best in providing a very thorough program for training of operators.

b. Conclusion

The licensee is rated Category 2 in this area.

c. Board Recommendations

None.

9. Radiological Controls

a. Analysis

Two inspections of preoperational radiation protection, radioactive waste, environmental monitoring, and confirmatory

measurement programs were performed during this assessment period. They included examination of licensee training activities, radiation protection and chemistry procedures, completed radwaste and instrument tests, the respiratory protection program, environmental monitoring results, quality assurance and quality control of analytical measurements, and management controls. No items of noncompliance were noted. The licensee's records for sample collection have been developed. Data recovery for environmental samples has been satisfactory; however, documentation of air monitoring equipment calibration and maintenance has been poor. The licensee has agreed to improve their documentation program. Audits of the preoperational radiological environmental monitoring program were satisfactory. Sample comparisons and assessment of the licensee's QC performance of analytical measurements has been acceptable. The licensee continues to make reasonable progress towards completion of the preoperational program in this area.

b. Conclusion

The licensee is rated Category 2 in this area.

c. Board Recommendations

None.

10. Emergency Preparedness

a. Analysis

Three inspections or portions of inspections were performed during the assessment period and included observations of the licensee's practice emergency exercise and the full-scale graded emergency exercise. The Emergency Preparedness Implementation Appraisal (EPIA) has not been conducted and is currently scheduled for fall 1982. The licensee's overall performance in the full scale emergency exercise was satisfactory. Some areas of weakness in the licensee's emergency preparedness program were identified during the exercise, including training and coordination with the U.S. Coast Guard and the local Fire Department and additional training for onsite and offsite personnel involved in medical emergencies. These areas will be reviewed during the EPIA.

b. Conclusion

The licensee is rated Category 2 in this area.

c. Board Recommendations

None.

11. Security and Safeguards

a. Analysis

One security and one material control and accountability inspection was performed during this assessment period and included security for fuel receipt and storage, material control and accountability, facility organization and operation, shipping and receiving, storage and internal controls, inventory and inventory verification, records and reports, management of materials control systems, review of the Security Plan, security organization, physical barriers, access controls, communications, and response. In addition, five portions of inspections were performed by the resident inspectors and included fuel receipt and storage and internal controls. The security inspections were limited to the security provided for the fuel storage area. No items of noncompliance were noted during the inspections.

An investigation was conducted during this assessment period and addressed several allegations, two of which pertained to security for the fuel storage area; however, no noncompliances were noted in this area.

Licensee management involvement was evident in planning for the effective implementation of the security program required when fuel is loaded. Prior planning, assignment of priorities, and control of activities appeared adequate to address the major components for the security program. A schedule for acceptance testing of installed security related equipment has been prepared, required training has been identified, and actions to obtain a security force contractor have been implemented. Installation of the security equipment is closely monitored by the station security supervisor. The licensee's Security Plan, Safeguards Contingency Plan, and Guard Force Training and Qualification Plan have been approved by NRC Headquarters.

The current security force is well managed, adequately trained for its limited responsibilities, and closely supervised. Procedural guidance for the security force is in sufficient detail to assure personnel are knowledgeable of their responsibilities. Security staffing appears adequate for the current limited role of the security force, although staffing levels may have to be increased when the complete security program required by 10 CFR 73.55 is implemented.

b. Conclusion

The licensee is rated Category 2 in this area.

c. Board Recommendations

None.

12. Quality Assurance

a. Analysis

A major ongoing investigation into allegations made by a former QC inspector, the Government Accountability Project, and others resulted in the identification of a significant breakdown in the implementation of the licensee's Quality Assurance Program. In addition, twenty-three inspections or portions of inspections were conducted during this assessment period to evaluate compliance with licensee commitments contained in the Final Safety Analysis Report (FSAR), the Quality Assurance Manual, applicable codes and standards, and site procedures. As a result of the investigation and inspections, the following noncompliances with NRC requirements were identified:

- (1) Severity Level II, 10 CFR 50, Appendix B, Criterion II: Failure to adequately document and implement a Quality Assurance Program to comply with the requirements of 10 CFR 50, Appendix B as evidenced by the following examples (358/81-13-01):
 - (a) Criterion XV: Reports reviewed were not processed in accordance with procedural controls.
 - (b) Criterion XVI: Failure to take adequate corrective action. Unacceptable welds were not properly controlled. Failure to control design changes and nonconformances on structural beams. Licensee audits failed to determine the cause of the condition and to take corrective action to preclude repetition.
 - (c) Criterion VIII: Failure to maintain traceability of structural beams.
 - (d) Criterion XVIII: Failure to perform audits of the Sargent and Lundy nonconformance control program.
 - (e) Criterion XVII: Failure to document inspection results for Bristol Steel and Iron Works quality control inspections.
 - (f) Criterion VII: Procurement of essential structural materials from unapproved vendors.

- (g) Criterion V: Nonconforming items dispositioned in surveillance reports without proper design review. Failure to follow procedure for handling surveillance reports.
 - (h) Criterion XI: Insufficient shimming at the penetrameters for vendor supplied radiographs.
 - (i) Criterion X: Lack of QC inspection requirements to verify cable separation as cables rise from the cable spreading room to control room panels. Lack of inprocess and adequate final inspection of field and vendor fabricated hanger welds.
 - (j) Criterion III: Weld inspection criteria were deleted on weld inspection forms. Inadequate design control for electrical cable installations. Deviations from the AWS code. The design basis for cable ampacity deviated from the FSAR. Lack of design control measures to verify thermal loading of power sleeves and physical loading of cable trays. A program for control of design deviations identified by Sargent and Lundy engineers did not exist.
- (2) Severity Level III, 10 CFR 50, Appendix B, Criterion XVII: Reports reviewed were false and did not furnish evidence of activities affecting quality. (358/81-13-02)
 - (3) Severity Level III, 10 CFR 50, Appendix B, Criterion I: Lack of sufficient organizational freedom for QC inspectors as a result of harassment and intimidation. (358/81-13-38)
 - (4) Severity Level IV, 10 CFR 50, Appendix B, Criterion XVI: Failure to identify and correct procedural nonconformances related to system turnover. (358/81-18-01)
 - (5) Severity Level V, 10 CFR 50, Appendix B, Criterion XI: Preoperational test activities were not controlled in accordance with administrative procedures. (358/81-01-02)
 - (6) Severity Level V, 10 CFR 50, Appendix B, Criterion IX: Unacceptable radiographic techniques and discrepancies in Kaiser Radiographic Reports were observed. (358/81-03-01)
 - (7) Severity Level V, 10 CFR 50, Appendix B, Criterion III: Inadequate control of design changes. (358/81-07-07)
 - (8) Severity Level V, 10 CFR 50, Appendix B, Criterion V: Preoperational test OP-RD-02 performance deviated from procedural requirements. (358/81-08-01)

- (9) Severity Level V, 10 CFR 50, Appendix B, Criterion XI:
Lack of program to perform periodic calibrations of essential test equipment. (358/81-08-03)
- (10) Severity Level V, 10 CFR 50, Appendix B, Criterion IX:
Failure to use proper technique for shimming and spacing of penetrameters for ASME code radiographs. (358/81-21-01)
- (11) Severity Level VI, 10 CFR 50, Appendix B, Criterion XVI:
Inadequate corrective action taken on licensee Field Audit Report No. 307. (358/80-26-02)
- (12) Severity Level VI, 10 CFR 50, Appendix B, Criterion VII:
Measurement and test equipment calibrations procured from an unapproved vendor. (358/81-06-07)
- (13) Severity Level VI, 10 CFR 50, Appendix B, Criterion V:
Failure to follow preoperational test program administrative procedures. (358/81-15-09)

Most of the above noncompliances had been identified prior to an NRC meeting with the licensee on March 31, 1981, which was held to discuss actions necessary to control ongoing and future work. These actions were documented in an Immediate Action Letter (IAL) to the licensee on April 8, 1981 (see Section V.F.3) and included augmented QA/QC staffing, upgraded procedures, improved training of QC inspectors, 100% reinspection by the licensee of future contractor QC inspections, and other QC and QA program improvements. These required actions were subsequently implemented by the licensee.

On July 30, 1981, the NRC requested that the licensee address the management actions taken to improve the effectiveness of the Quality Assurance Program implementation with regard to the following: qualifications of audit personnel; timeliness of audit responses from participating organizations; tracking implementation and verification of corrective actions; and methods to ensure the underlying cause of the deficiency has been identified and corrected to preclude repetition.

As stated earlier in this report (Sections IV.2 through IV.7), NRC inspection activities onsite since the start of the licensee's program to implement the April 8, 1981, IAL have consisted of continuing investigation activities, monitoring the performance of specific tasks under the IAL, and monitoring the implementation of the licensee's Quality Confirmation Program (QCP). Limited routine inspections were conducted. Recent findings from the continuing assessment of the improved Quality Assurance Program have identified some weaknesses in the licensee's organization and in program implementation. Five items of noncompliance related to two of these areas of weakness were identified as follows:

- (14) Severity Level IV, 10 CFR 50, Appendix B, Criterion I:
Failure to clearly establish and document the authorities and duties of all QA Department personnel. (358/82-01-01)
- (15) Severity Level IV, 10 CFR 50, Appendix B, Criterion II:
Failure to provide adequate certification of qualifications for all QA Department personnel. (358/82-01-03)
- (16) Severity Level V, 10 CFR 50, Appendix B, Criterion V:
Failure of procedures to adequately address the quality requirements concerning activities which had been performed. (358/82-01-04)
- (17) Severity Level V, 10 CFR 50, Appendix B, Criterion V:
Failure to have adequate procedures for control of Corrective Action Reports. (358/82-05-01)
- (18) Severity Level V, 10 CFR 50, Appendix B, Criterion V:
Failure to follow procedural requirements for review of activities for reportability under 10 CFR 50.55(e) and 10 CFR 21. (358/82-05-06)

Subsequent management discussions were held to ensure timely corrective actions, especially concerning the establishment of clearly documented personnel qualifications and the apparent QA inspection procedure inadequacies. Items 14 and 15 above relate to management failure to clearly delineate authorities and responsibilities of personnel performing quality functions and to adequately verify the capabilities and qualifications of those personnel prior to their performance of quality-related activities. Item 15 above was previously brought to the attention of the licensee as an unresolved item. These two items may have directly contributed to the procedural inadequacies identified in items 16, 17, and 18 above.

During the assessment period, the NRC noted that several commitments made by the licensee were not fully met (see Region III Inspection Report No. 50-358/81-17). One example related to the dispositioning of Nonconformance Reports by issuing DDCs. Another example related to the 100% installation verification of welding and anchor bolts. These are two examples of commitments made by the licensee which were not met. Additional examples which were the subject of deviations are identified in Section IV.3.a. of this report.

The failure to follow procedures for reportability under 10 CFR 50.55(e) and the failure to impose these reporting requirements on contractors resulted from inadequate management attention to this area. The administrative controls in this area were not adequate to ensure the timely identification, evaluation, documentation, and reporting of matters per 10 CFR 50.55(e). Evidence of this was the late reporting of some matters and failure to identify others. Further

evidence is the fact that several recent reports relate to problems that occurred some time ago.

Several management meetings were held throughout this SALP period to resolve the above described noncompliances and ensure that the licensee developed adequate and timely corrective actions. Toward the end of the assessment period, the licensee appeared to exhibit a better understanding of the issues and responded to correct the identified deficiencies.

Recent observations have revealed an improved system for control and tracking of commitments, audit findings, and corrective action items; an increased management awareness of and involvement in assuring quality of ongoing work; and a substantially increased commitment in the form of resources and manpower for QA functions. These and other actions implemented as part of the licensee's program to implement the April 8, 1981 IAL have resulted in a substantial increase in awareness of quality requirements and in the licensee's ability to identify and correct quality problems.

b. Conclusion

The licensee is rated Category 3 in this area when the entire assessment period is considered.

With regard to licensee activities during this SALP period prior to April 8, 1981, the licensee is rated below Category 3, since the minimum NRC requirements were not met. This unacceptable performance is evidenced by the number and significance of findings identified by the investigation.

With regard to licensee activities after April 8, 1981, the licensee marginally met the performance standard for a Category 2. Although significant improvements have been noted since April 8, 1981, the licensee's performance is considered a marginal Category 2 because of the significance of the Quality Assurance Program deficiencies identified. These deficiencies related to the qualification and certification of personnel; identification, evaluation, documentation, and reporting of construction deficiencies; and timely completion of commitments.

c. Board Recommendations

The Board recommends that the NRC continue the assessment of the licensee's Quality Assurance Program and monitor the implementation of this program as defined in the IAL of April 8, 1981. The Board recommends that the licensee focus attention on the implementation of the Quality Assurance Program including the ability to identify and resolve deficiencies, both from hardware and programmatic standpoints.

13. Quality Confirmation Program (QCP)

a. Analysis

As a result of findings made during the ongoing NRC investigation that identified a widespread breakdown in the licensee's Quality Assurance Program for construction, concerns were identified regarding the quality of work already completed. The licensee was required to implement a program to confirm the quality of construction of the plant and to ensure that any deficiencies are properly addressed through engineering evaluation, analysis, or rework. This Quality Confirmation Program (QCP) was submitted to the NRC by letter QA-1476 dated August 21, 1981. The scope of the Quality Confirmation Program is flexible and may change as new concerns are identified. The NRC will review the completion of the QCP to ensure that the William H. Zimmer Nuclear Power Station complies with applicable codes, standards, and FSAR commitments.

The Quality Confirmation Program presently consists of eleven specific tasks as follows:

- I. Structural Steel
- II. Weld Quality
- III. Heat Number Traceability
- IV. Socket Weld Fitup
- V. Radiography
- VI. Cable Separation
- VII. Nonconformances
- VIII. Design Control
- IX. Design Document Changes
- X. Subcontractor Quality Assurance Programs
- XI. Audits

NRC monitoring of activities in this functional area consisted of portions of seven inspections to evaluate the licensee's implementation of the eleven Quality Confirmation Program tasks. The majority of NRC inspection activities in this area were concentrated in Tasks I, II, III, V, and VII. Although some problems have been encountered in program administration, quality of procedure reviews, training of visual weld inspectors, and interfaces with the prime contractor's organization; NRC inspection activities have not identified any significant concerns. The recent QCP management changes provide more experienced, effective control of the program. The independent audit of the QCP performed by a contractor in February 1982 at the request of the licensee is a positive licensee action as is the direct overview of the QCP by upper management.

b. Conclusion

The licensee is rated Category 2 in this area.

c. Board Recommendations

The Board recommends that the NRC continue monitoring all of the Quality Confirmation Program tasks. In addition, independent verification actions should be considered to verify compliance with applicable code requirements.

V. SUPPORTING DATA AND SUMMARIES

A. Noncompliance Data

Facility Name: William H. Zimmer Nuclear Power Station Docket No. 50-358
 Inspections No. 80-22 through No. 80-27
 No. 81-01 through No. 81-32
 No. 82-01 through No. 82-05

<u>Functional Areas</u>	<u>Noncompliances and Deviations Severity Levels</u>							
	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	<u>VI</u>	<u>Dev.</u>	
1. Soils and Foundations								
2. Containment and Other Safety-Related Structures ¹								
3. Piping Systems and Supports ¹				7	2		2	
4. Safety-Related Components								
5. Support Systems ¹								
6. Electrical Power Supply and Distribution ¹								
7. Instrumentation and Control Systems ¹								
8. Licensing Activities								
9. Radiological Controls								
10. Emergency Preparedness								
11. Security and Safeguards								
12. Quality Assurance		1	2	3	9	3		
13. Quality Confirmation Program								
TOTALS		0	1	2	10	11	3	2

¹ Noncompliances in these functional areas are part of the Severity Level II violation assigned to Quality Assurance.

B. Licensee Report Data

1. Construction Deficiency Reports (CDR)

During this SALP period the licensee submitted twenty CDRs under the requirements of 10 CFR 50.55(e). Of the twenty reports submitted, four were later retracted. Nine of the reports involved deficiencies at suppliers that were not under direct control of licensee personnel, with five of these also submitted by the suppliers under the requirements of 10 CFR 21. The licensee uses 10 CFR 50.55(e) reports for any Part 21 reports received. The following is a list of CDRs submitted:

- (a) Sixty two essential pressure boundary thermowells were installed in code piping where traceability to certified material test reports was not available on site.
- (b) Failure of five Gould, Inc. Type J-13 auxiliary relays.
- (c) Thirteen ITT General Controls actuators supplied were not seismically qualified. (Part 21 report)
- (d) Seismic qualification of 24 four-inch gate valves furnished by William Powell Company is questionable.
- (e) One inch diameter HILTI Kwik-Bolt Anchors may not carry designed loads. (Part 21 report)
- (f) Failure of welds and concrete at the sheet pile and whaler connection of the intake flume to the service water pump structure.
- (g) Tube failures in the fuel pool heat exchangers. (Retracted)
- (h) Environmental discrepancies between the FSAR and GE Catalog information for the LPRM incore power range sensor electrical connector. (Retracted)
- (i) Galling of the discs and seat rings in 6 Powell Company Gate Valves.
- (j) QA Program deficiencies have been identified that may have allowed potentially significant conditions, adverse to quality, to go undetected.
- (k) Unqualified welding procedure for welds greater than 0.864 inch regarding installation of hanger lug attachments. (A Stop Work Order was also issued).
- (l) Bobbins made of lexan used in GE type HFA relays have been subject to cracking, resulting in occasional broken bobbins and inoperability of the relay.

- (m) Anderson Greenwood and Company half inch instrument air line globe valves were marked with the flow arrow in the wrong direction. (Retracted)
- (n) Undersized wiring utilized in 480 Volt motor control center.
- (o) Rockbestos coaxial cable may short out when exposed to continuous temperatures above 230°F. (Part 21 report)
- (p) Valve opening hydraulic transient loads may subject piping and suspension system to stresses which could result in the degradation of Control Rod Drive system reliability. (Part 21 report)
- (q) Some Crosby Solenoid actuated safety relief valves fail to operate at the minimum allowable supply voltage at design temperatures. (Part 21 report)
- (r) Unauthorized stamping of fittings.
- (s) ASME structural weld and welder qualifications were not met by welders qualified using H. J. Kaiser Procedure No. SPPM 3.1.51.
- (t) Welders not qualified for thickness range requirements per ASME requirements. (Retracted)

2. Part 21 Reports

For deficiencies reportable under Part 21, the required information is provided in the 50.55(e) report. Five Part 21 reports as identified above were issued by the licensee's suppliers and contractors were addressed in CDRs issued by the licensee.

C. Licensee Activities

The percentage of construction that has been completed, as reported by the licensee, remained nearly constant during this assessment period, with the status at the close of this period being approximately 97% complete. Construction activities during the assessment period included major emphasis on primary containment structural modifications, extensive redesign and modification of piping system hangers and supports, punchlist item completion, TMI modifications, installation of seismic columns for concrete block walls, and implementation of other engineering change requests. Some limited preoperational testing activities were completed. Construction activities were severely limited with the issuance of the April 8, 1981 IAL, until the licensee and contractors had instituted required corrective measures. The licensee's implementation of IAL requirements and the Quality Confirmation Program were subsequently initiated. Quality

Assurance activities have included major changes in personnel, including the addition of a Vice President for Nuclear Operations and the replacement of the Manager of Quality Assurance. In addition, the QA Department staff was substantially increased.

D. Inspection Activities

The team inspections and team reviews conducted at the Zimmer site during this SALP period consisted of three Region III team inspections and six NRR team reviews. The NRR team reviews were conducted as part of the NRR precicensing safety evaluation, and the results of these reviews were documented in the SER, NUREG-0528 with Supplements 1 and 2, which was issued during the evaluation period. The chronological listing of these activities is as follows:

1. Region III Team Inspections

	<u>DATES</u>	<u>REPORT NO.</u>	<u>INSPECTION SUBJECT</u>
(a)	08/29-28/81 09/01-23/81 10/05/81 11/02-05/81 11/16/81	50-358/81-27	Independent verification of construction activities, including NDE examination of welds and adjacent base materials, safety-related structural welds, framing members, and hanger beams
(b)	11/16-19/81	50-358/81-30	Emergency Response Exercise
(c)	11/02-05/81 01/18-22/82 01/25-28/82 02/10-12/82 02/16-18/82	50-358/82-01	Followup of the IAL dated April 8, 1981, and the QCP

2. NRR Team Reviews

	<u>DATES</u>	<u>REVIEW SUBJECT</u>
(a)	02/23-27/81	Control Room Design
(b)	02/24-25/81	Caseload Forecast Panel
(c)	03/16-20/81	Management Structure and Technical Resources
(d)	03/26/81	Emergency Operating Procedures Test
(e)	06/02-05/81	Equipment Environmental Qualifications
(f)	07/14-15/81	Inservice Testing Program

In addition to the above, a subcommittee of the Advisory Committee on Reactor Safeguards met in Cincinnati, Ohio, on February 18, 1982, to review the Quality Assurance problems at Zimmer.

E. Investigation and Allegations Review

The NRC conducted an extensive investigation of alleged construction problems at Zimmer during this SALP period. The investigation covered allegations made to the NRC by a former contractor quality control inspector at Zimmer; allegations provided to the NRC by Mr. Thomas Applegate through the Government Accountability Project, a Washington, D.C. public interest group; information supplied by other present and former site contractor employees during the investigation; and items identified by NRC personnel during the course of the investigation. Although the investigation is continuing, Investigation Report No. 50-358/81-13 was issued on November 24, 1981, because the major issues had been developed, the required corrective actions had been defined, and in recognition of the public interest in this matter. This report covered the period January 12 to October 9, 1981.

The investigation identified a widespread breakdown in the licensee's QA program for construction of the facility. The breakdown resulted from the licensee's failure to exercise adequate oversight and control of its principal contractors in the area of Quality Assurance.

The majority of problems were identified early in the investigation and focused on the ineffectiveness of controls implemented by the licensee and its contractors for assuring the quality of work performed. As a result, three items of noncompliance with numerous examples were identified as follows:

- (1) Numerous examples of failure to implement an adequate QA program (\$100,000 Civil Penalty)
- (2) Harassment and intimidation of quality control personnel (\$50,000 Civil Penalty)
- (3) False quality assurance documents (\$50,000 Civil Penalty)

On April 8, 1981, an Immediate Action Letter was issued which required the licensee to substantially upgrade its Quality Assurance Program in order for construction work to continue. In addition, the NRC has required the licensee to implement a comprehensive Quality Confirmation Program to determine the quality of completed work.

F. Escalated Enforcement Actions

1. Orders

None were issued.

2. Civil Penalty

On November 24, 1981, a proposed \$200,000 Civil Penalty was issued by the NRC as a result of an investigation pertaining to the widespread breakdown in the licensee's overall Quality Assurance Program. The licensee paid the Civil Penalty. Three items of noncompliance were identified involving examples of failure to follow 12 of the 18 criteria of Appendix B to 10 CFR 50, false QA records, and harassment and intimidation of QC inspectors. The amount of Civil Penalty for each noncompliance is shown in Section V.E of this report. These noncompliances were identified in Investigation Report No. 50-358/81-13, which covers the period January 12 through October 9, 1981.

3. Immediate Action Letters (IAL)

- (a) On December 24, 1980, an Immediate Action Letter (IAL) was issued confirming the licensee's Stop Work Order regarding work activities by Reactor Controls, Incorporated (RCI). The IAL specified that a verification of the adequacy of work performed by RCI be conducted and that no further work would be conducted by RCI until the NRC determined that all corrective actions were satisfactorily completed.
- (b) On April 8, 1981, an Immediate Action Letter (IAL) was issued documenting corrective measures to be taken by the licensee to control ongoing and future construction work. The IAL resulted from the identification of QA problems found during the NRC investigation. The IAL specified the following actions to be taken:
- (1) Increase the size and technical expertise of the licensee's QA/organization.
 - (2) Assure independence and separation of the QA/QC function performed by Kaiser from the construction function.
 - (3) Conduct 100% reinspection of QC inspections conducted by Kaiser and other contractors after April 8, 1981. This will continue until item (10) below is implemented and NRC releases this requirement.
 - (4) All QC inspection procedures will be reviewed and revised by qualified design engineers and QA personnel independent of the construction organization.
 - (5) QA/QC personnel will receive training on any new procedures and practices resulting from actions taken to fulfill provisions of the IAL, and refresher training will be given prior to June 1, 1981.

- (6) The procedures governing deviations from Codes and FSAR statements will be reviewed and revised to require the licensee to review and approve the resolution of any such deviations.
- (7) The procedures governing nonconformance reporting will be reviewed for adequacy and the disposition of each nonconformance report together with appropriate justification will be documented.
- (8) Review and alteration of existing QA and QC records has been stopped. These records will be controlled by the licensee until a program defining records control, usage, and adequacy has been prepared by the licensee and agreed to by the NRC.
- (9) The licensee will perform a 100% review of all surveillance and nonconformance reports written by contractor personnel after April 8, 1981, until the NRC releases this requirement.
- (10) The existing licensee audit program will be reviewed and revised to include technical audits of construction work and more comprehensive and effective programmatic audits.

G. Management Conferences

1. December 16, 1980, at Cincinnati, Ohio: Meeting held to discuss the initial SALP Program.
2. January 28, 1981, at Glen Ellyn, Illinois: Enforcement Conference held following an inspection of the design and installation of the Control Rod Drive system to discuss deficiencies identified.
3. March 31, 1981, at Glen Ellyn, Illinois: Meeting held to discuss the concerns identified during the ongoing investigation at the Zimmer site. The NRC's concerns relating to ongoing construction related activities were documented in an Immediate Action Letter issued on April 8, 1981, describing the licensee's corrective measures.
4. April 10, 1981, at Glen Ellyn, Illinois: Enforcement Conference held to discuss the licensee's proposed corrective action program for deficiencies identified to date in the current NRC investigation and the measures to be taken to assure acceptable quality of future activities.
5. April 30, 1981, at Glen Ellyn, Illinois: Meeting held to discuss corrective actions to be taken relative to unacceptable radiographic technique used by Pullman, the measures to be taken to assure acceptable quality of future

activities, and the licensee's proposed Quality Confirmation Program (QCP).

6. June 21, 1981, at Moscow, Ohio and June 3, 1981, at Cincinnati, Ohio: Meeting held to discuss the proposed program to confirm the quality of completed construction work, establishing controls to assure the quality of ongoing and future work, and other related topics.
7. June 29, 1981, at Moscow, Ohio: Meeting held to discuss corrective actions to be taken relative to unacceptable radiographic technique used by Pullman.
8. August 5, 1981, at Glen Ellyn, Illinois: Enforcement Conference held to discuss the findings of the ongoing NRC investigation, possible enforcement action, method of releasing the report, the licensee's Quality Confirmation Program, NRC's followup of the IAL and QCP if additional problems are identified, justification for performing less than 100% inspection, and licensee organization changes.
9. August 19, 1981, at Glen Ellyn, Illinois: Meeting held to discuss the licensee's plans to bring in an experienced nuclear maintenance contractor to perform selected work. The licensee described their proposed QA and management controls and requested partial relief for this maintenance contractor from the 100% reinspection of all QC inspections performed by contractors required by the April 8, 1981, Immediate Action Letter. Relief was granted for this specific contractor.
10. November 16, 1981, at Glen Ellyn, Illinois: Meeting held following an independent verification inspection to discuss the findings of the independent verification program and the status of the Quality Confirmation Program.
11. February 9, 1982, at Glen Ellyn, Illinois: Meeting held to discuss the status of the Quality Confirmation Program, the Immediate Action Letter items, the Preoperational Test Program, and other general items.
12. February 12, 1982, at Moscow, Ohio: Meeting held to discuss recent inspection findings regarding the establishment of clearly documented personnel qualifications and the apparent QA inspection procedures inadequacies.