

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

REGION III

Reports No. 50-329/81-12; 50-330/81-12

Docket Nos. 50-329; 50-330

Licenses No. CPPR-81; CPPR-82

Licensee: Consumers Power Company
1945 West Parnall Road
Jackson, MI 49201

Facility Name: Midland Nuclear Plant, Units 1 and 2

Inspection At: Midland Site, Midland, MI

Inspection Conducted: May 18-22, 1981

Inspectors: *C. C. Williams*
C. C. Williams, Team Leader

7-10-81

R. C. Knop for
R. J. Cook

7-10-81

R. J. Spessard
E. J. Gallagher
(IE Headquarters) *for*

7/10/81

C. C. Williams for
R. N. Gardner

7-10-81

R. C. Knop for
C. E. Jones

7-10-81

R. B. Landsman
R. B. Landsman

7-10-81

C. C. Williams for
R. S. Love

7-10-81

E. R. Schweibinz
E. R. Schweibinz

7-10-81

R. L. Spessard
I. T. Yin *for*

7/10/81

Other Accompanying Personnel: J. G. Keppler (May 21-22, 1981)

R. C. Knop (May 21-22, 1981)

C. C. Williams

Approved By: C. C. Williams, Chief
Plant Systems Section

7-10-81

Inspection Summary

Inspection on May 18-22, 1981 (Reports No. 50-329/81-12; 50-330/81-12)

Areas Inspected: Recent changes in the Quality Assurance Program and Organization, announced March 13, 1981, and verify that these changes are in place and adequate. Verify adequate and effective management involvement in the implementation of the site QA Program relative to its status, problem solving and resources support. Review and assess QA implementation at the site concerning civil-soils, electrical, instrumentation, piping and piping support systems activities. This inspection effort involved a total of 480 inspector-hours by nine NRC inspectors.

Results: Of the 18 areas inspected, no apparent items of noncompliance or deviations were identified in 10 areas; eight apparent items of non-compliance were identified in eight areas. (Failure to take adequate corrective action in that the licensee did not adequately implement the trend analysis procedure - Section 3, Paragraphs 2 and 3; failure to identify during inspection, that a nonconforming condition with regard to minimum installed cable bend radius, existed (Unit 2 only) - Section 4, Paragraph 1; failure to take proper corrective action with regard to the lack of approved procedures for the rework of items that had been accepted by QC - Section 4, Paragraph 3; failure to install large bore pipe restraints, supports, and anchors in accordance with design drawings and specifications - Section 5, Paragraph 2; failure of QC inspectors to reject large bore pipe restraints, supports and anchors that were not installed in accordance with design drawings and specifications - Section 5, Paragraph 2; failure to prepare, review and approve small bore pipe and piping suspension system designs performed on site in accordance with design control procedures - Section 5, Paragraph 3.a; failure to adequately control documents used in site small bore piping design activities - Section 5, Paragraph 3.b.; failure of audits to include a detailed review of system stress analysis and to followup on previously identified hanger calculation problems - Section 5, Paragraph 4.)

DETAILS

Persons Contacted

Consumers Power Company

- *D. B. Miller, Site Manager
- *J. W. Cook, Vice President, RE&C
- *G. S. Keeley, Project Manager
- *J. Wood, Section Head, QAS
- *D. R. Keating, Section Head, IE&TV
- *H. P. Leonard, Section Head, QAE
- *K. E. Marbaugh, Operations Quality Assurance Superintendent
- *R. E. McCue, Technical Superintendent
- *N. Ramanujam, Senior Geotechnical Engineer
- *T. C. Cooke, Project Superintendent
- *D. E. Horn, Civil Group Supervisor, QAE
- *G. B. Slade, Assistant Site Manager
- *D. W. Turnbull, MPQA, Site Superintendent
- *L. R. Howell, MPQA
- *M. J. Schaeffer, MPQAD, Electrical Engineer, Supervisor
- *W. R. Bird, MPQAD, Manager
- *E. Jones, Electrical Group Supervisor, IE&TV, MPQAD
 - S. Love, Sub Contracts Engineer
 - R. Whitaker, QA Engineering Supervisor
 - R. Sevo, MPQA
 - J. Decker, NDE/Welding Supervisor, MPQAD

Bechtel Power Corporation

- *J. A. Rutgers, Project Manager
- *A. J. Boos, Assistant Project Manager
- *W. D. Greenwell, AAPD Manager of Quality Assurance
- *M. A. Dietrich, PQAE
- *L. H. Curtis, Project Engineer
- *L. A. Driesbach, Assistant to the Project Manager
- *D. L. Daniels, Chief Construction Quality Control Engineer
- *E. Smith, PFQCE
- *L. Davis, Site Manager
 - L. Snyder, Resident Quality Engineer
 - E. Urbanawiz, QC Engineer
 - F. Almeida, Small Bore Resident Piping Design Engineer
 - R. Myers, Large Bore Resident Piping Design Engineer
 - F. G. Young, Small Pipe and Hanger Group Supervisor
 - W. J. Creel, Senior QC Engineer
 - P. Corcoran, Resident Assistant Project Engineer
 - A. McClure, Quality Assurance Engineer
 - J. Hockwater, Civil Resident Engineer
 - T. K. Subramanian, QA Program Engineer
 - C. Webb, Tech Aid Corporation Assigned to Bechtel Project Resident Engineer

Babcock and Wilcox Construction Company

T. Davis, Acting Supervisor
W. Linn, Field Engineer

U.S. Nuclear Regulatory Commission (RIII)

*J. G. Keppler, Director Region III
*R. C. Knop, Chief, Projects Branch 1
*C. C. Williams, Chief, Plant Systems Section
*R. J. Cook, Resident Inspector
*E. J. Gallagher, Reactor Inspector
*R. N. Gardner, Reactor Inspector
*C. E. Jones, Reactor Inspector
*R. B. Landsman, Reactor Inspector
*R. S. Love, Reactor Inspector
*E. R. Schweibinz, Reactor Inspector
*I. T. Yin, Reactor Inspector

IL & B (CPCo)

*R. Zamarin, Attorney
*A. Farnell, Attorney

*Denotes those present at the exit meeting on May 22, 1981.

The inspectors also contacted and interviewed other licensee and contractor personnel.

1. Licensee Action on Previous Inspection Findings

- a. (Closed) Noncompliance Item (50-329/78-03-03; 50-330/78-03-03):
Erroneous Quality Control inspections of welds in the lower cable spreading room. The licensee stated that a reinspection of affected welds was performed with the results documented on NCR 1287, NCR 1306 and MCAR-1 (Report No. 23). During a subsequent NRC inspection, welds in the lower cable spreading room were selectively reinspected and found to be acceptable. The inspectors verified that the aforementioned NCR's and MCAR are closed. This item is closed.
- b. (Closed) Noncompliance Items (50-329/78-20-01 through 78-20-10; 50-330/78-20-01 through 78-20-10): Findings made during soil settlement investigation. These items have been closed based on CPCo response to the 50.54(f) questions 1 and 23. Items associated with these findings have been reviewed and documented in NRC Report No. 50-329/80-32; 50-330/80-33. These items are closed.
- c. (Closed) Unresolved Item (50-329/79-12-02; 50-330/79-12-02):
Qualifications of Field Engineers with regard to the authorization of design change work activities. Specification G34(Q), "General Specification for Change Notices" was revised to clarify

the criteria for writing change notices. Inter-Office Memo (IOM) O-2707 was issued to document and reiterate the recommended training in the proper use of Specification G34(Q). Resident Engineers have been assigned to the Field Engineering Office to provide closer supervision on proposed design changes. This item is closed.

d. (Closed) Unresolved Item (50-329/79-25-01; 50-330/79-25-01): Cable separation violations in Motor Control Centers (MCC) OB65 and OB66. Nonconformance Report No. 2765 was closed on May 12, 1980 and Bechtel Quality Action Request No. SD-293 was closed on May 14, 1980. These two documents pertained to the cable separation violations in the two MCC's. The inspector observed that the cable separation in the aforementioned MCC's conformed to the requirements of Bechtel drawing E47(Q). This item is closed.

e. (Closed) Noncompliance Item (50-329/80-01-01; 50-330/80-01-01): Failure to have test procedures for soils work activities. The inspector reviewed QCP-10, Revision 1, dated March 16, 1981 and determined the following:

(1) With respect to the first issue, Section 4.1 states that the vibrator control shall be at maximum control dial setting. However, the procedure should state to determine at what setting gives maximum density for each soil type to be used. The licensee agreed to revise this section accordingly.

(2) With respect to the second issue, the inspector reviewed laboratory gradation data performed on material tested before and after compaction and determined that the change in gradation is insignificant.

(3) With respect to the third issue, the inspector reviewed SCN 7220-C-211(Q) - 11002 dated May 12, 1981 which added the density testing depths to the specification.

This item is closed.

f. (Closed) Unresolved Item (50-329/80-01-02; 50-330/80-01-02): Failure to have soils laboratory forms under complete document control. The inspector reviewed QCP-10, Section 5.0 which was added to address documentation and distribution of soils laboratory forms. The inspector also reviewed new Procedure QCP-14, Revision 0, dated February 12, 1981 which addresses the QC procedure for use of these forms. This item is closed.

g. (Closed) Unresolved Item (50-329/80-01-03; 50-330-80-01-03): Failure to have explicit instructions for the onsite geotechnical engineer's review of test results. The inspector reviewed new Procedure EDPI 2.14.7, Revision 0, dated May 14, 1981. Exhibit D to the procedure indicates how the onsite geotechnical engineer is to perform his review and document his review. This item is closed.

- h. (Closed) Unresolved Item (50-329/80-01-04; 50-330/80-01-04): Failure to have explicit instructions for the onsite geotechnical engineer's evaluation of density tests. The inspector reviewed EDPI 2.14.7, Exhibit D which delineates how to perform the evaluation. This item is closed.
- i. (Closed) Deviation (50-329/80-01-05; 50-330/80-01-05): Failure to have a qualified onsite geotechnical engineer onsite. The licensee now has an onsite geotechnical engineer which meets the project requirements. This item is closed.
- j. (Open) Unresolved Item (50-329/80-30-01; 50-330/80-30-01): Protection of Battery Rack Hardware from acidic environment. The licensee has initiated Quality Action Request (QAR) F-058 requesting Bechtel Engineering to identify what preventative measures will be established to preclude battery rack hardware from corroding in the acid environment. Pending review of Bechtel Engineering reply to the QAR, this item will remain open.
- k. (Open) Unresolved Item (50-329/80-30-03; 50-330/80-30-03): Incomplete test data for Class 1E Battery Chargers. Revision 7 to Bechtel Specification E-11 for Battery Chargers deleted the requirements for performing no-load-loss and full-load-loss tests and revised the requirement for an "insulation test to ground and between AC and DC" to require an "ohmmeter test to ground from AC input, DC output and alarms." Data received by the licensee for the ohmmeter tests was recorded as OK in lieu of a quantitative value. Pending review of the quantitative criteria for the OK or the actual ohmmeter data recorded, this item will remain open.
- l. (Closed) Noncompliance Item (50-329/80-32-01; 50-330/80-33-01): Failure to have interface procedures. The inspector reviewed EDPI 4.25.1, Revision 9, which was revised to state that all changes will be interfaced. This item is closed.
- m. (Closed) Noncompliance Item (50-329/80-32-03; 50-330/80-33-03): Failure to properly implement an SCN. The inspector reviewed SCN 11001 to Specification C-208 dated April 7, 1981 which adequately addresses the inspector's concern. This item is closed.
- n. (Open) Unresolved Item (50-329/80-32-04; 50-330/80-33-04): Specification C-208 comments. The inspector reviewed SCN 11001 and EDPI 2.14.7 which adequately address item part numbers 3.c(3), 3.c(5), and 3.c(6). Item numbers 3.c(2) and 3.c(4) remain open pending the inspector's further review.
- o. (Open) Unresolved Item (50-329/80-32-05; 50-330/80-33-05): Specification C-211 comments. The inspector reviewed SCN 11002 to Specification C-211 dated April 6, 1981 and drawing C130 which adequately address item part numbers 3.d(2) and 3.d(3). Item numbers 3.d(1) and 3.d(4) remain open pending the inspector's further review.

2. 10 CFR 50.55(e) Reportable Items

- a. (Closed) 10 CFR 50.55(e) Reportable Item (329/78-13-EE; 330/78-13-EE): Undersized Wire Installed in the Control Room Makeup Filter Drain Heater Units, Nos. OVM-78A, OVM78B, OVM94A, and OVM94B. The final report on this deficiency was received by the RIII office (Howe78-79) on March 9, 1979. This letter stated, in part, that the undersized wiring would be replaced by Bechtel under the supervision of Mine Safety Appliances (MSA) the heater unit vendor. The report also stated that the progress and closure of this operation (wire replacement) would be tracked through Nonconformance Report (NCR) No. 1733.

The undersized wire was replaced and the installation inspected by Bechtel Quality Control. NCR No. 1733 was closed on February 11, 1980.

During an over-inspection by CPCo, Quality Assurance (QA) on October 20, 1980, it was noted that type RHH wire had been used to replace the undersizes wire rather than type TA or SIS wire which is specified in Specification 7220-M-150(Q), Revision 4. NCR M-01-4-0-067 was initiated to document these observations. On December 5, 1980, MSA initiated Supplier Deviation Disposition Request (SDDR) No. 7. Bechtel SDDR No. 1967, requested type RHH wire be approved as equal to type TA or SIS wire. Bechtel Engineering approved the above referenced SDDR on January 11, 1981. This item is considered closed.

- b. (Open) 10 CFR 50.55(e) Reportable Item (329/78-12-EE; 330/78-12-EE): Inadequate Crimping in Vendor Supplied Electrical Penetrations. The final report on the inadequate crimping of cable/wire terminal lugs in the inboard terminal boxes of Amphenol Sams/Bunker Ramo supplied penetrations was received by the Region III office (Howe-153-79, dated May 25, 1979). CPCo prepared NCR No. M-01-4-8-107 and Bechtel prepared Management Corrective Action Report (MCAR) No. 26 for tracking this deficiency. The type of discrepancies noted on the MCAR were: wire not fully penetrating the lug barrel; crimps not tightly made; barrel of lug collapsed preventing full wire compression and connections loose on the terminal block.

An attachment to the final report states, in part, "During the April 30, 1979 through May 3, 1979 inspection, all unsatisfactory terminations were reworked and passed further inspections and pull tests." In addition, all terminations were checked for: (1) Proper type of lug; (2) Proper lug indentation; (3) Tightness to terminal blocks. Bechtel Field Inspection Report (14 pages) documents the rework and acceptance of the inspections and pull tests described above. CPCo Project Inspection Plan and Report No. 001, dated April 16, 1981, documents MPGAD's overinspection and acceptance of the terminations in the inboard terminal boxes of the 26 Class 1E Electrical Penetrations. NCR No. M-01-4-8-107 was closed on June 8, 1979 and MCAR No. 26 was closed on June 26, 1979.

The Region III inspectors observed the terminations in two (2) of the 26 Class 1E electrical penetrations. As of May 22, 1981, the following conditions existed in penetration Nos. 2Z112 and 2Z116:

Penetration 2Z112

- (a) Termination A-15 - wire does not fully penetrate lug barrel.
- (b) Terminals G-8, G-9 and G-10 - connections were loose on the terminal block.

Penetration 2Z116

- (a) Terminal A-14 - connection was loose on the terminal block.

Licensee indicates that immediate corrective actions would be taken; and explained that the discrepancies noted by the inspectors are limited degradation of previously acceptable conditions and oversights on their part. The NRC inspectors concurred in this assessment and informed the licensee that this reportable item will remain open until all discrepancies have been corrected and confirmed by a Region III inspector.

Functional or Program Areas Inspected

Details of the functional or program areas inspected are documented in Sections I through V as follows:

Section I

Prepared By: E. R. Schweibinz
Reviewed By: C. C. Williams

1. Scope of Persons Interviewed and Areas Reviewed

The following Consumers Power and Bechtel personnel were interviewed.

Consumers Power Company (CPCo)

Vice President, Midland Project
Site Manager
Construction Superintendent
Environmental Services and Quality Assurance Manager
Site Quality Assurance Manager
Site Quality Assurance Superintendent

Bechtel

Project Manager
Site Manager
Project Quality Assurance Manager
Project Field Quality Control Engineer
Lead Pipe/Mechanical Quality Control Engineer
Several QC Inspectors

The majority of the above personnel were interviewed separately by a two man team from Region III. This team consisted of a reactor inspector and a section chief. In addition, the team met with several of the individuals collectively. These interviews were made to assess the capability, attitudes, and functional adequacy of the personnel and to verify adequate and effective management involvement in the implementation of the site quality assurance program relative to its status, problem solving methodology, and the adequacy of resource support.

No items of noncompliance were identified.

2. Problem Areas Identified

- a. Site construction and quality management personnel are not sufficiently sensitive to symptoms of inadequacy identified by their program and other sources as evidenced by the following summary of findings in other sections of this report:
 - (1) The licensee is not routinely making comprehensive evaluations of root causes of problems.
 - (2) When problems are identified in an area, the licensee continued working in that area and did not always expedite effective corrective actions.
- b. The Region III inspectors identified a need to be more specific in the administration and organizational relationships of the

Bechtel site construction management and quality control organizations, in regard to the coordination, interface and working relationships between the two organizations. The purpose of this needed clarification is to ensure that the organizational freedom required by the Atomic Safety and Licensing Appeal Board ruling (ALAB 152) is fully addressed in the Bechtel procedures. The improvements of procedures to accomplish this clarification will be reviewed in a future inspection. This item is unresolved. (329/81-12-01; 330/81-12-01)

- c. Personnel recruitment and assignment philosophy is such that in some cases the licensee focuses excessively on academic achievement to the detriment of its need for a significant amount of experience in its "field grade" or first line personnel. Other sections of this report have identified cases where the primary inspections and other quality related activities are being conducted by academically qualified but insufficiently experienced personnel.

It is NRC's Region III assessment that the bulk of the Region III inspectors' findings during this and several recent NRC inspections were partially caused by the inadequacies identified in Paragraphs 2.a and c. above and management's failure to properly use its problem trending mechanism.

No items of noncompliance were identified.

3. Positive Comments

The personnel interviewed in the Consumers Power and Bechtel organizations were qualified, capable, and assertive individuals with positive attitudes. The licensee's management controls were judged to be effective. There is every indication that Consumers Power personnel are in control of the site, providing generally adequate direction and administration of Bechtel and other construction organizations. Examination of routine operations clearly demonstrated that Consumers Power and Bechtel organizations have formed an effectively integrated and coordinated construction and quality management team.

No items of noncompliance were identified.

SECTION II

Prepared By: R. J. Cook

C. E. Jones

Reviewed By: D. C. Boyd, Chief
Reactor Projects Section 1A

1. Objectives of the Inspection

The inspectors objective was to verify that current Quality Assurance Program description and implementation met requirements of 10 CFR Part 50, Appendix B, and other licensee commitments. The critical elements of the objective were accomplished as follows:

- a. Verify that changes in QA Programs and Organization effective August 1980 and (reported to the NRC on March 13, 1981) are in place and adequate.
- b. Assess/evaluate the magnitude of previously reported breakdowns in Quality Assurance.
- c. Verify adequate and effective management involvement in the implementation of the site QA Program.

2. General Areas Inspected

In general the inspectors reviewed selected examples of the following documents compiled by Consumers Power Company, Bechtel, and Babcock and Wilcox:

- a. Audit Finding Reports
- b. Nonconformance Reports (NCR's) and Nonconformance Report Logs
- c. Quality Action Requests (QAR)
- d. Corrective Action Requests (CAR)

In addition the inspectors reviewed documents selected at random to examine for corrective action, review and approval by authorized Quality Assurance and Engineering management, referral to Engineering Design and the timeliness of clearing the problem.

No items of noncompliance were identified.

3. Review of NSSS Nonconformance Reports (NCRs)

During the team inspection period, the Resident Inspector examined non-conformance reports issued by the NSSS contractor, B&W, and transmitted to the NRC by virtue of the requirements of ALAB 106. Approximately 15

of these B&W NCRs were examined in detail which also included review of backup information and categorizations by the licensee.

a. NCR's Associated with the Reactor Coolant Pumps

During the review of the B&W NCR's, it was noted that a rather large number of NCR's had been generated pertaining to conditions observed in the reactor coolant pumps and associated appurtenances. In slightly over a one year period, B&W generated 30 NCR's, and Consumers Power Company and Bechtel Power Corporation generated an additional eight NCR's against the reactor coolant pumps. Eight of the 30 NCR's were selected for a more thorough review in an effort to establish whether adequate corrective action had been taken to ensure the integrity of the reactor coolant pumps.

- (1) One of the B&W NCR's (Nonconformance Report No. 1630) addressed missing threads in a portion of the stud hole drilled and tapped into the reactor coolant pump casing for pump designated 2R51C. The disposition of this NCR was to proof test the hole with incomplete threads. The procedure used to perform this test required a 9325 psi pressure on the associated hydraulic tensioner. The pressure used for the studs with complete threads is 8850 psi. Therefore, approximately five percent over the normal installation preload was applied. The stud which was "proof tested" was not recovered from the hole and a subsequent inspection of the hole thread conditions performed. (Reference NRC Inspection Reports No. 50-329/79-26, 50-330/79-26)
- (2) Another of the B&W NCR's (Nonconformance Report No. 1664) addressed the fact that six of the holes in the motor mount for reactor coolant pump designated 2B51A have defects and voids in the threaded area. These holes are used in the attachment of the reactor coolant pump motor to the pump stand. This attachment has been addressed in 10 CFR 50.55(e) report to the NRC dated February 10, 1978. A portion of this 10 CFR 50.55(e) evaluation indicated that additional clamping force was required to increase the resultant friction between the motor flange and motor support flange. This was to be accomplished by use of preloaded studs in place of the originally designed cap screws. The disposition to the NCR addressing the nonconforming threads in the motor mount is to "Accept as is..." (Reference NRC Inspection Report No. 50-329/79-27; 50-330/79-27)

The examples referenced above do not appear to have received comprehensive engineering dispositions in that verification of the as-built conditions after "Proof Testing" was not accomplished. During the team inspection, the licensee stated that they were re-reviewing the actions taken on some selected NCR's for engineering adequacy and the two examples mentioned are included in this review.

Based on the above considerations, this item is considered an unresolved matter pending further review by the NRC.
(329/81-12-02; 330/81-12-02)

b. Core Support Assembly Guide Block Positioning and Welding

During the team inspection, the Resident Inspector inquired as to the status of NCR's which might have been generated as a result of welding the core support assembly (CSA) and the subsequent motion of these guide blocks. The Resident Inspector was aware that movement of nominally 0.030 to 0.040 inch had occurred between each pair of blocks during the welding operation. The motion was shared by each block of a given pair. Prior to welding, each block is fitted with an interference fit 1 5/8 inch diameter pin which engages the guide block and the core support assembly barrel.

The licensee stated that no NCR's had been initiated with regard to the motion of the guide blocks because the procedure referenced, PCA-58, Guide Block Positioning, required B&W to report any deviation to their Nuclear Service group when the expected gap exceeds the criteria. The site B&W representatives did report the final position of the guide blocks after welding. Consumers Power Company has issued a letter dated May 17, 1981, requesting information from B&W pertaining to the stresses induced when the guide blocks moved relative to the pin during the welding operation. This item is considered unresolved pending further evaluation of the engineering data associated with motion of the guide blocks. (329/81-12-03; 330/81-12-03)

No items of noncompliance were identified.

4. Review of Consumers Power Company Nonconformance Reports (NCR's)

During the team inspection period, the Resident Inspector examined in detail approximately 15 Nonconformance and/or Audit Findings Reports which were generated by the licensee (Consumers Power Company) and transmitted to the NRC by virtue of ALAB 106. From this sampling, the trend which was noted was that the disposition to these NCR's generated by Consumers Power Company appeared to be rigorous and the action justifiable.

No items of noncompliance were identified.

5. Review of Bechtel Corporation Nonconformance Reports (NCR's)

During the team inspection, the Resident Inspector reviewed approximately 75 Nonconformance reports initiated by Bechtel Power Corporation and transmitted to the NRC by virtue of ALAB 106. No discrepancies were noted in the disposition of these NCR's and there appeared to be a justification for these NCR's with a "use-as-is" disposition.

No items of noncompliance were identified.

6. Selection of Sampling Periods

Action on the items in Paragraph 2 (General Areas Inspected) were compared for a period of time prior to March 1980 against a period of time subsequent to August 1980. The purpose of the comparison was to determine the effect of the modified QA/QC Program on project activities and to verify the degree of implementation of the program.

The inspectors also reviewed NCR's issued against specific pieces of Class 1 equipment.

For the comparison, periods of time were selected at random and were chosen as those Nonconformance Reports (NCR's) issued by Bechtel January 2, 1979 through June 22, 1979, and closed during the month of January 1980. The second period chosen was October 1980 through January 31, 1981.

During the first period 42 Bechtel NCR's were closed during the month of January 1980. The initiating dates for those closed ranged from October 10, 1978 to August 8, 1979, or from fifteen to six months. The average time, initiation to closure, was eight months.

During 1979 a total of 1,101 NCR's were written by Bechtel with approximately 555 being issued between January 2, 1979 through June 22, 1979. Of those NCR's issued during this period 97 remained open on January 31, 1980. The rate of closure at the end of 1979 was about 46% of those being initiated within the time period examined.

A total of nine Nonconformance Reports (NCR's) initiated by Babcock and Wilcox were selected at random and reviewed by the inspector. Elapsed time from initiation to closure averaged one to seven months and averaged three and a half to four months but required additional review when completed.

The Quality Action Requests and Corrective Action Requests were complete and appeared to be prepared and processed in accordance with Procedures.

The second period, October 1, 1980 through January 31, 1981 was shorter than the first but indicated an overall improvement in record retention and documentation control.

A review of Audit Finding Reports indicated improved audits and strengthened followup of audit findings.

A total of 22 NCR's, nine from Babcock and Wilcox and 13 from Bechtel were reviewed. The nine NCR's initiated by B&W were approximately 50% complete. The remainder required Engineering Technical instructions from the Lynchburg Office. Other B&W NCR's are discussed in detail in other paragraphs of this section of the report.

The 13 NCR's initiated by Bechtel had been processed in two to three months with an average time of approximately two and a half months or

a reduction in processing time of approximately five and a half months. The NCR's were audited for disposition since the processing time had been reduced and many NCR's were dispositioned by the Field Engineer to "use-as-is". Those selected for review appeared to be properly dispositioned in accordance with approved project procedures. In general the NCR's prepared after August 10, 1980 indicated more care in their analysis, documentation, and a noticable improvement in the timeliness of the NCR processing.

No items of noncompliance were identified.

7. Conclusions

The inspectors reached the following conclusions during the review of plant documentation records and discussions with personnel from Consumers Power Company and major contractors onsite. The conclusions are as follows:

- a. Questions were raised regarding the dispositioning of specific B&W NCR's observed during the review of those initiated during the selected time periods. Verbal Response from B&W and Bechtel resolved these questions. Other questions discussed in Paragraphs 3.a and 3.b of this section remain to be answered.
- b. Nonconformance Report resolution time was reduced from an average of eight months to two and a half months during the time of the past 12 to 18 months. Those processed presently are more complete than the earlier examples selected.
- c. Technical evaluations appeared to be adequate. In general evaluations of NCR's dispositioned "use-as-is" were reviewed with special emphasis and observed to meet requirements.
- d. NCR's processed recently are more comprehensively responsive to the project's governing procedures.

No items of noncompliance were identified.

SECTION III

Civil

Prepared By: E. J. Gallagher
(IE Headquarters)

R. B. Landsman

Reviewed By: C. C. Williams, Chief
Plant Systems Section

A review of a cross-section of the past, present and planned civil work activities was performed with respect to implementation of the Midland Project Quality Assurance Program. The specific areas reviewed are as follows:

- Quality Assurance staffing (civil area)
- Trend Analysis and Evaluations
- Nonconformance Report Reviews
- Design Control of Block Walls
- Overinspection plans and implementation
- Permanent Dewatering System
- Procurement of Materials
- Quality Assurance Audits
- Project Quality Control Instructions

1. Quality Assurance Staffing (Civil Area)

During this inspection a review of the quality assurance staff for the civil work activities was made to determine that adequate technical, quality assurance depth and personnel availability exist for the present work activities and for the planned remedial measures to be performed as a result of the soil settlement issue.

The on-site QA group is divided into two sections; (1) Quality Assurance Engineering (QAE), and (2) Inspection-Examination and Testing Verification (IE&TV). Each of these sections presently consist of a section supervisor and two civil engineers. The following determinations were made:

- a. The present QA civil staff is adequate for the current civil work activities.
- b. The QA civil staff does not have the experience or depth in quality assurance, to implement the Midland Project Quality Assurance program for the remedial measures required as a result of the soil settlement issue. Specifically the QA civil staff has very limited technical experience and are unqualified for the complex nature of the planned remedial actions to correct the soil settlement problems. The license acknowledged the above determination and indicated that prior to the initiation

of the complex remedial activities, additional qualified staff will be available to participate in these activities.

No items of noncompliance were identified.

2. Trend Analysis and Evaluation

A review of the Midland Quality Assurance trend analysis for the period of July 1980 through March 1981 was performed to verify that the requirements of Consumers Power Company Procedure M-2, Revision 1, dated March 2, 1981 have been implemented.

The Trend Analysis Procedure M-2 defines a trend as follows:

- A single or multiple occurrence of the magnitude defined in 10 CFR 50.55(e).
- A single or set of circumstances which warrant actions beyond the normal quality program to reverse a situation that is adverse to quality.
- When the current month's data exceed the four month trailing average of the data for the individual performance area.

The procedure required for any of the trends identified above that a summary of corrective actions taken or the rationale for no corrective action be included with the trend report. It further specifies that MPQA personnel shall obtain appropriate corrective action commitments from the appropriate individual.

a. The following specific findings were made as a result of the trend analysis review:

- (1) Monthly Trend Analysis Report, July 17, 1980 to August 20, 1980 indicates a negative trend in the Mechanical area (Chart C) which shows an increase in deficiencies from approximately 12 to 75. The evaluation states, "It is therefore recommended that subject supervision be given a review of this report and instructions and indoctrination in the improvements of such deficiencies." Letter dated September 8, 1980 required corrective action by Bechtel Power Company Site Manager to preclude recurrence. No response from the Site Manager nor corrective action document could be located and it was concluded by the licensee's representative and the inspector that it had not been written. Chart C2 showed an increase in deficiencies from two to 60. Therefore, no evaluation regarding the cause of drawing and specification tolerances being exceeded in the mechanical area was made.
- (2) Monthly Trend Analysis Report, August 21, 1980 to September 17, 1980 continued to indicate a negative trend on Chart C2 (Mechanical drawings and specification tolerances exceeded). The evaluation simply stated, "The quantity is expected to

level off and then slowly decrease; however, it is expected that the quantity of indicators will remain at a higher level than previously observed. At the present time, no additional action is considered necessary." The number of deficiencies during this period increased from 75 to 125. Letter dated October 15, 1980 requested the site manager to evaluate this trend and take appropriate corrective actions. No response from the site manager or corrective action could be located during this inspection and it is assumed by the licensee representative and the inspector that it was not written.

- (3) Monthly Trend Analysis Report, September 18, 1980 to October 15, 1980 for Chart B3 (electrical procedures not followed) showed a negative trend from three to 24 deficiencies during this period. Letter dated November 13, 1980 requested the site manager to review, in depth, electrical B3 Chart and take appropriate action. No response from the site manager regarding corrective actions taken could be located during this inspection and likewise, it was acknowledged by the site QA superintendent that this document was not written.
- (4) Monthly Trend Analysis Report, October 16, 1980 to November 19, 1980 for Chart B3 (electrical procedures not followed) shows the monthly deficiencies above the four month trailing average. The evaluation states, "after a review of the above items it is concluded that further action is warranted. By copy of this report, the site manager is requested to take appropriate corrective action." No response to this request could be located during this inspection and the licensee representative concluded that the document apparently was not written.
- (5) Monthly Trend Analysis Report, January 22, 1981 to February 27, 1981 indicates a significant adverse trend in the electrical Chart B3 (electrical procedures not followed). The number of deficiencies increased from two to 60. The evaluation states, "This indicates field engineering is not keeping close to the construction effort and/or not walking down all work prior to inspection by QC. QAR F-033 has been issued." The corrective action taken as a result of QAR F-033 indicates meetings were held on March 31, 1981 with field engineering and construction superintendents. It was noted that the increase in deficiencies was due to an increase in production.
- (6) Monthly Trend Analysis Report, March 1, 1981 through March 31, 1981 showed a substantial decrease in Chart B3 (electrical procedures not followed). The number of deficiencies went from 60 to 15 during this period. The evaluation states, "The large reduction in number of deficiencies indicates that actions taken in response to QAR F-033 appear to have been

effective." Since QAR F-033 action was not taken until March 31, 1981, it would seem unlikely that this action caused the reduction in deficiencies between March 1, 1981 and March 31, 1981.

- b. Based on the above review of trend analysis reports, the following has been concluded:
- (1) Adverse trends have been identified without adequate response or corrective action from appropriate site managers.
 - (2) Evaluations by QA have not been adequate and have not identified the "root cause" of the increases in deficiencies.
 - (3) Routinely, increases in adverse trends are attributed to increases in production and inspection activity while decreases are attributed to corrective action. However, the trend reports do not substantiate these conclusions, and do not identify the real underlying causes (i.e., inadequate training, instructions, directions, etc.).
 - (4) There was no evidence of stop-work consideration by the QA manager even with substantial increases in the occurrence of deficiencies in the electrical and mechanical work areas.

Based on the foregoing, Consumers has not implemented the trend analysis program as required by Procedure M-2 in that appropriate corrective action commitments were not established by the appropriate individuals, resulting in failure to take comprehensive corrective action. This failure to take adequate and effective corrective actions as a result of the trend analysis indications, is an item of noncompliance, contrary to 10 CFR 50, Appendix B, Criterion XVI. (329/81-12-04; 330/81-12-04)

After the above findings were brought to the attention of the Consumers site QA superintendent, it was ascertained that the trend analysis program has been the subject of review. The site QA superintendent produced a memo dated May 19, 1981 which identified further weaknesses. These included the description of the trend categories, judgement in assigning trend codes and the variety of evaluations of the monthly trends. This memo proposed a revision to MPQAD Procedure M-2.

Except as noted above no items of noncompliance were identified.

3. Nonconformance Report Reviews

The inspector reviewed all civil NCR's closed by QAE during 1981. These NCR's were opened between May 30, 1980 and April 24, 1981. The closed NCR's were dispositioned appropriately except for 22 repetitive NCR's regarding construction personnel passing QC inspection hold points for concrete expansion anchors. Eighteen QC inspection hold points were "passed" during the month of March 1981. It was subsequently learned by the inspector that these 18 NCR's

were included in the trending analysis. CPCo's corrective action was to issue Quality Action Request F-046 which requested Bechtel Field Engineering and Quality Control to redispotion all NCR's. However, CPCo failed to determine the root cause of the problem, which was that construction craftsmen were repeatedly bypassing an important quality control activity, the inspection of cut rebar. Once the anchor bolts are installed, there is no easy way to verify if rebars have been cut. The NCR's were inappropriately dispositioned by checking the torque on the bolts. This is another example of failure to take adequate corrective action regarding an identified adverse trend and is an item of noncompliance contrary to 10 CFR 50, Appendix B, Criterion XVI. (50-329/81-12-04; 50-330/80-12-04)

Subsequent to the inspectors finding, the QA Site Manager issued Stop Work Order No. FSW-14, regarding the installation of anchor bolts and prohibits the bypassing of the inspection hold points.

Except as noted above no items of noncompliance were identified.

4. Design Control of Block Walls

On April 21, 1980, the NRC requested information on masonry block walls for plants under construction. On September 3, 1980, CPCo responded with the required information.

Bechtel then performed a design review of the walls and determined that the original design basis (Ultimate Strength Design) was less conservative than the Working Stress Design method. Consequently, removal of approximately five percent of the block walls in the buildings are required. Bechtel and CPCo performed an evaluation as to whether this constituted a 50.55e reportable item and determined that it did not since the design was in progress and there is no established design methodology at the present time.

Replacement of the block walls and their attachments will be done in accordance with the design change installation requirements.

No items of noncompliance were identified.

5. Overinspection Plans and Implementation

Overinspections performed by CPCo are a means to assess the effectiveness of the contractors QC function by performing augmented QC inspections. The overinspection plans are prepared by the QAE Section and implemented by the IE & TV Section. The inspector reviewed the overinspections performed during 1981 in two civil work areas: grouting and soil borings.

The following overinspections were reviewed:

- a. "Inspection of Soil Boring" No. 1 dated April 6, 1981 thru No. 6 dated May 14, 1981.

- b. "Preplacement, Placement and Curing Inspection of Grouting and Drypacking (Baseplates, Column Bases and Equipment Bases)" No. 2 dated January 26, 1981 thru No. 11 dated April 27, 1981.
- c. "Preplacement, Placement and Curing Inspection of Grouting and Drypacking (Dowels and/or Anchor Bolts)" No. 1 dated January 26, 1981 thru No. 10 dated May 5, 1981.

The overinspection plans reviewed covered their subject matter comprehensively and were being implemented adequately.

No items of noncompliance were identified.

6. Permanent Dewatering System

CPCo plans to install 20 of the permanent dewatering wells by the service water structure to be used temporarily for construction dewatering of the remedial fix on the service water structure. The preliminary drawings and specifications were reviewed. The following concerns were discussed with the licensee:

- a. It was indicated that the wells are to penetrate five feet into the underlying till (clay) layer. However, the drawings are unclear in this area. The licensee agreed to add this on the drawing.
- b. Supplemental borings are to be drilled at every fourth well to verify the aquifer grain size and the required length of well screen. However, there was no indication in the specification to allow the well design (i.e., the slot size of the screen and its length) to be altered by the new borings. The licensee agreed to include this provision in the specification.
- c. The PVC plastic well casing is not classified as safety-related; however, the licensee agreed to include the casing on the Project Quality Control Instruction to verify that the proper material is being installed in the well.
- d. The drawings indicate a five foot blank piece of casing on the lower end of the well below the screen. The design of this was questioned in that the well could pull the water table farther down if the screen extended all the way to the bottom of the well. The licensee agreed to review this matter.
- e. The drilling operation did not address the fact that the hole should be kept full of water to diminish the possibility of hole blow-in below the water table. The licensee agreed to evaluate this concern.

The above five items remain open pending the licensee's response.
(329/81-12-05; 330/81-12-05)

No items of noncompliance were identified.

7. Procurement of Materials

MPQAD has assumed responsibility for the review and approval of Field Purchase Orders to assure appropriate quality criteria are contained in these orders. The inspector reviewed MPQAD Procedure M-1 dated March 2, 1981 "QA Review of Bechtel Generated Procurement Documents" and found it to adequately address the quality criteria. It requires that review comments be documented. A memo from Mr. Leonard to MQAE's also requested them to maintain a log of these reviews. A review of this log indicated that they were adequately maintaining the log. However, the inspector requested that the licensee formalize this procedure by including it into their procedure instead of by memo. The licensee also agreed to clarify the status of the purchase orders within the log which was unclear. This item is unresolved pending the revision to Procedure M-1. (329/81-12-06; 330/81-12-06)

The inspector reviewed Purchase Orders, Material Certifications and Material Specification Requirements for grout material, Master Flow and Chemco, and determined that the records are satisfactory.

No items of noncompliance were identified.

8. Quality Assurance Audits

The inspector requested the MPQAD audit schedule to determine if audits are conducted periodically so that the entire civil program is audited at least annually. The inspector was informed that audit schedules are prepared quarterly to cover all forthcoming work activities.

MPQAD personnel indicated to the inspector that they rely on individuals within the organization to prepare the quarterly audit schedules to assure that all activities are being audited. The licensee indicated that they previously recognized that a master audit schedule was needed to assure that all activities are covered and they are presently working on preparing a master audit schedule. The inspector reviewed audit schedules for the second and third quarter of 1981 and found them to cover all ongoing civil activities satisfactorily.

Furthermore, the inspector reviewed audit M-01-19-01 dated April 20-21, 1981, of Woodward-Clyde Consultants Clifton New Jersey Laboratory and found that it was performed according to CPCo procedures.

No items of noncompliance were identified.

9. Project Quality Control Instructions

Project Quality Control Instructions (PQCI's) are written by the contractors to govern their quality control inspection activities. A separate plan is prepared for each separate work activity. The inspector determined that these are being developed and QC inspectors are being certified to individual plans. It is MPQAD's responsibility

to review these plans to ensure that quality items are covered comprehensively. The inspector reviewed MPQAD Procedure E-2M, dated March 2, 1981, which delineates how to perform the review, and found that it was being utilized accordingly by MPQAE to review the FQCI's for quality items.

No items of noncompliance were identified.

SECTION IV

Prepared By: R. N. Gardner

R. S. Love

Reviewed By: C. C. Williams

1. Observation of Electrical Work Activities - Terminations

- a. The Region III inspectors observed that the Z phase of terminated Class 1E Cable 2AB2322B was in violation of the minimum bend radius criteria at Motor Control Center (MCC) 2B23. Activity 3.11 of Project Quality Control Instruction (PQCI) E-5.0 states, "Verify that the cable or jumper is supported using approved cable ties and the minimum installed cable bend radius is not violated." Bechtel Quality Control had inspected the aforementioned cable termination on May 12, 1981 and the inspection records indicate that activity 3.11 in PQCI E-5.0 was found to be satisfactory. The licensee, MPQAD, subsequent to the NRC inspection, identified the cable bend radius violation on Nonconformance Report (NCR) No. M-01-91-061, dated May 21, 1981.

The Region III inspectors informed the licensee that the above instance is an example of failure to perform an adequate inspection and that this was an item of noncompliance, contrary to 10 CFR 50, Appendix B, Criterion X. (330/81-12-07)

- b. The Region III inspectors observed that Consumers Power Company (CPCo) test personnel were determining and reterminating the electrical power and control cables during the process of removal/installation of MCC circuit breakers temporarily turned over to CPCo for Magnetic Trip Testing. As indicated in the CPCo-Bechtel meeting minutes of December 22, 1980, CPCo has assumed the responsibility for the correct retermination of all such cables associated with MCC circuit breaker testing. The RIII inspectors requested the licensee to develop an inspection plan for the retermination of all electric cables associated with the ongoing test activities. Pending review of this plan, this matter is unresolved. (50-329/81-12-07; 50-330/81-12-08)

No items of noncompliance were identified.

- c. The Region III inspectors observed the following crimping tools being used in terminating electrical cables in the auxiliary building:

- (1) Tool No. BPC 2593; type MR 8-4
Date Certified: 5/12/81
Recertification Due Date: 11/12/81

- (2) Tool No. BPC 2716; type MR 8-4
Date Certified: 2/5/81
Recertification Due Date: 8/5/81
- (3) Tool No. BPC 2671; type MR 8-4
Date Certified: 12/2/80
Recertification Due Date: 6/2/81

The pertinent calibration records for the aforementioned crimping tools were reviewed and found to be clear, retrievable and well maintained. Personnel involved in the calibration process were interviewed and found to have a good knowledge of the requirements for calibrating such tools. Each crimping tool is checked monthly and recertified every six months.

No items of noncompliance were identified.

- d. The Region III inspectors observed completed and in process Class 1E 600 Volt cable terminations in the control room, service water pump house and in the general plant area. Terminations were observed in the following panels and cabinets: 0C2C(75); 1C24(50); 1C11(30); Y32(14); 1B23(25); 0C180(100); 2B64(10); 1B64(10); 0B64(15); and 1B56(40). (The number in parentheses indicates the approximate number of terminations checked in that panel/cabinet). The following cable scheme numbers were selected at random for a follow-up review of the cable pull cards, QC inspection records and termination landing points as compared with drawing E900, Revision 49: 1BB5606C, 1BB5621F, 1BB5631E, 1AB6302G, 0AY3301A, 0AY3303A, 0BV041D and 0EW21K.

No items of noncompliance were identified.

2. Qualification of QC Inspectors - Electrical

During a review of Consumers Power Company (CPCo) initiated Non-conformance Reports (NCR), Quality Action Requests (QAR) and Audit Finding Reports (AFR), it was noted that MPQAD was identifying numerous noncompliances in items that had been previously inspected and accepted by Bechtel Quality Control inspectors. As a sample, the following documents were selected for follow-up: AFR No. M-02-01-1-06 dated January 27, 1981; QAR No. F-028 dated February 19, 1981; NCR No. M-01-9-1-014 dated February 27, 1981; NCR No. M-01-9-1-016 dated March 24, 1981; NCR No. M-01-9-1-026 dated April 21, 1981 and NCR No. M-01-9-1-045 dated May 6, 1981.

The Region III inspectors requested that the Bechtel Project Quality Control Engineer (PQCE) provide the names and records of the QC personnel involved with the aforementioned nonconformance reports.

The personnel qualification and training records of three QC inspectors were reviewed and compared to the requirements of Regulatory Guide 1.58 and ANSI N45.2.6. Following is a summary of the personnel records reviewed:

Inspector "A"

No previous QA/QC experience

Education: Associate degree in business (No transcript)

Experience: 6/79-8/80 Field Engineer (FERMI)
3/78-6/79 Material Requisition Engineer (FERMI)
74-78 Salesman
8/11/80 Date reported on board
8/25/80 Certified Level I to PQCI E-4.0 "Installation of Electric Cables." Three (3) hours of documented training.
8/25/80 Certified Level I to PQCI E-5.0 "Cable Terminations." Three (3) hours of documented training.
11/18/80 Certified Level I to PQCI E-2.0 "Installation of Cable Tray and Wireway". Two (2) hours of documented training.
11/21/80 Certified Level I to PQCI W-1.00 "Welding, Heat Treating, and Nondestructive Examination of Q listed and ASME Section III Items". Twelve (12) hours of documented training.

Inspector "B"

Previous QC experience (See 72-76 experience)

Education: Not listed (See 68-70 experience)

Experience: 77-81 Production Manager
76-77 Manufacturing Manager
72-76 Industrial Engineer and QC Assistant
68-70 Taught High School
3/9/81 Date reported on board
3/23/81 Certified Level I to PQCI E-4.0 "Installation of Electric Cable". Four (4) hours of documented training.
3/26/81 Certified Level I to PQCI C-1.50 "Installation and Testing of Expansion Anchors". Five and one-half (5-1/2) hours of documented training.

- 4/7/81 Certified Level I to PQCI E-5.0 "Cable Termination." Two (2) hours of documented training.
- 4/30/81 Certified Level I to PQCI E-2.0 "Installation of Cable Tray and Wireway". Two (2) hours of documented training.
- 5/1/81 Certified Level I to PQCI E-2.1 "Tray Supports." Six (6) hours of documented training.

Inspector "C"

No previous QA/QC experience

Education: BSEE 9/80 (No transcript)

Experience: Miscellaneous parttime work

- 12/1/80 Date reported on board
- 12/23/80 Certified Level I to PQCI E-4.0 "Installation of Electric Cable". Five (5) hours of documented training.
- 12/23/80 Certified Level I to PQCI E-5.0 "Cable Terminations." Six (6) hours of documented training.
- 3/26/81 Certified Level I to PQCI C-1.50 "Installation and Testing of Expansion Anchors". Two (2) hours of documented training.
- 5/15/81 Certified Level I to PQCI E-2.0 "Installation of Cable Tray and Wireway". Two (2) hours of documented training.

Discussions with the licensee's contractor (Bechtel) PQCE indicated that all QC inspectors are certified on the basis of an oral examination plus observations of the individual in the field. This type of examination does not provide for an after-the-fact evaluation of the inspector's knowledge or the thoroughness of the examination.

The Region III inspectors informed the licensee that while it was fully recognized that the requirements for education and experience are not absolute, the intent of Regulatory Guide 1.58 and ANSI N45.2.6 is that the individual have the required education and prior related experience in quality assurance, including testing and/or inspection of equivalent construction and installation activities, or documented objective evidence (i.e., procedures and record of written tests) demonstrating that the individual indeed does have "comparable" or "equivalent" competence to that which would be gained from having the required education and experience.

The Region III inspectors indicated to the licensee that due to the liberal interpretation of the aforementioned requirements by Bechtel in the qualification and certification of electrical QC inspectors, the acceptability of the inspections performed by these persons is indeterminate at this time. It was requested that CPCo QAE perform an audit of the QC department to verify the adequacy of training, qualification and examination of the personnel prior to certifying them as Level I or Level II, as applicable, QC inspectors. Pending review of the QA audit report, this matter is unresolved. (329/81-12-08; 330/81-12-09)

No items of noncompliance were identified.

3. Review of Raceway Rework Controls

The Region III inspectors reviewed the licensee's method of controlling the rework of items previously inspected and accepted by Quality Control, such as electrical raceway. The initial installation of raceway is controlled by Bechtel Power Corporation (BPC) Procedure FPE-3.000. When a raceway design change requires rework, a new raceway card is issued by the Bechtel Ann Arbor design office. The rework of such raceway is then controlled by BPC Procedure FPE-1.000.

The Region III inspectors questioned the licensee's contractors Field Engineers concerning the rework of raceway when there are no design changes, e.g., rework consisting of the removal and subsequent reinstallation of the raceway to the original installation drawings and specifications. The inspectors requested to see the procedure being used to control such rework and were given a copy of an unapproved procedure that was being used by the Field Engineering Department. During further investigation by the Region III inspectors, it was determined that the lack of approved rework procedures had been previously identified by Bechtel Quality Assurance on Audit Finding Report (AFR) No. SA-97, dated April 3, 1980. Under Section 10(b), Recommended Actions, of the AFR it states, "Establish procedures for control of the alteration and/or removal of previously Q.C. accepted components. For example: Provide control for "ripout" of welds, cable trays, pipe sections, etc." This finding was closed on July 22, 1980, without such procedures having been established. Consumers Power Company (CPCo) AFR No. M-01-02-1-06 dated January 27, 1981, re-identified the rework of raceway without documented and approved procedures. As of May 22, 1981, approved procedures for rework of electrical raceway have not been developed.

The Region III inspectors informed the licensee that the above is an example of failure to take prompt corrective action and that this was an item of noncompliance, contrary to 10 CFR 50, Appendix B, Criterion XVI. (329/81-12-09; 330/81-12-10)

4. Review of Quality Assurance Records - Quality Action Requests

The Region III inspectors reviewed Quality Action Requests (QAR) Nos. F-032 and F-033 and determined the following:

- a. QAR No. F-032, dated March 25, 1981, identified that the Electrical Construction Quality Trend Graph B-2 for the period of January 22, 1981 thru February 17, 1981 showed an increase in deficiencies over those of previous periods. The indicated cause for this increase was construction not assuring completion of and/or not installing the items per drawings and specifications prior to reporting the item complete. Construction was requested to take corrective action to reduce and/or eliminate these deficiencies in the future and to provide MPQAD with a response that states the corrective action to be taken. Examples of items identified were:

- (1) Threads not coated.
- (2) Unapproved coatings.
- (3) Uninsulated conduit bushings.
- (4) Anchor bolt problems.
- (5) Too many bends between pull points.
- (6) Exceeding the maximum cable pull tensions.

The reported action taken was to instruct construction to make a closer inspection of raceway prior to sign-off and reporting the item complete. A contributing factor identified by construction was the increase in production by a factor of two. QAR F-032 was closed on April 13, 1981.

The Region III inspectors noted that the B2 Graph for the period of March 1, 1981 thru March 31, 1981 showed a decrease in the number of deficiencies.

- b. QAR No. F-033, dated March 25, 1981, identified that the Electrical Construction Quality Trend Graph B3 for the period of January 22, 1981 thru February 17, 1981 showed an increase in deficiencies over those of previous periods. The indicated cause for this increase was Field Engineering not assuring the completion of work prior to reporting the item ready for final inspection. Field Engineering was requested to take corrective action to reduce and/or eliminate these deficiencies in the future and to provide MPQAD with a response that states the corrective action to be taken. Examples of areas identified were:

- (1) Anchor bolts.
- (2) Supports.
- (3) Coating of welds.
- (4) Separation.
- (5) Cable splices.
- (6) Cable tie downs.

The reported action taken was to instruct Field Engineering to make a closer inspection of items prior to sign-off and turnover to Quality Control for acceptance inspection. A contributing factor identified was the increase in production by a factor of two. QAR F-033 was closed on April 13, 1981.

The Region III inspectors noted that the B2 Graph for the period of March 1, 1981 thru March 31, 1981 showed a decrease in the number of deficiencies.

No items of noncompliance were identified.

5. Storage of Electric Cable - Cable Storage Yard

The Region III inspectors made a tour of the electric cable storage yard. Items checked were as follows:

- a. Storage area free of weeds.
- b. Storage area contoured to provide drainage.
- c. Cable receiving area identified.
- d. Cable/cable reels stored on dunnage.
- e. Cable separated as to type.
- f. Cable reels identified as to type, footage, etc.
- g. Cable ends sealed.
- h. Nonconforming cable segregated and/or identified.
- i. Excess cable/cable reels identified.
- j. Cable stored so as to prevent damage from vehicle traffic.

No items of noncompliance were identified.

SECTION V

Prepared By: I. T. Yin

Reviewed By: D. H. Danielson, Chief
Materials and Processes Section

1. Review of Procedures and Specifications

In conjunction with observation of large bore pipe system installations and inspection of small bore piping design activities at the site on May 18-21, 1981, the inspector reviewed the following Bechtel procedures and specifications, and had no adverse comments:

- . QCI C-1.50, "Installation and Testing of Expansion Anchors," Revision 7, dated July 29, 1980.
- . QCI P-2.10, "Pipe (Component) Supports Installation," Revision 6, dated April 21, 1981.
- . QCI P-2.00, "Pipe (Component) Supports Final Setting," Revision 5, dated April 13, 1981.
- . Bechtel Engineering Department Project Instruction EDPI-4.46.9, "Project Engineering Review of Field Mark-up Working Prints (Redlines)," Revision 0, issued on November 7, 1980.
- . Bechtel Technical Specification 7220-M-366(Q), "Field Fabrication of ASME Section III Pipe Supports, Hangers, and Restraints for 2½ Inch and Larger Piping in a Nuclear Power Plant," Revision 3, dated May 13, 1980.
- . Bechtel Technical Specification 7220-C-305(Q), "Design, Furnishing, Installation and Testing of Expansion Type Concrete Anchors," Revision 13, dated December 30, 1980.
- . Bechtel Technical Specification 7220-M-326(Q), "Installation, Inspection, and Documentation of ASME Section III Pipe Supports, Hangers, and Restraints for Piping in a Nuclear Power Plant," Revision 6, dated February 6, 1981.
- . Bechtel Technical Specification 7220-M-343(Q), "Design, Documentation, and Field Fabrication of ASME Section III Pipe Supports, Hangers, and Restraints for Pipe 2 Inch or Smaller," Revision 6, dated November 24, 1980.
- . Bechtel Engineering Department Procedure, EDP-4.37, "Design Calculations," Revision 2, dated May 27, 1976.
- . Bechtel Manager of Engineering Directive, MED-4.37-0, "Design Calculations," Revision 15, dated January 21, 1981.

Bechtel MED 4.37-1, "Design Calculations - Piping Stress Analysis Instructions," Revision 2, dated November 30, 1979.

No items of noncompliance were identified.

2. Inspection of Large Bore Pipe Suspension System Component Installations

On May 18-19, 1981, the inspector observed approximately 100 installed large bore pipe hangers, restraints, anchors, and snubbers in the Unit 1 and Unit 2 Containment Buildings and in the Auxiliary Building. Ten restraints and anchors were selected for an in-depth review and resulted in the following findings:

a. Rigid Frame Support FSK-M-2HBC-181-1-H5 (Q)

This restraint was installed in the Auxiliary Building, Fl. El. 584, Decay Heat Removal Heat Exchanger Room No. 125. Thick washers were observed at one of the concrete expansion anchor bolts. The 2" embedment length for the 5/8" bolt was authorized by Bechtel field engineer on September 12, 1980. The calculation for the Red Line No. SH-1545 was properly prepared and reviewed. QC inspection was completed on September 24, 1980.

b. Rigid Frame Support FSK-M-1HBC-153-H2 (Q)

This restraint was installed in the Auxiliary Building, Fl. El. 599, Make Up Pump Room No. 214. Questions were raised relative to the requirement for jam nut installation. However, the inspectors questions were adequately resolved.

c. Rigid Frame Assembly 4-2CCB-79-H4

This restraint was installed in the Auxiliary Building, Fl. El. 599, Make Up Pump (1VM-51C) Room No. 212. One of the 5/8" J-type concrete expansion bolts of 6 1/2" length was cut. The UT record, dated December 10, 1980, indicated 6" actual length. This length was considered to be acceptable. The anchor bolt installation was QC inspected and accepted on December 18, 1980. In regard to the concrete anchor bolt installation locations, the inspector observed bolts installed only 2" from the embedment plate. This is in violation of Bechtel Specification 7220-C-305 (Q), Table 4.2 requirements. This nonconformance was accepted by Bechtel Field Engineering (Red Line No. LH 4276, dated October 8, 1980) with instructions that "Paint Embed for Non-use 12" above and below each bolt." The instruction was based on the requirements established in Bechtel Drawing No. C-143 (Q), "Project Civil Standards Reinforcing Concrete General Notes and Details," Sheet 4, Revision 4, dated October 27, 1980, where it was stated in Note No. 39, that "Inserts may be interrupted for grouted and expansion anchor bolts where insert is interrupted for anchor bolts, no attachment is permitted to insert for a distance above and below the anchor bolts of 12" (from center line of anchor bolts)." However, the embed was not painted and the installation had been inspected and accepted by QC personnel on December 23, 1980.

d. Rigid Frame Restraint FSK-M-1FCB-46-1-H1

This restraint was installed in the Auxiliary Building, Fl. El. 568, Spray Pump and Decay Heat Removal Pump Room No. 27. The clearance between the 3/4" pipe and the restraint was measured to be 5/32", which exceeds the Bechtel Standard Drawing FSK-M-PGS-104(Q) and Bechtel Specification 7220-M-326(Q) requirements. The maximum acceptable gap should be 1/8". The installation was QC inspected and accepted on May 19, 1980.

e. Rigid Frame Restraint 18-1HCB-2-H13

This restraint was installed in the Auxiliary Building, Fl. El. 568, Reactor Building Spray Pump and Decay Heat Removal Pump Room No. 27. Clearances on one of the restraint contact locations was measured to be from 1/16" to more than 3/8". By calculation, the fabrication angle exceeded the 2° established in Bechtel Specification 7220-M-366(Q), Paragraph 5.4.1, which states that "Dimensional tolerances apply to fabrication of component pipe supports where the tolerances are not explicitly stated. The angles, formed or torch cut, should be ±2°." The installation was QC inspected and accepted on May 5, 1980.

Furthermore, since portions of the clearance was 3/8" or more and exceeded the Bechtel Specification 7220-M-325(Q) tolerance, the applicability of Bechtel Specification 7220-M-366(Q) was questionable. This is an unresolved item. (329/81-12-10; 330/81-12-11)

f. Sliding Stanchien Assembly 2HBC-124-H7

This assembly was installed in the Auxiliary Building, Fl. El. 584, Decay Heat Removal Exchanger Room No. 125. Fair sized gaps covering large areas were observed between the concrete wall surface and the base plate. The condition was contrary to Bechtel Specification 7220-M-326(Q) Paragraph 5.11.1 requirements, which state that, "The clearance between the concrete walls and the structural attachment plates should not exceed 1/16 inch over a maximum of 20% of the bearing area; otherwise grouting is required to ensure proper bearing." The assembly was QC inspected and accepted on September 5, 1980.

g. Rigid Frame Assembly 12-2HBC-124-H5R

This assembly was installed in the same area as Item f above. Holes were drilled within the shear cone areas of the installed concrete expansion anchor bolts. The distance was measured to be 5 inches from the center of the 1½" bolt to the edge of one of the holes. This condition is in violation of Bechtel Specification 7220-C-305(Q), Table B-3 which requires that the distance for the 1½" dia. bolt under these conditions should not be less than 7½ inches. The assembly was QC inspected and accepted on March 18, 1980.

h. Anchor 2½"-1CCB-2-H7

The pipe anchor assembly was installed in the Auxiliary Building, Fl. El. 599, Make Up and Purification System Room No. 214. Drop-in type concrete anchor bolts of ½" diameter and 1" long were observed installed approximately 1½" from 5/8" structural concrete expansion anchor bolts. This violation is similar to the problem described in Item g above. The anchor assembly was QC inspected and accepted on October 14, 1980.

i. Sway Strut FSK-M-2HBC-137-3-H3 (Q)

The strut unit was installed in the Auxiliary Building, Fl. El. 599, Make Up Pump Room 213. An improper sized bolt spacer was observed installed in the pipe clamp, causing a large space between the pipe and the clamp shoes. The unit had not been QC inspected.

j. Rigid Restraint 3" - 2HBC-216-H5

The unit was installed in the Auxiliary Building, Fl. El. 645, Chiller Room No. 506. No problems were identified.

The piping suspension system components that were not constructed and installed in accordance with the drawing and specification requirements, as stated in Paragraphs c - i above are considered to be a deficiency in the pipe hanger program. This is an item of noncompliance, contrary to 10 CFR 50, Appendix B, Criterion V. (329/81-12-11; 330/81-12-12)

The failure of the QC inspectors to identify the above installation deficiencies is considered a lack of sufficient QC inspection, program implementation. This is an item of noncompliance, contrary to 10 CFR 50, Appendix B, Criterion X. (329/81-12-12; 330/81-12-13)

3. Review of Site Small Bore Piping Design Activities

The inspector reviewed the subject activities at the site Bechtel Small Bore Piping Design Center on May 19-21, 1981.

a. Design Control

The inspector selectively reviewed several of the small bore pipe system isometric drawings that had been issued for fabrication and installation, and had the following findings:

(1) FSK-1-HCB-271-1, Revision 2

Piping stress calculations including summary sheets were not included in the design package.

(2) FSK-1-GCB-36-2, Revision 2

Piping stress calculations including summary sheets were not included in the design package.

(3) FSK-MO-2HCB-136-2

The preliminary stress calculation package dated November 6, 1980, contained sufficient stress summaries, references, and design basis documentation.

(4) FSK-M-0HCC-58-3, Revision 3

Piping stress calculations including summary sheets were not included in the design package.

(5) FSK-M-2HBC-138-1

The preliminary stress calculation package dated November 6, 1980, contained sufficient stress summaries, references, and design basis documentation.

In discussion with the Small Pipe and Hanger Group Supervisor, the inspector was told that the stress calculations will be performed after the "stress walkdown" approximately ninety days prior to the system turnover for startup testing. The inspector stated that failure to document stress calculations prior to issuance of drawings for construction is in nonconformance with Bechtel EDP-4.37, Revision 2, Paragraphs 7.5 and 8.3, which state that, "Calculations shall be checked and approved, in accordance with these procedures, prior to issuing drawings for construction,..." Exceptions to this requirement shall be approved by the Project Engineer," and "To ensure follow-up and finalization of incomplete work, preliminary calculations tentatively committed to final design work are filed, after review, in a separate binder entitled, "Committed Preliminary Design Calculations (CPDC)." This is an item of noncompliance, contrary to 10 CFR 50, Appendix B, Criterion III. (329/81-12-13; 330/81-12-14)

On May 21, 1981, the licensee informed the inspector that, as of that date, 1363 isometric drawings had been issued for construction. The total number of stress calculations involved was 924. Among these, 174 were considered to meet the CPDC status and 750 lacked sufficient stress analysis documentation.

b. Document Control

During the above design control review on May 19 and 20, 1981, the following document control deficiencies were identified at the Small Bore Piping Design Center:

- (1) An out-of-date copy of Bechtel Specification 7220-M-343(Q), Revision 3, dated January 18, 1979, for field design of 2"

and smaller piping systems, was presented to the inspector by the Small Pipe and Hanger Group Supervisor during the course of technical discussions. Subsequently, it was identified that the Specification should be Revision 6, dated November 24, 1980. The Supervisor was not aware of the revision, and as a result the copy used by him had not been stamped "Superseded."

- (2) In review of Bechtel hanger calculation No. 412-2-11, (FSK-M-1HCB-271-1, Revision 2), performed on March 12, 1980 and checked on March 22, 1980, it was observed that the hanger design loads were not in accordance with Specification 7220-M-343 (Q) values. Subsequently it was determined that the design loads had been superseded by AP Engineering, Inc. calculation, dated February 24, 1981. However, the original hanger calculation sheet was not marked "Superseded."
- (3) In conjunction with the design calculation review, it was identified that the specific revision number of the specification or procedure, on which the calculation was based, was not included in the calculation package. The inspector could not determine if the design had been based on applicable up-to-date criteria.

This is an item of noncompliance, contrary to 10 CFR 50, Appendix B, Criterion VI. (329/81-12-14; 330/81-12-15)

c. Control of Installation Changes

Due to design changes and interferences, approximately 5,600 feet of installed small bore piping, including suspension systems, inside the Auxiliary Building was removed between December 1980 and May 14, 1981. In fact, since late 1979 27 area task forces were assigned to coordinate the various installation change activities for about 20 different areas in the Auxiliary Building.

The inspector noted that procedural provisions to control the effects of design revisions on small bore piping and piping suspension systems were questionable in the following areas:

- (1) Design instructions on how to modify the existing installed system; what parts of the system will be changed, what to do with the removed components, and what measures should be taken to control field and shop weld locations and identification.
- (2) Voiding of the portion of installed and inspected system records that were revised by design changes.

- (3) If the cut-off portions, including hangers, are to be installed in a different system, instructions on how to transfer installation or QC records (travelers, FCR's, DCN's, NCR's, etc) into the new piping system record files.
- (4) QC inspection records will not be assembled until just before system turnover. What measures will be taken to ensure effective QA audit and surveillance under these conditions?

This is considered an unresolved item. (329/81-12-15; 330/81-12-16)

4. Audits of Site Small Bore Piping Design Activities

On May 20-21, 1981, the inspector reviewed the following licensee and Bechtel QA audits and review of small bore pipe design activities at the site:

- . CP Audit Report No. M-01-24-0, performed on September 24 - October 13, 1980. Audit areas included the small pipe and support design process including review and approval, document control, and personnel training. Nine findings were identified.
- . CP Audit Report, No. M-01-17-1, performed on April 8 - 10, 1981. Audit areas included staff implementation of EDP's and control of Red lined Drawings. One finding was identified.
- . Bechtel audit report of audits performed on December 11, 1979 in the areas of support design. Eleven findings were identified.
- . Bechtel audit report of audits performed on July 8, 1980 on stress calculations. No deficiencies were identified. The report stated that, "The stress calculations were found to be in accordance with standard engineering practice."
- . Bechtel QA Management Audit performed on August 25 - 29, 1980, at the site and at the Ann Arbor office in the areas of piping and pipe supports. Audits in small pipe design included Red Line drawing control and pipe hanger calculations.
- . Bechtel QA Audit from May 18, 1981 to May 22, 1981. No discrepancies were identified in the hanger calculations.

Subsequent to the audit report review and discussions with the responsible CP and Bechtel staff, the inspector concluded that there were inadequate audits and surveillances of the site small bore pipe and hanger design activities. The determination was based on:

- a. Piping stress analysis was not audited by CP. Where the piping stress analysis was audited by Bechtel QA, the MED 4.37-1, "Design Calculations - Piping Stress Analysis Instructions", Revision 2, dated October 16, 1979 requirements were misinterpreted. The Bechtel small pipe design staff and QA staff interpreted Paragraph 9.0 of MED 4.37-1, which states, "the period following reconciliation of all as-built piping drawings with the stress

analysis" to mean no formal stress calculations will be documented prior to system installation and walkdown verification. The measures taken are in direct violation of EDP-4.37, Revision 2 requirements including Paragraphs 7.5 and 8.3 as discussed in Paragraph 3.a of this section of this report.

- b. CP Audit Report No. M-01-24-0, performed on September 24 - October 13, 1980, identified a large number of deficiencies in small bore piping suspension system design. Consistent deviations from Bechtel EDP-4.37 relative to the design review of weight calculations, thermal analysis, pressure effects, nozzle movements, checking and verification of design basis, and completeness in documentation were identified in the report, however, there was no technical audit followup in the first two quarters of CY 1981, and there were no audits planned for site small bore design activities for the third quarter of CY 1981.

This is an item of noncompliance, contrary to 10 CFR 50, Appendix B, Criterion XVIII. (329/81-12-15; 330/81-12-16)

Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of non-compliance, or deviations. Unresolved items disclosed during the inspection are discussed in Section I, Paragraph 2.b; Section II, Paragraphs 3.a and 3.b; Section III, Paragraph 7; Section IV, Paragraphs 1.b and 2; Section V, Paragraphs 2.e and 3.c.

Exit Meeting

The inspectors met with licensee representatives (denoted under Persons Contacted) for update meetings on May 19, 20 and 21, 1981, and conducted an exit meeting at the conclusion of the inspection on May 22, 1981. The inspectors summarized the purpose and findings of the inspection. The licensee acknowledged the findings reported herein.

Based on discussions between the licensee representatives and the NRC inspection staff on May 22, 1981 an Immediate Action Letter (IAL) was issued by Region III to ensure immediate and effective corrective action regarding each of the adverse issues identified in Section V of this report (piping and pipe supports).

May 22, 1981

Docket No. 50-329
Docket No. 50-330Consumers Power Company
ATTN: Mr. James W. Cook
Vice President
Midland Project
1945 West Parnall Road
Jackson, MI 49201

Gentlemen:

Based on Discussions between Mr. J. W. Cook and Mr. R. C. Knop on May 22, 1981, we understand that you will not issue fabrication and construction drawings for the installation of the safety related small bore pipe and piping suspension systems until steps one through four below have been completed and audited.

1. MED 4.37-0 will be revised to include requirements that the specific revision number of the specification or procedure, of which the calculation was based on, is identified in the calculation package. (Note: This action was completed on 5/21/81 by issuance of Revision 16 of MED 4.37-0).
2. Conduct document control review to ensure that all the applicable up-to-date specifications and procedures are in place in the work locations.
3. Conduct training on MED 4.37-1 (Design Calculations), the importance of following QA procedures in general, and use of specification M 343 for all personnel within the small bore piping design group performing stress analysis for safety-related piping.
4. Establish plans and schedules to review all small bore piping isometrics that have been issued without supporting calculations properly packaged to the revised MED 4.37-1 requirements.
5. Perform the reviews identified in Item 4, above, to accomplish the following:
 - a. Bring the calculation documentation up to the level required by MED 4.37-0, Rev. 16.
 - b. Ensure that the calculations are technically adequate.

In conducting those reviews, the highest priority shall be given to

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NOTIFICATION LETTER

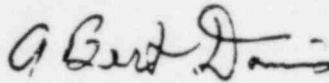
Midland
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July 22, 1961
piping isometric drawings issued for construction but not yet installed, in the order of installation.

6. During the conduct of the reviews, identified in items 4 and 5, you will document all discrepancies and will notify cognizant NRC Region III staff of any significant discrepancy. (An example of a significant discrepancy is if the reviewed calculation indicates that stresses in the pipe that is depicted on an isometric drawing issued for construction exceed code allowables).
7. Audits will be conducted at completion of steps one through four, and periodically during steps five and six, to ensure adequacy of the program.

Please inform us immediately if your understanding of these items is different from that stated above.

Sincerely,



for James G. Keppler
Director

cc: Central Files
Reproduction Unit NRC 20b
PDR
Local PDR
NSIC
TIC
Ronald Callen, Michigan Public
Service Commission
Myron M. Cherry, Chicago