

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

REGION III

Report No. 50-329/77-13; 50-330/77-15

Docket No. 50-329, 50-330

License No. CPPR-81, CPPR-82

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

Facility name: Midland Nuclear Power Plant, Units 1 and 2

Inspection at: Midland Site, Midland, MI

Inspection conducted: November 29-December 2, and December 5-8, 1977

Inspectors: R. J. Cook

R. J. Cook

1/10/78

K. R. Naidu

for K. R. Naidu

Approved by: D. W. Hayes, Chief
Projects Section

T. E. ...

1/10/78

Inspection Summary

Inspection on November 29-December 2, and December 5-8, 1977 (Report No. 50-329/77-13; 50-330/77-15)

Areas Inspected: Work activities and quality records related to concrete placement Unit 1; procedures, quality records and work activities related to the installation of safety related components Units 1 and 2; procedures and quality records related to containment structural steel, safety related structural steel and welding activities Units 1 and 2. This inspection involved a total of 81 inspector-hours onsite by two NRC inspectors.

Results: No items of noncompliance or deviations were identified.

8006090 743

DETAILS

Persons Contacted

Consumers Power Company (CPC)

- *W. Bird, Section Head, Quality Assurance Engineering
- *J. Corley, Quality Assurance Superintendent
- *D. Keating, Field Quality Assurance Engineer
 - P. Kiner, Field Quality Assurance Engineer
 - T. Black, Field Quality Assurance Engineer
 - M. DeWitt, Field Quality Assurance Engineer
- *P. Jacobsen, Quality Assurance Engineer
- *B. Peck, Construction Supervisor

Bechtel Power Corporation (Bechtel)

- *J. Boos, Project Field Engineer
 - B. Cheek, Lead Civil Quality Control Engineer
 - J. Behress, Head Piping and Mechanical Quality Control Engineer
- *G. Richardson, Lead Quality Assurance Engineer
- *H. Foster, Assistant Project Field Quality Control Engineer
 - A. Boulden, Head Welding Quality Control Engineer
 - S. Marrow, Head Receipt Inspector
 - R. Maes, Craft Superintendent
 - J. Miller, Material Storage and Maintenance Engineer
 - J. Hill, Material Storage Supervisor

Other personnel were contacted during the course of the inspection.

*Denotes those present at the exit interview.

Functional or Program Areas Inspected

SECTION I

Prepared by: R. J. Cook

Reviewed by: D. W. Hayes, Chief
Projects Section

1. Observation of Structural Concrete Activities (Unit 1)

The RIII inspector observed the concrete placement for the service water intake (SWI) structure slab No. 2 and preplacement activity for parapet wall No. 13 and determined that work and inspection activities were being accomplished according to applicable specifications; codes and drawings in the following areas.

a. Placement Preparation

- (1) Forms were properly secured, leak tight, and clean.
- (2) Rebar and other embedments were properly placed according to applicable drawings C-80 and associated drawings for the SWI pour and drawings C-207, C-271, C-299, and C-278 for the parapet wall.
- (3) Preplacement inspections had been completed prior to placement.

b. Delivery and Placement

- (1) Mix C-2 was specified and delivered to the SWI pour No. SWI (634.5)b.
- (2) Duration of concrete mixing and transportation was within the specified limits.
- (3) The piping material for pumping concrete was acceptable.
- (4) Testing was being performed at specified intervals at the placement site using calibrated equipment and met acceptance criteria; samples were being collected at the end of the line.
- (5) Temperature of the concrete was within specified limits for cold weather placement.
- (6) Adequate crew and equipment were being utilized during concrete placement. Vibrators were observed to be

properly used and the free fall was limited to less than five feet.

- (7) Inspections were being performed by qualified persons. During the inspection, the licensee performed specialized training in concrete test acceptance criteria for those personnel intimately involved in concrete placement. This was done to insure that the information U. S. Testing possessed for concrete placement was compatible with the applicable specifications and the requirements of Bechtel QC.

c. Aggregate and Cement Storage

- (1) Cement storage appeared to be adequate.
- (2) Aggregate storage was in separated piles, piles appeared to be stored in acceptable heights.

d. Curing

The RIII inspector noted that heated enclosures were used to protect the placed concrete from the cold weather conditions. Heat was supplied from portable heaters.

e. Batch Plant Operation

- (1) Measuring equipment appeared to be calibrated as indicated by attached calibration stickers.
- (2) Temperature was being maintained within specifications for cold weather conditions.
- (3) QC inspectors were present in the batch plant during the production of concrete.
- (4) Generation and control of batch records appeared to be adequate.

In the areas inspected, no items of noncompliance or deviations were identified.

2. Review of Containment Structural Concrete Quality Records (Unit 1)

The RIII inspector reviewed the pertinent work and quality records associated with two Unit 1 containment wall pours from elevation 754'-5" to 764'-7" and 764'-7" to 774'-9". Consumer Power Company QA overview records for Unit 1 containment wall pours from

elevations 744'-3" to 754'-5" and 754'-5" to 764'-7" were also reviewed. It was determined that the records reflected work accomplished consistent with applicable requirements in the following areas.

a. Preplacement Preparation

Preplacement records designated C1.20-338 and C1.20-400 indicated that preplacement inspections were performed and identified no adverse findings.

b. Delivery and Placement

- (1) Placement records designated C1.30-338 and C1.30-400 indicated that the mix specified was delivered and placed.
- (2) Records of batches delivered were on file and retained with the above referenced placement records.
- (3) The placement records noted above indicated that required tests of placement were taken and that concrete which met the specifications was placed.
- (4) Inspection records did not identify adverse conditions relative to segregation, consolidation, and temperature.
- (5) Records of the inspection personnel indicated that they were qualified.

c. Curing

Curing records designated C1.40-338 and C1.40-400 indicated that the placement was properly cured and that the forms were removed after the specified interval.

d. Rebar Splicing

- (1) Rebar splicings were performed according to the pertinent drawings.
- (2) The rebar splicing technique was qualified by users tests.
- (3) Rebar splicing records designated C6.00-611 indicated required tests for splicings were performed and determined acceptable.

- (4) Results of inspection records did not identify adverse conditions.
- (5) Rebar splicing records indicated that the Cadweld crew and inspection personnel were qualified.

e. Concrete Materials

- (1) Batch plant inspection and material control records designated C4.10-159 and C4.10-162 indicated that the material meets applicable specifications.
- (2) Inspection records indicated that the established requirements were met relative to the control of material receipt, handling, and storage.
- (3) Material test laboratory surveillance records designated SC1.05-41 and SC1.05-43 indicated that audits of the testing laboratory activities had been performed.

f. Batch Plant Operation

Production records for the placements identified no adverse findings.

No items of noncompliance or deviations were identified in the above areas.

3. Observation of Work and Storage Activities for Safety Related Components (Units 1 and 2)

The RIII inspector observed and reviewed relevant records pertaining to storage, installation, and protection of Unit 1 primary coolant pumps, Units 1 and 2 primary coolant pump motors, decay heat removal heat exchanger 2E-60B, makeup pump 1P-58B, decay heat removal pumps 1P-60B and 2P-60B, and four outside diesel fuel oil storage tanks.

The inspector determined the following activities for the above components met applicable requirements.

a. Storage and Protection

- (1) Storage environment protection for primary coolant pumps, primary coolant pump motors, and diesel fuel oil storage tanks.

- 2) Cleanliness preservation and protection for all above listed components.
- (3) Surveillance during storage for primary coolant pump motors and decay heat removal heat exchanger.

b. Installation

- (1) Review of QC inspection procedures revealed provisions for ensuring that component placement locations are made relative to applicable prints and surveyor markings for Bechtel installed equipment.
- (2) Component placement and mountings for makeup pumps and decay heat removal pumps were examined. The licensee is evaluating the present technique of shimming and grouting of pump base supports.

c. Protection After Installation

Installed decay heat removal pumps and decay heat removal heat exchangers were found protected against adverse external conditions.

The licensee is presently evaluating the need for maintaining specialized environmental conditions on heat exchangers and vessels which are completely installed.

In the areas inspected, no items of noncompliance or deviations were identified.

4. Review of Procedures for Safety-Related Piping (Units 1 and 2)

The RIII inspectors reviewed the procedures utilized by the construction contractor, Bechtel Corporation, for activities relative to safety related piping and valves and in-line component installation. It was determined that adequate procedures exist to control the following activities according to applicable requirements.

- a. Quality Control procedures identify items where QC inspection is required.
- b. Material receiving inspection Report No. R-100 contains provisions to document the following aspects (where applicable) of receipt inspection:
 - (1) Piping material is in conformance with purchase specifications and any special requirements.

- (2) Marking and identification are as specified.
 - (3) As-received cleanliness and protection meets requirements.
 - (4) Receiving inspection reports are generated as required.
- c. Procedure for Storage and Maintenance of Equipment and Materials No. FPG-4.000 and QC Procedure PQCI-S-1.00 covers storage and issue of piping, valves, and in-line components and contains requirements to verify the following:
- (1) Segregation of sizes and types of material.
 - (2) Storage identification.
 - (3) Storage condition and protection.
 - (4) Confirmation of issue of specified material.
 - (5) Storage and issuance records are generated as specified.
- d. Master QC Instruction Nos. P-1.00, P-1.10, and P-1.30 and Specification Nos. 7220-M-204(Q), 7220-M-214(Q), and 7220-M-326(Q) cover handling of piping valves and in-line components and include provisions to assure adequate protection during receipt, storage, issuance, and installation. In addition they assure that the following meet applicable requirements:
- (1) Location.
 - (2) Fit-up clearances.
 - (3) Type, size, location, and adjustment of hangers and restraints.
 - (4) Nondestructive examination and inspections.
 - (5) Control of cold spring.
 - (6) Installation records generated during work performance.
- f. The above listed procedures address post-installation cleaning of safety-related piping including the following:
- (1) Types of cleaning materials and use of these materials.

- (2) Established cleanliness criteria.
- (3) Adequate record keeping requirements.

No items of noncompliance or deviations were identified in the above areas.

5. Review of Procedures for Safety-Related Piping Welding Activities
(Units 1 and 2)

The RIII inspectors reviewed the procedures utilized by Bechtel for welding activities relative to safety-related piping and determined that the Master Quality Control Instruction No. W-1.00 covered the following areas:

- a. Provisions to indicate the drawings and engineering specifications and appropriate hold points.
- b. Provisions to ensure that welding procedures are qualified to applicable requirements. Welding procedures are qualified at Bechtel, San Francisco Office.
- c. Provisions to assure that welding personnel are properly qualified.
- d. Provisions to utilize nondestructive examination procedures which conform to applicable codes and standards. The procedures are written by Bechtel's Material Quality Services Department and transmitted to Bechtel's Engineering Department at Ann Arbor, Michigan.
- e. Provisions to assure that nondestructive examination personnel are qualified to applicable requirements.
- f. Provisions to control contaminants in the use of penetrant testing.
- g. Provisions to assure that the following activities are documented:
 - (1) Weld location, system, and weld number.
 - (2) Welder's name and identification.
 - (3) Weld procedures used which also includes procedures used for repair.

- (4) Weld filler material used.
 - (5) Nondestructive test examination requirements.
 - (6) Nondestructive examination personnel name.
 - (7) Nondestructive examination results.
 - (8) Additional inspection requirements.
- h. Provisions to require procedures for the following heat treatment activities where applicable:
- (1) Preheat.
 - (2) Interpass temperature.
 - (3) Post weld controlled cooling.
 - (4) Stress relieving.
- i. Provisions to require procedures for the following NDE activities where applicable:
- (1) Evaluation of weld quality by the use of specified NDE Procedures.
 - (2) Evaluation of weld quality by visual examination.
 - (3) Evaluation of radiography quality.
- j. Provisions to provide control of welding material in the following areas:
- (1) Receipt verification and conformance to specifications.
 - (2) Control of pre-issue storage conditions.
 - (3) Storage identification and issue control.
 - (4) Post-issue control regarding identification, temperature and moisture.
 - (5) Disposition of issued but unused material.
- k. Provisions to cover defect repair where applicable in the following areas:

- (1) Defect removal techniques.
- (2) Defect removal verification.
- (3) Stress relief of repairs.
- (4) Acceptance of repair.

No items of noncompliance or deviations were identified in the above areas.

SECTION II

Prepared by K. R. Naidu

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

1. Review of Procedures for Steel Structures and Supports (Units 1 and 2)

The RIII inspector reviewed the procedures utilized by Bechtel Corporation (Bechtel), the construction contractor, for activities relative to containment structures and supports and structural steel and supports. It was determined that adequate procedures exist to control and assure that the following activities are performed according to applicable requirements.

- a. Quality Control procedures identify items where QC inspection is required.
- b. Material Receiving Inspection Report (QCIR) No. R-100 contains provisions to document the following aspects (where applicable) of receipt inspection:
 - (1) Steel components are in conformance with purchase specifications.
 - (2) Marking or other identification is as specified.
 - (3) Verify documentation on the components.
 - (4) Visual examination to determine damage during transit.
 - (5) Identification and traceability of the material.
 - (6) User's tests (if applicable).
 - (7) Release for storage.
 - (8) Review of Supplementary records.
 - (9) Exceptions taken to specifications.
- c. Procedure for Storage and Maintenance of Equipment and Materials No. FPG-4.000 covers storage and issue of steel material and contains requirements to verify the following:

- (1) Storage identification.
 - (2) Storage and issuance records.
- d. Inspection procedures which cover the installation of steel structures and supports contain requirements to assure that:
- (1) Type, size, location and tolerances of components meet applicable requirements.
 - (2) ND Examinations and inspections meet the applicable requirements.
 - (3) Installation records meet established procedures.

No items of noncompliance or deviations were identified in the above areas.

2. Review of Procedures for Structural Steel Welding Activities
(Units 1 and 2)

The RIII inspector reviewed the procedures utilized by Bechtel for welding activities relative to containment structural steel and safety related structural steel. It was determined that the Project Quality Control Inspection (PQCI) procedure W-1.00 cover the following areas:

- a. Provisions to indicate the drawings, engineering specifications and the relevant change notices.
- b. Provisions to assure that welding procedures and welding personnel are qualified to applicable requirements.
- c. Provisions to utilize nondestructive examination procedures written by Bechtel's Material Quality services department and approved by Bechtel's Engineering department (Ann Arbor).
- d. Provisions to utilize persons qualified by Bechtel's San Francisco Level III person to perform appropriate nondestructive examinations.
- e. Provisions to utilize qualified welders; welders performing AWS welding activities who do not weld during a 6 month interval are required to be requalified; welders performing ASME code welding activities who do not weld during a 3 month interval are required to be requalified.
- f. Contamination is controlled by the use of penetrants in spray cans for dye penetrant examinations.

g. The following information is documented in the QC inspection record:

- (1) Weld identity.
- (2) SA/ASTM material type including grade (material to material).
- (3) Material thickness.
- (4) Weld procedure used.
- (5) Filler material type, backing ring, purge gas, preheat temperature parameters, interpass temperature limitations.
- (6) NDE procedure numbers.
- (7) NDE sequence.
- (8) Postweld heat treatment procedure including temperature/time data.
- (9) Welder's symbol.
- (10) NDE results.
- (11) Final inspection results of the weld.

h. Supplementary records including review of the following:

- (1) Postweld heat treat records.
- (2) NDE test reports.

i. Provisions to use repair procedures.

No items of noncompliance or deviations were identified in the above areas.

3. Review of Quality Records for Structural Steel and Supports (Units 1 and 2)

The RIII inspector selectively reviewed the Quality Records on the following items:

Containment liner plates
Penetration pipe assemblies
Embedments
Steel beam

The inspector determined that records exist to confirm that quality requirements have been met in the following areas:

a. Containment Liner Plates

Material Receiving Report (MRR) No. 2220 dated July 1, 1971, indicates that Southern Boiler and Tank Works Inc, (SBTW) Memphis, Tennessee supplied the following liner plate assemblies which met the purchase specification C-50A.

MK D-4-18
MK D-9-8
MK RD-3-11
MK RD-3-15
MK RD-4-9
MK RD-4-10

- (1) Material test reports from Armco Steel indicate that the material conforms to ASTM-A-36/69.
- (2) Receiving Inspection Reports (RIR) indicate that some pieces of the Lower Dome Liner were damaged at the ends or corners. Nonconformance Report (NCR) No. 0094 was generated to document the damage; there was no documentation that the damage was repaired prior to installation. The inspector requested the licensee to review this matter with Bechtel and determine whether such records exist. This matter will be identified as an unresolved item, considering that damage occurred as early as 1971, when the control of NCR's may have been marginal and the fact that liner plates cannot be installed if the bent corners of the liner plate were not straightened. (329/77-13-01, 330/77-15-01)

b. Penetration Assemblies

MRR No. 1898 dated November 19, 1970, indicates that SBTW supplied penetration pipe assemblies piece marks R-16-R, R-21-R, R-1-R, R-5-R, R-4-R which met the purchase specification C-50A.

- (1) Material test reports from Armco Steel Corporation indicate that the material conformed to ASTM-A-36/69.
- (2) Receiving Inspection Reports indicate that certain components were received with unapproved heat numbers. NCR 0083

indicates that unapproved heat numbers 68212, 22281, 60215, 83E 774 were identified on some components of the assemblies; also that certain radiographs were missing. Records indicate that the missing radiographs were subsequently furnished; however, the matter of unapproved heat numbers was not addressed. The licensee informed the inspector that he will review this matter further with Bechtel. This matter is considered an unresolved item. (329/77-13-02, 330/77-15-02)

c. Embedments

- (1) MRR No. AEO-4205 dated August 31, 1977, indicates that Embed mark 1-11B(L)-R/B1 was purchased to Purchase Order (PO) 7220-F-16781(Q) to reflect the requirements of specification C-233. QCIR indicates no adverse findings in the following areas:
 - (a) Willste and Company Saginaw was the prime vendor.
 - (b) Paragon Steel Corporation was the subvendor.
 - (c) Certificate of Compliance from Willste and Company that the material conforms to ASTM-A-36.
 - (d) Shop inspected material.
 - (e) Identification and traceability.
 - (f) Release for storage and installation.
 - (g) Supplementary records.
 - (h) No exceptions were taken to specification requirements.
 - (i) Tests reports - Ultrasonic (UT) and Radiographic furnished by NDT services Inc, Plymouth, Michigan. The RIII inspector reviewed the UT reports and requested certain clarifications; it was not clear whether the UT was performed under water or why water couplant was used; the enclosed Distance Amplitude Curve (DAC) was incomplete. The Bechtel shop inspector identified as No. 355 signed the report and Bechtel was unable to explain the significance of the signature and confirm whether the signature indicated that Bechtel shop inspector reviewed the test report or witnessed the test. The licensee agreed to review this matter. This will be considered as an unresolved item. (329/77-13-03, 330/77-15-03)

The above embedment was observed to be installed in its intended location as a RC Pump return line embedd; QC preplacement inspection were in progress.

- (2) MRR No. AEO-2181 dated November 30, 1976, indicates that embeds E4 plate mark E11, D4 plate Mark E13, E4 plate mark E14, and A5 plate mark 1/359 met the specification C-233 requirements. The QCIR indicates no adverse findings in the following areas:

- (a) Haven-Busch, the vendor, supplied the material certifications confirming that the material conforms to ASTM-A-36.
- (b) Welding material certifications were acceptable.
- (c) Shop welding inspection records indicate several root passes were unacceptable; in those instances, the final passes were signed off by the vendor shop inspector without indicating whether the defects in root pass were repaired. The RIII inspector was unable to establish whether this was an error in documentation or deficiency in inspection. The licensee agreed to investigate this matter further with Bechtel and furnish details. This is considered an unresolved item. (329/77-13-04, 330/77-15-04)

d. Bechtel Shop Inspection Checklist

In the above instances, a Bechtel Form G 321D was duly signed by a Bechtel Shop inspector in Section 22.0 documenting the shop inspection was included in the QA records; however, the RIII inspector was unable to determine the prerequisites to be satisfied prior to the signoff in Section 22.0. The licensee informed the inspector that he would obtain documented instructions relevant to the prerequisites from Bechtel. This is considered an unresolved item. (329/77-13-05, 330/77-15-05)

e. Steel Beam

- (1) MRR No. C38 indicates that a steel beam shipped from New City Steel on March 16, 1976, arrived on site on March 17, 1976.
- (2) No shipping damages were identified.

- (3) Certificate of Conformances indicate that materials used conformed to ASTM-A-36-74 and ASTM-A-572-76B, Grade 50.

No items of noncompliance or deviations were identified in the above areas.

4. Observation of Containment Penetrations Work Activities (Unit 2)

The RIII inspector observed partially completed work and completed work activities relative to containment penetrations No. 2226 and 2227. The following was determined.

- a. Method of installation appeared to be consistent with work specifications.
- b. The location of the penetrations were at elevation 605'-0" angles 307° and 262°-30' respectively as indicated on drawing No. C-419 (Q), Revision 3 and were intended for the decay heat removal supply lines.
- c. Inspection activities were being performed as required by established procedures by qualified personnel.
- d. Measures were not established to protect installed penetrations from construction debris, physical damage and hostile environments. Bechtel specification M-204 titled "Technical Specifications for Field Fabrication and Installation of Piping for Nuclear Service," Section 5.21 in part states, "Care shall be taken in handling and installation of piping to prevent surface damage"; however, protection of installed penetrations was not addressed. Section 6.4 requires open pipe and to be capped; all open ended caps were observed to be capped. The inspector informed the licensee that procedures should be established to protect installed penetrations. This matter is considered an unresolved item. (329/77-13-06, 330/77-15-06)

No items of noncompliance or deviations were identified in the above areas.

5. Review of Containment Structures Welding Records (Unit 2)

The inspector reviewed QC Inspection Plan No. C-111-111 which documented the inspections for the fabrication of (Unit 2) dome subassembly plate RD-4-10 to RD-9-10. QCIP No. C-111-111 indicates that inspections were conducted in the following areas and were determined to be satisfactory:

- a. Weld edge preparation and fitup.
- b. Storage and disbursement of weld filler material.
- c. Qualified welders were used.
- d. Welding requirements conformed to ASME Code Section VIII, Division 1, paragraphs UW-26 to UW-38.
- e. Single groove welds with continuous backing strips were used.
- f. Completed welds were visually inspected.
- g. In addition to visual inspections, Radiography (RT), Magnetic Particle (MP), Liquid Penetrant (LP), Vacuum Box (VB), and Leak Chase Tests (LCT) were formed; no unacceptable indications were identified.
- h. Report No. 948 indicates that VB tests could not be performed on Seams A, B and C while the components were on jigs due to jig bracing; instead MP testing was recommended and performed as indicated below.
- i. Report No. 945 indicates that 100% MP testing was performed on seams A, B and C to procedure MT-Y, 2 Rev. 0; no unacceptable indications were identified.
- j. NDE inspectors were qualified to perform NDE inspections.

No items of noncompliance or deviations were identified in the above areas.

Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. Unresolved items disclosed during the inspections are discussed in Section II paragraphs 3.a(2), 3.b(2), 3.c(1)(i), 3.c(2)(c), 3.d and 4.d.

Exit Interview

The inspectors met with licensee representatives (denoted under Persons Contacted) at the conclusion of the inspection and summarized the scope and findings of the inspection. Licensee's comments are noted in the applicable sections of this report.