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

REGION III

Report No. 50-329/79-12; 50-330/79-12

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 Plant, Units 1 and 2

Inspection At: Midland Site, Midland, Michigan; Jackson, Michigan; and Ann Arbor, Michigan

Inspection Conducted: May 8-11, 1979

Inspectors: P. A. Barrett — 6/15/79

K. R. Naidu — 6/13/79

G. F. Maxwell — 6/13/79

W. A. Hansen — 6/13/79

Approved By: R. C. Knop, Chief
Projects Section — 6/15/79

Inspection Summary

Inspection on May 8-11, 1979 (Report No. 50-329/79-12; 50-330/79-12)
Areas Inspected: Control of material purchase and receipt inspection, design and design control, site quality assurance including the functions of auditing or surveillance inspections conducted by Consumers Power, Bechtel and Babcock and Wilcox, and corporate auditing of contractor actions. The inspection involved a total of 135 inspector-hours onsite or at the corporate offices of Consumers Power Company or Bechtel Power Corporation by four NRC inspectors.
Results: Of the four areas inspected, two items of noncompliance and a deficiency were identified in two areas. Inadequate drawing control, Section I, Paragraph 2.c; inadequate welding procedure qualification, Section IV, Paragraph 3.b; and inadequate material receipt inspections.

DETAILS

Persons Contacted

Consumers Power Company

*S. H. Howell, Senior Vice President
*B. W. Marguglio, Director of Quality Assurance
*G. S. Keiley, Project Manager
*D. B. Miller, Jr., Site Manager
*J. L. Corley, Section Head, Inspection Examination and Test Verification
*W. R. Bird, Section Head. QA Engineering
*T. C. Cook, Project Supervisor
M. J. Schaffer, QA Engineering Electrical Group Supervisor

Bechtel Power Corporation, BPC

*H. Wall, Area Manager
*J. Milandin, Quality Assurance Manager, Ann Arbor
*L. A. Dreisbach, Project Quality Assurance Engineering
*P. A. Martinez, Project Manager
*J. F. Newgen, Site Manager
*E. A. Rumbaugh, Manager of Engineering
*K. Wiedner, Engineering Manager
*C. Smith, Procurement Manager
*R. L. Castleberry, Project Engineer
*M. G. O'Mara, Quality Engineering Supervisor
E. Smith, QA Engineer
C. Baryla, Trend Analysis Coordinator

USNRC - RIII

*R. Cook, Resident Inspector
*R. C. Knop, Chief, Reactor Projects Section

The inspectors also contacted and interviewed other licensee and contractor personnel, including craftsmen, QA/QC, technical and engineering staff members.

*Denotes those attending the exit meeting.

Licensee Action on Previous Inspection Findings

(Open) Unresolved Item (329/79-01-03; 330/79-01-03): Nonconformance report (BWCC-NCR No. 459) was written to identify a crack that developed near the weld between the primary loop pipe rupture (whip) restraints and the embed plates. The unresolved item was prepared to identify possible weaknesses in the program of trend analysis. A detailed review of the trend analysis program was not made during the inspection of February 6, 1979, (Report No. 329/79-01) because of a lack of time. Pertinent parts of the trend analysis program were reviewed during this inspection.

The program was implemented and being performed as required by Bechtel Power Company procedures. The program provides a mechanism for trend analysis, however, there are some short comings in the system; the number of nonconformance report classification categories is very large and the level of authority of the engineer determining if deficiency reports should be included in the trend code chart should be reviewed by CPCo. The basis for determining if a problem should be elevated from the trend code charts which are distributed to lower level individuals to the monthly activity report that is distributed to individuals in management positions should be reviewed.

In Consumers Power Company letter Howe-121-79, dated April 24, 1979, concerning the diesel generator building, it was stated that an in depth review of the Bechtel trend program data would be undertaken by Bechtel Quality Assurance Management. This review is to assure the identification of areas similar to civil construction work that were not analyzed in sufficient depth in the past reviews. The data review was to complete by June 1, 1979. Based on the unresolved item identified in report No. 50-329/79-01; 50-330/79-01, and the short comings identified above, previously accumulated data along with the details of the trend analysis program should be evaluated.

Functional or Program Areas Inspected

Functional or program areas inspected are discussed in Sections I, II, III, and IV of this report.

Section I

Prepared by G. F. Maxwell

Reviewed by D. W. Hayes, Chief
Engineering Support
Section 1

1. Site Audits - Conducted by CPCo Site QA

a. The inspector selected and reviewed audits which CPCo site QA scheduled and conducted during 1977 and 1978. The documented results of the audits and schedules were compared with the applicable CPCo procedures (CPCo Topical Report CPC-1-A, Policy 18, CPCo procedures numbered 10, 25 and 29), ANSI N45.2 and ANSI N45.2.12. The audits which were selected covered the following areas of site construction activities:

(1) Bechtel site QA activities - reviewed CPCo audit report numbered F-77-16 (April, 1977).

(2) Bechtel site Electrical activities - reviewed CPCo audit reports numbered F-77-31 (August, 1977); F-77-45 (December, 1977) and F-77-46 (December, 1977).

(3) Bechtel site Civil activities - reviewed CPCo audit reports numbered F-77-25 (June, 1977); F-78-5 (February, 1978); F-78-11 (March, 1978) and F-77-1 (January, 1977).

(4) B&W site Mechanical activities - reviewed CPCo audit reports numbered M-01-51-8 (December, 1978) and M-03-26-8 (June, 1978).

(5) Zack site HVAC activities - reviewed CPCo audit reports numbered M-01-29-8 (August, 1978) and M-01-47-8 (October, 1978).

b. The inspector selected personnel from those who had participated in the afore listed audits. The inspector interviewed the selected personnel, reviewed their qualification records and found them to be in accordance with ANSI N45.2.12 and CPCo procedure numbered 28.

No items of noncompliance were identified.

2. Site Audits - Conducted by Bechtel Site QA

a. The inspector selected and reviewed audits which Bechtel site QA scheduled and conducted during 1976, 1977 and 1978. The documented results of the audits and schedules were compared with the applicable Bechtel procedures (Bechtel Topical Report BQ-TOP-1, Rev. 1A, Section 18.0 and procedure QADM C-5); ASNI N45.2 and ANSI N45.2.12. The audits which were selected covered the following areas of site construction activities:

(1) Electrical installation - reviewed Bechtel audit reports numbered 19-1-1 (March, 1976) and 19-1-4 (August, 1977).

(2) Structural work - reviewed Bechtel audit reports numbered 9-4-3 (October, 1977) and 18.6 (May, 1977).

(3) Bechtel QC inspection - reviewed Bechtel audit report 18-3-6 (August, 1977).

(4) Zack site HVAC - reviewed Bechtel audit report 25.6.1 (June, 1978).

(5) Bechtel document control - reviewed Bechtel audit reports 9-4-1 (August, 1975), 9-4-2 (August, 1976) and Bechtel San Francisco management audit of the site, OE-143 (March, 1978).

b. The inspector selected personnel from those who had participated in the afore listed audits. The inspector interviewed the selected personnel, reviewed their qualification records and found them to be in accordance with ANSI N45.2.12.

c. As a result of the reivew of the Bechtel San Francisco management audit, OE-143 (March, 1978) and subsequently Bechtel Quality Assurance Finding SA-39 (9-2-6) dated March 13, 1978, and closed June 7, 1978:

(1) The inspector observed that the audit report identified several instances where:

(a) Superceded drawings were not properly controlled to prevent their misuse.

(b) Drawings did not have the applicable FCN, DCN or FCR's attached to or referenced on them.

(2) Bechtel Quality Assurance Finding SA-39 (9-2-6) dated March 13, 1979, references for requirements FPD-3.000, Rev. 0, Paragraph 5.0, stating in part, "Document Control Clerk . . . in the case of change addenda, attaches on the back of the "Work Print" and fills out the "Outstanding DCN/FCR/FCN Block" on the front . . . If there is a drawing revision, the old is collected from the individual and replaced with the new revision. The old revision is destroyed or stamped "Void", "For Information Only" and signed under the stamp." This Bechtel Quality Assurance Finding was closed on June 7, 1978.

(3) On May 9, 1979, the inspector selected, at random from various construction "work print" drawing sticks located throughout Units 1 and 2, twenty-five (25) drawings which were being utilized for safety related construction activities. The drawings affected civil, mechanical and electrical work. The drawings were compared with the master index files in the Bechtel document control center; as a result:

(a) One of the drawings, GH-611, Sheet-1-Q, was found not to be the most current revision. Revision 11 was the revision found on the stick; Revision 12 (issued on April 27, 1979) supercedes Revision 11.

(b) One of the drawings, M-604, Sheet-15-Q, Rev. 4/F1, was found not to have FCR-1621 or FCR-1709 referenced in its "Outstanding DCN/FCR/FCN Block" nor did it have these FCRs attached to the back of the drawing; as required by Bechtel procedure FPD-3.000, Rev. 2, Paragraph 5.

(c) Another drawing, E-617-Q, Sheet 1, Rev. 11, was also found not to have an applicable FCR (FCR-1692) referenced in its "Outstanding DCN/FCR/FCN Block" nor was the FCR attached to the back of the drawing.

This recurring condition is contrary to 10 CFR 50, Appendix B, Criterion 16; Consumers Power Topical Report CPC-1-A, Policy 16, Rev. 7; and Bechtel Topical Report BQ-TOP-1, Rev. 1A, Section 16. (329/79-12-01; 330/79-12-01)

Except as noted, no other items of noncompliance were identified.

3. Corporate Audits - Conducted by CPCo

a. The inspector selected and reviewed audits which CPCo corporate QA scheduled and conducted during 1975, 1976, 1978 and 1979. The documented results of the audits and schedules were compared with the applicable CPCo procedures; (CPCo Topical Report CPC-1-A, Policy 18 and CPCo procedures numbered 10, 21 and 25); ANSI N45.2 and ANSI N45.2.12. The audits which were selected cover the following areas relative to activities for Midland Units 1 and 2:

(1) Bechtel purchasing - site and Ann Arbor offices - reviewed CPCo audit reports numbered M-01-94-8 (September, 1978) and 01-96-8 (October, 1978).

(2) Bechtel vendor surveillance - reviewed CPCo audit reports numbered 01-99-8 (December, 1978) and M-01-98-8 (October, 1978).

(3) Bechtel QA (corporate) - reviewed CPCo audit report numbered 01-99-8 (December, 1978).

(4) Bechtel Engineering, supervision and QA/QC - site functions - reviewed CPCo audits reports numbered M-01-87-9 (April, 1979) and 01-89-8 (August, 1978).

(5) B&W Corporate activities - reviewed CPCo reports numbered MG076-01 (March, 1976) and MG075-8 (March, 1975).

b. As a result of reviewing CPCo audit report numbered M-01-98-8 (October, 1978) and Bechtel site audit report numbered 25.6.1 (June, 1978):

(1) The inspector observed that both of these audits reflected quality assurance program problems. The Bechtel audit report concerned a site contractor (Zack Company - HVAC) where as the CPCo audit report concerned an off site contractor (S.P. Kinney Engineers - manufacturers for the Service Water Self Cleaning Strainers).

(2) The inspector was informed, by the licensee, that the QA program problems identified relative to the site contractor is isolated and is not indicative of other site contractors. Further, that CPCo will take a larger sample of off site vendors, which have active

contracts affecting Midland 1 and 2, and determine if the quality assurance program problems identified on CPCo audit report M-01-98-8 (October 1978) are unique to S. P. Kinney Engineers.

(3) During the exit meeting, on May 11, 1979, the inspector was informed by the licensee that CPCo will complete the check of other off site vendor QA program (by selection and audit of a larger sample of active contractors) within 3 to 4 months. The inspector has no further questions about this matter, at this time.

No items of noncompliance were identified.

Section II

Prepared by W. A. Hansen

Reviewed by R. C. Knop, Chief
Projects Section

Overview Inspection Program

1. Federal regulation 10 CFR 50, Appendix B, in Section 1, requires that the applicant retain the responsibility to insure the work quality of work performed by contractors. Further, that a program is effectively executed by checking, auditing, and inspection to insure activities affecting safety related functions have been correctly performed.

2. During the resolution of problems associated with structural work (concrete reinforcement), Consumers Power Company instituted a program of over inspection to insure that work performed by Bechtel was correctly performed. Implementation of this inspection was referenced in Howe 95-76 of June 18, 1976.

   On February 7, 1979, a meeting was held to discuss the status of the Midland Project. The meeting was attended by the Director and senior staff members of Region III and Mr. Howell and senior staff members of Consumers Power Company (Report 50-329/79-04; 50-330/79-04) The overview inspection program was discussed. In summary, the discussion included the fact that:

   a. Consumers Power Company performed complete overview inspection of structural concrete reinforcement installation and concrete placement.

   b. Consumers Power Company is performing and intends to continue an overview of the mechanical and electrical areas of work. The decision was made to inspect these areas during the initial phase of work so that faulty work could be detected and corrected early in the work phase. The plan was to inspect more work in the electrical and mechanical areas early in the work process than had been done initially in the structural concrete phase of construction. The licensee states that the intent is to act early enough to avoid problems and then be forced to increase the overview program in the mechanical and electrical areas. The NRC commented that it appeared that

there could be a problem if the overview program was not comprehensive in that most of the significant problems at Midland were identified as a result of the overview program.

During this inspection, implementation of the inspection overview program was reviewed. Procedures and check sheets have been developed by Consumers Power Company. Nonconformance reports are used to identify problems found during the inspections. The date of inspection and areas covered are recorded. Three basic areas were reviewed: Electrical Work, Piping System Fabrication, and Structural Steel Fabrication.

Attachment A summarizes the overview inspections performed. Audits have been reported by Consumers Power Company to have occurred in some of the same areas as overview inspections (not of identical items, however, audits were not included in this review).

In conclusion, the program being performed falls short of the program discussed during the management meeting of February 7, 1979. The overview inspection program has documented an inspection of 20 cable installations. Eighty-one cable installations were reported by Consumers Power Company as having been inspected during an audit for a total of 101 inspections. Although the Bechtel Electrical Field Engineer Supervisor estimated that 1500 safety related cables had been installed, Consumers Power Company reported that only 261 cable inspection reports had been closed. In any event, Consumers Power Company has inspected fewer than 40% of the cable installations.

No items of noncompliance or deviations were identified.

Summary of Inspections Performed/Items Inspected

	Year	
Area	1978	1979
Welding NDE	13	21
Mechanical	21	11
Electrical	9	17

Inspection Area		Over Inspection Dates 1978	1979	Remarks
Electrical				
E-1	Field Shop Fabrication of Structural Assemblies and Electrical Cable Tray Seismic Supports			
E-2	Installation of Tray Supports	9-19-78	none	Inspected bolting tightness, location, etc.
E-3	Installation of Cable	9-18&19-79	none	17 sections of cable trays inspected
		11-29-79	none	8 sections of cable trays inspected
E-4	Installation of Conduit, Boxes, and Supports	10-78 12-19&20-78	3-1-79	25 conduit runs inspected
E-5	Installation of Electrical Cables	10-78	2-7-79, 2-16-79, 2-17-79, 3-1-79, 3-2-79, 4-5-79	One cable inspected in 1978, 19 cables in 1979
E-6	Installation of Electrical Penetration Assemblies		4-16-79	1 penetration inspected
E-7	Cable Terminations		1-30-79, 2-10-79, 4-7-79, 5-5-79	42 cable terminations inspected
E-8	Raceway Barriers and Seals			
E-9	Installation of Electrical Equipment		3-19-79, 4-12-79, 5-1-79, 5-7-79	Pieces of equipment installed
E-10	Installation of Station Storage Batteries			

Mechanical

M 1	Piping Subassembly Field Installation & Rework	7-17-78 10-17-78	3-1-79
M-2	Valve & In-Line Component Installation - Cleanliness	10-27-78	2-5-79
M-3	Piping Completed Line Installation		
M-4	Piping Subassembly Field Shop Fabrication & Rework		
M-5	Field Erected Storage Tanks		
M-6	Installation of Rotating Equipment		3-19-79
M-7	Installation of Cranes		
M-8	Installation of Shop Fabricated Tanks, Vessels, & Non-Rotating Stationary Equipment		3-23-79
M-9	Hydrostatic & Pneumatic Leak Testing		
M-10	Pipe Hanger, Support, Restraint, & Shock Suppressor Fabrication & Rework		
M-11	Pipe Hanger, Support, Restraint & Shock Suppressor Installation - Initial	10-78 12-78	1-79 2-79 3-79
M-12	Pipe Hanger, Support Restraint, & Shock Suppressor - Final		

M-13 Heating, Ventilation & Air Conditioning		
M-14 Installation of Instruments		
M-15 Installation of NSSS Related Piping - 1/2" - 18" Diameter		
M-16 Installation of NSSS Related Piping 18"	9-78, 10-78 10-78, 11-78	The over inspections performed in late October and November were closed in 3-79 and 4-79 respectively
M-17 Heavy Lift Rigging of NSSS Non-Rotating Equipment (Steam Generators, Reactor Pressure Vessel, Pressurizer) (Reliance Truck Co. Subcontract)		
M-18 Installing of NSSS Non-Rotating Equipment (Steam Generators, Reactor Pressure Vessel, Pressurizer) (B&W CC NSSS Erection Subcontract)		

Welding

W-1 Welding and Heat Treating	6-78	Weld repair
	7-21-78	Inspected a weld
	8-78	Inspected weld root pass
	7-78	Equipment hatch
	9-78	Main steam line penetration installation
	10-78	
	10-78	Main steam pipe restraint
	11-78	Root pass 2HCC

	11-78	Root pass 2HCC
	11-78	Personnel air locks
	12-78	
	12-78	Storage-handling-dispersing-weld filler material

NDE

NDE-1 Nondestructive Examination - General Requirements	3-22-79	Checked personnel quals-equip calibration
MT-1 Magnetic Particle Examination	3-22-79	Checked MT of welds
PT-1 Penetrant Examination Type I and II		
RT-1 Radiographic Examination	2-13&15-79	Valve RI Review
UT-1 Ultrasonic Examination	1-13-79	

Section III

Prepared by P. A. Barrett

Reviewed by D. W. Hayes, Chief
Engineering Support
Section 1

Design Development, Modification and Control

1. Design Change Implementation Programs

The RIII inspector reviewed and discussed the following established methods used to accomplish design changes:

Field Change Request, (FCR)
Field Change Notice, (FCN)

The two methods, basically differing only in the authorization required prior to implementation of changes, received the same types of controls, evaluations, and approvals.

The RIII inspector reviewed the following documented design changes involving three disciplines (electrical, mechanical, and civil):

Electrical

FCN #E-18 dated 8-29-78 concerning drawing #E-641, Sheet 2, Rev. 2
FCN #E-329 dated 2-10-79 concerning drawing #E-640, Sheet 3, Rev. 1
FCR #E-641 dated 2-28-78 concerning drawing #E-610, Rev. 7
FCR #E-939 dated 4-19-78 concerning drawing #E-610, Rev. 7
FCR #E-942 dated 4-20-78 concerning drawing #E-632, Rev. 2
FCR #E-1078 dated 7-3-78 concerning drawing #E-42, Sheet 18A, Rev. 31

Mechanical

FCN #M-147 dated 10-23-78 concerning drawing #M-657, 2, Rev. 3
FCN #M-279 dated 1-15-79 concerning drawing #M-616, Sheet 12, Rev. 6
FCR #M-710 dated 10-5-77 concerning drawing #2-617-11-16, Submittal 3, Rev. 2 (ITT Grinnell)
FCR #M-1058 dated 3-16-78 concerning drawing #M-604-3, Rev. 2
FCR #M-1462 dated 10-17-78 concerning drawing #M-616, Sheet 7, Rev. 6
FCR #M-905 concerning drawing #M-410, Rev. 8

Civil

FCN #C-27	dated 9-6-78	concerning drawing #C-383, Rev. 4
FCN #C-56	dated 12-7-78	concerning drawing #C-1017, Rev. 1
FCR #C-1162	dated 10-5-77	concerning drawing #C-440, Rev. 3
FCR #C-1222	dated 10-25-77	concerning drawing #C-645, Rev. 9
FCR #C-1588	dated 6-2-78	concerning drawing #C-807, Rev. 3

The above design changes were prepared, identified, checked, approved, evaluated for interfaces, classified (safety related), controlled and distributed in accordance with procedures No. FPD-1.000, Rev. 6, No. FPD-2.000, Rev. 3, and No. FPD-3.000, Rev. 2. Except for FCN Nos. M-279, C-56, E-329, and FCR No. C-1222, the design changes had been incorporated into subsequent revisions to the applicable drawings. The master index properly identified the unincorporated FCNs. FCR No. C-1222 was only partially incorporated into the applicable drawing because Part 1 of the change was an isolated nontypical change. Fabrication and inspection records indicated that Part 1 had been properly accomplished.

The RIII inspector verified the proper distribution of approximately 58 of the current revisions to the aforementioned drawings. One drawing was located which should have been marked void but was not. That drawing was immediately marked void. The three unincorporated FCRs were properly controlled and distributed.

The personnel responsible for the distribution and control of drawings and design change documents exhibited thorough knowledge of the established distribution procedures and controls.

No items of noncompliance were identified.

2. Architectural Engineering Design Controls

The RIII inspector reviewed and discussed the duties, responsibilities, and authorities of engineers, designers, group supervisors, and group leaders as defined in the Manager of Engineering Directive, MED, 2.13.0, Rev. 2, the corresponding Engineering Department Procedure, and the Project Engineering Organization Chart dated February 28, 1979.

The RIII inspector reviewed a Consumer Power Company letter for D. B. Miller to J. L. Corley dated May 2, 1979, which appeared to provide an interpretation of Bechtel Specification No. 7220-G-34(Q). The interpretation may have allowed Field

Engineers to authorize commencement of design change work activities for which the Field Engineers may not have been qualified. The licensee indicated that either Specification No. 7220-G-34 would be revised to further clarify the scope of authority in which the Field Engineers must perform or take other appropriate measures. The licensee states that a review would be made to assure that Field Engineers have performed within their scope of qualifications in the past and that corrective action would be taken where necessary. This matter is unresolved. (329/79-12-02; 330/79-12-02)

The RIII inspector reviewed and discussed with pertinent supervision the qualification records of four of the individuals involved in the engineering of the previously discussed design changes. The RIII inspector also discussed with one of the four individuals the limitations of his qualifications. The individuals appeared to have performed within the scope of their qualifications.

The RIII inspector reviewed and discussed with the cognizant engineers/designers the engineering analysis, interfaces, and calculations which pertain to FCR No. E-939, FCR No. E-942, FCR No. C-1222, FCR No. M-1462, and FCN No. C-27. The engineering decisions, interfaces, and calculations appeared to be appropriate for the individual designs and appeared to provide conservative margins of safety. The designs involved evaluating and determining by calculation, analysis, and engineering judgment such things as:

FCR No. M-1462--pipe stress created by positioning of valve actuators.

FCR No. E-942--the configuration, size and material needed for supports of non-safety related cable trays installed above safety related equipment.

FCN No. C-27--the load changes created by relocating support beams.

FCR No. E-939--the raceway loading and cable routing requirements which were altered by rerouting and deleting cable conduits.

FCR No. C-1222--The partial reduction of weld sizes to alleviate an interference.

No items of noncompliance were identified.

Section IV

Prepared by K. R. Naidu

Reviewed by D. W. Hayes, Chief
Engineering Support
Section 1

Control of Purchased Material

1. Review of Receiving Inspection Procedures

The inspector reviewed the Receiving Inspection Procedures utilized at the site by Bechtel, Babcox and Wilcox (B&W) and Zack Incorporated (Zack) for compliance with CP Topical Report CPC-1-A Policy 7 which commits to ANSI 45.2, Section 8, and ANSI 45.2.2, Section 5. The inspector determined the following:

a. Bechtel Procured Items

Bechtel procured items, except for miscellaneous items procured directly by the field, receive source inspection; the items are required to be receipt inspected at site utilizing Quality Control Instruction (QCI) R-1.00 along with a checklist which complements the instructions. Provisions for inspection points include checking for fire damage, excessive exposure, environmental damages, tie down damage, rough handling and verifying adequate documentation. See Paragraph 2.a for details on implementation.

b. B&W Procured Items

B&W procured Nuclear Steam Supply System (NSSS) items are received on site by Bechtel on behalf of B&W. Bechtel accepts the material after performing a cursory receipt inspection which does not include the requirements detailed in QCI R-1.00 mentioned in the preceding paragraph. Apparently, this interim arrangement was made because of the delays in construction. B&W was to perform a detailed receipt inspection at the time the material is withdrawn from the warehouse utilizing procedure 9-QPP-108, Rev. 4. Paragraph 3.3 of this procedure states "When dimensional inspections are performed a Report of Inspection shall be completed." However, the B&W checklist used in conjunction

with the procedure does not require dimensional inspections to be performed on all equipment. Subsequently, the inspector was informed that these inspections were being performed by B&W during source inspections. Refer to Paragraph 2.c for details on implementation.

c. Zack Procured Items

Zack fabricated ductwork to Bechtel Specification M-151 A (Q) for the Heating Ventilation and Air Conditioning Systems at their plant in Illinois and ships the fabricated parts to the site in Zack owned trucks. Miscelleneous items such as dampers and weldrod are procured by the home office and shipped to the site. Paragraph 4.2.1 and page 3 of Section II of the Zack QA manual focuses on receipt inspection requirements to verify damage did not occur in transit and to verify conformance with the description of the items listed in a traveller which accompanied the shipment. The Zack Receiving Inspection Procedure does not include requirements contained in Section 8 of ANSI 45.2 nor Section 5 of ANSI 45.2.2. The licensee has conducted extensive audits on Zack and has identified several findings relative to this matter which are still outstanding. This matter will be reviewed during a subsequent inspection and is included in the unresolved item identified in Paragraph 3.c.

2. Review of Receiving Inspection Implementation

The inspector selected motor operated valves and fittings which were being stored in the warehouse and verified the implementation of receiving inspection as performed by Bechtel and B&W; a similar review was not performed on Zack during this inspection but is planned for a later inspection.

a. Bechtel Field Procured Items

Bechtel Field personnel initiated procurement of miscelleneous fittings through Purchase Orders (POs) F-35280-Q and F-34870(Q). The POs reflected the requirements of specifications M-305(Q), Rev. 3, and M-215(Q). Material Receiving Report (MRR) No. AE0-9567 indicates that 1" and 3/4" threaded ASME SA182F304 material 3000 pound half couplings were received without damage from Chicago Tube and Iron Company. Material Test Reports were received with the material.

MRRs No. AEO 9575, 9559, and 9413 dated April 12, May 2 and 3, 1979, respectively, indicate that various pipe fittings arrived from Liberty Equipment Company without any shipping damage. A Nonconformance Report indicates that the necessary material certification was not received for the fittings. QCI R.100-9449 and -9575 dated May 4, 1979, for the fitting identifies no adverse findings and indicates that the configuration including dimensions of the fittings were verified and determined acceptable. The RIII inspector visually inspected these items which were stored in the warehouse and concurred with the receipt inspections findings.

b. Bechtel Procured Items

The inspector selected a motor operated valve manufactured by Borg Warner, Van Nuys, California, which was in storage. The valve was purchased to Bechtel Specification M-129B titled "Nuclear Service Valves 2" and Smaller." The physical appearance of the valve appeared acceptable. At the request of the RIII inspector, the valve with its crate was weighed and the valve weight was then computed to be 235 lbs. Subsequently, the inspector verified at the Bechtel Ann Arbor office, that the correct weight of 238 lbs. was used in the stress analysis calculations.

MRR No. AEO-2394 dated January 6, 1977, indicates that several valves including that with Serial No. 14814 identified as CCB-GT-2M0-437-RL were received on January 13, 1977. QCIR No. R-1.00-717 documents receiving inspection findings according to procedure QCIR-R-1.00. No adverse findings were identified in the receiving records. The inspector reviewed the documentation package on the valve and determined the following:

(1) The Bechtel Shop Inspector signed a checklist stating that the wall thickness of the valve nozzles were measured, however, the actual dimensions were not provided although the valve had been accepted on site. Paragraph 9.6.1 of the specification requires the wall thickness to be measured at both nozzle ends and the neck. The inspector informed the licensee that the control of purchased material was inadequate and this along with other examples mentioned in succeeding paragraphs is an item of noncompliance, contrary to the requirements of 10 CFR 50, Appendix B, Criterion VII. (50-329/79-12-03; 50-330/79-12-03)

Subsequently, prior to the conclusion of the inspection the measured values of wall thickness for this valve were obtained from Borg Warner, California.

(2) Even though the specification states that the valves should be suitable for boric acid service and meet the radiation requirements of Appendix A 1.9, there was no documented evidence that "Graphoil" and "John Crane" packing used in the valves would successfully withstand radiation environment combined with elevated temperatures and boric acid service without deleterious effects.

At the Bechtel Ann Arbor office, the Bechtel personnel presented "Union Carbide" Sales Literature relative to "Grafoil" for packing valves in Nuclear Service grade GTN which states "Resistant to nuclear radiation (tested as high as 5.5×10^{21} NVT and 1000°C neutron dosage and 1.5×11^{11} ergs/gram Gamma radiation with no apparent effect on "Graphoil"). No information was available relative to the "John Crane" packing.

The inspector stated that these are the only two nonmetallic items in the valve which are vulnerable to damage due to exposure to radiation combined with high temperature and boric acid. Even though these items can be replaced during routine maintenance or surveillance, a certificate of conformance should have been required and included in the documentation package. This matter will be reviewed further during a subsequent inspection to determine whether the licensee is in noncompliance with Criterion XVII of 10 CFR 50, Appendix B; this matter is considered unresolved. (50-329/79-12-04; 50-330/79-12-04)

(3) The environmental and seismic qualifications on the Limitorque operators were not included in the documentation package. There was no indication referring the site reviewer to where these documents could be located or that they existed. The documents on the Qualifications of the valve operator were later found to be available at the Bechtel, Ann Arbor office and indicate that the operator successfully withstood tests in accordance with IEEE 382-1972 for service inside the containment and IEEE 382-1972 and IEEE 323-71 for service outside containment.

(4) The qualification of the valve for seismic service was available. However, it was noted that the manufacturer computed the analysis assuming the yoke to be made of ASME SA 105 (forging) where as Item 19 on drawing 72.410-1 indicates the yoke to be ASTM A216 (casting). The RIII inspector verified from the ASME Section III, Table UCS 23, and determined that minimum yield, minimum tensile are compatable. The licensee acknowledged that this discrepancy went undetected during the various reviews and stated that the valve manufacturer will correct the documents. This matter is considered another example of inadequate control of purchased material, an item of noncompliance contrary to 10 CFR 50, Appendix B, Criterion VII, mentioned in Paragraph 2.b.(1) of this section of the report.

c. B&W Procured Items

The inspector selected two valves which were in storage to verify the implementation of receiving inspection requirements and determined the following:

(1) The pressurizer safety relief valve was procured to B&W Specification 08-102500006-03, and was manufactured and supplied by Dresser Industries.

(a) Receipt inspection performed by Bechtel to PQCI R-200 indicates no shipping damage. Paragraphs 2.14 a and b of the B&W specification requires Flexitallic gasket (or equivalent) for use with 2 1/2", 2500# RF flange and bolting material - 9 studs and 18 nuts ASTM A-461 grade 630 H1150 respectively. The receipt inspection reports did not acknowledge the receipt of this material. Apparently, no attempt was made to verify whether this material was received on site during receipt inspection. Failure to perform an adequate receipt inspection is considered inadequate control of purchased material, and this is another example of the item of noncompliance identified in Paragraph 2.b.(1) of this section of the report.

(b) The inspector reviewed the available documentation relative to the valve. The test report indicates that the seat leakage of the valve could not be

checked at 2250 psig as required by Paragraph 7.2.3 of the specification with the hydraulic setting device removed from the valve. Instead, the seat leakage test was performed per PT-69, Revision 3, at a steam pressure of 1350 psig, with the hydraulic setting device installed on the valve, with a hydraulic pressure of 520 psig. Steam at 2250 psig was not available at Dresser Industries to test the valve. Even though this concession was approved by B&W, the inspector plans to review this matter further to determine how the the valve can accurately be set without actually applying 2250 psig steam pressure. This is considered an unresolved item. (50-329/79-12-05; 50-330/79-12-05)

(2) Motor-operated Pressurizer Spray Control Valve was procured to B&W specification 08-102500 0004-03 and was manufactured and supplied by North American Rockwell. At the inspector's request, this valve was weighed with its crate and the weight of the valve was computed to be 460 lbs.

Subsequently, at the Bechtel Ann Arbor office, the inspector determined that drawing GH-601, Sheet 2(Q) shows the valve supported at either end with hangers in addition to a separate support for the motor-operator. The weight of the valve furnished in Rockwell's drawing PD-42102, Rev. B, is 470 lbs. and concurs with the approximated weight of 460 lbs. Receipt inspection report identifies no adverse findings.

The ambient temperature specified for the valve is 40°C (104°F). The inspector questioned the low temperature requirement since the valve is installed directly off the pressurizer. This requirement will be verified during a subsequent inspection and is considered an unresolved item. (50-329/79-12-06; 50-330/79-12-06)

The inspector noted in his review of the documentation package the cycle time for the valve exceeded the specified 4 seconds but that the necessary review was performed and the specification limit was relaxed.

(3) Both of the above documentation packages (C.1 and C.2) did not include the environmental and seismic qualifications. The licensee stated that this information was available at the B&W Lynchburg office. Pending review of the qualification data, this item is considered unresolved. (50-329/79-12-07; 50-330/79-12-07)

(4) The inspector reviewed the receipt inspections performed by B&W when the material is requisitioned from storage prior to installation. Typical receiving inspection report (RIR) dated March 1, 1978, for the decay heat removal 12" motor-operated valve identified as 2-CCA-018 identified no adverse findings. The licensee stated that this valve was supplied by Westinghouse and that since Westinghouse supplied items were subjected to shop inspections no detailed dimensional inspections were performed at site during receipt inspection. The inspector stated that he had no further questions on this subject.

(5) The inspector selectively reviewed Nonconformance Reports (NCR) generated by B&W. NCR 498 dated April 5, 1979, identifies that spool piece No. 1-CCA-021-610-1-4, belonging to the Core Flood System, had two damaged areas on the weld preparation land. The corresponding RIR dated March 19, 1979, for the above spool piece does not identify the damage. The RIR indicates only that the data package was not received and references NRC 492 which documents the unreceived package. The licensee did not know whether the damage occurred during the shipment to the site or during the handling from site storage to the location of installation.

d. Zack Procured Items

The inspector reviewed a typical traveller ticket No. F7095, shipment No. 29, dated March 14, 1979, which was signed by the Zack shop Quality Assurance inspector. The dimensions of the piece are furnished. No adverse findings were identified. The Zack representative stated that the components fabricated at the Zack shop are transported in Zack operated trucks and as such the site is considered an extension of the shop. This explanation is considered acceptable.

3. Review of HVAC Activities

a. The inspector reviewed the specification M-151A(Q) for the Seismic Class 1 Heating Ventillating and Air Conditioning Equipment and Ductwork Installation. The inspector determined that Paragraphs 5.14, 10.4 and 13.6 do not adequately specify the environmental conditions which the gaskets, sealants and flexible connections should withstand without deleterious effects; neither was the contractor required to furnish certifications. Unclear specifications which do not adequately translate design requirements are considered examples of items of noncompliance contrary to the requirements of 10 CFR 50, Appendix B, Criterion III. The licensee stated that the same question has been raised by NRR during the FSAR review in question 031.12. Pending resolution of this matter by NRR this item is considered unresolved. (50-329/79-12-08; 50-330/79-12-08)

b. The inspector reviewed Zack Welding Procedure Specification (WPS) M-B-QCP22, Revision 1, dated January 21, 1978. Paragraph 13.1 of the WPS states "WPQ shall be in accordance with the structural Welding Code AWS D1.1-75, Section 2.7, and Section 5, Part B." The licensee stated that the WPS was "prequalified" and hence, no qualification tests were made. The inspector pointed out that Section 5, Part B, did not apply to prequalified procedures; Section 5 Part A is the relevant section. The inspector stated that even though the WPS received several layers of reviews and was approved on March 2, 1978, this discrepancy was not detected. Inadequate control of special processes is considered an item of noncompliance and is contrary to the requirements of 10 CFR 50, Appendix B, Criterion IX. This item is a deficiency. (50-329/79-12-09; 50-330/79-12-09)

c. Review of Audits on Zack

The inspector reviewed an audit performed by Bechtel on Zack's activities. Quality Assurance Program Project Audit Report No. 25.6.2 documents the audit of March 19-26, 1979, on the Zack Company. Deficiencies relative to compliance with their revised QA manual dated February 28, 1979, include the following:

SA 52	Lacking written procedures
SA 53	Incomplete personnel listing
SA 54	Retrieval of superceded drawings

SA 55 Lacking storage inventory system
SA 56 Incomplete jobsite audit scheduling
SA 57 Discrepant storage practices
SA 58 Lacking equipment maintenance records
SA 59 Discrepant NCR records
SA 60 Deficient inspection records

Pending completion and verfication of the corrective action taken on the above findings, this item is considered unresolved. (50-329/79-12-10; 50-330/79-12-10)

4. Observation of Midland Welding Demonstration at Ohio State University, Columbus, Ohio

This section of the report acknowledges the observation of a welding demonstration at the above facility on December 15, 1978. This demonstration was arranged by the licensee as a result of previous NRC questions relative to the adequacy of welding voltage and current monitoring and control. (See IE Inspection Report No. 50-329/78-03; 50-330/78-03)

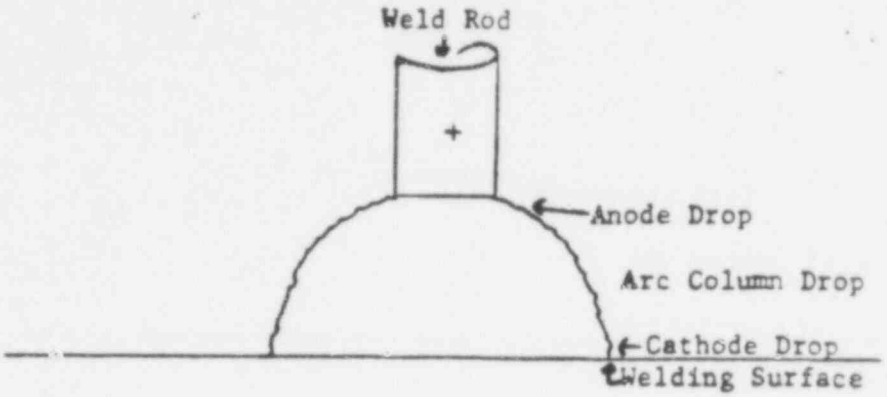
a. The following persons were present:

Professor Clarence Jackson, Ohio State University, Welding Department
Dave Whitaker, Graduate Student
Keith Mengel, Undergraduate Student
John Birkle, Consumers Power Company Engineer
John Walvoord, Consumers Power Company Welding Engineer
Chip Wood, Consumers Power Company Quality Assurance Engineer

b. Discussion Session

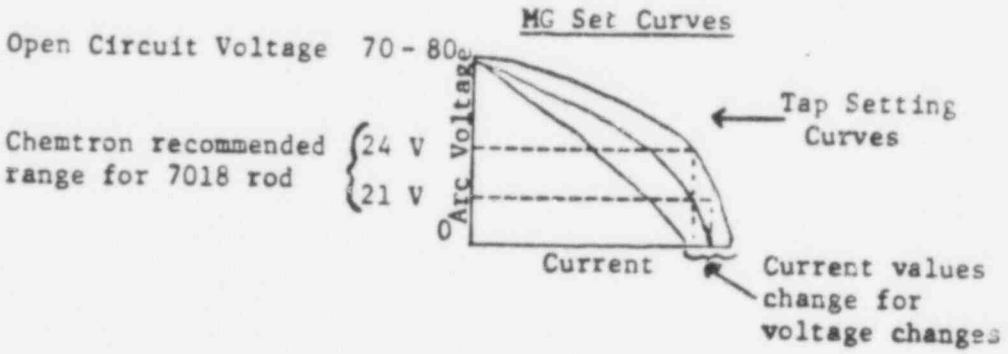
The phenomenon of welding, was discussed and that two types of metal transfer occur during the deposite of weld metal: (1) globular and (2) spray, these being dependent on voltage variation (the lower voltage or hot welding causing the undesirable spray transfer splatter). Movie films of the metal transfers for 7018 and 6010, in color and in infrared, demonstrated this.

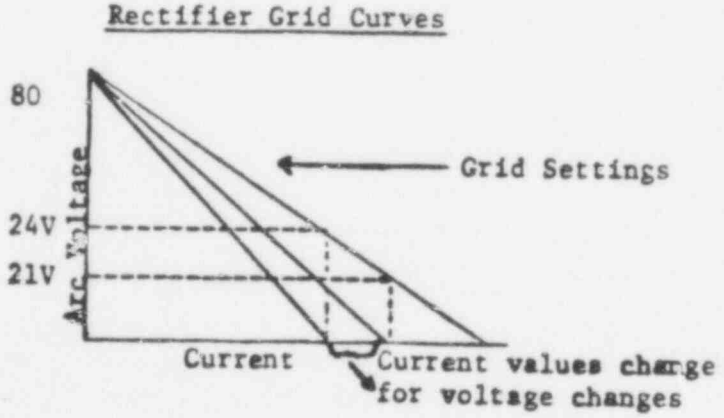
Also discussed was the fact that voltage of welding is made up of three elements: (1) anode drop, (2) arc column drop, and (3) cathode drop.



Of a 22-volt welding voltage, 17-18 volts make up the anode and cathode drop, while the remaining 4-5 volts make up the arc column drop. Thus, arc length variation by the welder can only change the arc column drop. It was further noted that the arc length per given set (of conditions) is approximately the diameter of the weld rod core.

Curves were presented showing the current/voltage relationship for both MG and rectifier grid power supplies.





c. Demonstration Session

Welding demonstrations were conducted in the welding lab at Ohio State University, utilizing machine held rod which can control the arc length and traverse speed (inches per minute). Voltage and amperage read out metering of a strip chart recorder records the RMS values on a time range not responsive to instantaneous values. The CRT display was set in a millisecond range capable of demonstrating the instantaneous voltage variations, including the short circuit (0-voltage) occurrences.

The demonstrations utilized coated electrode 7018 rod. The arc length was varied manually to demonstrate the range from sticking the rod (short circuit condition) to weld metal pile-up condition (no fusion high voltage). It was readily observable that the effective welding arc voltage range was the recommended range by the manufacturer (21-24 volts or a mean value of 22.5 volts ±10%).

d. Licensee Conclusions

Conclusions offered by the licensee include their belief that: (1) a qualified welder can readily detect the preferred voltage range during his welding by observing the globular transfer and by hearing the sound of frying (crackling of the intermittent short circuiting occurring), and (2) the welder qualification performance includes the weld voltage control.

The licensee's commitment to monitor voltage of welding, should provide a sufficient record of control of welding activities adequate to NRC concerns.

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 this inspection are discussed in Section III, Paragraph 2 and Section IV, Paragraphs 2.b(2), 2.c(1)(b), 2.c(2)(a), 2.c(3), 3.a, and 3.c.

Exit Interview

The inspectors met with the individuals so denoted, under Persons Contacted, on May 11, 1979, at the conclusion of the inspection. The inspection scope and findings were summarized. The licensee acknowledged the noncompliances identified in Sections I and IV and stated that actions would be taken to correct the conditions.