

U. S. ATOMIC ENERGY COMMISSION  
DIRECTORATE OF REGULATORY OPERATIONS

REGION III

Report of Construction Inspection

RO Inspection Report No. 050-346/74-01

Licensee: Toledo Edison Company  
Edison Plaza  
300 Madison Avenue  
Toledo, Ohio 43652

Davis-Besse Nuclear Power Station  
Oak Harbor, Ohio

License No. CPPR-80  
Category: A

Type of Licensee: PWR (B&W) - 873 Mwe

Type of Inspection: Routine, Unannounced

Dates of Inspection: January 8 - 10, 1974

Dates of Previous Inspection: October 16 - 18, 1973  
(Construction)

Principal Inspector: *M. W. Dickerson*  
M. W. Dickerson

2-19-74  
(Date)

Accompanying Inspector: *M. W. Dickerson / for*  
J. W. Sutton

2-19-74  
(Date)

*M. W. Dickerson / for*  
D. W. Hayes

2-19-74  
(Date)

Other Accompanying Personnel: None

Reviewed By: W. E. Vetter, Chief *W. E. Vetter*  
Reactor Construction Branch

2-19-74  
(Date)

8001310 568

## SUMMARY OF FINDINGS

### Enforcement Action

#### A. Violations

Certain of the activities at the Davis Besse site appear to be in violation of AEC regulations and in nonconformance with the Quality Assurance Program, as identified below, and are considered to be of Category II severity.

1. 10 CFR Part 50, Appendix B, Criterion V, states, in part, that: "Activities affecting quality shall be prescribed by documented instructions, procedures, . . . and shall be accomplished in accordance with those instructions, procedures, or drawings".

Contrary to the above, support and seismic welds, associated with Class 1E equipment, were being inspected without benefit of written procedures or instructions. Moreover, there was no documentation to establish that all the subject welds were being inspected. (Paragraph 4.d.1)

2. The Fischbach and Moore, Incorporated, Quality Control Manual, Quality Assurance Procedure No. 1 (QAP-1) Revision 1, dated September 27, 1972, states, in context, in Section 8.0, "Methods of Controlling Welding Operations", that: (1) the welding inspector must verify all fit-ups . . . and welder qualifications prior to weld operations, and (2) each welder is required to affix his identifying stamp to welding records for all welding operations which he performs, and the welding inspector must counterstamp the welding records, after verifying acceptability of the operation.

Contrary to the above, and 10 CFR Part 50, Appendix B, Criterion V, documentation was not available to establish that welding operations, associated with Class 1E electrical equipment, were being controlled in accordance with applicable procedures. (Paragraph 4.d (2))

#### B. Safety Matters

No safety matters were identified.

### Licensee Action on Previously Identified Enforcement Matters

No previously identified enforcement matters were involved.

### Design Changes

No new design changes were identified.

### Unusual Occurrences

A member of the public met with a representative of the Licensing Headquarters Staff on October 17, 1973, to set forth anonymous, second-party allegations regarding certain construction activities at the Davis-Besse site. Subsequently these allegations, requested by Headquarters to be handled during a routine inspection, were received by RO:III. During this inspection, these matters were given considerable attention. The specific allegations and results of the inspector's findings on these matters are contained in Paragraph 1.a through i of this report.

### Other Significant Findings

#### A. Current Findings

The licensee indicated that, as of January 1, 1974: (1) construction was 55% complete, and (2) engineering was 88% complete.

#### B. Unresolved Matters

##### 1. Westinghouse Electric Corporation (W) High Pressure Injection Pump Motors

The licensee indicated that the reported motor deficiency was under investigation by Babcock and Wilcox Company (B&W) and the results of this investigation would be available for review by RO:III during the next routine inspection.

##### 2. Weld Material Certifications

The B&W weld material certification record book was found to have certifications that did not clearly establish conformance to ASME code requirements. In addition, the legibility of the certificates was unacceptable. (Paragraph 2)

#### C. Status of Previously Reported Unresolved Matters

##### Apparent Corrosion of Stainless Steel Components and Stainless Steel Components in Contact With Carbon Steel Hangers and

Connectors (RO Inspection Reports No. 050-346/73-03 and No. 050-346/73-04)

During this inspection, it was determined that the investigation into the subject conditions, their cause, and their acceptability had been completed independently by both the Bechtel Corporation (Bechtel) and the Grinnel Company (Grinnel). The results of this investigation, which required no remedial action, was also established to have been reviewed and accepted by the Toledo Edison Company (TECO). This matter is considered closed. (Paragraph 3)

Management Interview

- A. The following persons attended the management interview at the conclusion of the inspection.

Toledo Edison Company (TECO)

L. E. Roe, Vice President - Power  
E. C. Novak, Chief Mechanical Engineer  
N. L. Wadsworth, General Superintendent- Power Construction  
E. M. Wilcox, Field Quality Assurance Specialist  
K. M. Cantrell, Field Quality Assurance Engineer

Bechtel Corporation (Bechtel)

D. L. Reddick, Field Coordinator  
\*H. A. Ablondi, Project Quality Assurance Engineer  
\*Part time

- B. Matters discussed and comments, on the part of management personnel, were as follows:

1. The inspector discussed the results of the inspection relative to the allegations and stated that no confirmatory evidence for any of the allegations had been found in the records reviewed by the inspectors at the site. However, one item, regarding CB&I NDE personnel qualifications for containment vessel fabrication, could not be completed at the site and that arrangements for access to the CB&I records at Kankakee, Illinois, was desired for January 14, 1974, to complete this review. The licensee agreed to arrange for this access.

Subsequent to completion of the inspection at the site, a review of the CB&I records, on January 15, 1974, at Kankakee, Illinois, established that the CB&I NDE personnel had been properly qualified.

2. The inspector briefly reviewed the satisfactory resolution of the previously identified matter relative to the apparent

corrosion of stainless steel components and stainless steel components in contact with carbon steel hangers and connectors.

3. The inspector requested that the licensee prepare information on the status of the valve wall thickness verification program for review during the next routine inspection. The licensee agreed to provide this information.
4. As a result of an inquiry by the inspector, the licensee indicated that B&W is presently evaluating the problem associated with the two W supplied motors on the high pressure injection pumps, but that resolution of the problem could not be reported at this time. The licensee was informed that this matter would remain open until it had been satisfactorily resolved.
5. The inspector stated that, in many instances, the B&W weld material certifications were found to be illegible and that the certifications were approved for Navship and fossil construction, but not for ASME requirements. The inspector also stated that this fact was known to the B&W site QA engineer and was to be discussed with B&W corporate QA personnel during a scheduled meeting within the next week. The licensee stated that TECO QA personnel would follow up this matter.
6. The inspector stated that support and seismic welds, associated with electrical Class 1E equipment, were apparently being inspected without benefit of written procedures or instructions. Moreover, there was no documentation available for review that would establish that all of the support and seismic welds were being inspected. The licensee was informed that this appeared to be in violation of 10 CFR Part 50, Appendix B, Criterion V.

The inspector also stated that the Fischbach and Moore, Incorporated (F&M) QC manual, QA procedure No. 1 (QAP-1) requires that: (1) the welding inspector must verify all fit-ups, electrodes and filler materials and welder qualifications prior to weld operations, and (2) each welder is to affix his identifying stamp to welding records for all welding operations which he performs, and the welding inspector must counterstamp the welding records after verifying acceptability of the operation. The inspector added that, contrary to the QC manual requirements, documentation was not available which would establish that welding operations associated with Class 1E electrical equipment were being controlled in accordance with procedures and that this appeared to be in violation of 10 CFR Part 50, Appendix B, Criterion V.

The licensee indicated that he was aware of deficiencies in the F&M electrical program and that a stop work order had been issued on January 8, 1974, as a result of an audit by Bechtel QA/QC on January 7, 1974, and that corrective action is required to be complete by January 14, 1974.

## REPORT DETAILS

### Persons Contacted

The following persons, in addition to individuals listed under the Management Interview Section of this report, were contacted during the inspection.

#### Toledo Edison Company (TECO)

M. D. Colcamuggioi, Power Plant Electrical Engineer

#### Bechtel Corporation (Bechtel)

J. J. Ford, Quality Assurance Engineer  
T. B. Fyock, Field Lead Civil Engineer  
W. B. Daly, Lead Welding Engineer  
L. M. Ruggieri, Lead Civil Quality Control Engineer  
R. L. Lewis, Project Field Quality Control Engineer  
R. L. Lykens, Contract Administrator  
W. C. Lowery, Quality Control Engineer (Electrical)

#### Babcock and Wilcox Company (B&W)

J. W. Marshall, Field Quality Control Supervisor

#### A. Bently and Sons Company (Bently)

R. G. Sanders, Quality Assurance/Quality Control Engineer

#### Michigan Testing Engineers, Incorporated (MTE)

D. (NMI) Ponke, Quality Control Supervisor

#### Chicago Bridge and Iron Company (CB&I)

V. M. Yarbrough, Area Quality Assurance Manager  
W. R. Wagner, Area Quality Assurance Supervisor

#### Fischbach and Moore, Incorporated (F&M)

D. M. Moeller, Quality Control Manager  
J. D. Binford, Chief Supervising Inspector  
Q. L. Waite, Welding Inspector

### Results of Inspection

#### 1. Allegations

As stated previously, a member of the public met with a representative of the Headquarters Licensing Staff on October 17, 1973, to set forth

anonymous, second-party allegations regarding certain construction activities at the Davis-Besse site. As a result of this meeting, RO:III was requested to handle this matter during the next routine site inspection. The allegations specified were as follows:

Integrity of the reactor ring girder foundation (concrete).

Reinforcing steel placed in concrete before testing, steel which failed tests for noncritical buildings used in reactor building, and records destroyed. (This steel was described as spiral steel.)

Water-cement ratios of concrete were ignored, and changes from one type of concrete to another were made without prior approval.

Concrete was placed and poured before tests were performed, in order to minimize overtime work.

Michigan Testing Company (assumed to be MTE) personnel were unqualified for testing.

Foundation fill for the cooling tower, which came from an onsite quarry, failed to meet specification.

Employees were asked to do things that were not in conformance with ASTM and ACI Standards.

Testers on the containment vessel were not qualified, and even laborers were used to perform tests.

Selective rather than random, sampling was done for testing.

Onsite quality control was weak link.

Records were destroyed.

Each of the above allegations were reviewed extensively during the inspection conducted on January 8 - 10, 1974, and included a review of records and interviews with personnel. Although the inspection did not establish any evidence to support the allegations, it did establish that certain of the activities did occur, i.e.: blasting following completion of the final ring girder pour. The allegations and results of the inspection regarding each allegation is discussed in the following paragraphs.

a. Integrity of the Reactor Ring Girder Foundation

(1) Concrete

The allegation specified that, during construction of the reactor building ring girder foundation, a concrete pour of 680 yards of concrete was poured starting at 7:00 a.m. and completed at 4:40 p.m.

that same day, and that at 4:50 p.m. that day, a contractor's office trailer, located near the concrete batch plant, was rocked by an explosion of sufficient intensity to knock items off shelves, etc.

According to the allegations, the explosion was the result of blasting authorized by Bechtel and could have been in a quarry about 100 feet from the freshly poured foundation. Concern about the integrity of the pour was alleged to have been contained in letters to Pittsburgh Testing, Bechtel, and TECO. The allegation also asserted that the letters and copies later disappeared. In addition, four men from Bechtel reportedly checked the concrete pour visually, after the forms were removed, and found that the blasting had not been detrimental to the foundation pour. It was also reported that ultrasonic tests had been completed to check the pour.

To evaluate the allegations, the inspector reviewed the records for the two pours which comprised the concrete reactor ring girder foundation. Records reviewed consisted of those for, (1) the batch plant operator, Nicholson Concrete and Supply Company (Nicholson); (2) the placement contractor (Bently); (3) the inspection contractor (MTE); (4) the concrete testing contractor, Pittsburgh Testing Laboratory (PTL); and (5) the mix design testing contractor, Toledo Testing Laboratory (TTL).

The first pour, designated as CB-FR-P No. 1 (S-14) poured on October 12, 1970, was comprised of 322 cubic yards of design mix C-2 and the second, designated as CB-FR-P No. 2 (S-22) was poured on October 27, 1970, and comprised of 655 cubic yards, was also design mix C-2. The second pour is apparently that referred to in the allegation, since the delivery starting time of 6:40 a.m., ending delivery time of 3:24 p.m., and the total number of yards delivered, plus two loads rejected for slump, closely approximate those stated.

The records for both pours reviewed consisted of:

- (a) Trip tickets (issued by Nicholson)
- (b) Installed inspection reports (ABS Form No. 13)
- (c) Reinforcing steel placement report (ABS Form No. 5)
- (d) Form work construction report (ABS Form No. 9)
- (e) Concrete placement checklist (ABS Form No. 10)
- (f) Concrete curing and form removal (ABS Form No. 12)
- (g) Report of batch plant operations (PTL)
- (h) Field inspection reports (ABS Form No. 11)
- (i) Field data on concrete compression tests (PTL)
- (j) Report of concrete mixture design (TTL mix design test of C-2 dated October 3, 1970)

All records were established as complete acceptable, including those for slump tests (except for the two truck loads which were rejected) and break cylinder tests, all of which, exceeded



the required 28-day strength of 4,000 psi.

No additional records of a special visual inspection or of an ultrasonic test of the ring girder foundation were available for review as alleged. Moreover, no basis was established which would indicate that records (or letters) had been destroyed or changed. Records for the particular reinforcing steel placed in the ring girder foundation were also reviewed, and all steel placement was determined to have been accepted by means of a certified user's test report prior to placement of the steel. Section 1.b of this report further describes inspection results regarding reinforcing steel.

Additional detailed information of an inspection of concrete ring girder foundation is included in RO Inspection Report No. 050-346/70-04.

(2) Blasting

A review of blasting records maintained at the site established that a blast by Great Lakes Construction Company did occur on October 27, 1970, and was located at the intake structure area approximately 500 feet east of the reactor ring girder foundation. No records of blasting in the quarry area were available for review, although it was established that the quarry area is located approximately 1/2 mile from the reactor ring girder and 300 feet from the concrete batch plant area. The blasting records indicate that 1,150 pounds of 60% nitro starch was placed in 240 holes at depths ranging from 10 to 15 feet, with center-line distances of 7 feet. The distance, approximately 500 feet from the blast area to the ring girder foundation, is well above the minimum distance required by Bechtel Specification No. 7749-C-1, dated and approved April 14, 1970. This specification is titled "Toledo Edison Company and Cleveland Illuminating Company, Unit No. 1 Construction, Bavis-Besse Nuclear Power Station", Section XI, Subsection 4.3.2, titled "Blasting" states, in paragraph 3, that "Blasting is not permitted with 100 feet of concrete or grout that has been in place less than seven days".

b. Reinforcing Steel

The allegation stated that: (1) reinforcing steel was placed in concrete before testing, (2) steel which failed tests for non-critical buildings was used in the reactor building, and (3) records were destroyed. (This steel was described as spiral steel)

Records pertaining to receipt, testing, storage, nonconformance, and placing of reinforcement steel used in the containment, auxiliary, and turbine buildings were examined and reviewed by the inspector. Particular attention was placed on the acceptance

of the steel by means of a certified user's test report. The material and testing of the steel was found to be in accordance with the engineering specifications and ASTM requirements. One instance of reinforcing steel (two bars) being placed, prior to receipt of a user's tests report, was found by the inspector. The bars were cut out of the auxiliary turbine building wall prior to the concrete pour, and the conditions found were noted. The reinforcement steel was found to be traceable to use and placement area by means of heat numbers. Receiving and shipping records were reviewed indicating that rejected steel was shipped offsite, as soon as it was known that the steel failed the user's test. Records were available that substantiated disposition of the steel. The records of concrete pours sampled indicated that all reinforcement steel was acceptable for use prior to pouring of the concrete.

Spiral steel was approved for used on the Davis-Besse project in the auxiliary and turbine buildings columns accordin to engineering design and specifications. The spiral steel used was manufactured to A 615-60 ASTM Standards. The steel rods were classed as No. 4 and No. 5. Three-eighths-inch diameter rods, with a two-inch pitch, were specified. The rods were required to be tested in accordance with Bechtel Specification No. 7749-C-29A, "Technical Specifications for the Furnishing, Detailing, Fabricating, Delivering, and Placing Reinforcing Steel". A review of receiving, test, and placement records indicated that the spiral steel used in the construction of the auxiliary and turbine buildings was tested prior to use and was not rejected rods.

Based on the continuity and completeness of the records reviewed, it appeared that no records were destroyed, and this allegation could not be substantiated. Additional information on rebar is also contained in RO:III Inspection Reports No. 050-346/70-04, No. 050-346/71-02, and No. 050-346/71-03.

c. Water-Cement Ratios

The allegation specified that water-cement ratios were ignored, and changes from one type of concrete to another were made without prior approval.

The records for several concrete pours, spanning the period from October 7, 1970, to December 22, 1971, were reviewed to assess the validity of the allegation. All records examined established that the mixes for each pour conformed to the specification requirements and to the ACI requirements for the cement, aggregate, fly ash and water. Water-cement ratios, slump tests, strength tests, and inspection requirements for pre-and-post placement were established as conforming to requirements. Where slump did not meet requirements, rejection of the material was properly documented. Records for pours examined (in addition to the ring girder foundation) were:

<u>Pour No.</u>		<u>Date Poured</u>	<u>*Type of Concrete</u>	<u>*Slump Req.</u>	<u>*28-Day Psi Req.</u>
M-9, M-10 & M-11 (24 cubic yds)	Membrane Protection	10/07/70	C-1	1" to 4½"	4000
P-10 (448 cubic yds)	Foundation Mat	2/11/71	C-1 C-2	1" to 4½" 1" to 4"	4000 4000
153 (205 cubic yds)	Auxiliary Bldg. Wall	7/06/71	C-2	1" to 4"	4000
541 (197 cubic yds)	Containment Building	12/22/71	D-1-3-A	1" to 4½"	5000

\*Bechtel Specification No. 25, Central Mix Plant, Section 3.5 (Mix Design) Revision 0, dated July 31, 1970, and Revision 1, dated October 23, 1970, (no change in mix design requirement from Revision 0 to Revision 1.)

The records reviewed during this inspection did not indicate that pours had been switched from one type of another. However, at least on incidence of misplaced concrete is known to have taken place. The incident and its resolution (placement of nine cubic yards of concrete designed for the reactor shield building into the spent fuel pit floor slab) is documented in RO:III Inspection Report No. 050-346/71-02. Additional documentation of RO:III inspection activities related to concrete are contained in RO:III Inspection Reports No. 050-346/71-01, No. 050-346/71-03, No. 050-346/72-01, No. 050-346/72-02, and No. 050-346/72-03.

d. Concrete Placed Before Tests Performed

The allegation stated that: "Concrete was placed and poured before tests were performed in order to minimize overtime work."

The exact nature of this allegation could not be determined, since required tests on concrete are difficult or impossible to perform after it has been poured. Records reviewed during the inspection were Bently and Bechtel field inspection reports for the period September 30, 1970, to March 10, 1971. Problems associated with preparation for pouring of concrete and two instances of reinforcing steel quarantine were noted with appropriate documentation of the resolutions. Included were inspection reports of batch plant operations for conformance with ASTM and Bechtel Specifications. The reports also included inspection results of PTL activities regarding tests of materials cement, aggregate, water, fly ash and Curing Tank temperatures for conformance to ASTM and Bechtel specifications. No deficiencies were noted. As indicated by the records examined above and in Sections 1.a and 1.c of this report, no

evidence was established which would substantiate this allegation.

e. Michigan Testing Engineers, Incorporated - NDE Personnel

The allegation specified that MTE personnel were unqualified for testing. A review of records of MTE indicated that the personnel assigned to the Davis-Besse project did not, except in one area (Cadwelding) perform any NDE work. MTE quality control efforts were limited to visual inspections of rebar and concrete work. All NDE work was performed by PTL. PTL verified all required strength tests for Cadwelding, concrete, and rebar. MTE Personnel were qualified and tested for Cadwelding inspections of rebar. The records reviewed indicated that the personnel of MTE, involved in Cadwelding inspections, were qualified to perform the job according to specifications. No requirements or qualifications were necessary for visual inspections of rebar and concrete slump tests.

f. Cooling Tower - Foundation Fill

The allegation stated that foundation fill for the cooling tower, which came from an onsite quarry, failed to meet specifications. Since this subject was extensively covered in the environmental hearings and is not considered to be Class I, this matter was not examined by the RO:III inspectors.

g. Employees Asked to Do Things Not in Conformance With ASTM and ACI Standards

During all of the reviews conducted by the inspectors during this inspection, no evidence was found which would substantiate the subject allegation.

h. NDE Personnel Used on Containment Vessel Fabrication

The allegation stated that testers on the containment vessel were not qualified and that even laborers were used to perform tests. The inspector reviewed all available personnel records to determine if the personnel performing NDE work on the containment vessel were qualified to perform the required tests. The records indicated that personnel involved in NDE work were qualified to perform the required tests. Tests performed on the vessel included Magnetic Particle, Radiography, and halide leak testing. All test personnel signed the as-built drawings made of the containment vessel. The records indicated that the personnel were qualified to SNT-TC-1A, Levels I, II, and III. The only area that unqualified workers would have been used during tests was during the halide leak test of the containment vessel welds. Helpers were needed to hold the test channel over the weld while the qualified tester performed the test from the opposite side. No requirements or qualifications were needed for the helpers used for this test.

Additional information on the qualification of personnel, relative to the containment vessel, is contained in RO:III Inspection Reports No. 050-346/70-04, No. 050-346/71-02, No. 050-346/71-03, No. 050-346/72-01, and No. 050-346/72-03.

i. Other Allegations

The specified allegations were: (1) selective rather than random sampling done for testing, (2) onsite quality control was a weak link, and (3) records were destroyed.

During the reviews conducted by the inspectors during this inspection, no evidence was found which would substantiate the allegations enumerated above.

2. Primary Piping

During the inspector's review of the B&W weld material certification records, it was noted that, in many instances, the certifications were copies of the original, but the legibility was unacceptable in that it was impossible to determine the certification figures. It was also noted that some certifications were approved for Navship and fossil use, but not for ASME requirements. The B&W representative stated that he had recognized this fact and that he had it on his agenda for discussion with B&W QA management. The inspector informed the licensee that this matter would be reviewed during the next scheduled inspection.

a. Follow-up Welding Record Review

Examination of the welding (procedures) and weld rod issue control records on file for the primary piping indicated that they were completed satisfactorily for those areas completed to date. A total of twenty-eight field welds comprise the primary system welding schedule. Seven welds have been partially completed. Final grinding and radiographic examination has not been performed. Records reviewed for weld procedures No. 26 and No. 30 included welds No. B-61-1, No. WJ-2-2, No. WJ-31-2, and No. WJ-5-2. The areas covered were: (1) visual inspection of joint preparation, environmental control, root gap alignment, root pass, and completed weld; (2) preheat temperature, interpass temperature, weld quality, correlation of records to welds, defect removal, and acceptance of repair (final NDE has not been completed); (3) weld rod control through material receipt verification, preissue storage condition and issue control; (4) disposition of unused material, and heat treat records; (5) repair records (for welds No. WJ-5-2 and No. WJ-31-2); and (6) material control.

b. Welding Follow-up Observation of Work

Visual examination of welds No. WJ-2-2 and No. WJ-5-2 was made

by the inspector. Areas checked were: (1) use of welding procedure; (2) joint preparation and alignment; (3) identification - weld, welder, and inspector (the welds are not stamped; control of identification is being maintained on the weld record sheets); (4) appearance of partially completed weld; and (5) control of weld material.

c. Piping - Follow-up Records Review

The quality records for piping examined during the inspection were reviewed. The primary piping is received onsite and installed using the material certification system as a prerequisite for receipt and installation. Records were examined for (1) receipt inspection; (2) installation NDT (were required); and (3) QC inspection of installations. The records were found to have been completed and signed satisfactorily. Hydrostatic testing and cleanliness of the piping is to be reviewed during future inspections.

3. Apparent Corrosion of Stainless Steel Components and Stainless Steel Components in Contact With Carbon Steel Hangers and Connectors (RO Inspection Reports No. 050-346/73-03 and No. 050-346/73-04)

A detailed investigation of the subject conditions was conducted by both Bechtel and ITT Grinnel. Bechtel's findings were transmitted by letter BT-3225, dated August 24, 1973, and the Grinnel reports were transmitted on July 27, 1973, and November 12, 1973. The investigations conclude that such rusting, or discoloration, does not affect the metallurgical structure or quality of the underlying metal, nor is there evident of a decrease in the integrity of the stainless steel due to this condition. Additionally, project specifications allow the use of carbon steel components on Class 3 systems and Class 2 systems of a 300 pound rating, or less. A review of this practice indicated that no galvanic action would be anticipated and the stainless steel would not be affected. Therefore, based on the conclusion of these reports and acceptance of these findings by TECO in memorandums dated January 10, 1974, from the chief mechanical engineer to the Vice President, Power Group, and from the Vice President, Power Group, to the Chief Mechanical engineer and the Davis-Besse quality assurance engineer, this matter is considered closed.

4. Electrical - Record Review - Welding

a. General

Records associated with support and seismic welding for Class 1E electrical equipment, excluding penetrations, were reviewed. The subject welding, which primarily involves supports for cable trays and conduit, was estimated to be 60% complete at the time of the inspection. Activities in two areas involving weld inspection for acceptability and control of welding operations appeared to be in nonconformance with applicable specifications or procedures and in

violation of AEC criteria and are discussed in Paragraph 4.d, below. A "stop work" order for Class IE (Q-listed) electrical welding was issued by Bechtel, approved by the licensee, and placed into effect on January 8, 1974. A subsequent phone call to the licensee established that the "stop work" order was still in affect as of January 31 1974.

Documents, procedures, and specifications examined during this inspection included:

- (1) Bechtel Specification No. 7749-E-14, Revision 3, dated October 15, 1973.
- (2) F-M, Quality Assurance Procedure (QAP) No. 1, "Welding Procedure", Revision 0, dated September 27, 1972.
- (3) F-M, QAP-2, "Receiving and Receiving Inspection", Revision 0, dated September 27, 1972.
- (4) F-M, QAP-6, "Processing of Nonconforming Items", Revision 0, dated September 27, 1972.
- (5) F-M, QAP-1, Appendix A, "Welding Procedure Specification for the Welding of Carbon Steel".
- (6) F-M, Quality Control Instruction (QCI) No. 1, "Welding Procedure for Welding of Carbon Steel Structures per AWS D1.0-69", Revision 1, dated October 15, 1973.
- (7) Weld Procedure Test Reports, Pittsburgh Testing Laboratory.
- (8) Bechtel reports of audits and inspections of F-M activities.
- (9) Bechtel and F-M Nonconformance Reports (NCR's) related to electrical welding activities.
- (10) Bechtel "Stop Work Record" No. 5, dated January 8, 1974.
- (11) American Welding Society (AWS) Standard D1.0-69.

b. Qualifications

Qualification records for welders and weld procedures were reviewed and found to be properly documented and approved in conformance with applicable specifications. Support and seismic welds for Class IE electrical equipment are specified to be in accordance with AWS Standard D1.0-69. Electrical penetration welding is to be in accordance with ASME Sections III and IX. (No electrical penetrations have been installed to date.) The F-M welding engineer checks, at least monthly, to verify the current qualification of each welder and records were available to establish this fact.

c. Weld Materials

Receiving and material certification records for Type E-7018 welding electrodes were reviewed for shipments received January 18, May 4, and October 2, 1973. No discrepancies were identified. No inspection, relative to storage and issue control of welding materials, was performed since no Class IE electrical welding was in progress at the time of the inspection.

d. Control of Welding Operations

(1) Inspections

Nonconformance reports and repair records for electrical welds were reviewed and considered to be in conformance with requirements. However, procedures for inspection of Class IE support and seismic welds were not available, nor was documentation available to establish that all electrical Q-listed welds were inspected.

The F-M Quality Control Manual, in Section No. 9, states, in context, that "inspections necessary to assure compliance with the contract requirements will be performed and that detailed inspection procedures will be prepared and shall include accept-reject criteria, validation sheets, or check-off lists".

(2) Other Controls

F-M, QAP-1, in paragraphs 8.1 and 8.2, states, in part, that: "The welding inspector is responsible for maintaining surveillance of all welding operations. He must verify all fit-ups, electrodes, and filler materials . . . prior to the weld operation; and (2) "Each welder is issued an identifying stamp. He is required to affix the stamp to welding records for all welding operations which he performs. The welding inspector must counter stamp the welding records after verifying acceptability of the operation". Contrary to this, there was no documentation available to establish that requirements of the procedure were being followed.

A representative of F-M stated that the procedure provisions referenced were intended to apply only to welding performed to ASME Section III requirements and not to welding performed in accordance with AWS Standard D1.0.

These same findings were identified by Bechtel in audits performed on September 21, 1973, and on January 7, 1974, and, as a result, a "stop work" order for electrical Q-listed welding was issued on January 8, 1974.

The licensee was informed that, although corrective action had been initiated, these matters were considered to be in violation of AEC



regulations and would be brought to the attention of corporate management by a copy of our report summarizing the results of the inspection.