

November 6, 1969

R. Powell, Reactor Projects Branch #2
Division of Reactor Licensing
THRU: p Dudley Thompson, Chief
Operational Safety Branch, DRL

REQUEST FOR ADDITIONAL INFORMATION - CP REVIEW FOR THE TOLEDO EDISON
COMPANY, DAVIS-BESSE NUCLEAR GENERATING STATION, DOCKET NO. 50-346

Ref: Review Plan for Davis-Besse, dated September 25, 1969

Additional information needed for our review of the Davis-Besse plant is outlined below. It is based on the requirements of a proposed amendment to 10 CFR 50. This proposed amendment would require the applicant to submit, at the time of the CP review, certain general descriptive information pertaining to emergency planning. This discussion should include, but not be limited to, the following:

- (a) The proposed organization for coping with emergencies, including procedures for notification of persons assigned to the organization;
- (b) The contacts to be made with local, state, and Federal agencies with responsibility for coping with emergencies;
- (c) The protective measures to be taken to prevent undue risk to the health and safety of both onsite and offsite personnel;
- (d) The provisions to be made for onsite emergency first aid, decontamination, and for emergency transportation to offsite treatment facilities.
- (e) The contacts to be made concerning emergency treatment at offsite facilities;
- (f) The training program for employees and for persons not employees of the applicant whose services may be required in coping with an emergency;
- (g) The features of the facility designed for ease of recovery and reentry.

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We find the Conduct of Operations and Initial Test and Operations sections of the PSAR to be adequate, with exception of the information requested above. The applicant should be informed that both of these subject areas will receive a more comprehensive review at the POL stage.

William R. Gwinn
Operational Safety Branch, DRL

cc: D. J. Skovholt, AD/RO, DRL
R. Tedesco, Chief, RPB#2, DRL

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DATE ▶	11/6/69	11/6/69				

- b. Contrary to 10 CFR Part 50, Appendix B, Criterion V, inspection and installation activities relative to cable and raceways were not being performed in accordance with specifications and procedures. (Report Details, Paragraph 3.c)
- c. Contrary to 10 CFR Part 50, Appendix B, Criterion XIV, completed cable routing inspections were determined to be incomplete. (Report Details, Paragraph 3.b)
- d. Contrary to 10 CFR Part 50, Appendix B, Criterion XVI, conditions adverse to quality were not being corrected promptly. (Report Details, Paragraph 2.).

These infractions were identified by the inspectors and had the potential for causing, or contributing to an occurrence with safety significance.

Licensee Action on Previously Identified Enforcement Matters

Not applicable.

Other Significant Findings

A. Systems and Components

- 1. Lack of certification that cable identifying materials and cable pulling compounds do not effect self-extinguishing and nonpropagating flame characteristics. (Report Details, Paragraph 1.h)
- 2. Improper labeling of motor control center position. (Report Details, Paragraph 1.i)
- 3. All cable material certifications were not available for review. (Report Details, Paragraph 1.g)

B. Facility Items: Not applicable.

C. Managerial Items: Not applicable.

D. Noncompliance Identified and Corrected by Licensee

Not applicable.

E. Deviations: Not applicable.

F. Status of Previously Reported Unresolved Items: Not applicable.

Management Interview

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

Toledo Edison Company (TECO)

M. D. Calcamuggio, Power Plant Electrical Engineer
G. W. Eichenauer, Quality Assurance Field Representative
J. D. Lenardson, Quality Assurance Manager
E. C. Novak, General Superintendent - Power Engineering
and Construction

Bechtel Corporation (Bechtel)

H. A. Ablondi, Project Quality Assurance Engineer
J. D. Heaton, Project Field Quality Control Engineer
C. L. Huston, Field Construction Manager
W. C. Lowery, Electrical Quality Assurance Engineer

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

1. The inspector stated that this was a special inspection relating to electrical equipment installations. Various areas of noncompliance were identified. Specific areas include: lack of separation criteria; inadequate inspection activities; improper cable routing and slowness in the dispositioning of noncompliance reports.
2. The inspector stated that, according to inspection records, electrical installation work had been completed but, a reinspection by the IE inspectors identified several construction deficiencies in these same areas.
3. The inspector stated that nonconforming items were being identified by the electrical contractor, but that the time required for disposition was too long and, in one case, exceeded ten (10) months.

4. The inspector stated that cable certifications relative to fire, radiation, and LOCA environment were satisfactory. However, certifications relative to the cable identification material and cable pulling compounds, concerning fire and cable deterioration properties, were not available for review.
5. The inspector stated that some cables were not routed according to routing cards and, in some instances, routing cards did not match the master circuit schedule. The licensee agreed that this was a serious problem but did not make any formal commitment to rectify the matter.
6. The inspector stated that the misrouting of safety related cables appeared to be a matter of noncompliance and that further review of the other previously discussed matters would be required. The inspector further stated that the licensee would be informed subsequent to the inspection of other items of noncompliance, if additional items are identified during the review.
7. The inspector stated that based on discussions during the inspection and as a result of this meeting it was his understanding there would be a 100% physical inspection of all essential cable, cable tray, wireway, and associated cabinets relative to separation requirements, as stated in the FSAR. The inspection would be conducted by Bechtel engineers from Gaithersburg, assisted by TECO engineers. The inspection would commence on, or about, June 2, 1975. Whenever separation criteria could not be met, the area would be documented. At these areas either an approved barrier would be installed or, in very limited cases, a complete, documented engineering evaluation would be made to justify deviating from the criteria. These evaluations are to be reviewed by cognizant TECO engineers.

The licensee acknowledged this matter, but stated that TECO engineers may not be available for the entire inspection.

During the interim, electrical installations will continue with the guidance provided in Bechtel letter FL14-2673, dated May 22, 1975, which was addressed to both site electrical contractors.

REPORT DETAILS

Persons Contacted

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

Bechtel Corporation (Bechtel)

J. R. Knoke, Electrical Field Engineer
W. C. Lowery, Electrical Quality Assurance Engineer
J. Serino, Electrical Quality Control Engineer
D. Stites, Electrical Quality Control Engineer
E. M. Steudel, Assistant Electrical Project Engineer - Gaithersburg

Fischbach and Moore, Incorporated (F&M)

W. L. Columbia, Assistant Project Manager
F. Kollin, Project Manager
D. M. Moeller, Quality Control Manager

Toledo Edison Company (TECO)

J. C. Buck, Field Quality Assurance Engineer
G. K. Grover, Quality Control Engineer
A. Topor, Power Plant Electrical Engineer

Results of Inspection

General

The purpose of this inspection was to ascertain if the licensee had installed and inspected electrical cables, raceway, and supports in compliance with NRC requirements and with commitments in the Davis-Besse Unit 1 FSAR.

During certain portions of the inspection, members of the TECO Power Plant Electrical Engineering Staff and Bechtel Project Engineering Staff accompanied the IE Inspectors.

1. Review of QC Records

- a. The inspectors reviewed Forty-three (43) cable installation records. In the review were safety related control and power cables, including those associated with the diesel generator start, reactor breaker trip, and Reactor Protection System

(RPS) Safety Features Actuation System (SFAS) power supply circuit. The records were signed and stamped appropriately by quality control personnel, indicating that the installations were complete.

- b. During physical verification of a cable installation by the use of a routing card, the relative cable, (4CY088) along with two others, was observed to be coiled at a mid-routing point. Other QC records indicated that these cables were to be subsequently rerouted. This item was well documented.
- c. A cable (No. 2CY1429B) was routed according to the routing card, but the routing did not conform to that of the master circuit schedule. Records indicated that the pull was in accordance with a documented approval change.
- d. Field Change Notices (FCN's) relative to modifications of the SFAS panels, were well documented. However, the actual changes made did not include installation of grommets, bushings or other insulation to prevent damage to cables after the cutouts were enlarged to allow for extra clearance.
- e. Cable insulation damage was identified on an inspection report. The inspection report included a reference to a nonconformance report (FM number 099) but the fact that insulation damage occurred and was an item to be resolved was not clearly documented in the nonconformance report.
- f. Cable testing (megger) sheets were well documented. However, as stated elsewhere in this report, in some cases, these tests were performed before the cable installations were completed.
- g. Cable material certifications for Kerrite, Okonite, and Boston insulated cable were reviewed. Prototype tests were performed relative to flame, radiation, and steam/chemical spray exposures. As originally reviewed, the test results appeared to be acceptable. However, it was determined that further information (i.e., does each type of cable meet requirements) would be required before an acceptance finding could be made. This matter will be reviewed during a subsequent inspection.
- h. Cable pulling compounds such as Ideal Industries' "yellow 77", Thomas & Betts' Jet line "MTW" and "MWP-66," and ITT Holub's "Hi Green", and the cable color coding inks, have not been determined to be acceptable as non-flame propagating or cable deteriorating materials. This item will be reviewed during a subsequent inspection.

1. 480-V switchgear compartment BE110, in unit substation E1, and compartment BF110, in unit substation F1, are not identified in accordance with figures 8-48, 8-10A, and 8-10B, of the FSAR.

This item will be reviewed during a subsequent inspection.

Records reviewed during the inspection included:

(1) Cable numbers:

12RPSM04A	1PAC108A	2CAD12DFF	2PAD101B
14RPSM01H	1PAC109A	2CBDF11A	2PAD107A
1CBE1102C	1PAC112A	2CBDF12A	2PAD108A
1CBE1173C	1PAC113A	2CBF1120F	2PAD109A
1CCRD287	1PBE1101A	2CBF1180C	2PAD112A
1CGD104B	1PBE1224A	2CGF1203C	2PBF1202A
1CGD104C	2CAD11DFD	2CBF1203D	2PBF1206A
1CV179AD	2CAD11DFE	2CCRD286	3CY308A
1CYE204F	2CAD11DFF	2CGD204C	4CY408A
1CY109A	2CAD12DFD	2CV1429B	4LRPSC05B
1PAC101B	2CAD12DFE	2CVDH13AE	

(The above cables and associated raceway were used as a basis for the physical aspect of the inspection).

(2) Cable numbers:

1PD1P07A	2PBF1202A	3PD1N07A
2CAB12DFE	2PFB1221A	4PDZ707A
2CF1505D	3PD1P07A	4PYR4A

(These cables were also observed to have separation and installation problems but records were not reviewed as thoroughly as those listed under (1) above).

- (3) Cable Pull Card Change Log, Authority No. 62.
- (4) F&M Mod. Pak No. 22, dated May 15, 1975.
- (5) Bus and Cable Test Data Sheets No. 51 and No. 60D.
- (6) Bechtel FCN's No. 2508, No. 2549, and No. 2764.
- (7) F&M Nonconformance Log data May 18, 1973, to May 15, 1975.
- (8) F&M Inspection Report No. 301.

(9) Specifications Nos. 7749-E-13, 7749-E-14, and 7749-E-17Q-10-1.

(10) Engineering Report No. 141 of February 29, 1972.

(11) Engineering Report No. 164 of October 17, 1972.

2. Nonconformance Reports (NCR)

The inspector reviewed the F&M NCR log from May 18, 1973, to May 15, 1975. These NCR's are normally dispositioned by Bechtel. Item 80, dated July 15, 1974, had not been dispositioned. Items 87 and 91, relating to raceway supports, were dispositioned to "accept as is". Twenty-six (26) items remain unresolved, some older than ten (10) months, eighteen (18) of these relate directly to items observed during this inspection.

The inspector concluded that this item was contrary to 10 CFR Part 50, Appendix B, Criterion XVI, in that conditions adverse to quality were not being promptly and, in some cases, adequately corrected. Cognizant TECO management was subsequently advised of this matter.

3. Observations of Work

The inspectors observed several safety related cable installations and determined the following:

a. Cable Separation and Seismic Support Criteria

- (1) Cable separation of four (4) feet vertical and eighteen (18) inches horizontal between redundant channels was not maintained. In some cases in the cable spreading room, horizontal spacing was less than one inch. (FSAR, Paragraph 8.3.1.2.20)
- (2) Minimum separation distance of twelve (12) inches within protection cabinets and control panels was not maintained. In some cases, redundant channel cables were in direct contact. (FSAR, Paragraph 8.3.1.2.25)
- (3) Power cables routed in conduit were noted to be cross routed and separation distances were not maintained when passing through a manhole. (FSAR, Paragraph 8.3.1.2.20)
- (4) In no case was barrier criteria documented to indicate how cable separation violations would be corrected. (FSAR, Paragraphs 7.1.2.3.1 and 8.3.1.2.26)

- (5) Conduit was not properly supported. A slight pulling force caused a section of conduit to move downward approximately three (3) inches. (FSAR, 8.3.1.2.10)

Subsequent to this inspection, the inspector determined that requirements, relative to the seismic support of conduits and associated equipment which carry safety related cables, have not been translated into specifications, procedures or instructions. (FSAR, Paragraph 8.3.1.2.24)

The inspector concluded that items (1) through (5), above were items of noncompliance contrary to 10 CFR Part 50, Appendix B, Criterion III, in that NRC requirements and FSAR commitments have not been translated into specifications, procedures, or instructions. Cognizant TECO management was subsequently informed of this matter.

b. Cable Routing Inspections

In some cases safety related cables were not routed according to the routing cards, in one case routing was according to the card even though the specified route did not match that of the master circuit schedule. The cards were stamped indicating that inspections were completed and approved by F&M quality control.

The inspector concluded that this item was an item of noncompliance contrary to 10 CFR Part 50, Appendix B, Criterion XIV, in that inspections documented to be complete were determined to be unacceptable by the IE Inspector. Cognizant TECO management was informed of this matter.

c. Installation

- (1) Cable tray contained debris, including rags, pieces of conduits, unistrut material, etc.
- (2) Wireways appeared to be overloaded. This was quite apparent regarding interconnecting cables of the SFAS panels and the RPS panels.
- (3) Several conductors located in the SFAS cabinets were not properly supported or secured. A number of exposed electrical terminals were within 1/8 inch of the cabinet door when closed. Some conductor terminals were bent at 90 degree angles to accommodate the closure of the cabinet

doc. Several teflon coated conductors were pulled from connectors. Cable separation was in gross conflict with FSAR requirements. Metal drilling fragments were lying on the bottom of the cabinet.

- (4) Identification by color coding of prefabricated cable between individual SFAS channels and the main control panel was not accomplished as required by procedures.
- (5) An identification tag attached to a cable did not match that of the routing card.
- (6) Identification of raceway was not in accordance with procedures.
- (7) Sharp edges were apparent at most wireway installations. Cables and conductors were noted to have insulation damage.
- (8) Sharp edges were apparent at holes which were cut between SFAS panels to accommodate prefabricated cable connecting plugs. Bushings or other protection devices were not installed according to field drawings. (FCN's).
- (9) Safety related cables had been prematurely tested (meggered) and terminated at one end before being completely installed in the raceway.
- (10) A nonsafety related cable was observed to be installed in such a way as to cross and be in physical contact with two redundant safety related systems.
- (11) Some cables were observed on which the minimum bending radius had been exceeded.

The inspector concluded that items (1) through (11) were contrary to the requirements of F&M Installation Inspection Procedure (IIP) No. 7a.001 and No. 7c.001 and Criterion V of 10 CFR Part 50, Appendix B. Cognizant TECO management was subsequently informed of the matter.

4. Inspection Conclusion

A breakdown in the licensee's management and procedural controls was evident by the identification of several items of noncompliance relative to the installation and inspection of electrical equipment. Based upon the limited sample chosen for the inspection and the results of the inspection, the inspectors concluded that this was an item of noncompliance contrary to 10 CFR Part 50, Appendix B, Criterion II. Cognizant TECO Management was advised of this matter.