U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-346/82-33(DETP)

Docket No. 50-346 License No. NPF-3

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

Facility Name: Davis-Besse Nuclear Power Station, Unit 1

Inspection At: Bechtel Power Corporation, Gaithersbury, Maryland

Inspection Conducted: November 30 and December 1, 1982

Inspector: for I. T. Yin 12/15/82

Approved By: D. H. Danielson, Chief 12/15/82
Materials and Processes Section

Inspection Summary

Inspection on November 30 and December 1, 1982 (Report No. 50-346/82-33(DETP))
Areas Inspected: Inspection of licensee implementation of IEB 79-14; followup on previously identified items. This inspection involved a total of 12 inspector-hours at the licensee's A-E office by one NRC inspector.
Results: No items of noncompliance or deviations were identified.

DETAILS

Persons Contacted

Toledo Edison Company (TECo)

*C. L. Mekbel, Civil and Structural System Engineer
*M. Nitzel, Stress Analysis Engineer

Bechtel Power Corporation, Gaithersburg, Maryland (BPC)

*J. W. Fay, Project Engineer
*R. Kies, PDE Group Supervisor
*C. M. Foltyn, Assistant Project Engineer
*N. Kalyanam, Staff Supervisor
S. P. Lingam, Senior Engineer
C. H. Abutaa, Pipe Support Engineer

*Denotes those attended the management exit interview on December 1, 1982.

Licensee Action on Previous Identified Items

(Closed) Unresolved Item (346/80-22-01): The inspection procedure for evaluation of as-built configurations did not require verification of pipe size, schedules, and materials. This item is resolved, see Paragraph 1 for details.

(Closed) Unresolved Item (346/80-22-02): Further review of Main Steam (MS) line stress analysis and restraint system modification. See Paragraph 2 for details.

(Open) Unresolved Item (346/82-22-03): Problems relative to retrievability of ITT-Grinnel performed hanger and restraint calculations. The inspector accompanied the licensee during their team audit of ITT-G on December 2, 1982. Review of the licensee's audit report and the measures taken to resolve open items is planned.

Functional or Program Areas Inspected

1. Review of Procedures

The inspector reviewed the following work procedures:

- PDP-2, "Inspection Procedure for As-Built Configuration of Nuclear Safety Related Piping Components, IEB 79-14", Revision 2, dated July 28, 1980.

- PDP-3, "Evaluation Procedure for As-Built Configuration of Nuclear Safety Related Piping Components, IEB 79-14", Revision 2, dated July 28, 1980.

In discussion with the licensee representative, it was stated that, although there were no specific IEB 79-14 field inspection procedure requirements for measuring pipe wall thickness and material, the plant's In-Service Inspection (ISI) program had included 100% baseline examination of all Class 1, and 25% of all Class 2 and 3 piping systems. ISI included weld joint non-destructive examinations and verification of pipe wall thickness shown on the piping class sheets. As a result of the review, the inspector determined that the procedures were adequate for performing the IEB 79-14 field inspection and stress evaluation work.

2. Followup Review on MS Analysis

In conjunction with discussions documented in Region III Report No. 50-346/80-22, Paragraph 1.c.(2), the inspector reviewed BPC Calculation 10A, "Main Steam," Revision 5, dated August 16, 1980. The inspection areas included:

a. The piping dynamic reaction force of 21,300 pound was modeled into the computer input. The inspector reviewed the BPC calculation, "MS Relief Valve Reaction Forces" dated February 2, 1972, where a 6x10 valve showed reaction forces from 21,229 pounds to 21,288 pounds; and a 6x8 valve showed a reaction force of 14,723 pounds. It was concluded by the inspector that the forces modeled into the computer run were conservative.

b. The inspector observed that the new snubber SR-47 installed in the 38" MS relief valve header manifold is close (approximately 14 feet) to the pipe elbow and anchor. The inspector questioned the functionability of the snubber. In review of the previous piping response spectrum used, OBE movements in the snubber direction were 0.03" (.8g max at 13 cps). This small displacement will not be able to activate the snubber. However, the new response spectrum curve modeled in the analysis showed a loading in excess of 4 g at 13 cps, and an OBE displacement of approximate 0.15" was expected if no snubber was installed at the location. The inspector determined that the snubber should lock up at 0.15" displacement and expressed no further concerns in this area.

c. The inspector reviewed: (1) SR-47 installation details shown on BPC Drawing C-279A, "Auxiliary Building MS Line Restraints, Detail Sheet 1A" Revision A, dated August 9, 1980; (2) Structural Calculation 35, Volumn C16, "Design Snubber for MS Line" Revision 0, dated August 11, 1980, and Revision 4 (line flooded seismic condition), dated September 9, 1982; and (3) piping component attachment enforcement calculation. This calculation had not previously been performed. For detailed discussion, see Paragraph 3.

3. Pipe Restraint Attachment Reinforcement

a. In reference to the lack of calculations (Paragraph 2.c.(3)) BPC performed a computer calculation, No. 10A-1, "SR-47", Revision 0, on November 30, 1982, to determine local pipe stress levels at the newly installed restraint attachment to the MS relief valve

manifold/header including the utilization of a reinforcement pad for better stress distribution. The inspector reviewed the calculation, and found improper replacement of Seismic Anchor Movement (SAM) loading by Relief Valve Lift (RVL) dynamic loading. The pipe stress in SAM is characterized as a secondary stress. The pipe stress in RVL is classified as a primary stress. By BPC's criteria, at plant upset condition, total primary stresses should be less than 1.5 Sm, and the total of the primary plus secondary stresses should be less than 3.0 Sm. In determination of the cause of the problem, the inspector reviewed the BPC procedure contained in GPD Stress Group Newsletter, No. 32, "Evaluation of Local Stresses at Welded Attachment on Piping Systems," dated November 18, 1980, and found that no specific detailed instruction was provided for the designer to incorporate the RVL in the overall calculation. Rather, a general statement, "Effects due to events such as relief valve opening, steam hammer, LOCA should be added for the appropriate check." The BPC engineers stated that this procedure will be revised to clarify the design requirements including insert of methods to combine OBE and SSF loads with other dynamic loads. This is an unresolved item (346/82-33-01).

Re-run of calculation 10A-1 was carried out on December 1, 1983, prior to the conclusion of the inspection. The properly combined stresses are within the design allowables.

b. In addition to the above review, the inspector reviewed a sample calculation presented to him by the BPC engineers, where the simplified criteria for design and calculation of piping localized reinforcements including the wrapper plate were referenced in a BPC Inter-Office-Memorandum (IOM), dated May 11, 1979. In review of the IOM and related documents, the design basis and required document control provisions appeared to be questionable. Due to time constraint, additional documents retrieved by BPC engineers were unable to be examined by the inspector. Further review of these matters is planned. This is an unresolved item (346/82-33-02).

4. Additional Review of BPC Piping Stress Analysis

The inspector selected an additional evaluation package, No. 32, High Pressure Injection System, shown on ISO. No. M-233D, Revision 13, dated February 2, 1977, for review. During the review of the field inspection record, dated August 10, 1979, Floor and Wall Penetration Checklist, penetration No. P6 was shown to be Bisco hard rubber, yet the pipe stress analysis did not model it to be a two directional restraint. However, where P6 is located, the piping stress analysis showed a 1.48 g loading (2nd vibration mode at 6.2 cps). When compared with the response spectrum peak of 1.6 g at 6 to 7.7 cps, the effect of the missing of P6 restraint could only point to a more conservative loading condition for the nearby pipe anchor.

At the request of the inspector, the BPC piping engineers further evaluated the following hard rubber penetrations that were modeled into the computer runs:

- P3 in Package 30, shown on ISO. M-233B.
- P2 in Package 31, shown on ISO. M-233C.
- P2, P4, and P6 in Package 32, shown on ISO. M-233D.
- M27 in Package 33, shown on ISO. M-233F.

All of these penetrations are found to be very close to an anchor or with negligible movements. Furthermore, it was stated that all of these hard rubber penetraions were installed at the very low floor elevations with a less severe seismic response spectra. In consideration of the facts presented, the inspector stated that he had no further questions.

5. Status of NRC-RIII IEB 79-14 Followup Inspection

Based on the inspector's review and observations during this and previous inspections, the overall measures taken by the licensee and the A-E to implement the IEB 79-14 requirements were substantial. However, due to the questionable areas identified and discussed in Paragraphs 3 and 4 above, and the fact that the inspector was unable to review the selected emergency diesel engine exhaust piping because of a shortage of time, additional followup review is planned prior to formal close-out of the IEB 79-14.

Unresolved Items

Unresolved items are matters about which more information or inspection efforts are required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. The unresolved items disclosed during this inspection are discussed in Paragraphs 3.a, and 3.b.

Exit Interview

The inspector met with licensee representatives at the conclusion of the inspection. The inspector summarized the scope and findings of the inspection. The licensee representatives acknowledged the findings reported herein.