

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

REGION III

Report No. 50-346/77-29

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: Davis-Besse Site, Oak Harbor, OH

Inspection Conducted: September 21 and 22, 1977

Inspector: R. J. Cook

*R.J. Cook*

10/24/77

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

10/25/77

Inspection Summary

Inspection on September 21 and 22, 1977 (Report No. 50-346/77-29)

Areas Inspected: Review vibration and loose parts monitoring noise analysis data; examine the implementation of the licensee LPM data acquisition program. The inspection involved 13 inspector-hours onsite by one NRC inspector.

Results: No items of noncompliance or deviations were found in the areas inspected.

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## DETAILS

### Persons Contacted

J. Evans, Stations Superintendent  
\*W. Green, Assistant to Station Superintendent  
\*J. Lenardon, Manager of Quality Assurance  
\*J. Buck, Quality Assurance Supervisor  
\*L. Davis, Assistant Engineer  
\*R. Leow, Reliability Technician  
\*L. Stalter, I&C Supervisor  
\*S. Hopper, Engineer

\*denotes those attending the exit interview.

### 1. General

Post hot functional testing examinations of the reactor vessel and internals had revealed some evidence of damage. The vessel and internals were repaired and the licensee indicated a diagnostic investigation for internal assembly anomalies would be performed at various power plateaus through a developed program for acquiring Loose Parts Monitor (LPM) baseline data.<sup>1/</sup> This program would incorporate provisions for early detection of core barrel gross motion anomalies from low frequency spectrum analyses.<sup>2/</sup> The licensee also stated that additional preassembly testing to establish the response sensitivity of the LPM would be performed.

An inspection was conducted to review the licensee's vibration and loose parts monitoring activities and ascertain whether gross motion anomalies may exist.

### 2. LPM Sensitivity Testing

The licensee performed LPM sensitivity testing prior to assembly of the reactor vessel internals. The tests were performed by applying known impact energies at the reactor vessel for quadrant axis and recording both the lower vessel accelerometer responses on strip charts. The impact energies used were 0.526 ft-lb and 1.020 ft-lb and were developed by dropping a pendulum through 90° and 160° arcs respectively. Both lower vessel accelerometers appeared to be sensitive to these impact energies.

<sup>1/</sup> IE Inspection Report No. 50-346/77-14.

<sup>2/</sup> IE Inspection Report No. 50-346/77-16.

The strip charts of impact energy traces appear to be photosensitive and would develop opaque with time. Therefore, the licensee agreed during the exit interview to investigate the need and feasibility of permanent record retention of the impact energy responses.

3. Vibration Data Taking

Review of the operating log revealed that the reactor coolant pumps (RCP's) were first operated after the post HFT assembly on July 1, 1977 when each pump was operated for 5-10 minutes. After these initial tests, the RCP's were operated until July 20, 1977 when the plant reverted to Mode 5 operation. The RCP's were again started on August 5, 1977. The first set of 0-25 H<sub>z</sub> vessel data (gross motion monitoring) was taken on August 6, 1977. It was the understanding of the NRC that, "During the initial operation of the reactor coolant pumps, it is intended to look at vibrations in the 0 to 25 hertz range to check for indications of core barrel movement." The licensee stated that the earlier 0-25 H<sub>z</sub> data was not taken because of equipment malfunctions, loss of the key noise analysis person, and lack of procedural revisions and approvals.

Although the RCP's had operated about three weeks prior to taking gross motion monitoring data, the data taken (in August) did not show indications of the core barrel impacting against the vessel guide lugs. Currently, the licensee's program for vibration and loose parts monitoring addresses procurement of gross motion data at the various power escalation plateaus.

4. Vibration Trends

The plant has been operated at 15% power and the following trends were noted from LPM hard copy data.

At 15% power the neutron detection channels indicate a spike at about 10.5 H<sub>z</sub>. The acoustic channel for the lower and upper vessel do not show any 10 H<sub>z</sub> predominance even with increased sensitivity. These conditions may be indicative of free beam mode core barrel motion without lower engagement.

Channel 4, an upper vessel (flange mounted detector) shows a spike at about 18.1 H<sub>z</sub> which has increased in amplitude during the previous month. Reactor power has also been increased during this period. However, there has been some subtle increases during a more recent

shorter time frame. Associated with this 18.1 Hz signal on channel 4, is a 20 Hz signal which is detected on both lower vessel channels when monitoring with increased sensitivity.

The LPM hard copy data is transcribed on a photosensitivity paper which causes the quality of the traces to deteriorate with time. During the exit interview, the licensee agreed to establish a more permanent record of the baseline data. Also during the exit interview, the licensee indicated they would follow the 18 Hz amplitude increase for indications of unexplainable growth rates.<sup>2</sup>

#### 5. Neutron Noise Analysis

The licensee indicated that the output of the four neutron monitoring channels was transcribed on magnetic tape with the plant at 15% power. These tapes could be used for further evaluation to determine internals motion.

During the exit interview, the licensee indicated that the determination to further analyze the 15% power neutron noise data had not been made. The licensee stated that neutron noise data taken at a nominal 40% power and at selected higher power levels would be contracted for further analysis.

#### Exit Interview

The inspector met with licensee representatives (denoted under Persons Contacted) at the conclusion of the inspection on September 22, 1977. The inspector summarized the scope and findings of the inspection. Licensee comments are noted in the applicable sections of the report.