DEC 29 1989

Docket No. 50-346

Toledo Edison Company
ATTN: Mr. Donald Shelton
Vice President
Nuclear
Edison Plaza
300 Madison Avenue
Toledo, OH 43652

Gentlemen:

By letter dated December 8, 1989, we provided you a copy of NRC Inspection Report No. 50-346/89021(DRS) regarding acoustic emission monitoring. Enclosure 3 to the inspection report entitled "Investigation of Acoustic Leak Monitoring for Nuclear Regulatory Commission Region III" contains information which is considered proprietary by H.A.F.A. and which, therefore, should not be in the public domain. Redacted pages 5, 17, 22, 23, and 24 with the confidential commercial information deleted are enclosed.

Please insert these pages in place of those pages contained in the report you received (and in all copies you may have made) and destroy the originals. Those who are on distribution for this letter and its enclosures should likewise take this action. Please call Duane Danielson at 708/790-5610 when this has been accomplished. Copies of this letter and enclosures have been sent to all other recipients of the inspection report.

Sincerely,

"Original Signed by R. W. Cooper II (for)

Hubert J. Miller, Director
Division of Reactor Safety

Enclosures: As stated

cc w/enclosures:
L. Storz, Plant Manager
DCD/DCB (RIDS)
Resident Inspector, RIII

RIII	RIII	RIII	RIII	RIII	RIII	RIII	RIII
Jacobson/jk	Jackiw	Danielson	Cooper	Martin	Grobe	Berson	Miller
12/28/89	12/28/89	12/28/89	12/28/89	12/29/89	12/28/89	12/29/89	12/29/89

A case in point is the treatment of AE response of sensor No. 6 on main steam line A at Palisades. [redacted] * The responsibility was shifted to "an additional VT-2" which found no sign of leakage. Based on the VT-2 result, a cautionary suggestion of other NDE when convenient was made. The conclusion was that no through-wall leakage was apparent from any other section of either main steam line.

If a leak-like noise is present, but judged to be a non-rejectable condition, the detection of additional leaks in the same area is not possible. If visual inspection must be invoked to detect leakage, then the reduced hold-time and reduced pressure allowed the IIT method should be revoked.

* Proprietary Information Deleted

6. H.A.F.A FACILITY VISIT

6.1 GENERAL DISCUSSION

General discussions with most of H.A.F.A management and engineering staff were led by Duane Danielson.

6.2 ACOUSTIC LEAK MONITORING QUESTIONS

My effort was concentrated on the question of the validity of the acoustic leak testing used on steam systems and water-pressurized piping at Palisades and Davis-Besse. The records of testing at both plants were examined in detail. Some data were re-plotted from the logs to determine the validity of acoustic leak test analysis on Palisades. Questions about the method of recording RMS data [redacted] * [redacted] were discussed with Allen Wehrmeister and Rick Milke at H.A.F.A. Questions and answers are listed below.

1. Why was no data recorded on EARS 1, 2 and 3 while the pressure was increasing from less than 50 psi to 900 psi?

A1. The power was off in containment where the three systems were located.

2. On ears 1, channel 6, the RMS millivolts is recorded as 14.32, 14.28, 14.28, 14300, 14300, 14.35, 14.30, 14.30, 14.35, 14.30, 14.30, 14.30, 14.30, 1430, 8000, 8000, 8000, 7.82, 7.85, 7.88, 5.02, 4.36, 4.01, 60, 110, 300, 350, 800. Is it possible that the underlined values all represent the same reading with the decimal misplaced?

* Proprietary Information Deleted

7. DESCRIPTION OF METHOD

I was shown how the RMS was taken from an analog output connected by a rotary switch to the 32 channels of the EARS (H.A.F.A's name for the Spartan). This output was a DC voltage representative of the RMS voltage. A standard DVM was used for the readout. The DC output was derived from a differential circuit which could have a negative output when the DC voltage dropped below an internal reference value.

Allen Wehrmeister explained to me how the interpretation of the Spartan recorded data was used to determine the presence of a leak. [redacted] *

[redacted]

* Proprietary Information Deleted

[redacted] *

7.1 DEMONSTRATION OF IIT

A laboratory demonstration of the IIT method was performed. A 20-foot length of 2-3 inch diameter pipe was outfitted with an inlet LMD and an outlet LMD to monitor the leakage from a throttle valve at the outlet. Acoustic sensors were connected to an EARS unit where the RMS output from each sensor could be monitored. At the suggestion of John Jacobson, a small valve near the inlet end was used as a simulated external leak. The outlet valve simulated an internal leak. We found that the RMS output from the sensor mounted on the throttle valve increased sharply when the external leak rate was increased to about 120 ml/min (0.03 gpm). These measurements were made while the simulated internal leak from the valve at the opposite end of the pipe was at 0.44 gpm indicated by the two LMDs. The LMD was not sensitive enough to detect the loss of 0.03 gpm through the simulated external leak while measuring 0.44 gpm flow through the pipe.

The demonstration showed that leaks could be detected when the leak signal exceeded the uncertainty of the ambient noise signal. [redacted] *

* Proprietary Information Deleted

8. ANALYSIS OF METHOD

It is clear that the signal-to-noise ratio must be very high for Wehrmeister's leak identification criteria. [redacted] * [redacted] Therefore, the sensitivity of the leak detection process depends on the background noise.

* No qualification testing was reported that defines the relation between noise and leak detection sensitivity.

* The sensor spacing on water filled system tests where LMDs were used was usually too great for acoustic leak detection.

The leak detection and location system described in Topical Report H.A.F.A. 135 P measures the input-output flow to determine amount of leakage and uses acoustic leak monitoring to locate the region or component that is leaking. This process would facilitate the rapid inspection of a pressure boundary.

The acoustic leak monitor technique was not fully or properly implemented at Palisades or Davis-Besse. The tests included in the topical report were not adequate to qualify the acoustic leak monitor technique because no calibration of the acoustic leak detection sensitivity was performed. A functional check using simulated leak was sometimes used. Another functional check using a pencil-lead break technique was performed. These tests give no evidence as to the leak detection sensitivity or the distance over which a leak may be detected. Further, the degradation of leak detection sensitivity with increasing background noise is not addressed.

* Proprietary Information Deleted