NRC FORM 195 (2-76)

U.S. NUCLEAR REGULATORY COMMISSION

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DOCKET NUMBER: 50-315

FILE NUMBER:

TO: Mr Rusche

FROM: American Elec Power Service Co
New York, NY
R S Hunter

DATE OF DOCUMENT: 11-11-76

DATE RECEIVED: 11-16-76

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INPUT FORM

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DESCRIPTION

Ltr re our 9-30-76 ltr.....furnishing info concerning loose parts monitoring system.....

PLANT NAME: D C Cook #1

ENCLOSURE

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ACKNOWLEDGED

SAFETY — FOR ACTION/INFORMATION — ENVIRO 11-20-76 ehf

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CONTROL NUMBER: AMDA 11692

AMERICAN ELECTRIC POWER *Service Corporation*

AEP

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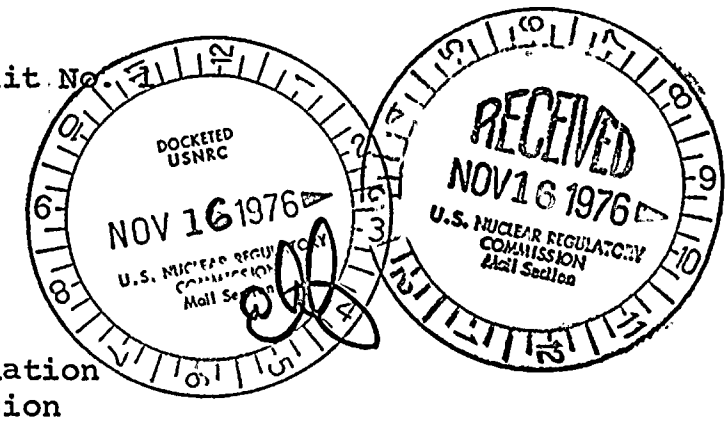
(212) 422-4800

ROBERT S. HUNTER
Vice President-Nuclear Engineering

Regulatory Docket File

November 11, 1976



Donald C. Cook Nuclear Plant Unit No. 1
Docket No. 50-315
DPR No. 58

Mr. Benard Rusche, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Rusche:

This letter is in response to Mr. Dennis L. Ziemann's letter dated September 30, 1976 which requested information concerning the operating experience of the Donald C. Cook Nuclear Plant Loose-Parts Monitoring Systems (LPMS).

The following numbered responses refer to the four questions in the request:

1. No event has occurred in which a loose-part has been found in any part of the primary system.

2. (a) The LPMS enables the detection of changes in vibration which may occur in the primary system. Vibrations are detected by twelve accelerometers, mounted throughout the primary system. Four accelerometers are mounted on the reactor vessel. Two are positioned on the reactor flange above the vessel head, and the other two are located on the vessel bottom where the hemisphere begins. One accelerometer is positioned on each reactor coolant pump, above the impeller, on the lower flange. An accelerometer is mounted on the outside shell of each steam generator, near the lower tube sheet.

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(See Table 1 and Figure No. 1 for details).

The accelerometer output is an electrical signal which is fed into an amplifier. Six amplifiers (two input signals per amplifier) are mounted on the Unit 1 control room panels and provide a visual display on a sensitivity meter. Should the signal magnitude exceed a preset limit, both an audible and visual alarm are activated.

2b. The LPMS has been in operation since April 1975.

2c. The LPMS monitors vibrations on a continuous basis and sends signals to the control room throughout the monitoring process. In addition, expanded surveillance is conducted every three months utilizing a real-time spectrum analyzer and an XY plotter to trace acceleration versus frequency for the reactor vessel, the reactor coolant pumps and the steam generators. At this time, traces are made from each of the twelve detectors over a frequency range. These traces can then be evaluated for accuracy against previous data sets available.

3. Operating experience since April 1975 has revealed no significant change in vibration signals. No abnormally large vibration signals have been detected that could not be identified as monitoring system faults. Overall signal magnitudes at all frequencies have increased slightly, with increased power operation.

   Of the twelve instrumentation channels sending signals to the six amplifiers, three have failed due to an open circuit in one channel and a short circuit of two channels.

4. The loose parts monitoring system appears to be an accurate and sensitive method of collecting and analyzing primary system vibrations. By employing this equipment we have been able to closely monitor variations in vibration since April 1975. The

installed cost of the LPMS on Unit 1 is approximately $100,000. The benefit to us is that we have an early warning system to detect a loose part and a diagnostic tool to evaluate its significance.

Very truly yours,

R. S. Hunter
Vice President-Nuclear Engineering

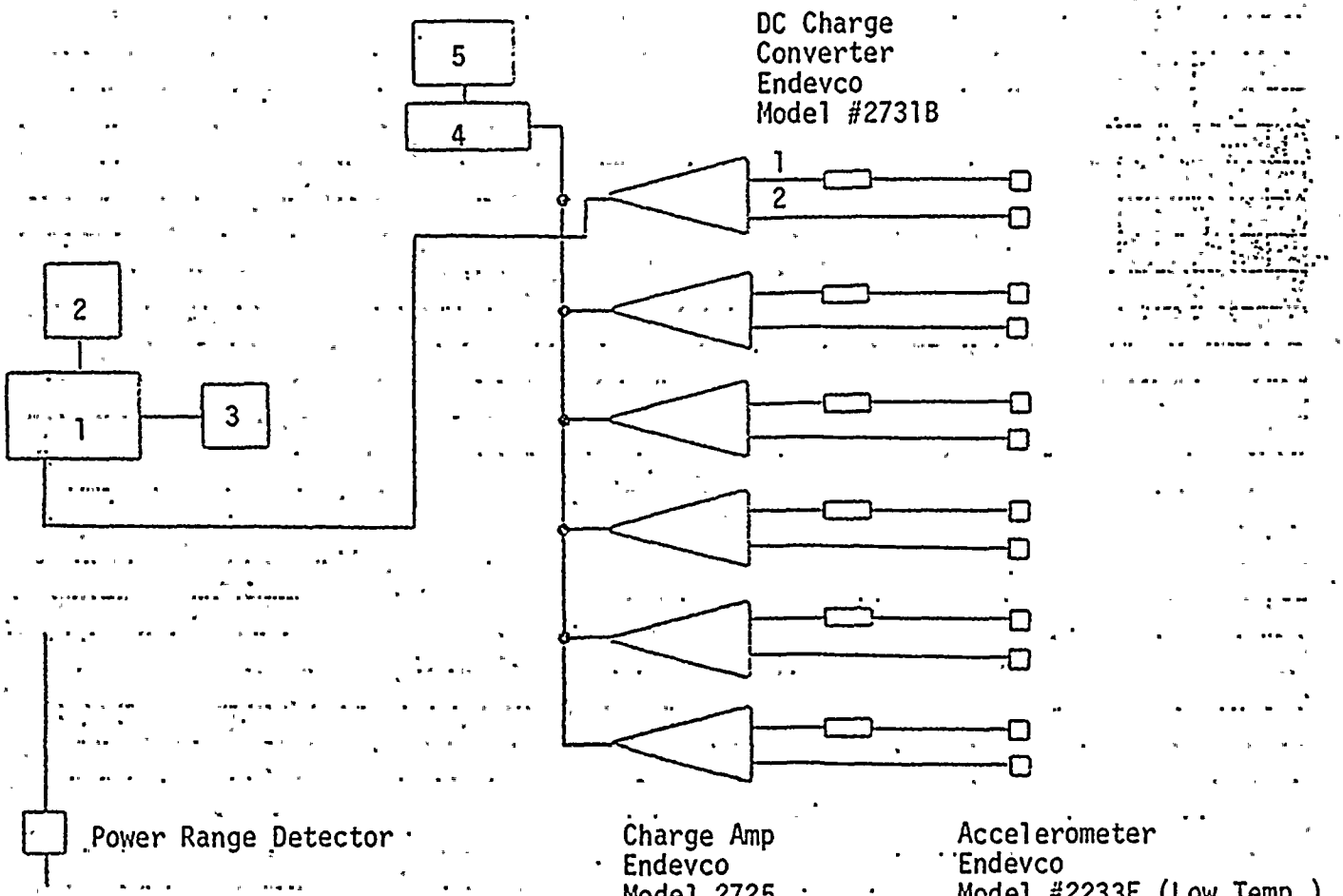
RSH:mam

cc: G. Charnoff
R. J. Vollen
R. C. Callen
P. W. Steketee
R. Walsh
John Tillinghast
R. W. Jurgensen - Bridgman

BY _____ DATE _____ SUBJECT _____ SHEET NO. _____ OF _____

CHKD. BY _____ DATE _____ Loose Parts Monitoring System JOB NO. _____

D. C. Cook Nuclear Plant, Unit #1



NOTE:

1. Honeywell SAI-52B Real Time Spectrum Analyzer/Digital Averager
2. Tektronix 5103N Oscilloscope
3. Hewlett - Packard 7035B X-Y Plotter
4. DC Level Alarm Detection Panel
5. "Loose Parts System Activated" Alarm

* Input #2 employs built in amplifier charge converter.

FIGURE NO. 1

LOOSE PARTS MONITORING

Table 1 Accelerometer Summary

Cable No.	Accelerometer Location Designation	Acceler. Serial #	Sensitivity 1 PC/g PC		Design Temp ^{0}F	Cable Length	Chg. Ampl.
1	Reactor Vessel - Upper West	CD 66	2.91	2.79	750	600	1
2	Reactor Vessel - Lower West	DR 48		64.0	500	580	1
3	Reactor Vessel - Upper North	CD 65	2.87		750	665	2
4	Reactor Vessel - Lower North	DQ 83		63.6	500	580	2
5	Reactor Coolant Pump #1 (East)	CD 82	2.87		750	430	3
6	Reactor Coolant Pump #2 (West)	DQ 95		63.3	500	660	3
7	Reactor Coolant Pump #4 (East)	CD 49	2.83		750	650	4
8	Reactor Coolant Pump #3 (West)	DQ 80		61.1	500	555	4
9	Steam Generator #1 (East)	CD 55	2.77		750	450	5
10	Steam Generator #2 (West)	DQ 71		60.1	500	550	5
11	Steam Generator #4 (East)	CD 51	2.75		750	560	6
12	Steam Generator #3 (West)	DE 70		58.5	500	575	6

Six - 750^{0}F Accel. (#2273) → 3' S.S. 3075 Cable → Chg. Converter RG Coax Cable → Cont. Rm.

Six - 500^{0}F Accel. (#2233) → All Special Cable (#3090 B) → Control Room