

# PHILADELPHIA ELECTRIC COMPANY

NUCLEAR GROUP HEADQUARTERS

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April 24, 1990

Docket No. 50-353

License No. NPF-85

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

SUBJECT: Limerick Generating Station, Unit 2  
Loose Parts Monitoring System  
Submittal of Alarm Levels for Power Operation

Dear Sir:

Regulatory Guide (RG) 1.133, "Loose-Part Detection Program for the Primary System of Light-Water-Cooled Reactors," Revision No. 1, dated May 1981, describes a method acceptable to the NRC for implementing regulatory requirements with respect to detecting loose parts in light-water-cooled reactors during normal operation. Section 4.4.6.1 of the Limerick Generating Station (LGS) Final Safety Analysis Report (FSAR), which provides a description of the Loose Parts Monitoring System (LPMS) at LGS, indicates the LGS LPMS is designed in conformance with RG 1.133, Rev. 1. The NRC concluded that the LGS LPMS is acceptable in Section 4.4.6 of NUREG-0991, "Safety Evaluation Report Related to the Operation of Limerick Generating Station, Units 1 and 2," Supplement No. 2, dated October 1984. RG 1.133 states that LPMS alarm levels for power operation should be submitted to the NRC within 90 days following completion of the startup test program. The LGS Unit 2 startup test program was completed on January 8, 1990. Accordingly, this letter provides the alarm levels at 100% power operation for the LGS, Unit 2 LPMS.

Section C.1.b of RG 1.133, Rev. 1, recommends an on-line sensitivity of the automatic detection system to detect, as a minimum, a metallic loose part that weighs from 0.25 lbs to 30 lbs and impacts at 0.5 ft-lbs. If the recommended sensitivity cannot be achieved, then the in-plant conditions and the actual on-line sensitivity should be specified at the time the alarm level is provided.

The following table lists the background levels at 100% power for LGS, Unit 2; the baseline calibration data for a 0.5 ft-lbs impact for three calibrated hammers, and the actual alarm levels. The baseline impact responses were

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obtained by Advanced Technology Engineering Systems prior to startup of the unit. The baseline report was issued to Philadelphia Electric Company (PECo) in March 1990.

AVERAGE SENSOR RESPONSE (Acceleration in "Gs" Peak to Peak)  
FOR A 0.5 FT-LBS IMPACT

CHANNEL	HAMMER SIZE			BACKGROUND 100% POWER	ALARM** LEVEL
	.25LB	1LB	12LB*		
LPM-1	.08	.06	.49	.30	.90
LPM-2	1.56	.07	.37	.19	.57
LPM-3	.18	1.61	.27	.81	2.43
LPM-4	.44	.92	.33	1.79	5.37
LPM-5	5.06	2.80	.58	.32	.96
LPM-6	6.76	2.38	.67	.41	1.23
LPM-7	4.28	2.56	.28	.54	1.62
LPM-8	3.79	1.81	.41	.72	2.16

\* A 30 LB hammer size was initially used during testing as recommended in RG 1.133, Rev. 1, for which proper LPMS response was observed, but was reduced to a 12LB hammer size to provide for increased repeatability of an impact of 0.5 ft-lbs.

\*\* The alarm level is set at three times the background level at 100% power.

The underlined responses in the above table are below the alarm level; therefore, an impact greater than 0.5 ft-lbs is required for automatic detection. The following table indicates the expected minimum on-line sensitivity required for automatic detection for those sensors whose impact level exceeds 0.5 ft-lbs.

IMPACT REQUIRED FOR AUTOMATIC DETECTION (IN FT-LBS)

CHANNEL	HAMMER SIZE		
	.25LB	1LB	12LB
LPM-1	5.6	7.5	.9
LPM-2		4.1	.8
LPM-3	6.8	.76	4.5
LPM-4	6.1	3.0	8.3
LPM-5			.9
LPM-6			.9
LPM-7			2.9
LPM-8		.6	2.6

With the specified alarm levels, the LPMS at LGS Unit 2 complies with RG 1.133, Rev. 1, dated May 1981. The detection system and the data acquisition equipment will automatically activate when the reported alarm levels are reached or exceeded, and an audible alarm will be sounded to alert the control room operator.

Should you have any questions concerning this system, please do not hesitate to call.

Very truly yours,

*G. A. Hunger, Jr.*

G. A. Hunger, Jr.  
Manager  
Licensing Section  
Nuclear Services Department

cc: T. T. Martin, Administrator, Region I, USNRC  
T. J. Kenny, USNRC Senior Resident Inspector, LGS