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NUCLEAR SERVICES DEPARTMENT

February 24, 1993

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
Revision of Alarm Levels and
Sensitivities for 100% Power Operation

Gentleman:

Regulatory Guide (RG) 1.133, "Loose-Part Detection Program for the Primary System of Light-Water-Cooled Reactors," Revision 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. Regulatory Position C.3.a.2.e of RG 1.133, Rev. 1, provides for the revision of the alert levels and alert logic to account for changes in the level of background noise monitored during power operation, and indicates that, if the revision is not temporary, the details of the revision should be submitted to the NRC as an amendment to the Loose Parts Monitoring System (LPMS) program description.

Section 4.4.6.1 of the Limerick Generating Station (LGS) Updated Final Safety Analysis Report (UFSAR) provides the description of the LPMS for LGS, Units 1 and 2, and indicates that the alarm setpoint for each LPMS channel is not a fixed setpoint, but varies as a function of the background noise level for each channel. In addition, the UFSAR indicates that the alarm is set at a multiple of the background noise level to minimize false alarms while maintaining an acceptable level of sensitivity. Although there is no change to the LPMS program description in the UFSAR, for your information this letter provides the details of revised alarm levels for channels 1 and 2 of the LPMS for LGS, Unit 2, because of the level of background noise.

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The alarm levels on these channels, originally set at three (3) times the background noise level as previously identified by letter dated April 24, 1990, have led to many nuisance alerts. These alerts occurred at reduced reactor power levels, and as a result of electrical noise generated by an annunciator bank in the main control room (MCR) during testing. In order to reduce the incidence of these nuisance alerts, the alarm level on channels 1 and 2 were set at six (6) times the background noise level as shown in the table below. These changes were implemented on November 18, 1992. For completeness, the table also includes the alarm levels previously identified in the April 24, 1990 letter for channels 3 through 8.

In addition, the April 24, 1990 letter provided the average channel sensor response for the secondary channels in units of acceleration, i.e., in "Gs" peak-to-peak (p-p), and the secondary channel sensitivities in foot-pounds force ($ft\text{-}lbs_f$). The sensitivities were only provided for those channels where an impact of greater than 0.5 $ft\text{-}lbs_f$ was required for automatic detection. However, as a result of the alarm changes to channels 1 and 2, the secondary channel sensitivities have been reevaluated for all of the LPMS channels. Therefore, the table below lists the secondary channel sensitivities for each LPMS channel.

The calculated channel sensitivities are based on two-channel alarming. The primary channel is the channel adjacent to the impacting hammer. The listed sensitivities are based on the response of the secondary channel that provides the greatest sensitivity to an impact adjacent to the primary channel. The alarm level of both the primary and the secondary channel must be exceeded for the alert level, as referenced in RG 1.133, to be exceeded. Therefore, each sensitivity below is the impact energy (in $ft\text{-}lbs_f$) required near the primary sensor to cause the primary and secondary alarm levels, and therefore, the overall alert level to be exceeded. These sensitivities are based on impact tests that used instrumented impact hammers of three (3) different weights (i.e., 0.25 lb, 1 lbs, and 12 lbs).

Primary Channel	LPMS Channel Sensitivity ($ft\text{-}lbs_f$) Hammer Weight			Background Level Gs (p-p)+	Alarm Level Gs (p-p)+
	0.25 lb	1 lb	12 lb		
LPM-1	8.14	9.50	1.16	0.30	1.80*
LPM-2	0.37	12.0	1.71	0.19	1.14*
LPM-3	4.39	0.44	2.82	0.81	2.43
LPM-4	1.12	0.59	1.45	1.79	5.37
LPM-5	0.15	0.34	1.69	0.32	0.96
LPM-6	0.08	0.32	0.85	0.41	1.23
LPM-7	0.12	0.24	3.00	0.54	1.62
LPM-8	0.14	0.27	1.98	0.72	2.16

* - Indicates alarm level change from 3X to 6X background
\+ - Gs (p-p) = acceleration in 'Gs' peak to peak

The LPMS, with the above specified alarm levels, meets the guidance of RG 1.133, Rev. 1. The loose parts detection system and the associated data acquisition equipment will automatically activate when the reported alert levels are reached or exceeded, and an audible alarm will be sounded to alert the MCR Operator.

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

Very truly yours,

G. J. Beck, Manager
Licensing Section

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