AUDIT WORKSHEET
GALL REPORT AMP

PLANT: _____

LRA AMP: _____ **REVIEWER:** _____

GALL AMP: **XI.M14, Loose Part Monitoring** **DATE:** _____

Program Element	Auditable GALL Criteria	Documentation of Audit Finding
Program Description	A. The program relies on an inservice monitoring program to detect and monitor loose parts in light-water reactor (LWR) power plants. This in-service loose part monitoring (LPM) program is based on the recommendations from the American Society of Mechanical Engineers operation and maintenance standards and guides (ASME OM-S/G)-1997, Part 12, "Loose Part Monitoring in Light-Water Reactor Power Plants."	Consistent with GALL AMP: ☐ Yes ☐No Document(s) used to confirm Criteria: Comment:
1. Scope of Program	A. The program includes measures to monitor and detect metallic loose parts by using transient signals analysis on acoustic data generated due to loose parts impact. The program is applicable, but not necessarily limited to, the reactor vessel and primary coolant systems in pressurized water reactors (PWRs) and the reactor recirculation system in boiling water reactors (BWRs). The detection and monitoring system includes a set of accelerometers installed in the vicinity of regions where loose parts impact is likely to occur. The system incorporates the capability of automatic annunciation (audible and visual), audio monitoring, automatic and manual signal recording, and acoustic signal analysis/evaluation. Measures for personnel radiation exposure and safety are included as part of the requirements of the LPM system. The objective of the LPM program is to provide early indication of component degradation.	Consistent with GALL AMP: ☐ Yes ☐No Document(s) used to confirm Criteria: Comment

Program Element	Auditable GALL Criteria	Documentation of Audit Finding
2. Preventive Actions	A. The aging management program (AMP) is a monitoring/detection program that provides early indication and detection of the onset of aging degradation. It does not rely on preventive actions.	Consistent with GALL AMP: ☐ Yes ☐No Document(s) used to confirm Criteria: Comment:
3. Parameters Monitored/ Inspected	A. The program relies on the use of transient acoustic signals to provide information on the occurrence of metallic loose part impact. Reactor coolant system (RCS) background noise may mask the noise generated due to loose part impact. These background noises may arise from sources such as coolant flow and mechanically and hydraulically generated vibrations. To differentiate loose part impact noise from background noise, ASME OM-S/G-1997, Part 12, recommends that the monitoring system sensitivity be set on the basis of the background noise and that maximum sensitivity be accomplished that is consistent with an acceptable false alarm rate arising from the background noise.	Consistent with GALL AMP: ☐ Yes ☐No Document(s) used to confirm Criteria: Comment:
4. Detection of Aging Effects	A. Impact signals contain significant information on the size of the impacting object, the impact force and energy, and the composition and shape of both the component struck and the impacting object. In general, the magnitude of the impact signal increases with the impact mass and impact velocity. However, the frequency response increases with increasing velocity and decreasing mass. These data may be used to extract information on possible loose part impact and differentiate it from background noise.	Consistent with GALL AMP: ☐ Yes ☐No Document(s) used to confirm Criteria: Comment:
5. Monitoring and Trending	A. The impact signals, collected data, frequency, and characteristics are recorded, monitored, and evaluated to locate and identify the source and cause of the acoustic signals for the purpose of determining the need and urgency for a detailed inspection and examination of the suspected reactor vessel internals components. These activities are performed and associated personnel are qualified in accordance with site	Consistent with GALL AMP: ☐ Yes ☐No Document(s) used to confirm Criteria: Comment:

Program Element	Auditable GALL Criteria	Documentation of Audit Finding
	controlled procedures and processes, as indicated by vendor, industry, or regulatory guidance documents.	
6. Acceptance Criteria	A. The LPM alarms that suggest metallic impacts are further evaluated to verify LPM operability and to determine the location of the impact, the impact energy, and mass. Plant process data are reviewed for anomalous behavior, and diagnostic results are assessed by plant personnel.	Consistent with GALL AMP: ☐ Yes ☐No Document(s) used to confirm Criteria: Comment:
7. Corrective Actions	A. If LPM diagnostics indicate the presence of loose parts, then corrective actions are taken. In some cases, the results of the diagnostic may indicate the signal is due to a change in the plant background noise characteristics and not due to the presence of loose parts. In such cases, the LPM alarm rates may in time become so high as to be unacceptable in practice. Adjustment of the alarm threshold (set points) is allowed. However, the reason for the change in background noise is to be investigated and understood, and the set point change is to be documented. As discussed in the appendix to this report, the staff finds the requirements of 10 CFR Part 50, Appendix B, acceptable to address the corrective actions.	Consistent with GALL AMP: ☐ Yes ☐No Document(s) used to confirm Criteria: Comment:
8. Confirmation Process	A. Site quality assurance (QA) procedures, review and approval processes, and administrative controls are implemented in accordance with the requirements of 10 CFR Part 50, Appendix B. As discussed in the appendix to this report, the staff finds the requirements of 10 CFR Part 50, Appendix B, acceptable to address the confirmation process and administrative controls.	Consistent with GALL AMP: ☐ Yes ☐No Document(s) used to confirm Criteria: Comment:
9. Administrative Controls	A. See Item 8, above.	Consistent with GALL AMP: ☐ Yes ☐No Document(s) used to confirm Criteria:

Program Element	Auditable GALL Criteria	Documentation of Audit Finding
		Comment:
10. Operating Experience	A. The loose part monitoring program is extensively and effectively used by the industry. The program has been developed and published as a standard in the ASME "Standards and Guides for Operation and Maintenance of Nuclear Power Plants," Part 12, an American National Standard. Part 12 was developed on the basis of knowledge gained from operating experience and research conducted since the Nuclear Regulatory Commission (NRC) issued Regulatory Guide (RG) 1.133 in May 1981.	Consistent with GALL AMP: ☐ Yes ☐No Document(s) used to confirm Criteria: Comment:

EXCEPTIONS

Item Number	Program Elements	LRA Exception Description	Basis for Accepting Exception	Documents Reviewed (Identifier, Para.# and/or Page #)
1.				
2.				
…				

ENHANCEMENTS

Item Number	Program Elements	LRA Enhancement Description	Basis for Accepting Enhancement	Documents Reviewed (Identifier, Para.# and/or Page #)
1.				
2.				
…				

DOCUMENT REVIEWED DURING AUDIT

Document Number	Identifier (number)	Title	Revision and/or Date
1.			
2.			
3.			
4.			
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