PRESSURIZED WATER REACTOR OWNERS GROUP

PWROG-20016-NP-A
Revision 0

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PWROG – Regulatory Relaxation for PWR Loose-Part-Detection Systems

Licensing Committee

PA-LSC-1612

December 2021

framatome

PWROG-20016-NP-A
Revision 0

PWROG – Regulatory Relaxation for PWR Loose-Part Detection Systems

PA-LSC-1612

December 2021

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This section contains the following correspondence:

1. NRC Letter, NRC Transmittal of the Final Safety Evaluation for Pressurized Water Reactor Owners Group (PWROG) Topical Report (TR) PWROG-20016-P/NP, Revision 0, “PWROG-Regulatory Relaxation for PWR Loose-Part-Detection Systems,” December 8, 2021.

2. Final Safety Evaluation by the Office of Nuclear Reactor Regulation for the Pressurized Water Reactor Owners Group Topical Report PWROG-20016-P/NP, Revision 0, “PWROG-Regulatory Relaxation for PWR Loose-Part-Detection Systems” EPID L-2020-TOP-0054

From: Fields, Leslie <Leslie.Fields@nrc.gov>
Sent: Wednesday, December 8, 2021 6:47 AM
To: Holderbaum, Chad M. <holdercm@westinghouse.com>; Nowinowski, W Anthony <nowinowa@westinghouse.com>
Subject: RESENT NRC Transmittal of the Final Safety Evaluation for PWROG-20016-P/NP, Revision 0 - Updated ML No.

[External Email]
Mr. W. Anthony Nowinowski, Executive Director
PWR Owners Group, Program Management Office
Westinghouse Electric Company
1000 Westinghouse Drive, Suite 380
Cranberry Township, PA 16066

SUBJECT: NRC Transmittal of the Final Safety Evaluation for Pressurized Water Reactor Owners Group (PWROG) Topical Report (TR) PWROG-20016-P/NP, Revision 0, "PWROG-Regulatory Relaxation for PWR Loose-Part-Detection Systems"

Dear Mr. Nowinowski,

By letter dated August 26, 2020 (Agencywide Documents Access and Management System Accession No. (ADAMS No.) ML20246G463), as supplemented by letter dated February 22, 2021 (ADAMS No. ML21053A422), the PWROG transmitted Topical Report (TR) PWROG-20016-P/NP, Revision 0, "PWROG-Regulatory Relaxation For PWR Loose-Part-Detection Systems," (ADAMS No. ML20246G463) to the U.S. Nuclear Regulatory Commission (NRC) for NRC staff review and approval. By email dated September 29, 2021, the NRC staff issued its draft safety evaluation (SE) (ADAMS No. ML20343A309) for PWROG-20016.

The PWROG provided comments on draft SE via Box.com on November 1, 2021. A copy of the final SE for TR PWROG-20016-P/NP, Revision 0 has been placed on BOX.com and access has been granted to Mr. Chad Holderbaum for review.

The NRC staff concludes that the PWROG TR is acceptable for referencing in licensing applications to the extent specified and discussed in the SE. The final SE defines the basis of our acceptance of the TR. Our acceptance applies only to material provided in the subject TR. In accordance with the guidance provided on the NRC website, we request that PWROG publish an accepted version of the TR, within three months of receipt of the date of this email. The accepted version shall incorporate this email and the enclosed SE after the title page.

This email has been placed in ADAMS (under No. ML21341B448) and has been declared as an Official Agency Record for public availability.

Please be informed that the accepted versions of this TR must contain historical review information, including NRC requests for additional information (RAI) questions and the associated responses. The accepted versions shall also include a "-A" (designating approved) following the TR identification symbol.

As an alternative to including the RAI questions and RAI responses behind the title page, if changes to the TR provided to the NRC staff to support the resolution of RAI responses, and if the NRC staff reviewed and approved those changes as described in the RAI responses, there are two ways that the accepted version can capture the RAIs:

1. The RAI questions and responses can be included as an Appendix to the accepted version.
2. The RAI questions and responses can be captured in the form of a table (inserted after the final SE) which summarizes the changes as shown in the accepted version of the TR. The table should reference the specific RAI questions and RAI responses which resulted in any changes, as shown in the accepted version of the TR.

If future changes to the NRC's regulatory requirements affect the acceptability of this TR, PWROG will be expected to revise the TR appropriately. Licensees referencing this TR would be expected to justify its continued applicability or evaluate their plant using the revised TR.

If you have any questions, please contact the Project Manager for the review, Leslie Fields, at 301-415-1186 or via electronic mail at leslie.fields@nrc.gov.

Sincerely,
Leslie C. Fields,
US NRC Senior Project Manager
NRR/DORL
leslie.fields@nrc.gov

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FINAL SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

FOR THE PRESSURIZED WATER REACTOR OWNERS GROUP

TOPICAL REPORT PWROG-20016-P/NP, REVISION 0

"PWROG-REGULATORY RELAXATION FOR PWR LOOSE-PART-DETECTION SYSTEMS"

EPID L-2020-TOP-0054

1.0 INTRODUCTION

By letter dated August 26, 2020 (Reference (Ref.) 1), as supplemented by letter dated February 22, 2021 (Ref. 2), the Pressurized Water Reactor (PWR) Owners Group (PWROG) submitted Topical Report (TR), PWROG-20016-P/NP, Revision (Rev.) 0, "PWROG-Regulatory Relaxation for PWR Loose-Part Detection Systems" (Ref. 4), to the U.S. Nuclear Regulatory Commission (NRC) for review and approval.

By submitting the Topical Report PWROG-20016, Rev. 0 (PWROG TR), the PWROG is proposing to generically justify the elimination of the licensing basis requirement for the loose-part detection system (LPDS) at PWR plants. These licensing bases were added based on guidance provided in NRC Regulatory Guide (RG) 1.133, Rev. 1, "Loose-Part Detection Program for the Primary System of Light-Water-Cooled Reactors" (Ref. 6) which was published in May 1981.

RG 1.133 discusses the purpose of loose-part monitoring and specifies the design features necessary for detection of loose parts in the primary system of light water reactors (LWRs), while minimizing radiation exposure and time expended by the station personnel. Most PWRs licensed after the issuance of the RG were required, as part of their licensing basis, to meet the methods acceptable to the NRC for implementing regulatory requirements in accordance with RG 1.133.

Based on the industry surveys conducted by the PWROG, many of the PWR plants have a licensing commitment to maintain the LPDS in an operable/functional status in accordance with the commitments made in response to NRC regulatory requirements listed in RG 1.133. The PWROG TR notes that for most PWR plants with a LPDS, the actual requirements have been relocated from the Technical Specifications (TS) to the Technical Requirements Manual (TRM), the Updated Final Safety Analysis Report (UFSAR), or other licensee-controlled documents. The PWROG TR states that licensees who have relocated the LPDS TS to a licensee-controlled document can eliminate it from their licensing basis in its 10 CFR 50.59 evaluations, which will be discussed further in Section 3.8 of this SE.

The NRC staff has reviewed the PWROG TR, the response to the requests for additional information (RAIs), and all the related documents. A safety evaluation (SE) for the PWROG TR follows.

2.0 REGULATORY EVALUATION

The PWROG TR discusses the bases for the proposed changes providing: (1) an analysis of the consequence of loose metallic parts, (2) a review of the operating experience from industry surveys of PWR plant that have an LPDS installed, and (3) discussion of the annual cost burden of maintaining or updating the LPDS. NRC staff's review of regulations associated with this proposal are presented in this section.

2.1 Regulatory Requirements and Guidance

Most PWR plants that have installed a LPDS are required as part of the licensing basis to meet RG 1.133, which describes methods acceptable to the NRC for implementing the specified regulatory requirements regarding the detection of a loose part. RG 1.133 states that the requirements for the LPDS are based on the following regulations:

> Criterion 1, "Quality Standards and Records," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," requires that structures, systems, and components important to safety be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed and that a quality assurance program be established and implemented in order to provide adequate assurance that these structures, systems, and components will satisfactorily perform their safety functions.
>
> Criterion 13, "Instrumentation and Control," requires, in part, that instrumentation be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions to ensure adequate safety, including those variables and systems that can affect the fission process, the integrity of the core, and the reactor coolant pressure boundary.
>
> Section 50.36, "Technical Specifications," of 10 CFR Part 50 requires an applicant for a facility operating license to provide proposed TS. Paragraph (c)(2), "Limiting Conditions for Operation," identifies a proposed TS relating to the lowest functional capability or performance levels of equipment required for safe operation of the facility. Paragraph (c)(3), "Surveillance Requirements," identifies a proposed TS relating to test, calibration, or inspection to ensure that the necessary quality of systems and components is maintained, the facility operation will be within the safety limits, and that the limiting conditions of operation will be met. Paragraph (c)(5), "Administrative Controls," requires an applicant for a facility operating license to provide proposed TS relating to reporting necessary to ensure operation of the facility in a safe manner.
>
> § 20.1101(b), "Radiation protection programs." The licensee shall use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA).

RG 1.133 states that:

> Loose parts traveling through the primary system will generally accumulate, at least for a time, in such natural collection areas as the plenums in reactor vessels and steam generators.

PWR coolant flow can transport lower vessel loose parts into the core inlet and upper vessel loose parts into steam generator inlets. Steam generator primary and secondary side loose parts can cause tube leaks.

In Section 3.2, the TR states:

> The LPDS is used to detect structure borne sound that can indicate potential loose parts impacting the inside of the reactor coolant system (RCS) and in the secondary side of the steam generators (SGs), including portions of the Main Feedwater (MFW) lines. Loose parts transported by fluid streaming will impact the inner wall of the pressurized boundary of the primary system or critical portions of the secondary system. These impacts (so called bursts) can be recorded by accelerometers which are attached to the outer surface of the monitored components. The system also estimates the mass of the impacting object. Typical sensor locations in the RCS of a PWR are identified in the table below:

Table 1-
Recommended PWR Sensor (Accelerometer) Locations

Location	Number of Sensors
Reactor Vessel, Upper	3
Reactor Vessel, Lower	3
Steam Generator (Each)	3
Reactor Coolant Pump (Each)	1

The sensor data is analyzed by the LPDS. On detecting a loose part, the detection system generates an alarm for plant personnel to investigate the reason for the alarm and takes actions as deemed appropriate.

2.2 Discussion of Regulatory Guide 1.133

In 2015, NRC staff performed a periodic review of RG 1.133 which is normally conducted every five years to ensure that regulatory guidance is up to date and current within the present regulatory structure. Staff's review did not identify any new technical requirements that currently need to be addressed for the publication of this SE. RG 1.133 provides guidance for the early detection of loose parts in the primary systems to avoid or minimize damage due to loose parts by early detection and assessment of the potential damage to the safety-related equipment.

In Electric Power Research Institute (EPRI) Report NP-5743, 1988, “Loose-Part Monitoring System Improvements,” (Ref. 8) metal impact theory and experimental data were used to develop an analytical basis for loose-part monitoring system performance. Methods and guidelines were developed to identify and implement loose-part monitoring system improvements. The EPRI project was coordinated with, and ultimately led to the creation of American Society of Mechanical Engineers (ASME) Standard Operation and Maintenance (OM) of Nuclear Power Plants (ASME OM-2020) (Ref. 13) and 10 CFR 50.55a (Codes and Standards). 10 CFR 50.55a(b)(3) states in part, “Mandatory appendices must be used if required by the ASME OM code; nonmandatory appendices are approved for use by the NRC but need not be used.” Appendices E and M of ASME OM-2020 as nonmandatory appendices reference Part 12 (Loose-Part Monitoring) and Part 24 (Reactor Coolant Pumps and Recirculation Pumps) of Division 2 of OM-2020, which covers loose-part monitoring in PWRs and Boiling Water Reactors (BWRs). The appendices that discuss loose-part monitoring are nonmandatory, thus deleting the LPDS from the licensing basis for PWRs does not conflict with 10 CFR 50.55a compliance.

2.2.1 Overview of Regulatory Guide 1.133

In RG 1.133, NRC staff states that the primary purpose of the loose-part detection program is the early detection of loose-metallic parts in order to avoid or mitigate damage to safety-related components.

The NRC staff points out that a loose (i.e., disengaged and drifting) part in the primary coolant system:

- can be indicative of a failed or weakening safety-related component. The detection of the loose parts will thus provide an early warning of a degraded safety condition.
- may have been inadvertently left in the primary system during construction, refueling or maintenance. The loose part (foreign object) can contribute to safety related component damage or wear by frequently impacting other parts of the system.
- may cause a blockage of the coolant flow through the fuel assemblies. Flow blockage could initiate departure from nucleate boiling and result in fuel cladding failure.
- might increase the potential for control rod jamming.
- might increase the levels of radioactivity in the reactor coolant system through the accumulation of crud; and
- might increase the likelihood of damage to the steam generator tubes and may even lead to leakage in the steam generator tubes.

According to RG 1.133, 10 CFR Part 50, Appendix A, Criterion 1, “Quality Standards and Records,” Criterion 13, "Instrumentation and Controls," and 10 CFR 50.36 apply to the detection

of safety-related loose parts during normal operation. Criterion 13 in Appendix A requires, in part, that instrumentation be provided to monitor variables and systems during anticipated ranges for normal operation, anticipated operational occurrences and accident conditions to ensure adequate safety, including those variables and systems that can affect the fission process, the integrity of the core and the reactor coolant pressure boundary. The primary objective of the proposed loose-part monitoring system is to detect loose-metallic parts in the primary system early and thus avoid damage to, or malfunctions of, primary system components. The second purpose of the LPDS is to minimize radiation exposure to the station staff. Since the LPDS would indicate the general location of the abnormal structural condition, it would allow the station staff to take timely remedial actions to minimize the collection of wear-generated radioactive crud, thereby, reducing the need for extensive structural repair. Thus, a well-implemented LPDS would prevent potential damage to the components in the reactor coolant pressure boundary, jamming of the control rod drives, blockage of flow through the fuel bundles, and accumulation of radioactive crud in the primary system.

If a loose part were to be detected, RG 1.133 recommends that the licensees develop diagnostic procedures, using supplemental station information (plant processing signals, inspection, and prior operating history). Licensees could evaluate both the short-term and long-term safety implications of the detected loose part, without taking any action on the plant operation solely based on the loose-part detection system. RG 1.133 recommends that licensees notify the NRC if the presence of loose parts is confirmed, in accordance with RG 1.16, “Reporting of Operating Information-Appendix A: Technical Specifications” (Ref. 7). NRC licensees’ reports to the Commission are also required when defining the LPDS alert level or when the LPDS TS requirements are violated.

RG 1.133 also states that loose parts traveling in the primary system should generally accumulate, at least for a time, in natural collection areas such as the plenums of the reactor vessel and the steam generators, while loose parts in straight pipes will pass through quickly. The design and layout of the system should minimize the personnel time in high radiation areas and facilitate the recognition, location, replacement, repair, and adjustment of malfunctioning components.

In RG 1.133, NRC staff states that a well-designed loose-part detection system should be able to discriminate signals caused by the impact of a loose part from those signals attributed to normal hydraulic, mechanical, and electrical background noise and large amplitude electrical transients. The potential damage of a loose part may not necessarily be proportional to the impact energy of the loose part. A small metallic plate imparts little impact energy but could restrict local flow to the reactor core. However, there are technical difficulties in trying to distinguish a very-low-energy impact signal from the normal reactor acoustic background noise. RG 1.133 states that the LPDS should be able to detect a loose part weighing from 0.25 pound (lb) (0.11 kilogram(kg)) to 30 lb (13.6 kg) and impacts with a kinetic energy of 0.5 lbf-ft (0.68 joules) on the surface of the reactor coolant pressure boundaries within 3 feet (0.91 meter) of the sensor. The NRC staff selected the specified weight range as representative of the most common and significant class of loose parts. RG 1.133 states that signals from metallic objects within the recommended sensitivity range should be able to be distinguished from the normal

background noise levels and in some instances smaller impact energy with signals within the background noise can be distinguished by the manual audio monitoring mode.

Since an earthquake could dislodge or lift loose parts from the natural collection sites or generate loose parts, the NRC staff recommends that the LPDS be designed to function following all seismic events that do not require plant shutdown.

3.0 TECHNICAL EVALUATION

This technical evaluation documents the NRC staff's evaluation of the PWROG TR against the relevant criteria identified in Section 2.0 above.

3.1 Overview of PWROG-20016 Proposed Request

The PWROG is requesting that NRC consider this TR acceptable for referencing to expedite the removal of LPDS requirements from the licensing basis at PWRs. The intended purpose of this PWROG TR is to facilitate PWROG licensees in the elimination of the licensing basis requirements for the LPDS. The PWROG TR further states that this approach will minimize the resource demand on the licensee for developing site-specific justifications as well as minimize the need for the NRC to conduct associated regulatory reviews.

3.1.1 PWROG's Justification for Eliminating the Loose-Part Detection System

The PWROG TR provides justification for the elimination of the licensing basis requirement for the LPDS at PWRs in the following observations:

- [[

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3.2 Precedence: Safety Evaluation for BWR Loose-Part Detection System

By letter dated July 31, 2000, the Boiling Water Reactor Owners Group (BWROG) submitted General Electric's TR NEDC-32957P, "Regulatory Relaxation of BWR Loose-Part Monitoring Systems" (Ref. 3). The BWROG TR discussed the effectiveness of the LPDS installed in some BWR plants and proposed eliminating the LPDS requirements. The BWROG stated that (1) Operating Experience (OE) did not indicate any beneficial advantage for plants that installed the system compared to plants who did not install the system; (2) The LPDS does not have the

sensitivity or the reliability to detect loose parts; (3) The LPDS incurred high repair costs; and (4) The maintenance of the system leads to high radiation exposures. On January 25, 2001, the NRC staff issued the Safety Evaluation (SE) for the BWROG TR (Ref. 5).

The January 2001 SE for the BWROG TR, in part, stated that, “Loose parts can be detected by the normal plant process and monitoring systems, and also through visual inspections. In addition, the operating history does not show a higher incidence or occurrence of damage to safety-related components in plants that have a LPDS installed. The staff concurs that the safety benefits of the LPDS do not appear to be commensurate with the cost of maintenance and associated radiation exposure for plant personnel.”

In the January 2001 SE, NRC staff agreed with the request and allowed the relaxation sought by the BWROG. PWR plant OE has significant similarities to the OE of BWR plants with respect to loose parts prevention and detection.

3.3 Overview of PWROG -20016

RG 1.133 recommends installation of an LPDS in light-water reactors. Most licensed PWR plants have an LPDS as part of their licensing basis in accordance with RG 1.133, Rev. 1. The PWROG TR proposes removing the LPDS licensee commitments from PWR plants. The PWROG TR discusses the bases for the proposed changes and provides: [[

]]

As stated in Section 3.1 of the PWROG TR, the first generation of LPDS did not perform well because calibration of these systems was difficult, the data provided was not reliable due to background noise and the difficulty in selecting the setpoint. Due to lack of previous data and background noise, the system sensitivity selection was not reliable.

Many nuclear plants have faced issues of reducing false alarms and increasing the effectiveness of the LPDS detection of significant loose parts. The NRC staff’s review indicates that the technical problems related to LPDS began surfacing as early as 1983.

3.3.1 Consequences of Loose Parts in PWRs

[[

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3.3.2 Staff Analysis of the Consequences of Loose Parts in PWR

[[

]]

3.4 Discussion of [[ ]]

To support the conclusions in this TR, [[

]]

3.4.1 [[ ]]

[[

[1] Justification for Continued Operation is a written document providing an evaluation of a specific deficiency which concludes either: 1) operability, 2) operability with specific compensatory actions, or 3) inoperability of an affected equipment.

]]

3.5 [[ ]]

[[

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3.5.1 Discussion of the Usefulness of Loose-Part Detection System

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3.5.2 [[ ]]

[[

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3.6 PWR Plant Specific Information

[[

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3.7 [[ ]]

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3.8 Staff Guidance for Eliminating Loose Part Detection System

PWROG is requesting that NRC consider this TR for generic acceptance to eliminate the LPDS from the licensing basis of the PWRs. Acceptance of the request removes certain loose-part detection capability that is available to PWRs from the licensing basis. RG 1.133 stated that the LPDS should be able to detect loose parts weighing from 0.25 lb to 30 lb and impacts with a kinetic energy of 0.5 lbf-ft on the surface of the reactor coolant pressure boundaries and the steam generators, within 3 ft of the sensors. Typical sensor locations in the RCS and steam generators are identified in RG 1.133. [[

]] However, it is not clear to what extent the prevention methods described in the PWROG TR cover the reactor coolant pressure boundary locations defined in RG 1.133. Since the LPDS will not be available to the plant if it is removed, the staff will require individual plants to confirm that [[
]] will be adequate according to 10 CFR 50.55a compliance.

[[

]] The specific extent of the exceptions was not identified in the TR. Therefore, NRC staff determined that licensees will need to provide more detail regarding the use/application of Sections 4.1.1.4 and 4.1.1.5 for specific PWRs. Accordingly, licensees seeking elimination of LPDS from the licensing basis should include such detection guidance in their 10 CFR 50.59 screenings/evaluations. Based on the PWROG's responses (Ref. 2) to the NRC staff's request for additional information (Ref. 2), as stated in SE Section 3.9, it is expected that licensees will address this concept in their 10 CFR 50.59 review as part of their [[ ]] determination.

[[

]]

3.8.1 Staff Guidance for [[ ]]

Staff guidance for [[ ]] (as it relates to the reactor coolant pressure boundary locations defined in RG 1.133 for all plants) is as follows:

- Review the [[ ]] aspects of a licensee's program and indicate if the program envelopes the locations defined in RG 1.133.
- If they are not currently applied, describe what changes would be made to the program(s).
- If changes are not necessary, describe the reasons for that determination.
- Describe the review and the results in the 10 CFR 50.59 reviews applicable to the associated plant.

3.8.2 Staff Guidance for [[ ]]

Staff guidance for [[ ]] (all plants) is as follows:

- [[
-
-

]]

3.8.3 Staff Guidance for [[ ]]

Staff guidance for [[ ]] (all plants) should include the following:

- [[
-
-

]]

3.9 Staff's Review of RAI Responses

By letter dated December 14, 2020, NRC staff transmitted requests for additional information (RAIs) which focused on the10 CFR 50.59 process as discussed in Section 1.3 of the PWROG TR. The information provided by the PWROG is included below to the extent necessary for a clear understanding of the process that licensees can follow when implementing the licensing basis changes potentially resulting from the PWROG TR and the associated NRC safety evaluation.

The PWROG stated that if the LPDS is contained in a licensee's TS, a license amendment request must be submitted in accordance with 10 CFR 50.90 to relocate the LPDS TS, to a licensee-controlled document. After NRC approval of the amendment to relocate the LPDS TS to a licensee controlled document, the removal of the LPDS from the licensing basis will be evaluated in accordance with a plant specific 10 CFR 50.59, which should discuss the current licensing basis for the LPDS, the NRC approved TR, and [[

]] No further supporting information or analysis will need to be included in a license amendment request to relocate the LPDS out of the TS to a licensee-controlled document, nor will the TR need to be referenced in the license amendment request. The justification for relocating the LPDS out of the TS is that it does not satisfy the criteria of 10 CFR 50.36(c)(2)(ii). Thus, the LPDS is not contained in the Standard Technical Specifications (NUREGs-1430, 1431, and 1432).

The NRC approved TR will need to be referenced in the plant specific 10 CFR 50.59 that will be performed to remove the LPDS from the plant's licensing basis. The plant specific 10 CFR 50.59 should discuss the current licensing basis for the LPDS, e.g., the Updated Final Safety Analysis Report (UFSAR), and licensee-controlled document that contains the LPDS, the NRC approved TR, and [[ ]] Section 1.3, of the PWROG TR entitled, "Objective" will be revised as shown in Enclosure 1 to this letter to reflect these RAI responses. The NRC approved version of the TR that will be issued after the Final Safety Evaluation is transmitted, will include these changes.

NRC staff reviewed the PWROG RAI responses and determined that the clarifications provided were sufficient. A full text of the RAIs and the PWROG's responses are available in the document dated February 22, 2021 (Ref. 3).

3.10 Staff Analysis of PWROG'S Request

According to NUREG/CR-3687 (Ref. 8), technical personnel at thirteen nuclear power stations (ten in the US and three in Western Europe) were interviewed during the summer of 1983 to ascertain their collective experience with acoustic-based loose-part monitoring systems. NUREG/CR-3687, Section 5.3, "Ability to Detect Secondary-Side Loose Parts in PWRs," discussed loose-part monitoring systems (LPMS), in part stating that:

> Impact response data with which to support conventional choices for the number and specific location of acoustic sensors necessary to assure adequate monitoring capability are largely unavailable, even for primary-side LPs.
>
> The sensitivity of present-day LPMSs to secondary-side LPs appears to be unknown. Some speculate that different sensor locations and/or mounting techniques could improve sensitivity if that is needed. Despite a number of secondary-side incidents (e.g., SGTRs), this topic does not seem to be of intense interest to utilities.

Based on NUREG/CR-3687, it is evident that problems related to loose-part detection systems were recognized very early on after the publication of RG 1.133. One of the major issues appeared to be the need for more research to improve the technology. As part of the PWROG TR review, NRC staff did not look at any new technologies and their costs, as it is outside the scope of the PWROG request. The NRC's review approach was to assess if the PWROG TR provided sufficient alternate means to support the PWROG's request to eliminate the LPDS from PWR plant(s) licensing basis.

The NRC staff evaluated the information provided in the PWROG TR, as noted in SE sections 3.4 to 3.8.

[[

]] Considering the combined OE of a few hundred years for these plants, this statistic indicates that the utility of LPDS is very limited.

The OE databases search indicates that in most cases involving a loose part detection, the condition was assessed, and a decision was made to continue to operate the plant. Only one case resulted in shutting down the plant to perform repairs.

[[

]] While no statistics were provided in the PWROG, the staff concurs that these improvements will result in a decrease of fuel related failures. Small metallic filings or debris could, and have, contributed to fuel cladding damage, but this class of debris cannot be detected by an LPDS. [[

]]

[[ ]] features described in the TR are generically acceptable, however some ambiguity remains with respect to the scope of

applicability of these features on a plant specific basis. Therefore, the staff provided recommended guidance in Section 3.8 of this SE as to how the 10 CFR 50.59 screenings/evaluations on plant specific basis can bring clarity and closure to the identified issues.

NRC staff has reviewed the results of the industry survey and the regulatory approach presented in PWROG TR and considers this request generically acceptable based on the fact that all activities will be conducted in compliance with the NRC's regulations.

4.0 CONCLUSIONS

In the subject TR entitled, PWROG-20016-P, “PWROG-Regulatory Relaxation for PWR Loose-Part Detection Systems,” the PWROG reported on the effectiveness of the LPDS installed in PWR plants in order to justify the proposed elimination of the LPDS requirements. The PWROG stated that although loose parts have been detected on a few occasions: [[

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The NRC staff finds that the operating history does indicate that parts came loose during plant operation or were inadvertently left in the RCS boundary during maintenance or refueling caused damage to components. [[

]] The staff concludes that the LPDS may not have a significant safety benefit commensurate with the radiation exposure to plant personnel, and alternate means can be used to demonstrate compliance with applicable regulatory requirements.

NRC staff finds that the PWROG TR is acceptable for referencing in licensing applications to the extent specified and the staff guidance in Section 3.8 of this SE. The staff will verify that the topical report and information and basis is applicable to the site-specific characteristics of the plant. Licensees will need to confirm that [[ ]] methods [[ ]] will be adequately applied to the locations defined in RG 1.133.

Based on the evaluations and technical reviews discussed herein, the NRC staff finds that the PWR plants can eliminate the LPDS from the licensing basis as addressed in TR PWROG-20016-P/NP, Revision 0, and continue to meet NRC regulatory requirements for licensees that reference the TR. The NRC staff finds that the unique configuration of each plant requires that each licensee evaluate whether eliminating the LPDS from the licensing basis can be made under 50.59 without prior NRC approval. Licensees may reference this SE, as applicable, when performing a 10 CFR 50.59 screening/evaluation.

NRC staff did not evaluate whether implementation of the subject TR by each licensee will satisfy the requirements of 10 CFR 50.59(c)(2). Each licensee must consider its licensing basis in totality as provided in the FSAR and plant specific configurations involving the LPDS in its 10 CFR 50.59 Screening/Evaluation. More specifically, 10 CFR 50.59(c)(2) states a licensee shall obtain a license amendment pursuant to 10 CFR 50.90 prior to implementing a proposed change if the change meets any of the eight criteria related to potential malfunctions, accidents, and methods.

The SE of the subject TR does not generically pre-approve an outcome of each licensee's evaluation against specific 10 CFR 50.59 criteria. The SE of the subject TR may be referenced in the site-specific 10 CFR 50.59 Screening/Evaluation process at the discretion of the licensee, to the extent that it meets the criteria as described in the RAI response (Ref. 2).

The NRC Final Policy Statement on Technical Specification Improvements for Nuclear Power Reactors (Ref. 12) states that when a licensee submits an amendment request based on the Policy Statement, they should identify the location of and controls for the technical and administrative requirements associated with the relocated requirements. The NRC staff determined that the process for a potential change to a licensee's TS to relocate the LPDS described by the PWROG TR and summarized in Section 3.9 above conforms with the Policy Statement.

4.1 Summary of Regulatory Compliance

The NRC has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered, and (2) there is reasonable assurance that such activities will be conducted in compliance with the NRC's regulations.

5.0 CONDITIONS, LIMITATIONS, AND/OR ACTION ITEMS

Based on the review of this TR, the NRC staff concludes that there is no specific condition associated with implementing this TR. However, based on Section 3.8 of the SE, licensees referencing the subject TR must apply specific action items and guidance when performing site-specific 50.59 Screening/Evaluations.

6.0 REFERENCES

1. Letter from Michael Powell, Pressurized Water Reactor Owners Group, to USNRC Document Control Desk, August 26, 2020, Submittal of Topical Report PWROG-20016-P/NP, Revision 0, “PWROG - Regulatory Relaxation for PWR Loose-Part-Detection Systems” (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20246G463).

2. Letter from Michael Powell, Pressurized Water Reactor Owners Group, to USNRC Document Control Desk, February 22, 2021, Transmittal of the Response to Request for Additional Information, (RAIs 1-2) Associated with PWROG-20016-P/NP, Revision 0, “Regulatory Relaxation for PWR Loose-Part-Detection Systems” (ADAMS Accession No. ML21053A422), and Enclosure 1 - Response to NRC Requests for Additional Information (RAIs 1-2) for PWROG-20016-P/NP, Rev. 0, August 26, 2020 (ADAMS Accession No. ML21053A423).

3. Letter from James M. Kenny, Boiling Water Reactor Owners Group, to Robert Pulsifer, USNRC, July 31, 2000, BWR Owners' Group Licensing Topical Report 3687NEDC-32975P, "Regulatory Relaxation For BWR Loose Parts Monitoring Systems dated July 2000,” (ADAMS Accession No. ML003754760).

4. Submittal from the PWR Owners Group, Topical Report PWROG-20016-P/NP, Revision 0, “PWROG – Regulatory Relaxation for PWR Loose-Part-Detection Systems,” August 2020, (ADAMS Accession No. ML20246G465).

5. Safety Evaluation by the Office of Nuclear Regulatory Regulation Related to Topical Report NEDC-32975P, “Regulatory Relaxation for BWR Loose Parts Monitoring Systems,” Boiling Water Reactor Owners Group Project 691, January 25, 2001, (ADAMS Accession No. ML010310355).

6. U.S. NRC Regulatory Guide 1.133, Revision 1, “Loose-Part Detection Program for Primary System of Light-Water-Cooled Reactors,” Washington D.C., May 1981, (ADAMS Accession No. ML003740137).

7. Regulatory Guide 1.16, “Reporting of Operating Information-Appendix A Technical Specifications,” August 1975 (ADAMS Accession No. ML003739954).

8. U.S. NRC NUREG/CR-3687, “Loose Part Monitoring Programs and Recent Operational Experience in Selected U.S. and Western-European Commercial Nuclear Power Stations,” April 1984. (ADAMS Accession No. ML20091A524).

9. Electric Power Research Institute (EPRI) Technical Report NP-5743, “Loose-Parts Monitoring Systems Improvements,” March 1988.

10. Electric Power Research Institute Report 3002003060, “Foreign Material Exclusion Process and Methods: Supersedes 1016315,” November 2014.

11. Institute of Nuclear Power Operations 07-008, Rev. 1, "Guidelines for Achieving Excellence in Foreign Material Exclusion (FME)," February 2011 (ADAMS Accession No. ML14297A513).

12. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR39132).

13. American Society of Mechanical Engineers (ASME) OM-12, “Operation and Maintenance of Nuclear Power Plants,” April 2013.

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Matthew Hamm, NRR/DSS

Dated:

TOPICAL REPORT PWROG-20016-P/NP, REVISION 0, "PWROG-REGULATORY RELAXATION FOR PWR LOOSE-PART DETECTION SYSTEMS" COMMENT RESOLUTION TABLE

Comment No.	Text Location in the Proprietary DSE		Comment Type (Clarification, Editorial, Accuracy, Proprietary)	PWROG Suggested Revision	NRC Response
	Page No.	Line No.			
-	-	-	Proprietary	Please see the attached Draft Safety Evaluation that identifies the proprietary information that is included in the TR that is included in the DSE with double brackets and yellow highlight.	NRC staff finds the comment acceptable, and the revisions have been incorporated.
1	1	43-44	Editorial	Please revise "LPMS" to "LPDS."	NRC staff finds the comment acceptable, and the revisions have been incorporated.
2	5	48-50	Clarification	Please revise "… expedite plant specific amendments requesting the removal of LPMS requirements and elimination of the licensing basis requirements for the LPDS at PWRs." to "… expedite the removal of LPDS requirements from the licensing basis at PWRs.	NRC staff finds the comment acceptable, and the revisions have been incorporated.
3	5 6	50 1-2	Clarification	Please revise "The intended purpose of this PWROG TR is to facilitate participating PWROG licensees in the elimination of the licensing basis requirements for the LPDS." to "The intended purpose of this PWROG TR is to facilitate PWROG licensees in the elimination of the licensing basis requirements for the LPDS." The PWROG Member Participation Table in the TR discusses the plants that participated in the program, however, the TR is applicable to all PWRs, and not just those that participated in the program. This revision will allow the plants that did not participate in the original	Based on the PWROG's clarification regarding the applicability of the TR, the NRC staff finds PWROG's clarification and proposed changes are acceptable, and the revisions have been incorporated.

TOPICAL REPORT PWROG-20016-P/NP, REVISION 0, "PWROG-REGULATORY RELAXATION FOR PWR LOOSE-PART DETECTION SYSTEMS" COMMENT RESOLUTION TABLE

Comment No.	Text Location in the Proprietary DSE		Comment Type (Clarification, Editorial, Accuracy, Proprietary)	PWROG Suggested Revision	NRC Response
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				program to implement the TR, if they decide to join the program at a later date. The LPDS evaluation in the TR was based primarily on OE searches from the PWR Vendors (Framatome and Westinghouse) and Institute of Nuclear Power Operations (INPO) databases, and a PWROG survey. T e PWROG survey obtained information on the reliability and maintenance costs associated with a LPDS, how the plants committed to the RG 1.133 requirements, and what kind of Foreign Material Exclusion (FME) programs, procedures and guidelines that are currently in place to avoid or mitigate damage to safety-related primary system components and fuel assemblies. The survey requested the type of LPDS that is installed, the method used to filter out background noise, and the loose-part detection experience at each plant. The survey also focused on the performance record (reliability), reasons for maintenance activities on the LPDS, and a description of the appropriate alternate means plants have in place for meeting the objectives of a RG 1.133 Loose-Part Detection Program if it was not required by the licensing basis.	

TOPICAL REPORT PWROG-20016-P/NP, REVISION 0, "PWROG-REGULATORY RELAXATION FOR PWR LOOSE-PART DETECTION SYSTEMS" COMMENT RESOLUTION TABLE					
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	Page No.	Line No.			
				Regulatory Guide 1.133 Revision 1 was issued in May 1981. Since then, the industry has made advances to plant design features and continues to implement effective water chemistry and radiation monitoring which mitigate the potential consequences of loose parts. Additionally, advances have been made in the area of Foreign Material Exclusion through rigorous FME programs which have reduced the potential for loose parts. Relying on alternate programs, operational procedures, and guidelines currently in place (e.g., EPRI guidance report 3002003060 and INPO 07-008 provide an acceptable level of protection for the prevention and detection of loose parts. Additionally, the LPDS have been unreliable in detecting small loose parts, which tend to have the most detrimental effect on fuel cladding failure. Instead, passive fuel debris filters and fuel inspections have been implemented to prevent and mitigate the impact of small loose parts on the fuel cladding.	

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TOPICAL REPORT PWROG-20016-P/NP, REVISION 0, "PWROG-REGULATORY RELAXATION FOR PWR LOOSE-PART DETECTION SYSTEMS" COMMENT RESOLUTION TABLE

Comment No.	Text Location in the Proprietary DSE		Comment Type (Clarification, Editorial, Accuracy, Proprietary)	PWROG Suggested Revision	NRC Response
	Page No.	Line No.			
4	7	1	Clarification	Please revise "… PWROG TR proposes removing the LPDS licensee commitments from the participating PWR plants in the TR." to "… PWROG TR proposes removing the LPDS licensee commitments from PWR plants." The PWROG Member Participation Table in the TR discusses the plants that participated in the program, however, the TR is applicable to all PWRs, and not just those that participated in the program. This revision will allow the plants that did not participate in the original program to implement the TR, if they decide to join the program at a later date. See the justification in Comment Number 3.	Similar to comment no. 3, NRC staff finds the suggested changes acceptable, and the revisions have been incorporated.
5	7	5	Editorial	Please place the number of plants in a parenthetical (i.e., XX plants) to improve readability.	NRC staff finds the comment acceptable, and the revisions have been incorporated.
6	7	5-6	Clarification	Please add the phrase after …a licensing commitment "that is contained in a licensee controlled document, e.g., the TRM, or UFSAR…."	NRC staff finds the comment acceptable, and the revisions have been incorporated.
7	9	25	Clarification	Please delete: "meant as a defense in depth" and replace it with: "a conservative assumption"	NRC staff finds the comment acceptable, and the revisions have been incorporated.

TOPICAL REPORT PWROG-20016-P/NP, REVISION 0, "PWROG-REGULATORY RELAXATION FOR PWR LOOSE-PART DETECTION SYSTEMS" COMMENT RESOLUTION TABLE					
Comment No.	Text Location in the Proprietary DSE		Comment Type (Clarification, Editorial, Accuracy, Proprietary)	PWROG Suggested Revision	NRC Response
	Page No.	Line No.			
8	10	28	Editorial	Please start the last sentence in the paragraph: "The following…"	NRC staff finds the comment acceptable, and the revisions have been incorporated.
9	12	3	Editorial	Section 3.5.1, Recommend referring to "Section 4" since the title of that section is consistent with the remaining text in that sentence.	NRC staff finds the comment acceptable, and the revisions have been incorporated.
10	13	28-29	Editorial	Section 3.6, begin each phrase with a lower-case letter.	NRC staff finds the comment acceptable, and the revisions have been incorporated.
11	13	29-30	Editorial	Please delete the phrase "...Have TS or licensee- controlled documents." This text is not applicable to the discussion, and is discussed in lines 34-36.	NRC staff finds the comment acceptable, and the revisions have been incorporated.

TOPICAL REPORT PWROG-20016-P/NP, REVISION 0, "PWROG-REGULATORY RELAXATION FOR PWR LOOSE-PART DETECTION SYSTEMS" COMMENT RESOLUTION TABLE

Comment No.	Text Location in the Proprietary DSE		Comment Type (Clarification, Editorial, Accuracy, Proprietary)	PWROG Suggested Revision	NRC Response
	Page No.	Line No.			
12	14	17	Clarification	Section 3.8, please delete the word "applicable" at the end of the first sentence so it will read "…from the licensing basis of the PWRs." The PWROG Member Participation Table in the TR discusses the plants that participated in the program, however, the TR is applicable to all PWRs, and not just those that participated in the program. This revision will allow the plants that did not participate in the original program to implement the TR, if they decide to join the program at a later date. See the justification in Comment Number 3.	Similar to comment no. 3, NRC staff finds the suggested changes acceptable, and the revisions have been incorporated.
13	14	18	Clarification	Section 3.8, please add the following phrase to the end of the second sentence "…from the licensing basis."	NRC staff finds the comment acceptable, and the revisions have been incorporated.
14	14	19	Editorial	Please add the word "to" ie., "…able to detect…"	NRC staff finds the comment acceptable, and the revision has been incorporated.
15	14	24	Clarification	Please revise "…(i.e., FME, inspections (visual and camera)…." to "…(i.e., FME, inspections (visual and camera, if used)…." Not all visual inspections use cameras.	NRC staff finds the comment acceptable, and the revisions have been incorporated.

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TOPICAL REPORT PWROG-20016-P/NP, REVISION 0, "PWROG-REGULATORY RELAXATION FOR PWR LOOSE-PART DETECTION SYSTEMS" COMMENT RESOLUTION TABLE					
Comment No.	Text Location in the Proprietary DSE		Comment Type (Clarification, Editorial, Accuracy, Proprietary)	PWROG Suggested Revision	NRC Response
	Page No.	Line No.			
16	14	25	Editorial	Add "the" in front of capabilities.	NRC staff finds the comment acceptable, and the revision has been incorporated.
17	14	26	Clarification	Revise "…the RCS boundaries defined in RG 1.133." to "…the reactor vessel and steam generators (SGs) defined in RG 1.133." The word boundaries is not clear. Locations of the detectors are specified in RG 1.133.	NRC staff proposes revising the sentence to: "…reactor coolant pressure boundary locations defined in RG 1.133".
18	14	28	Editorial	Typo – "adequately" should be "adequate"	NRC staff finds the comment acceptable, and the revision has been incorporated.

TOPICAL REPORT PWROG-20016-P/NP, REVISION 0, "PWROG-REGULATORY RELAXATION FOR PWR LOOSE-PART DETECTION SYSTEMS" COMMENT RESOLUTION TABLE					
Comment No.	Text Location in the Proprietary DSE		Comment Type (Clarification, Editorial, Accuracy, Proprietary)	PWROG Suggested Revision	NRC Response
	Page No.	Line No.			
19	14	37-38	Clarification	Please revise "Accordingly, applicants seeking elimination of LPDS should include such detection guidance in their 10 CFR 50.59 evaluations. Based on PWROG's responses (Ref. 2)," to "Accordingly, licensees seeking elimination of LPDS from the licensing basis should include such detection guidance in their 10 CFR 50.59 screenings/evaluations. Based on the PWROG's responses (Ref. 2),…" This revises "applicants" to "licensees" adds "from the licensing basis" and adds "screenings/" after to "10 CFR 50.59 evaluations." Please add "the" to "Based on PWROG's responses."	NRC staff finds the comments acceptable, and the revisions have been incorporated.
20	14	44	Clarification	Please add "…from the licensing basis." to the end of the first sentence of the last paragraph in Section 3.8 so it will read "…proposed elimination of LPDS from the licensing basis."	NRC staff finds the comment acceptable, and the revision has been incorporated.
21	15	3	Clarification	Please revise "…RG 1.133 boundaries…." to "…the reactor vessel and SGs defined in RG 1.133…." Locations of the detectors are specified in RG 1.133.	Similar to comment no. 17. NRC staff suggests revising the sentence to: "…reactor coolant pressure boundary locations defined in RG 1.133".

TOPICAL REPORT PWROG-20016-P/NP, REVISION 0, "PWROG-REGULATORY RELAXATION FOR PWR LOOSE-PART DETECTION SYSTEMS" COMMENT RESOLUTION TABLE					
Comment No.	Text Location in the Proprietary DSE		Comment Type (Clarification, Editorial, Accuracy, Proprietary)	PWROG Suggested Revision	NRC Response
	Page No.	Line No.			
22	15	6	Clarification	Revise "…the boundaries defined in RG 1.133." to "…reactor vessel and SGs defined in RG 1.133." Locations of the detectors are specified in RG 1.133.	Similar to comment no. 17. NRC staff suggests revising the sentence to: "…reactor coolant pressure boundary locations defined in RG 1.133".
23	15	13-14	Accuracy	Section 3.8.1, fourth bullet – please delete "and TS amendment requests" so it will read "Describe the review and the results in the 10 CFR 50.59 reviews applicable to the associated plant." which is consistent with Sections in 3.8.2 and 3.8.3 in the DSE.	NRC staff finds the comment acceptable, and the revision has been incorporated.
24	15	32	Clarification	Section 3.8.3 – please revise "…NRC staff reviews…" to "…NRC staff safety evaluation,"	NRC staff finds the comment acceptable, and the revision has been incorporated.
25	15	32-36	Editorial	Section 3.8.3 – recommend adding bullets to the list to be consistent with Sections 3.8.1 and 3.8.2 in the DSE.	NRC staff finds the comment acceptable, and the revisions have been incorporated.
26	17	1	Editorial	Section 3.10 – please revise "delete" to "eliminate"	NRC staff finds the comment acceptable, and the revision have been incorporated.

TOPICAL REPORT PWROG-20016-P/NP, REVISION 0, "PWROG-REGULATORY RELAXATION FOR PWR LOOSE-PART DETECTION SYSTEMS" COMMENT RESOLUTION TABLE					
Comment No.	Text Location in the Proprietary DSE		Comment Type (Clarification, Editorial, Accuracy, Proprietary)	PWROG Suggested Revision	NRC Response
	Page No.	Line No.			
27	17	33	Clarification	Please revise "…10 CFR 50.59 evaluations…" to "10 CFR 50.59 screenings/evaluations…"	NRC staff finds the comment acceptable, and the revision has been incorporated.
28	18	2-3	Accuracy	Section 4.0 – Revise the last sentence of the first paragraph from "…into the fuel support pieces…" to: "…on the fuel assembly bottom nozzle ..."	NRC staff finds the comment acceptable, and the revisions have been incorporated.
29	18	18-19	Clarification	Revise "…will be adequately applied to the boundaries defined in NRC regulatory requirements as addressed in RG 1.133." to "will be adequately applied to the locations defined in RG 1.133." This wording is consistent with changes requested above with respect to the word "boundaries." Additionally, RG 1.133 is not a regulatory requirement.	Similar to comment no. 17. NRC staff suggests revising the sentence to: "…reactor coolant pressure boundary locations defined in RG 1.133"..
30	18	21-27	Clarification	Please revise: "Based on the evaluations and technical reviews discussed herein, the NRC staff finds that the PWR plants can make changes to the LPDS as addressed in TR PWROG-20016-P/NP, Revision 0, and continue to meet NRC regulatory requirements when the associated NRC guidance is met for licensees that reference the TR. The NRC staff finds that the unique configuration of each plant requires that each licensee periodically analyze the continued	The NRC staff reviewed the proposed changes and finds them acceptable.

TOPICAL REPORT PWROG-20016-P/NP, REVISION 0, "PWROG-REGULATORY RELAXATION FOR PWR LOOSE-PART DETECTION SYSTEMS" COMMENT RESOLUTION TABLE					
Comment No.	Text Location in the Proprietary DSE		Comment Type (Clarification, Editorial, Accuracy, Proprietary)	PWROG Suggested Revision	NRC Response
	Page No.	Line No.			
				effective applicability of the report based on changes to NRC regulations. Licensees may reference this SE, as applicable, when performing a 10 CFR 50.59 screening/evaluation." To: "Based on the evaluations and technical reviews discussed herein, the NRC staff finds that the PWR plants can eliminate the LPDS from the licensing basis as addressed in TR PWROG-20016-P/NP, Revision 0, and continue to meet NRC regulatory requirements for licensees that reference the TR. The NRC staff finds that the unique configuration of each plant requires that each licensee evaluate whether eliminating the LPDS from the licensing basis can be made under 50.59 without prior NRC approval. Licensees may reference this SE, as applicable, when performing a 10 CFR 50.59 screening/evaluation." The TR does not propose to make changes to the LPDS, the TR proposes to eliminate the LPDS from the licensing basis. After the LPDS is eliminated from the licensing basis, the NRC guidance in Reg Guide 1.133 will no longer be required to be met. The discussion to periodically analyze the continued effective	

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TOPICAL REPORT PWROG-20016-P/NP, REVISION 0, "PWROG-REGULATORY RELAXATION FOR PWR LOOSE-PART DETECTION SYSTEMS" COMMENT RESOLUTION TABLE					
Comment No.	Text Location in the Proprietary DSE		Comment Type (Clarification, Editorial, Accuracy, Proprietary)	PWROG Suggested Revision	NRC Response
	Page No.	Line No.			
				applicability of the report to changes in NRC regulations was deleted because no such statement was included in previous NRC Safety Evaluations that approved Topical Reports that can be implemented under 50.59.	
31	18	46	Clarification	Revise "The NRC staff determined that the process for a potential change to a licensee's TS described by the PWROG TR …." to "…The NRC staff determined that the process for a potential change to a licensee's TS to relocate the LPDS described by the PWROG TR…" This change clarifies the relocation of the LPDS from TS is what is discussed in the TR.	NRC staff finds the comment acceptable, and the revisions have been incorporated.

TOPICAL REPORT PWROG-20016-P/NP, REVISION 0, "PWROG-REGULATORY RELAXATION FOR PWR LOOSE-PART DETECTION SYSTEMS" COMMENT RESOLUTION TABLE					
Comment No.	Text Location in the Proprietary DSE		Comment Type (Clarification, Editorial, Accuracy, Proprietary)	PWROG Suggested Revision	NRC Response
	Page No.	Line No.			
32	19	9-12	Clarification	Revise Section 5 from "Based on the review of this TR, NRC staff concludes that there is no specific condition associated with licensing requests. However, based on Section 3.8 of the SE, licensees referencing the subject TR must apply specific action items and guidance when submitting site-specific licensing requests. " to "Based on the review of this TR, the NRC staff concludes that there is no specific condition associated with implementing this TR. However, based on Section 3.8 of the SE, licensees referencing the subject TR must apply specific action items and guidance when performing site-specific 50.59 Screenings/Evaluations." The elimination of LPDS from the licensing basis will be evaluated in accordance with 10 CFR 50.59 to determine if prior NRC approval is required.	NRC staff finds the comment acceptable, and the revisions have been incorporated.

ACKNOWLEDGEMENTS

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Duke Energy:

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Duke Energy Fleet Licensing

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PWR Owners Group
United States Member Participation* for PA-LSC-1612

Utility Member	Plant Site(s)	Participant	
		Yes	No
Ameren Missouri	Callaway (W)		
American Electric Power	D.C. Cook 1 & 2 (W)		
Arizona Public Service	Palo Verde Unit 1, 2, & 3 (CE)		
Dominion Energy	Millstone 2 (CE)		
	Millstone 3 (W)		
	North Anna 1 & 2 (W)		
	Surry 1 & 2 (W)		
	V.C. Summer (W)		
Duke Energy Carolinas	Catawba 1 & 2 (W)		
	McGuire 1 & 2 (W)		
	Oconee 1, 2, & 3 (B&W)		
Duke Energy Progress	Robinson 2 (W)		
	Shearon Harris (W)		
Entergy Palisades	Palisades (CE)		
Entergy Nuclear Northeast	Indian Point 2 & 3 (W)		
Entergy Operations South	Arkansas 1 (B&W)		
	Arkansas 2 (CE)		
	Waterford 3 (CE)		
Exelon Generation Co. LLC	Braidwood 1 & 2 (W)		
	Byron 1 & 2 (W)		
	Calvert Cliffs 1 & 2 (CE)		
	Ginna (W)		
FirstEnergy Nuclear Operating Co.	Beaver Valley 1 & 2 (W)		
	Davis-Besse (B&W)		
Florida Power & Light \ NextEra	St. Lucie 1 & 2 (CE)		
	Turkey Point 3 & 4 (W)		
	Seabrook (W)		
	Pt. Beach 1 & 2 (W)		
Luminant Power	Comanche Peak 1 & 2 (W)		
Pacific Gas & Electric	Diablo Canyon 1 & 2 (W)		
PSEG – Nuclear	Salem 1 & 2 (W)		

PWR Owners Group
United States Member Participation* for PA-LSC-1612

Utility Member	Plant Site(s)	Participant	
		Yes	No
So. Texas Project Nuclear Operating Co.	South Texas Project 1 & 2 (W)		
Southern Nuclear Operating Co.	Farley 1 & 2 (W)		
	Vogtle 1 & 2 (W)		
Tennessee Valley Authority	Sequoyah 1 & 2 (W)		
	Watts Bar 1 & 2 (W)		
Wolf Creek Nuclear Operating Co.	Wolf Creek (W)		
Xcel Energy	Prairie Island 1 & 2 (W)		

*** Project participants as of the date the final deliverable was completed. On occasion, additional members will join a project. Please contact the PWR Owners Group Program Management Office to verify participation before sending this document to participants not listed above.**

PWR Owners Group
International Member Participation* for PA-LSC-1612

Utility Member	Plant Site(s)	Participant	
		Yes	No
Asociación Nuclear Ascó-Vandellòs	Asco 1 & 2 (W)		
	Vandellos 2 (W)		
Centrales Nucleares Almaraz-Trillo	Almaraz 1 & 2 (W)		
EDF Energy	Sizewell B (W)		
Electrabel	Doel 1, 2 & 4 (W)		
	Tihange 1 & 3 (W)		
Electricite de France	58 Units		
Elektriciteits Produktiemaatschappij Zuid-Nederland	Borssele 1 (Siemens)		
Eletronuclear-Eletrobras	Angra 1 (W)		
Emirates Nuclear Energy Corporation	Barakah 1 & 2		
Hokkaido	Tomari 1, 2 & 3 (MHI)		
Japan Atomic Power Company	Tsuruga 2 (MHI)		
Kansai Electric Co., LTD	Mihama 3 (W)		
	Ohi 1, 2, 3 & 4 (W & MHI)		
	Takahama 1, 2, 3 & 4 (W & MHI)		
Korea Hydro & Nuclear Power Corp.	Kori 1, 2, 3 & 4 (W)		
	Hanbit 1 & 2 (W)		
	Hanbit 3, 4, 5 & 6 (CE)		
	Hanul 3, 4 , 5 & 6 (CE)		
Kyushu	Genkai 2, 3 & 4 (MHI)		
	Sendai 1 & 2 (MHI)		
Nuklearna Electrarna KRSKO	Krsko (W)		
Ringhals AB	Ringhals 2, 3 & 4 (W)		
Shikoku	Ikata 2 & 3 (MHI)		
Taiwan Power Co.	Maanshan 1 & 2 (W)		

*** Project participants as of the date the final deliverable was completed. On occasion, additional members will join a project. Please contact the PWR Owners Group Program Management Office to verify participation before sending this document to participants not listed above.**

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LIST OF ACRONYMS

Acronym	Definition
ASME	American Society of Mechanical Engineers
ATWS	Anticipated Transient Without SCRAM
B&W	Babcock and Wilcox
BWR	Boiling Water Reactor
BWROG	Boiling Water Reactor Owners Group
CAP	Correction Action Program
CDF	Core Damage Frequency
CE	Combustion Engineering
CFR	Code of Federal Regulations
CR	Condition Report
CRD	Control Rod Drive
CRGT	Control Rod Guide Tube
CRDM	Control Rod Drive Mechanism
CVCS	Control Volume and Chemical System
DMIM	Digital Metal Impact Monitoring System
D/P	Differential Pressure
EDF	Electricite de France
EPRI	Electric Power Research Institute
FOSAR	Foreign Object Search & Retrieval
FWRV	Feedwater Regulating Valve
FM	Foreign Material
FME	Foreign Material Exclusion
GE	General Electric
I&C	Instrumentation and Control
IER	Industry Event Report
INPO	Institute of Nuclear Power Operations
LAR	License Amendment Request
LERF	Large Early Release Frequency
LPDS	Loose-Part Detection System
LPMS	Loose-Part Monitoring System
LPM	Loose-Part Monitoring
LRA	License Renewal Application
MFW	Main Feedwater
MHI	Mitsubishi Heavy Industries
NRC	Nuclear Regulatory Commission
NSSS	Nuclear Steam Supply System

Acronym	Definition
NOT/NOP	Normal Operating Temperature and Pressure
OE	Operating Experience
OM	Operation and Maintenance
OM-12	ASME Operations Maintenance Section
PA	Project Authorization
PRA	Probabilistic Risk Assessment
PWR	Pressurized Water Reactor
PWROG	Pressurized Water Reactor Owners Group
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RG	Regulatory Guide
RV	Reactor Vessel
SG	Steam Generator
SOER	Significant Operating Experience Report
TR	Topical Report
TS	Technical Specification(s)
UFSAR	Updated Final Safety Analysis Report
U.S.	United States of America
VCT	CVCS Volume Control Tank
VLPM	Vibration Loose Part Monitoring

1 INTRODUCTION, SYNOPSIS, AND OBJECTIVE

1.1 INTRODUCTION

In May 1981, the NRC published Regulatory Guide (RG) 1.133, Revision 1 (Ref. [1]), "Loose-Part Detection Program for the Primary System of Light-Water-Cooled Reactors." This RG discussed the purpose of loose-part detection and specified the design features necessary for detection of loose-parts in the primary system, while minimizing personnel time in high radiation areas and occupational radiation exposure. Section 4.4 of NUREG-0800 (Ref. [2]) states that the design description of the loose-part detection system should be consistent with the requirements of RG 1.133. Most Light Water Reactors - Boiling Water Reactors (BWR) and Pressurized Water Reactors (PWR) - licensed after the issuance of the RG were required, as part of their licensing basis, to meet RG 1.133.

The NRC issued safety evaluation report (Ref. [3]) that approved the BWR Topical Report on this issue (discussed in the following Section 1.2) states:

> "In RG 1.133, the staff stated that the primary purpose of the loose-part detection program is the early detection of loose metallic parts in order to avoid or mitigate damage to safety-related components. The staff discussed that a loose (i.e., disengaged and drifting) part in the primary coolant system:
>
> - can be indicative of a failed or weakening safety-related component. The detection of the loose parts will thus provide an early warning of a degraded safety condition;
> - may have been inadvertently left in the primary system during construction, refueling or maintenance. The loose part (foreign object) can contribute to safety related component damage or wear by frequently impacting other parts of the system;
> - may cause a blockage of the coolant flow through the fuel assemblies. Flow blockage could initiate departure from nucleate boiling and result in fuel cladding failure;
> - might increase the potential for control rod jamming; and
> - might increase the levels of radioactivity in the reactor coolant system through the accumulation of crud."

1.2 SYNOPSIS OF BWR REGULATORY EXPERIENCE WITH RG 1.133 COMPLIANCE

On July 31, 2000, the Boiling Water Reactor Owners Group (BWROG) submitted a General Electric (GE) Topical Report NEDC-32975P, "Regulatory Relaxation for BWR Loose-Part Monitoring Systems." In the submittal, the topical report discussed the effectiveness of the loose parts monitoring systems (LPMS) installed in some BWR plants and proposed eliminating the

LPMS requirements. The BWROG stated that (1) Operating experience (OE) does not indicate any beneficial advantage for plants that installed the system as compared to the plants that did not; (2) LPMS do not have the sensitivity or the reliability to detect loose parts; (3) LPMS incur high repair costs; and (4) The maintenance of the system leads to high radiation exposures.

On January 25, 2001, the NRC issued "Safety Evaluation (Ref. [3]) By The Office Of Nuclear Reactor Regulation Related to Topical Report NEDC-32975P, Regulatory Relaxation for BWR Loose Parts Monitoring Systems, Boiling Water Reactor Owners Group, Project No. 691." The Safety Evaluation Introduction reiterates the BWROG conclusion that:

> "… (1) the LPM system did not provide the safety benefits initially envisioned in the 1970s, (2) LPM systems' repair and maintenance entail high costs and high radiation exposures, and (3) the risk insights from several hundred years of plant experience indicate that there are no differential effects on core damage and/or early release fractions, whether the LPM systems are used or not."

The NRC letter further stated:

> "The staff finds that the operating history does indicate that {Loose Parts Monitoring System} LPMS did detect weakened or degraded safety related components as well as damage to components due to loose parts inadvertently left during maintenance or refueling. However, the LPMS in use are not reliable or sensitive enough to provide the safety benefits envisioned by RG 1.133. Loose parts can be detected by the normal plant process and monitoring systems and also through visual inspections. Also operating history does not show a higher incidence or occurrence of damage to safety-related components in plants that have a LPMS installed. The staff concurs that the safety benefits of the LPMS do not appear to be commensurate with the cost of maintenance and associated radiation exposure for plant personnel.
>
> Therefore, the staff finds that Topical Report NEDC-32975P is acceptable for referencing in licensing applications to the extent specified and under the limitations delineated in this safety evaluation. The staff will not repeat its review of the matters described in the subject report, when the report appears as a reference in license applications, except to ensure that the material presented applies to the specific plant involved.
>
> If the NRC's criteria or regulations change so that its conclusions about the acceptability of the report are invalidated, the BWROG or the applicant referencing the report, or both, will be expected to revise and resubmit its respective documentation, or submit justification for the continued effective applicability of the report without revision of the respective documentation."

Although the LPMS is no longer mandated for BWRs, the BWR OE is consistent with the operating PWRs in terms of loose-parts prevention and detection.

1.3 OBJECTIVE

The objective of this topical report is to justify the elimination of the licensing basis requirement for the LPDS that is discussed in RG 1.133. Licensees will reference this topical report in the 10 CFR 50.59 that is prepared to remove the LPDS from the plant's licensing basis.

If the LPDS is contained in a licensee's TS, a license amendment request will be submitted in accordance with 10 CFR 50.90 to relocate the LPDS TS, to a licensee controlled document. After NRC approval of the amendment to relocate the LPDS TS to a licensee controlled document, the removal of the LPDS from the licensing basis will be evaluated in accordance with 10 CFR 50.59.

2 APPLICABLE REGULATORY REQUIREMENTS AND GUIDANCE

2.1 LOOSE-PART DETECTION SYSTEM REGULATORY REQUIREMENTS AND LICENSING BASIS

Most PWRs that have installed a LPDS are required as part of the licensing basis to meet RG 1.133, Revision 1 (Ref. [1]). RG 1.133 describes methods acceptable to the NRC for implementing specified regulatory requirements regarding the detection of a loose part. RG 1.133 states that the requirements for the LPDS are based on the following regulations:

- Criterion 1, “Quality Standards and Records,” of Appendix A, “General Design Criteria for Nuclear Power Plants,” to 10 CFR Part 50, “Domestic Licensing of Production and Utilization Facilities,” requires that structures, systems, and components important to safety be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed and that a quality assurance program be established and implemented in order to provide adequate assurance that these structures, systems, and components will satisfactorily perform their safety functions.
- Criterion 13, “Instrumentation and Control,” requires, in part, that instrumentation be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions to ensure adequate safety, including those variables and systems that can affect the fission process, the integrity of the core, and the reactor coolant pressure boundary.
- Section 50.36, “Technical Specifications,” of 10 CFR 50 requires an applicant for a facility operating license to provide propose technical specifications. Paragraph (c)(2), “Limiting Conditions for Operation,” identifies a proposed technical specification relating to the lowest functional capability or performance levels of equipment required for safe operation of the facility. Paragraph (c)(3), “Surveillance Requirements,” identifies a proposed technical specification relating to test, calibration, or inspection to ensure that the necessary quality of systems and components is maintained, the facility operation will be within the safety limits, and that the limiting conditions of operation will be met. Paragraph (c)(5), “Administrative Controls,” requires an applicant for a facility operating license to provide proposed technical specifications relating to reporting necessary to ensure operation of the facility in a safe manner. Note that for most PWR plants with a LPDS, the actual requirements have been relocated from the Technical Specifications to the Technical Requirements Manual (or other licensee controlled documents) and/or the Updated Final Safety Analysis Report.
- Paragraph 20.1(c) of 10 CFR Part 20, “Standards for Protection Against Radiation,” states that, in addition to complying with the requirements therein, licensees should make every reasonable effort to maintain exposures to radiation as far below the limits specified in Part 20 as is reasonably achievable.

RG 1.133 states that the presence of a loose (i.e., disengaged and/or drifting) part in the primary coolant system can be indicative of degraded reactor safety resulting from failure or weakening of a safety-related component. A loose part, whether it is from a failed or weakened component or from an item inadvertently left in the primary system during construction, refueling, or maintenance procedures, can contribute to component damage and material wear by frequent impacting with other parts in the system. A loose part can pose a serious threat of partial flow blockage with attendant departure from nucleate boiling (DNB) which in turn could result in failure of fuel cladding. In addition, a loose part increases the potential for control rod jamming and for accumulation of increased levels of radioactive crud in the primary system.

RG 1.133 further states that the primary purpose of the loose-part detection program is the early detection of loose metallic parts in the primary system. Early detection can provide the time required to avoid or mitigate safety-related damage to or malfunctions of primary system components. The loose-part detection program also serves a second purpose since it can minimize radiation exposure to station personnel by providing for the early detection and general location of abnormal structural conditions. Information from the program can be used by station personnel to focus their efforts when taking remedial action to minimize the formation of wear-generated radioactive crud and to minimize the need for extensive structural repairs. The second purpose is consistent with the guidance contained in RG 8.8, “Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations Will Be As Low As Is Reasonably Achievable,” which provides guidance to licensees for maintaining occupational doses to individuals as far below the permissible limits specified in the NRC regulations as is reasonably achievable while, at the same time, providing guidance on methods to ensure that the sum of the doses received by all exposed personnel is also at the lowest practical level.

RG 1.133 also concluded that an improperly developed and poorly implemented loose-part detection program may require excessive attention by plant operating personnel and more frequent inspections of the primary system that can result in increased radiation exposure. For this reason, the RG emphasized the need for providing system features that will minimize false alert signals, and for developing diagnostic procedures that can be quickly implemented to supplement information from the loose-part detection system to determine the short and long-term safety significance of a loose part. A well-developed loose-part detection system should enable discrimination of the signal induced by the impact of a loose part from those signals induced by normal hydraulic, mechanical, and electrical background noise and large amplitude electrical transients.

The loose-part detection program outlined in RG 1.133 includes both automatic and manual modes of data acquisition. These data acquisition modes provide for automatic and manual detection of loose parts. It is stated that the loose-part detection program outlined in RG 1.133 was not intended to be a research program. Instrumentation and procedures that will result in the need for disproportionate amount of attention by control room personnel were not encouraged. Instrumentation that can be used to determine the approximate size and location of a loose part but that does not interfere with the normal alert and false signal rejection function of the detection program would be useful in complementing other instrumentation to determine the safety significance of a detected loose part. Loose parts traveling through the primary

system will generally accumulate, at least for a time, in such natural collection areas as the plenums in reactor vessels. Therefore, the NRC staff recommended in RG 1.133 that sensors be located at these and other natural collection areas. No benefit is seen in instrumenting straight lines of pipe or other areas through which a loose part will quickly pass. Close scrutiny of a relatively small amount of clearly relevant data is considered a better detection program that cursory review of a large volume of less significant data.

A prime consideration in developing the loose-part detection program was the avoidance of procedures requiring excessive attention by control room personnel and excessive reporting by the licensee. The recommended program requires operator action or engineering review when the detection methods indicate the presence or possibility of a loose part or when performing periodic audio monitoring or when confirming the operability of the instrumentation system. RG 1.133 specifies that licensee reports to the Commission during operation are required when defining the alert level, when a loose part is confirmed to be present, or when the associated technical specification is violated. It is noted that this reporting requirement is no longer applicable for the majority of PWRs who have relocated the LPDS requirements to the Technical Requirements Manual or other licensee controlled document and/or the UFSAR.

RG 1.133 reflects 1981 NRC staff practice as outlined in Section 4.4 of the Standard Review Plan per NUREG-0800 (Ref. [2]). The methodology described in RG 1.133 has been recognized as acceptable for complying with the Commission's regulations since January 1, 1978. Except in unique cases, RG 1.133 was used by the NRC staff in the evaluation of all construction permit applications and all operating license applications under review by the NRC staff after January 1, 1978.

2.2 CODE AND STANDARDS

American Society of Mechanical Engineers (ASME), Operation and Maintenance (OM) of Nuclear Power Plants and 10 CFR 50.55a (Codes and Standards) are reviewed hereafter.

10 CFR 50.55a, (b)(3) states in part "…nonmandatory appendices are approved for use by the NRC but need not be used". The OM Divisions that discuss Loose-Part Monitoring are nonmandatory, thus deleting the LPDS from the licensing basis of PWRs does not conflict with 10 CFR 50.55a compliance:

1. Division 1, OM Code, Nonmandatory Appendix M, Design Guidance for Nuclear Power Plant Systems and Component Testing, references:
    i) M-3520 Division 2: OM Standards, Part 12 (Loose-Part Monitoring) and states: "Consider guidance provided by ASME OM, Division 2, Part 12 for the design of loose part monitoring systems." Also, Part 12, "Nonmandatory Appendix A References" lists RG 1.133, Loose-Part Detection Program for Primary System of Light-Water cooled Reactors, Revision 1, 1981" as a nonmandatory reference.
    ii) M-3530 Division 2, OM Standards, Part 24 (Reactor Coolant Pumps and Recirculation Pumps) and states:

"Consider guidance provided by ASME OM, Division 2, Part 24 for the design of pump-monitoring systems." Also, paragraph 11.5.4 "Loose Parts Monitoring" refers to Nonmandatory Appendix E of this Part for additional information."

2. Division 2: OM Standards, Part 24, Reactor Coolant and Recirculation Pump Condition Monitoring, is presented as: "Nonmandatory Appendix E, Loose Parts Monitoring."
3. Division 3: OM Guides, Part 23, "Inservice Monitoring of Reactor Internals in Pressurized Water Reactor Power Plants", provides guidance for Loose-Parts Monitoring hardware. OM Guides are not mandatory.

3 LPDS AND LOOSE-PARTS IN PWR

3.1 HISTORICAL BACKGROUND

Loose-part detection within the reactor coolant systems of commercial light-water reactors has been covered by NRC regulations since the late 1970s. These detection systems were introduced as a result of the damage caused by loose parts at several plants. The first generation LPDSs did not perform well in general. Calibration of these original systems was difficult at best. A lack of any reliable data on typical RCS background vibration levels made the issue of setpoint selection difficult. The desired detection system sensitivity was selected but without an idea of the typical background noise levels or loose-part impact signal characteristics.

Many nuclear power plants have addressed the same issues: reducing LPDSs false alarms and increasing the effectiveness of detecting significant impact-like-events. Early problems (e.g., high false alarm rates, failure to detect loose parts) led to systematic reviews by the Oak Ridge National Laboratory (Ref. [4]), which showed that the LPDS performance in 1984 had improved relative to that in 1977 prior to RG 1.133, but there were still deficiencies related to signal propagation, frequency range, and distinguishing characteristics of valid signals. In addition to RG 1.133, several industry initiatives were undertaken during the early 1980s.

The Electric Power Research Institute (EPRI) in 1988 (Ref. [5]) conducted an LPDS research project using metal impact theory and experimental data to develop a quantitative description of loose parts, yielding signal amplitude and frequency as a function of impact energy and mass, signal transmission, and sensor response. This effort enabled EPRI to make recommendations for sensor mounting, system calibration, signal processing, and signal interpretation. The EPRI project was coordinated with, and ultimately led to the creation of American Society of Mechanical Engineers (ASME) Standard Operation Manual (OM-12) in 1991 (an updated revision is Ref. [6]). **[**

]

3.2 LPDS

The LPDS is used to detect structure borne sound that can indicate potential loose parts impacting the inside of the RCS and in the secondary side of the steam generators (SGs), including portions of the Main Feedwater (MFW) lines. Loose parts transported by fluid streaming will impact the inner wall of the pressurized boundary of the primary system or critical portions of the secondary system. These impacts (so called bursts) can be recorded by accelerometers which are attached to the outer surface of the monitored components.

A LPDS uses transient acoustic signal analysis to detect and locate impacts of metallic loose parts on the inner surfaces of the RCS. The system also estimates the mass of the impacting object. The acoustic signals are detected by sensors (e.g., accelerometers) located at strategic positions on the outer surfaces of the reactor vessel (RV), reactor coolant pumps (RCPs), SGs,

and possibly on other components of the RCS. Typical sensor locations in the RCS of a PWR are identified in Table 3-1, Figure 3-1 and Figure 3-2 (from Ref. [6]).

Table 3-1: Recommended PWR Accelerometer Locations

Location	Number of Sensors
Reactor vessel, upper	3
Reactor vessel, lower	3
Steam Generator (each)	3
Reactor coolant pump (each)	1

Figure 3-1: Typical Sensor Locations for a Four-Loop PWR

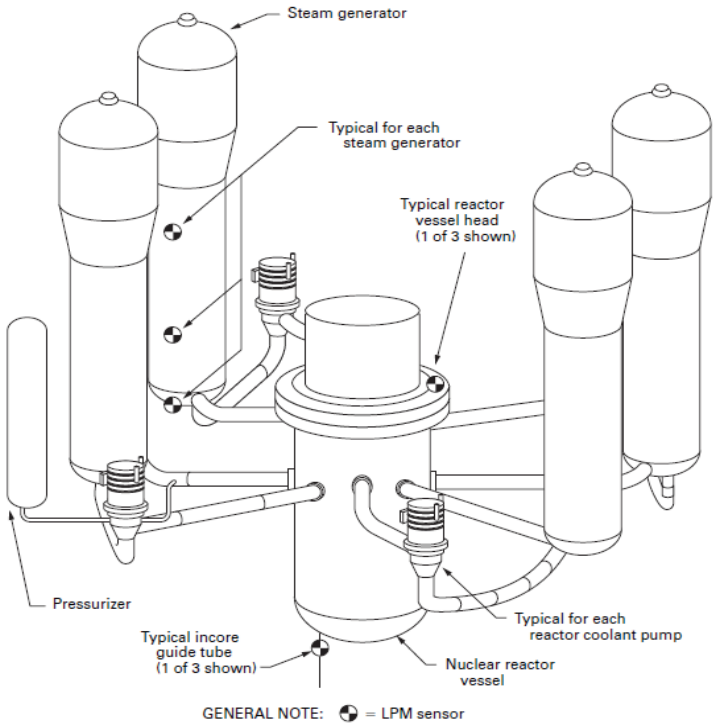
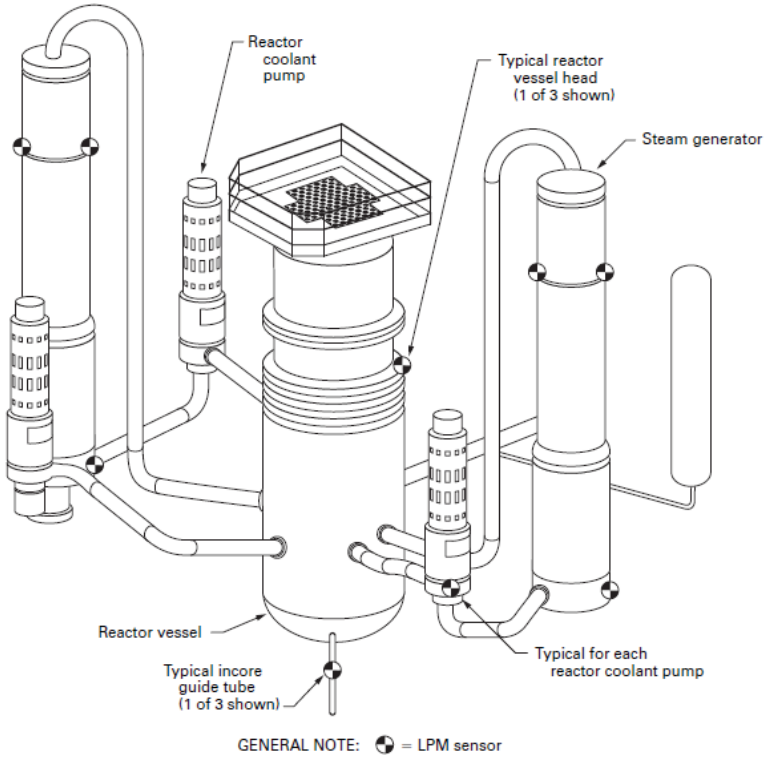


Figure 3-2: Typical Sensor Locations for a B&W PWR



The LPDS consists of the following main components:

- Transducers
- Preamplifiers, Signal Conditioning, and Processing Equipment
- LPDS Computer

The LPDSs for U.S. PWRs are designed in accordance with the Guidance and Standards provided in Ref. [1], [6], and Ref. [7]. LPDS and its components face demanding functional requirements and do not perform any safety-related functions.

3.2.1 [ ]

3.2.2 [ ]

3.2.3 [ ]

3.2.4 [ ]

3.2.5 [ ]

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3.2.6 [ ]

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4 JUSTIFICATION FOR ELIMINATING THE LPDS FROM THE LICENSING BASIS

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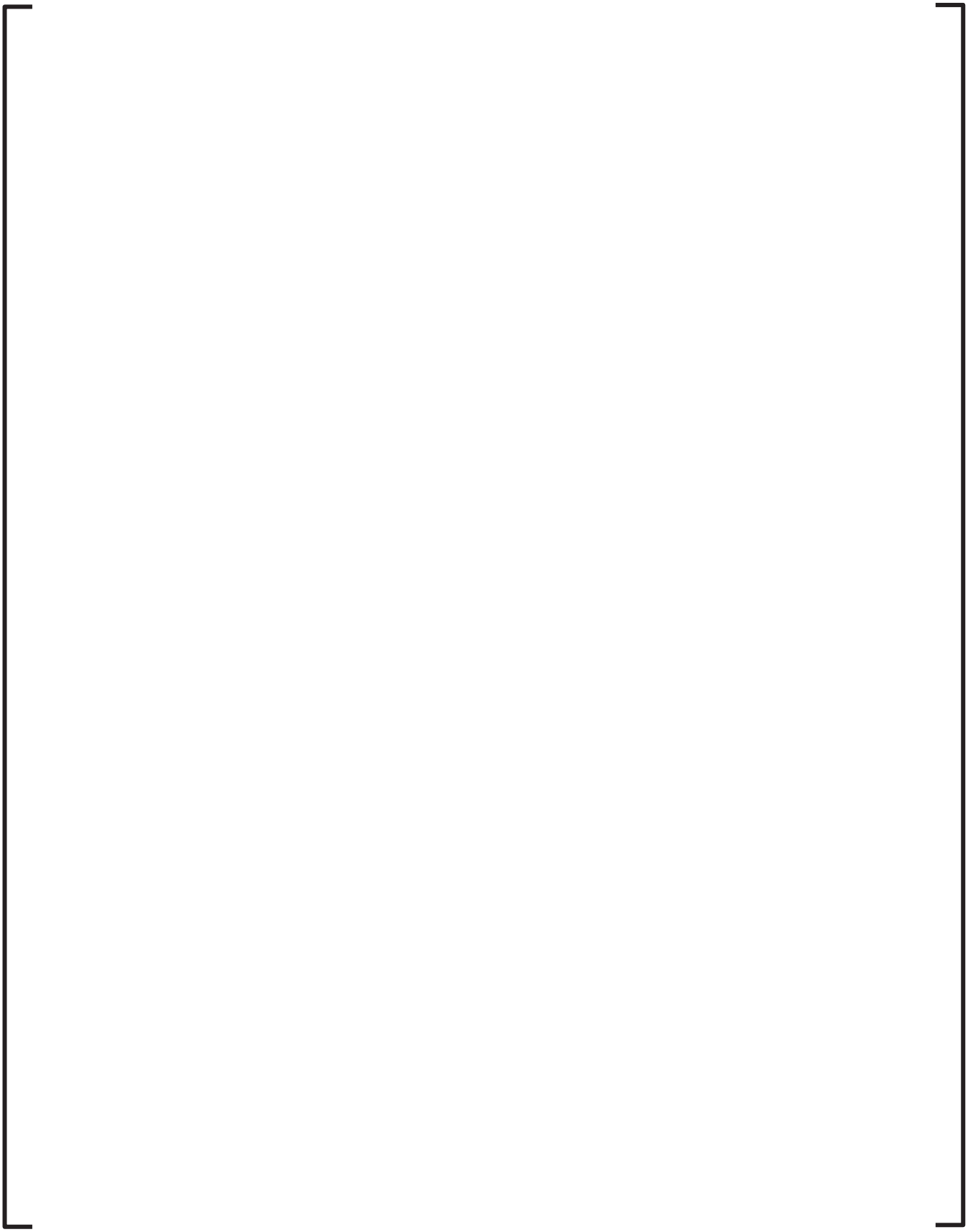

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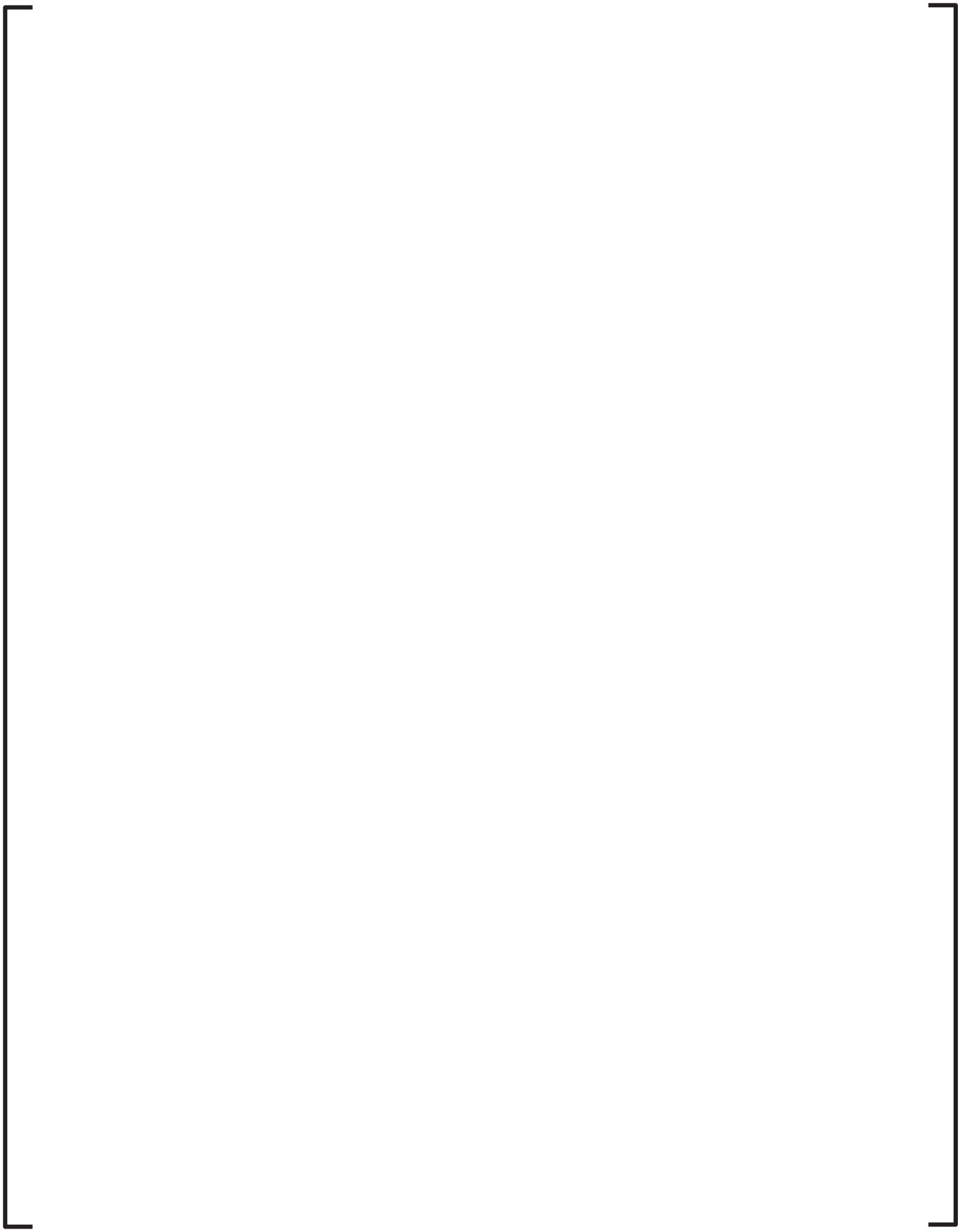

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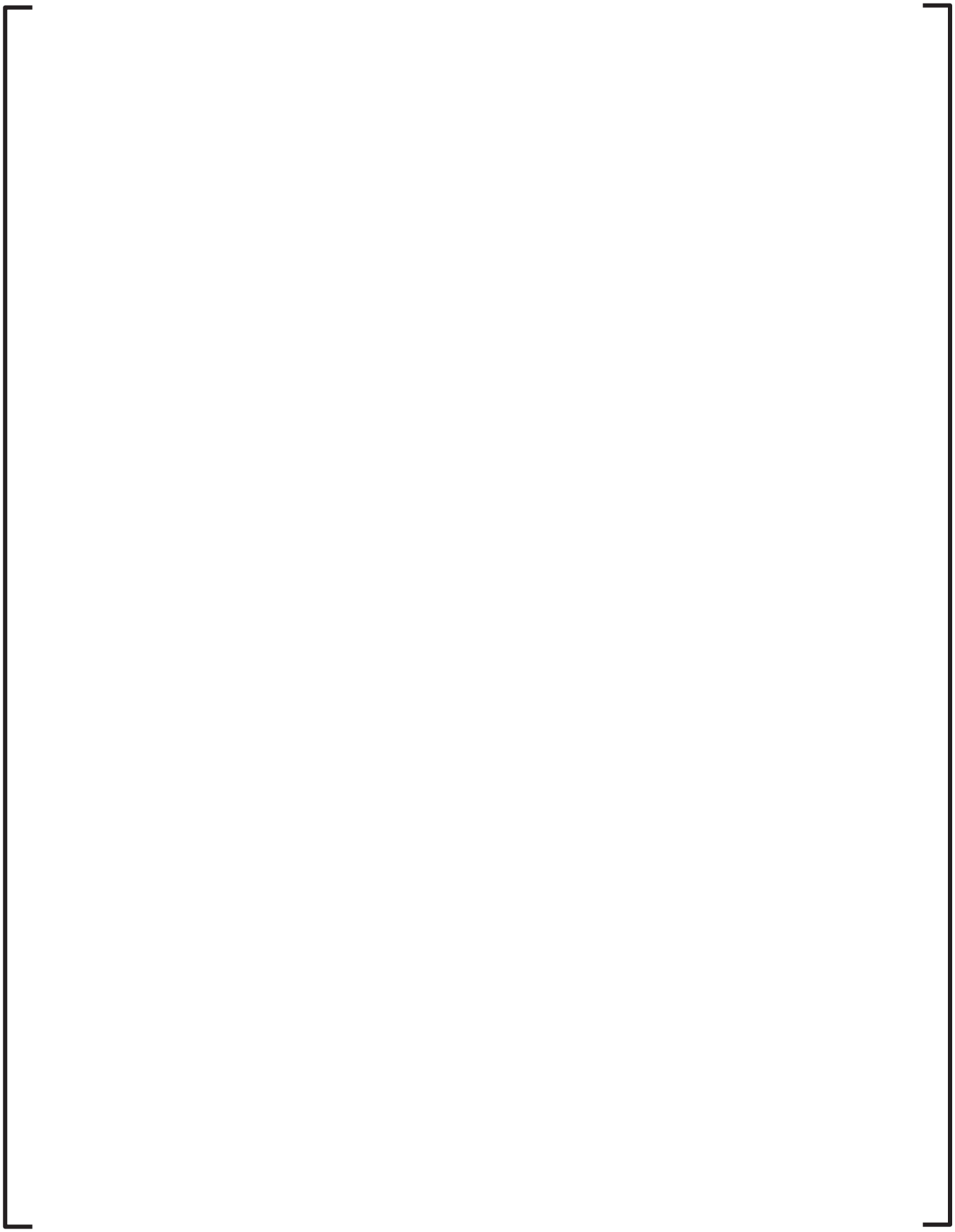

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4.4.1 [ ]

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4.4.3 [ ]

5 CONCLUSION

[

]

In summary, the requirements of RG 1.133 for a LPDS can be eliminated from the licensing basis because [

]

6 REFERENCES

1. U.S. NRC Regulatory Guide 1.133, Revision 1, May 1981, “Loose-Part Detection Program for the Primary System of Light-Water-Cooled Reactors,” ADAMS: ML003740137.
2. U.S. NRC NUREG-0800, “Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition,” ADAMS: ML070810350.
3. Safety Evaluation by the Office of Nuclear Regulatory Regulation Related to Topical Report NEDC-32975P, “Regulatory Relaxation for BWR Loose Parts Monitoring Systems,” Boiling Water Reactor Owners Group Project 691, January 25, 2001, ADAMS: ML010310355.
4. U.S. NRC NUREG/CR-3687, “Loose Part Monitoring Programs and Recent Operational Experience in Selected U.S. and Western-European Commercial Nuclear Power Stations,” April 1984.
5. Electric Power Research Institute (EPRI) Technical Report NP-5743, “Loose-Parts Monitoring Systems Improvements,” March 1988.
6. American Society of Mechanical Engineers (ASME) OM-12, “Operation and Maintenance of Nuclear Power Plants,” April 2013.
7. International Electrotechnical Commission (IEC), Standard IEC 60988, Edition 2.0, “Nuclear Power Plants – Instrumentation Important to Safety – Acoustic Monitoring Systems for Detection of Loose Parts: Characteristics, Design Criteria and Operational Procedures,” 2009.
8. Institute of Nuclear Power Operations (INPO), Event Report (IER) Level 2, Issue 19-6, “Preventing Debris-Induced Fuel Failures,” 2019.
9. Electric Power Research Institute (EPRI) report 3002003060, “Foreign Material Exclusion Process and Methods: Supersedes 1016315,” November 2014.
10. Electric Power Research Institute (EPRI) Technical Report TR-1016315, “Foreign Material Exclusion Process and Methods,” 2008.
11. Electric Power Research Institute (EPRI) Technical Report TR-106756, “NMAC Foreign Material Exclusion Guidelines,” 1997.
12. Institute of Nuclear Power Operations (INPO), INPO 97-008 Good Practice (MA-320), “FM Exclusion Program,” July 1997. (Available only to INPO members).
13. Institute of Nuclear Power Operations (INPO) SOER 82-12, “Steam Generator Ruptures Caused by Loose Parts on Secondary Side,” December 1982.
14. Institute of Nuclear Power Operator (INPO) 07-008, Rev. 1, “Guidelines for Achieving Excellence in Foreign Material Exclusion (FME),” February 2011.

APPENDIX A – PWROG CORRESPONDENCE

This section contains the following correspondence:

1. Letter, Michael Powell (PWROG) to Document Control Desk (NRC), “PWR Owners Group Submittal of Topical Report PWROG-20016P/NP, Revision 0, ‘PWROG-Regulatory Relaxation for PWR Loose-Part-Detection Systems’ (PA-LSC-1612),” OG-20-215, August 26, 2020.

2. Email, Leslie Fields (NRC) to Danielle Page-Blair (Framatome Inc.) and Chad Holderbaum (PWROG), “Request for Additional Information for Topical Report, PWROG-20016-P”

3. Letter, Michael Powell (PWROG) to Document Control Desk (NRC), “PWR Owners Group Transmittal of the Response to Request for Additional Information Associated with PWROG-20016-P/NP, Revision 0, ‘Regulatory Relaxation for PWR Loose-Part-Detection Systems’ (PA-LSC-1612 R0),” OG-21-47, February 22, 2021.

Program Management Office
1000 Westinghouse Drive, Suite 172
Cranberry Township, Pennsylvania 16066

PWROG-20016-P/NP, Revision 0
Project Number 99902037

August 26, 2020

OG-20-215

U.S. Nuclear Regulatory Commission
Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

Subject: PWR Owners Group
Submittal of Topical Report PWROG-20016-P/NP, Revision 0, "PWROG – Regulatory Relaxation for PWR Loose-Part-Detection Systems" (PA-LSC-1612)

The purpose of this letter is to submit Pressurized Water Reactor Owners Group (PWROG) Topical Report (TR), PWROG-20016-P/NP, Revision 0, "PWROG – Regulatory Relaxation for PWR Loose-Part-Detection Systems," in accordance with the Nuclear Regulatory Commission (NRC) TR program for review and acceptance for referencing in regulatory actions.

The purpose of this report is to generically justify the elimination of the licensing basis requirement for the Loose-Parts-Detection Systems (LPDS) related to Reg Guide 1.133, "Loose-Part Detection Program for the Primary System of Light-Water-Cooled Reactors". The TR will facilitate participating PWROG licensees in eliminating the licensing basis requirements for the LPDS with minimal need for plant-specific NRC reviews. This approach minimizes the resource demand on the licensee for developing site-specific justifications and also on the NRC for conducting regulatory reviews for each plant.

The PWROG requests the NRC review and approve the enclosed TR.

The enclosed TR (Enclosure 1) contains information proprietary to Framatome Inc.; which is supported by an affidavit signed by Framatome Inc., owner of the information. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b) (4) of Section 2.390 of the Commission's regulations. The affidavit is included as Enclosure 3.

Accordingly, it is respectfully requested that the information which is proprietary to Framatome Inc. be withheld from public disclosure in accordance with 10 CFR Section 2.390 of the Commission's regulations.

Correspondence with respect to the proprietary aspects of the information or supporting Framatome affidavit should reference this letter and should be addressed to Mr. Philip Opsal, Manager, Product Licensing, Framatome Inc., 3315 Old Forest Road, Lynchburg, Virginia 24506-0935.

TR Classification: As discussed above, this TR provides justification that the requirements of RG 1.133 for a LPDS can be eliminated from the licensing basis.

Specialized Resource Availability: This TR Supplement is being submitted to the NRC for review and approval so that the NRC approved version can be utilized as a reference to justify eliminating RG 1.133 from their licensing basis.

Applicability: This TR Supplement is applicable to the PWR utility sites with a LPDS or similar.

NRC Review Schedule

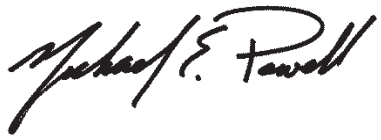
The PWROG requests that the NRC complete their review of the TR by August 30, 2021 since this is anticipated to be a non-complex review and it has high industry interest based upon the 29 US and international sites that expect to take action when the Safety Evaluation is completed.

Correspondence related to the non-proprietary transmittal should be addressed to:

Mr. W. Anthony Nowinowski, Program Manager
PWR Owners Group, Program Management Office
Westinghouse Electric Company
1000 Westinghouse Drive, Suite 172
Cranberry Township, PA 16066

If you have any questions, please do not hesitate to contact me at (602) 999-2080 or Mr. W. Anthony Nowinowski, Program Manager of the PWR Owners Group, Program Management Office at (412) 374-6855.

Sincerely yours,



Michael Powell
Chief Operating Officer & Chairman
Pressurized Water Reactor Owners Group

MP:DRPB:am

Enclosures

Enclosure 1: PWROG-20016-P "PWROG – Regulatory Relaxation for PWR Loose-Part-Detection Systems" (Proprietary)
Enclosure 2: PWROG-20016-NP "PWROG – Regulatory Relaxation for PWR Loose-Part-Detection Systems" (Non-Proprietary)
Enclosure 3: Affidavit for Withholding Proprietary Information (Non-Proprietary)

cc with enclosures:
L. Fields, US NRC
PWROG Licensing Committee Representatives in LSC-1612
cc without enclosures:
PWROG Steering and Management Committee
PWROG PMO
G. Peters, Framatome
P. Opsal, Framatome
P. Brocheny, Framatome
G. Elliott, Framatome
D. Page Blair, Framatome
J. Andrachek, Westinghouse
J. Moorehead, Westinghouse

Fields, Leslie

To: danielle.pageblair@framatome.com; Holderbaum, Chad M.
Cc: Waters, Michael; Singh, Gursharan; Chien, Nan; Ashcraft, Joseph; Hamm, Matthew (Matthew.Hamm@nrc.gov); Morey, Dennis; Wittick, Brian
Subject: Request for Additional Information for Topical Report, PWROG-20016-P

Dear Mr. Holderbaum of the Pressurized Water Reactor Owners Group,

This email serves as a cover letter for the formal transmittal for Requests for Additional Information (RAIs).

By letter dated August 26, 2020 (Agency-wide Documents Access and Management System (ADAMS) Accession No. ML20246G463), the Pressurized Water Reactor Owners Group (PWROG) transmitted Topical Report (TR) PWROG-20016-P Revision 0, "PWROG - Regulatory Relaxation for PWR Loose-Part-Detection Systems" for NRC review and approval.

With respect to the review of PWROG-20016-P, I have placed an electronic version of the RAIs in the BOX.com folder for your review.

The RAIs has been placed in ADAMS as nonpublic so it can be declared an Official Agency Record. When responding to this RAI, please confirm if there is any proprietary information in the RAI and/or the response.

Your formal response, provided via letter under authorized signature, will generate the ADAMS version of the RAIs based on the proprietary nature of the document.

In order to support the NRC staff's review schedule, please provide your response no later than January 15, 2021.

If you have any questions or would like to discuss the RAI with staff via MS teams to ensure you understand the NRC's request, please let me know.

This email will be uploaded in ADAMS and declared publicly available.

Thanks,
Leslie Fields, Sr. Project Manager
U.S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
301-415-1186
leslie.fields@nrc.gov

NRC'S REQUEST FOR ADDITIONAL INFORMATION ASSOCIATED WITH TOPICAL REPORT, PWROG-20016-P, "PWROG - REGULATORY RELAXATION FOR PWR LOOSE-PART-DETECTION SYSTEMS" EPID: L-2020-TOP-0054

By letter dated August 26, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20246G463), the Pressurized Water Reactor Owners Group (PWROG) transmitted Topical Report (TR) PWROG-20016-P Revision (Rev.) 0, "PWROG - Regulatory Relaxation for PWR Loose-Part-Detection Systems" for NRC review and approval.

BACKGROUND

In Section 1.3 the TR states that:

> The objective of this PWR topical report is to generically justify the elimination of the licensing basis requirement for the Loose Parts Detection System (LPDS) in accordance with RG 1.133. This topical report will facilitate participating PWROG licensees in eliminating the licensing basis requirements for the LPDS with minimal need for plant-specific NRC reviews. This approach minimizes the resource demand on the licensee for developing site-specific justifications and also on the NRC for conducting numerous regulatory reviews.
>
> For plants that have requirements for the LPDS in Technical Specifications, relocation to a licensee controlled document or plant-specific license amendments will be required to remove LPDS from their licensing basis. Licensees who have relocated the LPDS Technical Specification to a licensee controlled document can eliminate it from their Licensing Basis via 10 CFR 50.59. If the LPDS is also identified as an NRC commitment by the licensee, the commitment change process can be used to change the NRC commitment. Each licensee must consider its licensing basis in whole as provided in the licensing basis documentation and plant specific configurations involving the LPDS when making this change.

The PWROG conducted an industry survey in May 2019 obtaining information on the reliability and maintenance costs associated with a LPDS and confirming how the plants committed to the requirements in Regulatory Guide (RG) 1.133, Revision 1, "Loose-Part Detection Program for the Primary System of Light-water-cooled Reactors" (RG 1.133). The survey also addresses what types of Foreign Material Exclusion (FME) programs, procedures and guidelines that are currently in place to avoid or mitigate damage to safety-related primary system components and fuel assemblies.

After reviewing TR PWROG-20016, Rev. 0 the NRC staff has determined that following additional information is needed to complete its review:

REGULATORY BASES

The information requested below is based on the guidance contained RG 1.133 which references Title10 Code of Federal Regulation Part 50 (10 CFR 50), Appendix A, Criterion 13, Instrumentation and Controls; 10 CFR 50.36, Technical Specifications; and 10 CFR 20, paragraph 20.1(c), Standards for Protection Against Radiation as the bases for the RG.

REQUESTS FOR ADDITIONAL INFORMATION (RAI)

RAI 01 - Section 1.3 of TR - 10 CFR 50.59 Evaluation

PWR plants with LPDS as part of their licensing basis should ensure that they address the alternate means described in the report to ensure that the existing licensing basis is met without taking credit for LPDS.

The TR suggests that plants with LPDS in their technical specifications will address this issue by using the license amendment request (LAR) process and the plants with LPDS in other licensing documents can use the 10 CFR 50.59 process. However, there is potentially conflicting information in Section 1.3 of the TR which in part reads, "This topical report and the NRC Safety Evaluation (SE) will provide consistency in the justification that licensees include in the 10 CFR 50.59 Evaluation, if needed, and justifying a change to an NRC commitment to remove the LPDS from the plant licensing basis or directly from their plant's technical specifications is not safety significant."

a. Confirm that licensees will make changes to technical specifications using the LAR process per 10 CFR 50.59(c)(1)(i) and this TR as a supporting basis. Similarly, clarify how the approved TR will be used to address the criteria of 10 CFR 50.59

RAI 02 – Survey Data in Appendices A and B

The TR, in part, states, "PWROG licensees in eliminating the licensing basis requirements for the LPDS with minimal need for plant-specific NRC reviews. This approach minimizes the resource demand on the licensee for developing site-specific justifications and also on the NRC for conducting numerous regulatory reviews." The results of this industry survey provide the primary technical basis for the conclusions reached in the topical report regarding the removal of commitments for maintaining a LPDS within the plant licensing basis. The TR [and the survey of Appendices A and B] indicates significant variations among the programs used for foreign material exclusion, visual inspections, noise evaluation processes, chemistry tests, and radiation motoring programs.

a. Describe the process for each licensee to evaluate and apply the technical basis in the TR to remove LPDS from its site-specific licensing basis.

b. Describe whether a list of alternate systems and/or minimum requirements are needed to demonstrate that the TR provides a sufficient basis to remove the LPDS.

c. Describe supporting information or analysis that would be provided in a LAR referencing the topical report for removal of the LPDS. This information is needed to understand the scope of applicability of an NRC approved topical report and ensure consistent application of the topical report is achieved in subsequent licensing actions.

Program Management Office
1000 Westinghouse Drive, Suite 172
Cranberry Township, PA 16066

PWROG-20016-P/NP, Revision 0
Docket 99902037
Project 694

February 22, 2021

OG-21-47

U.S. Nuclear Regulatory Commission
Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

Subject: PWR Owners Group
Transmittal of the Response to Request for Additional Information Associated with PWROG-20016-P/NP, Revision 0, "Regulatory Relaxation for PWR Loose-Part-Detection Systems" (PA-LSC-1612 R0)

References:

1. Letter OG-20-215, Submittal of Topical Report PWROG-20016-P/NP, Revision 0, "Regulatory Relaxation for PWR Loose-Part-Detection Systems", dated August 26, 2020

2. Email from the NRC (Fields) to the PWROG (Holderbaum), Request for Additional Information for Topical Report, PWROG-20016-P, dated December 14, 2020

On August 26, 2020, in accordance with the Nuclear Regulatory Commission (NRC) Topical Report (TR) program for review and acceptance, the Pressurized Water Reactor Owners Group (PWROG) requested formal NRC review and approval of PWROG-20016-P & NP, Revision 0 for referencing in regulatory actions (Reference 1). The NRC Staff has determined that additional information is needed to complete the review per the email dated December 14, 2020 (Reference 2).

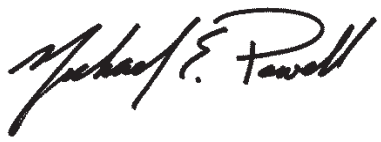
Enclosure 1 to this letter provides formal responses to NRC RAIs 1-2 (Reference 2) associated with PWROG-20016-P/NP, Revision 0, "Regulatory Relaxation for PWR Loose-Part-Detection Systems."

Correspondence related to this transmittal should be addressed to:

Mr. W. Anthony Nowinowski, Executive Director
PWR Owners Group, Program Management Office
Westinghouse Electric Company
1000 Westinghouse Drive
Cranberry Township, PA 16066

If you have any questions, please do not hesitate to contact me at (434) 832-2382 or Mr. W. Anthony Nowinowski, Program Manager of the PWR Owners Group, Program Management Office at (412) 374-6855.

Sincerely yours,



Michael Powell
Chief Operating Officer & Chairman
Pressurized Water Reactor Owners Group

MP:CMH:am

Enclosure 1: ANP-3851Q1, Revision 0 (non-proprietary), Framatome Response to RAIs on PWROG-20016 "Regulatory Relaxation for PWR Loose-Part-Detection Systems" (PA-LSC-1612)

cc: D. Page-Blair, Framatome
P. Opsal, Framatome
G. Peters, Framatome
P. Brocheny, Framatome
L. Fields, US NRC
J. Andrachek, Westinghouse
J. Moorehead, Westinghouse
PWROG Licensing Committee

framatome

Response to RAIs on PWROG-20016 “Regulatory Relaxation for PWR Loose-Part-Detection Systems” (PA-LSC-1612)

ANP-3851Q1
Revision 0

Topical Report

February 2021

Nature of Changes

Item	Section(s) or Page(s)	Description and Justification
1	All	Initial Issue

Contents

Nomenclature

Acronym	Definition
LAR	License Amendment Request
LPDS	Loose-Part Detection System
NRC	U.S. Nuclear Regulatory Commission
PWR	Pressurized Water Reactor
PWROG	Pressurized Water Reactor Owners Group
SE	Safety Evaluation
TR	Topical Report
TS	Technical Specification(s)
UFSAR	Updated Final Safety Analysis Report

1.0 INTRODUCTION

By letter dated August 26, 2020, the Pressurized Water Reactor Owners Group (PWROG) transmitted Topical Report (TR) PWROG-20016-P, Revision 0, “PWROG - Regulatory Relaxation for PWR Loose-Part-Detection Systems” for NRC review and approval. The U.S. Nuclear Regulatory Commission (NRC) staff has determined that additional information is needed to complete its review.

This report contains the Framatome response to RAI 1 and RAI 2 submitted il
o t NR i l s to t P RO ol u , R u st o A itio l
l o tio o To i l R o t, P RO -20016-P, t 14, 2020.

2.0 RAI 1

QUESTION:

Section 1.3 of TR - 10 CFR 50.59 Evaluation:

PWR plants with LPDS as part of their licensing basis should ensure that they address the alternate means described in the report to ensure that the existing licensing basis is met without taking credit for LPDS.

The TR suggests that plants with LPDS in their technical specifications will address this issue by using the license amendment request (LAR) process and the plants with LPDS in other licensing documents can use the 10 CFR 50.59 process. However, there is potentially conflicting information in Section 1.3 of the TR which in part reads, “This topical report and the NRC Safety Evaluation (SE) will provide consistency in the justification that licensees include in the 10 CFR 50.59 Evaluation, if needed, and justifying a change to an NRC commitment to remove the LPDS from the plant licensing basis or directly from their plant’s technical specifications is not safety significant.”

a. Confirm that licensees will make changes to technical specifications using the LAR process per 10 CFR 50.59(c)(1)(i) and this TR as a supporting basis.

   Similarly, clarify how the approved TR will be used to address the criteria of 10 CFR 50.59

RESPONSE:

Response to the First Part of RAI 01.a.:

If the Loose-Part Detection System (LPDS) is contained in a licensee’s Technical Specification (TS), a license amendment request will be submitted in accordance with 10 CFR 50.90 to relocate the LPDS TS, to a licensee controlled document. After NRC approval of the amendment to relocate the LPDS TS to a licensee controlled document, the removal of the LPDS from the licensing basis will be evaluated in accordance with 10 CFR 50.59.

Response to the Second Part of RAI 01.a.:

The NRC approved TR will be referenced in the plant specific 10 CFR 50.59 that will be performed to remove the LPDS from the plant’s licensing basis. The plant specific 10 CFR 50.59 will discuss the current licensing basis for the LPDS, e.g., the Updated Final Safety Analysis Report (UFSAR) and licensee controlled document that contains the LPDS, the NRC approved TR, and the alternate means for detecting a loose part.

Section 1.3, “Objective,” of the TR will be revised as shown in Attachment 2 to this letter to reflect these RAI responses. The NRC approved version of the TR that will be issued after the Final Safety Evaluation is issued, will include these changes.

3.0 RAI 2

QUESTION:

Survey Data in Appendices A and B:

The TR, in part, states, “PWROG licensees in eliminating the licensing basis requirements for the LPDS with minimal need for plant-specific NRC reviews. This approach minimizes the resource demand on the licensee for developing site-specific justifications and also on the NRC for conducting numerous regulatory reviews.” The results of this industry survey provide the primary technical basis for the conclusions reached in the topical report regarding the removal of commitments for maintaining a LPDS within the plant licensing basis. The TR (and the survey of Appendices A and B) indicates significant variations among the programs used for foreign material exclusion, visual inspections, noise evaluation processes, chemistry tests, and radiation motoring programs.

a. Describe the process for each licensee to evaluate and apply the technical basis in the TR to remove LPDS from its site-specific licensing basis.

b. Describe whether a list of alternate systems and/or minimum requirements are needed to demonstrate that the TR provides a sufficient basis to remove the LPDS.

c. Describe supporting information or analysis that would be provided in a LAR referencing the topical report for removal of the LPDS. This information is needed to understand the scope of applicability of an NRC approved topical report and ensure consistent application of the topical report is achieved in subsequent licensing actions.

RESPONSE:

Response to RAI 02.a.:

As discussed in response to the Second Part to RAI 01 a., above, the NRC approved TR will be referenced in the plant specific 10 CFR 50.59 that will be performed to remove the LPDS from the plant’s licensing basis. The plant specific 10 CFR 50.59 will discuss the current licensing basis for the LPDS, the NRC approved TR, and the alternate means for detecting a loose part.

Response to RAI 02.b.:

Since the alternate means at each plant are different, there is not a minimum list of alternate systems and/or minimum requirements. Therefore, alternate means to detect a loose part will be discussed in the plant specific 10 CFR 50.59 that will be prepared to remove the LPDS from the plant’s licensing basis.

Response to RAI 02.c.:

No supporting information or analysis will be included in a license amendment request to relocate the LPDS out of the TS to a licensee controlled document, nor will the TR be referenced in the license amendment request.

The justification for relocating the LPDS out of the TS is that it does not satisfy the criteria of 10 CFR 50.36(c)(2)(ii). Thus, the LPDS is not contained in the Standard Technical Specifications (NUREGs- 1430, 1431, and 1432).

4.0 CHANGES

The following page shows changes to the report PWROG-20016 “PWROG - Regulatory Relaxation for PWR Loose-Part-Detection Systems” that will be incorporated into the approved version of the report once the SE is received. These changes provide clarity consistent with the RAI responses provided in Section 2 and Section 3.

1.3 OBJECTIVE

The objective of this ~~PWR~~ topical report is to ~~generically~~ justify the elimination of the licensing basis requirement for the LPDS that is discussed in ~~accordance with~~ RG 1.133. ~~This topical report will facilitate participating PWROG l~~Licensees ~~in eliminating~~will reference this topical report in the 10 CFR 50.59 that is prepared to remove the LPDS from the plant’s licensing basis ~~requirements for the LPDS with minimal need for plant-specific NRC reviews. This approach minimizes the resource demand on the licensee for developing site-specific justifications and also on the NRC for conducting numerous regulatory reviews~~.

~~For plants that have requirements for the LPDS in Technical Specifications, relocation to a licensee controlled document or plant-specific license amendments will be required to remove LPDS from their licensing basis. Licensees who have relocated the LPDS Technical Specification to a licensee controlled document can eliminate it from their Licensing Basis via 10CFR50.59. If the LPDS is also identified as an NRC commitment by the licensee, the commitment change process can be used to change the NRC commitment. Each licensee must consider its licensing basis in whole as provided in the licensing basis documentation and plant specific configurations involving the LPDS when making this change.~~

~~This topical report and the NRC Safety Evaluation (SE) will provide consistency in the justification that licensees include in the 10CFR50.59 Evaluation, if needed, and justifying a change to an NRC commitment to remove the LPDS from the plant licensing basis or directly from their plant’s Technical Specifications is not safety significant.~~

If the LPDS is contained in a licensee’s TS, a license amendment request will be submitted in accordance with 10 CFR 50.90 to relocate the LPDS TS, to a licensee controlled document. After NRC approval of the amendment to relocate the LPDS TS to a licensee controlled document, the removal of the LPDS from the licensing basis will be evaluated in accordance with 10 CFR 50.59.