UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 30, 2018

Ms. Cheryl A. Gayheart
Regulatory Affairs Director
Southern Nuclear Operating Company, Inc.
3535 Colonnade Parkway
Birmingham, AL 35243

SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2; EDWIN I. HATCH NUCLEAR PLANT, UNITS 1 AND 2 – PROPOSED INSERVICE INSPECTION ALTERNATIVE GEN-ISI-ALT-2017-03, CODE CASE N-513-4 FOR MODERATE PRESSURE (EPID L-2018-LLR-0069)

Dear Ms. Gayheart:

By letter dated April 6, 2018 (Agencywide Documents Access and Management System Accession No. ML18096B554), Southern Nuclear Operating Company (the licensee), requested approval of an alternative to the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) Section XI, for the Joseph M. Farley, Units 1 and 2, (FNP) and Edwin I. Hatch Nuclear Plant, Units 1 and 2 (HNP). The proposed alternative would allow the licensee to use ASME Code Case N-513-4, "Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping Section XI, Division 1," for the evaluation and temporary acceptance of flaws in moderate energy Class 2 and 3 piping in lieu of specified ASME Code requirements for the fifth 10-year inservice inspection (ISI) interval.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Paragraph 50.55a(z)(2), the licensee requested to use the proposed alternative, GEN-ISI-ALT-2017-03, on the basis that compliance with the specified ASME Code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality of safety.

The U.S. Nuclear Regulatory Commission (NRC) staff has completed its review of alternative GEN-ISI-ALT-2017-03. As set forth in the enclosed safety evaluation, the NRC staff has determined that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(2). Accordingly, the NRC staff concludes that complying with the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Therefore, the NRC staff authorizes the use of alternative GEN-ISI-ALT-2017-03 at FNP, Units 1 and 2, and HNP, Units 1 and 2, for the remainder of each plant's fifth 10-year ISI interval or until such time as the NRC approves Code Case N-513-4 for general use through revision of NRC Regulatory Guide (RG) 1.147. If the proposed alternative is applied to a flaw near the end of the authorized 10-year ISI interval, and the next refueling outage is in the subsequent interval, the licensee is authorized to continue to apply the proposed alternative to the flaw until the next refueling outage.

All other requirements of ASME Code, Section XI, for which relief has not been specifically requested and approved in this request remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

SNC's letter dated April 6, 2018, also included a separate relief request to use proposed alternative HNP-ISI-ALT-05-07 for HNP, Units 1 and 2. Alternative HNP-ISI-ALT-05-07 was approved in NRC letter dated October 18, 2018.

If you have any questions, please contact the Project Manager, Shawn Williams, at 301-415-1009 or by e-mail at Shawn.Williams@nrc.gov.

Sincerely,

Michael T. Markley, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-348, 50-364
50-321, 50-366

Enclosure:
Safety Evaluation

cc: Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

PROPOSED ALTERNATIVE GEN-ISI-ALT-2017-03

USE OF ASME CODE CASE N-513-4

SOUTHERN NUCLEAR OPERATING COMPANY

JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2

EDWIN I. HATCH NUCLEAR POWER PLANT, UNITS 1 AND 2

DOCKET NOS. 50-321, 50-348, 50-366, AND 50-364

1.0 INTRODUCTION

By application dated April 6, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18096B554), Southern Nuclear Operating Company (SNC, the licensee), submitted a request for a proposed alternative to the requirements of Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) at Joseph M. Farley, Units 1 and 2, (FNP) and Edwin I. Hatch Nuclear Plant, Units 1 and 2 (HNP). The proposed alternative would allow the licensee to use ASME Code Case N-513-4, "Evaluation Criteria for Temporary Acceptance of Flaws in Moderate Energy Class 2 or 3 Piping Section XI, Division 1," for the evaluation and temporary acceptance of flaws in moderate energy Class 2 and 3 piping in lieu of specified ASME Code requirements for the fifth 10-year inservice inspection (ISI) interval.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Paragraph 50.55a(z)(2), the licensee requested to use the alternative on the basis that complying with the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

2.0 REGULATORY EVALUATION

The licensee proposes an alternative to the requirement of ASME Code, Section XI, Articles IWC-3000 and IWD-3000.

Adherence to Section XI of the ASME Code is mandated by 10 CFR 50.55a(g)(4), which states, in part:

> Throughout the service life of a boiling or pressurized water-cooled nuclear power facility, components (including supports) that are classified as ASME Code Class 1, Class 2, and Class 3 must meet the requirements, except design and access provisions and preservice examination requirements, set forth in Section XI, ... to the extent practical within the limitations of design, geometry, and materials of construction of the components.

Pursuant to 10 CFR 50.55a(z), alternatives to the requirements of paragraphs (b) through (h) of this section may be used when authorized by the Director, Office of Nuclear Reactor Regulation. A proposed alternative must be submitted and authorized prior to implementation. The licensee must demonstrate (1) the proposed alternative would provide an acceptable level of quality and safety; or (2) compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

ASME Code Case N-513, Revision 3 (Code Case N-513-3) is approved for generic use by licensees in NRC Regulatory Guide (RG) 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," Revision 18 (ADAMS Accession No. ML16321A336), with one condition. This RG is incorporated into NRC regulations by reference in 10 CFR 50.55a. Code Case N-513 provides criteria, which allows licensees to temporarily accept flaws, including through-wall flaws, in moderate energy Class 2 or 3 piping without performing repair or replacement activities. Code Case N-513-4 contains several revisions including expanding the applicability of the code case beyond straight pipe to include elbows, bent pipe, reducers, expanders, and branch tees. Code Case N-513-4 has not been approved by the NRC for generic use by licensees.

Based on the above, and subject to the following technical evaluation, the NRC staff finds that regulatory authority exists for the licensee to request the use of an alternative and the NRC to authorize the proposed alternative.

3.0 TECHNICAL EVALUATION

3.1 The Licensee's Request for Alternative

3.1.1 ASME Code Components Affected

The affected components are ASME Code Class 2 and 3 moderate energy piping systems, as described in Code Case N-513-4, Section 1, "Scope," whose maximum operating temperature does not exceed 200 degrees Fahrenheit (°F) and whose operating pressure does not exceed 275 pounds per square inch gauge (psig).

3.1.2 Applicable Code Editions and Addenda

The licensee provided the applicable ASME Code editions and Addenda for each plant as shown in the table below. In addition, the table shows the applicable ISI 10-year intervals, including the start and end dates.

PLANT	ISI INTERVAL	ASME CODE EDITION	START	END
Edwin I. Hatch Nuclear Plant, Units 1 and 2	5th	2007 Edition through 2008 Addenda	01/01/2016	12/31/2025
Joseph M. Farley Nuclear Plant, Units 1 and 2	5th	2007 Edition through 2008 Addenda	12/1/2017	11/30/2027

3.1.3 Applicable Code Requirement

For ASME Code Class 2 components, Subarticles IWC-3120 and IWC-3130 of ASME Code, Section XI, require that flaws exceeding the specified acceptance standards be corrected by repair or replacement activities or determined to be acceptable by analytical evaluation. For ASME Code Class 3 components, Paragraph IWD-3120(b) of ASME Code, Section XI, requires that components containing flaws exceeding the acceptance standards of IWD-3400 be subject to supplemental examination, or to a repair or replacement activity.

3.1.4 Reason for Request

The licensee stated that performing an ASME Code repair of moderately degraded piping could require a plant shutdown within the required action statement timeframes. In addition, the licensee stated that plant shutdown activities result in additional radiological dose and plant risk that would be inappropriate when a degraded condition is demonstrated to retain adequate margin to complete the component's function. The licensee contends that compliance with the current code requirements results in a hardship without a compensating increase in the level of quality and safety.

The licensee's proposed alternative, to use Code Case N-513-4, would allow temporary acceptance of flaws in components currently not addressed in Code Case N-513-3, such as elbows, bent pipe, reducers, expanders, branch tees, and heat exchanger tubing.

3.1.5 Licensee's Proposed Alternative and Basis for Use

The licensee's proposed alternative is to use ASME Code Case N-513-4 for the evaluation and temporary acceptance of flaws, including through-wall flaws, in moderate energy Class 2 and 3 piping in lieu of specified ASME Code, Section XI requirements. The licensee's proposed alternative permits the temporary acceptance of flaws, meeting the requirements of the code case, until the next scheduled refueling outage or prior to exceeding the allowable flaw size (whichever comes first), at which time an ASME Code, Section XI compliant repair or replacement will be completed. In addition, the licensee's proposed alternative includes the determination of an allowable leakage rate by dividing the critical leakage rate by a safety factor of four.

The licensee stated that the limitations in Code Case N-513-3, related to its use on piping components, such as elbows, bent pipe, reducers, expanders, branch tees, and external tubing or piping attached to heat exchangers, have been addressed in Code Case N-513-4. The licensee provided a high level overview of the differences between Code Case N-513-3 and Code Case N-513-4 in its application, listed below:

1. Revised the maximum allowable time of use from no longer than 26 months to the next refueling outage.

2. Added applicability to piping elbows, bent pipe, reducers, expanders, and branch tees where the flaw is located more than $(R_0t)^{1/2}$ from the centerline of the attaching circumferential piping weld (R_0 is the outside pipe radius and 't' is the evaluation wall thickness surrounding the degraded area).

3. Expanded use to external tubing or piping attached to heat exchangers.

4. Revised to limit the use to liquid systems.

5. Revised to clarify treatment of service level load combinations.

6. Revised to address treatment of flaws in austenitic pipe flux welds.

7. Revised to require minimum wall thickness acceptance criteria to consider longitudinal stress in addition to hoop stress.

8. Other minor editorial changes to improve the clarity of the code case.

The licensee referenced technical basis document, "Technical Basis for Proposed Fourth Revision to ASME Code Case N-513," from the *Proceedings of the ASME 2014 Pressure Vessels & Piping Conference,* July 20-24, 2014, Anaheim, California. This document was submitted to the NRC as part of another licensee's alternative to use Code Case N-513-4 (ADAMS Accession No. ML16029A003).

The licensee stated that the effects of leakage may impact the operability determination or the plant flooding analyses specified in paragraph 1(f) of Code Case N-513-4. For a leaking flaw, the licensee will determine the allowable leakage rate by dividing the critical leakage rate by a safety factor of four (4). The critical leakage rate is determined as the lowest leakage rate that can be tolerated and may be based on the allowable loss of inventory or the maximum leakage that can be tolerated relative to room flooding, among others.

The licensee contends that the proposed allowable leakage rate provides quantitative measurable limits, which ensure the operability of the system and early identification of issues that could erode defense-in-depth and lead to adverse consequences.

The licensee stated that Code Case N-513-4 utilizes technical evaluation approaches that are based on principals that are accepted in other Code documents already acceptable to the NRC. The licensee contends that the application of Code Case N-513-4, in concert with safety factors on leakage limits, will maintain acceptable structural and leakage integrity while minimizing plant risk and personnel exposure by minimizing the number of plant transients that could be incurred if degradation is required to be repaired based on ASME Section XI acceptance criteria only.

3.1.6 Hardship Justification

The licensee stated that performing an ASME Code repair of moderately degraded piping could require a plant shutdown within the required action statement timeframes. Plant shutdown activities result in additional radiological dose and plant risk that would be inappropriate when a degraded condition is demonstrated to retain adequate margin to complete the component's function. The licensee stated that the use of an acceptable alternative analysis method in lieu of immediate action for a degraded condition will allow it to perform additional extent of condition examinations on the affected systems while allowing time for safe and orderly long term repair

actions if necessary. Actions to remove degraded piping from service could have a detrimental overall risk impact by requiring a plant shutdown, thus requiring use of a system that is in standby during normal operation. The licensee contends that compliance with the current code requirements results in a hardship without a compensating increase in the level of quality and safety.

3.1.7 Duration of Proposed Alternative

The licensee requested use of the proposed alternative for the ISI intervals for each unit, as stated in Section 3.1.2 above, or until such time as the NRC approves Code Case N-513-4 in RG 1.147 or other document. The licensee stated that when using its proposed alternative, a Section XI compliant repair or replacement will be completed prior to exceeding the next refueling outage or allowable flaw size, whichever comes first. The licensee stated that if a flaw is evaluated near the end of an ISI interval, and the next refueling outage is in the subsequent interval, the flaw may remain in service until the next refueling outage.

3.2 NRC Staff Evaluation

The NRC staff evaluated the adequacy of the proposed alternative in maintaining the structural integrity of piping components identified in Code Case N-513-4. Code Case N-513-3, which is conditionally approved for use in RG 1.147, Revision 18, provides alternative evaluation criteria for temporary acceptance of flaws, including through-wall flaws, in moderate energy Class 2 and 3 piping. However, Code Case N-513-3 contains limitations that the licensee considers restrictive and could result in an ASME Code repair that leads to an unnecessary plant shutdown. Code Case N-513-3 is limited to straight pipe with provisions for flaws that extend for a short distance, at the pipe to fitting weld, into the fitting. Evaluation criteria for flaws in elbows, bent pipe, reducers, expanders, branch tees and heat exchangers are not included within the scope of N-513-3. Code Case N-513-4 addresses these aforementioned limitations. Given that Code Case N-513-3 is conditionally approved for use in RG 1.147, Revision 18, which is incorporated by reference in 10 CFR 50.55a, the staff focused its review on the differences between Code Case N-513-3 and N-513-4.

The significant changes in N-513-4 include: (1) revised temporary acceptance period; (2) added flaw evaluation criteria for elbows, bent pipe, reducers/expanders and branch tees; (3) expanded applicability to heat exchanger tubing or piping; (4) limited use to liquid systems; (5) clarified treatment of service load combinations; (6) revised treatment of flaws in austenitic pipe flux welds; (7) revised minimum wall thickness acceptance criteria to consider longitudinal stress in addition to hoop stress; and (8) revised leakage monitoring requirements. The NRC staff also evaluated the licensee's proposed limitation on the leakage rate and its hardship justification.

The NRC staff notes that many requirements specified in Code Case N-513-4 are not discussed in this safety evaluation, but they should not be considered as less important. As part of the NRC-approved proposed alternative, all requirements in the code case must be followed. Any exceptions or restrictions to the code case that are approved in this safety evaluation also must be followed.

3.2.1 Temporary Acceptance Period

Code Case N-513-3 specifies a temporary acceptance period of a maximum of 26 months. Code Case N-513-3 is accepted for use in RG 1.147, Revision 18, with the following condition:

The repair or replacement activity temporarily deferred under the provisions of this Code Case shall be performed during the next scheduled outage.

Code Case N-513-4 includes wording that limits the use of the code case to the next refueling outage. The NRC staff finds that Code Case N-513-4 appropriately addresses the NRC condition on Code Case N-513-3, and, therefore, is acceptable.

3.2.2 Flaw Evaluation Criteria for Elbows, Bent Pipe, Reducers/Expanders and Branch Tees

Evaluation and acceptance criteria have been added to Code Case N-513-4 for flaws in elbows, bent pipe, reducers, expanders and branch tees using a simplified approach, which is based on the Second International Piping Integrity Research Group (IPIRG-2) program reported in NUREG/CR-6444, BMI-2192, "Fracture Behavior of Circumferentially Surface-Cracked Elbows," published December 1996.

The flaw evaluation methodology approach in Code Case N-513-4 for piping components is conducted as if in straight pipe by scaling hoop and axial stresses using ASME piping design code stress indices and stress intensification factors to account for the stress variations caused by the geometric differences. Equations used in the code case are consistent with the piping design by rule approach in ASME Code Section III, NC/ND-3600. NUREG/CR-6444 shows that this approach is conservative for calculating stresses used in flaw evaluations in piping elbows and bent pipe. The code case also applies this methodology to reducers, expanders and branch tees.

The NRC staff finds that the flaw evaluation and acceptance criteria in Code Case N-513-4 for elbows, bent pipe, reducers, expanders and branch tees is acceptable because the flaw evaluation methods in the code case are consistent with ASME Code Section XI, ASME Code Section III design by rule approach. The flaw evaluation provides a conservative approach as confirmed by comparing the failure moments predicted using this approach to the measured failure moments from the elbow tests for through-wall circumferential flaws conducted as part of the IPIRG-2 program.

3.2.3 Flaw Evaluation in Heat Exchanger Tubing or Piping

Code Case N-513-4 has been revised to include heat exchanger external tubing or piping, provided that the flaw is characterized in accordance with Section 2(a) of the code case and leakage is monitored. Section 2(a) requires that the flaw geometry be characterized by volumetric inspection or physical measurement.

The NRC staff determined that the flaw evaluation criteria in Code Case N-513-4 for straight or bent piping, as appropriate, can be applied to heat exchanger external tubing or piping. The NRC staff determined the methods for evaluating flaws in straight pipe are acceptable since they are currently allowed in Code Case N-513-3. For bent pipe, the acceptability is described in Section 3.2.2 above. Therefore, the NRC staff finds inclusion of heat exchanger external tubing or piping in the code case to be acceptable because only heat exchanger tubing flaws that are accessible for characterization and leakage monitoring may be evaluated in accordance with the code case and the code case provides acceptable methods for the evaluation of flaws.

3.2.4 Limit Use to Liquid Systems

Use of Code Case N-513-4 is specifically limited to liquid systems. The NRC staff finds this change acceptable since Code Case N-513 is not intended to apply to air or other compressible fluid systems.

3.2.5 Treatment of Service Load Combinations

Modifications in Code Case N-513-4 now make clear that all service load combinations must be considered in flaw evaluations to determine the most limiting condition. Although previously implied in Code Case N-513-3, Code Case N-513-4 makes this requirement clear. Therefore, the NRC staff finds this change acceptable.

3.2.6 Treatment of Flaws in Austenitic Pipe Flux Welds

Paragraph 3.1(b) of N-513-4 contains modifications which include a reference to ASME Code Section XI, Appendix C, C-6320, to address flaws in austenitic stainless steel pipe flux welds. The ASME Code, Section XI, Appendix C, C-6000 permits the use of elastic plastic fracture mechanics criteria in lieu of limit load criteria to analyze flaws in stainless steel pipe flux welds. Equation 1 of the code case was also revised to be consistent with ASME Code, Section XI, Appendix C, C-6320, so the equation can be used for flaws in austenitic stainless steel pipe flux welds. The NRC staff finds this acceptable because Code Case N-513-4 includes the appropriate methods for the evaluation of stainless steel pipe flux welds in accordance with ASME Code, Section XI.

3.2.7 Minimum Wall Thickness Acceptance Criteria to Consider Longitudinal Stress

Although it is unlikely that a minimum wall thickness calculated based on the longitudinal stress would be limiting when compared to a minimum wall thickness calculated based on hoop stress, Code Case N-513-4 includes revisions that require consideration of longitudinal stress in the calculation of minimum wall thickness. Previous versions of the code case only required the use of hoop stress. The NRC staff finds this acceptable because it will ensure that the more limiting of the longitudinal or hoop stress is used to determine minimum wall thickness.

3.2.8 Leakage Monitoring for Through-Wall Flaws

Code Case N-513-3 required through-wall leakage to be observed by daily walkdowns to confirm the analysis conditions used in the evaluation remain valid. Code Case N-513-4 modifies this requirement by continuing to require that leakage be monitored daily, but allows other techniques to be used to monitor leakage such as using visual equipment or leakage detection systems to determine if leakage rates are changing. The NRC staff finds this change acceptable because the code case continues to require through-wall leaks to be monitored daily and inspected every 30 days.

3.2.9 Leakage Rate

Code Case N-513-3, Paragraph 1(d) states:

> The provisions of this Case demonstrate the integrity of the item and not the consequences of leakage. It is the responsibility of the Owner to demonstrate system operability considering effects of leakage.

Code Case N-513-4 modified the last sentence, now located in paragraph (f), to state:

> It is the responsibility of the Owner to consider effects of leakage in demonstrating system operability and performing plant flooding analyses.

In its application, the licensee stated that the allowable leakage rate will be determined by dividing the critical leakage rate by a safety factor of four. The licensee contends that applying a safety factor of four to the critical leakage rate provides quantitative measurable limits which ensure the operability of the system and early identification of issues that could erode defense-in-depth and lead to adverse consequences.

Code Cases N-513-3 and N-513-4 do not contain leakage limits for components with through--wall flaws. The NRC staff finds that the licensee's approach of applying a safety factor of four to the critical leakage rate is acceptable because it will provide sufficient time for corrective measures to be taken before significant increases in leakage erodes defense-in-depth, which could lead to adverse consequences.

3.2.10 Hardship Justification

The NRC staff finds that performing a plant shutdown to repair the subject piping would unnecessarily cycle the units, resulting in an increase in personnel exposure and plant risk. Additionally, performing certain ASME Code repairs during normal operation may challenge a Technical Specification Completion Time and place the plant at higher safety risk than warranted. Therefore, the NRC staff determines that compliance with the specified ASME Code repair requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

3.3 Summary

The NRC staff concludes that the proposed alternative will provide reasonable assurance of the structural integrity because: (1) Code Case N-513, Revision 4, addresses the NRC condition in RG 1.147, Revision 18, for Code Case N-513-3; (2) flaw evaluations in component types added to Revision 4 of Code Case N-513 are based on acceptable methodologies; and (3) the method for determining the allowable leakage rate is adequate to provide early identification of a significant increase in leakage. In addition, complying with ASME Code, Section XI requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

4.0 CONCLUSION

As set forth above, the NRC staff determined that the proposed alternative provides reasonable assurance of structural integrity of the subject piping segments, and that complying with IWC-3120, IWC-3130, IWD-3120(b), and IWD-3400 of the ASME Code, Section XI, would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(2).

Therefore, the NRC staff authorizes the use of the proposed alternative described in the licensee's application for the remainder of each plant's fifth 10-year ISI interval, as specified in Section 3.1.2 of this safety evaluation, or until such time as the NRC approves Code Case N-513-4 for general use through revision of NRC RG 1.147. If the proposed alternative is

applied to a flaw near the end of the authorized 10-year ISI interval, and the next refueling outage is in the subsequent interval, the licensee is authorized to continue to apply the proposed alternative to the flaw until the next refueling outage.

The NRC staff notes that approval of this alternative does not imply or infer NRC approval of ASME Code Case N-513-4 for generic use.

All other requirements of the ASME Code, Section XI, for which relief has not been specifically requested and authorized by NRC staff remain applicable, including a third-party review by the Authorized Nuclear In-service Inspector.

Principal Contributor: Robert Davis, NRR

Date: November 30, 2018

SUBJECT: JOSEPH M. FARLEY NUCLEAR PLANT, UNITS 1 AND 2; EDWIN I. HATCH NUCLEAR PLANT, UNITS 1 AND 2 - PROPOSED INSERVICE INSPECTION ALTERNATIVE GEN-ISI-ALT-2017-03, CODE CASE N-513-4 FOR MODERATE PRESSURE (EPID L-2018-LLR-0069) DATED NOVEMBER 30, 2018

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