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LTR-NRC-19-79

December 12, 2019

Subject: Notification of the Potential Existence of Defect Pursuant to 10 CFR Part 21

The following information is provided pursuant to the requirements of 10 CFR Part 21 to report a defect that could lead to a substantial safety hazard (SSH.)

During a 2019 planned outage at a Westinghouse plant, site personnel identified a fractured and dislocated control rod drive mechanism (CRDM) thermal sleeve. The fracture occurred just beneath the worn area of the flange in the full cross-section of the thermal sleeve tube. A stress concentration exists at this transition. Previous operating experience (OE) with thermal sleeve failures did not include a cross-sectional thermal sleeve fracture such as this.

Additional data supplied from the affected plant showed evidence of additional thermal sleeve locations with crack-like indications in the flange collar region (i.e., evidence of degradation but not failure). Although there was no evidence that control rod motion was hindered, Westinghouse is conservatively reporting this condition as having the potential to create a SSH, were it to remain uncorrected.

(i) Name and address of the individual or individuals informing the Commission.

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(ii) Identification of the facility, the activity, or the basic component supplied for such facility or such activity within the United States which fails to comply or contains a defect.

Based on the recent OE where an additional means of mechanical failure has been identified (i.e., fracture, in addition to flange wear) and is not specifically being inspected for, there is a potential that one or more drive rods (basic components) could become jammed by a thermal sleeve flange remnant.

(iii) Identification of the firm constructing the facility or supplying the basic component which fails to comply or contains a defect.

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(iv) Nature of the defect or failure to comply and the safety hazard which is created or could be created by such defect or failure to comply.

Based on new OE provided to Westinghouse, a defect has been identified that is associated with a previously unseen form of thermal sleeve degradation (i.e., mechanical fatigue and fracture that leads to flange separation). Control rod functionality could become adversely impacted not only due to the flange wear reported in LTR-NRC-18-34, but due to the additional coincident fracture and separation of the thermal sleeve tube from its flange. This condition could exist prior to reaching the flange wear criteria established in PWROG-16003-P, Revision 2. The information supplied in PWROG-16003-P, Revision 2 and NSAL-18-1 also does not address this new OE. If no action is taken to monitor and/or correct this condition, an SSH could occur if the insertion of more than one control rod is prevented.

The probability for this to result in a SSH is low given that this is the very first observance of this phenomenon. Westinghouse does not expect that an affected plant would experience two or more stuck control rods during its current operating cycle. Even if multiple stuck control rods were to occur, such an event would be bounded by the licensee's ATWS analysis. Based on known wear conditions and wear rates, plants can safely operate for at least one cycle or until the next opportunity to perform a visual inspection.

(v) The date on which the information of such defect or failure to comply was obtained.

The Westinghouse president was informed of this potential defect on December 12, 2019.

(vi) In the case of a basic component which contains a defect or fails to comply, the number and location of these components in use at, supplied for, being supplied for, or may be supplied for, manufactured, or being manufactured for one or more facilities or activities subject to the regulations in this part.

The potentially affected plants listed below are Westinghouse design plants that:

1. Operate with higher upper head bypass flow conditions, known as "T-cold" head plants, and
2. Operate with thermal sleeves containing a collar (or upper centering pad ring) just below the flange.

Asco 2	Comanche Peak 1	Maanshan 2
Braidwood 1	Comanche Peak 2	Seabrook
Braidwood 2	Doel 4	Sizewell B
Byron 1	Hanbit 1	Tihange 3
Byron 2	Hanbit 2	Vogtle 1
Callaway 1	Kori 3	Vogtle 2
Catawba 1	Kori 4	Wolf Creek
Catawba 2	Maanshan 1	

(vii) The corrective action which has been, is being, or will be taken; the name of the individual or organization responsible for the action; and the length of time that has been or will be taken to complete the action.

A Westinghouse communication will be supplied to affected licensees in early 2020 to inform them that this defect has been reported. The communication will provide updated recommendations concerning future inspection guidance.

(viii) Any advice related to the defect or failure to comply about the facility, activity, or basic component that has been, is being, or will be given to purchasers or licensees.

A Westinghouse communication will be issued to inform affected licensees concerning the new OE and steps that may be taken to monitor and potentially remedy the situation.

(ix) In the case of an early site permit, the entities to whom an early site permit was transferred.

N/A

Camille T. Zozula, Secretary
Westinghouse Safety Review Committee

cc: E. Lenning (NRC, NRR)
Leslie Fields (NRC, NRR)
Dave Rudland (NRC, NRR)