Southern Nuclear

Vogtle Request for Alternative to ASME Section XI and Section III Requirements for Repair of Reactor Vessel Head Penetrations

NRC Pre-submittal Meeting

May 2021

Why Are We Here?

Vogtle will be requesting approval of an Alternative to …

Use the less intrusive generic embedded flaw process (WCAP-15987-P, Rev. 2-P-A) for the repair of vessel head penetrations which has been approved by the NRC, as opposed to the defect removal requirements of ASME Section XI and Section III.

Key Goals for This Meeting:

- ✓ Brief NRC on Alternative, the Basis for the Alternative, and Proposed Timeline
- ✓ Ensure Common Understanding of Vogtle Request, Technical Scope and Regulatory Expectations
- ✓ Obtain Feedback Prior to Formal Submittal

We appreciate your participation and feedback

Vogtle Alternative for Reactor Vessel Head Penetration Repairs

Background:

Affected components: Vogtle Unit 1 and 2 Class 1 Reactor Vessel Head Penetrations and J-groove welds

An alternative from the following requirements is requested:

- ASME Section XI, IWA-4000 requirements.
- ASME Section III, NB-4131, NB-2538, and NB-2539 to eliminate and repair defects in materials.
- ASME Section III, NB-4450, NB-5340, and NB-5350 to eliminate and repair defects in weld metal.

Proposed Alternative:

Use the less intrusive embedded flaw process (WCAP-15987-P, Rev. 2-P-A) for the repair of vessel head penetrations which has been approved by the NRC, as opposed to the defect removal requirements of ASME Section XI and Section III.

- 12 Month Review Requested

Vogtle Alternative for Reactor Vessel Head Penetration Repairs

Reason for Request:

Southern Nuclear Operating Company, (SNC) will conduct examinations of the reactor Vessel Head Penetrations (VHPs) in accordance with Code Case N-729-6, as amended by 10 CFR 50.55a. Flaw indications that require repair may be found on the VHP tube material and/or the J-groove attachment weld(s) on the underside of the reactor vessel head.

Proposed Alternative:

The repairs will be consistent with approved WCAP-15987-P, Rev. 2-P-A, which the NRC staff has approved for seal weld repairs of circumferential and axial cracks in the VHP nozzle ID at or above the j-groove weld, in the VHP nozzle ID and OD below the j-groove weld, and in the j-groove.

Vogtle Alternative for Reactor Vessel Head Penetration Repairs

Basis:

The embedded flaw repair technique involves deposition of Alloy 52 weld metal to isolate existing flaws and the susceptible materials from the primary water environment.

As discussed in WCAP-15987-P, the embedded flaw repair technique is considered a permanent repair. As long as a Primary Water Stress Corrosion Crack (PWSCC) remains isolated from the primary water (PW) environment, it cannot propagate. Since Alloy 52 weldment is resistant to PWSCC, a new PWSCC crack will not initiate and grow through the Alloy 52 overlay to permit the PW environment to contact the susceptible material.

Vogtle Alternative for Reactor Vessel Head Penetration Repairs

Basis for Request (continued):

In order to provide reasonable assurance that the embedded flaw repairs at VEGP will continue to perform their design function, a combination of volumetric and surface examinations will continue to be performed.

As a part of the submittal, Vogtle will provide a plant specific analysis to support the request for alternative.

Vogtle Alternative for Reactor Vessel Head Penetration Repairs

Precedent:

Requests to use the embedded flaw technique to repair cracks on the OD of VHPs as well as to repair flaws in the J-groove attachment welds of VHPs have been previously approved by the NRC on a plant specific basis.

- Braidwood, Units 1 and 2 (ML18284A445 / ML19155A060)
- Byron, Units 1 and 2 (ML16229A250 / ML17062A428)
- Beaver Valley, Unit 2 (ML15273A066 / ML16190A133)

Vogtle Alternative for Reactor Vessel Head Penetration Repairs

Duration of Alternative:

The duration of the proposed alternative is for the remainder of the renewed operating license (60 years).

Target Submittal:

August 2021

Requested Approval:

September 2022

What Feedback Do You Have?