

## Weld Accessibility for Inservice Inspections

### **Issue**

The staff wrote several RAIs regarding accessibility of welds to perform ISI. Staff believes that all Class 1 and 2 welds that require volumetric inspection, per ASME Code, Section XI, should be designed in a manner that facilitates PDI qualified UT examinations. The ESBWR applicant has indicated that all components will be assessable from one side to perform UT examinations, which makes ferritic welds a nonissue given that PDI procedures exist that allow one-sided examinations. PDI qualified procedures do not exist for one sided austenitic weld (i.e. austenitic to austenitic and dissimilar metal welds) examinations. ASME Code and 10 CFR 50.55a do not preclude the use of radiography (RT) to perform ISI.

The staff has the following concerns:

1. RT is not the preferred method to detect stress corrosion cracking (ISI).
2. Some welds may be in portions of systems that are difficult to drain, making RT impractical to perform, thus requiring licensees to request relief from performing examinations. All welds must be designed to allow for inspection. Choosing an inspection method for PSI that will be impractical to perform after the plant goes into operation is unacceptable.
3. GE-H has not identified the quantity of welds or the weld locations where the above conditions may exist.
4. The staff has not been informed of the criteria that will be used to determine if piping and components are redesigned to facilitate UT inspections.

## Background

RAI 5.2-62 (May 22, 2007; ADAMS ML071410310)

*This RAI supercedes RAIs 6.6-1, 6.6-2, 6.6-3, 6.6-4, 5.2-51, 5.2-53, 5.2-54 5.2-57, and 5.2-58. The staff requests that the applicant modify the DCD (1) to specify the inspection methods that are practical to use for inservice inspection (ISI) of welds in ASME Boiler and Pressure Vessel (B&PV) Code Class 1 and 2 austenitic and dissimilar metal welds, and (2) to add COL action items to Sections 5.2.4 and 6.6 for COL applicants to ensure that a COL applicant referencing the ESBWR will provide a detailed description of its plans to incorporate, during design and construction, access to piping systems to enable nondestructive examinations (NDE) of such welds during ISI.*

*By way of background, the staff understands that materials selected for use in ESBWR ASME B&PV Code Class 1 and 2 austenitic and dissimilar metal welds are not expected to encounter stress corrosion cracking or appreciable amounts of other forms of degradation based on currently available information. However, the staff notes that stress corrosion cracking was not expected in previously built PWRs and BWRs based on information that was available at the time of their licensing and construction. Accordingly, the staff considers that the design of components should include provisions to enable NDE to detect future component degradation, such as stress corrosion cracking. This is a critical attribute of any new reactor design.*

*The ASME B&PV Code, Section XI, as incorporated into 10 CFR 50.55a(g), currently allows for either ultrasonic or radiographic examination of welds in Code Class 1 and 2 piping systems. Please modify the DCD in Tier 1 to state that one or both of these types of examination is practical for ISI of austenitic and dissimilar metal welds. The staff notes that ultrasonic examination has advantages with respect to ALARA considerations, and with this change to the DCD, any design certification rule that might be issued for the ESBWR will preclude the granting of relief under 10 CFR 50.55a(g)(6) for ISI of such welds. Please confirm that austenitic or dissimilar metal welds in Class 1 and 2 piping systems will be accessible for examination by either ultrasonic or radiographic examination to satisfy § 50.55a(g)(3).*

*In support of these DCD changes, a COL applicant referencing the ESBWR design certification application should inform the staff of how it plans to meet all access requirements during construction and operation as required by 10 CFR 50.55a(g)(3)(i) and (ii). The staff notes that the preservice inspection (PSI) requirements are known at the time a component is ordered, and 10 CFR 50.55a(g) does not contain provisions for consideration of relief requests for impractical examination during the construction phases of the component. The COL action items requested above should reflect these considerations.*