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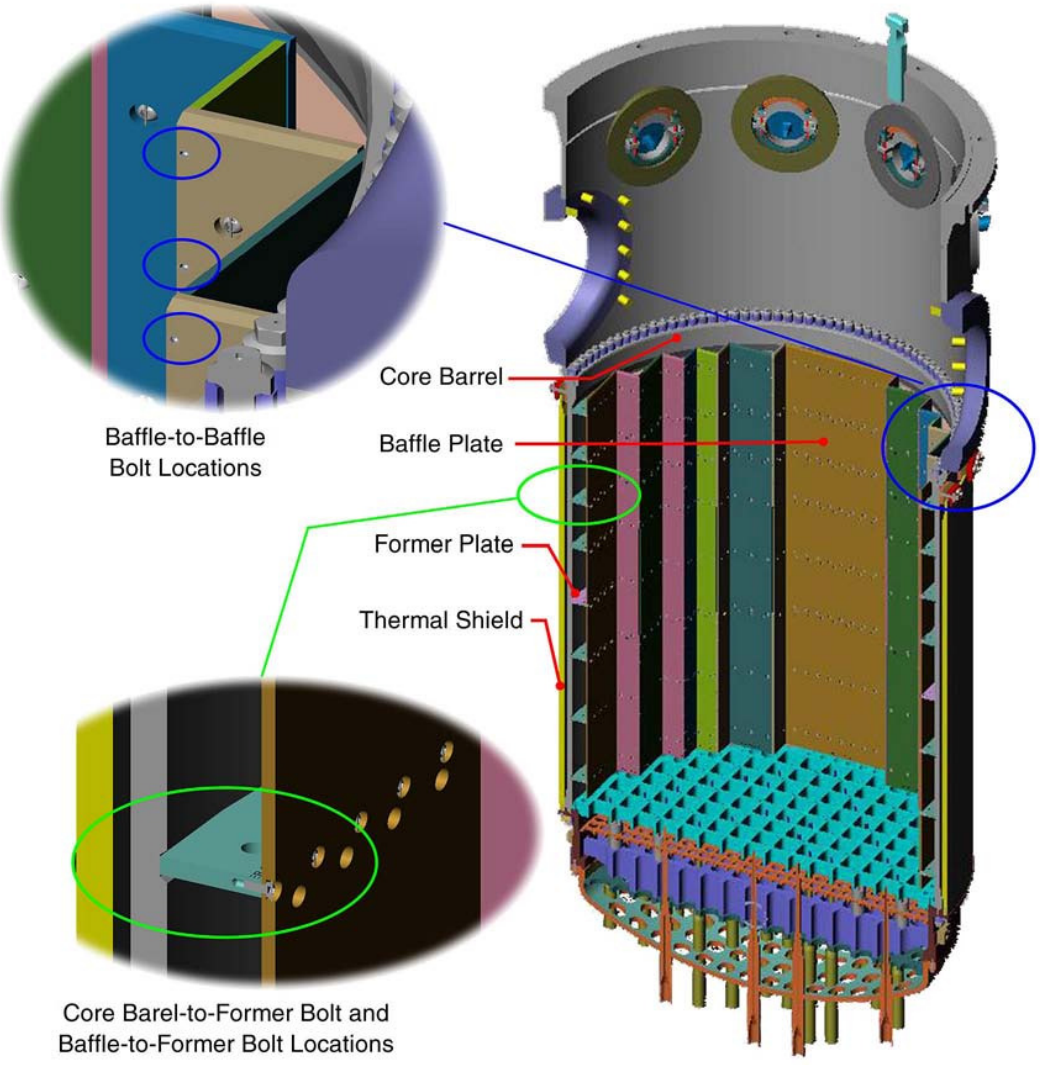
Materials Reliability Program: Pressurized Water Reactor Internals Inspection and Evaluation Guidelines (MRP-227-Rev. 0)



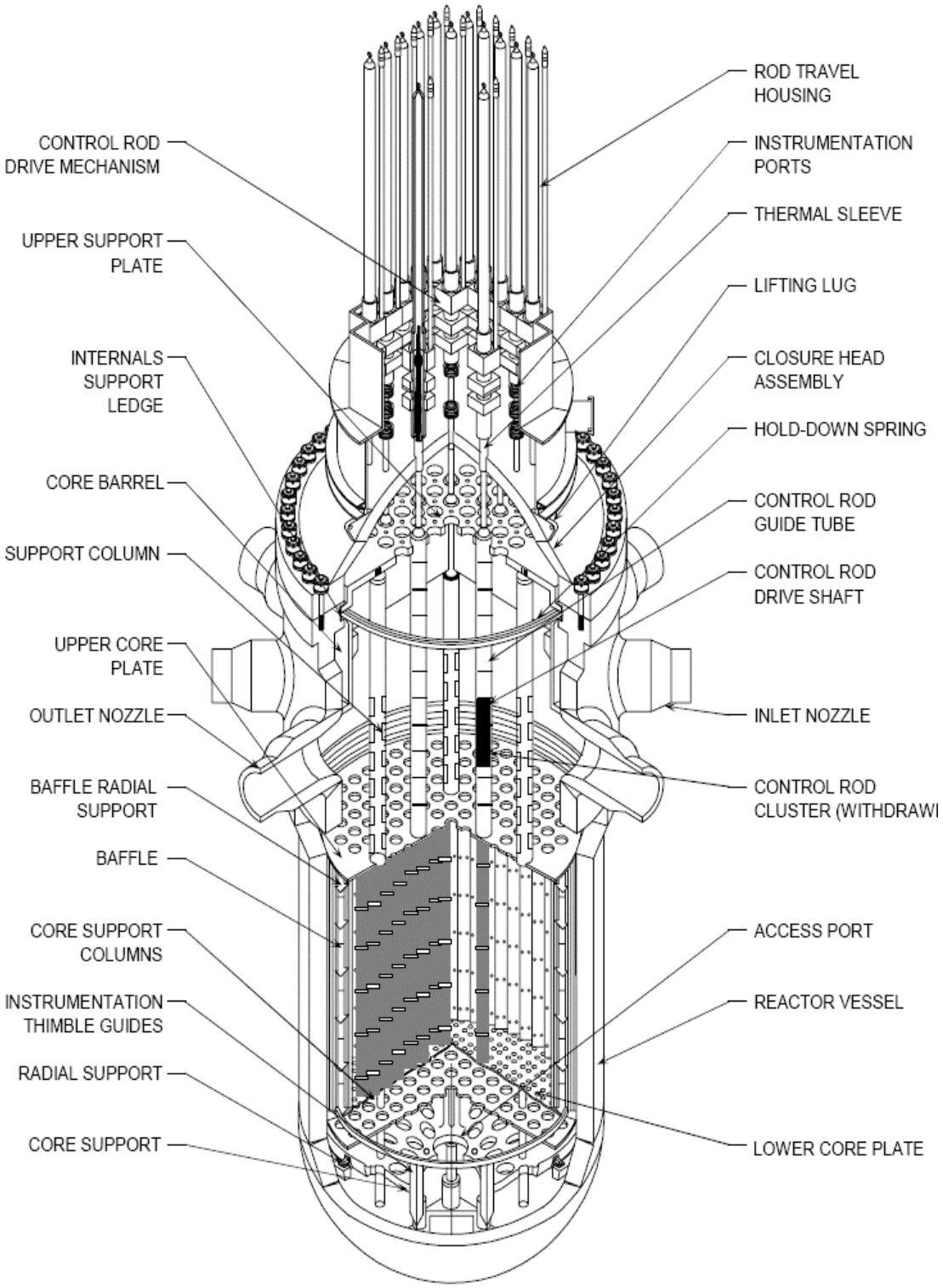


Figure 3-5
Overview of typical Westinghouse internals

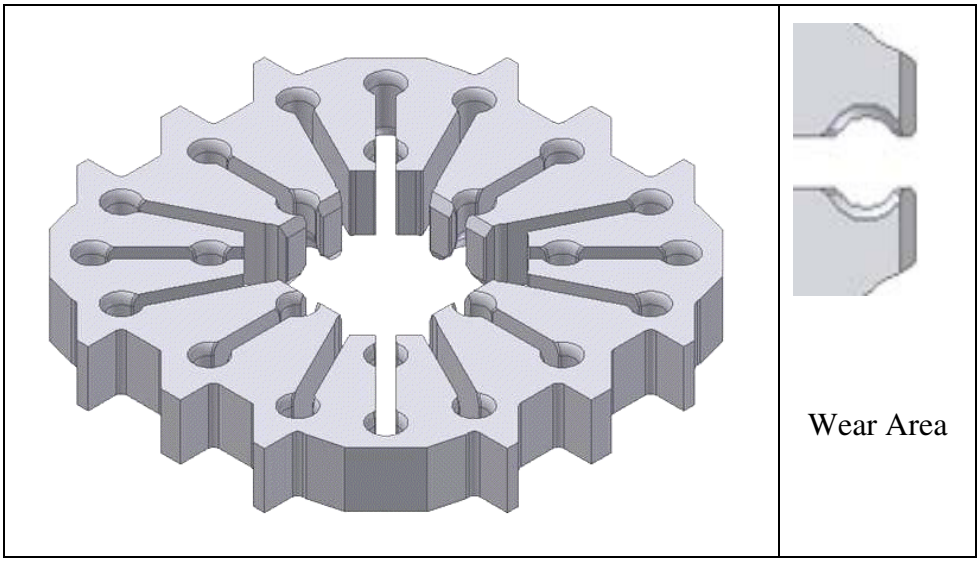


Figure 4-20
Typical Westinghouse control rod guide card (17x17 fuel assembly)

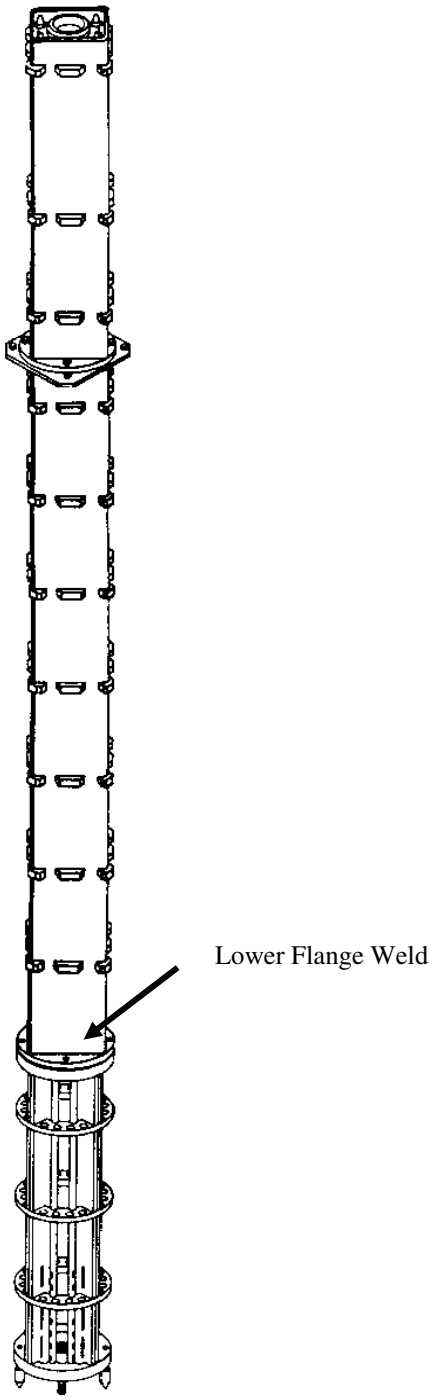


Figure 4-21
Typical Westinghouse control rod guide tube assembly

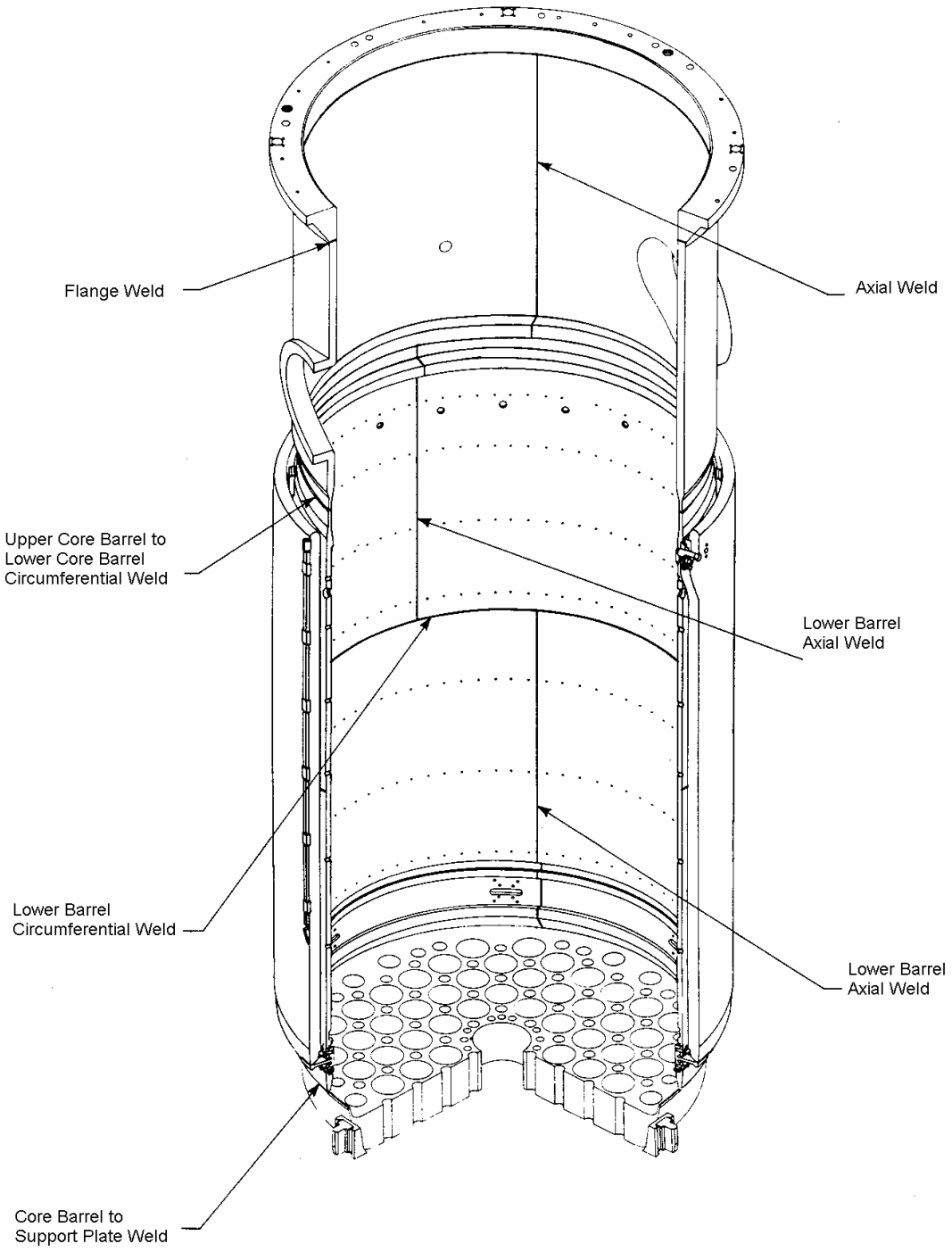


Figure 4-22
Major fabrication welds in typical Westinghouse core barrel

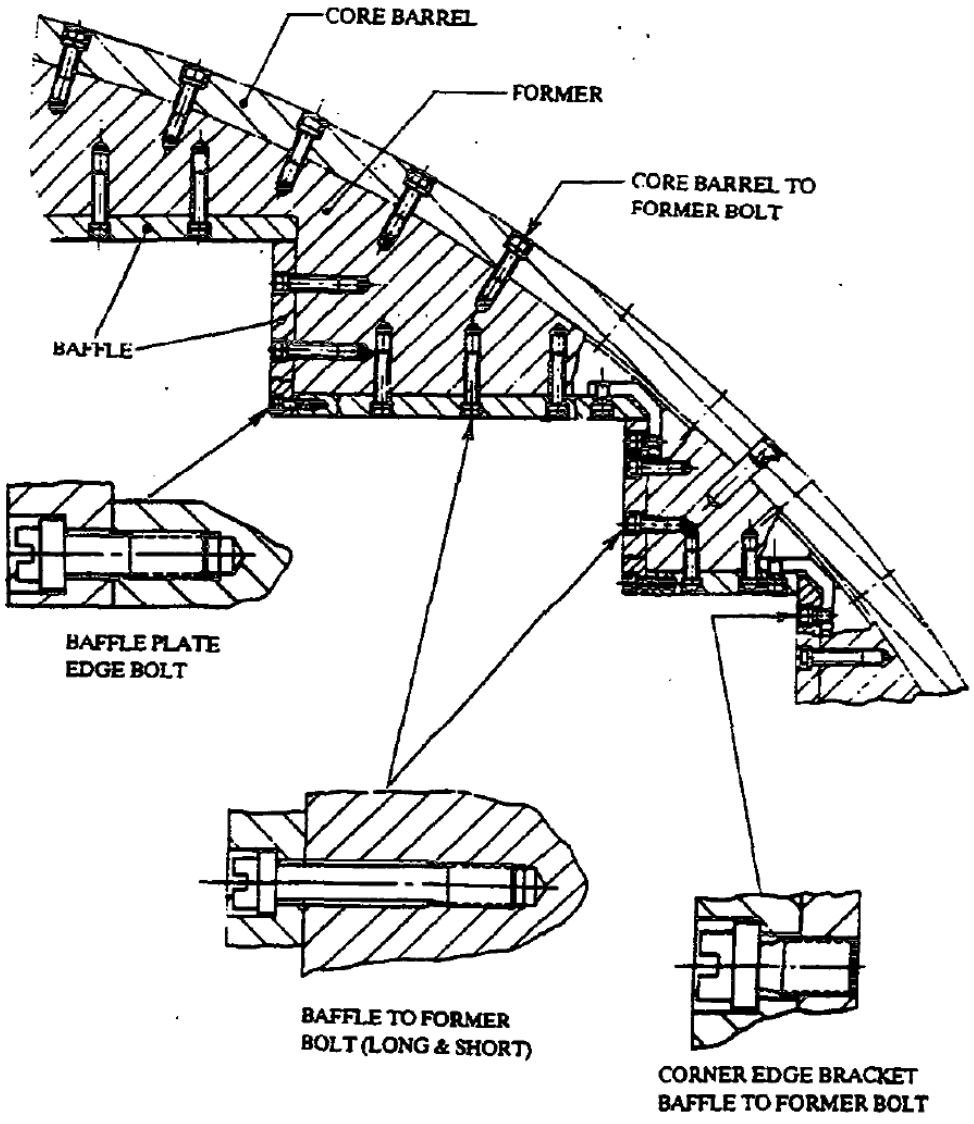


Figure 4-23
Bolt locations in typical Westinghouse baffle-former-barrel structure. In CE plants with bolted shrouds, the core shroud bolts are equivalent to baffle-former bolts and barrel-shroud bolts are equivalent to barrel-former bolts

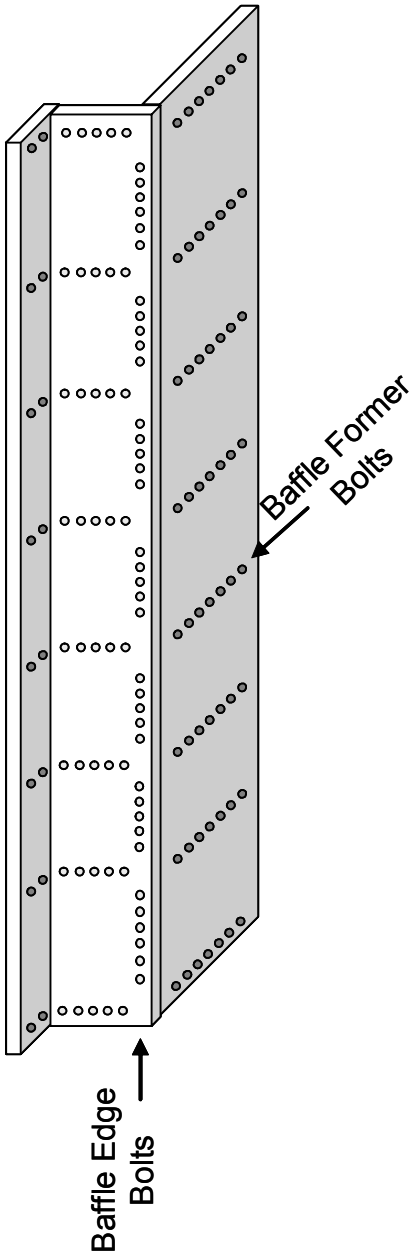


Figure 4-24
Baffle-edge bolt and baffle-former bolt locations at high fluence seams in bolted baffle-former assembly (note: equivalent baffle-former bolt locations in bolted CE shroud designs are core shroud bolts)

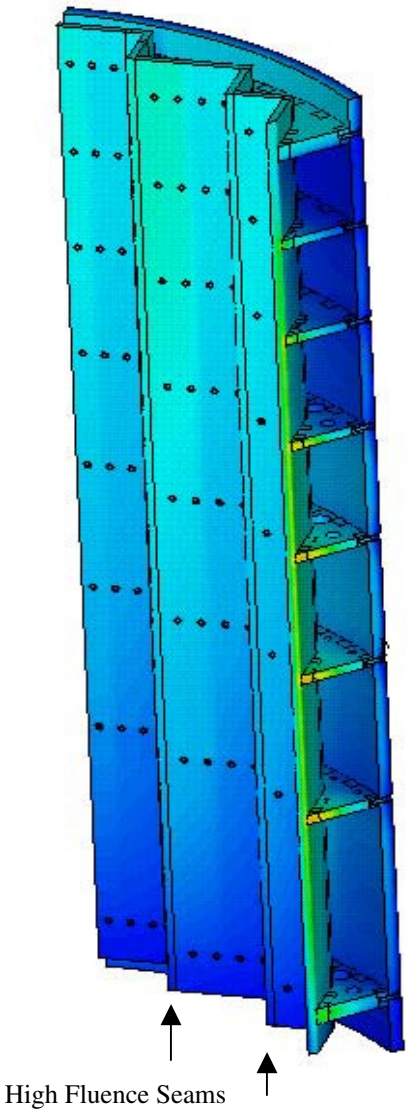


Figure 4-25
High fluence seam locations in Westinghouse baffle-former assembly

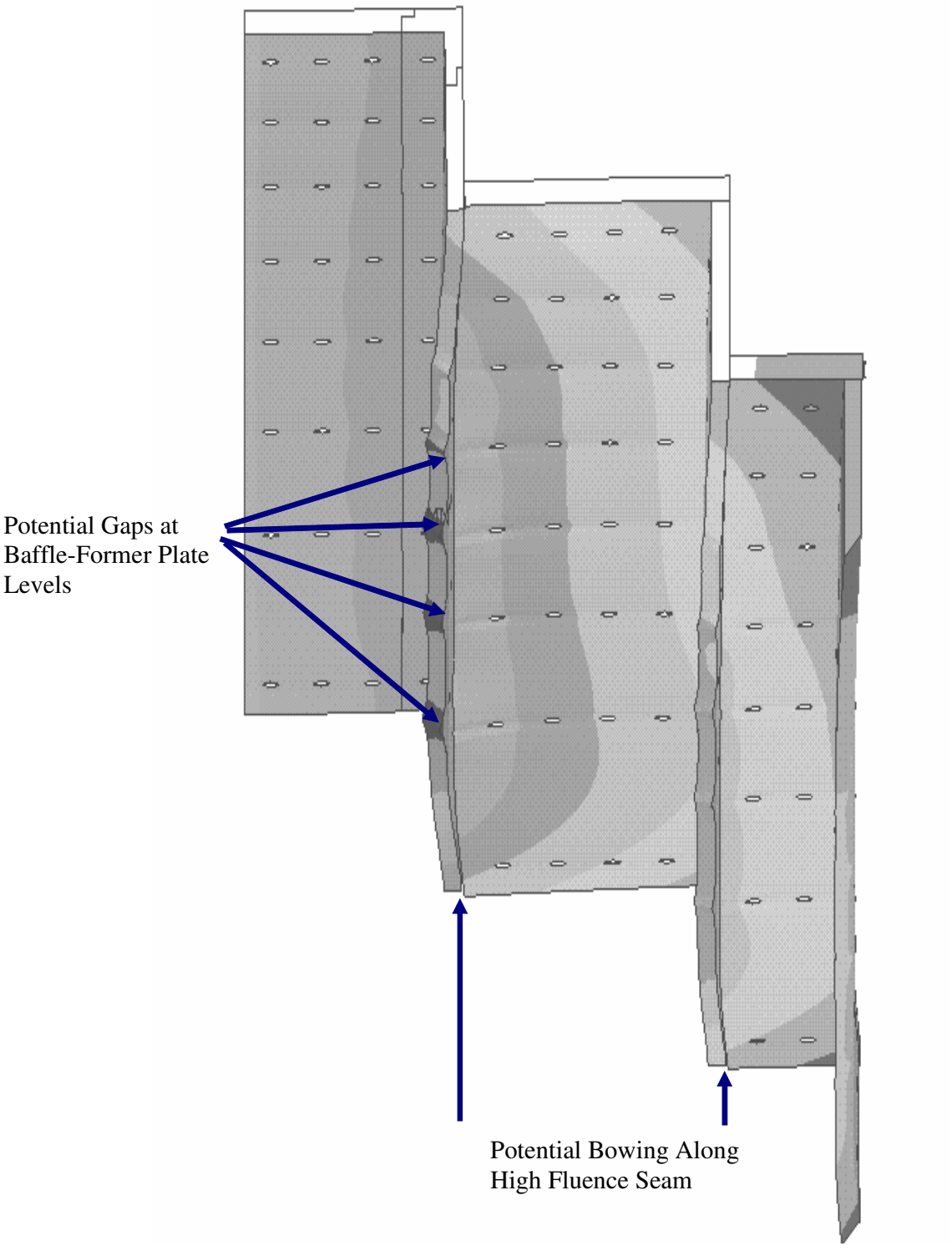


Figure 4-26
Exaggerated view of void swelling induced distortion in Westinghouse baffle-former assembly. This figure also applies to bolted CE shroud designs

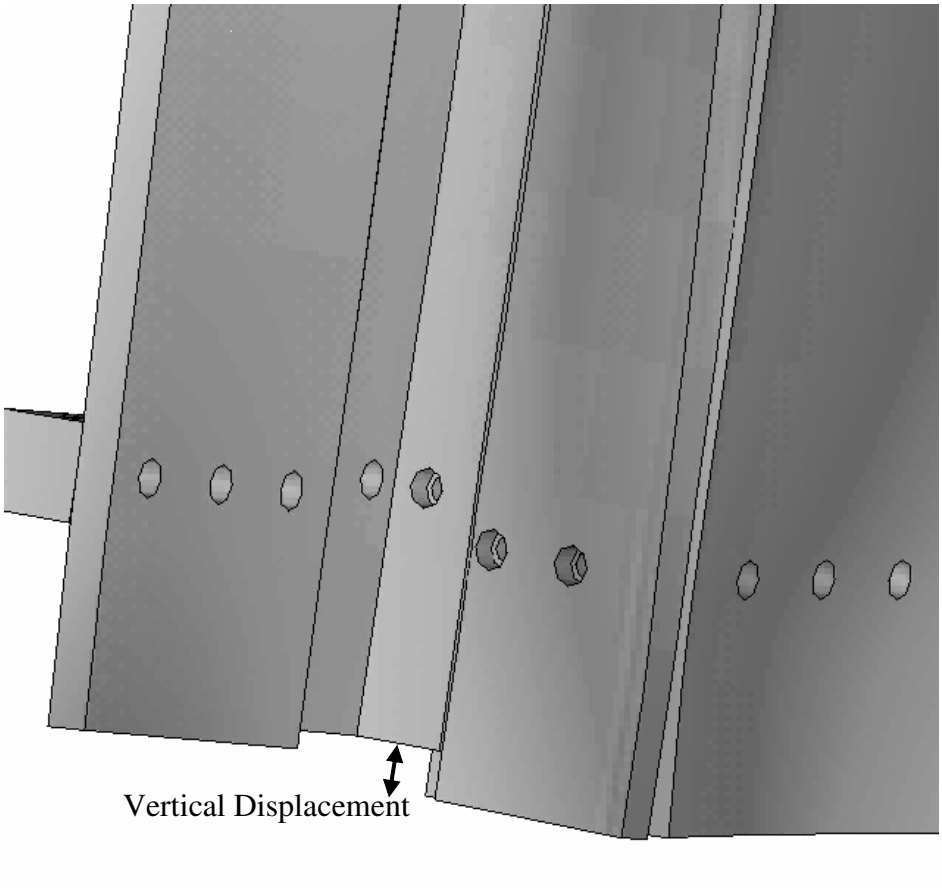


Figure 4-27
Vertical displacement of Westinghouse baffle plates caused by void swelling. This figure also applies to bolted CE shroud designs

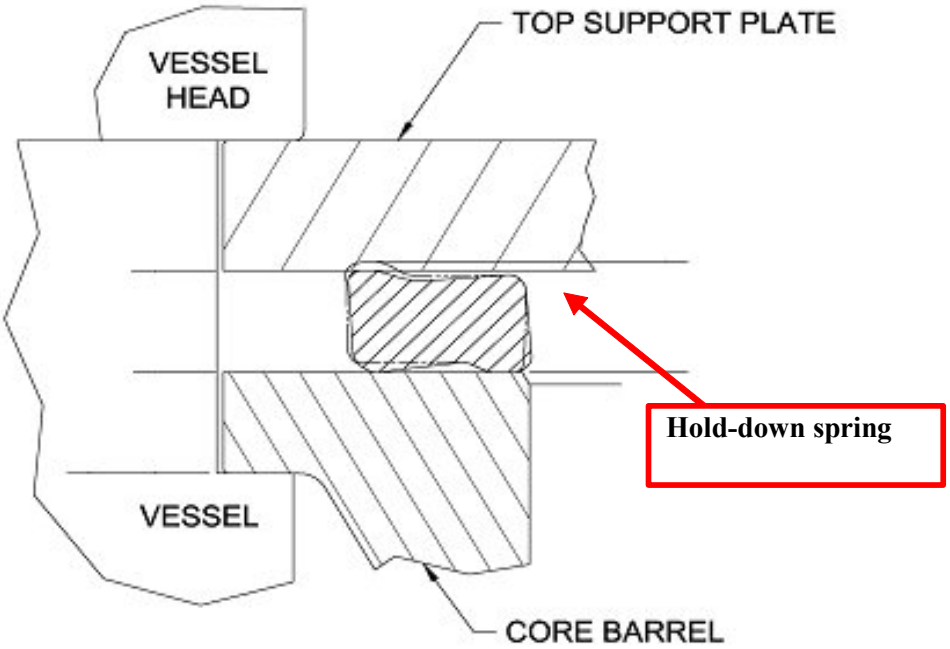


Figure 4-28
Schematic cross-sections of the Westinghouse hold-down springs

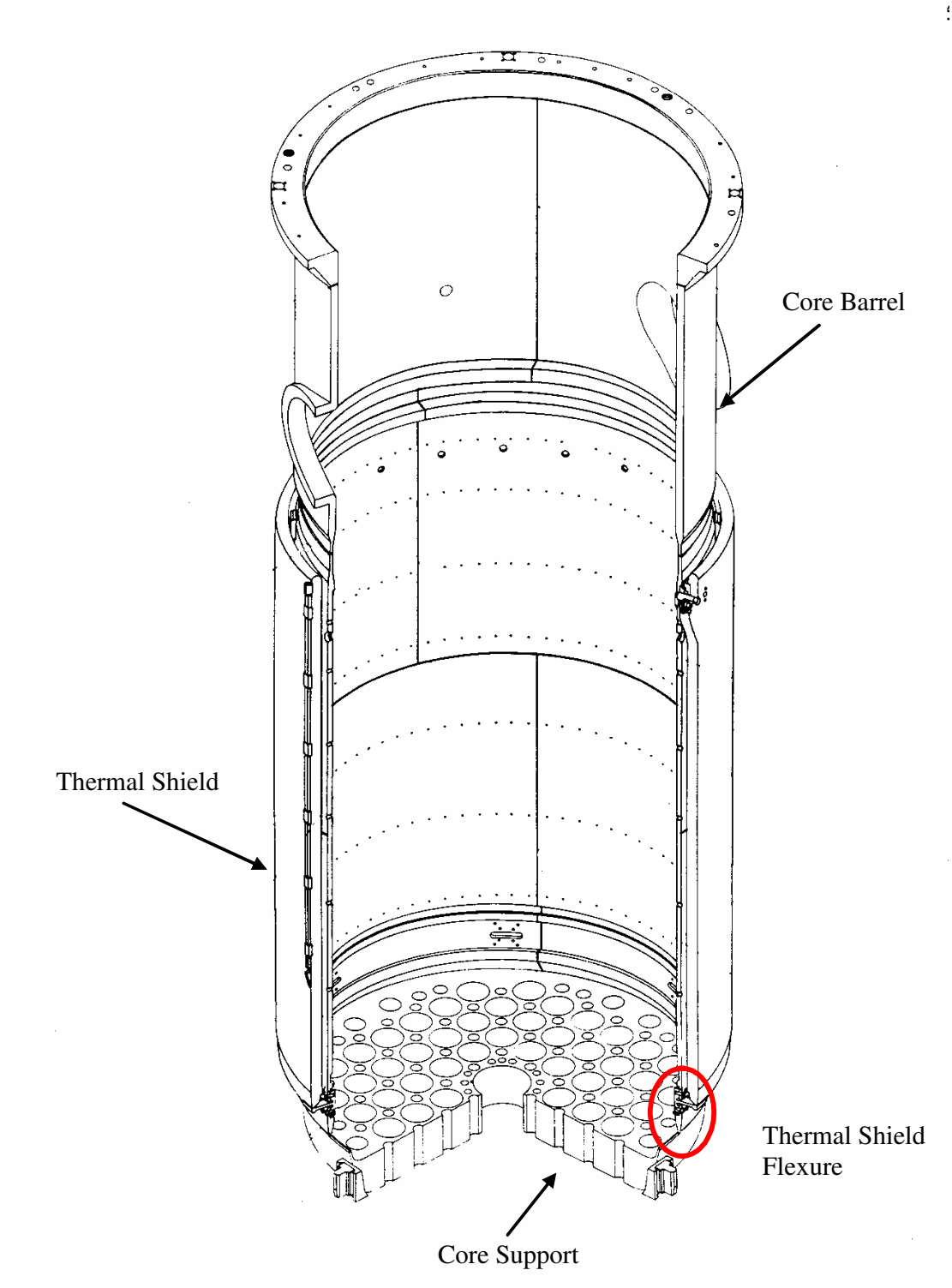


Figure 4-29
Location of Westinghouse thermal shield flexures

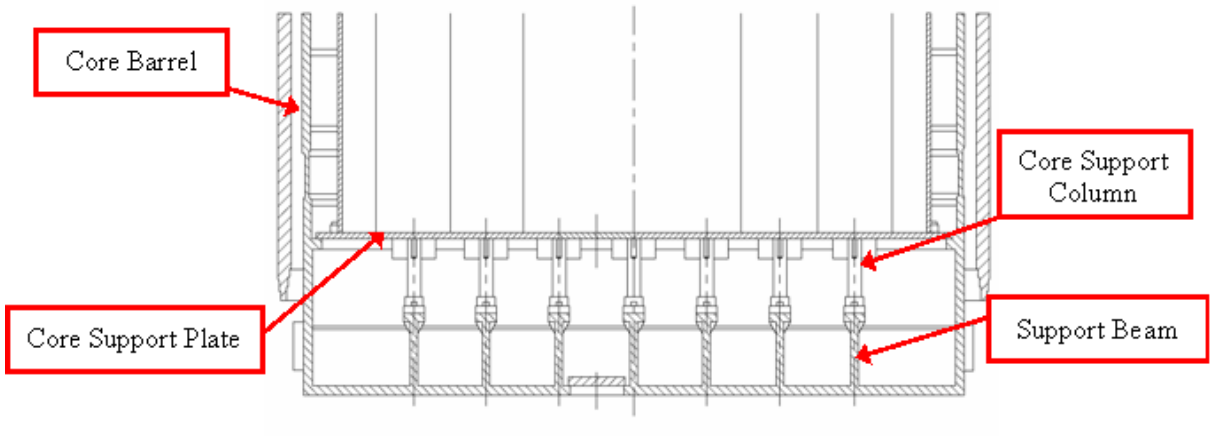
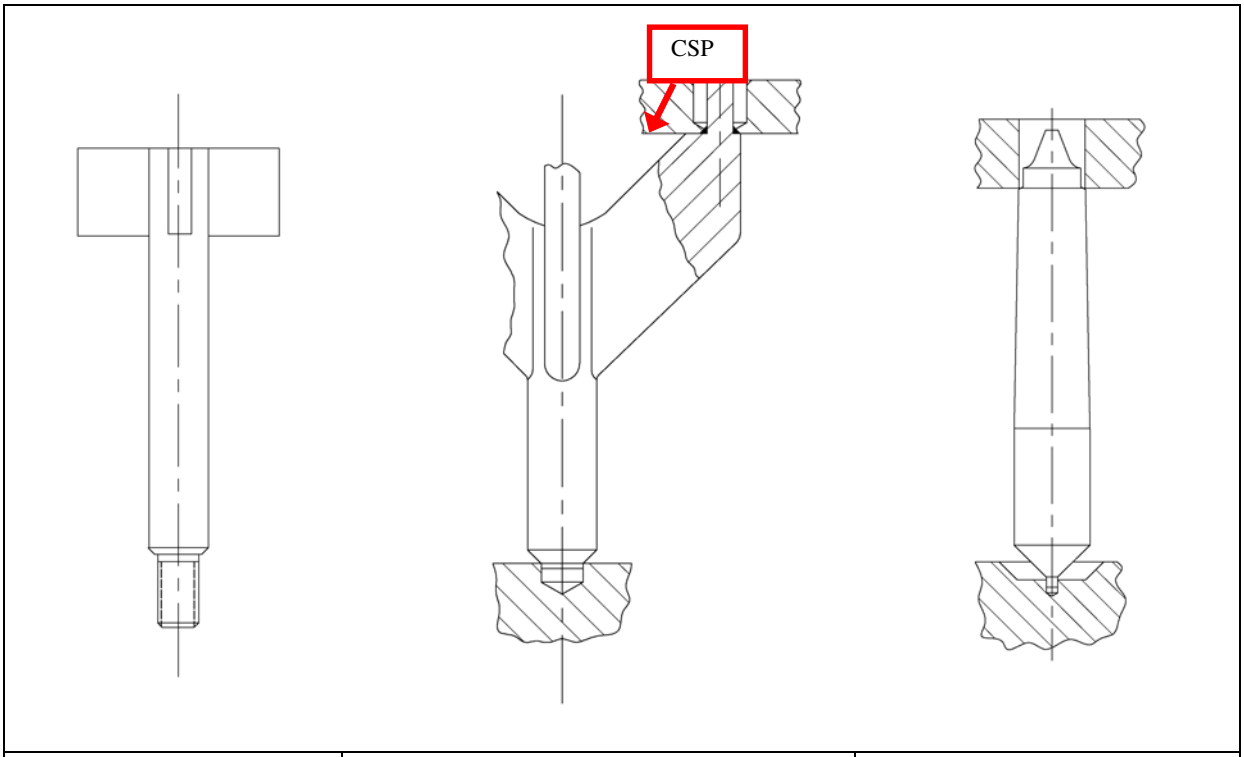


Figure 4-30
CE lower support structure assembly for plants with integrated core barrel and lower support structure with a core support plate (this design does not contain a lower core barrel flange)



a)	b)	c)

a) Early support column design
b) "Winged" support column design and plants with second generation core support assemblies
c) Later support column design used in plants with second generation core support assemblies

Figure 4-31
CE core support columns

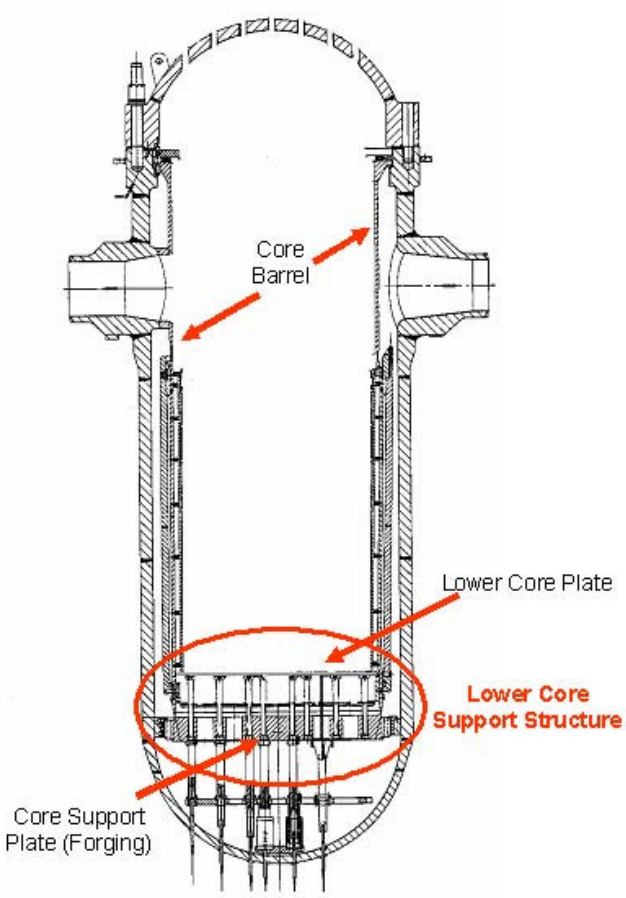


Figure 4-32
Schematic indicating location of Westinghouse lower core support structure. Additional details shown in Figure 4-33

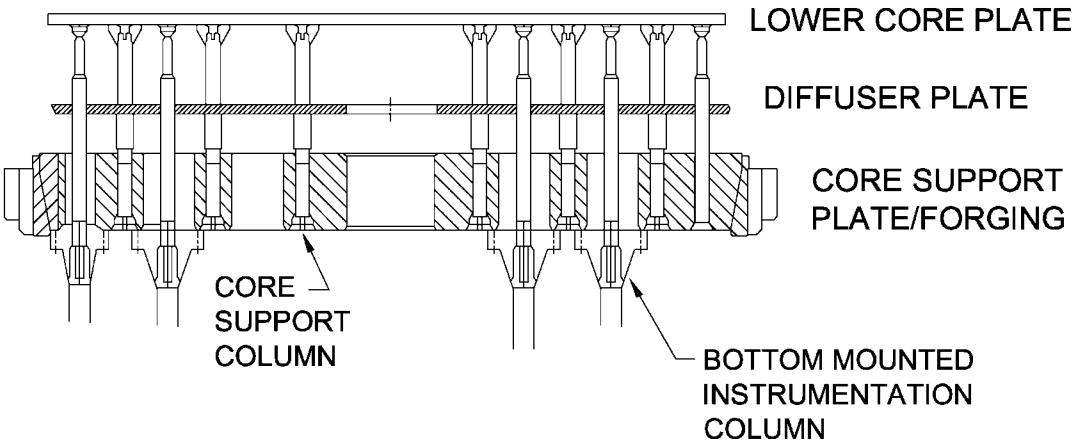


Figure 4-33
Westinghouse lower core support structure and bottom mounted instrumentation columns. Core support column bolts fasten the core support columns to the lower core plate

Figure 4-34
Typical Westinghouse core support column. Core support column bolts fasten the top of the support column to the lower core plate

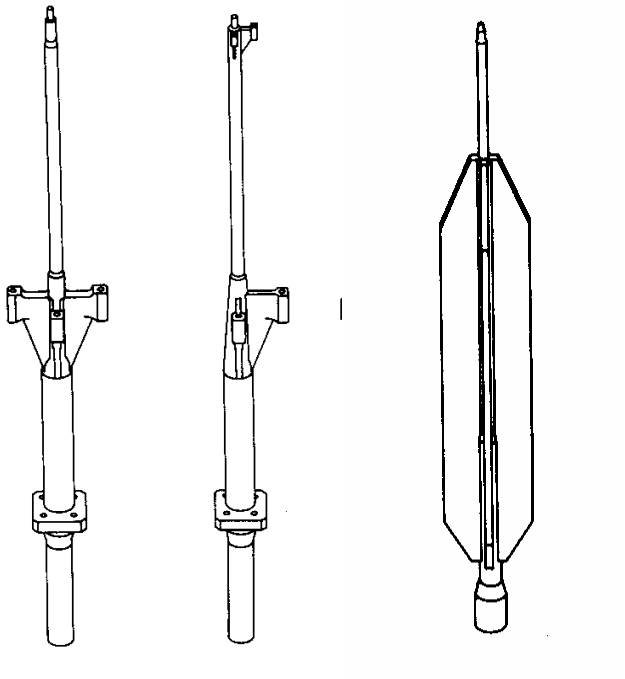


Figure 4-35
Examples of Westinghouse bottom mounted instrumentation column designs

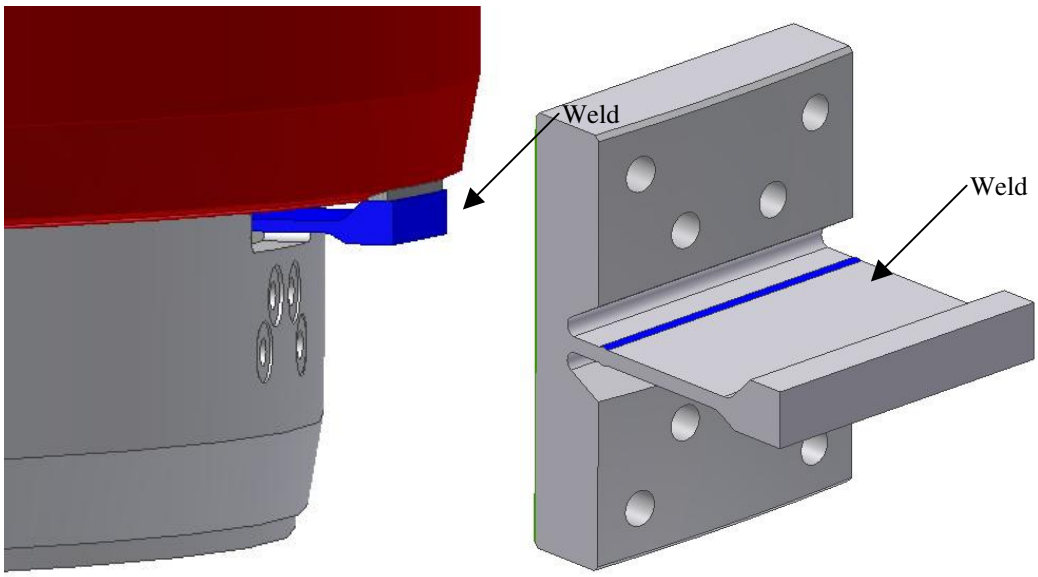


Figure 4-36
Typical Westinghouse thermal shield flexure

4.4 Existing Programs Component Requirements

Existing Programs components are those PWR internals for which current aging management activities required to maintain functionality are being implemented. The continuation of these activities is credited within these guidelines for adequate aging management for specific components.

Included in the Existing Programs are PWR internals that are classified as removable core support structures. ASME Section XI, IWB-2500, Examination Category B-N-3 [2] does not list component specific examination requirements for removable core support structures. Accordingly, factors such as original design, licensing and code of construction variability could result in significant differences in an individual plant's current B-N-3 requirements. These guidelines credit specific components contained within the general B-N-3 classification for maintaining functionality.

These examination requirements, as applied to the components designated in Tables 4-7, 4-8, and 4-9, have been determined to provide sufficient aging management for these components.

Table 4-7
B&W plants Existing Programs components

No existing generic industry programs were considered sufficient for monitoring the aging effects addressed by these guidelines for B&W plants. Therefore, no components for B&W plants were placed into the Existing Programs group.