Inquiry: Under what conditions is it permissible to attach a spherical head segment to a cylindrical shell section to form an intermediate head, as shown in Figure 1, for PVHOs constructed in accordance with Section VIII, Division 1?

Reply: It is the opinion of the Committee that it is permissible to attach a spherical head segment to a cylindrical shell section to form an intermediate head, as shown in Figure 1, for PVHOs constructed in accordance with Section VIII, Division 1, provided the following requirements are met:

a) Head thickness shall be calculated in accordance with Section VIII, Division 1, Mandatory Appendix 1, 1-6(g)(1)(-a) and (-b) with \( P \) being the maximum pressure acting on either side. For pressure on the convex side of the head, ASME Section VIII Code Case 2286 may be used to determine the head thickness as an alternative to Mandatory Appendix 1, section1-6. For differential pressure design, see UG-19(a). The maximum intermediate head dish radius, \( L \), shall be limited to the shell inside diameter.

b) The stresses in the area of the head to shell joint shall be evaluated in accordance with Parts 5.2 and 5.3 of Section VIII, Division 2. Section VIII, Division 1 allowable stresses shall be used as the basis for stress categorization. The cyclic loading conditions shall be evaluated or exempted per Part 5.5 of Section VIII, Div. 2.

c) The weld shall be a full penetration through the head thickness (see Figure 1).

d) When the shell base material is formed from plate, the region 9 in. (230 mm) or \((R_{ts})^{1/2}\) whichever is greater, above and below the weld centerline, shall be ultrasonically examined in accordance with SA-578, and the Level C acceptance criteria shall apply. \( R \) and \( t_s \) are the shell radius and thickness, respectively. For all shell product forms, the completed weld shall be ultrasonically examined after any postweld heat treatment (PWHT) in accordance with Mandatory Appendix 12 of Section VIII, Division 1.

e) After welding and any PWHT, the weld joint shall be examined by magnetic particle examination in accordance with Mandatory Appendix 6 or by liquid penetrant examination in accordance with Mandatory Appendix 8.

f) All other requirements of PVHO-1 shall be met.

g) This Case number shall be shown in the Manufacturer’s Data Report.