cated joints, and for some fabricated piping products. Some piping products designed for pressure by applying the rules of NB-3649 may not be listed in NB-3680. For such products, the designer shall determine the stress indices as required in NB-3650.

(c) When a design does not satisfy the requirements of NB-3640 and NB-3650, the more detailed alternative analysis given in NB-3200 or the experimental stress analysis of Section III Appendices, Mandatory Appendix II may be used to obtain stress values for comparison with the criteria of NB-3200.

(d) The requirements of this subarticle shall apply to all Class 1 piping except as exempted under (1) or (2) below.

(1) Piping of NPS 1 (DN 25) or less that has been classified as Class 1 in the Design Specification may be designed in accordance with the design requirements of Subsection NC.

(2) Class 1 piping may be analyzed in accordance with the Class 2 analysis of piping systems in Subsection NC, using the allowable Class 2 stresses and stress limits, provided the specified service loads for which Level A and B Service Limits are designated meet all of the requirements stipulated in (a) through (e) below.

(a) Atmospheric to Service Pressure Cycle. The specified number of times (including startup and shutdown) that the pressure will be cycled from atmospheric pressure to service pressure and back to atmospheric pressure during normal service does not exceed the number of cycles on the applicable fatigue curve of Section III Appendices, Mandatory Appendix I corresponding to an $S_n$ value of three times the $S_m$ value for the material at service temperature.

(b) Normal Service Pressure Fluctuation. The specified full range of pressure fluctuations during normal service does not exceed the quantity $\frac{1}{3} \times$ Design Pressure $\times (S_n/S_m)$, where $S_n$ is the value obtained from the applicable design fatigue curve for the total specified number of significant pressure fluctuations and $S_m$ is the allowable stress intensity for the material at service temperature. If the total specified number of significant pressure fluctuations exceeds the maximum number of cycles defined on the applicable design fatigue curve, the $S_n$ value corresponding to the maximum number of cycles defined on the curve may be used. Significant pressure fluctuations are those for which the total excursion exceeds the quantity: Design Pressure $\times \frac{1}{3} \times (S/S_m)$, where $S$ is defined as follows:

(1) If the total specified number of service cycles is $10^6$ cycles or less, $S$ is the value of $S_n$ obtained from the applicable design fatigue curve for $10^6$ cycles.

(2) If the total specified number of service cycles exceeds $10^6$ cycles, $S$ is the value of $S_n$ obtained from the applicable design fatigue curve for the maximum number of cycles defined on the curve.