Proposed Intent Interpretation:
Question: Is it the intent of Appendix 44, paragraphs 44-6.2(c)(3) and 44-6.2(d) that an observed strain rate not exceeding 0.1%/hr be obtained before terminating the cold stretching process?

Reply: Yes.

Explanation:
The current text of paragraphs 44-6.2(c)(3) and 44-6.2(d) could be interpreted to mean that a strain rate of 0.1%/hr must be met (achieved as a minimum) near the end of the cold stretching process. The actual intent of the rules is for that strain rate to not exceed 0.1%/hr before terminating the cold stretching process. When cold stretching is applied to a vessel the initial strain rate is high, but as the material stretches and work hardens the effective yield strength increases and the strain rate slows. When the strain rate falls below 0.1%/hr, the cold stretching process is essentially complete and maintaining the cold stretching pressure provides no significant additional effect. Achieving this low strain rate is therefore the determining endpoint of the cold stretching process. The actual duration of the cold stretching process is dependent only upon the observed strain rate. The time frame will vary for each application since even materials of the same specification and grade stretch at different rates.

Proposed Text Revisions:

44-6.2 COLD-STRETCHING OPERATION (excerpt)

(c) The cold-stretching operation shall be carried out as follows:

(1) The pressure shall be increased until \( P_e \) is reached. \( P_e \) shall be maintained until the calculated strain rate has dropped to less than 0.1%/hr.

(2) The minimum holding time under \( P_e \) shall be not less than 1 hr, except as described in (d).

(3) The calculated strain rate shall be determined by repeated or continuous measurements of the circumference while the vessel is under \( P_e \) as described in (b).

The required maximum strain rate of 0.1%/hr shall be met during the last half hour.

CAUTION: Pressurized equipment contains stored energy capable of sudden release in the event of a catastrophic failure. The potential hazard is greater as the pressure is increased. A "safety zone" should be established and maintained around the vessel while cold-stretching pressure is applied. Special care shall be taken to minimize the time personnel remain within the "safety zone" while taking the required measurements.

NOTE: The total time under \( P_e \) required to achieve the desired strain may be substantial. The amount of time the vessel is subjected to \( P_e \) may be reduced somewhat if a 5% higher \( P_e \) is applied during the first 30 min to 1 hr to accelerate strain formation.

(d) For pressure vessels having a diameter not more than 79 in. (2,000 mm), the time under pressure may be reduced to 30 min, provided the strain rate of 0.1%/hr is not exceeded during the last 15 min.

Replace with: The strain rate shall not exceed 0.1%/hr during the last half hour, indicating that the cold stretching process is complete.

Replace with: not exceeded