

Regulatory Citation(s):

78.84 / 78a.84. Casing standards.

(f) Casing which is attached to a blow-out preventer with a pressure rating of greater than 3,000 psi shall be pressure tested after cementing. A pressure test must be holding the anticipated maximum pressure to which casing will be exposed for 30 minutes with not more than a 10% decrease. Certification of the pressure test shall be confirmed by entry and signature of the person performing the test on the driller's log.

Question:

Regarding the pressure testing of intermediate casing that will be equipped with a 3000 psi or larger BOP: How long do operators have to wait before completing the pressure test? If the pressure test is conducted within the first 8 hours following cement placement, will it jeopardize the cement in the annulus or cause a micro annulus? How do operators determine what the anticipated pressure is going to be? Are they to set a plug above the intermediate casing shoe so the pressure is not against the casing shoe?

Response:

According to API RP65 – Part 2, pressure testing of casing should be done before significant gel strength has developed in the cement. This pressure testing will ultimately be limited by the pressure ratings of plugs, floats, cementing heads, and other equipment. Pressure testing after the cement has set can result in microannulus formation or damage to the cement sheath. The pressure should only ever be held for the shortest amount of time required to achieve the objectives of the test. Mechanical stress modeling is one way to determine the optimal time for conducting pressure testing (Section 4.10.2 of API RP65 – Part 2).

Standard tests for determining gel strength can be found in API 10B-6/ISO 10426-6. Service companies have expertise in estimating gel strength based on expected wellbore conditions (Section 4.7.8 of API RP65 – Part 2).

Prior to drilling, minimizing encounters with potential flow zones can be achieved by accurate review and analysis of available shallow and deep hazards data, and proper interpretation of this information. One way to determine anticipated pressures is to rely on data gathered at offset wells. Shallow and deep hazard identification and evaluation can also both be accomplished through the use of seismic surveys. Shallow seismic surveys over potential well sites may be helpful and should be supplemented with shallow seismic data collected at offset wells or from adjacent fields where shallow flows occurred. The supplemental data will assist in verification of expected conditions at the proposed well site. Deeper subsurface hazards can often be identified through seismic interpretation and/or analysis of offset wells or fields. If available, it is recommended that deep seismic data from offset wells or adjacent fields be analyzed to aid in the prediction of flow zones (API RP65 – Part 2, Annex B).

If an operator desires to reduce the minimum test duration to less than 30 minutes, under 78.84 / 78a.84, then an Alternate Method (78.75 / 78a.75) should be submitted to DEP for approval prior to implementation.