**Section 245.560 Intermediate Casing Requirements**

When intermediate casing is required by subsection (a), intermediate casing used in the construction of wells must be set and cemented pursuant to the requirements of subsections (b) through (m). *Intermediate casing used to isolate fresh water must not be used as the production string in the well in which it is installed, and may not be perforated for purposes of conducting a hydraulic fracture treatment through it.*

a) Cemented intermediate casing must be installed under the following conditions:

1) *when necessary to isolate fresh water not isolated by surface casing*; or

2) *to seal off potential flow zones, anomalous pressure zones, lost circulation zones and other drilling hazards.* (Section 1-70(d)(12) of the Act)

b) Intermediate casing shall be set and cemented to one of the standards below:

1) *When intermediate casing is installed to protect fresh water, the permittee shall set a full string of new intermediate casing at least 100 feet below the base of the deepest fresh water and bring cement to the surface;*

2) *In instances* in which *intermediate casing was set solely to protect fresh water encountered below the surface casing shoe, and cementing to the surface is technically infeasible, would result in lost circulation, or both, cement must be brought to a minimum of 600 feet above the shallowest fresh water zone encountered below the surface casing shoe or to the surface if the fresh water zone is less than 600 feet from the surface;*

3) *In the case that intermediate casing was set for a reason other than to protect fresh water, the intermediate casing string shall be cemented from the shoe to a point at least 600 true vertical feet above the shoe;* or

4) *If there is a hydrocarbon bearing zone* that is *capable of producing* and that is *exposed above the intermediate casing shoe,* then *the casing shall be cemented from the shoe:*

A) *to a point at least 600 true vertical feet above the shallowest hydrocarbon bearing zone;* or

B) *to a point at least 200 feet above the shoe of the next shallower casing string that was set and cemented in the well*; or

C) *to the surface if less than 200 feet.* (Section 1-70(d)(12) of the Act)

c) *The location and depths of any hydrocarbon-bearing zones or fresh water zones* requiring intermediate casing or *that are open to the wellbore above the casing shoe must be confirmed by coring, electric logs, or testing and must be reported to the Department.* (Section 1-70(d)(12) of the Act)

d) Intermediate casing must conform to the industry standards set forth in the document referenced in Section 245.115(a)(2). Additionally, the use of intermediate casing in the well construction must be in a manner consistent with the industry standards set forth in the document referenced in Section 245.115(a)(2).

e) *Casing thread compound must conform to* and meet all manufacturing and material requirements of the industry standards set forth in the document referenced in Section 245.115(a)(3) (Section 1-70(d)(2) of the Act). Additionally, the uses of casing thread compound in the well construction must be in a manner consistent with the industry standards set forth in the document referenced in Section 245.115(a)(3).

f) *The borehole must be circulated and conditioned* before intermediate casing setting and cementing*to ensure an adequate cement bond* (Section 1-70(d)(5) of the Act).

g) The permittee shall notify the Department's District Office by phone and electronic mail at least 24 hours before setting and cementing intermediate casing cementing operations to enable an inspector to be present.

h) When setting intermediate casing in non-deviated holes, centralizers are required to be used as follows to keep the casing in the center of the wellbore before and during cementing operations:

1) *Centralizers shall be placed* on *every fourth joint from the cement shoe to the ground surface or to the bottom of the cellar;*

2) *The Department may require additional* centralizers *as necessary to ensure the integrity of the well design*; and

3) *All centralizers* must conform to and *shall meet specifications in, or equivalent to,* the industry standards set forth in the documents referenced in Section 245.115(a)(4) through (a)(6)*.* (Section 1-70(d)(3) of the Act)

i) *A pre-flush or spacer must be pumped ahead of the cement* (Section 1-70(d)(6) of the Act).

j) Intermediate casing cement must:

1) meet the cement requirements of Section 245.520(a) and (b); and

2) be applied behind the casing according to the requirements of Section 245.520(c) and (d).

k) A radial cement bond evaluation log, or other evaluation approved by the Department, such as, but not limited to, temperature surveys, must be run to verify the cement bond on the intermediate casing. Remedial cementing is required if the cement bond is not adequate for drilling ahead. (Section 1-70(d)(13) of the Act)

l) The cementing and testing requirements of subsections (b)(2), (b)(3), (b)(4) and (c) may be waived if all intermediate casing strings are cemented to surface.

m) After the cement is placed behind the intermediate casing (Section 1-70(d)(8) of the Act), the cement must be tested and cement job logs maintained pursuant to the requirements of Section 245.520(f) through (h).

n) After the intermediate casing cement operation is completed, the permittee shall notify the Department's District Office by phone and electronic mail to enable an inspector to be present for testing the internal mechanical integrity of the intermediate casing pursuant to Section 245.540.

o) If the annulus between the production casing and the surface of intermediate casing has not been cemented to the surface, the intermediate casing annulus shall be equipped with an appropriately sized and tested relief valve. The flow line from the relief valve should be secured and diverted to a lined pit or tank. (See API HF1 – Hydraulic Fracturing Operations – Well Construction and Integrity Guidelines, 1st Edition, October 2009, Section 10.4.2, Pressure Monitoring.)