July 10, 2009

NOTICE TO OPERATORS

IGNACIO BLANCO FIELD - Fruitland Coal

Directionally Drilled Wells

MODIFICATIONS TO SELECTING WATER WELL SAMPLING
&
RISK ASSESSING PLUGGED & ABANDONED WELLS

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In Reference to

Cause 112 Orders 156 & 157

And subsequent Infill Drilling Orders

Purpose

Orders 156 and 157 (160 ac infill- Year 2000) & Orders 180 and 181 (80 ac infill-Year 2005) took measures to monitor for the possibility of coal bed methane (CBM) migrating upward through man-made conduits into shallow fresh water wells. The first primary concerns were conventional wells and previously P&A'd wells located within a quarter mile of the proposed CBM well. Secondary concerns were fracture stimulations and possibly poor cement jobs done on the newly drilled infill wells. Because of these concerns two water wells must be sampled & analyzed prior to drilling the proposed CBM well.

These orders and subsequent infill drilling orders failed to take into account the increased area of influence created by a directional well bore (see attached schematic). The purpose of this notice is to take into account that new area of influence and to require operators to adjust their means of selecting water wells for sampling and

analysis and for P&A risk assessments. The authority for implementing the requirements of this notice is granted through rule 207 (a) of the COGCC Rules and Regulations.

Discussion

As a condition to allow infill CBM drilling in the Ignacio Blanco Field, the commission ordered (as defined in Cause 112 Orders 156 and 156) two measures to be performed: (1) to establish a fresh water quality baseline prior to drilling any new infill Fruitland Coal wells & (2) to assess the potential impacts of a nearby plugged and abandoned (P&A'd) well.

At the time of promulgating these orders, vertical drilling of infill wells was commonplace and assessment of a baseline water quality and potential impacts to nearby conventional & P&A'd wells was deemed appropriate. In selecting water wells for testing, the first order of priority is to determine if there are conventional or PA wells within a quarter (1/4) mile of the CBM well. If there are, then sample the water wells located within a quarter mile of the conventional or PA well. If there are none, then extend the search to a half (1/2) mile. The preference is to select wells on opposite sides of the conventional or PA well. If no water wells are found within the a ½ mile of the conventional or PA well then test two wells within a quarter (1/4) mile of the CBM well. If there is only one then test one and if there is none then test none. Also, a risk assessment was required for plugged wells within a ¼ mile of the proposed CBM well. The implementation of directionally drilled infill wells has changed the basic assumptions of risk. Therefore, the COGCC has implemented an alternative approach to meeting the requirements of the orders for directional bores.

A vertical well is a *single point* of contact having a radial influence or a circle with a quarter mile radius. Because a directional well cuts through the coal seam at an angle there is now a *line of influence* or a swath with many points of radial influence. To address risk(s) from this linear feature, the COGCC has developed a policy whereby measurement of water quality and potential impacts of both conventional & P&A'd wells is based on the distance from the *line* as opposed to the surface *point* of the directional bore. Therefore, a line must be drawn on a well plat starting at the point of the top of pay zone (T/P) being penetrated by the well bore extending to the point of bottom of pay zone (B/P). The selection of water wells requiring sampling and P&A'd wells requiring assessment is based on the closest distance between the points of the conventional well/water well and the *line of influence* of the CBM directional well (see the attached schematic depicting both the horizontal and vertical planes intercepted by the well bore).

Conclusions

The directional CBM well creates more potential for impacts to fresh water wells than those of a vertical well. To compensate for this, please adjust your selection process for

water well sampling and risk assessments for a P&A'd well. The key principles to the concept are tied to man-made conduits and the influential distance of one quarter (1/4) mile. Gas can potentially migrate up the casing/wellbore annulus on both the CBM & conventional gas wellbores as well as improperly plugged wells. The order of priority for concern is (1) Conventional gas wells, (2) P&A'd well(s), and (3) CBM wells.

Example:

Refer to the attached PLAT MAP & WELLBORE PATHWAY

A directional CBM is proposed. On a plat map, draw a line depicting the position and orientation of the horizontal dimensions of the CBM directional wellbore. Use the top of coal and bottom of coal as the end points. The wellhead of a vertically drilled conventional gas well has been found to be positioned within a quarter mile of that line. Then at least two (2) water wells within a quarter (1/4) to half (1/2) mile radius of that particular ***conventional*** gas well shall be sampled and tested. This will apply to all conventional gas wells near this directional CBM wellbore. If these conditions do not exist, then test two water wells within a quarter mile of the wellhead of the proposed directional CBM well. If this condition does not exist, then test two water wells within a quarter mile of the swath created by the CBM wellbore (horizontal components relative to the section lines). In all cases, only two water wells need be tested with a CBM APD. The order of priority is (1) Conventional gas wells, (2) P&A'd wells, and (3) CBM wells.

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