

STATE OF NEW MEXICO  
DEPARTMENT OF ENERGY, MINERALS AND NATURAL RESOURCES  
OIL CONSERVATION DIVISION

IN THE MATTER OF THE APPLICATION OF  
BURLINGTON RESOURCES OIL AND GAS  
COMPANY LP, BP AMOCO AND ENERGEN  
RESOURCES CORPORATION FOR APPROVAL  
OF A PILOT PROJECT INCLUDING  
UNORTHODOX WELL LOCATIONS AND AN  
EXCEPTION FROM DIVISION RULE 104.D.3  
[19.15.15.11] FOR PURPOSES OF  
ESTABLISHING A PILOT PROGRAM IN THE  
PICTURED CLIFFS FORMATION TO  
DETERMINE PROPER WELL DENSITY  
REQUIREMENTS FOR PICTURED CLIFFS  
WELLS IN SAN JUAN, SANDOVAL AND RIO  
ARRIBA COUNTIES, NEW MEXICO

Case No. 12857 (Reopened)

**AFFIDAVIT OF LINDA HTEIN**

STATE OF TEXAS            )  
                                  ) SS.  
COUNTY OF HARRIS        )

Linda Htein, duly sworn and upon her oath states as follows:

1. I am a reservoir engineer and an employee of BP.
2. Based on current conditions, BP's position is that additional 80-acre infill drilling/completion of the Pictured Cliffs formation in BP's area of operations within the Application Lands is unwarranted. BP's area of operations is shown in Figure 1 attached. This is based primarily on pressure and production data observed from three pilot infill wells, but also inferentially upon current economic and market conditions. BP's position is based on current conditions, and its position may change under different circumstances or with new information.

3. In October of 2002, BP, Burlington, and Energen attended a hearing in this matter and received approval from the NMOCD to drill several Pictured Cliffs 80-acre pilot wells across the basin. In 2003, BP completed the Pictured Cliffs formation in three existing Mesaverde/Dakota wells. The deeper zones were temporarily abandoned so that production from the Pictured Cliffs could be analyzed as part of the 80-ac pilot. General information for these pilot wells is provided in Table 1. Figure 1 shows the locations of these wells in the basin.

4. In 2003, Pictured Cliffs pressure measurements were recorded in each of these three pilot wells using downhole gauges. Shut-in periods for the pressure build-up tests ranged from 6 hours to 4 days. Static bottomhole pressure measurements were also recorded in the offset 160-acre parent wells via pressure gradient surveys that were run after a shut-in period of no less than 2 days. All pressure measurements were measured after hydraulic fracturing. These results are summarized in Table 2.

5. Figure 2 shows measured pressure in the pilot well versus measured pressure in the corresponding parent well. Two of the three pilot wells showed higher measured pressure than its corresponding parent well. The measured pressure in Storey LS B 1A was slightly lower than that of its corresponding parent well, but this may be due to a large difference in the time permitted for pressure build-up. Figure 3 shows shut-in pressure relative to approximate original reservoir pressure. In all cases, pressure has been reduced to no more than 33% of the original reservoir pressure, implying substantial drainage beyond an 80-acre area.

6. Production performance from the three pilot wells varies. Peak production rates ranged from 200 to 300 mcf/d, and current production rates (as of March 2010) range from 10 to 140 mcf/d. All of the pilot wells were completed with nitrogen foam fractures. Only one of the

three pilot wells, GCU 204E, is equipped with wellhead compression, and it has exhibited the strongest performance amongst the three wells. The production data is summarized in Table 3.

7. Figures 4-6 show average monthly production rates of each pilot well and its corresponding parent well. In all three cases, the pilot wells came on stronger than their corresponding parent well, suggesting higher localized reservoir pressure at the pilot wells' locations. However, the pilot wells' peak production rates were no more than 34% of those seen in the parent wells, which were all greater than 750 mcf/d. This indicates significant depletion at the pilot wells' locations due to parent well drainage.

8. The pressure and production evidence assembled by BP suggests that some portion of the pilot wells' production should be classified as rate acceleration rather than reserves addition. BP has not yet studied this in detail and, therefore, cannot comment on the quantity of incremental volumes produced by the pilot wells at this time.

9. There have been no specific economic evaluations of these wells to date, but based on other internal evaluations, newly drilled 80-acre infills with performance similar to these three BP pilot wells would likely be uneconomic with current drilling costs and gas prices.

10. The pressure and production evidence from these three BP pilot wells suggests that increased well density in the Pictured Cliffs is not currently appropriate in the areas of the Application Lands within which BP operates. BP is, therefore, not requesting an infill order from the NMOCD with respect to the BP operated units at this time. In the future, reduced drilling costs, increased gas prices, or new geological or reservoir information may result in a re-evaluation of the viability of infill drilling of the Pictured Cliffs in these areas.

FURTHER, AFFIANT SAYETH NAUGHT.

  
LINDA HTEIN

SUBSCRIBED AND SWORN TO before me this 26<sup>th</sup> day of August, 2010.

Suzanne M. Jones  
Notary Public

My Commission Expires:

1-11-2013

