Chapter 7 Responses to Operator Survey

7.1 Summary of responses

The objective of the industry survey (example in Appendix 1) was to solicit informed opinions from coalbed methane operating companies and other companies familiar with the Raton Basin. See Chapter 2 for the methods applied. Four responses were provided; three were from coalbed methane operators in the Raton Basin. The following list of base assumptions was provided to the operators:

- There is a "shallow" (generally less than 2000 feet depth) petroleum system play that yields coalbed methane from coal and sandstone beds in the Raton and Vermejo Formations in the Raton Basin. Much or all of the RFD study lies within a moderate to high probability area for production from this system. Exploration and production activity associated with this play will dominate the RFD scenario.
- There is a "mid-depth" (generally between 2000 feet and 8000 feet depth) petroleum system play that could yield oil or natural gas from Mesozoic sandstone and shale formations ranging from the Trinidad Sandstone to the Morrison Formation. There has been no commercial production to date from this system, but the number and quality of oil and gas shows from these formations suggests that the play would be an attractive target for future exploration, conducted through drilling of wildcat wells. The RFD scenario will consider a limited number of such wells.
- There is potential for a "deep" (generally greater than 8000 feet depth) play in Paleozoic rocks that may cause seismic exploration activity to be conducted with the possibility of one or more exploratory wells.

The Following questions were asked. Responses are noted.

7.1.1 Do you agree with the base assumptions?
YES: 4
NO: 0

7.1.2 Do you currently operate CBM wells in the Raton Basin?
YES: 3
NO: 1

7.1.3 Do you currently operate CBM wells in other basins but not Raton Basin?
YES: 2
NO: 1
No response:1

7.1.4 Current CBM well spacing in the Raton Basin is 160 acres per well. Considering the 20-year timeframe of the RFD, do you anticipate an increase in well density to 80 acre spacing?
YES: 3
NO: 1

7.1.5 Current CBM wells in the Raton Basin are vertical wells. Do you anticipate horizontal drilling becoming a viable option for such shallow reserves in the coming 20 years?
YES: 1
NO: 3

7.1.6 Noise and exhaust emissions from production and transportation equipment could be a critical consideration for allowing/denying development. On the Vermejo Park Ranch, buried electric power is used to run pumpjacks, compressors, and other motors. Would you consider this to be an acceptable alternative to lease-gas powered equipment if necessary?
YES: 2
NO: 2
Additional comment from one respondent stated "terrain too rugged-would also limit economic viability. Current technology can reduce noise and exhaust emissions to acceptable limits."

7.1.7 What gas compression option would you prefer for this type of production?
Wellhead**:** 0
Centralized**:** 4

7.1.8 What water disposal options would you prefer for produced water less than 2000 ppm total dissolved solids?
Surface disposal: to settling pits, then to natural drainages**:** 4
Subsurface injection into deep saline aquifers**:** 0
Trucking (at minimum 30 miles) to off-site approved disposal facilities**:** 0

7.1.9 If productive, mid-depth Mesozoic targets will most likely yield gas with producing wells spaced 320 acres per well.
YES: 2
NO: 2
Additional comments from two respondents with NO answer: "Shale gas potential may require wells closer than 320s to drain the tight gas source" and "160 acres required as would be tight gas"

7.1.10 Seismic exploration methods in the area will likely be:
2-D: 0
3-D: 4

Probable spacing between lines/cross-lines: One respondent replied “~1000 ft”. Another respondent replied “900 ft shot lines, 300 ft receiver lines, but use existing roads as much as possible”.

7.2 Implications of responses to RFDS

The survey responses generally support the base assumptions presented to the respondents with some exceptions.

In question 7.1.4, three of four respondents favored 80-acre well spacing for development. We do not have enough data to demonstrate a need for 80-acre spacing at this time. Justification for infill drilling to this density would need to be supported by modeling and analysis of more years of production than are available in wells adjacent to the eastern Valle Vidal Unit. The degree of stratigraphic complexity of the Vermejo and Raton Formations does suggest to us that evaluation of 80-acre well spacing might be justified at some point in the future when sufficient production data is available. We provide two scenarios in the RFDS, one based on 160-acre and 80 acres well spacing.

In question 7.1.8, all of the four respondents preferred a surface discharge option for produced waters. The Carson National Forest is encouraged to consider a surface discharge option as part of any further analysis of field development. Currently the State of New Mexico requires subsurface disposal for produced waters.