

January 23, 2008

Dear Dr. Swann,

Here is our reply to your question to Dr. Muehlenbachs. After reading Dr. Blyth's report "An independent review of coalbed methane related water well complaints filed with Alberta Environment" January 16, 2008, and listening to Dr Blyth's appearance on the Dave Rutherford radio show, we have three basic and critical concerns regarding the validity of the study and the conclusions regarding the Rosebud area.

1. Use of the unqualified D35 well isotope database as the standard of water gas not impacted by CBM development

The report states "The composition and carbon isotope signature of free gas from the water wells was the primary data used to evaluate the well complaints. The gas composition and carbon isotope signature of the wells were evaluated using a series of plots and statistically compared to 105 to 145 nearby D35 wells from the AENV water well database collected under the AEUB Directive 35." Section 5.6, p.7.

In other words, the conclusions of the report are based primarily on a comparison of the isotope ratios of complainant water well gases to those of gases in the baseline water study initiated in May 2006. The report assumes that water gases included in the baseline water study come from waters that have had no impact from CBM development. However, based on samples analyzed in our laboratory, as illustrated in the area immediately surrounding Rosebud (Figure 1), seven of the thirteen D35 wells in this small sample area lie within less than ½ mile from a CBM well already developed prior to May 2006. These water wells that lie in such close proximity to CBM wells could have been impacted by CBM activity, but have been included without qualification in this report as representative of pre-CBM development. Due to the abundant CBM activity before initiation of the D35 project, it is not valid to use the D35 database as a standard against which to compare water wells, without first evaluating each D35 well for proximity to and possible impact by CBM development.

2. Disregard of ethane isotope data and its diagnostic potential

The report concludes "The ethane carbon isotope values for the CBM wells fall within the normal range of ethane values for all D35 wells in the area". This range for ethane is shown in Figure 5 of the report to be -58 to -40 per mil, a very broad range. We suggest that given the above problems with the D35 baseline data, the less negative ethane values in the D35 database may indicate that a number of supposedly baseline waters have, in fact, been impacted by previous CBM activity. Certainly, the quoted statement is not a valid reason to totally ignore the ethane isotopic data that we have found to be highly diagnostic as illustrated in Table 1 and in the following discussion. In Table 1, for example, the Ernst and the Signer waters have the same isotopic ratio for methane, but have significantly different isotopic ratios for ethane (Table 1). This ethane difference may indicate that the gas in each of these waters is sourced from different depths within the Lower Horseshoe Canyon or the underlying Belly River Formations.

Table 1. Reproducibility of Carbon Isotope Analyses of Methane and Ethane in Water Wells from the Hamlet of Rosebud (Sept 2006 – Oct 2007)

Landowner	Number of Gas Samples	Number of Sampling Periods	Average Methane Isotope Ratio	Average Ethane Isotope Ratio
Ernst	10	5	-67.9 +/- 0.5	-45.0 +/- 0.9
Lauridsen	7	3	-63.7 +/- 0.2	-41.6 +/- 0.3
Signer	4	2	-67.8 +/- 1.0	-40.9 +/- 0.2
Pearl	3	1	-66.7 +/- 0.3	-43.2 +/- 0.1

3. Lack of isotope data for coal gas from zones of water well completion and CBM production

“In the Rosebud/Redland area, local water wells appear to be predominantly producing water from the Carbon Thompson and Weaver coals of the (Middle) Horseshoe Canyon Formation”, whereas CBM production in this area is from the Lower Horseshoe Canyon Formation i.e., a different coal zone. The report concludes “The carbon isotope value of the ethane in the CBM wells is the same as the ethane isotope value of the complainant and surrounding D35 water wells. The similarity between ethane isotope values is not unexpected as both the CBM wells and the water wells are completed in the same formation (but different coal members).” The key factor here is that although the water reservoir coal and CBM coal are within the same formation, they are different coal members at different depths. There is no documented isotope data in this report to show that gases from these two coal zones are isotopically the same. In fact, our study of coals in a region about 50 miles north of Rosebud, shows that carbon isotope ratios for ethane in the middle Horseshoe Canyon water reservoir coals (-47.5 +/- 0.3 per mil) are significantly different from carbon isotopes ratios for ethane in the lower Horseshoe Canyon CBM coals (-40.9 +/- 1.2 per mil). In other words, gases from the two coal zones can be distinguished by their ethane isotopic ratios. As quoted above, the carbon isotope values of ethane in the complainant waters are similar to that of the CBM wells, and therefore, are not similar to *in situ* gas from the water reservoir coal. This indicates that the source of the gas is not purely the *in situ* gas from within the completed zone of the water well. Instead, there must be a contribution of gas from the CBM coals of the lower Horseshoe Canyon Formation or from the underlying Belly River Formation.

In summary, given the unqualified nature of the D35 well database, the disregard of diagnostic ethane isotope ratios and the lack of coal gas isotope data, we find the overall conclusion of Dr. Blyth’s report “An independent review of coalbed methane related water well complaints filed with Alberta Environment” January 16, 2008, to be premature.

Drs. Barbara Tilley and Karlis Muehlenbachs

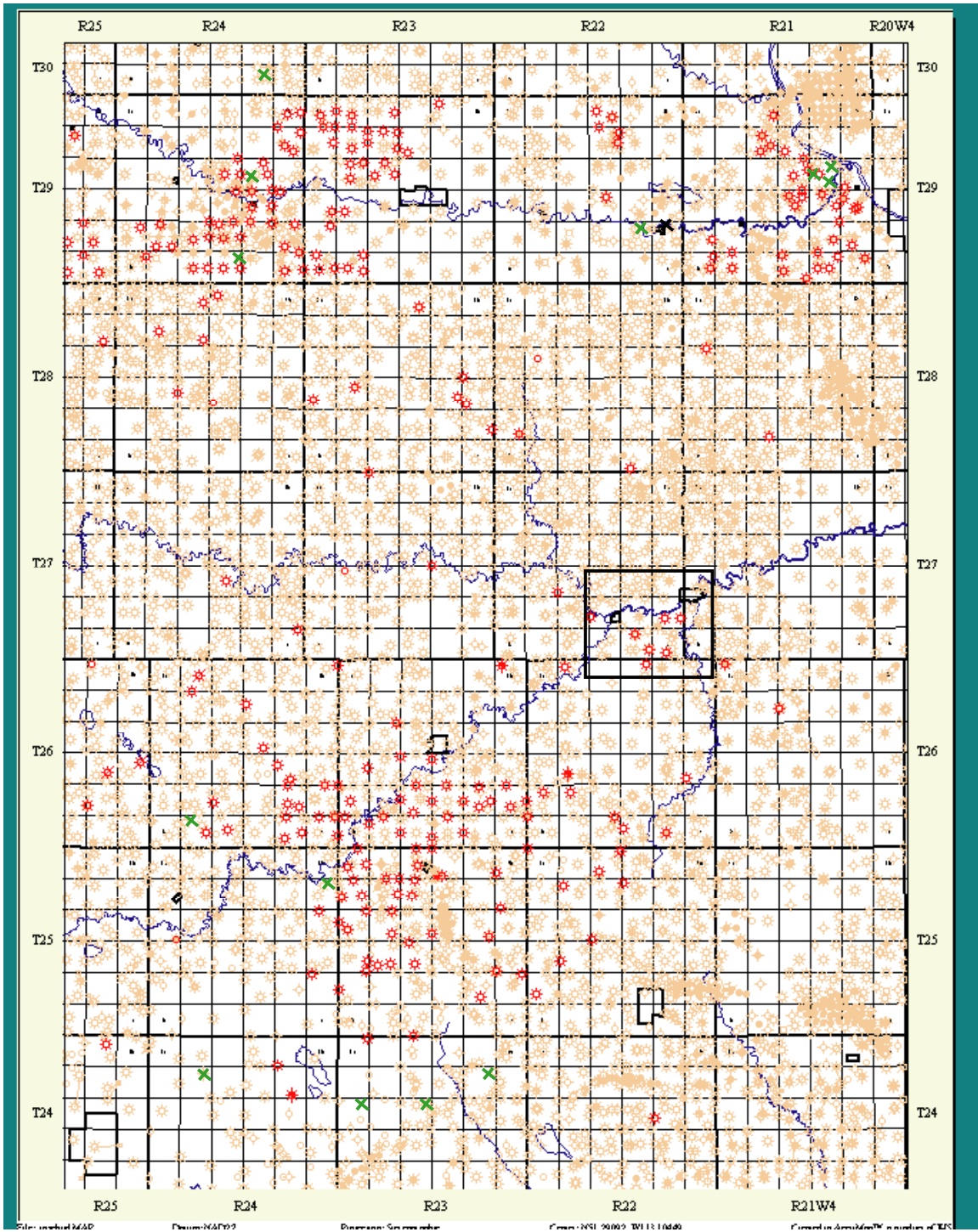


Figure 1. Proximity of D35 water wells (green x's) to already existing CBM wells (pre-May 1, 2006, red well symbols) in the region around and including the Hamlet of Rosebud.

