

By E-Mail

July 25, 2006

Canadian Natural Resources Limited
c/o Thackray Burgess
1900, 736 – 6th Avenue SW
Calgary, Alberta T2P 3T7

Attention: Mr. Patrick McGovern

Dear Mr. McGovern

RE: APPLICATION NO. 1409180
APPLICATION TO SHUT-IN GAS PRODUCTION
COLD LAKE OIL SANDS AREA CLEARWATER FORMATION

Please find enclosed information requests made by the Board staff to Canadian Natural Resources Limited with respect to Application No. 1409180.

Yours truly,


Giuseppa Bentivegna
Board Counsel

cc: EnCana Oil and Gas Partnership,
c/o D. G. Davies
McCarthy Tetrault LLP

Board Staff Information Requests for Canadian Natural Resources Limited (CNRL)

1. With respect to the wells requested to be shut-in.
 - a) Provide a list of the wells that CNRL is requesting the EUB to shut in and specify the intervals that CNRL wants shut in.
 - b) In its August 5, 2005 submission, CNRL included wells 5-10-69-4W4M and 3/8-3-69-4W4M on the list of wells it wanted shut in, but these wells are not included in CNRL's July 4, 2006 submission which supersedes CNRL's previously submitted evidence. Explain why CNRL is no longer requesting the shut in of these two wells.
2. On Page 1 of its submission CNRL states, "The Clearwater Formation of greater than 10m thickness has generally been targeted for CSS development, but recent improvements in technology are expanding feasible development to intervals as thin as 7m." Provide information to support this statement.
3. On page 2, CNRL states, "A primary recovery pilot was conducted at Primrose East Burnt Lake pilot in the early 1990's. Here primary oil rates were 10-30 m³/d well."
 - a) Provide a comparison of the reservoir and bitumen properties for the Primrose East Burnt Lake Pilot and area 5 on Figure 6.1.
 - b) Provide the cumulative oil production data for the Primrose East Burnt Lake pilot.
 - c) Discuss the impact that current completions practices and technology might have had on primary production from the pilot area.
4. With respect to thermally induced cold flow:
 - a) On page 3, thermally induced cold flow at North Tangleflags is used as an analogy for the Primrose Blue Valley sand facies assemblage E. Provide a comparison of the reservoir and fluid properties for the two areas and explain why the analogy is appropriate.
 - b) Provide an explanation, with a sample calculation if possible, of how the curves shown on Figure 1.4 were generated.
 - c) With respect to Figures 1.6 and 1.7, show the location of the thermal area relative to wells 14/15-23-52-25W3M and 41/5-23-52-25W3M.
5. With respect to geological data and analysis:

- a) Provide annotated logs (Gamma Ray, Neutron-Density, SP, and Resistivity) over the Clearwater Formation for all wells within the region of influence as defined in the application. The composite well logs should identify:
 - i) Formation and facies tops.
 - ii) All gas pay, water zone, and bitumen pay intervals.
 - iii) All perforated and cored intervals.
 - iv) Location of piezometers.
 - b) Provide core photos and core analysis for all cored wells used in the cross-sections in the application.
 - c) Section 2 of the application provides a general description of the Clearwater depositional environments and internal facies. Provide a detailed description of the Clearwater depositional environments and the internal facies description for each of the Blue, Yellow and Orange Sands. Include appropriate figures (i.e. type logs and core photographs).
 - d) Provide bitumen net pay maps, at a scale of 1:75000, for the following sands based on a bitumen saturation equal to or greater than 50 % pore volume with the net pay values for each well posted on the maps. Include the cutoffs (resistivity, porosity) used by CNRL to determine the net pays.
 - i) The Clearwater Orange Sand.
 - ii) The Clearwater Yellow Sand.
 - iii) The Clearwater Blue Sand.
 - iv) Facies A/B of the Blue Sand.
 - v) Facies E of the Blue Sand.
 - e) Provide the reservoir parameters (area, porosity, water saturation, oil volume formation factor) used to calculate the original bitumen in place values shown on table 6.2.
 - f) Provide a map showing the thicknesses of any water zones associated with the gas or bitumen zones.
6. With respect to the calculation of the regions of influence:
- a) On page 23 of its submission CNRL states that simulation of the pressure data for the Orange Sand observation well yields a good match using a diffusivity of $1.5 \cdot 10^{-3} \text{ m}^2/\text{s}$. However, Figure 3.1 shows the simulated pressures diverging from the measured pressures at later times. Did CNRL do any sensitivity calculations using different diffusivity values to try to get a better match of the later time data? If yes, provide the results. If not, why not?

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- b) Did CNRL simulate the pressure data for the Blue Sand observation well? If yes, provide the results. If not, why not?
 - c) Provide the input information used to generate the curves presented on Figure 3.2 and, if possible, provide a sample calculation showing how the curves were generated.
7. With respect to the methodology of CNRL's gas pool analysis described on page 28 of its submission where CNRL states that in interpreting the P/Z plots, early time data were used to delineate an "initial decline" curve which was extrapolated to yield an "Original OGIP" and this was compared to a "later decline" curve delineated by later time data which was extrapolated to yield a "Recoverable Gas in Place":
- a) Comment on the reliability of extrapolating the early time data considering the amount of data that are available for the pools that CNRL wants the EUB to shut in.
 - b) Comment on whether the data actually show two distinct trends or whether there is just scatter in the data around a single trend.
8. Section 5.0 has a number of plots showing pressure and production data and analysis.
- a) Provide a tabulation of well location, type of test, date of pressure test and shut-in time for each static gradient and AOF test for each of the pools in Section 5.
 - b) On page 31, in reference to Figure 5.4, CNRL states that, "the sum of the current declines for the wells (dotted red line) indicates that the pool will make 350 E6m³". Explain how the dotted red line is supported by the production data after a cumulative production of about 120 E6m³.
 - c) On Page 43, it is stated, "The 10-22 well is currently shut-in by Canadian Natural...". EUB records indicate that the 10-22-67-5W4 well produced full hours in April 2006. When did CNRL shut-in the well?
9. With respect to the pressure monitoring wells:
- a) Provide an electronic tabulation of the pressure data in excel format for each piezometer in the pressure monitoring wells.
 - b) The data on most the pressure monitoring wells does not appear to be current. Update the pressure monitoring well plots with current data if additional data is available.

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- c) It appears that some of the piezometers are set in the gas and/or bitumen zones while other piezometers are "hung" in the wellbores (i.e. wells 13-33-67-3W4M, 13-10-68-3W4M, and 11-12-68-4W4M). Explain how each of the piezometers were installed, and indicate how the wells are completed and which zones are being monitored by each of the piezometers.
 - d) Pressure monitoring well 102/10-33-68-4W4M is referred to on Figure 5.17 regarding CNRL's Fisher K Pool but only the pressure data for the gas zone are shown. In CNRL's June 30, 2005 submission, CNRL provided a pressure plot for this well which indicated there are three piezometers in the well. Provide a pressure plot (and electronic tabulation) that shows the data for all three piezometers, explain how the piezometers were installed, and indicate how the well is completed and which zones the piezometers are monitoring.
 - e) It appears that Figure 5.5 presents the bitumen pressure at the 11-12-68-4W4 well. Provide an explanation why the pressure shown on this plot in 2005 is lower than the gas pressure at the 7-13-68-4W4 well taken in 2005, as shown on Figure 5.6.
 - f) Provide the original pressure for the bitumen zone in the area of application and the method used to determine this pressure.
10. Provide the basis for CNRL's gas pool mapping, specifically:
- a) Why is the 11-6-68-3W4M well interpreted to be in CNRL's Fisher E/F Pool considering that its initial pressure prior to being produced appears to have been lower than the pressures in the other wells in the pool that had already been on production by the time the initial pressure was taken in the 11-6-68-3W4M well?
 - b) Why is the 5-17-68-3W4M well interpreted to be in a single well pool rather than being in CNRL's Moore B/C Pool considering that the well appears to have a depleted initial pressure?
 - c) Why doesn't CNRL interpret the wells in sections 2, 3, and 10-69-4W4M to be in CNRL's Fisher K Pool?
11. On page 56 of its submission CNRL states that production of the solution gas from the progressively migrating regions of influence will defeat the gas drive mechanism and thereby prevent the recovery of the bitumen. Provide a discussion of why production of the solution gas would prevent the recovery of bitumen rather than reduce the recovery of bitumen.

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12. Provide copies of references 1, 2, 3, 4, 6 (pages 31-34), 7 and 8.