

Barristers & Solicitors
Patent & Trade-mark Agents

McCarthy Tétrault

McCarthy Tétrault LLP
Suite 3300, 421-7th Avenue S.W.
Calgary AB T2P 4K9
Canada
Telephone: 403 260-3500
Facsimile: 403 260-3501
mccarthy.ca

D. G. Davies
Direct Line: 403 260-3681
Direct Fax: 403-260-3501
E-Mail: ddavies@mccarthy.ca

Assistant: Penny Goebel
Direct Line: 403-260-3662
E-Mail: pgoebel@mccarthy.ca

April 23, 2007

Alberta Energy and Utilities Board
640 - 5 Avenue S.W.
Calgary Alberta
T2P 3G4

Attention: Mr. Gary D. Perkins

Dear Sir:

Re: EnCana Oil And Gas Partnership (EnCana) Application No. 1394112
Canadian Natural Resources Limited (CNRL) Application No. 1409180
Husky Oil Operations Limited (Husky) Application No. 1481725
Cold Lake Oil Sands Area – Clearwater Deposit

Attached please find the responses of EnCana to the information requests of Husky dated April 13, 2007.

Yours very truly,

McCarthy Tétrault LLP

Original signed by

D. G. DAVIES

cc: Alberta Energy and Utilities Board
Attention: Mr. Ernie Smith

Canadian Natural Resources Limited
Attention: Mr. Jared Paddock

Thackray Burgess
Attention: Mr. Patrick J. McGovern

Husky Oil Operations Ltd.
Attention: Ms. Susan Anderson

Borden Ladner Gervais LLP
Attention: Mr. Randall W. Block

Imperial Oil Resources
Attention: Ms. Cheryl Trudell

EnCana Oil and Gas Partnership (EnCana) Application No. 1394112
Canadian Natural Resources Limited (CNRL) Application No. 1409180
Husky Oil Operations (Husky) Application No. 1481725
Cold Lake Oil Sands Area - Clearwater Deposit
Board's Letter of March 28, 2007

Responses of EnCana Oil and Gas Partnership (EnCana) to
Information Request of Husky Oil Operations Limited (Husky)
Dated April 13, 2007

All appended figures were generated from EnCana's files submitted April 5, 2007.

1. Reference: EnCana's counsel's letter of April 5, 2007, item No. 2. - Runs respecting certain EnCana flank cases.
 - a. Confirm that in simulation folders "FL 2" (**Figure 1**) and "FL 8", the permeability multipliers in the I (x-axis), J, and K (y-axis) directions in the wellblocks and all gridblocks between and beyond the wellblocks in the J direction, are 10 times higher than elsewhere.
 - b. If EnCana cannot provide the confirmation sought in response to Husky Information request 1 a., provide a detailed explanation.
 - c. If EnCana can provide the confirmation sought in response to Husky Information Request 1 a., provide:
 - i. copies of all geological data examined and analysis undertaken by or for EnCana that justifies the referenced assumption in respect of permeability multipliers,
 - ii. a full description of and substantiate all assumptions relied upon in the analysis, and
 - iii. all core analysis and well logs examined in performing the analysis.
 - d. Confirm that in simulation folders "FL 6", the permeability multipliers in the I, J, and K directions in all the gridblocks from the right-hand side of the grid, up to the toe of the well, are 60 times higher than elsewhere.
 - e. If EnCana cannot provide the confirmation sought in response to Husky Information request 1 d., provide a detailed explanation.
 - f. If EnCana can provide the confirmation sought in response to Husky Information Request 1 d., provide:
 - i. copies of all geological data examined and analysis undertaken by or for EnCana that justifies the referenced assumption in respect of permeability multipliers,

- ii. a full description of and substantiate all assumptions relied upon in the analysis, and
 - iii. all core analysis and well logs examined in performing the analysis.
- g. Confirm that in simulation folders “FL 11” and “FL 12”, a transmissibility factor of zero has been applied in the vertical (“K”) direction in layers 3 to 6, in the gridblocks corresponding to the 20-metre thick shale plus the adjacent sandstone layers (**Figure 2**) leaving a restricted flowpath consisting of a narrow 10-metre bottleneck between the top gas zone and the lower bitumen zone.
- h. If EnCana cannot provide the confirmation sought in response to Husky Information request 1 g., provide a detailed explanation.
- i. If EnCana can provide the confirmation sought in response to Husky Information Request 1 g., provide:
 - i. copies of all geological data examined and analysis undertaken by or for EnCana that justifies the referenced assumption in respect of transmissibility factor,
 - ii. a full description of and substantiate all assumptions relied upon in the analysis, and
 - iii. all core analysis and well logs examined in performing the analysis.
- j. Confirm that in simulation folder “FL 19”, the permeability multipliers in the I, J, and K directions are 60 times higher in the blocks in the CSS location, as opposed to those under the gas cap (**Figure 3**).
- k. If EnCana cannot provide the confirmation sought in response to Husky Information request 1 j., provide a detailed explanation.
- l. If EnCana can provide the confirmation sought in response to Husky Information Request 1 j., provide:
 - i. copies of all geological data examined and analysis undertaken by or for EnCana that justifies the referenced assumption in respect of permeability multipliers,
 - ii. a full description of and substantiate all assumptions relied upon in the analysis, and
 - iii. all core analysis and well logs examined in performing the analysis.
- m. Confirm that in simulation folder “FL 21 Rew”, the permeability multipliers in the I, J, and K directions in the wellblocks, 70m beyond the toe of the well, and all gridblocks between and beyond these wellblocks in the J direction, are 60 times higher than elsewhere (**Figure 4**).
- n. If EnCana cannot provide the confirmation sought in response to Husky Information request 1 m., provide a detailed explanation.
- o. If EnCana can provide the confirmation sought in response to Husky Information Request 1 m., provide:

- i. copies of all geological data examined and analysis undertaken by or for EnCana that justifies the referenced assumption in respect of permeability multipliers,
 - ii. a full description of and substantiate all assumptions relied upon in the analysis, and
 - iii. all core analysis and well logs examined in performing the analysis.
- p. Confirm that in simulation folder “FL 21 Re”, the permeability multipliers in the I, J, and K directions in all the gridblocks from the right-hand side of the grid, up to 70m beyond the toe of the well, are 60 times higher than elsewhere (**Figure 5**).
- q. If EnCana cannot provide the confirmation sought in response to Husky Information request 1 p., provide a detailed explanation.
- r. If EnCana can provide the confirmation sought in response to Husky Information Request 1 p., provide:
 - i. copies of all geological data examined and analysis undertaken by or for EnCana that justifies the referenced assumption in respect of permeability multipliers,
 - ii. a full description of and substantiate all assumptions relied upon in the analysis, and
 - iii. all core analysis and well logs examined in performing the analysis.
- s. Confirm that in respect of all cases in the subdirectories contained in folder - Rerun EnCana’s Flank Cases_Material Balance Error that within the bitumen zone, the imbibition relative permeability curve for water has an irreducible water saturation of 0.45 (**Figure 6**), in contrast to Husky’s value of 0.15, which was based on core data provided to all parties.
- t. If EnCana cannot provide the confirmation sought in response to Husky Information request 1 s., provide a detailed explanation.
- u. If EnCana can provide the confirmation sought in response to Husky Information Request 1 s., provide:
 - i. copies of all data examined and analysis undertaken by or for EnCana that supports the referenced assumption in respect of relative permeability curves,
 - ii. a full description of and substantiate all assumptions relied upon in the analysis, and
 - iii. confirm that EnCana’s relative permeability curves were based upon core tests, and if so provide the core tests relied upon.

Response: 1a.,1b.,1c.,1d.,1e.,1f.,1j.,1k.,1l.,1m.,1n.,1o.,1p.,1q., and 1r.

Permeability multiplier factors were required and applied in all our models to simulate reservoir dilation during steam injection. This includes application of the multiplier factor in the Flank cases FL 2, FL 8, FL 6, FL 11, FL 12, FL 19, FL 21 Rew and FL Re referred to by Husky. The gridblocks in which we implemented the permeability multiplier factors (dilation grid block treatment) and the values of the factors have been provided in previous submissions (see attached Tables in EnCana's additional information to EUB of January 4, 2007). The use of permeability multiplier factors in steam injection models has been discussed in our previous submissions (see EnCana's Response to Board Staff Information Requests of October 3, 2006).

Response: 1g., 1h., and 1i.

EnCana provided description of the geological concepts behind its generic models in its September 5, 2006 submission. Please refer to the Executive summary section of that report in which the following was stated:

- “ 4. Flank pool areas. The following two major types of reservoirs are identified and models were constructed to represent these reservoir types:*
- a. Flank areas containing extensive shale barriers but not overlying the bitumen zone completely (Figure E.6)*
 - b. Flank areas containing no shale barriers between the gas cap and the bitumen zone (Figure E.7).”*

FL 11 and FL 12 are part of 11 models described in that report containing barrier. EnCana has also described 18 models in that report containing no barriers and therefore no “bottleneck between top gas zone and the lower bitumen zone” as stated by Husky.

A summary Table of the Flank models including FL 11 and FL 12 were provided in that submission and in the submission of January 4, 2007 (see attached Tables in EnCana's additional information to EUB of January 4, 2007). These models were presented during the Cold Lake Hearing of February 20 to March 1, 2007.

Response: 1s., 1t., and 1u.

The input and output files provided in EnCana's April 5, 2007 submission in the folder entitled “Rerun EnCana's Flank Cases Material Balance Error” were reruns of cases, already presented in EnCana's previous submissions and also presented at the Cold Lake Hearing, that had material balance errors of greater than 2%. Note that changes in irreducible water saturations in the models are not expected to change the overall conclusions of our study results that suggest that gas cap depletion will have no adverse impact on HWCSS and HSAGD recovery factors. Note that Husky and

CNRL applied an irreducible water saturation of 0.15 and 0.35 respectively. However, model results of the Husky and CNRL model runs do not show any significant impact of gas cap depletion on bitumen recovery factors.

2. Reference: EnCana's counsel's letter of April 5, 2007, item No. 3. - Runs respecting the revised model referred to on page 54 of EnCana's opening statement.
 - a. The results described on page 54, "Summary of Prediction Results, Piezometer Model" for the so-called "Dilation, High-Pressure Steam Injection" case imply that dilation has occurred. Husky's examination of the wellbore pressures indicate that only one well pressure spike exceeded the minimum pressure for the onset of dilatancy, 7300 kPa, for both the depleted case and the non-depleted case (**Figures 7 & 9**). However, Husky examined the simulation results in greater detail and although the wellbore pressures exceeded 7300 kPa once, Husky was unable to find any gridblock with a pressure that ever exceeded the necessary minimum pressure for dilation, which would preclude any subsequent compaction drive. **Figures 8 & 10** show the gridblock pressures for the wellblock 36,51,10 which appeared to have the highest pressure in the grid (**Figure 11**). Provide:
 - i. all data reviewed and analysis undertaken that demonstrates when and where dilation was achieved in your "Revised Model" runs provided in folders "HWCSS_depletion" and "HWCSS_No_Depletion", and
 - ii. a full description of and substantiate all assumptions relied upon in the analysis.

Response: 2a.

See EnCana's Response to Board Staff IR No. 2 (CAL_DOCS-1574583-v1-EnCana Response to Board Questions on EnCana Input Output Files April 13 2007). Please note that the injection pressure exceeded the dilation as you correctly observed in Results Graph. However, the grid blocks that dilated could not be viewed in Results 3D because the Time or Date Keyword specified for output files for Results 3D did not correspond to the time at which the dilation occurred.

3. Reference: EnCana's counsel's letter of April 5, 2007, item No. 4. - Runs respecting the use of high-pressure HWCSS in gas over bitumen and gas flanking bitumen cases.

Based upon advice from Board Counsel, Husky understands that information requests in respect of the gas flanking bitumen cases that EnCana provided are to be filed on April 17, 2007.

EnCana provided runs of CNRL's models, in folders "GOR 1" through "GOR 8", for gas: oil ratios of 1, 2, 3, 5, and 8.

- a. Confirm that these runs use an obsolete injection and production scheme from Husky's January 30th, 2007 submission, as stated in file Model_Construction_GOR_1_to_8.doc.
- b. If EnCana cannot provide the confirmation sought in response to Husky Information Request 3 a., provide a detailed explanation.
- c. If EnCana can provide the confirmation sought in response to Husky Information Request 3 a., explain why EnCana used an operating schedule that was known not to allow solution gas drive rather than using CNRL's own operating strategy that allows solution gas drive.

Response: 3a., 3b., 3c.

At the time EnCana started the rerun of the CNRL model, it was decided to use Husky's High pressure injection strategy to avoid unnecessary argument with regards to the choice of the operating schedule applied in the model. At that time the latest Husky's operating schedule was that of January 30, 2007 submission and this schedule was applied to investigate the CNRL GOR model reruns of EnCana. We believe that any optimization of the high pressure operating schedule would not result in any significant changes to the overall conclusions of the GOR runs submitted April 5, 2007 by EnCana. That is, there is no significant impact of gas cap depletion on HWCSS.

It should be recognized that Husky has carried out several optimizations of its high pressure operating schedule in its model including those in its latest submission of April 5, 2007 and reruns by EnCana (EnCana's IR to Husky of April 13, 2007). Results of Husky's model when run with acceptable material balance errors showed no adverse impact of gas cap depletion on HWCSS and HSAGD. EnCana will be pleased to rerun the GOR model with a different high pressure operating schedule should this be requested by Board Staff.