

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

September 5, 2006

*Electronic Notification*

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

**Attention: Mr. Ernie Smith**

Dear Sir:

**Re: Application No. 1409180**  
**Cold Lake Oil Sands Area - Clearwater Deposit**

Attached please find the submission of EnCana Oil and Gas Partnership.

Yours very truly,

**McCarthy Tétrault LLP**

*Original signed by*

**D. G. DAVIES**

cc: Alberta Energy and Utilities Board  
Attention: Ms. Giuseppa Bentivegna

Canadian Natural Resources Limited  
Attention: Mr. Jared Paddock

Thackray Burgess  
Attention: Mr. Patrick J. McGovern

**ALBERTA ENERGY and UTILITIES BOARD**

**APPLICATION NO. 1409180**

**COLD LAKE OIL SANDS AREA – CLEARWATER DEPOSITION**

**SUBMISSION OF ENCANA OIL AND GAS PARTNERSHIP (ENCANA)**

EnCana has reviewed the Canadian Natural Resources Limited (CNRL) application dated July 4, 2006 and the CNRL responses to information requests. It is the submission of EnCana that CNRL has failed to demonstrate that the recovery of commercial bitumen reserves in the Clearwater formation in the application area would be adversely affected by production of gas.

CNRL has identified three development strategies to recover the bitumen; 1.0 Cyclic Steam Stimulation (CSS), 2.0 Thermally Induced Cold Flow, and 3.0 Primary (Cold Flow). Each is discussed below.

**1.0 CYCLIC STEAM STIMULATION (CSS)**

**1.1 Background**

The majority of the bitumen identified for recovery by CNRL ( $13.0 \text{ e}^6\text{m}^3$  of  $15.0 \text{ e}^6\text{m}^3$ ) will be produced by CSS. CNRL has presented no evidence, with respect to Clearwater formation bitumen in the application area, to quantify the effect that the lowering of reservoir pressure and/or the loss of solution gas might have on CSS recovery levels.

**1.2 Simulation Model**

EnCana has commissioned an independent consultant, Kade Technologies Inc., to construct a model representative of the Clearwater formation in the application area. The results of this study are presented in the attached report. The report shows that production of bitumen within the area identified by CNRL as the "Region of Influence" is not adversely affected by the

production and depressuring of the gas cap. The study demonstrates how erroneous conclusions can be reached by endeavouring to transfer inapplicable learnings from SAGD or vertical wellbore CSS to a development using horizontal wellbore CSS, without performing the necessary simulations. CNRL does not present any reservoir modeling or simulation to analyze and investigate the effect of gas production and pressure depletion on the potential CSS development. CNRL also does not provide any directly applicable analogue of horizontal CSS development within the proposed distance of a gas cap. The results of the independent study show that there is no need to shut in the gas wells that CNRL claims will affect the planned CSS development.

## 2.0 THERMALLY INDUCED COLD FLOW

### 2.1 Background

A smaller portion of the bitumen identified for recovery by CNRL ( $1.7 \text{ e}^6\text{m}^3$  of  $15.0 \text{ e}^6\text{m}^3$ ) is planned to be produced by Thermally Induced Primary. This bitumen is situated above a barrier referred to as the C&D muds which act as a vertical seal, as mapped by CNRL in Figure 2.7 of the July 4, 2006 submission. Above this barrier the reservoir quality is discontinuous with areas of nonproductive rock and thick calcite stringers. The bitumen contained in the interval above the barrier is often separated from the gas by water. There is a significant disconnect between the abundant "hard" data from Dean Stark analysis ( $R_o > 50\%$ ) performed on core, and the calculated net pay provided by CNRL in the IR responses. EnCana believes that CNRL will be unable to technically produce this bitumen due to high water saturation, potential water and gas coning restrictions, thin pay, discontinuous reservoir, and calcite stringers. CNRL has produced no existing applicable analogue pools or simulations to demonstrate the viability of such a project.

### 2.2 Comparison to Tangleflags Pool Characteristics

CNRL claims that the data from the Tangleflags pool is applicable to the Clearwater formation in this area. The difference in CNRL's average water saturations from the General Petroleum

formation at Tangleflags of 17% to 41% in the Clearwater formation clearly shows that Tangleflags is not a valid analogy. EnCana would expect that a 1000 cp oil reservoir with 32% porosity 41 % water saturation and darcy permeability would produce predominately water.

### **2.3 Query of all Conventional and Heavy Oil Pools in Western Canada**

EnCana has performed a search of the government agency reserve estimates for conventional and heavy oil pools in Western Canada with porosities of 31 % or higher, water saturations of 40% or higher and net pay less than 2.5 m. This search criterion was chosen based on the average parameters supplied by CNRL for the Clearwater formation bitumen in this development strategy. Only nine pools meet this criteria out of the over 11,000 pools registered. None of these pools was in the Clearwater formation. The API gravities for the pools ranged from 12 to 25.

### **2.4 Comparison to all Conventional and Heavy Oil Pools in Western Canada**

The nine pools described in section 2.3 have a weighted average recovery of only 2.5%, and the total recoverable reserve for those nine pools was estimated at  $0.087 \text{ E}^6 \text{ m}^3$ . For CNRL to be claiming 10.0% recovery and recoverable reserves of  $1.700 \text{ E}^6 \text{ m}^3$  in a Clearwater formation reservoir of this poor quality is not credible. Even in areas where the reservoir may have better than average parameters, CNRL has provided no PVT data, relative permeability data, or field tests from areas above old CSS projects that might permit an objective assessment of whether any reserve actually exists. CNRL has provided no simulation studies to support its estimates or to quantify the effect that water and gas zones would have on heat transfer and bitumen recovery.

### **2.5 Conclusion**

CNRL has presented no relevant data to justify its claim that there might, 10 to 15 years from now, be a Thermally Induced Primary reserve. There is no reason to shut in the gas wells identified as potentially affecting this development strategy.

### 3.0 **PRIMARY (COLD FLOW)**

#### 3.1 **Background**

CNRL has also identified a small portion of the bitumen to be recovered through Cold Flow (0.3 e<sup>6</sup>m<sup>3</sup> of 15.0 e<sup>6</sup>m<sup>3</sup>). CNRL has provided insufficient evidence that the supposed analogue Burnt Lake Pilot is applicable to the Clearwater formation for Cold Flow that is identified in the CNRL application. The Burnt Lake Pilot ended 13 years ago.

#### 3.2 **Conclusion**

To EnCana's knowledge, since the termination of the Burnt Lake pilot, no one, including CNRL, has attempted a commercial cold production project in the Clearwater formation within or near the application area. If CNRL is not prepared to exploit an area with average net pays of 20.1 m and 35% water saturation, it cannot credibly claim that a recoverable reserve exists in an area with 6m of pay and 43 % water saturation, in the total absence of any data other than some viscosity measurements.

### 4.0 **REQUESTED DISPOSITION**

EnCana submits that the CNRL has failed to demonstrate that CSS is adversely affected by production and depletion of any gas cap, or that the Thermally Induced Primary and Cold Flow areas have any viable bitumen reserves. EnCana therefore requests that the CNRL application to shut in EnCana gas wells be denied.