

**In the Matter of Alberta Energy and Utilities Board  
Bitumen Conservation Requirements  
Phase 3 Final Proceeding**

**Staff Submission Group  
Reply Submission for the  
Bitumen Conservation Phase 3 Final Hearing**

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## 1 Introduction

This submission (and the attached CD) constitutes the Staff Submission Group (SSG) reply to the response submissions filed by other parties on May 9, 2005, for the Alberta Energy and Utilities Board (EUB) Bitumen Conservation Phase 3 final hearing. Specifically, this submission replies to the response submissions filed by Canadian Natural Resources Limited (CNRL), ISH Energy Ltd. (ISH), and Stylus Energy Inc. (Stylus).

## 2 CNRL Response Submission

CNRL provided comments/evidence respecting gas pooling and vertical association in the Kirby area, and the nature of the Wabiskaw B valley-fill bitumen deposit in the Kirby area. The SSG believes it has addressed in its previous submissions the issues raised by CNRL.

CNRL also provided comments on the SSG's core-based study regarding the capability of well logs for determining the presence and thickness of the Wabiskaw D shale. CNRL stated that a comparison of the 41 wells in common to the Nexen Inc. (Nexen) and SSG core analysis shows that the two studies are inconsistent and contradictory.

The SSG reviewed the 41 wells in common to the Nexen and SSG studies. These wells are located in Nexen's Long Lake area and are listed in Table 6.2 – 2<sup>nd</sup> Supplemental and shown on Figure 1.

In the Long Lake area, the RGS interpreted the Wabiskaw D shale to be present at or near the base of the Wabiskaw C sand based on high gamma ray, high neutron porosity and low resistivity log readings. In its core-based study, the SSG determined that this log character, although similar to the log character of the Wabiskaw D shale, is reflecting the presence of a Wabiskaw C mudstone<sup>1</sup>. This mudstone has different physical characteristics from the Wabiskaw D shale and is overlain and underlain by Wabiskaw C sands.

It appears from the core photos in the Nexen study that the interval it identifies as Wabiskaw D shale is the interval mapped by the RGS, which is the same interval the SSG interprets to be Wabiskaw C mudstone. In addition to the 41 common wells, the SSG notes that Nexen has consistently identified and measured the thickness of the RGS mapped interval at the other wells in its study.

Based on the above, the apparent inconsistencies between the Nexen and SSG studies are related to the following:

- In cases where both the Wabiskaw C mudstone and Wabiskaw D shale were interpreted by the SSG to be present, Nexen and the SSG reported thicknesses for different core intervals. Nexen reported the thickness of the Wabiskaw C mudstone and the SSG reported the thickness of the Wabiskaw D shale.

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<sup>1</sup> *SSG Submission*, February 14, 2005, Section 6.2, page 16, paragraphs 2 and 3.

- In cases where the SSG interpreted only the Wabiskaw C mudstone to be present, the SSG reported the absence of Wabiskaw D shale (i.e., zero thickness) where Nexen reported the Wabiskaw C mudstone thickness.

*The SSG conclusions<sup>2</sup> respecting the capability of well logs to determine the presence and thickness of the Wabiskaw D shale are unchanged.*

### 3 ISH Response Submission

ISH submitted that at the interim hearing the SSG, "...acknowledged it is reasonable to interpret the McMurray A mudstone as present in the wells 00/10-02, 00/9-03, 00/16-05 and 00/12-09 all in Township 74 Range 9 West of the 4<sup>th</sup>, based on similar log characteristic".

ISH has misinterpreted the SSG's testimony at the interim hearing respecting the 16-5-74-9W4 well (Kirby Upper Mannville O3O Pool). Although the SSG acknowledged that the presence of the McMurray A2 mudstone at the 16-5 well is a possible interpretation, the SSG agreed with the RGS interpretation that the McMurray A2 mudstone is not present. Following are the interim hearing transcripts respecting the 16-5 well that were referenced by ISH (i.e., Volume 3, March 12, 2004, pages 524-525), which provide the SSG reasons for agreeing with the RGS interpretation.

23 Q. And above the McMurray channel deposits highlighted in  
24 green, is there not a shale in the 11-8 and 16-5 wells?

25 A. MS. CONNELLY: Yes, there is.  
0525

1 Q. And that shale lines up stratigraphically in all three  
2 wells?

3 A. MS. CONNELLY: Well, the shale in the 16-5 if  
4 there happens to be a shale there, but the sediments  
5 immediately overlying it look nothing like the A2 sequence  
6 and, in fact, everything from the bold red line at the base  
7 of the C sand down, it does not correlate at all, except for  
8 possibly that green unit.

9 I see we didn't -- the RGS did not pick an A2  
10 in that well, and I think that that might be reasonable in  
11 this case.

12 Q. Right, it might be reasonable to pick that shale?

13 A. MS. CONNELLY: It might be reasonable to not  
14 pick that shale in this case, based on the character of the  
15 sediments overlying it do not resemble the A2 regional  
16 sands.

17 Q. I think the position of CNRL, Ms. Connelly, is that the  
18 erosion occurred down to the shale and stopped. There is  
19 the same log signature on all three wells?

20 A. MS. CONNELLY: I think it's possible. It may  
21 not be the case, and it becomes difficult when you have

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<sup>2</sup> SSG Submission, February 14, 2005, Section 6.3, page 17.

22 these channels very close to, and cutting down in these  
23 sequences, to know if a mudstone has been preserved, if the  
24 rest of the unit is entirely removed.

25 Q. Correct, but you would agree that the log signature in  
0526

1 all three wells shows a high gamma ray separation on the  
2 neutron density with low resistivity, correct?

3 A. MS. CONNELLY: Yes, it does.

4 Q. And so, therefore, it is possible that that shale is  
5 present; isn't it?

6 A. MS. CONNELLY: I think that's a possible  
7 interpretation. The RGS interpretation is that it's not.

The SSG maintains that the erosional event which removed the upper portion of the McMurray A2 sequence at the 16-5 well eroded deeply enough to also remove the basal McMurray A2 mudstone.

*The SSG continues to recommend that the Kirby Upper Mannville O3O Pool be shut in.*

#### 4 Stylus Response Submission

Stylus interprets the top of the McMurray B2 sequence at the AA/8-28-82-12W4 and AA/15-28-82-12W4 wells (oil sands evaluation wells drilled subsequent to the RGS) to be structurally lower than the gas/water contact at the 7-28-082-12W4 well (Divide McMurray R Pool). As a result, Stylus interprets the McMurray B2 sequence gas at the 7-28 well to not be in lateral communication with the channel gas at the 6-27-82-12W4 well (Divide McMurray Undefined 074 Pool).

The SSG agrees that the top of the McMurray B2 sequence at the AA/8-28 and AA/15-28 wells are structurally lower than the gas/water contact at the 7-28 well. The SSG also notes that the top of the McMurray B2 sequence at the AA/8-28 and AA/15-28 wells are lower than the water/bitumen contacts at the 7-28 and 6-27 wells. The SSG interprets the AA/8-28 and AA/15-28 wells to define the southern and northern flank of a structural high through which gas is continuous between the 7-28 and 6-27 wells.

*The SSG continues to recommend that the 7-28 well be shut in.*

Table 6-1: 2 <sup>nd</sup> Supplemental	SSG Wbsk D Shale Study (with Nexen data) (CD only)
Figure 1	Location of Wells Common to SSG and Nexen Core Studies (CD only)
Attachment 1	Computer Disk containing the SSG Reply submission, table and figure