

**In the Matter of Alberta Energy and Utilities Board  
Proceeding No. 1347905, Bitumen Conservation Requirements  
Athabasca, Wabiskaw-McMurray Phase 3 Final Hearing**

**Petro-Canada Response to Information Requests of the Board Staff**

**1 Reference:** On page 2 of its submission, Petro-Canada requests that the Board order a pressure monitoring program for the collection of adequate pressure data to further understand reservoir continuity issues throughout the Chard area.

**Request:**

- (a) Is Petro-Canada requesting the same pressure monitoring program it requested at the Chard-Leismer Hearing? If yes, why does Petro-Canada believe it would be appropriate for the Board to order such a program now, considering the Board did not require it at the Chard-Leismer Hearing (refer to section 12.3.1 of Decision 2003-023).
- (b) If Petro-Canada is proposing a different pressure monitoring program, provide the details of the proposed program.
- (c) Why would it be appropriate for the Board to order a pressure monitoring program just for the Chard area?

**Response:** (a) No.

The initial program submitted at the Chard-Leismer Hearing can be updated due to recent advancements in the understanding of regional continuity issues throughout the Chard lease area. In general, additional information and analysis since the drafting of the initial pressure monitoring program has revealed a higher level of reservoir continuity within the Wabiskaw-McMurray than had been previously anticipated. Consequently, the framework for an effective pressure monitoring program should be updated.

In order to progress the acquisition of relevant pressure data from gas wells, it is appropriate for the Board to mandate guidelines specific to the requirements for evaluating the Wabiskaw-McMurray reservoir continuity issues, as opposed to past requirements more focused toward gas production as outlined in Guide 40. Such a program would be necessary at the conclusion of the hearing process to ensure the acquisition of an adequate pressure record for establishing reservoir responses that support or negate the issue of pressure continuity.

(b) Petro-Canada would recommend the implementation of an updated pressure monitoring program following gas shut-in to include:

1. An annual static gradient pressure survey requirement on all shut-in gas wells/zones without permanent downhole gauges within the Wabiskaw-McMurray.
2. The installation of a permanent downhole gauge (PDG) for the acquisition of continuous pressure data for a minimum of one well in each defined gas pool. Through the Chard lease area, this would average approximately 5 PDGs (typically piezometer gauges) per section. Recommended wells for PDG installation would include:

1. 11-13-81-8W4
2. 11-22-81-7W4
3. 08-07-81-7W4
4. 10-14-80-8W4
5. 03-34-80-7W4
6. 08-30-80-7W4
7. 10-23-80-7W4
8. 07-14-80-7W4
9. 11-06-80-7W4
10. 11-28-80-6W4/2
11. 07-04-80-6W4
12. 06-22-80-6W4
13. 12-35-79-7W4
14. 04-30-79-7W4
15. 11-08-79-7W4
16. 11-20-79-6W4

(c) As Petro-Canada's submission is particular to the Chard area, the proposed pressure monitoring program has been referenced specifically to this area. However, considerations that warrant a pressure monitoring program in the Chard area may also be applicable to the broader regional area. Petro-Canada would support a Board initiative to order pressure monitoring throughout the Athabasca where warranted.

**2 Reference:** On page 24 of its submission, Petro-Canada states that the one-metre thick upper McMurray bayfill mudstones are susceptible to *in situ* fracture from even minor tectonic disturbance.

**Request:** Does Petro-Canada have any evidence of fracturing through the bayfill mudstones in the Chard area?

**Response:** In the Chard lease area, strong evidence of post-Wabiskaw faulting is, by inference, evidence of structural discontinuity and fracture in the one-metre thick, pre-Wabiskaw, regional bayfill mudstones of the McMurray.

In the Athabasca oil sands region, the Wabiskaw T21 surface has a relatively consistent south westerly dip of 1.5 to 2.0 metres per kilometre (Tab 1), with the exception of the eastern “Main Valley” trend (Tab 2), where reversals in dip of up to 60 metres coincides with salt dissolution scarps of underlying Devonian Prairie Evaporite (Tab 3).<sup>1</sup>

Petro-Canada’s lands at Chard straddle the western edge of the salt dissolution scarps of the Prairie Evaporite and are structurally influenced by faulting associated with salt dissolution collapse.

The Wabiskaw T21 structure map (Tab 4) illustrates the structurally disturbed nature of the surface that has resulted from post-Wabiskaw collapse induced by differential salt solution. The four cross sections (Tabs 5, 6, 7, and 8) demonstrate the abrupt vertical differences between nearby wells on the Wabiskaw, the A2 and the B2 regional mudstones. In particular, the wells (6-2-80-7W4, AA/10-26-80-7W4, 6-4-81-7W4) show significant structural drop from surrounding wells. Elevation differences range from eight to almost 18 metres per one or two kilometres and greatly exceed the consistent 1.5 to 2.0 metres per kilometre dip of undisturbed Wabiskaw. The structural difference between the closely spaced wells is strong evidence of post-Wabiskaw faulting associated with salt-solution collapse. Post-Wabiskaw faults with throws of 8 metres or more are common in the Chard area and easily breach and compromise the mechanical integrity of one metre thick A2 or B2 regional mudstones.

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<sup>1</sup> AOSTRA Technical Publication Series #10, Resource Characterization of the McMurray/Wabiskaw Deposit, 1995, page 32.