

ALBERTA ENERGY AND UTILITIES BOARD

Calgary Alberta

FRANCO-NEVADA MINING CORPORATION INTERIM SHUT-IN OF GAS PRODUCTION 00/10-23-076-07W4M/0 WELL LEISMER FIELD

**Decision 2001-64
Application No. 1095081**

1 INTERIM DECISION

Having considered the evidence submitted to the interim hearing, the Alberta Energy and Utilities Board (EUB/Board) is not persuaded that continued production of Wabiskaw gas from the 00/10-23-076-07W4M/0 well (10-23 well) in the interim period to the main hearing of applications scheduled to commence on November 13, 2001, would have a significant impact on bitumen recovery, the costs of recovering the bitumen, and the economic desirability of a bitumen project. Accordingly, the Board denies the subject application.

This interim decision should not be considered as conclusive or permanent with regard to the issues to be addressed at the main hearing. An interim decision necessarily means that the Board did not have the benefit of the entirety of the evidence and argument that will ultimately be made available to it, nor was it in a position to assess the merits based on the totality of evidence. Accordingly, the Board will not be bound by the above interim decision.

2 INTRODUCTION

2.1 Background

On September 8, 2000, Franco-Nevada Mining Corporation (Franco-Nevada) applied (i.e., Application No. 1086353), pursuant to Section 42 of the Energy Resources Conservation Act (ERCA), for a review of two Anderson Exploration Ltd. (Anderson) applications for approval to produce gas that were previously approved by the EUB. Franco-Nevada submitted that Wabiskaw gas production from the 10-23 well and 00/04-04-076-06W4M/0 well may be detrimental to the recovery of bitumen from its Leismer oil sands lease due to either pressure reduction or the influx of water. Franco-Nevada's Leismer oil sands lease is located in the southeast quarter of Township 76, Range 7, West of the 4th Meridian.

On March 20, 2001, Franco-Nevada requested that the Board shut in the 10-23 well on an interim basis pending the Board's ultimate disposition of related applications by Anderson for approval to produce gas in the area of Franco-Nevada's oil sands lease. On April 26, 2001, the Board denied Franco-Nevada's application for the interim shut-in of the 10-23 well.

2.2 Application and Interventions

On June 5, 2001, Franco-Nevada requested that the Board review at a hearing its April 26, 2001, decision in which it denied Franco-Nevada's application for the interim shut-in of the 10-23 well. The Board subsequently received a submission from Anderson, dated June 8, 2001, opposing Franco-

Nevada's request for a hearing. Anderson submitted that Franco-Nevada had not provided any new evidence that would justify the reversal of the Board's earlier decision.

On June 12, 2001, the Board issued its decision (Appendix 1) to conduct a hearing to consider Franco-Nevada's application for the interim shut-in of the 10-23 well.

2.3 Hearing

A public hearing of the subject application was held on July 9 and 10, 2001, in Calgary, Alberta, before J. D. Dilay, P.Eng., B. T. McManus, Q.C., and C. A. Langlo, P.Geol. A list of those who appeared at the hearing is provided in the following table.

THOSE WHO APPEARED AT THE HEARING

Principals and Representatives (Abbreviations Used in Report)

Witnesses

Franco-Nevada Mining Corporation (Franco-Nevada)
D. C. Edie

K. Bygrave, P.Geol.,
Consultant
M. Carlson, P.Eng.,
of Applied Reservoir Engineering Ltd.
P. Collins, P.Eng.,
Consultant
G. Waterman

Anderson Exploration Ltd. (Anderson)
L. M. Sali, Q.C.

P. Harvey, P.Eng.
K. Kingsmith
L. Piedimonte
A. Vink, P.Eng.

Alberta Energy and Utilities Board staff
M. E. Connelly, P.Geol.
G. W. Dilay, P.Eng.
K. M. Johnston
D. A. Larder
K. F. Schuldhuis, P.Eng.

3 JURISDICTION OF THE BOARD TO ISSUE AN INTERIM SHUT-IN ORDER

The Board explained its position on the power to grant interlocutory shut-in orders and the appropriate test for such action in *Decision 2001-63*, issued on August 2, 2001. It concluded that the common law tripartite test for interlocutory injunctive relief was not strictly applicable to such applications before the Board because the Board's legislative responsibility to conserve energy resources in the public interest was the paramount consideration, not the parties' private interests. In making this determination, the Board also rejected the argument that it possessed the requisite authority to compel an applicant to

provide an undertaking for damages to gas producers whose production was curtailed pending the main hearing on a shut-in application. A fuller discussion of this issue is found in *Decision 2001-63*.

4 ISSUES

The Board considers the issues with regard to the subject application to be as follows:

- geological interpretation,
- effect of associated gas production on bitumen recovery by steam-assisted gravity drainage (SAGD), and
- economics and public interest.

5 VIEWS OF THE BOARD

Given the interim nature of the subject application and the need to issue a timely decision, this report contains only the views of the Board and not the views of the hearing participants, as is the Board's normal practice.

5.1 Geological Interpretation

On the basis of the information currently available, the Board believes that Wabiskaw gas at the 10-23 well may be in communication with underlying bitumen through an intervening water leg within a localized Wabiskaw channel sand. It appears that the channel sand has downcut and removed the uppermost McMurray deposits in the area of the 10-23 well.

The Board accepts that pressure depletion due to gas production from the 10-23 well is shown to have reduced the pressure at the nonproducing 03/10-14-076-07W4/0 well (10-14 well). The Board believes that the available information demonstrates that the gas zone in the 10-23 well may be in indirect pressure communication through a water zone with the Wabiskaw gas at the 10-14 well on the Franco-Nevada oil sands lease and therefore is in communication with Wabiskaw bitumen on the Franco-Nevada lease.

Furthermore, based on the highly variable nature of the intervening sediments, the lack of any extensively correlatable mudstone units, and the unpredictable nature of channel environments, the Board believes that there is potential for vertical communication between the Wabiskaw and McMurray channel sands on the Franco-Nevada lease. Consequently, Wabiskaw gas at the 10-23 well may be in potential communication with Wabiskaw and McMurray bitumen on the Franco-Nevada lease. Additionally, the Board believes that the bitumen within the Wabiskaw and McMurray sands on the Franco-Nevada lease is of sufficient quantity and quality to warrant consideration for protection pending the outcome of the main hearing.

5.2 Effect of Associated Gas Production on Bitumen Recovery by SAGD

Franco-Nevada used reservoir simulation to assess the impact of associated gas production on bitumen

recovery by SAGD. The simulation results submitted by Franco-Nevada for a single SAGD well pair showed that the bitumen recovery would be reduced from 383 300 cubic metres (m³) to 381 100 m³ when the pressure was reduced from 2000 kilopascals absolute (kPaa) to 1000 kPaa. This is a predicted reduction in bitumen recovery of only 0.6 per cent. Considering the uncertainties involved in reservoir simulation, the Board considers this to be an insignificant reduction. Furthermore, this reduction in bitumen recovery is for a 1000 kilopascal (kPa) pressure drop. Franco-Nevada and Anderson estimated the current rate of pressure decline for the region of influence containing the 10-14 and 10-23 wells to be 275 kPa per year and 240 kPa per year respectively. If one assumes it will take the Board in the order of a year to conduct the main hearing and issue its decision, a more appropriate pressure drop to use for this interim review would be 260 kPa, rather than 1000 kPa. If one used a linear interpolation, the predicted reduction in bitumen recovery of 0.6 per cent would be further reduced to about 0.15 per cent. Pressure measurements taken on the 10-14 and 10-23 wells in May 2001 indicated pressures of 1887 kPaa and 1458 kPaa respectively, for an average pressure of 1673 kPaa. Based on an estimated pressure decline rate of 260 kPa per year, the average pressure in one year would be about 1415 kPaa. This pressure is above the 800 kPaa pressure level that the Board concluded in *Decision 2000-22* makes artificial lift more difficult. The Board does not believe that Franco-Nevada has demonstrated that continued gas production from the 10-23 well for the interim period would result in a significant loss in bitumen recovery.

Notwithstanding this conclusion, the Board believes that it is necessary to consider the economic impacts that could result from continued gas production from the 10-23 well in order to properly assess the public interest.

5.3 Economics and Public Interest

The Board notes that the bulk of Franco-Nevada's technical evidence describes its Leismer lease as a likely prospect for the application of SAGD technology. For example, with a gas price of \$3.50 per gigajoule and an oil price of \$16.40 per barrel, Franco-Nevada calculated an internal rate of return for a phased project of 186 well pairs to be in excess of 30 per cent.

Notwithstanding the reservations expressed by Anderson regarding several costs that were overlooked by Franco-Nevada, the Board does not dispute that should SAGD technology live up to expectations, the Franco-Nevada lease is a potential candidate for its application.

Franco-Nevada submitted an analysis of the effects on SAGD performance of pressure depletion through gas production from the 10-23 well. A comparison of the forecast results from operating a well pair in a 40 m pay zone with a reservoir pressure of 2000 kPaa (Table 5-16 of Exhibit 5) and operating the same well pair at a pressure of 1000 kPaa (Table 5-18 of Exhibit 5) indicates the following:

- With lower reservoir pressure, total operating costs would increase marginally on an undiscounted basis (\$12.8 million compared to \$11.1 million), and when discounted at 10 per cent, operating costs would be virtually the same, at about \$8.1 million.
- On an undiscounted basis, provincial royalties amended to remove production costs would decline modestly, from about \$6.7 million in the higher pressure case to \$6.2 million in the lower pressure case, while applying a discount rate of 10 per cent would imply a drop in royalties from some \$4.6 million with higher reservoir pressure to \$3.7 million with reservoir pressure declining to 1000 kPaa.

- With a discount rate of 10 per cent, pre-tax corporate profits would decline from \$13.6 million to \$10.4 million.
- The combined economic losses—comprising royalties, taxes and corporate profits—could be in the order of \$4 million per well pair at a discount rate of 10 per cent.

The Board believes that the above estimates of impacts are high, as they are based on a reservoir pressure drop of 1000 kPa. Since the pressure decline in the absence of granting the interim shut-in order would only be about 260 kPa per year, the Board believes that the potential negative impacts per well pair would be far less than those shown above. Therefore, assuming a linear relationship between pressure decline and economic losses, the combined economic losses from not granting the interim shut-in order could be in the order of \$1 million per well pair. However, the Board notes that the nature of the combined economic losses is largely related to the prospective timing of the revenues from production, rather than either the ultimate volume of bitumen recovery or the total costs of recovering it, both of which would be approximately the same with or without the granting of the interim approval. While the Board acknowledges that the timing of revenues and costs is a relevant economic and public-interest issue, the Board is not persuaded at this time that the impacts described by Franco-Nevada are significant enough to have a material effect on the economic desirability of the Franco-Nevada lease. The Board is prepared to hear discussion of these issues in the main hearing.

DATED at Calgary, Alberta, on August 2, 2001.

ALBERTA ENERGY AND UTILITIES BOARD

<original signed by>

J. D. Dilay, P.Eng.
Board Member

<original signed by>

B. T. McManus, Q.C.
Board Member

<original signed by>

C. A. Langlo, P.Geol.
Acting Board Member

APPENDIX 1

File No. 7000-1039410-01

June 12, 2001

Don Edie
Carscallen Lockwood
1500, 407 – 2 Street SW
Calgary AB T2P 2Y3
Fax: 262-2952

Lenard Sali
Bennett Jones
4500, 855 – 2 Street SW
Calgary AB T2P 4K7
Fax: 265-7219

Dear Sirs:

**RE: APPLICATION NO. 1095081
INTERIM SHUT IN OF GAS PRODUCTION
10-23-76-7W4M WELL
LEISMER FIELD
FRANCO-NEVADA MINING CORPORATION LIMITED**

1 Shut-In Request

The Alberta Energy and Utilities Board (EUB/Board) received a letter dated June 5, 2001, from Franco-Nevada Mining Corporation Limited (Franco-Nevada) requesting that the Board review its decision of April 26, 2001, in which the Board denied Franco-Nevada's application for the interim shut-in of Anderson Exploration Ltd.'s (Anderson) 10-23-76-7W4M well (10-23 well). Franco-Nevada seeks an order from the Board shutting-in the 10-23 well on an interim basis because of the potential harm to the recovery of its bitumen resources underlying the 10-23 well. It argued that the balance of economic interests favours the shut-in of the 10-23 well. Franco-Nevada referred to its earlier letter and supporting materials of March 20, 2001, and provided an additional letter dated June 11, 2001. It submitted that the Board should review its earlier decision by way of a hearing. Initially, Franco-Nevada proposed that its review be held in conjunction with the scheduled hearing regarding Petro-Canada Oil and Gas' (Petro-Canada) application for similar interim relief in the Chard area. In its letter of June 11, 2001, Franco-Nevada withdrew this request for a combined hearing.

Anderson opposed the request for a review by way of its letter dated June 8, 2001, maintaining that Franco-Nevada had not provided any new evidence that would justify the reversal of the Board's earlier decision. It pointed out that there are significant differences between Franco-Nevada's application and Petro-Canada's application in terms of the geology and the quality and economics of the bitumen reserves in question. Anderson argued that it would be inappropriate for the Board to consider the 10-23 well in isolation from Anderson's existing gas well production applications in the area as the evidence related to the 10-23 well will be directly related to Anderson's other wells. It proposed that the shut-in application be heard concurrently with Anderson's gas production applications at an early date.

The Board has deliberated on this matter and instructed me to advise you that it will conduct a review of its earlier decision not to impose an interim shut-in of the 10-23 well. The Board considers that its April 26, 2001 decision, based on its view that the evidence would be too detailed and complex for an interim decision, does not squarely address the issue of potential irreparable harm to the recovery of the bitumen resource, in the present circumstances. Franco-Nevada's main application for a permanent shut-in is part of the combined hearing outlined in the Board's letter of April 26, 2001. A considerable amount of time will elapse before a decision is issued on the main application. The Board is concerned that the extraction of the bitumen may be negatively affected by the continued production of the 10-23 well during this period. Accordingly, the Board will hold a hearing to consider the interim shut-in of the 10-23 well, utilizing the best evidence available at this time.

The Board does not accept, for the purposes of an interim shut-in application of the 10-23 well, that it is necessary to evaluate the several pending applications by Anderson for gas production. It is the producing 10-23 well that has been specifically identified by Franco-Nevada as posing a direct and immediate threat to its bitumen resource. Anderson's other wells are not producing at this time and do not present the same present concern.

Hearing Process

The Board directs that the parties to Application No. 1095081 are Franco-Nevada and Anderson. The filing and hearing schedule is as follows:

Notice of Hearing and Deficiency Letter to Franco-Nevada	June 12, 2001
Deficiency Response by Franco-Nevada	June 20, 2001
Intervention Submission by Anderson	July 4, 2001
Hearing	July 9 and 10, 2001

The hearing of Application No. 1095081 will be held at the offices of the National Energy Board (2nd floor hearing room) located at 444 – 7 Avenue SW, Calgary, and will commence on July 9, 2001, at 1:00 p.m.

At the hearing, participants will be limited in the amount of time allowed to present their positions. The following allotment of time is proposed as an outline; the Board will strive to be flexible and fair to all parties as the hearing unfolds.

Franco-Nevada Direct Evidence	0.5 hr.
Anderson Cross-Examination	2.0 hr.
Board Staff and Board Questioning	0.5 hr.
Anderson Direct Evidence	0.5 hr.
Franco-Nevada Cross-Examination	2.0 hr.
Board Staff and Board Questioning	0.5 hr.
Franco-Nevada Argument	0.5 hr.
Anderson Argument	0.5 hr.

Additional Information

The EUB requires that Franco-Nevada provide fourteen copies of the following additional information by June 20, 2001, with a copy to Anderson by the same date.

1. On Page 5 of the March 20, 2001 submission, it states that Franco-Nevada's analysis indicates that low pressures significantly reduce bitumen recovery and that the preliminary results of this analysis are shown in Figure 5. Briefly elaborate on the basis of Figure 5 and its applicability to gas production from the 10-23 well.
2. Provide the following for the gas pool containing the 10-23 well:
 - A listing of all the wells in the pool.
 - A summary of all the pressure measurements taken at each well in the pool including the test date.
 - An estimate of the current pool pressure and monthly decline rate.
3. Provide a net gas pay map for the pool containing the 10-23 well and a net bitumen pay map for the area potentially impacted by gas production from the 10-23 well, including the relevant cutoffs used to generate these maps.
4. Provide a summary analysis showing the following:
 - Annual bitumen production if the interim order were granted.
 - Annual bitumen production at successively lower reservoir pressures, under the assumption that the interim order were not granted.
 - The net present values of the bitumen volumes that could potentially be sterilized at successively lower reservoir pressures if the interim order were not granted.
 - The net present value of the gas that would be shut-in if the interim order were granted.
 - The net present value of the gas that would be shut-in at successively lower reservoir pressures.
 - The relevant assumptions that are used in the above analyses.

If you have any questions regarding the additional information described above, please contact Ken Schuldhaus at 297-3572.

Yours truly,

Douglas A. Larder
Board Counsel

pc: Interested Parties (see attached list)