

# **ALBERTA ENERGY AND UTILITIES BOARD**

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**Calgary Alberta**

## **APPLICATION FOR A WELL LICENCE**

### **TWINING FIELD**

**PENN WEST PETROLEUM LTD.**

**WELL LICENCE NO. 0195726**

**LSD 16-5-31-23 W4M**

**Examiner Report 97-5**

**Application No. 970251**

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## **1 INTRODUCTION**

### **1.1 Application**

Penn West Petroleum Ltd. applied to the Alberta Energy and Utilities Board (EUB), pursuant to section 2.020 of the Oil and Gas Conservation Regulations, for a well licence to drill in Legal Subdivision 16 of Section 5, Township 31, Range 23, West of the 4th Meridian. The purpose of the well, PENN WEST TWINING 16-5-31-23 (16-5 well), is to obtain oil production from the Twining Mannville Ostracod Formation (Ostracod pool). The well is anticipated to encounter trace amounts of hydrogen sulphide (H<sub>2</sub>S) and would be classified as a Level 1 facility with a corresponding 74-metre Emergency Planning Zone (EPZ). Well Licence No. 0195726 was issued on 20 December 1996 for the 16-5 well on the understanding that there were no outstanding issues related to the well that fall within the EUB's jurisdiction.

### **1.2 Intervention**

On 13 January 1997, the EUB received a submission from Terry and Marlene Mullinger (the Mullinger's), adjacent residents located in the NW quarter of Section 4-31-23 W4M (Section 4), stating that they were opposed to the drilling of the 16-5 well at the proposed distance of 141 metres from their residence. Subsequently the Board directed, pursuant to Section 43 of the Energy Resources Conservation Act, that a public hearing be held to hear the original well licence application.

The attached map illustrates the location of the proposed 16-5 well, the Mullinger's residence, as well as alternative well surface locations and surface improvements discussed at the hearing.

### **1.3 Hearing**

The application was considered at a public hearing held on 14 May 1997 in Drumheller, Alberta, before Board-appointed examiners H. W. Knox, P.Eng., R. Elle, and K. M. Johnston.

At the opening of the hearing, prior to Penn West's formal presentation of its application, the examiners and hearing participants viewed the proposed 16-5 wellsite location.

Those who appeared at the hearing and abbreviations used in this report are listed in the

following table.

### **THOSE WHO APPEARED AT THE HEARING**

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#### Principals and Representatives (Abbreviations Used in Report)

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#### Witnesses

Penn West Petroleum Ltd. (Penn West)  
G. E. Wilson

C. Frostad, P.Geol.  
W. Tang Kong, P.Eng.  
E. Mills  
T. J. Trotta

Terry and Marlene Mullinger (the Mullinger's)  
N. L. Tainsh

T. Mullinger, P.Eng.  
M. Mullinger

Alberta Energy and Utilities Board staff  
D. L. Schafer  
G. Salisbury  
D. F. Brezina

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## **2 ISSUES**

The examiners consider the issues respecting the application to be:

- the need for the well,
- the subsurface location of the well, and
- the surface location and impacts of the well.

## **3 NEED FOR THE WELL**

### **3.1 Views of Penn West**

Penn West submitted that it holds a valid crown Petroleum and Natural Gas (P&NG) lease, number 26155, for the purpose of obtaining oil production from the Ostracod Formation in Section 5-31-23 W4M<sup>1</sup>. Penn West also submitted that it has a valid surface lease agreement for the proposed 16-5 location.

Penn West stated that the proposed 16-5 well would optimize its existing enhanced recovery scheme and improve overall hydrocarbon recovery because it would be drilled in a portion of the

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<sup>1</sup> Penn West undertook to provide a copy of their petroleum and natural gas lease, subsequent to the hearing, at the request of the Mullinger's.

Ostracod pool that has not been swept by the existing water flood scheme.

### **3.2 Views of the Intervener**

The Mullinger's did not offer an opinion as to the need for the 16-5 well. They stated that they would not be opposed to the drilling of the well if the surface location was at least 400 metres or some other distance south to reduce the impact on the view from their home.

### **3.3 Views of the Examiners**

The examiners acknowledge that Penn West has a valid P&NG lease to explore for oil in Section 5-31-23 W4M and that a well is needed to recover additional hydrocarbons from the Ostracod pool. The examiners also accept that Penn West has a valid surface lease with the surface owner.

## **4 THE SUBSURFACE LOCATION OF THE WELL**

### **4.1 Views of Penn West**

Penn West advised that the Ostracod pool had been discovered in 1959 with the drilling of the 9-9 well in the northeast portion of the pool, and that currently there are seven producing oil wells, three water injectors, three suspended water injectors, and one abandoned water injector in the pool. About 48 cubic metres ( $m^3$ ) of oil per day is produced from the Ostracod pool.

Penn West described the geology of the Ostracod pool as a series of thin overlapping northeast/southwest trending bar sands. Penn West stated that there is no water leg to the Ostracod pool, and therefore, the net sand thickness is equivalent to the net oil pay. The sand appears to be three metres thick at its thickest point in the pool. The 16-5 well location is expected to have 2.7 metres of net oil pay thickness. The average porosity in the Ostracod pool is about 13 per cent.

Penn West has replaced about 93 per cent of the reservoir fluid volume with its water flood scheme, and cumulative production to January 1997 has been about  $398 \times 10^3 m^3$  of oil (approximately 21 per cent of the estimated original oil in place). Some  $62 \times 10^6 m^3$  of solution gas and about  $80 \times 10^3 m^3$  of water have also been produced from the pool. As a result the reservoir pressure has declined from 12 megapascals (MPa) to about 9 MPa.

Penn West stated that in 1993 it drilled two infill wells located at 5-9 and 14-4. Both wells have been exceptionally good producers with each having produced about  $18 \times 10^3 m^3$  of oil to date. The bulk of the oil production from the Ostracod pool is from these wells. Water is currently being injected into the 4-4, 12-4 and 9-9 wells and there has been no water breakthrough at the 14-4 well to date. Penn West stated that the water injected into the Ostracod pool travels in a northeast and southwest direction sweeping oil along the main sand bodies of the pool, and therefore, it expects that the area to the west and southwest of the 14-4 well would be an optimal location for a new well. The 12-4 injector may be shut-in as a precautionary measure to

minimize impacts to the recovery in that portion of the reservoir to be accessed by the proposed 16-5 well. On the basis of this information, Penn West submitted that drilling the 16-5 well would optimize its enhanced recovery scheme and increase oil production from the Ostracod pool.

In response to questioning, Penn West stated that regulatory restrictions placed certain limitations on the location of the 16-5 well. A well could not be drilled within 200 metres of the existing well spacing unit boundary, nor within 200 metres of an existing well producing from the Ostracod pool. Penn West conceded that the existing spacing restrictions did not preclude moving the subsurface location for the 16-5 well to the south, however, it believed that its proposed subsurface location would delay water breakthrough, thereby increasing recovery overall.

#### **4.2 Views of the Intervener**

The Mullinger's did not dispute the pool and water flood information provided by Penn West nor did they object to the choice of the subsurface target for the 16-5 well. However, they did point out that the well could be moved to the south and still be in compliance with existing regulatory well spacing requirements.

#### **4.3 Views of the Examiners**

The examiners have reviewed the information submitted by Penn West and do not take issue with Penn West's selection of the bottom hole target for optimal resource recovery. Although no specific evidence was provided by Penn West to suggest that movement within Legal Subdivision 16 of Section 5 would negatively affect resource recovery, the examiners believe that the probability of water breakthrough occurring earlier would be higher if the 16-5 well's bottom hole location was moved closer to the active 4-4 and 12-4 injection wells.

### **5 THE SURFACE LOCATION AND IMPACTS OF THE WELL**

#### **5.1 Views of Penn West**

Penn West submitted that the 16-5 surface location was selected having regard for the well's subsurface target. In response to questions regarding the cost of alternate surface locations Penn West estimated that drilling, completing, equipping and pipelining the proposed vertical well would cost approximately \$650,000. A directional well with a 150-metre horizontal deviation would increase that cost by \$52,000 while a 400-metre horizontal deviation would add \$129,000. On the basis of its estimates of expected oil production, Penn West advised that directional drilling from an alternative surface location 150 metres away from the preferred 16-5 wellsite would still be marginally attractive, while an alternative surface location 400 metres away would not likely be drilled.

Penn West offered two alternative surface locations for the 16-5 well. The proposed alternative locations A and B, as shown on the attached map, are approximately 225 metres and 165 metres, respectively, from the Mullinger's residence. However, Penn West indicated that neither of these locations appeared acceptable to the Mullinger's.

Penn West stated that it intends to meet or exceed EUB requirements throughout the drilling, testing and subsequent production life of the 16-5 well and that it is prepared to implement a number of measures to address the Mullinger's concerns. During the drilling phase, Penn West agreed to provide alternative accommodations for the estimated six to eight days necessary to drill the proposed well. To mitigate noise and light impacts from well testing operations, it proposed to construct a temporary berm, and while it suggested that a 30-day test period would be desirable to clean up the well and determine its productivity, it acknowledged that it may be able to obtain the necessary information within one or two weeks and minimize the duration of any impacts. Penn West advised that the testing operations would initially be monitored continuously for approximately one week and then on a daily basis until the completion of the test. For subsequent production operations Penn West said it would, subject to landowner consent, consider building a permanent berm to minimize visual impacts. The pumpjack for the proposed 16-5 well would be electric-driven for quieter operation. Additionally, Penn West advised that its maintenance program would minimize rod noise to the extent possible. It noted that, because the production from the well would be pipelined to the existing 9-9-31-23 W4M battery, there would not be a continuous flare at the 16-5 location.

Penn West described its efforts to contact the Mullinger's prior to filing an application for the 16-5 well. Although there had been no direct contact, Penn West believed that a reasonable effort had been made, including notification via registered letter. It was also pointed out that, rather than proceed to drill the well after it obtained a well licence, Penn West continued efforts to contact the Mullinger's. Penn West advised that, given the low estimated release rate of the 16-5 well, a site-specific emergency response plan (ERP) was not required. This view was supported by the calculation of a 74-metre emergency planning zone using a gas analysis having an H<sub>2</sub>S content of 0.017 moles per kilomole<sup>2</sup>. At the hearing, Penn West advised that it has a corporate ERP for all of its drilling operations and undertook to finalize emergency response procedures with the Mullinger's prior to lease preparation.

In response to concerns raised about dust problems from increased truck traffic during drilling and testing operations, Penn West committed to implement control measures acceptable to the municipality. It also advised that traffic during production operations would be similar to that currently experienced for the existing wells in the area.

In response to the Mullinger's concerns about the quality of their well water, Penn West volunteered to test the Mullinger's well water before drilling, immediately after drilling and again six months after the 16-5 well was drilled.

## **5.2 Views of the Intervener**

The Mullingers believe that the proposed 16-5 well, if drilled 141 metres from their residence, would have an adverse effect on their quality of life and expressed concerns regarding safety, noise, water well impacts and visual impacts. While they acknowledged that Penn West had

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2 Penn West undertook to provide a copy of a representative gas analysis from the Ostracod pool, subsequent to the hearing, at the request of the Mullinger's.

provided two alternative surface locations for the 16-5 well, they advised that neither would be acceptable and indicated a preference for the surface location to be some other distance south of the proposed 16-5 location to reduce the impact on the view from their home. They stated that a surface location 400 metres or more from their residence would be acceptable. They confirmed that attempts to negotiate an alternative surface location with Penn West had been unsuccessful.

The Mullinger's did not offer an opinion on the additional cost that might be borne by Penn West if the 16-5 well were to be directionally drilled from an alternative surface location. Regardless of the cost though, the Mullinger's stated their wish to have the 16-5 well set back at least 400 metres from their residence.

The Mullinger's raised safety concerns and expressed the opinion that Penn West had not contacted them directly to inform them about the presence of H<sub>2</sub>S, nor had they been provided with details regarding an ERP or evacuation procedures. They believe that Penn West could have contacted them directly if they had made more of an effort and that their differences might have been resolved. The Mullinger's acknowledged, however, that unfortunate scheduling conflicts contributed to the poor communication between themselves and Penn West. The Mullingers also raised concerns about the impacts associated with drilling, testing and production operations including noise, lights, odours, increased traffic, dust control, water well contamination, equipment maintenance and long term visual impacts of the pumpjack.

When questioned about the quality of their well water, the Mullinger's confirmed that their water well is not currently potable and that it is unfit even for livestock. They truck water in for use at their farm. While the Mullingers believe that existing industry activity has affected their water supply, they did not provide any specific evidence to support this contention.

The Mullinger's commented on the noise generated from existing pumpjacks and sought assurances that noise would be kept to an absolute minimum during the night-time. They also indicated that the lights and odours associated with flares are very unpleasant.

The Mullinger's raised concerns regarding increased truck traffic and the dust problems that would be associated. They believed that Penn West should implement dust control methods to help mitigate this problem.

The Mullinger's stated that a well at the proposed location, just outside their front yard, would also result in a visual impact on the view to the southwest. In summary, the Mullingers indicated that the 16-5 well would adversely affect their quality of life.

### **5.3 Views of the Examiners**

The examiners accept the Penn West data regarding incremental drilling costs associated with moving the 16-5 well surface location and agree that drilling from a surface location 400 metres from the Mullinger's residence would adversely affect the economics of the well to a point where it would not likely be drilled. The examiners believe that impacts from either of the alternative locations proposed by Penn West would be somewhat less, however, neither of those locations were acceptable to the Mullinger's.

The examiners accept that there would be some temporary impacts associated with drilling and testing of the 16-5 well and recognize the Mullinger's concerns regarding safety, noise, light impacts and odours during drilling and testing operations. While the examiners agree that the H<sub>2</sub>S safety risk posed from the 16-5 well would be relatively low with an emergency planning radius of some 74 metres, they believe that improved communication between Penn West and the Mullinger's might have addressed this concern prior to the hearing. The examiners believe that emergency planning matters and safety concerns in general should be addressed at the earliest opportunity through effective communication with nearby residents after notification of a proposed development. While the communication specific to the proposed 16-5 well between the parties appears to have been less than effective, the examiners believe the overall safety risk posed by the proposed 16-5 well would be similar to other wells located on the lands that the Mullinger's occupy, and accordingly, are satisfied with Penn West's commitment to meet with the Mullinger's to discuss emergency procedures relative to the 16-5 well. The examiners encourage Penn West to renew its commitment to effective communication with all area residents for the remaining life of the Ostracod pool.

With respect to impacts during drilling and testing operations, the examiners note Penn West's proposal to relocate the Mullinger's during the short drilling period as well as the proposal to construct a temporary berm to minimize noise and light impacts. Regarding the duration of the clean up and production test period the examiners believe this should be limited to two weeks to minimize noise and light impacts associated with flaring during production testing operations. Further, given the proximity of the well to the Mullinger's residence, testing operations should be continuously monitored for the duration of the test. Additionally, Penn West is encouraged to reduce the production test period further if at all possible.

In terms of longer term impact from odours and flaring, the examiners note Penn West's plans to connect the 16-5 well to the 9-9-31-23 W4M battery as soon as practical. Therefore, the long term impacts from odours and flaring at the 16-5 location would be minimal.

For subsequent production operations, the examiners are satisfied that Penn West's plan to utilize an electric-driven pumpjack at the 16-5 location would minimize noise impacts, and also note its commitments to operate the 16-5 well in a manner to minimize all sources of noise.

Respecting water quality concerns, the examiners note that the water quality at the Mullinger's residence has been poor for several decades and that the Mullinger's currently haul water to meet their needs. The examiners also note that Penn West agreed to test the water supply before and after drilling to verify whether or not drilling the 16-5 well affects water quality.

The examiners note Penn West's plan to implement dust control methods as necessary to address the Mullinger's concerns. Furthermore, the examiners agree that the truck traffic after the well has been connected to the 9-9-31-23 W4M battery would be substantially less than during drilling and testing of the well.

Regarding longer term visual impact, the examiners note Penn West's proposal to explore the potential value of a permanent berm, but recognize this would require consent from the landowner. The examiners are not convinced that this alternative would necessarily be the best method to minimize the visual impact of the 16-5 well. While there would be some longer term

visual impact, particularly in the winter months when there are no leaves on the trees surrounding the Mullinger's residence, the examiners believe such impacts would not be significant enough to warrant denying the application.

In conclusion, while the examiners believe there would be some impact on the Mullinger's if the 16-5 well were approved, they are satisfied that both the short and long term impacts associated with the drilling, testing, and production operations of this well could be mitigated using the measures described in Penn West's application, and at the hearing.

## **6 RECOMMENDATIONS**

The examiners recommend that Well Licence No. 0195726 remain in good standing subject to the production test operations being continuously monitored for the duration of the test period and the test duration being limited to a maximum period of two weeks.

Dated at Calgary, Alberta on 05 August 1997.

### **ALBERTA ENERGY AND UTILITIES BOARD**

H. W. Knox, P.Eng.

R. Elle

K. M. Johnston\*

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\* K. M. Johnston was not available to sign but concurred with the report and recommendation.