

ALBERTA ENERGY AND UTILITIES BOARD

Calgary Alberta

HUSKY OIL OPERATIONS LTD.

APPLICATION TO CONSTRUCT AND OPERATE TWO SOUR OIL EFFLUENT PIPELINES AND ASSOCIATED FACILITIES IN THE MOOSE FIELD

**Addendum to Decision 97-17
Application No. 1007046**

1 INTRODUCTION

1.1 Application and Intervention

Husky Oil Operations Ltd. (Husky), applied to the Alberta Energy and Utilities Board (Board) pursuant to part 4 of the Pipeline Act for a permit to construct and operate two sour oil effluent pipelines within a common right-of-way approximately 26.0 kilometres in length and, pursuant to section 7.001 of the Oil and Gas Conservation Regulations to construct and operate a multi-well sour oil production facility located in Legal Subdivision (Lsd) 16, Section 22, Township 23, Range 7, West of the 5th Meridian. The two proposed sour oil effluent pipelines would have an outside diameter (O.D.) of 114.3 millimetre (mm), and 88.9 mm O.D. respectively and would be constructed from the proposed multi-well sour oil production facility located in Lsd 16-22-23-7 W5M to an existing pipeline tie-in point known as Junction **A** located in Lsd 11-36-24-6 W5M. The sour oil effluent would be commingled with existing production at Junction **A** and delivered through existing pipelines to the Shell Jumping Pound gas processing facility located in Sections 13, 23, and 24, Township 25, Range 5, West of the 5th Meridian. The applicant proposed initially to use the 114.3 mm O.D. pipeline for the purpose of transporting sweet fuel gas from the existing Junction **A** pipeline tie-in point located in Lsd 11-36-24-6 W5M to the proposed multi-well sour oil production facility located in Lsd 16-22-23-7 W5M.

In response to a public notice issued by the Board, several parties registered their objection to the application. Accordingly, the Board directed, pursuant to section 29 of the Energy Resources Conservation Act, that a public hearing be held to review Husky's application (Application). Subsequently, following discussions between Husky and the interveners, all objections except for that of Parkland Refining Ltd. (Parkland) were either formally withdrawn or were not pursued at the hearing. Parkland participated in the hearing and presented concerns related to potential implications that approval of the Application would have on its Bowden Refinery (the refinery).

The attached diagram illustrates the locations of Husky's proposed facility and pipelines and the tie-in to the existing Shell Jumping Pound gas gathering system, as well as the portions of the Koch and Federated pipeline systems which collect condensate from several sources in the area. The diagram also shows the refinery location.

1.2 Background

In the winter of 1992/93, Husky drilled a discovery well near Moose Mountain in Kananaskis Country which encountered hydrocarbons. In September 1993, Husky applied for five additional well licences in the Moose Mountain area. The applications generated considerable interest and became the subject of a public hearing which was held in January 1994. Following the hearing, and as outlined in Decision 94-2, the five well licences were approved. Subsequently, the wells were drilled and then tested to evaluate the feasibility of a commercial project and provide the data necessary for the design of commercial facilities. The testing phase confirmed the wells had encountered hydrocarbons in what Husky believed to be commercial quantities. Husky's proposal, in the subject Application, is to tie-in and produce two of the wells from the original five well delineation program. The two wells to be tied-in have surface locations in Lsd 16-22-23-7 W5M, but have bottomhole locations in Lsd 10-22-23-7 W5M and Lsd 2-27-23-7 W5M.

By virtue of Moose Mountain's location within Kananaskis Country and the Eastern Slopes, Husky has been obligated to meet Board expectations respecting Information Letter 93-9, Oil and Gas Developments - Eastern Slopes (Southern Portion). Largely as a result of the environmental concerns arising from its 1994 Moose Mountain well licence applications, Husky has engaged in public consultation, project planning, and environmental research to assess and mitigate the potential impacts associated with initial stages of production operations. This effort included open houses, negotiations with residents and other stakeholders, research of recreational users, media releases, and the mailing of eight newsletter updates to 40,000 homes in the area.

Husky's identification of future development plans has been conceptual and was constrained by uncertainties of pool extent and reservoir characteristics. Should future production facilities be identified, Husky committed to early and open public consultation and would seek additional approvals from the Board and Alberta Environmental Protection (AEP) as required. The engineering design of Husky's proposed facilities would accommodate future production increases.

Extensive environmental research has been completed by Husky in assembling baseline environmental data and selecting options for pipeline routing. These studies include ecological land classification of the local and regional study areas and provide the framework for ranking of wildlife habitat units for selected indicator species. Additional assessments were made for rare plants, breeding birds, amphibians/reptiles, ungulates, bears, fisheries, historical resources, traditional aboriginal land use, and ethno-botanical studies. Overall impacts, including cumulative effects of the project, have been greatly reduced by routing 92 per cent of the pipeline across existing surface disturbances such as cut blocks, seismic lines, and parallel to existing roads. Impacts have been further mitigated by the use of Shell's existing pipelines and processing facilities and by restricting public access from Husky's lease road.

1.3 Hearing

The Application and intervention was considered at a hearing in Calgary, Alberta, on 2 December 1997, before Board Members J. P. Prince, Ph.D. (Presiding Member), A. C. Barfett, and Acting Board Member W. J. Schnitzler, P.Eng. Having considered all of the evidence and argument provided at the hearing, the Board issued Decision 97-17 (attached), approving

Application No. 1007046. This addendum provides reasons for the Board's decision. Those who appeared at the hearing and abbreviations used in this report are listed in the following table:

THOSE WHO APPEARED AT THE HEARING

Principals and Representatives (Abbreviations Used in Report)	Witnesses
Husky Oil Operations Ltd. (Husky) R. A. Neufeld K. Smee	R. S. Coward, P.Eng. M. Pow, P.Eng. B. W. Worbets, M.E.Des.
Parkland Refining Ltd. (Parkland) D. G. Davies J. C. Donald	B. Leflar, P.Eng. E. Klapstein, P.Eng.
Alberta Energy and Utilities Board staff D. L. Schafer T. H. Donnelly, Board Counsel B. K. Eastlick, M.E.Des., P.Eng. P. R. Hunt, M.Sc. K. Johnston	

2 ISSUES

The Board considers the issues respecting the Application to be:

- C the need for the pipelines and associated facilities, and
- C impacts of the proposed facilities on the refinery.

3 NEED FOR THE PIPELINES AND ASSOCIATED FACILITIES

3.1 Views of Husky

Husky stated it has discovered substantial reserves in the Moose Mountain area which it estimates to be 5 to 10 million barrels of recoverable oil. The company needs the proposed facilities in order to commercially produce this oil which in addition to the benefit to Husky would, over the life of the project, generate royalty revenue of \$25 to \$50 million for the province. Husky would spend \$10 to \$12.5 million initially, benefiting the local economy through employment opportunities. In addition, it would be spending \$3 million per year in operating costs. It said the proposed development would be economic, would not constitute proliferation of facilities, and would be beneficial to the Shell Jumping Pound gas processing facility.

Husky noted in its evidence that Parkland's submission did not directly contest the need for, nor the attributes of, the facilities being applied for by Husky.

3.2 Views of the Intervener

Parkland did not dispute Husky's need to develop the Moose Mountain reserves and find a market for its product. However, Parkland believed that the development, as applied for, would have a very negative impact on its refinery as a result of introducing the Moose Mountain sour oil effluent into the existing condensate pipeline system. Therefore, Parkland said that Husky should modify its Application to eliminate the impacts it would have on the refinery or the Application should be denied.

3.3 Views of the Board

The Board agrees there is a need for facilities to allow Husky to proceed with development of the Moose Mountain reserves. The proposed facilities would allow Husky to transport its product to the condensate market.

The success of Husky's efforts in identifying environmental sensitivities and resolving issues was evident from the absence of interventions by local stakeholders at the hearing. Husky's public consultation efforts also resulted in cooperative management of First Nations' issues. Husky's efforts to protect the environment and its focus on communicating with interested parties with respect to this Application have been commendable.

The Board notes that Husky controls public access to its lease road at Moose Mountain. Some form of access control is suggested for the pipeline right-of-way, particularly at junctions with existing roadways such as Highway 63 and the Rifle Range Road. The Board suggests that Husky discuss with AEP's Land and Forest Services appropriate access management at those locations. Husky should review with AEP the suitability of the pipeline surface installation that is proposed in the vicinity of the Demonstration Forest.

The Board understands Parkland's issues with respect to the downstream impacts from the proposed facilities, however, it notes that Parkland did not take direct issue with the need for the proposed development nor the pipeline routing.

4 IMPACTS OF THE PROPOSED FACILITIES ON THE REFINERY

4.1 Views of Husky

Husky said its Application relates only to construction and operation of a multi-well sour oil production facility and two sour oil effluent pipelines. Husky maintained its commercial arrangements for processing and transportation of its Moose Mountain oil effluent, once the material enters the Jumping Pound gathering system, do not require Board approval and are beyond the scope of the hearing. Therefore, Parkland's intervention to have the Board rule on pipeline product specifications asks the Board to exercise authority beyond its jurisdiction.

Commingling of the Moose Mountain oil effluent with other produced fluids at Junction A@ processing the production at the Jumping Pound Gas Plant, and marketing the resulting product as condensate provides Husky with access to a premium priced market. Husky noted the project will increase the Alberta condensate supply, which serves as diluent for bitumen and heavy oil

production. Husky said projects such as Moose Mountain expand the condensate pool and have potential to alleviate supply shortages which have resulted in the condensate price premium. Husky noted expansion of the condensate supply ought to benefit Parkland through reduction of premium feedstock prices it pays relative to its competitors.

While Husky acknowledged Parkland's concerns, it said the commingled product containing its Moose Mountain production will meet pipeline specifications for condensate. Relevant specifications define maximum density, vapour pressure, sediment, water, and temperature. No limits are currently in place for sulphur content. The product specifications are agreed upon by the IPL Shippers Committee which consists of approximately 40 members.

Husky stated that Parkland's problems relating to composition of condensate feedstock should be dealt with through the IPL Shippers Committee. Husky maintained that EUB restrictions on its operation would be unfair, unworkable, and unlawful. Such EUB intervention would set a precedent whereby Parkland could object to the connection of any future condensate sources to the pipeline system on the basis of composition issues not addressed by pipeline condensate specifications.

Husky investigated options to mitigate impacts on the refinery including installation of sulphur recovery at the refinery and batching of the commingled Moose Mountain - Jumping Pound condensate around the refinery. The investment required by Parkland regarding the option of upgrading the refinery was not well defined because Parkland did not provide its economics to Husky. Husky's estimated cost for upgrading the refinery to accept the higher sulphur content condensate stream would be approximately \$4 million, with incremental operating costs and lost revenue amounting to around \$800 000 per year.

Alternatively, facilities to enable batching of the commingled Moose Mountain - Jumping Pound condensate around the refinery would cost approximately \$1 million with minor operating costs. Husky said this option would be satisfactory to it, subject to Parkland making suitable arrangements to meet the related cost obligations. Husky expected development of a batching system would result in the sulphur content of the Parkland feedstock increasing from 0.2 to 0.25 weight (wt.) per cent and the specific gravity decreasing from 0.711 to 0.708. Husky stated that while batching might address Parkland's feedstock issues in the short term, longer-term solutions should be pursued by Parkland.

In response to Parkland's contention that even the increase to 0.25 wt per cent sulphur in the condensate feedstock would require the refinery to reduce throughput to comply with AEP approval limits on inlet sulphur rates, Husky suggested Parkland appeal to the Environmental Appeal Board (EAB) for a review of those conditions. Husky also noted the sulphur compounds attributable to its Moose Mountain production are relatively heavy and would effectively bypass the refinery in the bottoms stream which is returned to the condensate pipeline system.

Husky maintained there are no economically feasible alternatives to commingling the Moose Mountain sour oil effluent at Junction A with other produced fluids which are then processed at the Jumping Pound Gas Plant. Husky said the option of commingling Moose Mountain production at Junction A and installation of equipment at Jumping Pound to separate crude oil from the condensate and remove mercaptans from the condensate and a pipeline connection to

the sour crude system would be uneconomic. The capital cost for the additional facilities at the Jumping Pound Gas Plant and a separate pipeline connection to a crude oil pipeline system would be between \$5 and \$8 million. Incremental operating costs were estimated at \$1 million per year.

4.2 Views of the Intervener

Parkland requested the Application be denied on the basis of the negative impacts on its refinery and the economy in the Bowden area of Central Alberta. Parkland said section 2.1 of the Energy Resources Conservation Act requires the Board to consider the public interest when deciding on applications within its jurisdiction. In this case, the effect on the public interest resulting from approval of this Application would be the shutdown of the refinery. Parkland said its refinery currently employs the equivalent of 42 full-time staff with a payroll of \$3.5 million per year and an operating budget of over \$11 million per year. It was Parkland's position that the Board should consider the severe socio-economic impacts not only to Parkland but also to the area communities.

Parkland stated it has seen no evidence of the condensate supply becoming more sour, and it expected, barring introduction of the Moose Mountain sour crude oil, that deliveries from the Federated system would remain in the range of 0.20 to 0.21 wt. per cent sulphur for the foreseeable future. In so much as commingling Moose Mountain sour oil effluent at Junction A would adversely affect its refinery, Parkland expressed the view that Husky should invest in segregation facilities for its Moose Mountain sour crude oil in order to eliminate the adverse impacts.

Parkland stated the pipeline system does not accept discrete crude oil deliveries and argued that commingling of the Moose Mountain production at Junction A has the effect of introducing sour crude oil into the condensate pipeline system. Parkland said that through the introduction of sour crude oil to the system, the Moose Mountain development would affect an integrated condensate pipeline system which its refinery relies upon for feedstock. The refinery was designed to process sweet condensate delivered on the Koch/Federated pipeline system. Husky's proposal would increase the sulphur content of the refinery condensate feedstock stream from 0.20 wt. per cent to 0.38 wt. per cent. The refinery is not designed to process the higher sulphur content nor is it designed to process feedstock with a specific gravity approaching that of crude oil. The refinery currently operates near the maximum inlet sulphur limit set by AEP (1.48 tonnes/day sulphur as a quarterly average) and an increase in condensate supply sulphur content will require the facility to reduce throughput to comply with the approved limit.

Parkland stated it had estimated the costs that would be incurred at its refinery to handle the Moose Mountain production. Capital investment to process the projected higher sulphur content feed condensate stream would include \$3 million for sulphur recovery, \$1 million for metallurgical changes to the crude unit, and \$1 million for changes to the hydrotreaters. Even with these expenditures, the diesel product would have to be rejected with heavy ends due to excessive sulphur content. Parkland stated such an upgrade would not be economic and it would have to shut down its refinery. With respect to the alternative of batching the commingled Moose Mountain - Jumping Pound condensate around the refinery, Parkland maintained the effects, including the reduction in throughput necessary to accommodate the 0.20 to 0.25 wt. per cent increase in sulphur content, would still cause closure of the refinery. Additionally, Parkland

noted that the current Jumping Pound condensate is a valued feedstock which has the effect of diluting sulphur content of other gas plant condensate streams. Therefore it is not acceptable, in Parkland's view, to batch the commingled Moose Mountain - Jumping Pound condensate around the refinery.

In response to Husky's questioning regarding the refinery's AEP approval, Parkland noted that it believed that the current sulphur constraints were the most favourable it could obtain from AEP and that Parkland had not considered appealing its approval conditions to the EAB.

4.3 Views of the Board

The Board agrees the effects of the Application on the refinery may be taken into account pursuant to the Board's mandate under section 2.1 of the Energy Resources Conservation Act, which states the Board shall have consideration for whether [an application] is in the public interest, having regard to the social and economic effects of the project, and the effects of the project on the environment.

In considering the overall public interest, the Board must consider not only the interests of the parties involved but also the interests of any party affected including the government, the public, and the industry as a whole. In the case at hand, there is an addition to the province's reserves base that affects an existing refinery. Parkland has asserted that allowing the applicant to transport its product on the existing condensate pipeline system will alter the feedstock stream to such a degree that the refinery will not be able to handle it without expensive modifications. Additionally, the current approval from AEP limits the sulphur inlet rate and the increased sulphur from the commingled Moose Mountain - Jumping Pound condensate would require a significant reduction in throughput to comply with the approval. The refinery will therefore, in Parkland's submission, have to close down.

The Board notes that no economic analysis was proffered by Parkland to support its position regarding the economic implications of an altered condensate stream, nor had Parkland provided specific cost information to Husky as part of an attempt to negotiate the matter. Parkland's witnesses cited certain costs associated with upgrading the refinery and simply stated that these costs would force the refinery to close.

Husky provided its own estimates of the cost to upgrade the refinery and it also considered an alternative of batching in the existing line. The costs of batching could be significantly lower, but Parkland rejected this option on grounds that it would still require a significant reduction in throughput to meet AEP requirements. However, Parkland acknowledged it had made no attempt to have the requirements of AEP, with respect to inlet sulphur, reviewed in light of the changing condensate stream.

In the absence of definitive supporting information, particularly regarding the costs of upgrading and/or batching, but also with respect to potential consideration from AEP, the Board is not convinced that the closure of the refinery is inevitable. Even if the Board were confident that the refinery would have to close, a decision on the matter would have to weigh the implications of that closure on the local economy against the extra costs that would be imposed on Husky and others if Husky were forced to separate its sour crude oil stream, as well as other implications of

such a decision. Since the Board cannot confidently accept the inevitability of closure, it did not attempt to assess these relative costs in detail. The Board notes, however, that the level of potential costs to modify the refinery, as estimated by Parkland, is somewhat less than the costs Husky said would be needed to separate its sour crude oil stream and transport it to market using a dedicated crude oil pipeline.

There were two associated factors the Board had to consider in assessing Parkland's recommendation that Husky not be allowed to transport its new production of sour oil effluent on the existing system.

- C First, accepting that recommendation would result in the development of the newly discovered reserves being deferred while Husky provided for separation of its production and connection to a sour crude system. That would involve a significant cost to Husky (and also some cost to the province through deferred royalties).
- C Secondly, and very important for this application, historically, pipeline specifications and requirements have been determined and changed over time through a committee of shippers on each pipeline system. In this case, an IPL Shippers Committee exists to deal with such issues. The Board has not, in the past, regulated this aspect of pipeline transportation. A decision by the Board to embark on such regulation would have implications for all pipelines in the province. There would be a significant increase in regulatory costs to deal with matters that have, heretofore, been adequately handled on a commercial basis. The Board has not been convinced by the evidence before it that, assuming it has jurisdiction, exercise of its judgement over that of the shippers' committee would, in this instance, be appropriate¹.

Parkland's evidence suggests Husky should be responsible for mitigating or preventing the impacts the Moose Mountain production would have on its refinery. This position leads to a more general issue regarding who is responsible for managing the impacts of a changing reserves base on refineries. Parkland, in this case, held the view that the responsibility fell to Husky. The Board considers then, by extension, potentially any condensate producer whose product would unfavourably alter the refinery feedstock stream could be subject to regulation. There is a jurisdictional issue which would come into question, if the Board were inclined to agree with Parkland and wished to issue approval of the Application conditional upon Husky mitigating impacts on the refinery. However, in the case at hand, the Board is not convinced that the various alternatives to resolving the problem have been thoroughly addressed by Parkland, nor has Parkland convinced the Board that Husky should be held responsible for the effects of the changing composition of the product in the pipeline on Parkland's operations.

5 DECISION

Having carefully considered all of the evidence, the Board approves Husky's Application

¹ There is a jurisdictional issue, as raised by Husky, since the Application relates to a production facility and pipelines, not to matters relating to transportation downstream from the Jumping Pound system. However, since the Board has decided not to accept Parkland's recommendation, it chose not to address this jurisdictional question.

No. 1007046 and has issued the required approvals as outlined in its earlier Decision 97-17.

Dated at Calgary, Alberta, on 9 April 1998.

ALBERTA ENERGY AND UTILITIES BOARD

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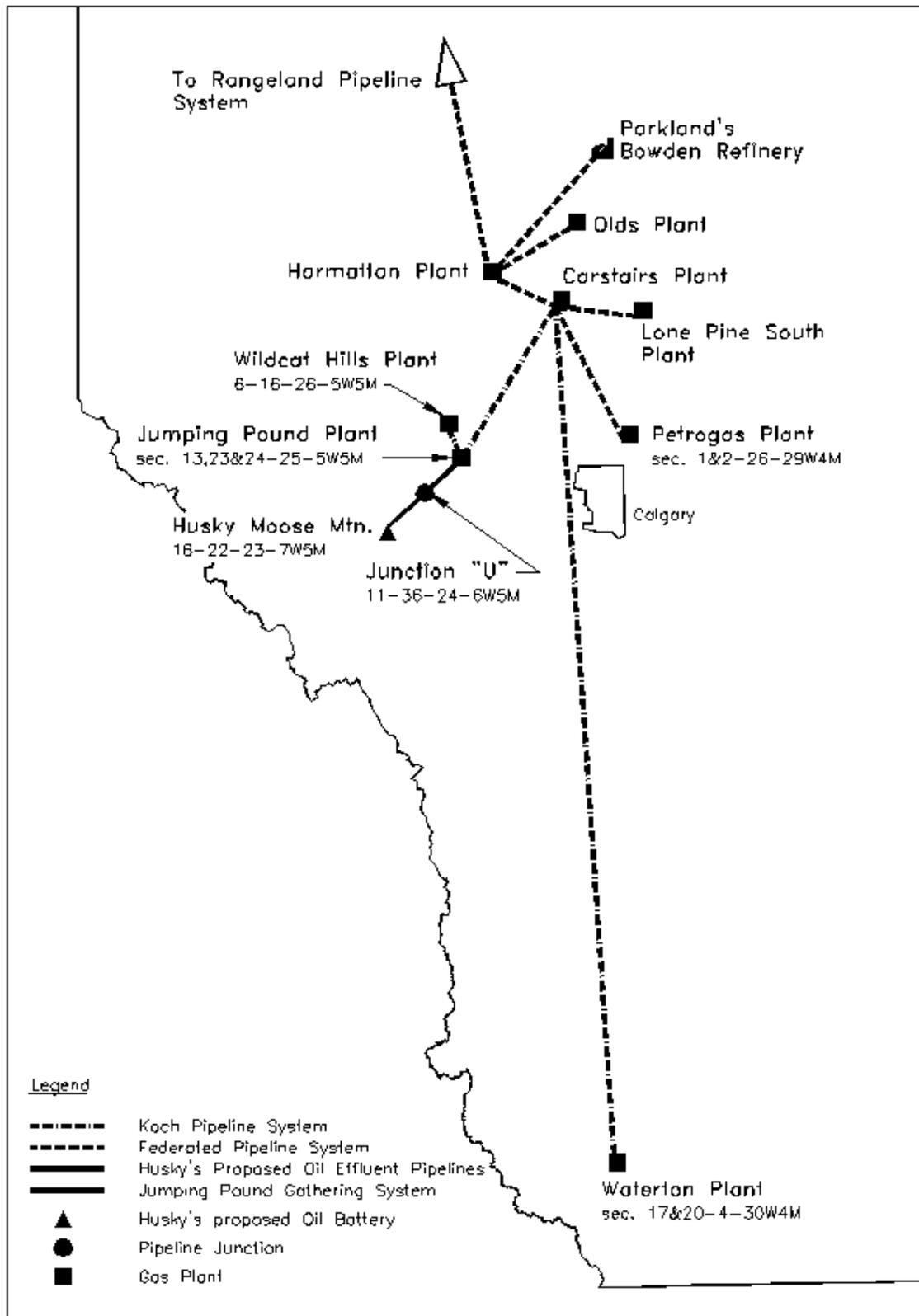
J. P. Prince, Ph.D.
Presiding Board Member

[Original signed by]

A. C. Barfett
Board Member

[Original signed by]

W. J. Schnitzler, P.Eng.
Acting Board Member



Schematic Diagram
 Existing Condensate Pipeline System
 Application No. 1007046
 Husky Oil Operations Ltd.
 Moose Field

Addendum to
 Decision 97-17

ALBERTA ENERGY AND UTILITIES BOARD

Calgary Alberta

HUSKY OIL OPERATIONS LTD. APPLICATION TO CONSTRUCT AND OPERATE TWO SOUR OIL EFFLUENT PIPELINES AND ASSOCIATED FACILITIES IN THE MOOSE FIELD

**Decision Report 97-17
Application No. 1007046**

1 APPLICATION AND INTERVENTION

Husky Oil Operations Ltd. (Husky) applied to the Alberta Energy and Utilities Board (Board) pursuant to part 4 of the Pipeline Act for a permit to construct and operate two sour oil effluent pipelines within a common right-of-way approximately 26.0 kilometres in length and pursuant to section 7.001 of the Oil and Gas Conservation Regulations to construct and operate a multi-well sour oil production facility located in Legal Subdivision (Lsd) 16, Section 22, Township 23, Range 7, West of the 5th Meridian. The two proposed sour oil effluent pipelines would have an outside diameter (O.D.) of 114.3-millimetre (mm), and 88.9-mm, O.D. respectively and would be constructed from the proposed multi-well sour oil production facility located in Lsd 16-22-23-7 W5M to an existing pipeline tie-in point known as Junction "U" located in Lsd 11-36-24-6 W5M. The sour oil effluent would be commingled with existing production at Junction "U" and delivered through existing pipelines to the Shell Jumping Pound gas processing facility located in Sections 13, 23 and 24, Township 25, Range 5, West of the 5th Meridian. The applicant proposes initially to use the 114.3-mm, O.D. pipeline for the purpose of transporting sweet fuel gas from the existing Junction "U" pipeline tie-in point located in Lsd 11-36-24-6 W5M to the proposed multi-well sour oil production facility located in Lsd 16-22-23-7 W5M.

In response to a public notice issued by the Board, several parties registered their objection to the application. Accordingly, the Board directed, pursuant to section 29 of the Energy Resources Conservation Act, that a public hearing be held to review the application. Subsequently, following discussions between Husky and the interveners, all objections except for that of Parkland Refining Ltd. (Parkland) were either formally withdrawn or were not pursued at the hearing. Parkland participated in the hearing and presented concerns related to potential implications that approval of the application would have for Parkland's Bowden Refinery (the refinery).

2 HEARING

The application and intervention was considered at a hearing in Calgary, Alberta, on 2 December 1997, before Board Members J. P. Prince, Ph.D. (Presiding Member), A. C. Barfett, and Acting Board Member W. J. Schnitzler, P.Eng. Those who appeared at the hearing and abbreviations used in this report are listed in the following table:

THOSE WHO APPEARED AT THE HEARING

Principals and Representatives (Abbreviations Used in Report)

Witnesses

Husky Oil Operations Ltd. (Husky)
R. A. Neufeld
K. Smee

R. S. Coward, P.Eng.
M. Pow, P.Eng.
B. W. Worbets, M.E.Des.

Parkland Refining Ltd. (Parkland)
D. G. Davies
J. C. Donald

B. Leflar, P.Eng.
E. Klapstein, P.Eng.

Alberta Energy and Utilities Board staff
D. L. Schafer
T. H. Donnelly, Board Counsel
B. K. Eastlick, M.E.Des., P.Eng.
P. R. Hunt, M.Sc.
K. Johnston

3 SUMMARY AND CONCLUSIONS

Following a detailed review of the evidence, the Board has decided to approve the application. By issuing an early decision, in interim form, the Board intends to provide Parkland the maximum possible time and flexibility in considering alternative courses of action in responding to the situation it now faces. The final report will set out the issues and the reasons for the Board's decision in some detail. In order to allow this decision to be released as quickly as possible, only an overview of some factors affecting the Board's decision are provided here.

- C The Board has not, in the past, approved pipeline product specifications. Historically, such specifications have been part of the commercial arrangements under which condensate is processed and transported. A change to that policy would have implications that go beyond the present application.
- C While the Board recognizes a potentially adverse impact to the Parkland Refinery that stems from the application, it believes that Parkland may have alternatives in responding to the impact other than closing the refinery. For example, options such as pursuing an appeal of conditions in Alberta Environmental Protection's approval or making the necessary changes to the refinery could be considered.
- C The benefits of the application must be weighed against possible adverse effects from its approval, and the Board has concluded that the balance favours approving the application.

4 DECISION

Having carefully considered all of the evidence, the Board is prepared to approve Husky's Application No. 1007046 and will issue the required approvals in due course. A detailed final report giving the reasons for the Board's decision will be issued.

Dated at Calgary, Alberta, on 19 December 1997.

ALBERTA ENERGY AND UTILITIES BOARD

(Original signed by)

J. P. Prince, Ph.D.
Presiding Board Member

(Original signed by)

A. C. Barfett
Board Member

(Original signed by)

W. J. Schnitzler, P.Eng.
Acting Board Member