

ALBERTA ENERGY AND UTILITIES BOARD

Calgary Alberta

**APPLICATION FOR A WELL LICENCE
TOMAHAWK FIELD
MAXWELL OIL & GAS LTD.
LSD 13-5-53-5 W5M**

**Decision 97-15
Applications No. 970239**

1 INTRODUCTION

1.1 Application and Interventions

Maxwell Oil & Gas Ltd. applied to the Alberta Energy and Utilities Board (Board), pursuant to section 2.020 of the Oil and Gas Conservation Regulations, for a well licence to drill a well from a surface location in Legal Subdivision (Lsd) 4 of Section 5, Township 53, Range 5, West of the 5th Meridian, to a projected bottom-hole location in Lsd 13 of Section 5, Township 53, Range 5, West of the 5th Meridian. Maxwell proposed to drill a vertical wellbore from Lsd 4-5 to a total depth of some 1640 metres, and to then drill a horizontal section a length of some 1200 metres into Lsd 13-5. The purpose of the well, MAXWELL ET AL TOMAHAWK 13-5-53-5 (13-5 well), would be to obtain oil production from the Board-designated Nordegg C and Banff D (Nordegg-Banff) Pool.

The Board received objections to the subject well licence application (the Application) from various landowners, residents, cottage owners, and summer villages in the vicinity of Lake Wabamun and the proposed well. Accordingly, the Board directed, pursuant to Section 29 of the Energy Resources Conservation Act, that a public hearing be held to hear the Application. The Board received submissions from the Lake Wabamun Enhancement and Protection Association (the Association) in opposition to the Application. The Association is comprised of people who live or own land in the vicinity of Lake Wabamun. The Association was formed to present a collective voice in opposition to the Application, as well as monitor long-term industrial and related development near Lake Wabamun.

The attached maps show the location of the proposed 13-5 well, as well as an alternative well surface location and surface improvements discussed at the hearing (Figures 1 and 2).

1.2 Background

Lake Wabamun is located approximately 50 kilometres (km) west of the City of Edmonton. The lake has extensive recreational use as well as industrial development on its shoreline areas and supports both permanent and seasonal residents. The population varies from winter to summer, but the lake is used recreationally year-round.

The proposed well would be located on the southwestern boundary of Lake Wabamun in the vicinity of the summer villages of Seba Beach and Betula Beach (Figure 1).

1.3 Hearing

As a result of a request by the Association for an adjournment of the original hearing date of 25 June 1997, the Board rescheduled the hearing to 29 July 1997.

The hearing was opened on 29 July 1997 in Edmonton, at which time the Association made four preliminary applications seeking:

- an inquiry to be held by the Board pursuant to Section 22 of the Energy Resources Conservation Act (the "ERC Act"), prior to the Board's consideration of Maxwell's application;
- the convening of a pre-hearing conference prior to the Board's consideration of Maxwell's application;
- a two-phased hearing; and
- an adjournment of the hearing.

With respect to the Association's request for an inquiry, the Board decided that it would not convene an inquiry on the basis that sufficient requirements, guidelines, and Board expertise were in place so as to allow the Board to properly consider the Application.

In light of the discussion of matters on 29 July 1997, the Board declined to hold a pre-hearing conference but adjourned the hearing to 19 August 1997 and directed Maxwell to provide additional information regarding the type, nature and control of all drilling, well and other fluids associated with its drilling operations for the proposed well.

The Board determined that a two-phase hearing process was not necessary and that the parties, as well as the Board itself, were capable of properly addressing, in one hearing, the pertinent issues including need, location, and conditions. It directed that the Board's normal process for a hearing would be followed.

The hearing was reconvened on 19 August 1997 in Edmonton with J. D. Dilay, P.Eng. (Presiding Member), G. J. Miller, and B. T. McManus, Q.C., sitting. Prior to the continuation of the hearing on 19 August 1997, the Board viewed the proposed surface location of the 13-5 well as well as the surrounding area.

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

Maxwell Oil & Gas Ltd. (Maxwell)

B. K. O'Ferrall
L. MacLachlan

Lake Wabamun Enhancement and Protection
Association (the Association)

R. C. Secord
A. O. Ackroyd, Q.C

Alberta Energy and Utilities Board staff

D. L. Schafer
D. G. Beamer, R.E.T.
D. A. Larder, Board Counsel
L. Woynarowich
D. B. Fairgrieve, P.Geol.
C. Etty

E. Stein, P.Eng.
M. Waleschuck
N. Bentson, P.Eng. of Frontier
Engineering & Consulting Ltd.

A. Hiebert
D. Balcon of TeleResearch Inc.
J. Newton
R. Korol, P.Eng. of Mitchell & Associates
Ltd.
J. Drever
P. Spilsted

2 ISSUES

The Board considers the issues respecting the Application to be:

- adequacy of public consultation,
- the need for the well,
- the surface location and impacts of the well, and
- other matters.

3 ADEQUACY OF PUBLIC CONSULTATION

3.1 Views of Maxwell

Maxwell submitted that it conducted, starting in the fall of 1996, a significant public consultation program with regard to its proposed well. Maxwell believed that its public consultation program was very important because of the perceived sensitivity of drilling a well in the vicinity of lake- side cottages at Lake Wabamun. Maxwell mailed information brochures

to property owners and other interested parties, followed by individual mail and door-to-door delivery of drilling notices.

In addition, Maxwell continued to provide information brochures to a large number of individuals who resided further from the proposed well and who had been part of Maxwell's previous public consultation program for a three-dimensional seismic program proposed by Maxwell during the summer of 1996. Maxwell's public consultation efforts included meetings, open houses, and publication of newsletters. In addition, Maxwell responded in writing to each individual who expressed concerns or had questions regarding the Application. Maxwell believed that its public consultation program was very thorough.

3.2 Views of the Intervener

The Association submitted that the public consultation program conducted by Maxwell was inadequate and misleading. The Association believed that Maxwell's initial strategy was to limit its communication regarding the proposed well to South Seba Beach property owners only and during the winter months when seasonal owners were away from their lake cottages. The Association said that, because the proposed well might potentially damage the lake water, all users of the lake and all property owners would be directly affected by this well, and therefore, all deserved adequate notice and input. The Association said that the property owners of South Seba Beach believed that they were lulled into this proposal because Maxwell's public consultation program was conducted incrementally over an extended period of time. The Association believed that Maxwell did not fully divulge its entire future development plans for the Lake Wabamun area initially and as a result the property owners of South Seba Beach did not clearly understand what Maxwell intended regarding future drilling in the area. Initially, the Association said that it understood that one well was being proposed. Subsequently, however, the Association became aware that if one well were approved and successful, then other wells might also be drilled in the area. The Association said that public input from all property owners at Lake Wabamun should have occurred prior to the leasing of the mineral rights to Maxwell.

3.3 Views of the Board

The Board believes that Maxwell's public consultation effort was extensive, thorough, and probably exceeded the needs created by the Application for the 13-5 well. The Board does not agree that the program was inadequate or that it misrepresented Maxwell's plans.

The Board notes that, initially, Maxwell's communication with area residents and others was for the purpose of Maxwell's plans to conduct seismic operations on the lake, and therefore, needed to involve the many interested people who Maxwell contacted. When Maxwell decided not to proceed with the seismic work, but to apply to drill the 13-5 well instead, it continued to provide information to the large group. In that respect, the Board believes that Maxwell's consultation efforts exceeded that which could reasonably be expected for an application to drill the type of well which is proposed. The Board recognizes the Association's concern that Maxwell's public consultation program was conducted during the winter months when some cottage owners may have been away. However, the Board believes that the property owners ultimately have the

responsibility to ensure that their business matters are taken care of in their absence. Further, the Board notes that Maxwell responded in writing to each person who had a concern or question.

With regard to the Association's contention that some of its members did not clearly understand Maxwell's plans, the Board notes that Maxwell's intention to apply for approval of the subject well was set out in communication with residents. With respect to the contention that Maxwell did not reveal all of its plans to the Association, the Board accepts that Maxwell had no specific plans to divulge beyond the proposed well, and that any further additional wells would depend on the results from the 13-5 well, assuming it was approved and drilled. In addition, the Board notes that any future wells would require public consultation and applications.

4 NEED FOR THE WELL

4.1 Views of Maxwell

Maxwell submitted that it held a valid petroleum and natural gas lease for the Nordegg-Banff Formation in Section 5-53-5 W5M, and therefore, had acquired the right to explore for and exploit the hydrocarbons present in the drilling spacing unit in Section 5. Furthermore, Maxwell said that the well was required to test its geological interpretation that the outline of the existing Nordegg-Banff Pool extended northward approximately one mile from the existing wells located in Section 32-52-5 W5M (Figure 2). In addition, Maxwell said that, because it could not proceed with its proposed seismic program to further evaluate its lease, it decided to proceed with its Application for a drilling licence.

Maxwell indicated that this was a very important well for the company and saw it as an investment in the expansion of its reserves, production, cash flow, and value to its investors as a result of discovering and producing new oil reserves. Maxwell also submitted that the recoverable reserves for the proposed well could be as high as 38 thousand cubic metres of oil, and therefore, the well would benefit the Province of Alberta by proving up additional reserves and supplying additional royalties to the Crown. Maxwell said that the well's associated surface facilities would also benefit the local municipality because they would be taxed.

4.2 Views of the Intervener

The Association did not question Maxwell's right to explore for and develop its minerals in Section 5. However, the Association did argue that there was ample opportunity to explore for oil throughout Alberta, in areas of reduced impact, and therefore, there was no need to take the risk of drilling a well under Lake Wabamun.

4.3 Views of the Board

The Board notes that Maxwell has acquired the rights to the minerals underlying Section 5 from the Crown. The Board also notes the Association's view that the proposed well is not needed because other areas of the province could be explored instead. It is Maxwell's evidence that it seeks to locate and produce significant new reserves under Section 5. These new reserves, if they are located, would provide considerable benefit not only to Maxwell, but to the people of

Alberta by way of additional royalties to the Crown. However, the Board considers that, in order to explore for and produce hydrocarbon resources that may be present under Section 5, Maxwell would require a well.

The Board will not address the Association's contention that it had no input to the Crown's decision to lease the mineral rights to Maxwell, since that is not a matter which is within the Board's jurisdiction.

5 THE SURFACE LOCATION AND IMPACTS OF THE WELL

5.1 Views of Maxwell

Maxwell submitted that the landowner of the proposed surface location in Lsd 4-5-53-5 W5M has granted it a surface lease for the well, agreed to the well's location, and agreed to the issuance of a well licence. Maxwell advised that it had made certain that it was able to obtain surface access prior to acquiring the mineral rights. Maxwell indicated that, following its request to post the subject mineral rights in late 1995, it consulted with Alberta Environmental Protection (AEP) regarding the relative suitability of potential surface sites in the area.

Maxwell stated that it selected the 4-5 surface location for a number of important reasons. It indicated that the surface lease, and particularly the location of the well, were as far away from recreational development as possible without jeopardizing Maxwell's ability to achieve its drilling objectives. Maxwell said that its drilling objectives included drilling the horizontal portion of this well to a subsurface target in Lsd 13-5-53-5 W5M in order to explore, evaluate, and extend the mineral potential in the Nordegg-Banff Pool as well as explore the up-hole mineral potential in the vertical portion of a well in Section 5. Maxwell said that the site was designed to accommodate one well or several wells if necessary, thereby avoiding proliferation of surface sites. Maxwell said that the 4-5 surface lease was located in a hay field next to the Sundance Road on land that was high, dry, and relatively flat, sloping gently southward toward the road away from the lake. Due to the rolling topography of the site, Maxwell said that only a small number of people who have cottages in South Seba Beach would be able to see the well site. Maxwell believed that the proposed site was optimal and might be the only site for development of reserves underlying Sections 5 and 6 for which it had the mineral rights.

Maxwell stated that the drilling would take approximately three weeks assuming that drilling operations proceeded 24-hours-per-day, seven-days-per-week. Maxwell planned to drill this well in the fall/winter of 1997/98, at a time when fewer people were utilizing the lake or their cottages on the lake. Maxwell anticipated conducting a well test at the 4-5 location for a duration of approximately six months after drilling was complete. The testing operations would involve locating a single oil well battery on the 4-5 lease, with equipment such as a standard beam pumping unit, a conventional separator and building, two 400-barrel oil storage tanks, and a flare stack. Maxwell indicated that a number of steps would be taken during the drilling and production operation phases in order to ensure the safety of the public and the environment and minimize impacts to area residents.

Maxwell stated that there was a very low risk of a blowout at this well. The reservoir Maxwell intended to develop was an initially underpressured, moderately heavy oil pool which would not flow to surface without mechanical pumping. Maxwell said that the Nordegg-Banff Pool contained little or no hydrogen sulphide (H_2S). On the basis of an estimated H_2S concentration of 0.0002 mole fraction (0.02 per cent H_2S) and the well's projected gas/oil ratio of approximately $1,061 \text{ m}^3/\text{m}^3$, Maxwell calculated a maximum H_2S release rate of 0.00008 cubic metres per second (m^3/sec). Maxwell believed that this is well below any level of concern and far below the $0.01 \text{ m}^3/\text{sec}$ threshold of a Level 1 sour well outlined in the Board's Interim Directive ID 87-2. Therefore, Maxwell did not prepare a site-specific emergency response plan but would rely on its corporate plan. Maxwell said that the well would be drilled in an overbalanced condition, with continuous 24-hour-per-day supervision during drilling operations in order to deal with any unexpected reservoir conditions.

With respect to the control and containment of all fluids during drilling operations and the prevention of any spills of such material, Maxwell said that it would adequately berm the drilling lease, would construct a ditch around the rig, would contain all drilling fluids in steel tanks with level indicators, and would not use drilling sumps. Maxwell indicated that it would have a vacuum truck and extra tankage on lease so that, if a spill did occur, it could be dealt with immediately to prevent any escape of fluids off-lease. Maxwell confirmed that it would dike the production tanks during production and, if acceptable to the surface owner, it would maintain a berm around the lease to ensure containment of fluids. Maxwell indicated that it would also install an automatic switch that would sense the well's flowline pressure and shut off the power to the pump jack, if a release occurred.

Maxwell did not dispute that the proposed well would result in increased noise levels, particularly during drilling operations. Maxwell said that the main sources of noise expected during drilling would include engine noise, the clanging of drilling tools, and the banging of elevators and drill pipe; particularly when tripping. Maxwell recognized that this was a sensitive situation, given that drilling was typically a 24-hour-per-day, seven-days-per-week activity, and therefore, stated that it would do the best it could under the circumstances to minimize drilling rig noise. Maxwell said that it would be amenable to undertaking modifications to the drilling program in the interests of the residents, provided those modifications were not unduly onerous. Maxwell said that it would meet the Board's Noise Control Guidelines set out in Interim Directive 94-4 during drilling and production. To minimize noise impacts to residents, Maxwell also proposed to construct a perimeter berm around the lease, and to attempt to orient the rig engine mufflers to the south, toward the Sundance Road and away from South Seba Beach residents. With respect to the possibility of limiting certain types of activities and associated noise disturbances, such as tripping, to the daylight hours, Maxwell indicated that it would have to consider the merits of this concept on the basis of overall costs, and any associated risks and drilling difficulties it might present. Maxwell did commit to attempt to find the quietest drilling rig available in the period the well would be drilled, but expressed concern at the suggestion the Board should require use of an electric motor on the drilling rig. Maxwell said that its concern with respect to the use of electric motors on the rig was one of availability. Maxwell indicated that an electric rig would not address all of the noise-related concerns, and that imposing such a condition could delay the drilling of the well if an electric rig was not readily available. Maxwell

said that it agreed with Mr. Korol's recommendation that the well only be drilled between 15 October and 31 March, since there would be fewer residents in the area during this time of year.

With respect to noise from production operations, Maxwell committed to installing electric-drive prime movers for all pumps on surface. In addition, Maxwell indicated that very little noise would result from the burning of waste gas at the flare stack since the volumes and flowrates of the gas directed to the flare stack would be minimal.

Maxwell indicated that there would be increased truck traffic as a result of the proposed well. The increase in traffic would be most prominent during drilling. Maxwell said that, if the well was successful, approximately one truck per day would be required to transport production from the site. Maxwell identified two truck routing options. The first route was north on Highway 759, by the summer village of Seba Beach to Highway 16, then west to the Niton Oil Terminal. The second route proposed was south on Highway 759, then west to Drayton Valley (Figure 1). Maxwell said that it had not decided on the final route, but preferred the first option. Maxwell said that it was aware that a grade school was situated along its preferred route, but it did not believe that this presented any additional risk or warranted any further protective measures than those already in place for traffic safety. Maxwell's position was that increased traffic from the proposed well on the Sundance Road would be almost imperceptible, because the road was already heavily travelled, primarily by local residents and TransAlta Utilities Limited (TransAlta) traffic. Maxwell said that it was already a very busy road, and had been for a long time. With regard to increased traffic levels on Highway 759 from the proposed well, Maxwell stated that the increase from the drilling would be infinitesimal when compared to the existing traffic levels on this road.

Maxwell said that, if the well was successful, it would fence the site for safety and security reasons and it would also cage the pumpjack to further ensure safety. In terms of traffic safety, Maxwell said that the access point to the lease would be on a straight, flat stretch of the Sundance Road with excellent visibility to traffic. Maxwell said that the access to the site would be gravelled to prevent mud tracking and that signs would be posted. In terms of aesthetics, Maxwell said that it would maintain a berm around the well to further screen the lease from area residents and to help reduce visual and noise impacts. If acceptable to the landowner, Maxwell indicated that it would also plant trees to provide additional visual separation between the lease and the residents of South Seba Beach.

The applicant said that, in order to ensure ground water protection, prevent contamination of lake and well water, and avoid casing failures, it would use a casing and cementing program that had a number of safety factors built into the design which would exceed regulatory design factors. Maxwell said that it would try to set conductor pipe as deep as possible through the upper coal beds, and would strive to get the conductor below 60 feet. The conductor would be dry drilled and driven. Maxwell said that it would set 261 metres of surface casing that would be cemented full length back to surface. If any fluids were lost during the drilling of the surface hole, Maxwell undertook to use a quick setting cement to seal fluid losses instead of pumping down large volumes of fluid. Maxwell said that it would set approximately 1640 metres of intermediate casing that would be cemented full length in two stages back to surface in order to isolate all fresh water aquifers from deeper zones and prevent external corrosion on the casing.

Maxwell advised that it would be prepared to test the nearby domestic water wells for water quality and rate.

Maxwell said that it was sensitive to the odour and emission concerns expressed by local residents, and would take appropriate measures to address these concerns. Maxwell stated that the main source of odours and emissions from the proposed well would be from the production of solution gas, or waste gas, associated with the produced oil. Maxwell said that the decision to conserve solution gas would depend on whether the gas was generated in sufficient quantity to offset the costs associated with tying-in and conserving the gas.

Maxwell suggested that solution gas conservation may be viable in the future by combining the gas from a number of operators and producing wells in the area. Maxwell said that it would monitor production performance and the economics of future solution gas conservation.

Maxwell proposed to use existing flaring technology to dispose of the small volumes of waste gas that would be generated by the proposed well. Maxwell said that it would use better flaring technology than currently exists in the area. Maxwell proposed a flare stack rather than a flare pit, as it believed that a flare stack provided better combustion efficiency and dispersion characteristics. Maxwell said that the proposed flare stack would be equipped with a continuous pilot and ignition system. A second option investigated by Maxwell for the disposal of waste solution gas was incineration. Maxwell said that waste gas incinerators ensured better combustion efficiency than a typical flare stack and also eliminated the visual impact of a flare. Maxwell stated that this option would only be considered if odour or emission complaints were encountered.

The applicant said that flaring emissions at the proposed well would not likely be of significant impact to residents because solution gas is already being safely flared at existing wells in the area. Maxwell said that it believed that there had been no flaring-related odour complaints reported to the Board from existing wells in the immediate area. Maxwell said that its review of existing wells and gas compositions from the area indicated that H₂S was not encountered, with the exception of one well, which showed a trace amount of H₂S (less than 0.02 per cent) in one of the three samples collected. Maxwell believed that the odours from the proposed well would be minimal, and could be effectively managed so as not to be of concern to area residents.

To eliminate stock tank vapours, Maxwell indicated it would consider the installation of a vapour recovery system or an enclosed tank system. Maxwell said that its commitment to install these systems would be based on the level of concern expressed by area residents regarding odours or emissions.

Maxwell planned to intersect the Nordegg-Banff Pool with the heel of the well (the beginning of the horizontal portion of the well) 200 metres north of the south boundary of Section 5. Maxwell said that the toe of the well (the terminus of the horizontal portion of the well) would be drilled an additional 1200 metres in a northerly direction and would terminate in a subsurface location in Lsd 13-5-53-5 W5M. Maxwell said that the Belly River interval in the vertical portion of the well in Section 5 was a secondary target.

Maxwell believed it was important to drill the well as proposed, locating the heel close to seismic lines and the known oil column (adjacent to wells in Section 32) resulting in an acceptable financial risk. According to Maxwell, the northerly horizontal extension would permit exploration and testing of its geologic interpretation, would enable testing of reservoir engineering judgement which suggested a significant productivity increase from a horizontal well as compared to a vertical well, and would establish additional new reserves since the well will be drilled away from the depleted pressure area. Maxwell stated that the horizontal portion of the well had to be drilled quickly to minimize reservoir damage.

In response to the Association's suggestion that Maxwell should have made a significant effort to purchase the mineral rights in Section 32, Maxwell indicated that it had pursued this option. However, it had not been successful in its negotiations to acquire the mineral rights from the current mineral owners. In response to the Association's suggestion that Maxwell should also drill this well from a surface location in Section 32, directly south of TransAlta's berm, Maxwell said that a well located south of TransAlta's berm would be a different well. The proposed 13-5 well with a surface location at 4-5 had a vertical hole that was designed to be drilled and produced with little difficulty. A vertical well drilled at the Association's proposed location, south of TransAlta's berm, and then extended northward would begin its horizontal trajectory in the mineral rights of another company. Maxwell indicated that this option would not be desirable because it would not be able to produce the minerals in the vertical portion of a well drilled in Section 32 because it did not own them (Figure 2). Maxwell said that if it were unable to extend the well a sufficient distance northward, it would risk spending almost all of its dry hole costs without ever penetrating its own mineral rights.

Maxwell said that the proposed 13-5 well with a vertical hole located in Section 5 was designed to allow maximum weight on the bit, which would permit maximum horizontal extension. Maxwell stated that a well south of the berm, in Section 32, would have to be drilled directionally. Maxwell estimated that drilling, completing and equipping the proposed horizontal well would cost approximately \$1 000 000 and that a deviated well would add a minimum of \$115 000 to the drilling costs. A directionally drilled well would transfer less of the drill pipe weight onto the bit, and therefore, might result in slower drilling of the horizontal portion of the well. This could damage the initial penetration of the reservoir as a result of longer exposure to drilling fluids. In addition, Maxwell indicated that a deviated well might present additional problems and associated costs in the production phase.

The applicant indicated that, although a site in Section 32 was not compatible with its drilling plans, such a site might be suitable for a future multi-well oil production facility. However, Maxwell indicated that a remote facility would be contingent upon the results of drilling and testing more than one well. Maxwell was unable to provide an estimate of the costs associated with flowlining production from 4-5 to a facility located in Section 32.

Maxwell indicated that it had considered several alternative surface locations at a very early stage in its development plans. Maxwell considered alternative sites to the north and east of the proposed site in Section 5, but concluded that they were less compatible with existing residential land use due to proximity to recreational development and existing vegetation.

With respect to locating a well in the southeast corner of Section 6, Maxwell indicated that this site was deemed unsuitable, in consultation with AEP, due to potential surface drainage problems, a higher concentration of existing vegetation, and existing plans to further develop this land for recreational use. Maxwell also indicated that geological and geophysical indicators suggested that the target reservoir in Section 6 could be water bearing or absent.

5.2 Views of the Intervener

The Association believed that Lake Wabamun was a valuable finite recreational resource that was becoming more fragile and sensitive to the constant pressure from existing industrial development such as coal mine activity and TransAlta's power plants. The Association believed that the Application to drill under the lake should be considered too great a risk and intrusion under the existing circumstances. The Association said that horizontal drilling under Lake Wabamun would increase the risk of something catastrophic happening to the lake, and therefore, such a risk should not be taken. It said that the Application should be denied.

The Association stated a number of concerns with respect to the Application, including the surface location of the well, impacts to public health and safety, environmental impacts, the potential for a blowout, increased noise and truck traffic levels, visual impacts, the impact on property values, and the associated impacts to the quality of life of area residents.

The Association expressed concern with the proposed 4-5 surface location and the potential for more significant future development at that site, such as additional wells and facilities. The Association proposed an alternative surface location for the subject well in the northwest quarter of Section 32, directly south of TransAlta's berm (Figure 2). The Association said that this proposal would not require a significant revision to Maxwell's drilling plan, would allow Maxwell to drill additional wells from a common pad, and would also permit consolidation of production facilities on one site. The Association believed that this alternative location would mitigate a number of impacts from the proposed well during drilling and production operations.

The Association expressed concern for public safety and for potential impacts to the environment in the event there was a blowout at the proposed well. It stated that, if there was a blowout at this well that caused damage to the lake water, it would affect all users of Lake Wabamun, not just the property owners of South Seba Beach. The Association believed that a blowout would cause irreparable damage to the lake as well as damage to property owners and as a result, it was concerned with Maxwell's contingency plans and its ability to deal with such an event. Mr. Korol said that he had advised the Association that the probability of a blowout at this well would be very low due to technological advancements, proper crew training and the Board's regulations. However, Mr. Korol said that there was still an inherent risk of a blowout associated with any drilling operation.

The Association said that any increase in noise levels would impact the quality of life of area residents and visitors to the area. The Association believed that residents and visitors were attracted to the area to experience a degree of quietness and tranquility. The Association said that the proposed well and the associated noise impacts would disrupt that quality of life. The Association stated that the only way to retain the existing quality of life for the people in the

area was to prevent the well from being drilled north of TransAlta's berm under any circumstances.

The Association said that the increased traffic activity from the proposed well would be not only an intrusion into the solitude and tranquility that was currently enjoyed by lake users, but also a safety concern to the community of South Seba Beach. In addition, the Association expressed concern that the increased traffic levels would result in poorer road conditions, and potentially higher taxes as a result of increased maintenance requirements.

The Association said that it was concerned with the possibility of the proposed well contaminating either the lake water or existing domestic water wells. The Association believed that it would be possible that contamination could occur during the drilling of the surface hole due to the potential loss of drilling fluids into the shallow coal beds. The Association believed that these beds contained fresh water aquifers which charge Lake Wabamun and the nearby domestic water wells. The Association believed that the lake water could be contaminated by a catastrophic accident such as a well blowout or a large spill of fluids that could move off-lease and into Lake Wabamun. However, the Association acknowledged that Maxwell proposed to take a number of precautionary measures to prevent water contamination and was prepared to test the nearby domestic water wells for water quality and quantity. Mr. Korol indicated that an appropriate schedule for testing the nearby domestic wells would be before drilling, after setting well casing, with a follow-up test sometime after the well was completed and production operations commenced.

The Association said that it had concerns regarding the venting and flaring of solution gas. It believed that the odour of solution gas, even though the volumes would be minimal and the gas would be flared or collected, would be unacceptable. The Association said it was concerned that the solution gas might contain hydrogen sulphide, and might have the potential to be explosive, thereby endangering residents in the area. With respect to flaring, the Association believed that, even with safeguards such as a continuous pilot and ignition system on the flare stack, there would still be a risk that these systems might fail and result in unburned emissions being released to the atmosphere. The Association agreed that relocating the proposed well and associated production facilities south of the TransAlta berm would not necessarily alleviate its venting and flaring concerns. The Association also stated that, from time to time, odours from existing wells in the area have been detected, but it was not aware of any complaints directed to the Board as a result of these odours.

The Association said that it was concerned with the impact of the proposed well on property values in the area. It questioned what assurances or commitments it would have from Maxwell or the Government of Alberta with respect to all lake property owners being fully compensated if the proposed well had a negative impact on current property values. The Association said that there were several properties which had been for sale in the South Seba Beach area for some time and it believed that this situation could be attributed to the proposed well.

The Association suggested that Maxwell should have made a significant effort to purchase the mineral rights in Section 32, since Maxwell had significant mineral rights to the north in Sections 5, 6 and 7-53-5 W5M. It suggested a holding application could have been made to

include these four sections. The Association noted that approval of the holding application would have permitted siting of wells and consolidation of operations in Section 32 south of TransAlta's berm. It believed that the Board should not be as concerned with a proposed development in Section 32.

The Association proposed that, alternatively, Maxwell could apply to have the Section 5-53-5 W5M centralized oil target buffer zone, approved under Board Order No. SU 2535A, reduced from the currently-approved 200 metres to 100 or 50 metres north of the south boundary of Section 5. The Association proposed that the well could be spudded in the northwest quarter of Section 32-52-5 W5M, directly south of TransAlta's berm. It suggested that this proposal would not require a significant revision to the proposed well if the oil target buffer zone was reduced and the bottom-hole target was changed to 12-5. However, the Association acknowledged that additional horizontal wellbore would be required for Maxwell to reach its proposed bottom hole target in 13-5. On the basis of an additional rig time of three to four days at a daily rig cost of \$20 000 to \$30 000, the Association estimated that its alternative proposal in Section 32 would result in an additional expenditure by Maxwell of \$100 000. The Association acknowledged that Maxwell would not be able to produce minerals in the vertical portion of a well drilled in Section 32, since Maxwell did not own them. In addition, it acknowledged that correlative mineral owners, in Section 32-52-5 W5M and Section 8-53-5 W5M, would likely object to a reduction in the Section 5 buffer zone in order to protect their own interests.

Should the well be permitted at the proposed 4-5 location, the Association requested that certain mitigative measures be incorporated into the drilling and production operations to minimize the noise impact. These measures included restricting drilling to the period of 15 October to 31 March when there would be less people in the area, utilizing an electric drilling rig, and restricting to daylight hours particularly noisy activities during drilling, such as tripping and trucking.

5.3 Views of the Board

The Board notes that Maxwell has a valid surface lease agreement with the landowner at 4-5. The Board also understands that, having regard for the sensitivity of the area, Maxwell first considered other alternative surface locations in the immediate area north of TransAlta's berm, and did so in consultation with AEP early in the planning stage. The Board agrees that the other alternative surface locations are less compatible with existing residential land use because of environmental concerns raised by AEP, proximity to existing residential development and plans for the development of additional recreational properties.

The Board appreciates the Association's preference for a well surface location in Section 32, south of TransAlta's berm. However, the Board accepts Maxwell's submission that moving the well's surface location from 4-5 to 13-32, south of TransAlta's berm, would result in additional incremental drilling costs to Maxwell and notes that the intervener agreed. A surface location south of TransAlta's berm at 13-32 would also impose a number of other problems for Maxwell, including jeopardizing its drilling objectives, preventing it from producing minerals from the vertical portion of the well and creating additional operational problems with respect to drilling and producing the well. Before considering these problems in detail, the Board will first

consider whether the risks and impacts associated with Maxwell's proposed surface location at 4-5 would be acceptable, given the Association's concerns with regard to safety, noise, lake and well water contamination, property values, visual impacts, odours and emissions.

The Board believes that the possibility of a well blowout or a catastrophic accident occurring with the drilling of this well at a surface location at 4-5 would be extremely low, and therefore, that the associated public safety and environmental risks would be low as well. The Board notes that Maxwell proposed to drill in an overbalanced condition which would provide the first line of blowout prevention. The Board also notes that Maxwell would be required to meet the Board's blowout prevention regulations. The Board also considers this well to be a low risk to public safety based on the evidence provided by Maxwell that the 13-5 well's production would be virtually sweet, containing only trace amounts of H₂S and that the production would not flow to surface without assistance. The Board is satisfied with Maxwell's commitments to minimize safety risks associated with the proposed well's drilling operations and also agrees with Maxwell's commitment to drill with continuous 24-hour-per-day supervision.

The Board also believes that, considering the topography of the area and Maxwell's plans for the control of fluids, the proposed well poses little risk of contaminating Lake Wabamun during the drilling phase and is satisfied with Maxwell's plans to prevent contamination of lake and well water. The Board acknowledges that Maxwell is prepared to test nearby domestic water wells for water quality and quantity prior to drilling.

The Board heard the Association's concerns with respect to negative impacts that the proposed well may have on property values in nearby South Seba Beach and in the general area. However, the Board heard no evidence from the Association to substantiate their contention.

The Board recognizes that there would be some impacts associated with the proposed drilling at the 4-5 surface location. With respect to impacts during drilling operations, the Board notes Maxwell's proposal to drill this well during the period 15 October - 31 March when fewer people are using the lake and their cottages on the lake. The Board is satisfied that this commitment and Maxwell's plans to minimize noise, odours, and visual impacts would address the Association's concerns relative to the short-term impacts associated with drilling operations at 4-5.

The Board will now consider possible longer-term impacts related to the 4-5 location. The Board notes that, if the proposed well were successful, Maxwell would want to conduct a well test for approximately six months which would involve locating a single well production facility at the 4-5 location. The Board also notes the Association's concerns regarding the negative impacts such a facility could have on the area of South Seba Beach. While the Board understands and agrees with the need to test wells for purposes of assessing reserves and productivity, sizing equipment and pipelines, and deciding on additional drilling, the Board is very concerned about whether or not a production facility, even a temporary one for the purpose of testing, could be located at 4-5 with appropriate and acceptable impacts.

The Board agrees that a production facility located at 4-5 could have unacceptable impacts on the area because of its nature. However, the Board received limited evidence on the matter of a

production test and test facility. Accordingly, the Board would require Maxwell to obtain prior approval for any short or long-term test, including the requested test facilities, mitigative measures, duration, and timing. In addition, Maxwell must apply to the Board for approval of any permanent production facility. Accordingly, the Board would expect Maxwell to address thoroughly all of the issues raised by the intervener directly with it and in the application, and to address, in detail, the feasibility of locating the production facilities south of TransAlta's berm.

Although the Board finds that the impacts of drilling a well at the 4-5 location can be satisfactorily mitigated, the Board will now consider whether the interveners' proposed Section 32 location is preferable, considering its various advantages and disadvantages. The Board believes that, although locating the well south of the TransAlta berm in Section 32 could result in the elimination of certain impacts that would result from a location in Section 5, the problems which would result to Maxwell are not inconsequential.

The Board recognizes that the least risky approach for Maxwell to encounter the minerals it has leased the rights to in Section 5 is to drill in that section in the prescribed target area. The Board also recognizes that any move away from the target area in Section 5 puts Maxwell at a greater risk of not being able to encounter its objective, although the risk only becomes substantial at large distances.

The Board agrees with Maxwell that drilling from Section 32 would make it impossible for Maxwell to evaluate the up-hole potential in Section 5. While this is a potential negative impact to Maxwell, the Board is unable to quantify it. For example, if there is no up-hole oil and gas potential in Section 5, or if it is too small to be economic, then there would be no impact. On the other hand, if there is economic potential, Maxwell would be disadvantaged to that extent by not being able to evaluate and develop it. The Board simply has no means to quantify it however.

The Board recognizes that, to drill from Section 32, Maxwell would not be able to take advantage of the opportunity to use the full weight of the drill string in its horizontal drilling program. The Board agrees that this technical feature would be an advantage to Maxwell that would not be available if the well were drilled directionally from Section 32.

Additionally, the Board recognizes that, if the well were to be drilled vertically from a surface location in Section 32 with the objective of drilling a horizontal section into Lsd 13-5, it is possible, although not likely, that Maxwell might not be able to extend the horizontal section into the target area of Section 5. A consequence of that is that Maxwell could then be subject to an off-target penalty. Even more serious would be the possibility, however unlikely, that the horizontal section could not be drilled for some reason or was so far from the target area that the production penalty was severe. Moreover, even if Maxwell were able to reach the target area, the greater risk to Maxwell is that it might not be able to drill as much of a horizontal section in the target zone as it wishes to. The Board recognizes the importance to Maxwell of being able to have a long horizontal section in the target area to maximize productivity and recovery.

With respect to the intervener's suggestion that Maxwell could apply for spacing changes to provide for a smaller buffer zone (and therefore a larger target area) in Section 5, the Board notes that there are neighbouring mineral rights holders with an existing well in the adjacent

quarter section (NW 32) who could object to such an application. In addition, the Board notes that Maxwell attempted to make an arrangement with the holders of the mineral rights in NW 32 but was unsuccessful.

In summary, the Board believes that, while the alternative of drilling the well from a surface location in Section 32 might reduce surface impacts, it is not straightforward, and could present a number of significant problems and disadvantages to Maxwell. In addition, the Board believes that the impacts of the drilling operations at a well at 4-5 would be temporary, and that the long-term impacts would be acceptable. The Board will therefore approve the Application recognizing that, in order to minimize impacts, Maxwell must be extremely diligent in meeting all regulatory requirements and in completing all of its undertakings.

6 OTHER MATTERS

In closing argument, counsel for the Association argued that the legislation for oil and gas development, and consequently the regulatory system, was biased in favour of the oil and gas developers. He said that, of the many wells for which licences have been applied for in Alberta, only a handful have been denied by the Board. He argued that, even if an application was denied by the Board, there was provision for an appeal to the provincial cabinet to approve the well. He said that the Crown Mineral Disposition Review Committee did not provide for public input in its process respecting the leasing of mineral rights. He added that the new Municipal Government Act directed the municipalities, in their exercise of authority over land use or planning, to amend any of their bylaws dealing with land use to favour and accommodate decisions of the Board.

In response, Counsel for the applicant took the position that the legislation was an expression of the legislative assembly on behalf of the people of Alberta and that, under the legislation, a properly conceived application ought to be approved. He recognized that, if an application were denied, there was provision in the legislation for an appeal to the cabinet to have the denial overturned, and the well authorized by the cabinet. However, he argued that, if there were a legislated bias in favour of the oil and gas industry, it was eliminated with the enactment of section 2.1 of the Energy Resources Conservation Act which directs the Board to give consideration to whether the project 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.

These arguments of counsel for the applicant and intervener were brief, and accordingly, the Board will respond to them briefly, and only insofar as they pertain to the Board's jurisdiction. That is, the Board will not respond to the matters of the Crown Mineral Disposition Review Committee, the Municipal Government Act, or the provision in the legislation for appeal to the cabinet.

The Board believes that it must follow the direction given to it in the legislation. With respect to the contention that the Board has denied only a small number of applications for well licences, the Board agrees. However, the Board believes that the fact that only a small number are denied is, in large part, a result of the detailed, comprehensive and stringent requirements and processes which applicants must meet. The Board notes that applicants generally do not apply for projects

which do not meet the requirements, that is, they apply on the basis of the requirements. Further, if a company's plans are shown to not meet the requirements, the application is withdrawn, or it is modified to meet the requirements. Only applications which meet all of the requirements, including the public interest as set out in section 2.1 of the Energy Resources Conservation Act, are approved, and only after either the Board determines that there are no objections to the well or a public hearing has been held to consider any objections.

The Board does not intend to pursue these matters further other than to draw them to the attention of the government.

7 DECISION

Having considered all of the evidence carefully, the Board is prepared to approve Maxwell's well licence application, subject to Maxwell meeting all regulatory requirements and all its undertakings in its application and at the hearing. The well licence will be issued in due course.

Dated at Calgary, Alberta, on 27 November 1997.

ALBERTA ENERGY AND UTILITIES BOARD

(signed by)

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

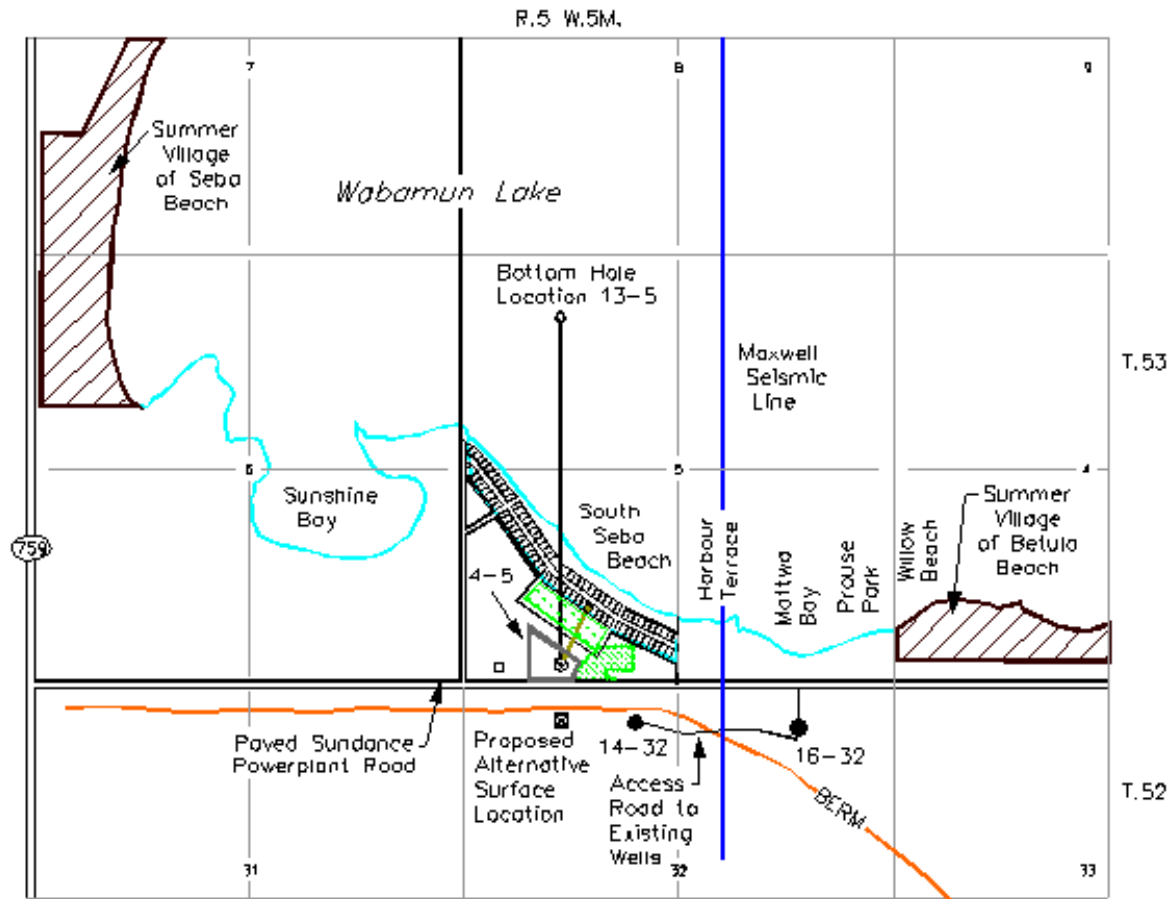
(signed by)

G. J. Miller
Board Member

(signed by)

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

Attachments: Maps



LEGEND:



Proposed Well and Surface Lease



Existing Oil Well



Residences



Park Reserve (undeveloped)



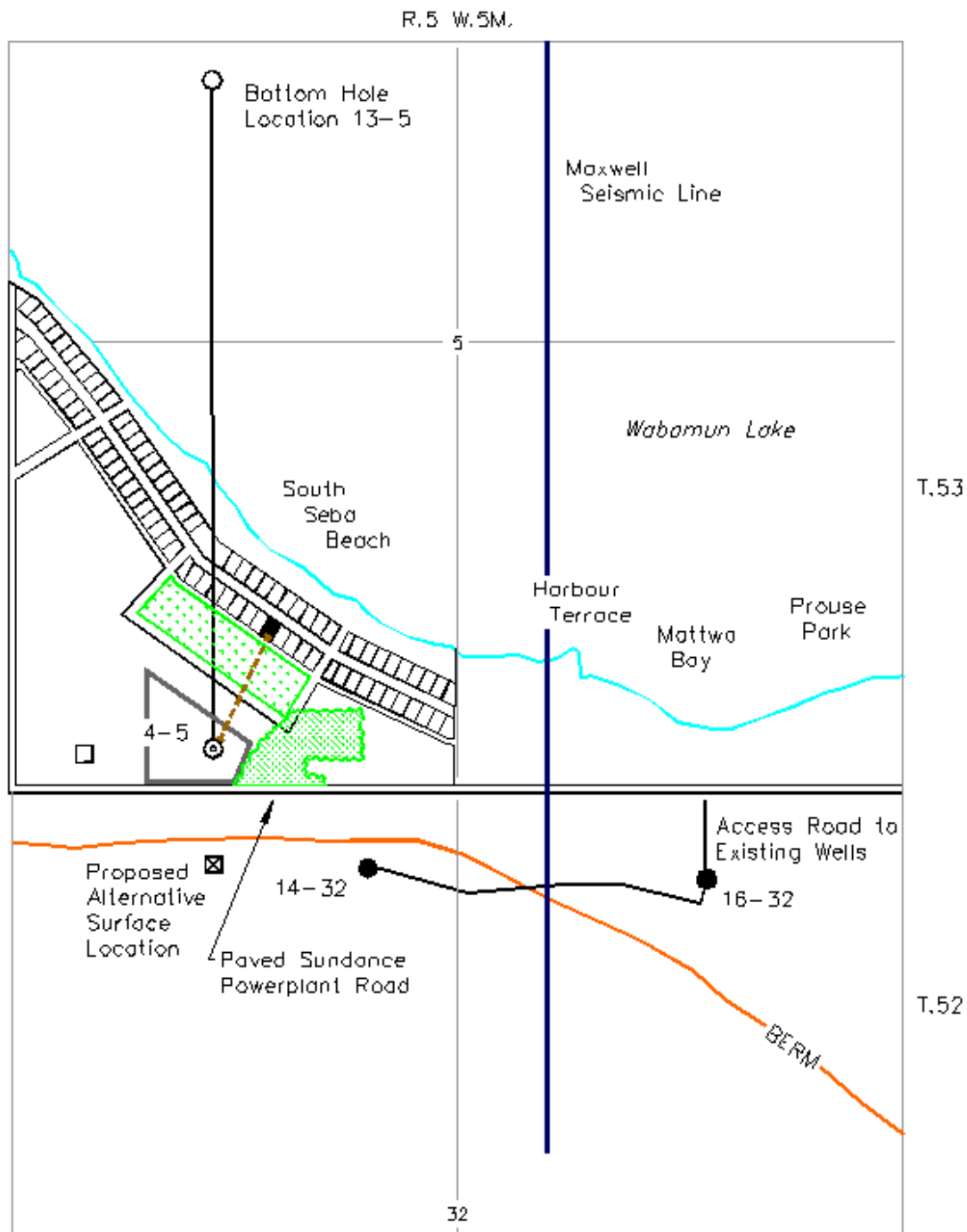
Low Area Willows



Distance to nearest residence - 238.2m

FIGURE 1
TOMAHAWK FIELD - SOUTH SEBA BEACH
 Application No. 970239
 Maxwell Oil & Gas Ltd.

Decision 97-15



LEGEND:

- | | | | | | |
|--|---------------------------------|--|----------------------------|--|--------------------------------------|
| | Proposed Well and Surface Lease | | Residences | | Low Area Willows |
| | Existing Oil Well | | Park Reserve (undeveloped) | | Distance to nearest residence-238.2m |

FIGURE 2
 TOMAHAWK FIELD - SOUTH SEBA BEACH
 Application No. 970239
 Maxwell Oil & Gas Ltd.