

ALBERTA ENERGY AND UTILITIES BOARD**Calgary Alberta**

**NUMAC ENERGY INC.
TO AMEND APPROVAL NO. 7936
FOR REDUCED SPACING IN THE WOLF LAKE
AND BONNYVILLE SECTORS****Decision D 98-2
Application No.1006527**

1 INTRODUCTION**1.1 Application**

Numac Energy Inc. (Numac) applied to the Alberta Energy and Utilities Board (the Board), in accordance with section 14 of the Oil Sands Conservation Act, for an amendment to Primary Recovery Scheme Approval No. 7936 to allow for a reduction in the drilling spacing unit from 64 hectares (ha) to 4 ha over 50.25 sections of land in the Bonnyville and Wolf Lake sectors. Numac's application (the Application) also requested a 100-metre (m) interwell distance and a 50 m project boundary buffer. Approval No. 7936 currently allows reduced spacing to 4 ha on 16 sections of land and allows for the operation of a cleaning plant. The lands applied for (the Application area) are shown on Figure 1.

1.2 Interventions

Three interventions opposing the Application were filed by Tony and Beverly Ell, landowners of North-east 31-62-6 W4M; Bruce Friedel, landowner of North-west 29 and all 32-62-6 W4M; and Conrad Prosser and Melanie Hammond, landowners of part of South-east 31-62-6 W4M. Mr. Friedel operates Moose Lake Wapiti Ltd. which is an elk farm with pedigree seed stock. Ms. Hammond operates the Fieldstones Equestrian Centre which offers horse-riding lessons and horse boarding. She plans to offer "get away" vacations in the future. Of the three interveners, the lands of the Ells' and Mr. Friedel are within the Application area and the Hammond/Prosser lands offset the development as shown on Figure 2. These same interveners objected to a similar application by Canadian Natural Resources Limited (CNRL) relating to an area in proximity to the Application area.

1.3 Hearing

The Application was considered at a public hearing which took place from 30 September to 3 October 1997 at Bonnyville, Alberta before Board members B. T. McManus, Q.C. and G. J. Miller, and Acting Board Member R. N. Houlihan, P.Eng. A viewing of a typical Numac functioning pad site, a pad site under construction, a drilling site, a CNRL pad site, and the sites of the interveners occurred on the afternoon of 30 September 1997. The CNRL application was initially to have been considered at a hearing scheduled immediately following the Numac hearing. However, CNRL's hearing was subsequently adjourned and was held on 29 and 30 October 1997 in Bonnyville before the same Board members.

Participants who attended the hearing are listed on the following table:

THOSE WHO APPEARED AT THE HEARING

Principles and Representatives (Abbreviations used in the Report)	Witnesses
Numac Energy Inc. (Numac) T. R. Owen	J. Flynn, P.Eng. J. Howard, P.Eng. C. Elliott, P.Eng. G. Riley, P.Geol. F. Morrissey, P.Eng. K. Ryan J. Farquharson, C.E.T. S. Mychasuik S. Pachet, WSO-CSM R. Clissold, P.Geol. J. Church, Ph.D. J. Schubert, P.Eng. D. Trotter, Ph.D.
Tony and Beverly Ell (the Ells) R. C. Secord	A. Ell B. Ell I. Ell S. Ell R. Korol, P.Eng.
Bruce Friedel	B. Friedel, M.Sc., P.Ag.
Les Prosser and Melanie Hammond (the Hammonds)	M. Hammond D. Hammond D. Moroney J. Pickle M. Crichton M. Hamilton
Alberta Energy and Utilities Board staff T. Donnelly, Legal Counsel K. Sadler, P.Eng. C. Ety M. Drake	

In a submission dated 19 September 1997, the Ells made three preliminary applications. First, the Ells requested that the Board hold an inquiry pursuant to section 22 of the Energy Resources Conservation Act in respect of both the Application and the CNRL application (collectively the two Applications) and/or, in the alternative, grant an adjournment of the hearing "until such time as all of the information which has been requested can be properly analyzed and reviewed on behalf of Mr. and Mrs. Ell in order to objectively analyze the full extent and consequences of the two Applications and proposed development plans of Numac and CNRL." Finally, the Ells submitted that, pursuant to section 12 of the Oil Sands Conservation Act, the Board must refer the two Applications to the Alberta Minister of Environmental Protection for his approval as they affected matters of the environment. The latter motion was reiterated at the commencement of the Numac hearing.

As support for their motions, the Ells asserted that the information presented in the two Applications was insufficient to address the following considerations:

- information requirements, public consultation and what constitutes the public interest, and environmental and social conditions;
- potential future development; and
- public health, safety, and quality of life.

In a letter dated 23 September 1997, the Board solicited submissions from Numac and CNRL with respect to the preliminary applications. Both applicants responded that the Board had undertaken a hearing process which, by its own rights, would address all of the issues raised by the Ells and provide them with a fair opportunity to respond. In addition, the applicants were of the view that the Ells had been given adequate opportunity to review the information provided to them in the two Applications and an adjournment was not justified under those circumstances. The Board's decision regarding these preliminary matters was conveyed to all interested parties in a letter dated 26 September 1997. The role of AEP was also addressed by the Board at the hearing. The Board's position was essentially as follows:

2.1 Request for an Inquiry

Informational Letter IL 85-12 was developed in response to a growing number of applications in respect of oil sands or crude bitumen operations. It sets out the Board's general guidelines for reviewing oil sands primary recovery scheme applications. The Board considered that the public hearing process as undertaken was appropriate to allow the necessary review, to permit participants to solicit information from the applicants and appropriately present their concerns, and thereafter to permit the Board to properly balance the impacts of the proposed operations in light of the public benefits. The Board believed that, when compared with a public hearing, an inquiry would elicit no additional or superior information upon which the Board could make an informed decision. The Board noted that both Numac and CNRL would first have to apply for well licenses before drilling, and that concerns regarding specific well locations could be dealt with at that time. The Board noted that, as always, it was prepared to take into account cumulative effects of proposed development when reviewing specific applications.

Accordingly, the Board denied the request for an inquiry.

2.2 Request for an Adjournment

The Board noted that both Numac and CNRL would be prejudiced by the granting of an adjournment and that Mr. and Mrs. Ell had several months and the assistance of counsel to review the information which Numac and CNRL provided to them. Further, the Board noted that the Ells did not ask for additional information from the applicants until 22 September 1997. The Board believed that the applicants had provided sufficient information to allow interested parties to proceed to a hearing.

Accordingly, the Board also denied the request for an adjournment and advised that the hearings would proceed as scheduled.

2.3 Role of Alberta Environmental Protection (AEP)

Regarding the need to refer applications made pursuant to sections 10 and 14 of the Oil Sands Conservation Act to the Minister of Environmental Protection, the Board confirmed in its 26 September 1997 letter and again at the hearing that a waiver of this requirement was granted by AEP in September 1994. Consequently, the Board noted that due process was followed in this regard.

With respect to the need for an environmental impact assessment (EIA), the Board noted that oil production sites are currently exempted from that requirement under the Environmental Protection and Enhancement Act. Notwithstanding, the Board noted that it shared jurisdiction over environmental issues with AEP and, as a result, would give due consideration to all such project-related impacts in rendering its decision.

3 ISSUES

The Board believes that the issues raised during the hearing can be categorized as follows:

- the need for the amendment,
- project design and operations,
- transportation,
- environmental impacts, and
- public consultation.

4 THE NEED FOR THE AMENDMENT

4.1 Views of the Ells

The Ells' position was that Numac had not demonstrated a need for the Application in the area consisting of Sections 28, 29, 30, 31, 32, and 33-62-6 W4M (collectively described as the "Area Surrounding the Interveners"). They submitted that Numac presented almost no evidence in its original Application, or in its update to the Application, concerning the geology and net pay information for this area, and therefore the need for the Application had not been established. Only when pressed by the Board did Numac provide net pay information indicating that the pay thickness in the Area Surrounding the Interveners was only five m.

The Ells expressed concern that Numac might be overestimating the potential of the Area Surrounding the Interveners because Numac's evidence revealed low average production rates per well, poor reservoir and fluid qualities (high fluid viscosity and thin pay), and a large number of wells shut-in from March to September 1997. The Ells also questioned the viability and economics of the entire project and why the 13 sections to the north-west of the Application area were left out of the Application. The Ells maintained that the net pay in the Sparky Zone was similar in those 13 sections to the Area Surrounding the Interveners. Furthermore, those 13 sections were closer to the cleaning plant than the Area Surrounding the Interveners. Therefore, traffic impacts would be minimized if Numac were to develop those 13 sections rather than the Area Surrounding the Interveners.

The Ells were also concerned that if enhanced recovery were to be initiated in the Area Surrounding the Interveners, there would be the potential for a whole series of new wells drilled.

With respect to the request for 4 ha spacing, Numac's own evidence suggested that only 8 ha spacing would be required. Accordingly, the Ells were of the view that Numac had not demonstrated the need for 4 ha spacing.

In summary, the Ells submitted that pursuant to section 10(3)(c) of the Oil Sands Conservation Act, the Application should be deferred and Numac should be required to prove up the need for the Application.

4.2 Views of Mr. Friedel

Mr. Friedel raised general concerns respecting the need for the applied-for amendment and, particularly, the fact that the proposed pad locations seemed to be constantly changing. He described Numac's development plans as a "moving target". Mr. Friedel also mentioned that Numac, through its landman, had communicated to him that the company had at one time considered removing the lands in the Area Surrounding the Interveners from its Application because of the opposition it was receiving in this area, suggesting that perhaps Numac was willing to forego development of this land.

4.3 Views of the Applicant

Numac stated that its project had the possibility of being very significant to its shareholders in terms of added value. The projected volumes of production would increase Numac's current production by about 40 per cent, and Numac's reserve base of liquids in the order of 27 per cent. In terms of the overall value to Numac, a net present value of \$20 to \$30 million was projected with an overall capital expenditure of \$185 million.

Although Numac applied for 4 ha spacing, it stated that it intended to develop the lands using 8 ha spacing. The 4 ha approval would give Numac greater flexibility in locating pads when topography posed a problem. The nature of the formation lent itself to reduced spacing as the drainage radius per wellbore was relatively small. Remaining on conventional spacing (one well per quarter section or 64 ha) would not be sufficient to drain the reservoir and Numac would be unable to achieve the economies of scale that their proposed development would permit. Primary recovery from 8 ha spacing would be 6 to 10 per cent, while recovery at conventional quarter section spacing would be less than 3 per cent.

The Application requested primary production only, since Numac had no current plans to initiate any enhanced recovery operations. An enhanced recovery pilot project was carried out by Canadian Occidental Petroleum on Numac's lands in the mid 1980s. This pilot was unsuccessful as were a number of other enhanced recovery pilots in the immediate vicinity. Enhanced recovery potential was limited due to the relatively thin nature of the sands in the Application area, the mineralogy of the reservoir, and the presence of bottom water.

In terms of the public interest, Numac pointed out that the project would create local employment. During the construction phase of the development, Numac anticipated 215 person years and 230 person years for the operations and support staff. There would also be a direct effect on local business, and particularly the contract and service sectors. Numac would also be paying property taxes and surface lease payments.

4.4 Views of the Board

The Board is satisfied that Numac has reserves in the Application area that may be developed in the manner proposed and that the project is technically viable. Furthermore, the Board considers that reduced spacing will increase recovery of the resource. The Board notes that primary recovery schemes are typically approved on 8 or 4 ha spacing and that there are many factors which can impact the recovery from individual wells and reservoirs. The Board also notes that, in accordance with Approval No. 7936, Numac is required to submit a report, by 31 December 2000, on the appropriateness of the existing well spacing and the ultimate recovery potential for the entire project area, including the effect of substantial primary recovery on subsequent thermal recovery. The number of wells and their configuration relating to reduced spacing is discussed in section 5.5.

In terms of the level of detail of information made available by Numac to the public, the Board is satisfied it was sufficient for the most part. However, the Board notes that the geological information provided to affected parties was vague and caused concern to the interveners. Numac's supplemental information provided at the hearing addressed many of these concerns. It is the Board's opinion that an applicant must make every effort to provide sufficient detail to

allow the public to be able to assess the full scope of the development proposed. The Board takes this opportunity to advise all oil sands operators to refer to IL 89-4 entitled, "Public Involvement in the Development of Energy Resources" when planning public consultation.

The Board does not see a need to direct which lands should have been applied for as such business decisions are the prerogative of each individual applicant. The Board will deal with the geographical scope of each application on its own merits.

The Board notes Numac's assurance that it has no current plans for enhanced recovery operations. Should Numac consider such operations in future, Board approval would be required.

5 PROJECT DESIGN AND OPERATIONS

5.1 Views of the Ells

With respect to the drilling techniques proposed by Numac, the Ells' position was that Numac presented no evidence with respect to what options were available to it to develop the Application area other than by drilling conventional directional wells. It was the Ells' view that Numac would only consider drilling horizontal wells as a form of enhanced oil recovery. The Ells submitted that, because the Application specifically requested approval for the construction and operation of additional drilling and production pads, it was incumbent upon Numac to present to the Board those options that were available to develop its entire 80 sections of oil sands holdings.

The Ells were also concerned with the possibility that any single well location could be expanded to be a multi-well pad and that drilling the pads in the Area Surrounding the Interveners would involve three to four months of continuous drilling activity.

The Ells also expressed reservations concerning Numac's proposal to change casing design. Their concerns centred around the use of a lighter weight casing than originally proposed in the Application and its ability to adequately protect the aquifers. The Ells believed that Numac did not provide sufficient evidence to justify the lighter production string and requested that the Board order Numac to use the originally proposed J-55 (34.10 kg/m) production casing.

5.2 Views of Mr. Friedel

Mr. Friedel was concerned that the Numac pad locations were not definite; they continually changed and therefore it was difficult for him to make an informed decision. Mr. Friedel was also specifically concerned with three proposed pad locations. The first (Pad Y), in the North-west quarter of Section 29-62-6 W4M, as shown on Figure 2, would be situated on a floating muskeg aquifer. The second (Pad X) on Figure 2, would be situated in the South-west quarter of Section 32-62-6 W4M which Mr. Friedel contended had flooded in the past. Mr. Friedel was concerned about the possibility of these two pads being flooded, with materials from the pads migrating off the pads into the water basin. Mr. Friedel noted that he had up to four water dugouts in this water basin and was concerned about water contamination. The third pad (Pad Z) of concern to Mr. Friedel was located in the North-east quarter of Section 29-62-6 W4M.

Mr. Friedel stated that the proposed pad would be within 100 m of his Paddock #22, which was to be used to isolate his expensive breeding bulls from the other livestock.

Mr. Friedel also expressed concerns regarding the effect that noise from Pad Z and traffic travelling to that pad would have on his elk, especially in light of Numac's proposed 24-hour a day operation.

Certain recommendations were made in a report Numac presented regarding the potential impacts of its operations on Mr. Friedel's elk (the Elk Report). Mr. Friedel agreed that the following recommendations had merit:

- drilling and completion operations should be limited to winter only. Numac should also attempt to conduct, to the extent reasonably possible, other intensive operations during winter;
- construction of the pads and any major changes to the pads should be introduced slowly and systematically over time, where possible;
- moving the proposed pad located in the North-east 29-62-6 W4M, 275 m from his handling facility;
- Numac should erect fencing or use other means to eliminate the visual sight lines of elk to the pads;
- truck traffic should be eliminated after dark on the pads immediately around Mr. Friedel's operations; and
- giving notice to Numac regarding the time of specific programs such as cow insemination, so as to permit Numac to reduce or eliminate activity accordingly.

5.3 Views of Ms. Hammond

Ms. Hammond was concerned with the location of pads in relation to her home and the possible impacts of those pads on her business. She expressed general concerns regarding safety and liability and contended that the proposed single-well battery located in the North-east quarter of Section 30-62-6 W4M (Pad W) would adversely affect the view from her elevated deck. These concerns would impact her ability to offer "get away" vacations for urban and foreign visitors. Ms. Hammond requested that Numac put up fences around the pads on and around South-east 31-62-6 W4M to ensure that her horses would not be injured should they be spooked by oilfield activity. Ms. Hammond indicated that if Pad W was approved, it would be her preference that drilling and completion activities be conducted in the winter so as to reduce the impact on her business activities.

5.4 Views of the Applicant

Numac stated that its development would be based on the use of multi-well pads to reduce land disturbance and to concentrate production facilities. By year end 1997, Numac expected to have 13 multi-well pads and 5 single-well batteries operating within the existing approval area. It planned a total of 35 to 40 pads for the entire project. The production pads would be equipped with up to 9 wells, a 120 m³ test tank, a 320 m³ production tank, and an electrical building. The tanks would be heated by natural gas which would be provided from Numac's nearby gas gathering system.

Numac explained that its practice was to determine the location of pads based on log information from wells drilled in the area, as well as seismic and other geological data. Pad sites were located so as to drain as much as possible of the area between the wells. In this project, Numac identified three potential target zones. Proposed pads were located at sites where there was confidence in encountering at least two of these zones.

With respect to the interveners' concerns regarding pad placement, Numac stated that it could exercise some flexibility in locating pad sites, however, it would be unable to move all of the proposed pads away from the interveners' lands and still be able to effectively drain the reservoir. Numac expected that the pad locations may change as more information regarding the reservoir becomes known.

Numac acknowledged the potential for any single-well battery to become a multi-well pad. Numac's practice was to first drill a single well to test the viability of a reservoir in a particular area and if that single well was successful, a multi-well pad would be considered.

Numac stated that its change in casing design would affect only the production casing, not the surface casing. Numac proposed to change its production casing design from 177.8 mm, 34.1 kg/m, J-55, LT&C casing to a combination of 177.8 mm, 29.8 kg/m, H-40, ST&C and 177.8 mm, 25.3 kg/m, H-40, ST&C casing. The make up of the production string would be a function of the availability of casing. The change was initiated as a cost saving measure. The cost of the 34.1 kg/m casing would be in the range of \$35 per m while the 25.3 kg/m casing would be in the order of \$27 per m. Numac did not believe that there was an advantage to using the heavier casing over the two lighter casings and indicated that it would use any of the three casing weights to case the production strings in the wells.

In response to the concerns raised by Mr. Friedel regarding the potential impacts on his elk operation, Numac stated that it would adopt the recommendations made in the Elk Report which were deemed by Mr. Friedel to have merit.

With respect to Ms. Hammond's concerns, Numac stated that it was prepared to look at mitigative measures such as adjusting the well-site location and scheduling construction and drilling in the winter.

5.5 Views of the Board

The Board supports Numac's use of pad drilling as the multi-well sites offer advantages in terms of reduced land disturbance and centralization of production facilities which may be beneficial for bitumen collection and transportation. The Board believes that the impacts associated with drilling operations can be further mitigated through certain pad relocation requirements.

The Board is concerned with Numac's apparent limited flexibility on the siting of pad locations given the recent advancements in drilling technology. As well, the Board is of the view that additional evaluation work on the part of Numac might have resulted in improved locations for the pads, particularly on Mr. Friedel's lands. Therefore, the Board does not accept the proposed location for the pad in the North-east 29-62-6 W4M (Pad Z on Figure 2) due to its proximity to Mr. Friedel's operations and directs Numac to relocate this pad a minimum of 275 m from Paddock #22. Once relocated, this pad should be constructed with sight barriers, such as fencing, to minimize impacts on the elk.

The Board is also concerned about the proposed pad location (Pad Y) in the area of the floating muskeg aquifer (North-west 29-62-6 W4M) and directs Numac to re-evaluate this location and report to the Board by 31 July 1998 concerning possible alternative locations. If Numac concludes that the pad location cannot change, it must provide a full description of the measures to be taken to ensure that no adverse impacts will result from this development.

With respect to the pad in the North-east 30-62-6 W4M (Pad W on Figure 2), Numac is directed to report to the Board by 31 July 1998 concerning the possibility of relocating this pad further away from the Hammond residence. Numac should also advise the Board as to any mitigative measures it is prepared to take to minimize impact on the Hammonds, such as incorporating sight barriers and restricting operations to the winter period as much as possible.

The Board is satisfied that Numac's well drilling and completion program is acceptable for the current development plans, but would emphasize that the proposed casing may not be suitable for enhanced recovery operations. The Board is also satisfied that project development and reclamation will not pose long-term problems given Numac's commitment to follow well construction guidelines administered by AEP and the requirement to obtain a reclamation certificate on all well sites. In this regard, the Board recognizes Numac's efforts to use the textile matting to prevent soil mixing and simplify site reclamation.

The Board notes that the number of wells to be drilled as part of Numac's development did not appear to be clearly communicated to the public and this led to some confusion and concern. In this regard, the Board wishes to clarify that a maximum of 16 wells may be drilled per quarter section based on the 4 ha spacing applied for. However, the Board expects that the actual number of wells drilled will be substantially less based on the current 8 ha development plans. The Board considers that the increased flexibility provided by the 4 ha spacing is desirable when there are topographical difficulties in siting wells. The use of multi-well pads should minimize surface impacts if Numac decides to reduce spacing to 4 ha.

It is the Board's view that pad proliferation should be controlled and that accordingly there should be a limit of 4 pad drilling sites per quarter section. The Board expects that all future developments by oil sands operators will comply with this guideline. Numac's project appears to

be well within the guideline in that the Application references an ultimate potential of 3.5 pads per section. Also, at the hearing Numac made it clear that typically for its development there would only be 1 pad per quarter section.

In summary, Numac shall be limited to a maximum of 4 pad sites and 16 wells per quarter section to provide flexibility. However, the Board's expectation is that Numac will generally utilize 1 pad per quarter section with up to 9 wells.

6 TRANSPORTATION

6.1 Trucking

6.1.1 Views of the Ells

The Ells expressed concerns regarding the effects of truck traffic on their rural lifestyle. Their concerns related to the volume of truck traffic per pad, the suitability and upkeep of roads, safety, noise, and dust.

There was a great deal of discussion regarding the number of trucks that would be passing the Ells' residence. The Ells believed that Numac had underestimated the amount of truck traffic, since their estimate was between 7390 and 10 602 round trips past their home on an annual basis compared to Numac's estimate of 7538 round trips per year. The Ells contended that if the CNRL application was taken into account, the truck traffic passing their home would be doubled.

The Ells expressed serious concerns with the suitability of the roads in the Area Surrounding the Interveners to handle the volume of heavy oilfield traffic. They noted that Numac itself indicated that the roads were not well constructed for heavy oilfield use.

Safety was also a major concern of the Ells as their home was situated only 40 feet from a T-intersection as shown on Figure 2. They stated that, on occasion, oilfield trucks have entered their driveway when unable to stop in time or when drivers assumed that the road just carried on through the Ells' farm. The Ells also stated that they make use of the roads for jogging, horseback riding, and bike riding and, with the increased traffic, it would be extremely dangerous to continue these activities.

In their final argument, the Ells outlined a number of conditions they would like to see imposed on Numac regarding truck traffic and road maintenance if the Application were to be approved. These conditions were as follows:

- require Numac to upgrade all of the roads in the Area Surrounding the Interveners to pavement and ensure that they are suitably maintained for heavy oilfield traffic. Numac is to retain the services of an independent, professional engineer to determine which roads would need to be widened to permit trucks, joggers, horseback riders, etc. to co-exist in a safe manner;
- require Numac to post a 15 km/h speed limit on all roads within a half mile radius of the Ells' residence so as to reduce heavy oilfield trucking noise;
- require Numac to remove the roads in and around the Ells from Numac's designated

- trucking route; and
- require Numac to pay for a move of the Ells' residence away from its current site to an area that will not be adversely affected by Numac's industrial activity or, alternatively, require Numac to pay for the remodelling of the Ells' residence.

6.1.2 Views of Mr. Friedel

Mr. Friedel's concern with trucking had to do with the negative impact the increased truck traffic would have on his elk operation. He submitted that the noise and dust from trucks passing his operation, on the east, west, and north roads, could cause stress which could in turn affect the productivity of elk cows and antler velvet production. Mr. Friedel stated that it would be difficult to isolate calving cows or high-priced bucks from the impacts of trucks on the roads.

Given Numac's proposed 24-hour operation, Mr. Friedel was concerned about the potential for injury to or loss of elk if trucks were to enter onto his property. This concern was increased by the possibility of trucks entering his property at night with headlights shining upon the elk. He expressed concerns regarding the difficulty of trying to qualify and quantify the impact of possible accidents resulting in injury or loss of his elk. Mr. Friedel explained that he would also have difficulty determining which operator a truck was working for if it were to cause harm to his elk.

Mr. Friedel also expressed concern regarding the suitability of the roads for heavy oilfield use and the safety of residents using the roads. Mr. Friedel cited an incident in which he almost hit a mud tank that had been left on the road.

6.1.3 Views of Ms. Hammond

Ms. Hammond was concerned with the negative impacts that truck traffic could have on the operations of her equestrian centre. Ms. Hammond indicated that her house was 200 feet from the road Numac was proposing to use. The noise from truck traffic would jeopardize the planned second phase of her operation, that being to offer riding holidays, including accommodations, in a quiet country setting. Ms. Hammond stated that she planned to charge between \$750 and \$1000 a week for these holidays. She did not believe this was possible with oilfield trucks passing her home at all hours of the day and night.

Ms. Hammond and other interested persons who appeared on her behalf expressed concerns with safety and road conditions. They also stated that poor road conditions have prevented clients from entering the Hammond operation which relies upon a certain level of drive-by traffic to make the operation viable.

6.1.4 Views of the Applicant

In response to the concerns regarding the suitability of roads in the area to handle heavy oilfield traffic, Numac stated that it had entered into a cost-sharing agreement with the Municipal District of Bonnyville (the M.D.) for the repair of roads that Numac was utilizing as designated trucking routes. Pursuant to that agreement, Numac would monitor the condition of the roads that it used and would itself repair anything above normal wear and tear. Numac posted

designated truck route signs in consultation with the M.D. so as to route its traffic on as direct a route as possible. To deal with trucking issues related to the Iron River School, Numac set up a trucking committee involving Numac, the M.D., and a representative from the school.

To deal with the Ells' specific concern about trucks entering their driveway, Numac stated that it met with all contractors and individual drivers to ensure that they were aware of the designated truck routes. With regard to trucking routing in the vicinity of the Ells' residence, Numac explained that trucks would travel south towards the T-intersection and would slow to a stop at the intersection, then turn east or west and accelerate away from the Ells' home. Trucks travelling east or west along the oiled road would have to slow down at the intersection to turn north, then accelerate away from the Ells' home. Numac submitted that this routing and procedure would ensure that there were no safety concerns to the Ells.

With regard to general safety on the roads, Numac suggested that if horse riders, bike riders, or joggers exercised normal care and caution, safety should not be a problem. Numac made use of effective dust suppression measures when necessary to increase safety. It stated that there was no evidence presented of any accidents or collisions involving Numac trucks. It pointed out that all roads being used were public roads and therefore accessible to all traffic.

With regard to Ms. Hammond's specific concerns about loss of business, Numac stated that Ms. Hammond might also benefit from Numac's operations due to snow removal from the roads and building up the road allowance to all weather status.

6.1.5 Views of the Board

If Numac's project goes ahead as proposed, there will clearly be a significant increase in the trucking in all areas of development including the Area Surrounding the Interveners. Without effective mitigation efforts, there will also be an increase in the detrimental aspects associated with trucking, including noise, safety, and an adverse impact on road conditions. This impact may be particularly severe because the roads in question were not designed or built to accommodate the type and volume of traffic that is being forecast. In terms of most effectively addressing the detrimental aspects of trucking, the Board believes pipelining has the potential to significantly reduce truck traffic and may therefore offer the best long-term solution as outlined in section 6.2.3. However, until a pipeline solution can be implemented, other mitigative measures must be found to permit increased trucking in a fashion acceptable to the affected public.

A good deal of time at the hearing was devoted to the trucking issue and various recommendations were put forward. Although the Board has a mandate to consider how the public interest is affected by general concerns regarding trucking and safety, the Board does not consider it appropriate, given the limited information before it in this instance, to attempt to deal with certain specific issues relating to trucking, such as routing, road upgrading and repair, and speed limits. In any event, the Board considers that trucking concerns can most effectively be addressed by the concerted effort of the heavy oil industry, municipal officials, and affected members of the public. Accordingly, the Board strongly urges Numac to work with other operators in the area to establish, with the M.D., a committee to address trucking concerns in a thorough and coordinated way. The Board will not attempt to specify how public input to the committee might best be accomplished; however, the Board assumes that some mechanism

would be needed to ensure that public concerns are addressed in an effective and equitable manner. The Board's expectation is that a joint committee would address various matters in a comprehensive manner, including without limitation, the following examples:

- **Truck Routing**

Coordinated planning, taking into account the concerns of the interveners and others, needs to occur in order to develop firm commitments on trucking routes, particularly in the Area Surrounding the Interveners. There may be ways to avoid the T-intersection adjacent to the Ells' residence, at least in a north/south direction. It may be viable to truck production to the west through the establishment of roads to the south of the Hammond and Friedel properties so as to reduce traffic frequency near them. Truck routes might not be limited to existing roads, as there may be opportunities to develop new "in-field roads" to reduce adverse effects on the public. Clearly, various options need to be considered to develop a comprehensive plan that accommodates all affected parties to the greatest extent possible.

- **Priorities for Development and Upgrading of Roads**

It is the Board's understanding that the road running north/south between Sections 1 and 2, Township 63, Range 7 is a designated truck route and should therefore be a top priority to get operational by early 1998. However, this is but one priority and cannot be addressed in isolation. Road upgrading and development, maintenance and upkeep, dust suppression, and possible use of noise reduction barriers all require establishing priorities for the use of available resources. These priorities should be established in a rationalized fashion, taking into account the public interest and the limitations and requirements of industry.

- **Resource Commitment**

Numac indicated its commitment to cost sharing, road repairs and monitoring of road conditions to enhance the operations of the M.D. Other present and future operators in the area should likewise be expected to equitably contribute to the resources needed to address trucking problems.

- **Standardized Conduct**

Numac advised that it instructed its trucking contractors to refrain from using air retarder or Jake brakes, to follow all posted speed limits, to maintain vehicles in good condition, and to slow down around residences. It may be that such a "code of conduct" could be expanded, particularly if it affected all contractors serving operators in the area. With proper planning, the Board considers that trucking on a 24-hour basis could be severely limited, if not eliminated entirely. Reduced trucking hours and voluntary reduction of speed limits might also be considered, in sensitive areas, to reduce public impacts. A consistent set of ground rules would benefit all parties and hopefully encourage better overall compliance by contractors. It would appear existing ground rules are generally followed, but when occasional complaints are received, it would serve the interests of the operators to maintain a consistent procedure for fully investigating the complaint and

reporting back to the complainant. One difficulty for potential complainants is identifying the contractor involved. Operators might consider whether there is some practical way of permitting easier identification of contractor vehicles or the operators they are working for.

- **Speed Limits**

The Ells recommended a 15 km/h speed limit within a half mile of their residence. While this suggestion may have merit, any amendments to posted speed limits must be imposed by the M.D. As noted in the foregoing paragraph, however, operators may choose to have their contractors adhere to voluntary speed reductions at selected locations and times.

The foregoing is not an attempt to lay out a specific plan of action or set of priorities, but rather to suggest the types of matters that a multi-party committee might address. Hopefully, other creative approaches can be developed. One thing seems clear — without a particular, concerted effort to address trucking concerns, the problem will be exacerbated to the detriment of all parties concerned.

The Board would like to keep abreast of any developments resulting from the establishment of a multi-party committee and, to this end, requests Numac to submit a report by 31 July 1998 outlining the progress made by such a committee.

6.2 Pipelining

6.2.1 Views of the Interveners

The potential for pipelining was raised by Numac, although it was not specifically identified by any of the interveners at the hearing. However, the Ells did request in final argument that Numac be required to transport by pipeline all oil produced from the Area Surrounding the Interveners to a remote tank site or, if technically possible, to the central cleaning plant.

6.2.2 Views of the Applicant

In order to reduce the effects of trucking, Numac stated it was working with an industry group, the Petroleum Technology Alliance of Canada (PTAC), and with the Centre for Frontier Engineering Research (C-FER) to investigate the potential for pipelining bitumen. The proposed time frame for the work would be one year. Numac could not elaborate on the scope of the work because it was unsure if PTAC had agreed on it. Numac indicated that had also spoken to other operators who have tried pipelining to better understand why it was not successful. Numac stated that it was difficult to pipeline bitumen because it was very viscous and carried a lot of sand. If the viscosity were lowered the sand had a tendency to drop out and plug the pipeline.

6.2.3 Views of the Board

The Board notes the studies currently underway on pipelining of bitumen and is of the view that this type of initiative is sorely needed. Given the areal extent of these projects and the impacts on existing land use and roads, it is imperative that transportation alternatives to trucking be

developed. Consequently, the Board directs Numac to file a report, by 30 June 1999, on the feasibility of bitumen pipelining at this project, including the technical and economic feasibility of pipelining bitumen to central gathering facilities or directly to the central cleaning plant. The Board believes that the pipelining alternative should focus on those areas with the greatest potential for success and where trucking would have the most adverse impacts. The Board accepts that trucking of the sand component of production will likely be required in any event.

The Board takes this opportunity to alert other operators as to the need to evaluate and to incorporate pipelining to the maximum extent possible in their future development plans.

7 ENVIRONMENTAL IMPACTS

7.1 Air Emissions/Odours/Gas Venting

7.1.1 Views of the Ells

The Ells argued that the air dispersion model presented by Numac lacked scientific rigour and was deficient in the following areas:

- there were no measurements of the flows from any casing vents or tanks from Numac's pads or single-well batteries. Only one BTEX (benzene, toluene, ethylbenzene and xylene) sample was done, taken from the CNRL well 2B-6-63-6 W4M. Numac was unaware of what zone this well was producing from;
- although Numac was producing from different zones and its consultant indicated that a variance in the composition and flowrates of emissions could be expected depending on the zones being produced, Numac only sampled one tank and provided data for one tank, presumably containing production from a single zone;
- Numac's consultant had no knowledge of the methods for estimating tank flow rates and Numac did not know what percentage of fugitive emissions would come from their pad sites; and
- the model did not take into account CNRL's plans on Section 6-62-6 W4M or the cumulative effects of emissions from other nearby existing facilities.

Accordingly, the Ells contended that the air dispersion modelling results presented by Numac were seriously flawed. As the health assessment report was based entirely on the results of the air dispersion modelling, the Ells contended this report must also be flawed and deficient.

The Ells expressed concern that the reports did not address the issue of odours, but only seemed to focus on acute or chronic health impacts. They were also concerned that Numac would not entertain vapour management and collection for vent gases, such as using a closed venting system or incineration because of a lack of money in the project budget. Furthermore, Numac personnel did not have any specific fugitive emissions training.

The Ells submitted that the Application should be denied pending Numac doing proper scientifically based air dispersion modelling of the emission sources in the Application area in order to determine the true cumulative health effects and the level of predicted cumulative odours.

If the Application was to be approved, the Ells requested that Numac institute vapour recovery systems at all its pad sites in the Application area, that no emissions from tanks or casing vents be emitted directly into the atmosphere, and that all waste gases collected in the vapour recovery system be incinerated.

7.1.2 Views of Mr. Friedel

Mr. Friedel expressed concerns regarding the negative impact that cumulative emissions would have on ground water and the productivity of his soils, forage crops, and elk. He maintained that these impacts would not be measurable, as there would be no air quality monitoring at any of the interveners' residences prior to development commencing. Mr. Friedel stated that it would be prudent to obtain baseline air quality measurements before Numac started its project so that there would be an indication of what changes occurred as a result of development in the area.

Mr. Friedel also expressed some concern with the sulphur content of the vent gases and the potential effects these emissions might have on livestock and his half million dollar investment in triple zinc-coated, high-tensile wire. Mr. Friedel referenced some circumstances in which agricultural fencing needed to be replaced prematurely as a result of exposure to oilfield related emissions.

7.1.3 Views of the Applicant

As part of its evidence, Numac presented two reports. The first was an air dispersion model used to estimate and assess the impacts of emissions on air quality in the Application area. Actual samples of the tank and casing vent gases were collected from an existing casing and tank vent source. This data was then used to input a total of 72 tank vent and 45 casing vent sources into the model to reflect the actual type and number, as well as the composition and volume of emission sources proposed in the Application area. The report concluded that the predicted maximum ground-level concentrations of sulphur compounds for Numac's development, including existing sites, would be well below acceptable ambient air objectives, at $3.04 \mu\text{g}/\text{m}^3$. The same calculation was performed with benzene and the concentration of benzene for Numac's entire development was again very low at $0.74 \mu\text{g}/\text{m}^3$.

The second report assessed what health effects, if any, these modelled emissions might have on residents in the area of the proposed development. Analysis of the emissions indicated that 99 per cent of the vent emissions were methane and 1 per cent was a variety of different organics and trace sulphur compounds. The health assessment report, which used the output results from the air dispersion model, concluded that the emissions from the proposed project would not present a health threat to any residents in the area. With respect to concerns relating to livestock health, Numac stated that there was no evidence to support claims of emissions causing harm to livestock.

In response to concerns about releasing vent emissions to the atmosphere, Numac stated that it

had not incorporated vapour management or waste gas incineration into its 1997 budget; however, it did have a miscellaneous category that allowed for minor capital installations, should these be necessary. The cost to implement true vapour recovery, in order to get the gas into a fuel system, would be in the order of \$200 000 per pad location and would likely require a dehydration system and a compressor. Numac stated that vapour recovery was not always appropriate and, in some instances, it might be better to shut-in a well or pursue different producing zones.

In addressing fugitive emission training, Numac stated that it ensured that employees were trained in all areas in which they conducted their business, and that site-specific safe operating procedures were in place for each operating area. These procedures were developed by the operators themselves and included daily checks at each pad to ensure that equipment was operating properly and that there were no leaks. Numac employees typically relied on their senses of sight and smell to detect any fugitive emissions.

7.1.4 Views of the Board

The Board recognizes the complexity and intricacy of the air dispersion modelling study and notes the efforts put forth by Numac in its attempt to determine the potential air quality impacts from the proposed operations. However, it is apparent that particular aspects of this modelling exercise, such as the input of more representative sample data, could have been improved. This having been noted, the Board does not believe that, at this time, sufficient evidence is available to indicate that gas collection either at the wellhead or at the storage tanks is justified as a general policy.

The Board directs Numac to conduct a thorough review of the technical and economical feasibility related to vent gas collection and recovery within its development area, and to file a report by 31 July 1998, outlining the conclusions of the review. The Board also urges Numac to take measures to collect vent gases in sensitive areas, such as production facilities near residences. The Board is satisfied that these types of emissions do not pose a health or safety concern, however, they may need to be addressed where there are residents because they can be aesthetically displeasing and present a nuisance odour factor to those residents living downwind. The Board expects Numac to work upfront with local residents in the project area to identify and eliminate potential odour-related concerns. In the Board's view, the likelihood of public concerns will undoubtedly increase as further development by Numac and other operators intensifies in these areas. The Board currently has mechanisms in place to deal with bona-fide odour-related complaints and action will be taken by the Board, including ultimately the suspension of a facility, if complaints persist and the situation is not remedied in a timely manner.

The Board is satisfied that Numac employees have adequate training to deal with fugitive emissions. The Board is also satisfied that the sulphur content in any emissions from the proposed development would not exceed ambient air guidelines.

7.2 Groundwater Protection

7.2.1 Views of the Ells

The Ells raised two specific issues with regard to groundwater protection. These were the proposed casing design change requested by Numac, which has been discussed in section 5.5 of this report, and the lack of monitoring for water wells in the area. In final argument, the Ells requested that Numac set up a monitoring program for all water wells in the area and be prepared to immediately replace wells if problems occur.

7.2.2 Views of Mr. Friedel

Mr. Friedel had concerns with the continued quality of his domestic water well and the 16 water dugouts for his elk. He was concerned that Numac had not established baseline water quality parameters. Mr. Friedel indicated that his water well and up to four dugouts were all part of the floating muskeg aquifer on which Numac was proposing to build a pad. He was concerned with possible flooding of this pad and the possible migration of contaminants from the pad into the aquifer. Mr. Friedel also wanted Numac to set up monitoring programs for his water wells and dugouts.

7.2.3 Views of Ms. Hammond

Ms. Hammond's only concern regarding water was an issue of water well replacement. Ms. Hammond wanted assurances from Numac that it would replace her water well if it was damaged due to drilling activity. She also wanted assurances that an alternative water supply would be made available if her water well was affected.

7.2.4 Views of the Applicant

With respect to the Ells' concerns regarding the change in casing design, Numac stated that in considering groundwater protection, it was important to note that there was no proposal to change the design of its surface casing. All wells would have surface casing to a depth of 100 m to protect the shallow aquifers.

In response to concerns about water well testing, Numac offered to test water wells and dugouts if a landowner or resident requested it. Numac stated that it had offered to test water wells for all the interveners and all landowners in the area. Numac also offered to test Mr. Friedel's dugouts.

Numac presented a hydrogeological report (the Hydrogeological Report) relating to groundwater issues within the area of the Application. The report concluded that the proposed increase in drilling activity would not pose any additional threat to the quality of the groundwater in the main aquifers in the area. Locations were identified where the risk of contamination was higher, however, none of the risks were considered high enough to prevent drilling at a given pad location. The Hydrogeological Report recommended that before constructing the pad site in the North-east Section 29-62-6 W4M, an investigation be completed to determine the best method to ensure there would be no uncontrolled flow from the aquifer. Also, before any activity began at the site, an aquifer test should be performed with the water wells in Sections 29, 30, 31 and 32-62-6 W4M. Numac stated that it would adopt all recommendations made in the Hydrogeological

Report.

With respect to Mr. Friedel's concerns regarding the proposed location of a pad on the floating muskeg aquifer, Numac stated that there was some flexibility to move the pad but it could not move the pad off the quarter section.

In response to Ms. Hammond's concerns regarding impacts on her water well, Numac stated that it was common practice for a water tank to be utilized as an interim measure if there was an interruption in the water supply. If it were determined that Numac was responsible for the interruption, Numac would replace the water well.

7.2.5 Views of the Board

The Board considers that the main issues associated with groundwater protection are water quality, quantity, and flow rate. In this regard, the Board notes Numac's commitment to test residential water wells and dugouts upon request and to adopt the recommendations contained in the Hydrogeological Report.

The Board also notes Numac's intentions to use surface casing in all wells. While the Board's view is that the primary purpose of surface casing is for well control purposes, it may also serve to reduce the potential for groundwater impacts and its use is therefore encouraged.

The Board's concerns regarding the location of the proposed pad in the area of the floating muskeg aquifer (North-west 29-62-6 W4M) are outlined in section 5.5.

7.3 Noise

7.3.1 Views of the Ells

The Ells expressed concern regarding the increased noise that would be associated with the increase in truck traffic. The Ells contended that the noise associated with trucks accelerating and decelerating at the intersection near their home would exceed the permissible sound levels outlined in ID 94-4. The Ells believed that the Preliminary Noise Impact Study prepared for Numac by Patching Associates was flawed in that it did not address the tremendous amount of heavy truck traffic that would be passing the Ells' residence. The Ells also believed that Numac underestimated the sound levels associated with truck traffic.

The Ells were also concerned about the noise generated during the drilling and completion phase of development and during the production phase.

As part of their final argument, the Ells requested that Numac be required to build noise attenuation berms and plant a sufficient number of trees in and around their residence to help buffer noise from heavy truck traffic.

7.3.2 Views of Mr. Friedel

Mr. Friedel was also concerned with noise from truck traffic associated with the proposed development. He indicated that although 40 decibels was considered safe for livestock

production, anything above that would cause stress to his animals. Mr. Friedel referred to studies outlining the effect of noise on a variety of test animals. He also referred to a study which provided noise levels for heavy equipment which differed from those offered by Numac. Mr. Friedel was very concerned about having to quantify to Numac the effects of truck traffic noise on his operation.

7.3.3 Views of Ms. Hammond

Ms. Hammond also expressed concerns regarding the effect the truck noise would have on her equestrian centre. She stated that the noise from trucks would echo in her riding barn and could possibly spook her horses. She further stated that she was not willing to accept responsibility if one of her students were to be injured due to an incident resulting from truck noise.

Ms. Hammond also indicated that she had put off purchasing a new riding barn earlier in the year because of her concerns, including noise, associated with the proposed development.

7.3.4 Views of the Applicant

To minimize noise from trucking, Numac instructed its trucking contractors to refrain from using jake brakes, to follow all posted speed limits, and to slow down around residences. Numac also required all of its trucking contractors to maintain their vehicles in good condition.

Numac stated that multi-well pad sites would be equipped with 40 hp electric motors to minimize noise from pad sites.

Patching Associates, on behalf of Numac, prepared two noise studies. The first study was a Community Noise Survey conducted in March 1997, prior to significant development in the area by Numac or other operators. This study indicated that the noise levels in the Application area were fairly representative of rural Alberta. The second study was a Preliminary Noise Impact Assessment. It was prepared as a planning tool for Numac to use in designing facilities and took into account existing pad sites and their impact on the surrounding area and also incorporated the plans of CNRL. In particular, the study was focused at proposed pad sites in the Area Surrounding the Interveners. The results of this study indicated that noise levels were in compliance with ID 94-4 at all three interveners' homes. Numac clarified that the Preliminary Noise Impact Study did not take truck traffic into account as ID 94-4 does not include provisions for noise from trucks.

7.3.5 Views of the Board

The Board notes that Numac submitted two studies relating to noise and its impacts on the community. The Preliminary Noise Impact Assessment indicated that the predicted sound levels from the facilities in the Area Surrounding the Interveners would be in compliance with ID 94-4.

The Board notes that ID 94-4 attempts to take a balanced viewpoint by considering the interests of both nearby residents and facility owner/operators. The Directive does not guarantee that a resident will not hear sounds from a facility, even if it is in compliance; rather, it aims for a situation where sound level increases will be kept to acceptable minimums, overall quality of life for neighbours to a facility will not be impaired, and indoor sound levels will not be adversely affected.

At this time, the Board believes that Numac has complied with the intent of ID 94-4 and believes that the noise levels from the proposed facilities will be in compliance with permissible sound levels.

The Board notes that the interveners were concerned with noise from drilling and completion activities and from trucking. ID 94-4 categorizes drilling and service rigs as temporary facilities even if they are expected to be at a location more than 2 months. Temporary activities do not generally require a Noise Impact Assessment and noise disturbances from these activities are dealt with on a complaint basis. Sound control for drilling and service rigs is the responsibility of the well licensee. The Board considers that it is the responsibility of the well licensee to contract an appropriately equipped rig for sensitive situations. The rig contractor is then responsible for suitably equipping and maintaining rigs contracted for sensitive situations. Because of the large number of variables at each location, compliance for drilling and servicing rigs is on a complaint basis only. It is expected that all parties will act quickly to remedy any complaints.

Noise impact from facility-related heavy truck traffic and vibration impact from energy-related facility operations are not specifically addressed in ID 94-4. However, receipt of a public complaint with regard to these impacts may require corrective action by the operator. The Board appreciates the special nature of these impacts and is prepared to consider these on a site-specific basis. It is expected that every reasonable measure will be taken by industry to avoid or minimize the impact of heavy truck traffic or vibration concerns in an area.

The Board strongly urges Numac to make every reasonable effort to minimize the impacts of noise on the interveners. The construction of noise attenuation berms and the planting of trees are common examples of methods of minimizing the impacts of noise on affected persons.

8 PUBLIC CONSULTATION

8.1 Views of the Ells

It was the Ells' view that Numac's public consultation process was flawed and that Numac conducted itself in a manner that would justify the Board denying the Application. The Ells were concerned with Numac's strategy in obtaining signed letters of consent. They believed that Numac sent its landmen out to gather signatures on consent forms prior to the open house because it did not want to be in the position of having to obtain signatures after explaining and answering questions regarding the full impact of the proposed development. The Ells contended that the consent document requested consent for the proposed development as well as for the Board's subsequent issuance of necessary licenses, permits, and orders as may be required. In final argument, the Ells stated that individuals signing this letter could not have had the details about pad locations or trucking routes. The Ells described Numac's public relations as "shady" and referred to Numac's refusal to share geological data as keeping area residents in the dark.

The Ells stated that Numac's initial information indicated that there would be a joint application involving the construction of a central cleaning plant and the reduced spacing application. However, two separate applications were later made. This troubled the Ells in that they contended that there was no real understanding of the full nature and extent of the development being proposed.

8.2 Views of Mr. Friedel

Mr. Friedel stated that he was extremely concerned about Numac's staged development and about amending different applications. He stated that the people in the community had to see things with their own eyes to understand the impacts of this kind of development on their livelihood. He also stated there was no understanding of where the pads would be located as Numac's maps continually changed. It was Mr. Friedel's understanding that the selection of pad sites was inflexible and he was frustrated by the fact that, as the hearing approached, Numac appeared to become more flexible.

Mr. Friedel also stated that he had concerns with Numac's personal consultation practice. He believed that with the community now having a better understanding of Numac's proposal, it would have difficulty obtaining consents.

8.3 Views of Ms. Hammond

Ms. Hammond was also concerned about Numac's public consultation process and particularly its practices related to obtaining letters of consent.

8.4 Views of the Applicant

In addressing public consultation, Numac stated that it had executed consents from 142 separate individuals and occupants in and offsetting the Application area. Numac held an open house on 13 and 14 January 1997 with all area landowners and occupants invited to attend. It stated that a total of 190 persons attended the open house and that an informational package was made available to all. Numac stated that it received positive feedback, but there were also concerns raised which Numac did address. Numac stated that its public consultation program was an ongoing process and that it was investigating the possibility of further open houses to update area residents.

With respect to concerns regarding staged development, Numac stated that the phased approach allowed Numac, the Board, and the public at large to assess the Application on the basis of past experience and up-to-date information. Numac argued that if it had applied for the project as a whole at too early a date, much of the information provided to the Board and the public would have been purely speculative. Furthermore, if Numac were to provide exact information regarding all aspects of the project, then it would have to proceed on a quarter section by quarter section basis combining both reduced spacing and well licensing applications.

In addressing the concerns regarding letters of consent being obtained prior to the open house, Numac confirmed that no one revoked their consent during or after the open house or even after the Board published its Notice of Hearing. Numac stated that the letters of consent related only to the Application, and not to other approvals that would be required in future.

With regard to Mr. Friedel's concerns regarding changing pad location maps, Numac stated that it was necessary for the maps to change as more information was gathered about the reservoir.

8.5 Views of the Board

The Board notes that all the interveners had concerns with Numac's public consultation program. They did not understand the full nature and extent of the development despite interactions with Numac's landman and technical experts, and the fact that the plan of development had been set out in the Application and at an open house meeting held to explain it and to respond to questions. Some problems occurred because Numac did not provide sufficient geological information. Some people did not understand industry terminology and were not helped to understand it. There was distrust of Numac's method of obtaining consents from affected landowners and residents, concern about Numac's apparent lack of flexibility with respect to pad locations, and concern that pad locations were changing. The fact that the number of wells per pad could change was not well understood. There were also indications that people did not understand that when well locations were not known or applied for, affected persons would have to be consulted and have other opportunities to raise concerns.

The Board is concerned with the foregoing information difficulties, and that such problems too often occur despite the efforts of industry and the affected public to identify and resolve concerns that may arise with energy resource developments. The Board and AEP developed Informational Letter IL 89-4 with the objective of improving public consultation. The essence of this IL is the expectation of regulators that industry will proactively consult with the public prior to making applications, during the application review process, and throughout the operational phase of the development, right through to suspension and abandonment. The industry is expected to bring affected people together and establish effective two-way communication prior to application submission. At this stage, the broad plan of development should be outlined and it should deal with the plans of other developers to the fullest extent possible. It should identify benefits of the development to the community and the province. Industry should determine if there are concerns with proposed applications and explore every avenue to resolve them. Members of the public can assist by taking advantage of opportunities to learn about proposed developments that may impact them and the regulatory processes to review applications and monitor operations. Where there are unresolved concerns, they need to be brought forward clearly.

Numac appears to have generally followed the expectations as set out in IL 89-4 in that it had a plan of development that was explained at an open house and at meetings with interveners. However, the Board has earlier noted certain information difficulties. Holding back on information, especially geological information as is required in applications of this nature, is unwise and appears to have created distrust. At the hearing, Numac was flexible with respect to pad locations and responsive to interveners' concerns. It responded to public concerns and planned to hold another open house in the future. It is unfortunate that this flexibility and responsiveness was not evident to the interveners prior to the hearing. Had it been, the Board believes that some of the interveners' concerns could have been resolved. In summary, the Board considers Numac's consultation process to have been satisfactory, notwithstanding there were aspects that could have been improved.

9 INDUSTRY COLLABORATION AND COMMUNICATION

Production of bitumen in the Cold Lake oil sands area by primary measures has become attractive over the past several years. Growth has been extensive and is expected to continue. However, this growth challenges producers and concerns adjacent residents. These challenges and concerns have been raised and discussed at several Board hearings, including those of Numac and CNRL.

Challenges are both technical and of a more general nature. Technical challenges relate to drilling and production operations and include production handling, off-gas management, and the impacts of water and air emissions, noise, and trucking. More generally, there is the challenge to facilitate and coordinate effective communication with the public. Rapid resource development invariably raises a variety of public concerns and considerable effort is required to ensure good relations are developed and maintained between industry and the affected public. Communication is often the key to these relations.

The presence of several developers in an area provides opportunities for collaboration on resolution of both technical and communications issues. When this does not occur satisfactorily, regulatory processes are impacted by requests for environmental assessments, cumulative effects information, inquiries, and hearings. The Board urges Numac to work with other developers on the resolution of technical issues. The Board notes that industry is already collaborating to some extent in an attempt to overcome the challenges of bitumen pipelining. Similarly, off-gas management and the assessment of impacts on air quality would benefit from industry collaboration. This collaborative approach is likely to be more effective than for each operator to work alone.

Industry collaboration can also be beneficial in addressing the public's requirement for information on all potential developments and their impacts, by providing such information in a thorough and coordinated fashion. The Board similarly urges Numac to work with other developers in developing a process that responds to the public need for information on all developments in a region and addresses concerns in a coordinated manner.

The Board notes that the collaborative approach being suggested has been used with some success in examples such as the Lakeland Petroleum Producers Association and the Lindburgh Operators Committee, amongst others.

10 DECISION

The Board is prepared, with the approval of the Lieutenant Governor in Council, to approve Application No. 1006527 by Numac for an amendment to its existing Primary Recovery Scheme Approval No. 7936. The approval of this amendment is subject to all of the undertakings given by Numac in the Application, in written submissions and at the hearing. It is also subject to the conditions set out in this decision report.

For ease of reference, undertakings and conditions of particular note are restated on the attached Appendices 1 and 2.

DATED at Calgary, Alberta on 29 January 1998.

ALBERTA ENERGY AND UTILITIES BOARD

<Original signed by>

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

<Original signed by>

G. J. Miller
Board Member

<Original signed by>

R. N. Houlihan, P.Eng.
Acting Board Member

Attachments

APPENDIX 1 — CONDITIONS

Conditions of note in this decision report include, without limitation:

- (a) Numac is required, pursuant to Approval No. 7936, to submit a report by 31 December 2000 on the appropriateness of the existing well spacing and the ultimate recovery potential, for the entire project area, including the effect of substantial primary recovery on subsequent thermal recovery. (*Section 4.4*)
- (b) Numac is to relocate the pad shown on Figure 2 as Pad Z, a minimum of 275 m from Paddock #22 on Mr. Friedel's lands. Once relocated, this pad should be constructed with sight barriers, such as fencing, to minimize impacts on the elk. (*Section 5.5*)
- (c) Numac is to re-evaluate the location for the pad in North-west 29-62-6 W4M (Pad Y on Figure 2) and report to the Board, by 31 July 1998, on a possible alternative location. If it becomes apparent that the pad location cannot change, Numac must provide a full description of the measures to be taken to ensure that no adverse impacts will result from this development. (*Section 5.5*)
- (d) Numac is to report to the Board, by 31 July 1998, on the possibility of relocating the single-well pad in North-east 30-62-6 W4M further away from the Hammond residence and incorporating sight barriers at the new location as required. (*Section 5.5*)
- (e) Numac is required to submit a report, by 31 July 1998, outlining the progress of any multi-party committee established to address trucking issues. (*Section 6.1.5*)
- (f) Numac is required to submit a report, by 30 June 1999, on the technical and economic feasibility of bitumen pipelining and how pipelining can be incorporated into the project in the future as a method of transporting bitumen to central gathering facilities or directly to the main cleaning plant. (*Section 6.2.3*)
- (g) Numac is required to submit a report, by 31 July 1998, outlining its review of the technical and economic feasibility of vent gas collection and recovery within its development area. (*Section 7.1.4*)

APPENDIX 2 — UNDERTAKINGS

Undertakings of note given by Numac include, without limitation:

- (a) Numac is to hold at least one open house per year or some other form of public forum. (*Transcript page 352, lines 6 through 23.*)
- (b) Numac will accept responsibility for all operations done by contractors in its employment. (*Tr. page 357, lines 5 through 17.*)
- (c) Numac will test water wells (*Tr. page 357, lines 18 through 19*) and water dugouts (*the Hydrogeological Report*) upon request.
- (d) Numac will adopt the recommendations made in the Hydrogeological Report and in the Elk Report. (*Tr. page 430, line 10 through to page 431, line 9.*)
- (e) Numac will investigate vapour recovery if substantial volumes of gas are encountered. (*Tr. page 207, lines 9 through 20.*)
- (f) Numac will minimize truck traffic, where it can, during the night and during the early morning hours. However, it is unable commit to never moving or hauling during the night as operations are subject to the availability of equipment. (*Tr. page 229, lines 6 through 24.*)



