ALBERTA ENERGY AND UTILITIES BOARD
Calgary Alberta

CANADIAN 88 ENERGY CORP.
APPLICATIONS FOR WELL LICENCES
LSD 16-4-38-7 W5M AND LSD 1-17-38-7 W5M **Addendum to Decision 98-22**
FERRIER FIELD **Applications No. 1027624 and 1030076**

1 DECISION

Having carefully considered all of the evidence, the Alberta Energy and Utilities Board (the Board) confirms that Well Licence No. 216606 for the well, CDN 88 ENERGY FERRIER 16-4-38-7 (16-4 well), remains in good standing subject to Canadian 88 Energy Corp. (Cdn 88) meeting all regulatory requirements, its various undertakings, and the conditions listed on Attachment 1.

2 CONCLUSIONS

The Board has concluded that:

1. The commitments of Cdn 88 with respect to flaring, odours, and groundwater will mitigate potential effects.

2. The possibility of a well blowout is low and the emergency response plan should protect the public.

3. Mitigative measures such as additional elk fencing and avoiding drilling, and pipeline and facility development during the calving season from May to August should reduce negative impact on the elk.

4. The public consultation process envisioned by the Board failed to take place.

3 APPLICATIONS AND HEARING

3.1 Applications and Intervention

On 20 July 1998, Cdn 88 submitted Application No. 1027624 to the Board, pursuant to section 2.020 of the Oil and Gas Conservation Regulations, for a well licence to drill a well in Legal Subdivision 16 of Section 4, Township 38, Range 7, West of the 5th Meridian (Lsd 16-4-38-7 W5M). The purpose of the 16-4 well is to obtain gas production from the Basal Quartz Sand and the Elkton Formation. Subsequently on 22 July 1998, the Board issued Well Licence No. 216606 on the understanding that there were no outstanding issues related to the 16-4 well.

On 31 July 1998, the Board received an objection to the proposed 16-4 well from Edward and Sandra Sehn. The Sehns are residents in the southwest quarter of Section 10-38-7 W5M, approximately 746 metres (m) from the 16-4 wellsite, and operate Sehn Oilfield Construction

Services and Sandy Brown Elk Farm Ltd. from their property. The Sehns expressed concerns regarding the impact of the well on their health, the health of their employees, on livestock, and on the environment.

On 22 September 1998, Cdn 88 submitted Application No. 1030076 to the Board, pursuant to section 2.020 of the Oil and Gas Conservation Regulations, for a well licence to drill a well in Lsd 1-17-38-7 W5M. The purpose of the well, CDN 88 ENERGY FERRIER 1-17-38-7 (1-17 well) is to obtain gas production from the Elkton Formation. The Board also received a submission from the Sehns that they opposed the 1-17 well.

Cdn 88 subsequently amended both applications to indicate that the 16-4 and 1-17 wells would be level one sour gas wells.

Accordingly, pursuant to sections 29 and 43 of the Energy Resources Conservation Act, the Board directed that a public hearing be held to consider the applications. Cdn 88 agreed to refrain from any further activity related to Well Licence No. 216606 and the 16-4 well pending the outcome of the hearing.

The attached figure shows the location of the proposed wells and the Sehn residence.

3.2 Hearing

The applications were considered at a public hearing in Rocky Mountain House, Alberta, on 4 December 1998, before Board Members B. F. Bietz, P.Biol., M. N. McCrank, Q.C., and A. J. .Berg, P.Eng. The Board panel and staff viewed the surface location of the proposed wells, the Sehn residence, and the surrounding area prior to the commencement of the hearing.

THOSE WHO APPEARED AT THE HEARING

Principals and Representatives (Abbreviations Used in Report)	Witnesses
Canadian 88 Energy Corp. (Cdn 88)	
S. Carscallen	F. O. Ceh, C.E.T.
D. C. Edie	G. T. Dowling, C.R.S.P.
	G. R. Gill, P.Eng.
	G. A. Thompson, P.Geol.
	J. S. Church, B.Sc., M.Sc., Ph.D. of Strategic Animal Management
	I. Dowsett, R.E.T. of Conor Pacfic Environmental Technologies Inc.
	J. Kenny, P.Eng. of ATECH Application Technology Limited
Edward and Sandra Sehn (the Sehns)	
R. Elander	E. Sehn
	S. Sehn
	B. Burrington
Alberta Energy and Utilities Board staff	
M. E. Connelly, P.Geol.	
T. Donnelly, Board Counsel	
P. R. Forbes, C.E.T.	
S. Kelemen, C.E.T.	

At the hearing, the Sehns advised the Board that they no longer objected to the drilling of the 1-17 well provided the well was drilled with adequate care and attention. The Board, in Decision 98-22, dated 10 December 1998, approved Application No. 1030076 for the 1-17 well. Therefore, only Application No. 1027624 respecting the 16-4 well is discussed in this report.

4 ISSUES

The Board considers the issues to be:

- the impact of the well on health, safety, and the environment,
- the impact of the well on elk, and
- notification and public consultation.

5 IMPACT OF THE WELL ON HEALTH, SAFETY, AND THE ENVIRONMENT

5.1 Views of the Applicant

Cdn 88 stated that the primary purpose of the proposed 16-4 well was to obtain sweet gas production from the Basal Quartz Sand. The applicant also intended to drill down to the Mississippian System to confirm its seismic interpretation in the area and obtain geological information. Cdn 88 estimated a greater than 50 per cent probability of encountering sweet gas in the well from the Basal Quartz zone and a zero per cent probability of encountering sour gas in the Elkton Member of the Mississippian. However, in its initial application, Cdn 88 assumed that sour gas may be encountered and based on publicly available information calculated a potential sour gas release rate of 0.001 cubic metres per second (m^3/s) for the 16-4 well, and an emergency planning zone of 40 metres. Following the release of confidential information in October 1998 from an offsetting well in Lsd 3-16-38-7 W5M, Cdn 88 revised the possible release rate of the 16-4 well to 0.093 m^3/s, with a corresponding emergency planning zone of 505 m.

Cdn 88 stated that, in the unlikely event that it encountered a productive sour Mississippian zone at the 16-4 well, it would only be tested through a pipeline system. Cdn 88 stressed that no sour gas flaring would occur at the 16-4 wellsite during testing operations. Any flaring would occur only during drilling operations to circulate a gas kick, during completion to flow back completion fluids and clean up, during flow testing of the sweet gas zone, during workovers to bleed down the well, and during emergency operations. Cdn 88 committed to providing the Sehns with 72 hours advance notice of any planned flaring. The applicant further stated that there would be no odours during drilling and no sour gas emissions from the 16-4 well during production operations, except under emergency conditions.

Cdn 88 proposed to install four to six static air monitors at agreed to locations on the Sehns property prior to spudding the 16-4 well. Should the 16-4 well prove to be sour, the static monitors would remain at the Sehn residence for as long as the 16-4 well produces sour gas. The applicant further committed to continuously monitor hydrogen sulphide and sulphur dioxide levels on lease during drilling operations.

To address concerns regarding safety, Cdn 88 submitted a hazard assessment report which included information on sour gas dispersion for a horizontal release under a range of meteorological conditions. Based on the report, Cdn 88 predicted the maximum distance at which a peak (three minute average) concentration of 20 parts per million (ppm) of hydrogen sulphide (H_2S) would occur is 390 m down wind of the 16-4 well. Although the study only addressed the 20 ppm level, Cdn 88 stated that a 10 ppm plume could extend to 700 m. Cdn 88 requires its own employees to mask up with oxygen bottles if there is any potential of encountering H_2S or to evacuate a work site. The applicant also submitted a site specific emergency response plan for the 16-4 well which stated that should air monitoring indicate H_2S levels in excess of 20 ppm in unevacuated areas, the gas flow would be ignited. Cdn 88 also committed to relocate the Sehns to suitable alternate accommodations, should they wish, during the time of drilling the potentially sour formation and during any flaring operations.

With respect to protection of ground water and prevention of pollution to nearby Prairie Creek, Cdn 88 submitted that the lease boundaries would be diked and drilling fluids would likely be contained in steel tanks during drilling operations, and there would be no storage of fluids on the wellsite during production operations. Further, Cdn 88 submitted a groundwater investigation report and committed to follow several recommended practices, including testing of the Sehns water well.

5.2 Views of the Intervener

The Sehns acknowledged that Cdn 88 has the right to remove hydrocarbons from the subject lands; however, they also insisted that their right to continue to use their lands must also be considered. The Sehns were of the opinion that Cdn 88 could develop its primary target of sweet gas reserves at the 16-4 well without the need to drill deeper to the potentially sour Elkton zone, particularly since Cdn 88 indicated that it believed there was virtually no chance of encountering productive gas in the Elkton zone.

The Sehns stated that they farm three quarters of land which is an original homestead. The farming operation includes cattle, horses, and most recently elk. As well, the Sehns operate a commercial welding shop which is open 24 hours a day and which employs approximately five to ten people and at times up to 15 people. The Sehns submitted that they have attempted to co-operate with the oil industry in the area as evidenced by other wellsites on their lands, and are open minded concerning development as some of their welding business is derived from the oil industry. The Sehns stated that they did not object to the drilling of sweet gas wells; however, they expressed general concerns with the 16-4 well potentially encountering sour gas which could affect their personal health, their livestock, and the environment. Further, the Sehns expressed concerns over the safety of their employees and Sandra Sehn's mother, who lives in the southwest quarter of Section 3-38-7 W5M and experiences breathing difficulties.

The Sehns indicated that they had experienced problems with flaring from other wells in the area, sour gas odours, and deteriorating water quality in their water well. The Sehns did not believe that testing of their water well by Cdn 88 was an advantage given that water quality problems were already evident prior to any activity by Cdn 88 in the area but the testing was appropriate to protect the interests of both parties. The Sehns appreciated Cdn 88's offer of relocation during drilling of the sour zone at the 16-4 well; however, it was not practical for them to leave either their livestock or business. The Sehns were also concerned with the effects of an H_2S release in that their lands are at a lower elevation than the 16-4 well and sour gas would tend to migrate to lower land.

5.3 Views of the Board

The Board accepts that Cdn 88 has the right to explore for and produce the minerals lying below the 16-4 well and notes that this right was not opposed by the Sehns. The Board also accepts that Cdn 88 has the right to extend its drilling operations into the Mississippian and that to do so during the drilling of the 16-4 well is very likely the most economic way of gaining the geological information.

The Board notes the commitments of Cdn 88 with respect to flaring at the 16-4 well, the prevention of odours, and the protection of groundwater in the area. The Board is satisfied that these measures should mitigate potential effects of the 16-4 well on public health and the environment.

The Board considers the possibility of a well blowout or other serious event arising from the drilling of the proposed 16-4 well to be low. The Board considers that public safety and environmental risks would therefore also be low, and would be consistent with the hazard assessment submitted by Cdn 88. Further, the Board has reviewed the emergency response plan for the well and is satisfied that Cdn 88's proposed response to emergency situations is adequate to protect the public in the unlikely case of a blowout and meets regulatory requirements.

The Board is concerned with the flow rates used by Cdn 88 in calculating its original emergency planning zone. The Board appreciates that the higher release rate from an adjacent well was not publicly available at the time of the application. However, flow rates for emergency planning purposes are expected to reflect potential worst case situations and the original flow rates submitted by the applicant were not consistent with this philosophy.

6 IMPACT OF THE WELL ON ELK

6.1 Views of the Applicant

To address effects of the 16-4 well on elk, Cdn 88 submitted a report entitled "*Recommendations to Canadian 88 Energy Corp. on the potential impact of their proposed drilling activity on the farmed Wapiti residing on the Sandy Brown Elk Farm Ltd.*". The report indicated that more intensive development should be avoided during the summer months because of the elk calving season which begins in May and ends in August. During this period, pregnant elk cows should be disturbed as little as possible. Further, velvet antler removal also occurs during the summer months and the likelihood of antler injuries increase during the growth period from the end of March to mid-June. Activities such as drilling and pad site construction should preferably be done during winter months when animal activities are minimal under most elk management programs. However, the report concluded that the elk should be able to easily tolerate Cdn 88's gas field operations if drilling were to take place during the summer months.

Cdn 88 stated that elk which are repeatedly exposed to stimuli will become accustomed to the stimuli and eventually lose their fear reactions. With respect to health effects, the applicant acknowledged that there have been no studies on intermittent low level sour gas emissions on elk. However, it believed that studies conducted on cattle, which found no significant detrimental associations between such emissions and the health and productivity of livestock, could be extrapolated to elk. Cdn 88 concluded that the productivity of elk is unlikely to be affected given the distance from the 16-4 well to the Sandy Brown Elk Farm.

Cdn 88 submitted that construction of fencing to facilitate movement of the elk on the Sehn's lands was not justified, given that the 16-4 well was expected to be a sweet gas producer. Regardless of this, moving the elk to the southeast as proposed by the Sehns would place the elk

closer to the well and more exposed to the prevailing winds, which in Cdn 88's opinion are from the northwest. Nonetheless, Cdn 88 committed to provide additional elk fencing if the 16-4 well should be productive from a sour gas zone.

At the hearing, Cdn 88 confirmed that it believed that, should its operations be shown to be having a negative impact on the Sehns livestock, it would be liable for any resulting damages.

6.2 Views of the Intervener

The Sehns estimated that they have spent over $300 000 in developing a high quality elk facility over the last two years and currently have approximately 20 elk on site. The Sehns stated that their primary unresolved concern with the 16-4 well was the potential adverse effect of the well on their elk. In particular, they were concerned about the impact of noise, light, and odours on the behaviour of their animals and of the effects of emissions on their animal's health. With respect to behavioural responses, the Sehns agreed that elk would eventually acclimate to disturbance. However, they noted that the animals did react adversely to new or unexpected stimuli, such as could occur if emergency flaring were required. The degree of response varied both between individuals and between sexes and age groups, with males less than two years old particularly vulnerable. As well, once calves are weaned at the age of three to five months, they tend to be more easily stressed up until they are a year old. Finally, they noted that elk would often follow the behaviour of other individuals.

The Sehns submitted that it was not reasonable to extrapolate previous studies conducted on cattle to predict elk response to sour gas emissions. They noted that many drugs which work on cattle, for example, are ineffective on elk, indicating different physiological reactions. The Sehns noted that the elk were located in a low area which was directly in line with the prevailing winds from the proposed 16-4 well site, which in the Sehn's opinion are from the west. It was their belief that any hydrogen sulphide emissions would tend to concentrate in this area. Therefore, the only way to mitigate the effect of the well on the elk would be to move them to the southeast, away from the direction of the prevailing winds. However, during calving season, it is extremely difficult to move a herd of cow elk and calves. The Sehns estimated the cost of fencing, labour, and a new dug out to be approximately $25 000.

6.3 Views of the Board

The Board notes Cdn 88's commitment that if the 16-4 well proves productive in any sour gas zone, Cdn 88 will undertake to provide additional elk fencing to facilitate movement of the elk to the southeast portion of the Sehn's lands. The Board acknowledges the Sehns concerns for the impact of the well on the elk and is also prepared to accept the need for additional fencing to move the herd southward should the well prove to be productive from a sour gas zone. Further, the Board believes that ample prior notification of any planned flaring at the 16-4 wellsite should assist the Sehns in relocating the elk. The Board also expects Cdn 88 to work with the Sehns to plan its drilling operations and associated pipeline and facility construction so as to avoid construction during the elk calving season.

7 NOTIFICATION AND PUBLIC CONSULTATION

7.1 Views of the applicant

Cdn 88 submitted that it had fulfilled all of the requirements set out in Guide 56, "*Energy Development Application Guide and Schedules"*, prior to submitting the well licence application for the 16-4 well. This included notifying all parties within the emergency planning zone and providing an information package. Cdn 88 indicated that the resident and landowner information packages provided information on the health affects of H_2S and sulphur dioxide and believed the information was sufficient to address any concerns. After receiving objections to the well licence, Cdn 88 immediately discontinued construction of the lease and engaged in further discussions with the objecting parties in an attempt to identify and resolve the specific issues. Cdn 88 subsequently revised its emergency response plan to include the parties who were objecting.

Cdn 88 submitted that because of the competitive nature of the area, they did not communicate to landowners and residents a definitive development plan. Cdn 88 also stated they did not consider any pipeline alternatives to tieing in to the Strachan gas plant. With hindsight, the applicant agreed that it could have conducted its public consultation program differently; however, Cdn 88 expressed difficulty with determining, based on Guide 56, an acceptable area of notification that would include all affected parties.

7.2 Views of the Intervener

The Sehns stated that they first learned that Cdn 88 would be drilling a potentially sour gas well from other residents in the area, and that they did not receive any information from Cdn 88 regarding the 16-4 well until they objected to the issuance of the well licence. The Sehns believed that Cdn 88 did not adequately inform landowners regarding the seriousness of sour gas, and that Cdn 88 allowed the public to assume that the H_2S content would be insignificant. The Sehns were also concerned that insufficient information regarding health affects was provided to landowners prior to obtaining consent. The Sehns felt mistrustful in their dealings with Cdn 88 and believed that Cdn 88 had failed to be forthright and honest concerning its intentions. The Sehns submitted that all landowners adjacent to a proposed well site should be notified of the project, although they were aware that this was not currently required by Guide 56. The Sehns were also disappointed with Cdn 88's attempts during negotiations to have the Sehns commit to not objecting to any further Cdn 88 activity in the area. The Sehns expressed the hope that complete and open communication would occur with Cdn 88 in the future. The Sehns stated that if open communication starts and continues, the Sehns believe they can work with Cdn 88.

7.3 Views of the Board

The Board believes that while Cdn 88 did meet the minimum requirements respecting notification, the company failed to meet the intent of Guide 56. As indicated in the guide, the EUB does not precisely define the scope of a public involvement program. An applicant's program needs to

address public expectations regarding consultation as well as any issues unique to the area. In this case, the Sehns land was directly across the road from the proposed well and their access road exited from their land within the emergency planning zone. The Sehns had a reasonable expectation to have been consulted.

The Board expects that an appropriate public consultation process will be thorough enough to allow all parties who are or may be directly affected to be sufficiently aware of, and understand the implications of the proposed project. The Board also expects that the affected parties are provided the opportunity to review the project and assess its impacts. The applicant's information must be consistent, open, and complete. It should also describe the full range of possible outcomes from drilling. If the proposal is part of a larger project, the applicant should be
prepared to discuss the entire project and to explain how its components complement other future energy development plans in the area. In this case, the applicant should also have explained its proposed pipeline routing in its discussions with residents.

The Board believes that the public consultation process envisioned by the Board failed to take place. The Board emphasises that checking the "no outstanding objections" box on the well licence must match public expectations.

8 DECISION AND CONCLUSIONS

Refer to sections 1 and 2 of this report.

Dated at Calgary, Alberta on 18 December 1998.

ALBERTA ENERGY AND UTILITIES BOARD

<*Original signed by***>**

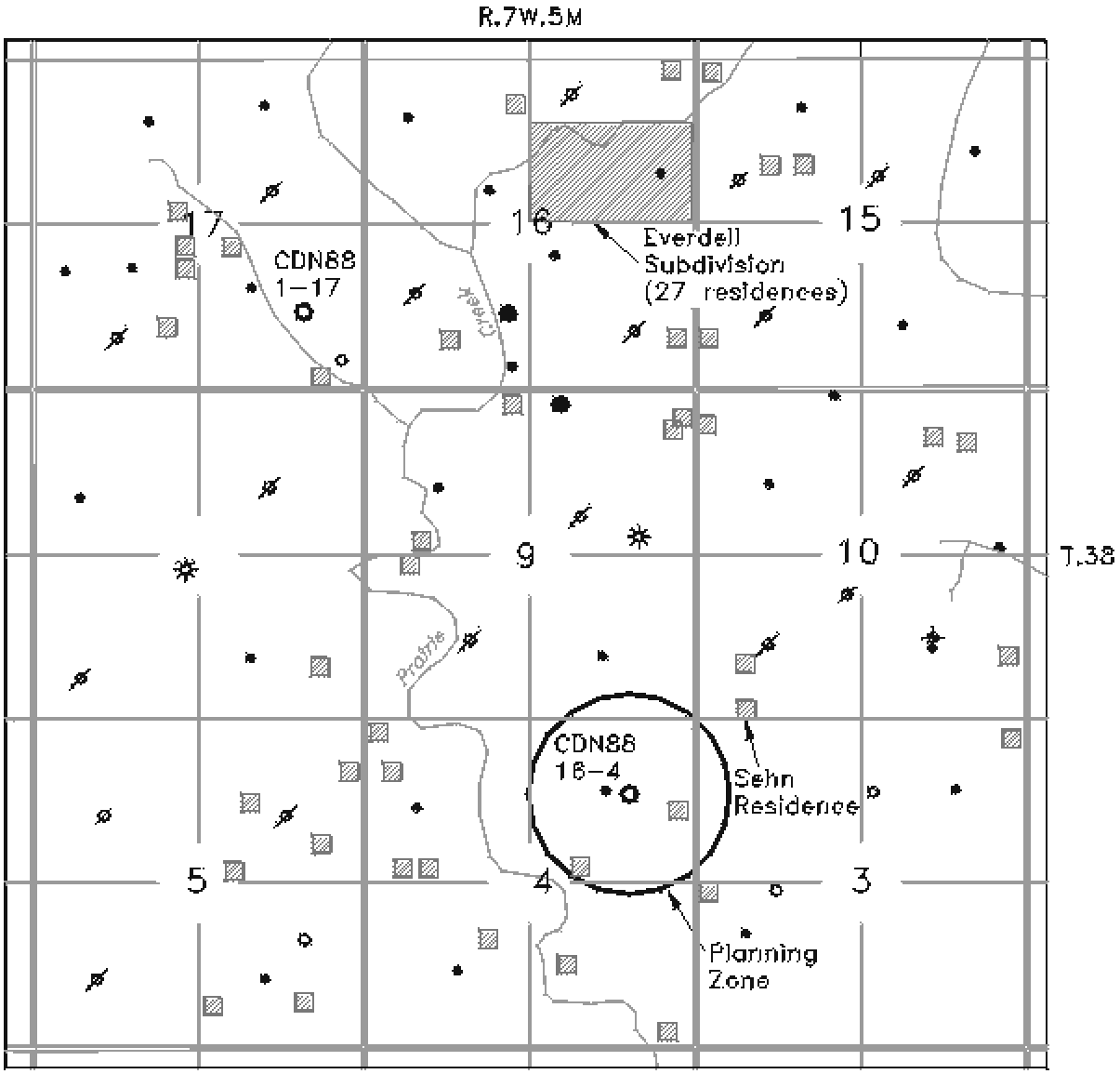
B. F. Bietz, P.Biol.

<*Original signed by***>**

M. N. McCrank, Q.C.

<*Original signed by***>**

A. J. Berg, P.Eng.



FERRIER AREA
APPLICATIONS NO. 1027624 AND 1030076
CANADIAN 88 ENERGY CORP.

Decision 98-22

ALBERTA ENERGY AND UTILITIES BOARD
Calgary Alberta

CANADIAN 88 ENERGY CORP.
APPLICATIONS FOR WELL LICENCES
LSD 16-4-38-7 W5M AND LSD 1-17-38-7 W5M **Decision 98-22**
FERRIER FIELD **Applications No. 1027624 and 1030076**

1 INTRODUCTION

1.1 Applications and Intervention

On 20 July 1998, Canadian 88 Energy Corp. (Cdn 88), submitted Application No. 1027624 to the Alberta Energy and Utilities Board (the Board), pursuant to section 2.020 of the Oil and Gas Conservation Regulations, for a well licence to drill a well in Legal Subdivision 16 of Section 4, Township 38, Range 7, West of the 5th Meridian (Lsd 16-4-38-7 W5M). The purpose of the well, CDN 88 ENERGY FERRIER 16-4-38-7 (16-4 well), is to obtain gas production from the Basal Quartz Sand and the Elkton Formation. Subsequently on 22 July 1998, the Board issued Well Licence No. 216606 on the understanding that there were no outstanding issues related to the 16-4 well.

On 31 July 1998, the Board received an objection to the proposed 16-4 well from Edward and Sandra Sehn. The Sehns are residents in the southwest quarter of Section 10-38-7 W5M and operate Sehn Oilfield Construction Services and Sandy Brown Elk Farm Ltd. from their property. The Sehns expressed concerns regarding the impact of the well on the health and safety of their family, on livestock, and on the environment.

On 22 September 1998, Cdn 88 submitted Application No. 1030076 to the Board, pursuant to section 2.020 of the Oil and Gas Conservation Regulations, for a well licence to drill a well in Lsd 1-17-38-7 W5M. The purpose of the well, CDN 88 ENERGY FERRIER 1-17-38-7 (1-17 well) is to obtain gas production from the Elkton Formation. The Board also received a submission from the Sehns that they opposed the 1-17 well.

Cdn 88 subsequently amended both applications to indicate that the 16-4 and 1-17 wells would be level one sour gas wells.

Accordingly, pursuant to sections 29 and 43 of the Energy Resources Conservation Act, the Board directed that a public hearing be held to consider both applications. Cdn 88 agreed to refrain from any further activity related to Well Licence No. 216606 and the 16-4 well pending the outcome of the hearing.

1.2 Hearing

The applications were considered at a public hearing in Rocky Mountain House, Alberta, on 4 December 1998, before Board Members B. F. Bietz, Ph.D., P.Biol., N. McCrank, Q.C., and A. J. Berg, P.Eng. The Board panel and staff viewed the surface location of the proposed wells, the Sehn residence, and the surrounding area prior to the commencement of the hearing.

At the hearing, the Sehns had no further objections to the 1-17 well, provided the well was drilled with adequate care and attention.

THOSE WHO APPEARED AT THE HEARING

Principals and Representatives (Abbreviations Used in Report)	Witnesses
Canadian 88 Energy Corp. (Cdn 88)	
S. Carscallen	F. O. Ceh, C.E.T. G. T. Dowling, C.R.S.P. G. R. Gill, P.Eng. G. A. Thompson, P.Geol. J. S. Church, B.Sc., M.Sc., Ph.D. Of Strategic Animal Management I. Dowsett, R.E.T. Of Conor Pacific Environmental Technologies Inc. J. Kenny, P.Eng. Of ATECH Application Technology Limited
Edward and Sandra Sehn (the Sehns)	
R. Elander	E. Sehn S. Sehn B. Burrington
Alberta Energy and Utilities Board staff	
M. E. Connelly, P.Geol. T. Donnelly, Board Counsel P. R. Forbes, C.E.T. S. Kelemen, C.E.T.	

2 DISCUSSION

The Board notes that at the hearing the Sehns indicated that they had general concerns with sour gas development at both the proposed 16-4 and 1-17 wells; however, their primary concern was with the 16-4 well because their property is located closer to this well and in the direction of the prevailing winds. Regarding the 1-17 well, the Sehns submitted that adequate precautions must

be taken during drilling through the Cardium Formation as other wells in the area had experienced difficulties due to the over-pressured nature of the formation. However, if all of the Board regulations and practices were followed during drilling at the 1-17 well, the Sehns had no further objections to a well licence being issued for this well.

The Board is satisfied that Cdn 88 is aware of the potential to encounter over-pressured formations at the proposed 1-17 well, and expects that Cdn 88 will take appropriate precautionary measures during drilling of the well.

3 DECISION

In view of the above, the Board is prepared to approve Application No. 1030076 for the 1-17 well, subject to Cdn 88 meeting all regulatory requirements and practices and taking appropriate measures during drilling through any over-pressured formations. A detailed report giving the Board's decision on Application No. 1027624 for the 16-4 well will be issued in due course.

Dated at Calgary, Alberta on 10 December 1998.

ALBERTA ENERGY AND UTILITIES BOARD

<*Original signed by*>

B. F. Bietz, Ph.D., P.Biol.

<*Original signed by*>

N. McCrank, Q.C.

<*Original signed by*>

A. J. Berg, P.Eng.

ATTACHMENT 1 TO DECISION 98-22

Condition 1

Prior to any drilling operations at the 16-4 wellsite, Cdn 88 will meet with the Sehns and determine a mutually agreeable method of assessing any damages to their elk herd as a result of drilling in accordance with Tier I, II, and III Guidelines for Resident Compensation During Sour Gas Blowout Emergencies.

Condition 2

Drilling of the 16-4 well and associated pipeline and facility construction is not to occur during the elk calving season from May to August.

Condition 3

If the 16-4 well proves productive in any sour zone, Cdn 88 will undertake to provide the Sehns with additional elk fencing to facilitate movement of the elk. Such fencing shall be in place either through direct construction or through agreement with the Sehns prior to production of any sour gas from the 16-4 well.

Condition 4

No sour gas flaring shall occur at the 16-4 well unless emergency flaring operations are necessary.

Condition 5

Cdn 88 shall provide the Sehns with a minimum of 72 hours notice of any planned flaring activities or other operations at the 16-4 well.

Condition 6

Cdn 88 will install 4 to 6 static air monitors at agreed to locations on the Sehns lands prior to spudding the 16-4 well. The monitors shall remain in place if the 16-4 well encounters a productive sour gas zone for as long as the 16-4 well produces sour gas. A copy of all results from the monitors shall be sent directly from the laboratory to the Sehns.

Condition 7

Prior to reaching the potential sour gas zones at the 16-4 well, Cdn 88 shall introduce the site and safety supervisors to the Sehns. While drilling through the potential sour zone of the 16-4 well, Cdn 88 shall have the emergency response team at the wellsite. Laboratory data from any incident at the 16-4 wellsite shall be provided to the Sehns.

Condition 8

To ensure protection of groundwater in the area, Cdn 88 shall

- Obtain background water samples from the Sehns water wells and from Prairie Creek;
- Obtain background flow measurements in Prairie Creek and yield measurements from the Sehns well;
- Assume careful control of the mud quality particularly in the first part of the open hole;
- Follow accepted grouting controls and monitoring;
- Ensure that an adequate emergency response program is in place for the 16-4 well;
- Use containment structures to manage potential spills and leaks;
- Follow accepted abandonment procedures;
- Develop a water monitoring program for Prairie Creek and the Sehns well; and
- Conduct annual site audits to insure the integrity of storage containers and containment structures.

The water monitoring program shall be discontinued after a period of two years, unless problems with water quality are detected.