

ALBERTA ENERGY AND UTILITIES BOARD

Calgary Alberta

CANADIAN NATURAL RESOURCES LIMITED	Decision 2003-013
APPLICATIONS FOR NEW AND AMENDED	Applications No. 1086695, 1087189,
PRIMARY RECOVERY SCHEMES	1087193, 1247164, 1247165, 1247166,
AND WELL LICENCES	1247167, 1247168, 1247171, 1247172,
LINDBERGH SECTOR	1247178, 1248249, 1248252, 1248255, 1249233,
COLD LAKE OIL SANDS AREA	1252711, 1252712, 1259621, and 1259622

1 APPLICATIONS, PREHEARING MEETING, AND HEARING

1.1 Applications

New or Amended Primary Crude Bitumen Recovery Schemes

Canadian Natural Resources Limited (CNRL) applied to the Alberta Energy and Utilities Board (EUB/the Board), pursuant to Section 10 of the Oil Sands Conservation Act, for approval to construct and operate a new scheme and to amend two existing schemes for the recovery of crude bitumen from the Mannville Group in the Cold Lake Oil Sands Area.

Application No. 1086695: CNRL applied for approval to construct and operate a new scheme for the recovery of crude bitumen. The applicant proposed that

- the drilling spacing units be reduced from 64 to 8 hectares (ha) in a scheme area comprising Sections 7, 8, 9, and 18 of Township 57, Range 4, West of the 4th Meridian (57-4W4M), and
- wells drilled or to be drilled within the scheme area have a minimum interwell distance of 100 metres (m) and a project boundary buffer of 50 m.

Application No. 1087189: CNRL applied to amend Approval No. 8050 respecting a primary recovery scheme for crude bitumen. The applicant proposed that

- Sections 20, 28, 31, 33, and 34-56-5W4M, Sections 25 and 36-56-6W4M, and Sections 4, 9, and 18-57-5W4M be added to the area subject to the approval,
- the drilling spacing units within the area to be added to the scheme be reduced from 64 to 8 ha, and
- wells drilled or to be drilled within the area to be added to the scheme have a minimum interwell distance of 100 m and a project boundary buffer of 50 m.

Application No. 1087193: CNRL applied to amend Approval No. 7306 respecting a primary recovery scheme for crude bitumen. The applicant proposed that

- Section 36-57-5W4M and Sections 4, 5, the south half of Section 8, Section 9, 19, and 20-58-4W4M be added to the area subject to the approval,
- the drilling spacing units within the scheme area comprising the north half of Section 31-57-4W4M, Section 36-57-5W4M, and Sections 4, 5, 6, 7, 8, 9, 16, 17, 18, 19, 20, and 21-58-4W4M be reduced from 16 or 64 ha to 8 ha, and

- wells drilled or to be drilled within the area in which the drilling spacing units have been reduced have a minimum interwell distance of 100 m and a project boundary buffer of 50 m.

Well Licences

CNRL applied, pursuant to Section 2.020 of the Oil and Gas Conservation Regulations, for licences to drill three vertical wells for sweet gas production and 54 wells from 13 well pad sites for the purpose of obtaining crude bitumen production from the Mannville Group. The application numbers, location or pad location, and wells proposed to be drilled from pads are listed in Appendix 1. A map showing the project area is included as Appendix 2.

1.2 Prehearing Meeting

In view of the significant number of statements of concern respecting similar developments in separate applications proposed for the area by both CNRL and Petrovera Resources Limited (Petrovera; see *Decision 2003-014*), the Board decided to hold a prehearing meeting to deal with matters such as the date for the hearing, whether the CNRL and Petrovera applications should be heard jointly or consecutively, the issues to be considered, and any other matters.

The Board held a prehearing meeting in Elk Point, Alberta, on June 26, 2002, before Presiding Board Member J. R. Nichol, P.Eng., and Acting Board Member R. H. Houlihan, Ph.D., P.Eng., The third member of the panel, Board Member J. D. Dilay, P.Eng., was not available to attend the prehearing meeting but did read the verbatim transcripts. The Board subsequently issued *Decision 2002-071* on July 26, 2002.

Following the close of the prehearing meeting, CNRL continued consultation with those who had filed statements of concern. The applicant and interveners made considerable effort to discuss their issues through the appropriate dispute resolution (ADR) process, resulting in the resolution and subsequent withdrawal of several of the objections. The Board does not intend to address the specific concerns that were resolved between the applicant and the affected parties, except to the extent that interveners that participated in the hearing raised the same concerns.

1.3 Hearing

The applications and interventions were considered at a public hearing commencing on November 5, 2002, in Elk Point, Alberta, before Board Members J. R. Nichol, P.Eng. (Presiding Member), J. D. Dilay, P.Eng., and Acting Board Member R. Houlihan, Ph.D., P.Eng.

Interventions opposing the applications were filed by G. and S. Osborne, K. and M. Stewart, and a group of residents within the Hamlet of Lindbergh (the Lindbergh Group).

CNRL filed documentation at the commencement of the hearing indicating that a number of objections to the applications had been withdrawn. The Board was satisfied that those objections were resolved, and it does not intend to address the specific circumstances of those objections.

At the opening of the hearing, the Lindbergh Group indicated that it was continuing to negotiate with CNRL and had received positive indications that an agreement would be reached. It participated in the hearing by way of cross-examination of the applicant but did not provide evidence. Prior to the close of the hearing, the Lindbergh Group filed an agreement between it and CNRL and withdrew its objection. Because the Lindbergh Group withdrew its objection, its specific concerns are not discussed further in this report.

The Frog Lake First Nation and the Kehewin Cree Nation (FLFN/KCN) requested that the Board adjourn the proceedings taking place in Elk Point and resume the hearing at a venue or venues in one or both of the First Nations' communities. The Board decided to reopen the hearing in Elk Point on December 18, 2002 to hear from the First Nations. Prior to that date, counsel for the FLFN/KCN filed a document entitled "Preliminary Overview of the Legal Submissions of the Frog Lake First Nation and the Kehewin Cree Nation to the Alberta Energy and Utilities Board."

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

THOSE WHO APPEARED AT THE HEARING

Principals and Representatives (Abbreviations Used in Report)	Witnesses
Canadian Natural Resources Limited (CNRL) P. J. McGovern	J. Parr, P.Eng. N. Guay B. Parker S. G. Stauth T. Sabelli, C.E.T. D. W. Charabin, P.Eng. J. T. Freeman, of Matrix Solutions
G. and S. Osborne R. J. Jeerakathil	G. Osborne S. Osborne
K. and M. Stewart	K. Stewart M. Stewart
The Lindbergh Group R. J. Jeerakathil	H. and M. Rybak W. and M. Saranchuk K. and M. Saranchuk R. and D. Pindroch E. and B. Koppang M. Smith D. Smereka

(continued)

THOSE WHO APPEARED AT THE HEARING (continued)

Principals and Representatives (Abbreviations Used in Report)	Witnesses
Frog Lake First Nation and Kehewin Cree Nation (FLFN/KCN) S. P. Zaluski	Chief R. Quinney, of the Frog Lake First Nation Chief G. John, of the Kehewin Cree Nation Chief A. Lameman, of the Beaver Lake First Nation J. Dion S. Delver M. Quinney H. Gadwa P. Waskahat M. Stanley G. Youngchief
Alberta Energy and Utilities Board staff G. Perkins, Board Counsel K. Fisher L. D. Wilson-Temple G. McClenaghan, P.Eng. B. A. Austin, P.Geol.	

2 PRELIMINARY MATTERS

2.1 CNRL Amendments to Applications

At the opening of the hearing, CNRL amended several applications to address concerns raised by some parties. The amendments were submitted as exhibits to the hearing. The Board accepted the amendments subject to CNRL submitting revised survey plans and schedules, as well as confirming that public consultation in accordance with EUB *Guide 56: Energy Development Application Guide* had been completed.

The applications that CNRL amended are footnoted in Appendix 1.

2.2 First Nations' Request

Following the conclusion of final arguments, the FLFN/KCN requested that the Board adjourn the proceedings and travel to one or both of the FLFN/KCN communities to resume the hearing there, as stated earlier. The FLFN/KCN stated they did not participate in the hearing at Elk Point because that process was not designed to deal with First Nations issues and concerns. The FLFN/KCN stated that the First Nations have a special role in decisions regarding resource development that take place on their lands. They are key stakeholders with constitutional and treaty rights and people whose history, culture, society, and economy are tied to the land. The FLFN/KCN stated that Board decisions fundamentally affect the First Nations people. As a

result, the FLFN/KCN believed that they are entitled to a separate and distinct process that is directed to their specific needs and concerns. The stated purpose of their request to resume the hearing in their communities was so that the Board could change not only the venue for the hearing, but also the Board's orientation.

The Board subsequently reopened the hearing at Elk Point in order to hear the concerns of the FLFN/KCN. The FLFN/KCN submitted that there was a constitutional duty to consult them, as First Nations with treaty rights, about the effects of the proposed projects on their rights. Therefore, the FLFN/KCN requested the Board to

- 1) either exercise its own jurisdiction to itself engage in the constitutionally required consultation with them, or
- 2) suspend any decision on the CNRL applications unless and until the Alberta Crown has fulfilled its requirement for constitutional consultation, and
- 3) in any case, should the CNRL applications be approved, impose conditions on CNRL to ensure that appropriate mitigation and compensation measures, developed in consultation with FLFN/KCN, are met.

FLFN/KCN stated that there were four essential points to their position. First, the lands upon which the applicant's development was proposed are the FLFN/KCN's traditional territory and traditional lands. Second, the applications would have a direct impact on the FLFN/KCN's treaty rights as Treaty First Nations with rights under Treaty 6. Third, the treaty rights enjoyed by the FLFN/KCN are part of the Constitution of Canada pursuant to Section 35(1) of the Constitution Act, 1982. Any infringement of their constitutionally protected rights gives rise to a constitutional obligation on the part of the Crown and a corresponding constitutional right of the First Nations to be consulted on decisions that affect the First Nations Treaty rights. Fourth, this constitutional requirement imposes an obligation on the Board to ensure that before any decision is made on the CNRL applications, the FLFN/KCN's right to be consulted under Section 35 of the Constitution is fulfilled.

Counsel for the FLFN/KCN indicated that even though the CNRL applications did not concern reserve lands themselves, they did have an impact on treaty rights because the exercise of treaty rights is not confined to the reserves. Counsel stated that the FLFN/KCN's understanding of the treaty is that the First Nations had only surrendered title to the surface lands, not to subsurface interests.

Following the submissions by counsel for FLFN/KCN, the Board heard from the chiefs of the FLFN/KCN and a number of First Nations elders and councillors. The witnesses described the particular concerns of the FLFN/KCN as follows:

- The importance of how the treaty by which the First Nations surrendered their lands to the Crown came about and the rights that were conferred on the First Nations by treaty. In particular, a number of speakers indicated that only land to the depth of a plough was surrendered to the Crown by the First Nations.
- The area within which CNRL proposed to drill is part of the FLFN/KCN's traditional land.
- Moose Mountain and the Moose Hills area are the traditional hunting and gathering lands of the FLFN/KCN. The lands were once plentiful with animals, plants, and medicines, but now those have disappeared and the quality of the meat from the animals is poorer.
- The land, air, and water are being polluted, and water bodies are receding.

- Fences and locked gates in Moose Hills interfere with access to traditional hunting and gathering lands.
- Licences issued by the EUB have permitted industry activity that does irreversible environmental damage. The cumulative effect of site-specific environmental damage is pollution and toxic waste that affects all living things.

The preponderance of the evidence given by the FLFN/KCN's witnesses concerned their understanding of the rights conferred on them by treaty and the failure of the Crown to fulfill its treaty obligations.

CNRL's position with respect to the FLFN/KCN's request was that consultation between it and the FLFN/KCN had taken place over the previous two years, it was ongoing at the time of the hearing, and CNRL was prepared to continue consultation with the FLFN/KCN. CNRL submitted that the applications met all regulatory requirements and ought to be approved.

The Board has carefully considered the argument and submissions made by counsel for the FLFN/KCN, the evidence presented by the FLFN/KCN witnesses, and CNRL's submissions.

The Board is a statutory, quasi-judicial body at arm's length from government and has those duties set out in its governing legislation. The public notification and consultation requirements administered by the EUB are found in Section 26 of the Energy Resources Conservation Act and in *Guide 56*. *Guide 56* requires applicants for a proposed oil and gas project to notify and consult people potentially directly and adversely affected by a decision of the Board regarding an application and to advise the Board of any unresolved concerns regarding that application. People who are affected must be given information about a proposed project so they can determine the impacts that the project may have on them.

Pursuant to Section 26 of the Energy Resources Conservation Act, if it appears to the Board that a decision may directly and adversely affect the rights of a person, the Board must give that person a reasonable opportunity to furnish evidence on how the application will affect her or him and to make representations to the Board. The Board provides that opportunity through the public consultation requirements outlined in *Guide 56*, through the giving of Notice of Application, and where necessary by setting the application down for hearing. The procedure must comply with the hearing rules set out in the Board's *Rules of Practice*. Once the process for hearing the application is established, the Board expects that all parties will participate in the proceedings, so that each party is given an opportunity to hear, present, and cross-examine evidence relating to the application. Under the current legislation, there is no method or process permitted by law for the Board itself to engage in constitutional consultation as requested by the FLFN/KCN. In addition, as a quasi-judicial body, the Board must remain independent from the parties appearing before it.

The Board is of the view that the consultation requirements applicable to these applications are those contained in the EUB's governing legislation and in *Guide 56*. The evidence shows that CNRL complied with those requirements and, therefore, the Board has decided not to suspend its proceedings on the CNRL applications until further consultation with the FLFN/KCN by the EUB or the Crown takes place.

With respect to one particular concern expressed by a number of the FLFN/KCN's witnesses,

namely, that only lands to the depth of a plough were surrendered by the First Nations to the Crown, the Board is of the view that it is not required to decide the question of what the First Nations did or did not cede to the Crown by way of treaty. It is sufficient for these applications that CNRL has acquired the rights to explore and recover minerals underlying the lands constituting the application area.

With respect to the impacts discussed by the FLFN/KCN, the Board notes that those were general in nature and that no indication was given of the location at which the impacts would occur. The exception is that the FLFN/KCN did refer a number of times to Moose Mountain and to the Moose Hills area, being that area between Frog Lake and the Kehewin Reserve. The impacts discussed in those areas included the loss of fish, animals, plants, and medicines and fencing or gating that impeded access to those lands. The FLFN/KCN also mentioned pollution in Frog Lake and the contamination and loss of other water bodies in the area. The Board notes that Moose Mountain and the Moose Hills area are not included in CNRL's application area, and no evidence was provided to indicate how the proposed development would result in the impacts discussed by the FLFN/KCN.

On the basis of the evidence provided by the FLFN/KCN, the Board finds that the FLFN/KCN did not show that the proposed development would have any material effects on them. Therefore, the Board is unable to add conditions to the approval to mitigate the effects raised by the FLFN/KCN. Notwithstanding that finding, before it would approve the CNRL applications, the Board must be satisfied the proposed project is in the public interest and meets all requirements administered by the EUB. For the reasons discussed in this decision report, in this case the Board is satisfied those requirements have been met.

The FLFN/KCN stated that they had been attempting to reach an agreement with CNRL for the past two years. CNRL indicated that consultation with the FLFN/KCN was ongoing and it was committed to continuing those meetings. The Board encourages the parties to continue their efforts.

In summary, the Board will not itself engage in consultation with the FLFN/KCN or grant an adjournment until further consultation between the FLFN/KCN and the Alberta Crown takes place. In addition, the lack of evidence about the impacts of the applications on the FLFN/KCN prevents the Board from imposing conditions that are intended to mitigate them.

3 VIEWS OF THE APPLICANT

CNRL indicated that approval of the reduced spacing applications is vital to its development plans in the area. Although CNRL planned to drill most of the wells on the equivalent of 16 ha spacing, it said that the flexibility of being able to drill wells on 8 ha spacing where required would enhance its ability to maximize crude bitumen recovery and accommodate topographic and other surface restrictions.

On the basis of experience, CNRL submitted that it expected a reduction from 64 to 16 ha to increase recoverable reserves by 3.0 to 3.5 times. It anticipated that a further reduction from 16 to 8 ha, where geologically justified, would yield an additional increase in recoverable reserves

of 1.5 to 1.6 times over what would be anticipated using 16 ha spacing. CNRL expected recoveries on 8 ha development to be 10 to 17 per cent of the original bitumen in place.

CNRL requested approval of the reduced spacing now so that when opportunities for enhancing recovery by drilling on reduced spacing were identified, the required wells could be drilled prior to the development of worm holes and the reduction of initial reservoir pressure, each of which would reduce the improvement in recovery efficiency that might otherwise be attained with the reduced well spacing.

CNRL submitted that the reduced spacing and the resulting increased resource recovery would result in benefits to CNRL, the province of Alberta, and the local community. It submitted that this supported the need for the applied-for downspacing and associated wells.

CNRL presented a Groundwater Exploration and Research Ltd. (GERL) report that described usable groundwater resources in the area as being contained in the shallow surficial deposits overlying the bedrock. CNRL noted that the publicly available Prairie Farm Rehabilitation Association (PFRA) St. Paul aquifer study provided additional information regarding regional aquifer flow directions. CNRL had also participated in a groundwater report specific to the Hamlet of Lindbergh.

On the basis of its groundwater information, CNRL recognized that a shallow, unconfined aquifer could be present in the area. Therefore, CNRL committed to

- drill surface hole without mud additives (use only a bentonite and freshwater system),
- set surface casing into the Lea Park shales bedrock, covering all usable aquifers,
- maintain a minimum 100 m setback from water wells, and
- conduct water well testing within 500 m of its proposed well sites.

CNRL noted that it had no evidence of groundwater contamination related to any of the 20 000 wells it operated. CNRL also commented that the Lindbergh Group had withdrawn its objection and was concerned that the remaining interveners' concerns could dictate conditions for the entire area of application. It submitted that the above commitments would adequately mitigate any potential adverse impacts on groundwater.

CNRL believed that complying with EUB *Interim Directive (ID) 99-08: Noise Control Directive* would be sufficient to address the majority of landowners' noise concerns. CNRL submitted that it works with the landowner to implement a "stepped approach" to address the issue if it receives a noise complaint. Measures that have been taken by CNRL in the past to address noise complaints included

- installing various types of sound abatement enclosures,
- installing more effective mufflers,
- installing wellhead blankets, and
- experimenting with new drive heads.

CNRL submitted that for the previous two years it had made a significant effort to reduce noise in the project area and had received positive feedback from landowners.

CNRL stated that it was a participant in the Lakeland Industry and Community Association

(LICA) and, through LICA, had participated in a regional air quality assessment. Although the report was not yet complete, CNRL stated that the preliminary results indicated that Alberta Ambient Air Quality Guidelines had not been exceeded. Further, it appeared that the average readings detected to date were only about 5 per cent of the limits permitted under the guidelines.

CNRL submitted that studies on its sites in particular showed that casing vent gas was 99 per cent methane and was unlikely to produce odours. The gas that originated from tank vents was about 99 per cent background air and water vapour. Of the remaining 1 per cent, 79 per cent was methane and the remaining trace gas contained benzene, toluene, ethylbenzene, and xylene (BTEX) compounds and traces of mercaptans. While CNRL agreed that those compounds were odorous, it maintained that since they were released in such low volumes, it was unlikely that odours would be detected off lease. CNRL said that it had made commitments to the community to investigate any odour complaints promptly.

CNRL maintained that it should be allowed the flexibility to truck its production over 24 hours, even though most trucking would occur during daylight hours. It stated that it would encounter operational and scheduling difficulties if trucking hours were restricted. Additionally, CNRL stated that it would be safer for local residents and truck drivers to have the trucking volumes spread out over 24 hours.

CNRL acknowledged that traffic and related noise and dust were a concern for some residents. It stated that it would continue to work to mitigate those impacts by enforcing appropriate trucking practices with contractors and working with the county and other stakeholders.

Prior to the hearing, CNRL stated that it was not aware of the concern with respect to earth tremors, although it was aware of a publicly available study done in the Cold Lake area, just north of the project area, by the University of Alberta (U of A) in the early 1980s. The study concluded that the tremors were almost exclusively related to military activities, namely, sonic booms. It also concluded that industrial activities conducted in that area would not produce tremors of a magnitude that could be felt by residents. While the U of A study did not extend to the Lindbergh area, CNRL believed that it would not be beyond the realm of possibility that the low-frequency, high-energy nature of a sonic boom could be felt by the Osbornes, and it hypothesized that this may be the source of the tremors.

CNRL committed to follow the requirements of the existing *Guide 60: Upstream Petroleum Industry Flaring Guide*. As such, it would investigate the economic feasibility of conservation if vented gas volumes on an operating site exceeded 500 cubic metres per day (m^3/d). CNRL argued that it should not be required to meet any volume or other limitations other than those currently specified in *Guide 60*.

CNRL stated that it had completed phase 2 of its Lindbergh gas conservation project, which collected for sale approximately 28 thousand (10^3) m^3/d , or 50 to 60 per cent, of the gas currently produced. CNRL submitted that the close proximity of this conservation system to the area of the proposed downspacing increased the likelihood that gas conservation would occur in the applied-for area. CNRL committed to put on to LICA's agenda the matter of "operators working cooperatively together to use the infrastructure in place and to employ new venting technology when it is available."

CNRL stated that the technology did not exist to economically pipeline crude bitumen more than short distances. In 1998 and 1999, CNRL conducted a study on the feasibility of pipelining crude bitumen. The study concluded that under specific conditions it was technically feasible over short distances but not necessarily economically justifiable.

Research since that time included development of a computer model for heavy oil gathering systems and basic research on flow regimes by the Centre for Frontier Engineering Research (CFER) in 2000/2001. As part of this work, a 300 m pipeline loop was planned for the winter of 2002/2003. Funding for the CFER work by an industry group was in the order of \$250 000 to \$300 000. CNRL indicated that it would continue to participate with CFER and attempt to further the development of this technology.

4 VIEWS OF THE OSBORNES

The Osbornes are acreage owners in the subdivision located in the southeast quarter of Section 36-56-6W4M. Although the Osbornes did not contest the need for any of the wells, they objected to the number of wells that could be located in the vicinity of their home and they believed they had made enough compromises. They were concerned that they, their children, and their grandchildren would lose the enjoyment of their home and property and they would suffer a financial loss if the developments negatively impacted their property's value. They were concerned that they would continually be subjected to noise, odour, traffic, and the stress of dealing with oil-related issues on a daily basis. They stated that they received none of the benefits of activities in the oil and gas industry and no compensation but had to bear all of the negative impacts listed above.

The Osbornes stated they feared that the quantity and quality of the water from their water well could be affected if the proposed development were allowed to proceed, possibly to the point that it would be unsuitable or insufficient for household use. The Osbornes were concerned that the practice of spreading drilling mud in the vicinity of their home could result in contamination of their water well.

The Osbornes maintained that the GERL report was flawed because it was a literature report and no data were directly obtained from boreholes or monitoring wells. Thus, they concluded that CNRL did not have a good understanding of groundwater flow in their immediate area. They also noted that the author was not available at the hearing to speak to the report.

The Osbornes stated they heard noise almost constantly at their house that was loud enough to be heard over the television.

The Osbornes stated that they could smell a strong crude oil odour three to four times per month. They feared that odours would get worse with more intense development. The Osbornes also expressed concern with health effects from long-term exposure to low-level emissions. The Osbornes expressed concerns about traffic safety with the existing development, as well as about how much worse matters could get if the proposed development were allowed to proceed. Specific concerns included oilfield trucks not always stopping before entering a county road or a

major thoroughfare, oilfield trucks driving over the posted speed limits, and the safety of their grandchildren when they bicycled on the side roads. The Osbornes also mentioned the degradation of road quality, including potholes and sections of washboard.

The Osbornes stated that they had felt earth tremors once or twice a year since the oil industry moved into the area, most recently on April 14, 2002. They conceded that they had not investigated or requested anybody else to investigate the cause of these tremors. They wondered if increased oil and gas activity would increase the frequency or intensity of these tremors. The Osbornes requested that the subject applications be denied. However, they also requested that if the Board decided to grant the approvals, several conditions be attached, as follows:

- CNRL test their well prior to any drilling and report the results to them.
- If the CNRL developments adversely affected their water quality or quantity, CNRL replace their well or otherwise provide them with water from another source.
- CNRL submit a regional groundwater testing program and a hydrogeological study of Sections 36-56-6W4M and 4-57-5W4M.
- CNRL install Noise Solutions Inc. (NSI) shacks over any wells in Section 36-56-6W4M.
- CNRL maintain tank temperatures to minimize odours, provide them with a copy of the LICA air quality study, and monitor baseline hydrogen sulphide (H₂S), sulphur dioxide (SO₂), nitrogen oxides (NO_x), and hydrocarbon compounds and submit the results to the Board.
- CNRL trucking be restricted to a 12-hour period during the daytime.
- CNRL investigate the tremors.
- CNRL be subject to the identical gas conservation requirements that were imposed on Ranger Oil Limited in *Decision 2000-23*, that is, 75 per cent of casing vent gas must be conserved when flow is greater than 140 m³/d.
- CNRL have a base form of pipelining in place within six years following any approval.

5 VIEWS OF THE STEWARTS

The Stewarts are acreage owners in the subdivision located in the southeast quarter of Section 36-56-6W4M. The Stewarts did not contest the geological information presented by CNRL, nor did they dispute that greater well density would increase the reserves produced in the area. The Stewarts did object to the number of wells that could be located in the vicinity of their home if the downspacing applications were approved.

The Stewarts stated that it might be possible to reach an acceptable agreement with CNRL, as they had done regarding the proposed 4-6-57-5W4M pad site, if CNRL met with them in good faith.

The Stewarts asked that CNRL not be allowed to spread drilling mud on lands within 1.5 kilometres (km) of their home. They cited health concerns, the sandy soil conditions, and that previously spread drilling mud was not tilled into the ground.

The Stewarts submitted that CNRL's "stepped-approach" to dealing with noise complaints was very frustrating. They did not identify any outstanding noise concerns except in relation to truck traffic.

The Stewarts expressed several concerns with respect to traffic. One of the concerns was with regard to truck traffic and their own and their children's safety when riding bicycles or horses on two of the side roads adjacent to their property. They were concerned that if CNRL developed the land surrounding their house to the full extent possible under the proposed reduced spacing, the third and last side road available for bicycle and horse riding would not be safe either.

The Stewarts questioned CNRL's estimate that a four-well pad site would have about 14 truck trips to it per week. The Stewarts stated that a single well within 350 m of their residence had two trips per day to the site. They questioned how there could be more wells at a location and yet no increase in traffic.

The Stewarts stated that CNRL had agreed to restrict trucking hours to the existing 3-31-56-5W4M location, but submitted that talking to CNRL, meeting with its representatives, attending facilitation with them, and even initial enforcement action by the EUB had still not generated 100 per cent compliance with this agreement. They were discouraged that it required so much effort on their part to get CNRL to comply with a past agreement. The Stewarts believed that the responsibility of ensuring enforcement had been left to the landowners. They also submitted that the consequence of CNRL not abiding by its agreement (being shut in for two hours) was hardly a deterrent against future noncompliance. If CNRL could not be trusted to abide by an agreement on one well, the Stewarts questioned why it should be permitted to drill more.

The Stewarts asked the Board to condition any approvals granted to CNRL such that CNRL would not be permitted to truck on a 24-hour schedule.

6 VIEWS OF THE BOARD

The Board notes that the need for the applied-for down-spacing applications and the associated wells was not contested during the hearing. The Board finds that the reduced down-spacing and the applied-for wells are necessary to improve recovery of the resource, subject to adequate mitigation of the adverse impacts identified by the interveners.

The Board believes that CNRL's groundwater protection practices are adequate. Further, the Board supports testing of water wells adjacent to future oilfield activity prior to drilling of oil wells. This practice provides baseline data that the landowner and operator can both use for future reference. The Board notes that CNRL made several commitments to protect groundwater, and it expects those to be met. Additionally, the Board expects CNRL to respond to the Osbornes' and all other reasonable requests for water well testing. The Board believes that this will provide sufficient delineation of background conditions.

The Board notes the Osbornes' request to impose a condition that CNRL drill a new water well for them or otherwise replace their water if CNRL's activities damage it. The Board also notes that CNRL has drilled approximately 20 000 wells apparently without having damaged any water wells as a result of its activities. In addition to the Board having responsibility to prevent oil and gas operations from causing water well problems, Alberta Environment (AENV) has primary responsibility for dealing with complaints related to water wells and would take the lead

in conducting the initial investigation of a problem. If the results of AENV's initial investigation indicated that oil and gas activity may be responsible for the identified problem, the EUB would become directly involved in the completion of the investigation and would ensure that the appropriate follow-up action is taken. Given that there is a well-established protocol for dealing with water well complaints, the Board does not find that there is a need to place this condition on any approvals that may be issued.

Although CNRL referenced the PFRA report during the hearing, this document was not entered as an exhibit or discussed in detail at the hearing. As the Board believes this publicly available document may be of interest to the Osbornes, specifically in response to their request for a regional groundwater testing program and a hydrogeological study, it directs CNRL to provide a copy of the PFRA report to the Osbornes and to indicate to them the data in the report that may be applicable to their location.

The Board notes that both the Osbornes and the Stewarts had concerns with respect to the spreading of drilling mud on lands in the vicinity of their residences. The acceptable disposal methods and associated requirements for drilling wastes are described in considerable detail in EUB *Guide 50: Drilling Waste Management*. Off-lease disposal of drilling wastes, including the spreading of drilling muds on farmland, is covered in this guide. In addition, spreading is subject to landowner approval and compliance with the contaminant end-point limits established by AENV. The Board is satisfied that no further restrictions or prohibition of disposal on certain lands is warranted at this time.

The Board notes that the Stewarts found CNRL's "stepped approach" to dealing with noise complaints frustrating. With respect to the Osbornes' request to have CNRL install NSI shacks over any wells drilled in Section 36-56-6W4M, the Board finds that in the absence of any evidence to indicate that the proposed developments on Section 36 would exceed the EUB's noise guidelines, the Board is not prepared to require the installation of NSI shacks as a condition of approval. However, given the concerns raised by the Osbornes and the Stewarts, the Board expects CNRL to be proactive in assessing the noise generated by facilities in Section 36 and to take appropriate steps to avoid future noise problems for nearby residents. The Board further expects that any corrective measures will be implemented in a timely fashion.

The Board believes that odours and venting issues are best dealt with on a regional basis. In that respect, it accepts CNRL's commitment to put on to LICA's agenda the matter of "operators working cooperatively together to use the infrastructure in place and to employ new venting technology when it is available."

With respect to the Osbornes' request to have CNRL limit its tank temperatures, the Board notes that under *Guide 60*, facilities must be operated in a way that does not cause off-lease odours. If the Board receives odour complaints related to a facility, the operator must respond expeditiously to investigate and eliminate off-lease odours. Enforcement action by the Board with respect to off-lease odours can result in the Board requiring that the facility be shut in until the problem is rectified. Accordingly, while the Board recognizes that off-lease odours can occur from time to time, it expects operators to take whatever action is necessary to eliminate those; therefore, the Board will not specify a minimum tank temperature. With respect to the Osbornes' request to have CNRL monitor baseline H₂S, SO₂, NO_x, and hydrocarbon compounds, the Board

notes that this is one of the purposes of the LICA air quality study and directs CNRL to provide a copy of the study to the Osbornes when it is complete.

The Board notes that the Osbornes and Stewarts expressed concern about trucking and its impacts. Notwithstanding its view that it is more appropriate to address this issue on a regional basis, the Board expects CNRL to pay particular attention to trucking in the area of the Osbornes' and Stewarts' homes in light of their concerns and to determine if alternative routes or adjustments to the trucking schedule in their area could mitigate impacts.

The Board recognizes the request of the Osbornes and the Stewarts to limit trucking to a 12-hour daytime period. The Board also notes that CNRL was opposed to this, citing concerns over restrictions placed on its operations, traffic congestion, and safety. The Board does not believe it is necessary to place any trucking restrictions on CNRL at this time; however, it does believe that this issue is another that needs to be dealt with on a regional basis. It encourages CNRL to work cooperatively with other area operators to mitigate trucking impacts as much as possible.

The Board notes that although the Osbornes raised a concern with respect to tremors, there was no evidence provided to connect tremors to oil and gas activities. The only evidence referred to connected the tremors to other activities; therefore, the Board is not prepared to require CNRL to conduct a study.

The Board notes that EUB *General Bulletin (GB) 2002-05: EUB Requirements for Evaluation of Solution Gas Vent Gas Conservation* requires operators to assess venting following commencement of production and to implement conservation if vented volumes are sufficient to conserve economically. Further, operators are required to evaluate conservation of existing vent sources larger than 800 m³/d in 2002 and larger than 500 m³/d beginning in 2003. Conservation of economic solution gas must be implemented by the end of the subsequent year. The Board is of the view that effective conservation includes use of gas to fuel production equipment, recovery of gas for sale, and use of gas to fuel electric generators.

The Board requires that all vent sources associated with the proposed project, regardless of size, be evaluated using the economic methods and assumptions prescribed in *Guide 60*, Section 2. The Board believes that new vent sources should be evaluated as soon as gas production rates can be established and in any event within 90 days after initial production. The Board expects that conservation for economic produced gas will be operational within six months after initial production. The Board further expects that economic gas conservation will be implemented sooner (i.e., within 30 days after initial production) where production facilities are in close proximity to existing gas pipelines.

The Board acknowledges that CNRL has a gas conservation system in close proximity to the area of proposed development. In this situation, the Board believes that greater conservation of vented gas is possible.

Significant gas volumes are already being vented in this region of northeastern Alberta. The Board believes that with greater cooperation among the operators in this area, there could be opportunities identified that would lead to improved gas conservation. The Board notes that evidence at the hearing indicated that some cooperation is occurring between operators of

existing conservation schemes and developers of new wells. It is not clear, however, whether operators venting gas in an area are routinely collaborating to evaluate the potential for developing joint solution gas conservation schemes. The Board believes that more solution gas conservation would be economic if area operators coordinated their efforts to take advantage of combined gas volumes and economies of scale.

The Board expects that CNRL will actively consult with other licensees of production facilities in the area of the proposed wells and expects all parties to cooperate in the evaluation and implementation of solution gas conservation projects. The Board expects all licensees in an area to exchange production data and jointly consider clustering of solution gas production and regional gas conservation systems.

Solution gas conservation economics will be enhanced if conservation is incorporated into the initial planning of larger multiwell projects. The Board expects CNRL to continue to evaluate produced gas conservation on a project basis where multiple wells are developed within a project area.

In order to ensure that CNRL actively pursues joint regional gas conservation schemes, the Board will condition its approvals to require the following:

- CNRL must assess produced gas conservation within 90 days after initial production at each site and must reassess nonconserving sites not less than once per year thereafter.
- As part of the conservation evaluations, CNRL must formally contact licensees of production facilities within a 1 km radius of each of its nonconserving sites and investigate joint options for conserving produced gas.

Notwithstanding the 1 km radius stipulated in the above condition, the Board believes that a radius of more than 1 km may be appropriate in certain circumstances, and it expects CNRL to recognize this and expand its investigation efforts accordingly.

CNRL must submit gas conservation evaluation audit packages for all sites where conservation will not be implemented. The evaluation packages must include documentation indicating the actions taken by CNRL to assess joint conservation opportunities with other operators in the area, including information on area produced-gas flaring and venting rates. The evaluation information for nonconserving sites must be submitted to the EUB Operations Group at the end of the calendar quarter-year period in which the evaluations were completed until all sites have been evaluated.

It is not clear to the Board that sufficient evaluation of joint industry approaches to produced gas conservation has been made in the general Lindbergh/Elk Point area. The Board encourages industry, particularly licensees of facilities that currently do not conserve produced gas, to collaboratively seek a joint approach to achieving greater gas conservation in this region. The Board encourages operators to initiate a joint approach to evaluate the situation and to develop a regional gas conservation action plan. The Board believes that such a joint approach would identify economic opportunities to enhance conservation of produced gas sooner than might otherwise be the case.

The Board acknowledges that produced gas in the area contains very low to no concentrations of

H₂S. Board requirements described in *Guide 60*, Section 8, prohibit release to the atmosphere of gas containing more than 10 moles H₂S per kilomole. The Board does not anticipate that H₂S concentrations from CNRL's proposed project will exceed that limit. However, the Board also notes that *Guide 60* also prohibits venting of gas to atmosphere that could result in off-lease odours. The Board expects that CNRL's operating and site inspection procedures will include detection and management of odorous fugitive emissions. In accordance with *Guide 60*, should the Board receive odour complaints and subsequent investigation determines that vented produced gas is the source, CNRL may be required to conserve or burn the odorous vent gases or shut in the production.

With respect to the Osbornes' request that CNRL be required to conserve at least 75 per cent of the gas at sites where produced gas volumes exceed 140 m³/d, the Board notes that no evidence was provided to support the economics of gas conservation at that level of gas production. The Board acknowledges that such a condition was included in the Ranger Oil Cold Lake development approval that followed from *Decision 2000-23*. However, that decision was based on evidence that supported the economics of gas conservation at that threshold and the commitments made by Ranger Oil Limited. Due to the absence of any evidence in these proceedings to support the economics of gas conservation at the production threshold of 140 m³/d, the Board is not prepared to impose such a condition on CNRL. In the matters before the Board in this hearing, the Board believes that approaches consistent with *Guide 60* and the conditions listed in this report are appropriate.

The pipelining of cold crude bitumen production continues to be an issue that challenges all operators of primary oil sands schemes. It is directly related to the issues of trucking and its impacts. The Board is disappointed that very little progress has apparently been made to advance the pipelining of primary crude bitumen production, since the matter was raised in much more detail at Board hearings between 1998 and 2000. In fact, it appears that unless a dramatic technological breakthrough or a substantial increase in the price of crude bitumen occurs, pipelining of this product will not be technically or economically feasible within the foreseeable future. The Board intends to arrange a meeting of primary crude bitumen producers, technical institutions, research organizations, and other interested parties to determine if more can be done to develop cold crude bitumen pipelining.

The Osbornes requested that CNRL be required to have a base form of pipelining in place within six years following any approval. Given the current state of the technology, the Board is of the view that imposing this timeline would not be appropriate, because the technology developed to date and the economics of pipelining do not support establishing a specific timeline.

The objections that were filed prior to the prehearing meeting and, to a lesser extent, the final interventions in the hearing raised a number of general concerns related to water wells, traffic, noise, dust, off-site odours, and various air emissions. These concerns have been raised in the past and are likely to continue to be raised with this Board whenever downspacing applications are being considered. This is particularly true in the designated oil sands and heavy oil areas, where dense well development includes trucking of produced fluids and venting/flaring of significant volumes of gas on a project and area basis. Some of the concerns can be and are very site specific or resident specific and should be dealt with on that basis. However, in the main, these issues are regional in nature and should be addressed on a joint, consistent, and cooperative

basis by all of the operators in the area.

With respect to the regional issues, the Board believes that these can best be addressed through an industry/public synergy group, such as LICA, which provides for direct and ongoing input from all parties. If the parties have not already done so, the Board recommends that these issues be placed on the agenda for future LICA meetings.

The Board believes that there is a need to consider establishing area-wide protocols respecting noise assessment and mitigative measures, such as water well testing and traffic restrictions, including enforcement, and that such consideration can be accomplished through LICA. The adoption of area-wide protocols would ensure that all operators are taking the same approach to dealing with issues and that all landowners are, to the extent possible and appropriate, dealt with on a consistent basis.

The Board notes that CNRL must submit an annual report as described in *ID 2002-03: Performance Presentations for In Situ Oil Sands Schemes*, and it expects that CNRL will include a summary of noise, traffic, and gas conservation/emission complaints in that report. That summary must discuss what CNRL's experience has been with each of these items and how it has responded to concerns that have been raised in the project area.

With respect to site-specific concerns and complaints such as those raised by the Osbornes and Stewarts, the Board expects CNRL and all other operators in the Lindbergh/Elk Point area to continue to address these matters in a timely and effective manner. To the extent possible and practical, the Board encourages all operators to be proactive in assessing sites for offsetting landowner concerns and to communicate with landowners and occupants on a regular and ongoing basis throughout the operating life of their facilities.

7 DECISION

Having carefully considered all the evidence, the Board finds that CNRL has demonstrated the need for the proposed downspacing and wells. The Board finds that the associated impacts can be properly addressed and mitigated. As a result, the Board is of the view that the subject applications are in the public interest and, therefore, approves the applications subject to CNRL meeting all regulatory requirements and the conditions set out in Appendix 3.

DATED at Calgary, Alberta, on February 7, 2003.

ALBERTA ENERGY AND UTILITIES BOARD

[Original signed by]

J. R. Nichol, P.Eng.
Presiding Member

[Original signed by]

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

[Original signed by]

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

APPENDIX 1: WELL APPLICATIONS, SURFACE AND DOWNHOLE LOCATIONS

Vertical, Sweet Natural Gas Wells

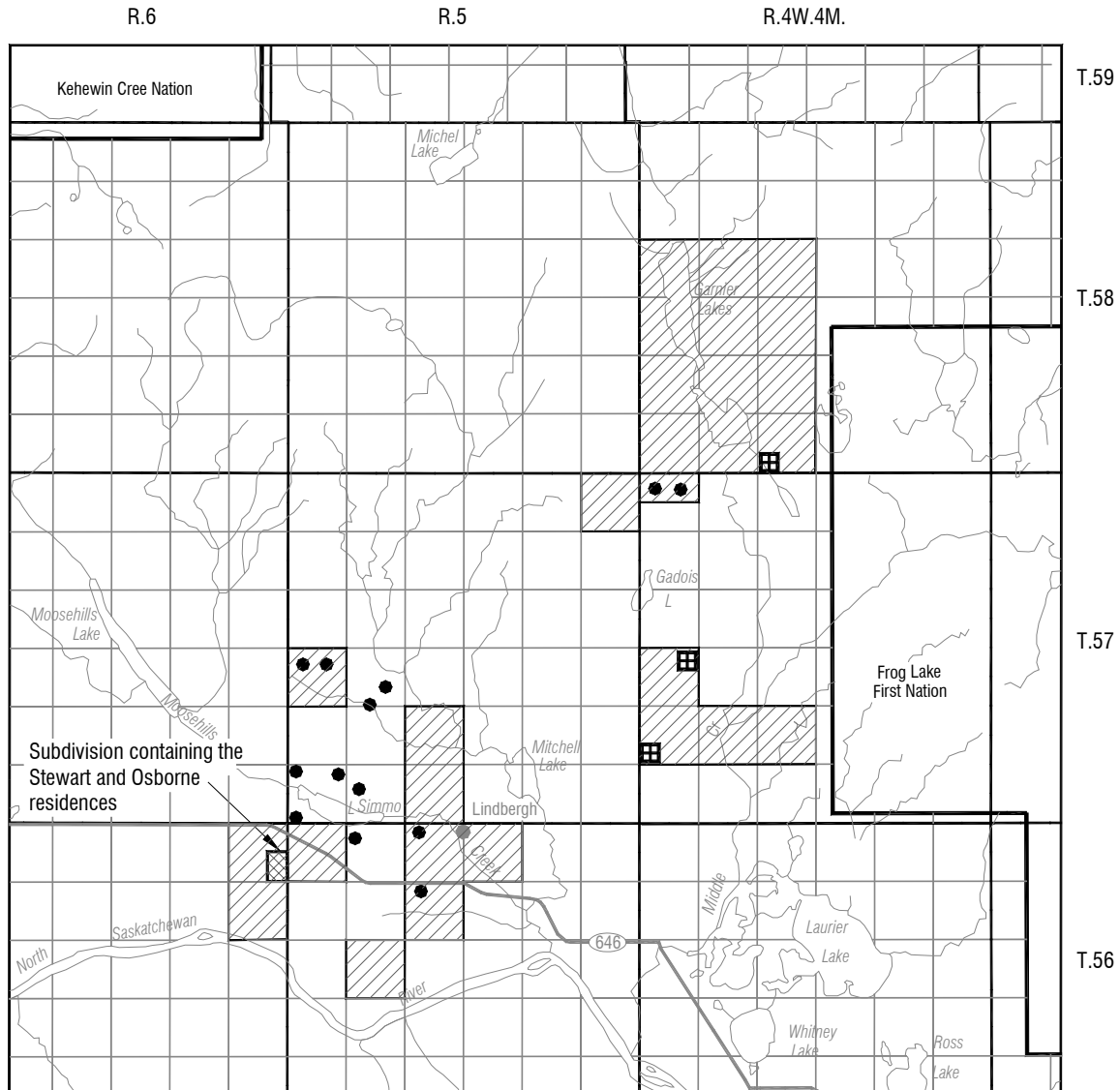
<u>Application No.</u>	<u>Well Location (Legal Subdivision –Township-Section-Range W4M)</u>
1247165	11-18-57-4W4M
1249233	3-7-57-4W4M
1259622	4-4-58-4W4M

Crude Bitumen Pad Sites

<u>Application No.</u>	<u>Pad Location</u>	<u>Wells Locations to Be Drilled from Pad</u>
1247164 *	12-33-56-5W4M	11-33-56-5W4M 12-33-56-5W4M 13-33-56-5W4M 14-33-56-5W4M
1247166 *	12-28-56-5W4M	11-28-56-5W4M 12-28-56-5W4M 13-28-56-5W4M 14-28-56-5W4M
1247167	13-31-57-4W4M	11-31-57-4W4M 12-31-57-4W4M 13-31-57-4W4M 14-31-57-4 W4M
1247168	4-6-57-5W4M	2-6-57-5W4M 3C-6-57-5W4M 3D-6-57-5W4M 4-6-57-5W4M 5-6-57-5W4M 6-6-57-5W4M
1247171	12-5-57-5W4M	3-5-57-5W4M 4-5-57-5W4M 5-5-57-5W4M 6-5-57-5W4M 11-5-57-5W4M 12-5-57-5W4M 13-5-57-5W4M

Application No.	Pad Location	Wells Locations to Be Drilled from Pad
1247172 *	10-18-57-5W4M	6-18-57-5W4M 10-18-57-5W4M
1247178 *	9-6-57-5W4M	8-6-57-5W4M 9-6-57-5W4M 10-6-57-5W4M 16-6-57-5W4M
1248249	13-6-57-5W4M	11-6-57-5W4M 12-6-57-5W4M 13-6-57-5W4M 14-6-57-5W4M 3-7-57-5W4M
1248252	11-32-56-5W4M	6-32-56-5W4M 11-32-56-5W4M 12-32-56-5W4M 13-32-56-5W4M 14-32-56-5W4M
1248255	16-31-57-4W4M	9-31-57-4W4M 10-31-57-4W4M 15-31-57-4W4M 16-31-57-4W4M
1252711	7-17-57-5W4M	1-17-57-5W4M 2-17-57-5W4M 7-17-57-5W4M 8-17-57-5W4M
1252712	3-17-57-5W4M	3B-17-57-5W4M 3C-17-57-5W4M 4-17-57-5W4M 6-17-57-5W4M
1259621	11-18-57-5W4M	12-18-57-5W4M

- * Indicates applications that were amended at the hearing:
- Three surface locations were moved.
 - Four wells were deleted from the applications.
 - Five wells were added to the applications.



Legend

- Crude bitumen well or pad site surface location
- ▣ Down-spacing application area
- ⊞ Gas well surface location

Appendix 2. Lindbergh Sector, Cold Lake Oil Sands Area

Applications No. 1086695, 1087189, 1087193, 1247164, 1247165, 1247166,
 1247167, 1247168, 1247171, 1247172, 1247178, 1248249, 1248252,
 1248255, 1249233, 1252711, 1252712, 1259621, and 1259622
 Canadian Natural Resources Limited

Decision 2003-013

APPENDIX 3: SUMMARY OF APPLICANT'S COMMITMENTS AND THE BOARD'S CONDITIONS

Commitments

The Board notes that during the proceeding CNRL undertook to conduct certain activities in connection with the proposed applications that are not specifically required by the EUB's regulations. It is the Board's view that when applicants make commitments of this nature, they have satisfied themselves that the activities will benefit both the project and the public, and the Board takes these commitments into account when arriving at its decision. The Board expects an applicant, having made the commitments, to fully carry out the commitments or advise the Board if for any reason it cannot fulfill a commitment. At that time, the Board can assess whether the circumstances of the failed commitments are sufficient to trigger a review of the licence. Affected parties may also ask the Board to review a licence if commitments made by an applicant remain unfulfilled.

- 1) CNRL commits to set surface casing into the Lea Park shales bedrock, covering all usable aquifers.
- 2) CNRL commits to drilling surface holes without mud additives (using only a bentonite and freshwater system).
- 3) CNRL commits to maintain a minimum 100 m setback from water wells.
- 4) CNRL commits to conduct testing of water wells within 500 m of its proposed well sites.
- 5) CNRL commits to put on LICA's agenda the matter of "operators working cooperatively together to use the infrastructure in place and to employ new venting technology when it is available."

Conditions

The conditions imposed in the licences are summarized below. Conditions generally are requirements in addition to or otherwise expanding upon existing regulations and guidelines. An applicant must comply with conditions or it is in breach of its approval and subject to enforcement action by the EUB. Enforcement of an approval includes enforcement of the conditions attached to that licence. Sanctions imposed for the breach of such conditions may include the suspension of the approval, resulting in the shut-in of a facility.

- 1) CNRL must provide a copy of the PFRA groundwater study to the Osbornes and indicate the data within the report that may be applicable to their location.
- 2) CNRL must provide a copy of the LICA air quality study to the Osbornes when it is complete.
- 3) CNRL must assess produced gas conservation within 90 days following initial production at each site and must reassess nonconserving sites not less than once per year thereafter.

- 4) As part of the conservation evaluations, CNRL must formally contact licensees of production facilities within at least a 1 km radius of each its nonconserving sites and investigate joint options for conserving produced gas.
- 5) CNRL must submit gas conservation evaluation audit packages for all sites where conservation will not be implemented. The evaluation packages must include documentation indicating the actions taken by CNRL to assess joint conservation opportunities with other operators in the area, including information on area produced-gas flaring and venting rates. The evaluation information for nonconserving sites must be submitted to the EUB Operations Group at the end of the calendar quarter-year period in which the evaluations were completed until all sites have been evaluated.
- 6) CNRL must submit an annual report as described in *ID 2002-03: Performance Presentations for In Situ Oil Sands Schemes* and include a summary of noise, traffic, and gas conservation/emission complaints. This summary must discuss what CNRL's experience has been with each of these items and how it has responded to concerns that have been raised in the project area.