

ALBERTA ENERGY AND UTILITIES BOARD

Calgary Alberta

**CANADIAN NATURAL RESOURCES LIMITED
APPLICATION FOR A PRIMARY RECOVERY SCHEME
FOR REDUCED SPACING IN THE BONNYVILLE AND
WOLF LAKE SECTORS****Decision 98-5
Application No. 1007817****1 INTRODUCTION****1.1 Application**

Canadian Natural Resources Limited (CNRL) applied to the Alberta Energy and Utilities Board (the Board), in accordance with section 10 of the Oil Sands Conservation Act, for a primary recovery scheme to allow for a reduction in the drilling spacing unit from 64 hectares (ha) to 4 ha over a total of one section of land in the Bonnyville and Wolf Lake sectors of the Cold Lake Oil Sands Deposits. CNRL's application (the Application) also requested a 100 metre (m) minimum interwell distance and a 50 m project boundary buffer. The lands which are the subject of the Application (the Application area) and an overview of the general area of the Application are shown on Figure 1.

1.2 Interventions

Five interventions opposing the Application were filed by: Tony and Beverly Ell, surface owners of North-east 31-62-6 W4M; Bruce Friedel, surface owner of North-west 29 and all 32-62-6 W4M; Les Prosser and Melanie Hammond, surface owners of part of South-east 31-62-6 W4M; Walter Solowoniuk, surface owner of West 31-62-6 W4M; and Clinton and Karen Sabatier, surface owners of South-east 6-63-6 W4M. The Sabatiers are within the Application area; the remaining interveners are offset from CNRL's proposed development as shown on Figure 2. Mr. Friedel operates Moose Lake Wapiti which is an elk farm with pedigree seed stock and Ms. Hammond operates Fieldstones Equestrian Centre which offers horse riding lessons and horse boarding. Ms. Hammond plans to offer "get away" vacations in the future. The Ells, Friedels, and Hammonds objected to a similar application by Numac Energy Inc. (Numac) relating to an area in proximity to the Application area.

The Board notes that the Sabatiers have adopted the Final Argument submitted to the Board on behalf of Tony and Beverly Ell with respect to this Application.

1.3 Hearing

The Application was considered at a public hearing from 29 October to 30 October 1997 at Bonnyville, Alberta before Board members B. T. McManus, Q.C., G. J. Miller, Esq., and Acting Board Member R. N. Houlihan, P.Eng. A viewing of a typical CNRL production pad and the sites of the interveners occurred on the afternoon of 30 September 1997, in conjunction with the viewing of Numac production pads and drilling pads. The Numac application was considered from 30 September to 3 October 1997 in Bonnyville before the same Board members, resulting in Board Decision 98-2.

Participants at the hearing are listed on the following table:

THOSE WHO APPEARED AT THE HEARING

**Principles and Representatives
(Abbreviations Used in the Report)**

Witnesses

Canadian Natural Resources Limited (CNRL)
L. A. Cusano

T. Jocksch, P.Eng.
T. Krause
B. Schaffer
B. Day
J. Church, Ph.D.
D. Cousins, P.Eng.
S. Stauth
T. McKay, P.Eng
J. Farquharson, C.E.T.
S. Roth, Ph.D.
R. Clissold, P.Geol.
J. Schubert, P.Eng.

Tony and Beverly Ell (the Ells)
R. C. Secord

A. Ell
B. Ell
R. Korol, P.Eng.

Bruce Friedel (the Friedels)

B. Friedel, M.Sc., P.Ag.

Les Prosser and Melanie Hammond
(the Hammonds)

M. Hammond
L. Prosser

Walter Solowoniuk

W. Solowoniuk

Clinton and Karen Sabatier (the Sabatiers)
R. C. Secord

K. Sabatier

Alberta Energy and Utilities Board staff
T. Donnelly, Legal Counsel
K. Sadler, P.Eng.
C. ETTY
M. Drake

2 PRELIMINARY MOTIONS

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 Numac 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 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 Minister of Environmental Protection for his approval as the two Applications affected matters of the environment.

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

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

In a letter dated 23 September 1997, the Board solicited submissions from CNRL and Numac 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 an adequate opportunity to review the information provided to them in the two Applications and an adjournment was not justified under these circumstances. The Board's decision regarding these preliminary matters was conveyed to all interested parties in a letter dated 26 September 1997 and 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 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 in the present case. The Board noted that both CNRL and Numac must first apply for well licenses before drilling and concerns regarding specific well locations may be dealt with at that time. The Board also 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 CNRL and Numac would be prejudiced by the granting of an adjournment in the present case, and that Mr. and Mrs. Ell had several months and the assistance of counsel to review the information which CNRL and Numac 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 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 the September 1997 letter and again at the Numac 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 of an EIA, the Board noted that oil production sites are currently exempted from that requirement under the Environmental Protection and Enhancement Act (EPEA). 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 of the Application can be categorized into five general categories outlined below:

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

4 THE NEED FOR THE PROJECT

4.1 Views of the Ells

The Ells believed that CNRL did not demonstrate a need for the project. The Ells contended that three of the four existing wells drilled in the Application area were uneconomic and questioned CNRL's intent to drill more wells. The Ells argued that CNRL was over-estimating the Application area's potential without adequately satisfying itself and the Board that the Application area was in fact economic to produce. The Ells noted that the viscosity of the oil in the existing wells was high and might be a factor in the low productivity of the wells. The Ells also noted that CNRL had 325 000 acres of land in the Bonnyville area and that much of this land was closer to CNRL's cleaning plant sites than the area of Application. The Ells believed that some of these lands might be more economically viable than those in the Application area.

The Ells noted CNRL's lack of development plans for South-east 31-62-6 W4M and further noted that CNRL was not giving up on these lands because of the pay in the Colony, McLaren, and Waseca Formations. The Ells argued that CNRL should have tested those formations and should have brought the relevant information before the Board to establish the economic justification for including that quarter section in the Application.

At the hearing, the Ells raised concerns that the Application did not meet all the requirements of IL 85-12. Specifically, matters relating to environmental protection measures and development and reclamation were not addressed.

The Ells submitted that CNRL has not demonstrated a need for the project. The Ells requested that CNRL be required to perforate its existing four wells in the other zones and present the relevant information to the Board prior to asking the Board to approve a reduced spacing application which could lead to the drilling of in excess of 20 wells in the Application area. With regard to the request for 4 ha spacing, the Ells argued that CNRL's own evidence suggested that only 8 ha spacing was required.

The Ells were also concerned that in the event that CNRL were to initiate an enhanced oil recovery operation, a whole series of new wells would have to be drilled.

4.2 Views of Ms. Hammond

In her summation given at the hearing, Ms. Hammond stated that it appeared that the well located in section 31-62-6 W4M was not anticipated to be economical. She also stated that CNRL had communicated to her that the likelihood of further drilling on this quarter was diminishing. In light of this information and in the interest of maintaining Highway 465 as a quiet dead-end road, so necessary for the *Aget away@vacations* contemplated for the Fieldstones Equestrian Centre, Ms. Hammond requested that the Board deny the reduced spacing for the South-east 31-62-6 W4M.

4.3 Views of the Applicant

CNRL stated that it has over 500 producing oil and gas wells, two heavy oil cleaning plants, and three compressor stations in the Bonnyville area and produces approximately 3500 m³ a day of oil and 481 440 m³ a day of gas. CNRL expected to drill approximately 200 to 250 wells in the Bonnyville area by the end of 1997. CNRL stated that its total capital and operating expenditures in the Bonnyville area would exceed \$100 million.

CNRL stated that due to the producing characteristics of heavy oil, well spacing of less than a quarter section is required to efficiently recover the reserves. CNRL believed that primary recovery on 8 ha spacing could be as high as 10 to 15 per cent of the oil in place with life expectancy to be 5 to 10 years per well.

CNRL maintained that all technical aspects of its Application were sound. It did evaluate all of its options, chose the areas of drilling wisely, and would be using state of the art equipment. CNRL stated that it had no plans for enhanced oil recovery as the sands in the area of Application are relatively thin.

In its evidence, CNRL stated that it had no plans to further develop section 31-62-6 W4M beyond the existing single well. It has tested three different intervals within the well and did not sustain economic rates. CNRL restated this position in its final argument and in its reply argument.

With regard to reclamation, CNRL stated that the specifics would be dealt with in the approvals issued by Alberta Environmental Protection. CNRL stated that all equipment would be removed from the site and wells abandoned in accordance with EUB regulations. Gravel would be removed and the site inspected for contamination. The site would be re-contoured to closely match the pre-construction conditions. Sites would be re-seeded and crop cover established, with all reclamation being completed in accordance with established guidelines.

4.4 Views of the Board

The Board is satisfied that CNRL has reserves in the Application area that may be developed in the manner proposed and that the project is technically viable. Furthermore, it is the Board's opinion that there is a need for reduced spacing as it will increase recovery of the resource and contribute to more orderly development. With respect to South-east 31-62-6 W4M, the Board is satisfied that reduced spacing would be appropriate if development were to proceed, however, the Board notes that CNRL did not indicate any specific plans to develop this quarter section beyond the existing single well. Due to its proximity to the various interveners' lands, and particularly the Fieldstones Equestrian Centre, South-east 31-62-6 W4M is a particularly contentious area. It is the Board's view that, if CNRL decides it wishes to develop that quarter section in the future, full disclosure of the surface development must be made to adjoining landowners so as to permit them to assess the impact of the development and to provide either informed consent or their objections to the Board. Therefore, while at this time the Board will approve the requested reduced spacing for South-east 31-62-6 W4M, the Board directs CNRL, or any successor in interest, to appropriately respond to the concerns of adjoining landowners if it chooses to submit future well licence applications affecting the quarter section. Any such applications shall be submitted according to the Board's non-routine application procedure and shall advise as to how the concerns of landowners have been addressed.

In terms of information made available by CNRL to the public, the Board is satisfied that the level of information provided was sufficient.

Concerning the alleged deficiencies regarding IL 85-12, the Board is satisfied that CNRL will follow all guidelines for the abandonment of wells and the reclamation of sites. Although IL 85-12 requires information regarding environmental protection measures and development and reclamation aspects to be provided, the Board notes that this information is now dealt with through applications to Alberta Environmental Protection.

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

5 PROJECT DESIGN AND OPERATIONS

5.1 Views of the Ells

The Ells were concerned that CNRL had presented no evidence with respect to what options were available to it to develop its land base in the Bonnyville area. The Ells suggested that development options might have been presented indicating that the five pads could have been drilled outside the Application area on land that would have been more economic and would have had less impact on local residents than those in the Application area.

The Ells were also concerned with CNRL's statement that it was proposing to use a *AtHixmaster*® blend of cement. The Ells were unsure whether the thixotropic cement blend was a thermal cement. It was the Ells' view that if existing and proposed wells were not cemented with a true thermal cement, then a whole new series of wells would have to be drilled in the area of Application should thermal operations become viable in the future.

5.2 Views of Mr. Friedel

Mr. Friedel had concerns with the location of the pad at 12B-6-63-6 W4M. He noted that the existing well was located in a low spot which had been flooded in the past. He was concerned that there would be groundwater contamination if more wells were to be drilled at this location. Mr. Friedel expressed concerns with the security of his elk operation indicating instances of oil company people trespassing on his property, with the potential for gates to be left open.

Mr. Friedel was also concerned with truck traffic and noise from CNRL's operations. These concerns are dealt with in sections 6.1.2 and 7.3.2 respectively.

5.3 Views of the Applicant

CNRL stated that it presently plans to drill five slant wells from the 2-6 pad in 1998 or in 1999. If these wells were successful, CNRL would then continue with development by drilling another five wells off the 4-6 pad in 1999 and possibly two more wells from the 12-6 pad. Development in section 6-63-6 W4M would continue in 2000 at the 8-6 and the 14-6 pads if the regional sands were successful. CNRL stated that it had no development plans for South-east 31-62-6 W4M beyond the existing single well. All wells would be drilled from multi-well pads which would be approximately 160 m by 160 m, resulting in a total land usage of 2.5 ha per pad. CNRL proposed to develop on 8 ha spacing. CNRL stated that it would be unlikely that it would move to 4 ha spacing. CNRL stated that it applied for 4 ha spacing to accommodate any future development.

Pad sites would include a 320 m³ group tank, a 160 m³ sales tank, and a 160 m³ test tank. The tanks would be surrounded by a 3 foot high steel barrier and the ground would be covered by an impermeable plastic polyliner. All storage areas would meet with the requirements of the EUB Guide 55 entitled "*Storage Requirements for the Upstream Petroleum Industry.*" The lease would be contoured such that any surface runoff would be gathered, tested, and disposed of appropriately as per Guide 55. Once completed, all wells would be equipped with a well-head drive and electric motor.

Sales oil would be hauled to CNRL's Seibert battery and shipped to market via Husky Oil's

pipeline. Produced water would be disposed of at a Board approved water disposal well at the Seibert battery. Produced sand would be trucked to CNRL's Kitscoty ecology pit located in 15-7-51-2 W4M. CNRL stated that it was currently evaluating its sand management program and was investigating several alternatives including the need for a sand injection facility.

In response to the Ells' concern regarding Thixmaster cement, CNRL stated that Thixmaster meets all the requirements of a thermal cement.

5.4 Views of the Board

The Board supports the use of pad drilling for oil sands development as multi-well sites offer advantages in terms of reduced land disturbance and the centralization of production facilities which may be beneficial for bitumen collection and transportation. The Board also sees advantages and opportunities in this regard related to bitumen pipelining and gas collection and reuse.

With respect to concerns about Thixmaster cement, the Board notes that this is a brand name of a thixotropic cement which is acceptable for thermal operations.

With regard for Mr. Friedel's concerns about the location of the pad at 12B-6-63-6W4M, the Board expects CNRL to design pad sites and facilities to ensure that flood waters do not encroach on the pad site and that water contamination resulting from flooding does not occur. The Board notes that the number of wells to be drilled as part of CNRL'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 to be drilled will be substantially less based on the current 8 ha development plans. The use of multi-well pads should minimize surface impacts should CNRL decide 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. CNRL's project appears to be well within this guideline in that CNRL's development plans indicate a maximum of two pad sites per quarter section.

In summary, CNRL will be limited to a maximum of 4 pad sites and 16 wells per quarter section. However, the Board's expectation is that CNRL will generally utilize a maximum of 2 pad sites per quarter section and up to 9 wells per pad as outlined in the Application.

6 TRANSPORTATION

6.1 Trucking

6.1.1 Views of the Ells

The Ells noted that if CNRL strictly adhered to its designated trucking routes, there would be no additional vehicle traffic associated with development in section 6-63-6 W4M and passing the Ells' residence. However, the Ells stated that despite the designated truck route, CNRL vehicles have continued to travel back and forth past their residence (see Figure 2 for designated trucking routes). The Ells' residence is situated 40 feet from a T-intersection along both a CNRL and a Numac designated truck route. The Ells stated that oilfield trucks have entered their driveway thinking that the road continues through their yard. The Ells also expressed concerns that the increased truck traffic would make jogging, bike riding, and horseback riding very dangerous. The Ells also stated that the CNRL designated truck route was not suitable for heavy oilfield traffic and that CNRL has been negligent in upgrading and maintaining the route.

Mr. Ell stated that with the degree of concern regarding roadways around his residence and those of the Friedels and Hammonds, he was concerned that no local resident had been invited to attend an M.D. meeting.

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

- C require CNRL to upgrade all roads in the area of the interveners to pavement and to ensure that they are suitably maintained for heavy oilfield traffic. CNRL is to retain the services of an independent, professional engineer to determine which roads need to be widened to permit trucks, joggers, horseback riders, etc. to co-exist in a safe manner;
- C the roads must be upgraded, including designated truck routes, before any further drilling takes place in the Application area;
- C require CNRL to post 15 km/h speed limits on all roads within a half mile radius of the Ells' residence so as to reduce heavy oilfield trucking noise;
- C require CNRL to remove the roads in and around the Ells from CNRL's designated trucking route; and
- C require CNRL to pay for a move of the Ells' residence away from its current site to an area that will not be adversely affected by CNRL's industrial activity, or alternatively, require CNRL to pay for the remodelling of the Ells' residence.

6.1.2 Views of Mr. Friedel

Mr. Friedel's concerns regarding trucking had to do with the negative impacts the increased traffic would have on his elk operation. Mr. Friedel acknowledged that the impacts from CNRL's trucking would not be on the same scale as those resulting from Numac's trucking. However, the cumulative effects of both Numac and CNRL trucking would potentially impact on his operation. Mr. Friedel stated that the dust and noise from trucks passing his operation could cause stress to his elk and could in turn affect the productivity of his elk cows or antler velvet production. Mr. Friedel also stated that it would be difficult to isolate calving cows or high priced bucks from the impacts of trucks. He was also concerned with being faced with the onerous task of qualifying and quantifying any loss of elk and/or elk products due to truck traffic.

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

6.1.3 Views of the Hammonds

Ms. Hammond was also concerned with the potential negative impacts that truck traffic could have on the operations of her equestrian centre. Ms. Hammond indicated that her home was 200 feet from the road which CNRL was proposing to use. She contended that the noise from truck traffic would jeopardize her plans to offer riding holidays with accommodation in a quiet rural setting. Ms. Hammond stated she planned to charge between \$750 and \$1000 a week for these holidays. She believed that people would not be willing to pay that much money if they had to put up with oilfield trucks passing her home at all hours. Ms. Hammond expressed concerns regarding issues of liability and indicated that it was very difficult to obtain insurance for her operation. She contended that it would be even more difficult with increased truck traffic.

Ms. Hammond was also concerned about safety on the roads. She indicated that road riding was an essential part of her operation and that she used the roads extensively. She maintained that horses were considered vehicles and were entitled to use the roads.

Ms. Hammond also expressed concerns with road conditions. She stated that she relied on drive-by traffic to make her operation viable and stated that poor road conditions have already prevented clients from entering her property. She was also concerned with the potential for roads to be paved as paved roads are not suitable for horse riding.

As CNRL had indicated that the likelihood of further drilling on South-east 31-62-6 W4M was diminishing and in the interest of maintaining Highway 465 as a quiet dead-end road, Ms. Hammond submitted that the Board should deny the request for reduced spacing in this quarter.

6.1.4 Views of the Applicant

In response to concerns raised by the interveners regarding trucking, CNRL stated that the great majority of traffic would be proceeding from and to the west of the 2-6-63-6 W4M pad site, which is located north and west of all three interveners. Traffic would exit from the 2-6 site south onto the correction road, then travel west to the road running north/south between Sections 1 and 2, Township 63, Range 7, W4M (the "Squiggly Road"), then north to Highway 55. Furthermore, there would be no additional traffic to the 8-31 site as CNRL did not have any plans to further develop this quarter. CNRL concluded that there would be no additional traffic passing the Ells', the Friedel's, or the Hammond's residences and as a result, the interveners would not be impacted by any additional dust or noise associated with truck traffic.

With regard to road upgrading and maintenance, CNRL stated that it would be working with the Municipal District of Bonnyville (the M. D.) to upgrade the "Squiggly Road" and to maintain the roads which it used.

CNRL contended that Mr. Ell had acknowledged at the hearing that his traffic concerns were alleviated. Since Mr. Friedel identified traffic proceeding to the 8-31 site as his major concern, CNRL maintained that the lack of traffic directed to that site should alleviate this concern. CNRL submitted that as a result of its pad sites and truck route selection, the concerns of the interveners had been addressed.

CNRL contended that with no traffic passing the area surrounding the interveners, noise related to trucking would not be a concern. CNRL stated that it anticipated trucking operations to commence at 6:00 a.m. and to cease at 10:00 p.m. daily.

6.1.5 Views of the Board

The Board acknowledges that there are many detrimental aspects associated with trucking including noise, safety, and adverse impacts on road conditions. These impacts may be particularly severe if the roads in question are not designed or built to accommodate large volumes of heavy oilfield trucks. In terms of most effectively addressing the detrimental aspects of trucking, the Board sees pipelining as offering the best long-term solution as discussed in section 6.2.3. However, until a pipeline solution can be implemented, other mitigative measures must be found in the shorter term to permit increased trucking in a fashion that is acceptable to the affected public.

The Board notes CNRL's statement that it did not have further development plans for South-east 31-62-6 W4M, which should alleviate some of the trucking concerns raised by the interveners. The Board acknowledges that CNRL's choice of trucking routes should minimize impacts to the Ells as trucks would be accessing the pads in section 6-62-6 W4M to the west of the Ells' residence and would not be passing it. CNRL's decision not to develop South-east 31-62-6 W4M would also minimize the effects of truck traffic on the Friedels and the Hammonds.

With respect to suggestions that the Board be involved in dealing with road upgrading and repair, the Board notes that its regulatory jurisdiction does not extend to certain issues related to trucking such as road upgrading and repair, and speed limits. 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 CNRL to work with all other heavy oil operators in the area to jointly establish, with the M.D., a committee to address trucking concerns in a general overall manner. The Board cannot specify how public input to the committee might best be accomplished. 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:

(a) 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. Trucking routes might not be limited to existing roads, as there may be opportunities to develop new "in-field" roads to reduce the 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 possible extent.

(b) Priorities for Road Development and Upgrading

It is the Board's understanding that the Asquiggly Road@running north/south between Sections 1 and 2, Township 63, Range 7, W4M is a designated truck route and should therefore be a top priority to get operational in 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.

(c) Resource Commitment

At the Numac hearing the Board noted Numac's commitment to cost sharing and the repair and monitoring of road conditions to enhance the operations of the M.D. It is the Board's view that other area operators should likewise be expected to equitably contribute to the resources needed to address trucking problems.

(d) Standardized Conduct

The Board notes that it can be difficult for the public to deal with separate operators when dealing with trucking issues. A consistent set of ground rules would benefit all parties and hopefully encourage better overall compliance by contractors. Reduced trucking hours, as voluntarily adopted by CNRL, and voluntary reduction of speed limits might be considered, in sensitive areas, to reduce public impacts. When complaints are received, it would serve the interests of the operators to maintain 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 operator they are working for.

(e) 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 Board's intention in setting out 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 is clear C without a particular concerted effort to address trucking concerns, the problem will be exacerbated to the detriment of all parties concerned.

As indicated in the Numac decision, the Board would like to be kept abreast of any developments resulting from a possible multi-party committee and to this end requests a report to the Board by 31 July 1998 outlining the progress made by such a committee. A report may be submitted separately by CNRL or jointly with Numac.

6.2 Pipelining

6.2.1 Views of the Interveners

The issue of pipelining was not specifically raised by the interveners; however, the Ells did request in final argument that CNRL be required to transport by pipeline all oil produced from the Application area to a remote tank site, or if technically possible to the central cleaning plant.

6.2.2 Views of the Applicant

CNRL stated that it was considering the prospect of bitumen pipelining in other areas. However, it was CNRL's opinion that the amount of sand being produced from the Application area might result in facilities which could create a greater strain on the environment. In particular, there would be more surface facilities required to pipeline, such as blending facilities and associated instrumentation, pumps, line heaters, and pipelines for fuel gas. CNRL confirmed that it would keep abreast of research surrounding pipelining of bitumen.

6.2.3 Views of the Board

The Board notes that CNRL is investigating the potential to pipeline bitumen from production pads in the Pelican Lake area but notes pipelining in the Pelican Lake area and the Application area are different issues as the lower viscosity of the oil and the different production characteristics (little sand production) in Pelican Lake make pipelining easier. The Board notes

that there are industry groups such as PTAC (Petroleum Technology Alliance of Canada) and C-FER (Centre for Frontier Engineering Research) that are investigating the potential for bitumen pipelining. The Board would urge CNRL to become involved with such industry groups to participate and benefit from such studies. Given the areal extent of these projects, the impacts on existing land use and roads, it is imperative that a better transportation alternative to trucking be developed. Consequently, the Board will require CNRL to file a report, by 30 June 1999, on the feasibility of bitumen pipelining in general in the Bonnyville area and specifically at the project. The report shall include the technical and economic feasibility of incorporating pipelining into this project for the transportation of bitumen to central gathering facilities. The Board believes that the pipelining alternative should focus on those areas where trucking is likely to 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 would take this opportunity to again alert other operators as to the need to evaluate 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 submitted that the air dispersion model, presented by CNRL, was deficient in a number of areas as outlined below:

- C There were no actual measurements of the flows from any of the casing vents or tanks from the 8D-31-62-6 W4M, 4D-6 or 12B-6-63-6 W4M wells. Only one CNRL tank was sampled, 2B-6-63-6 W4M, and the model did not take into account that there would be differing emissions from the tanks depending upon the zones being produced.
- C A BTEX sample was done on a stock tank and a casing vent at 2B-6-63-6 W4M. The sample may have been contaminated and therefore could not be considered representative of CNRL's wells. A BTEX sample was taken from the 11-29-62-5 W4M sales/production tanks and casing vent. This well was producing from a different zone than the wells in the Application area. Therefore, this sample could not be representative of CNRL's wells in the Application area. Accordingly, CNRL's consultant did not know whether he was working with a representative sample in doing his report on health effects.
- C The air dispersion model ignored cumulative effects from existing oil and gas activity and did not include any emissions from waste associated gas; fugitive equipment leaks from heavy oil wells; fugitive equipment leaks from the cleaning plants; cleaning plant combustion of fuel gas and flaring; line heaters, fuel dehydrators, and compressor stations from the 645 wells already licensed; and diesel engine emissions from all heavy oilfield truck traffic.

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

The Ells expressed concern that the reports did not address the issue and impacts of odours, but only seemed to focus on acute or chronic health impacts. In the Ells' view, even the health information provided in the report did not seem to address any specific impacts.

The Ells were also concerned that CNRL did not have plans for vapour management and collection of vent gases, such as using a closed venting system or incineration. The Ells maintained that CNRL did not know how to assess the economics of vapour collection.

The Ells submitted that the Application should be deferred until CNRL developed a plan for vapour collection. Alternatively, the Ells requested that the Board make it a condition of any approval that CNRL must collect the vapours from their casing vents and stock tanks and incinerate, rather than flare, any gas not used on the pad site.

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 the 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 CNRL started its project so that there would be an indication of what changes occurred as a result of development in the area.

Mr. Friedel was also concerned 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 quoted 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

In response to the Ells' concerns regarding emissions and odours, CNRL stated that the numbers used in its model were representative of a worst case scenario. The actual anticipated emissions and emission rates would be far below those used in the analysis. Even using the worst case data, the emissions were within established guidelines. CNRL submitted in summary that appropriate and representative samples were used and that its modelling was reliable. However, CNRL stated it would be prepared to conduct more sampling or to share this information with other companies to confirm whether the samples were representative.

With respect to the effects of emissions and odours, CNRL stated that the samples taken did not support any concerns regarding health risks. CNRL submitted that the concentrations registered at the receptor points were orders of magnitude below any published guidelines and the cumulative effects would be minimal. The standards against which CNRL measured the results

were the Occupational Health and Safety Standards, which were more stringent than the applicable AEP guidelines with regard to exposure to emissions.

CNRL believed that odours might be problematic as this was a well known concern to the oil and gas industry. CNRL stated that it would work with landowners and use its best efforts to reduce odours where possible.

CNRL acknowledged that it did not have any present plans for the collection of vapours from the casing and tank vents. CNRL maintained that a greater flow of gas would be required to make any decisions surrounding the conservation of gas. CNRL believed that it would be able to make a better decision once the first pad was drilled and it could assess the total volume of gas being generated and the economics involved. CNRL undertook to monitor emissions in accordance with existing guidelines and take action as required.

7.1.4 Views of the Board

The Board recognizes the complexity and intricacy of the air dispersion modelling study and notes CNRL's efforts to determine the potential air quality impacts from the proposed development. However, it is apparent that particular aspects of this modelling exercise, such as the input of more representative sample data, could have been improved. Nonetheless, 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 CNRL to conduct a thorough review of the technical and economical feasibility related to vent gas collection and recovery and to file a report by 31 July 1998 outlining the conclusions of the review. The Board also urges CNRL to take measures to collect these 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, these emissions may need to be addressed in residential areas because they can be aesthetically displeasing and present a nuisance odour factor to those residents living downwind. The Board expects CNRL 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 CNRL 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.

7.2 Groundwater Protection

7.2.1 Views of the Ells

The Ells were concerned with the potential contamination of their ground water. The Ells agreed that CNRL's hydrogeologic consultant indicated that if groundwater became contaminated in Section 6-63-6 W4M, it would likely flow south and have the potential to contaminate the Ells' groundwater. The Ells noted that the 12B-6-63-6 W4M pad site had been flooded.

The Ells maintained that the oil industry practice of simply replacing water wells without investigating the cause of the problem is very self serving. This practice leads to no evidence being gathered which might be used against the oil industry in future applications. The Ells were also concerned that CNRL had not implemented a water monitoring program for water wells in the area.

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. Mr. Friedel expressed concerns that CNRL had not established baseline parameters regarding water quality. He also expressed concerns regarding the volumes of toluene and benzene that would find its way into the water supply. As previously mentioned, Mr. Friedel was concerned with the existing well site at 12B-6-63-6W4M as it had been flooded in the past. He noted CNRL's plans to drill more wells at this site and was concerned about

groundwater contamination.

Mr. Friedel also wanted CNRL to set up a water monitoring program for his water well and dugouts.

7.2.3 Views of the Applicant

CNRL presented a hydrogeological report with respect to the effect of the proposed activity on the area groundwater. The report concluded that there were no significant aquifers in the upper bedrock that were suitable for development of potable groundwater supplies. The report stated that the proposed increase in drilling activity would not pose any additional threat to the quantity or quality of the groundwater in the main aquifers in the Application area. When questioned about contamination because of casing failures or fluid migration along the annulus, CNRL responded that it was unaware of any studies of documented effects of groundwater contamination, of depletion through casing failures, or fluid migration as a result of primary recovery projects. As a further protective measure, CNRL stated that it would install a plastic polyliner underneath the tanks as a secondary containment measure.

In response to the interveners' concerns regarding water well testing, CNRL stated it was prepared to conduct water well and dugout testing upon request.

7.2.4 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 CNRL's commitment to test residential water wells and water dugouts upon request.

The Board also notes CNRL's intention to use surface casing in all wells. While the Board's view is that the primary purpose of surface casing is for well control, it may also serve to reduce the potential for groundwater impacts and its use is therefore encouraged. The Board's views regarding the 12B-6-63-6W4M site are outlined in section 5.4.

7.3 Noise

7.3.1 Views of the Ells

The Ells expressed concerns regarding the noise that would be associated with the increase in truck traffic. The Ells' residence is located at a T-intersection of the main east-west road and a major north-south designated truck route as shown on Figure 2. The Ells contended that the noise associated with trucks accelerating and decelerating at this intersection would exceed the permissible sound levels outlined in the Board's ID 94-4. The Ells believed that the Preliminary Noise Impact Study prepared 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 were also concerned that there was no ambient monitoring done at their residence.

The Ells also expressed concerns about the noise generated during the drilling and completion

and production phases of the development.

In their final argument, the Ells submitted that the Application should be denied until a proper noise impact study was done by CNRL incorporating a component for heavy oilfield trucking. If the Application were to be approved, the Ells requested that CNRL 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 concerned that noise from truck traffic would negatively impact his operation. Mr. Friedel indicated that 40 decibels was considered safe for livestock production, and that anything above that would cause stress to his elk. Mr. Friedel referred to studies outlining the effects of noise on a variety of test animals.

7.3.3 Views of Ms. Hammond

Ms. Hammond expressed concerns regarding the effect the truck noise would have on her existing operation. She stated that the noise from trucks would echo in her riding barn and could potentially spook her horses. She stated that she was not willing to accept responsibility if one of her students was injured as a result of noise from trucks. Ms. Hammond also indicated that she had put off purchasing a new riding barn earlier in the year because of her concerns with the proposed development and associated noise.

7.3.4 Views of the Applicant

In response to concerns regarding the Preliminary Noise Impact Assessment, CNRL stated that the study was prepared as a working tool to aid in predicting sound levels around proposed pad sites. CNRL maintained that the predicted sound levels of the proposed facilities were in compliance with the permissible sound levels outlined in ID 94-4. CNRL also noted that, as it had no plans to develop in South-east 31-62-6 W4M, the concerns of increased facility noise in the immediate vicinity of the interveners would be mitigated. In addition, the electrification of pad sites would further allay any concerns regarding noise.

With regard to truck traffic noise, CNRL stated that the interveners would not be impacted by CNRL traffic as there would not be an increase in the number of trucks passing the area of the interveners. As outlined in section 6.1.2, CNRL would not be using the T-intersection in front of the Ells' residence nor would there be an increase in traffic along the Hammond/Friedel road (Highway 456) as CNRL did not plan to develop the South-east 31-62-6 W4M.

7.3.5 Views of the Board

The Board notes that CNRL prepared two studies relating to noise and its impact on the community. The Preliminary Noise Impact assessment indicated that the predicted sound levels from the facilities in and around 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 the facility owner/operator. 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 CNRL 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 these sensitive situations. Because of the large number of variables at each location, ensuring 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 acknowledges 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 notes that noise resulting from truck traffic in the area of the interveners should not increase as CNRL has no plans to further develop the South-east 31-62-6 W4M.

The Board would strongly urge CNRL 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 a few examples of methods of minimizing the impacts of noise on affected persons.

8 PUBLIC CONSULTATION

8.1 Views of the Intervenors

The interveners did not express many concerns with CNRL's public consultation and in fact were complimentary of CNRL's efforts. However, the interveners did note that there were more interveners for the CNRL hearing than for the Numac hearing.

The Sabatiers stated that they were not properly informed of CNRL's development. Mrs. Sabatier indicated that CNRL had provided an application package but provided no follow-up consultation. Mrs. Sabatier stated that she phoned CNRL and invited someone out to her home

but did not hear back. Mrs. Sabatier expressed concerns which were very similar to those of the Ells.

8.2 Views of the Applicant

CNRL stated that, as part of its public consultation program, all landowners in the area were initially provided with correspondence and then personally contacted where required. Each landowner received an information package including a letter of explanation, a consent/objection form, and a copy of the Application. CNRL also stated that it held an open house on 14 October 1997 in Bonnyville, allowing landowners with questions or specific concerns to have them addressed by individuals involved with the project. CNRL submitted that it would be willing to work with all landowners in the area to address any concerns.

If the Sabatiers were not properly informed, CNRL stated that this was clearly an oversight. CNRL had confirmation that the Sabatiers had received the cover letter and application package explaining the development. CNRL believed at that time that the Sabatiers had no concerns and would submit the appropriate consent form. CNRL stated that the Sabatiers were contacted again and CNRL remained of the impression that there were no concerns. CNRL did not hear from the Sabatiers again until the hearing.

8.3 Views of the Board

One of the fundamental aspects of the Board's application process is adequate public consultation and this is described in some detail in Informational Letter IL 89-4. In this particular case, the Board notes that the interveners, with the exception of the Sabatiers, were generally satisfied with CNRL's public consultation program.

In the case of the Sabatiers, the Board cannot know what events occurred to lead to the apparent miscommunication. It would appear that CNRL was diligent in communicating its plans to other landowners and residents in the area and in trying to resolve concerns of other interveners up to the time of the hearing. The Board expects that affected persons will take every opportunity to learn more about the business of resource development and will bring forth their concerns to the company involved or the Board as early as possible so that attempts may be made to resolve outstanding issues. The Board notes that all area residents and landowners were provided notice through the Bonnyville Nouvelle and the Cold Lake Sun and that affected persons with concerns were asked to submit those concerns to CNRL.

It is the Board's view that industry should make every reasonable effort to ensure that all affected persons, especially those within application areas, understand how they can be affected by development. Applications should be presented in a language that is understandable to the lay reader and strong effort should be made to explain the application to directly affected persons. The Board encourages industry to make use of open houses or community meetings, prior to the application process, to discuss development plans with the community and to make the community aware of who affected persons can contact with their concerns.

The Board believes that CNRL has followed the expectations as set out in IL 89-4 with respect to the Application.

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 CNRL and Numac. 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 CNRL 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 CNRL 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 Lindbergh Operators Committee, amongst others.

10 DECISION

The Board is prepared to approve Application No. 1007817 by CNRL for a primary recovery scheme. The approval is subject to all of the undertakings given by CNRL in the Application, in subsequent submissions and at the hearing and to the conditions set out in this report. For ease of reference, conditions of particular note are restated as follows:

- (a) CNRL, or any successor in interest, shall provide full disclosure of any surface development in South-east 31-62-6 W4M to adjoining landowners so as to permit them to assess the impact of the development and to provide either informed consent or their objection to the Board. If it chooses to submit any future well licence applications affecting the quarter section, CNRL, or any successor in interest, shall submit such

applications according to the Board's non-routine application procedure and shall advise as to how the concerns of landowners have been addressed (section 4.4).

- (b) CNRL will submit a report to the Board, by 31 July 1998, outlining the findings or conclusions of any multi-party committee regarding trucking issues (section 6.1.5).
- (c) CNRL will file a report with the Board, by 30 June 1999, on the feasibility of bitumen pipelining in general in the Bonnyville area and specifically with respect to this project. The report shall include the technical and economic feasibility of incorporating pipelining into the project for the transportation of bitumen to central gathering facilities (section 6.2.3).
- (d) CNRL will conduct a thorough review of the technical and economic feasibility related to vent gas collection and recovery and file a report, by 31 July 1998, outlining the conclusions of this review (section 7.1.4).

DATED at Calgary, Alberta on 26 March 1998.

ALBERTA ENERGY AND UTILITIES BOARD

<Original signed by>

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

<Original signed by>

G. J. Miller
Board Member

<Original signed by>

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

Attachments

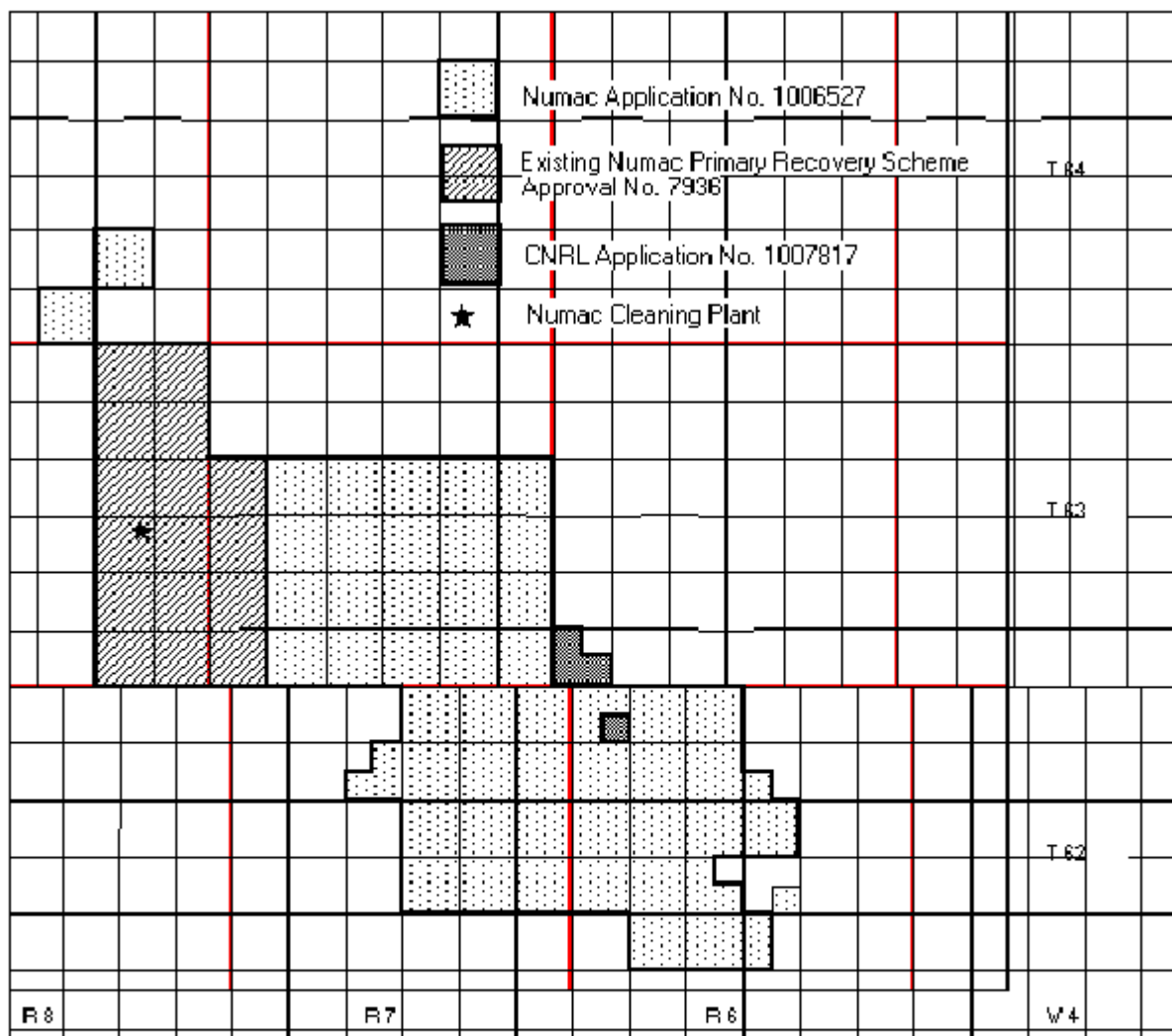


Figure 1 Canadian Natural Resources Limited General Area of Application

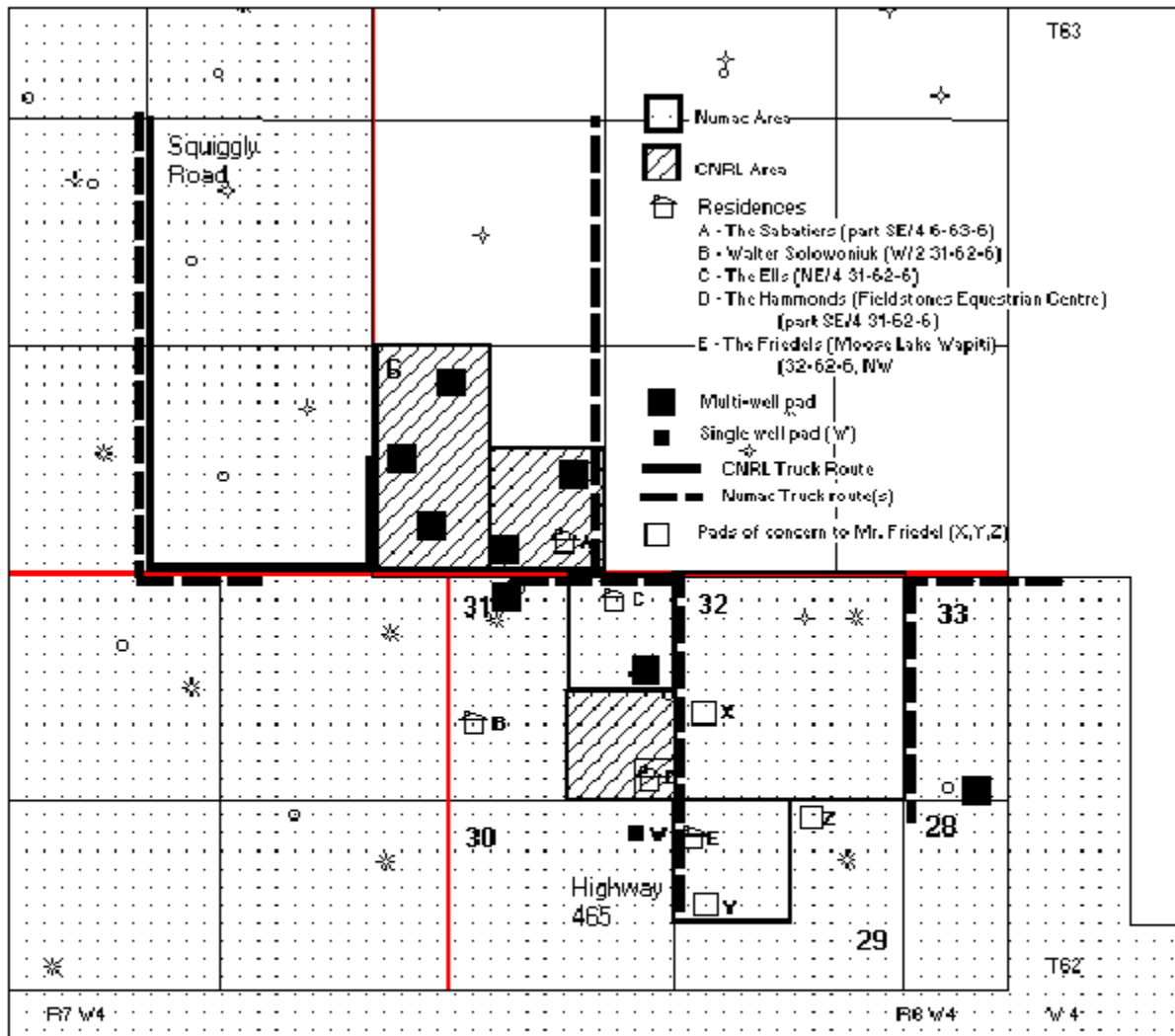


Figure 2 Canadian Natural Resources Limited Development Area and Intervenor Locations