

ALBERTA ENERGY AND UTILITIES BOARD

Calgary Alberta

**CE ALBERTA BIOCLEAR LTD.
NEW MTBE/ETBE PLANT
FORT SASKATCHEWAN AREA**

**Decision 98-1
Application No. 960864**

1 THE APPLICATION, INTERVENTIONS, AND HEARING

CE Alberta BioClean Ltd. (BioClean) applied to the Alberta Energy and Utilities Board (EUB), pursuant to section 30 of the Oil and Gas Conservation Act¹ (the Act), for an industrial development permit respecting a new methyl tertiary butyl ether/ethyl tertiary butyl ether (MTBE/ETBE) facility to be located in Strathcona County (the County). This world-scale facility would be sited adjacent to the Dow Canada Chemical Inc. (Dow) complex near the City of Fort Saskatchewan (the City), in the south-west quarter, the north-west quarter, and a small portion of the south-east quarter of Section 18, Township 55, Range 21, West of the 4th Meridian. (See attached figure.) BioClean requested authorization to use 1.088 million cubic metres per year (10^6 m³/yr) of field butanes² as feedstock, 54.4×10^6 m³/yr of hydrogen as feedstock, and 110.5×10^6 m³/yr of natural gas as fuel in the production of a maximum of 1.267×10^6 m³/yr of MTBE/ETBE and 32.9 thousand (10^3) m³/yr of industrial and fuel grade ethanol.

The proposed facility would also use some 850 kilotonnes/yr (kt) of barley and produce 302.5 kt/yr of a by-product called Distillers Dried Grain with Solubles (DDGS) which would be used as a high quality agricultural livestock feed. The facility would also produce a maximum of 34 kt/yr of barley hulls which would initially be sold as a high-fibre animal feed. The latter could be converted to ethanol if conversion equipment were installed. In addition, a grain loading and unloading facility would be associated with the facility.

BioClean requested a 20-year permit term to commence with start-up of the ethanol plant in September 1999.

The application and submissions were considered at a public hearing in Fort Saskatchewan, Alberta on 4 and 5 September 1997 before F. J. Mink, P.Eng. (Presiding Member), B. T. McManus, Q.C. (Board Member), and W. J. Schnitzler, P.Eng. (Acting Board Member).

¹ Oil and Gas Conservation Act, R.S.A. 1980, c. O-5.

² The term "field butanes" refers to a specification product, consisting of normal butanes and iso-butanes (usually averaging about 65 per cent/35 per cent, respectively), which has been separated through processing directly at some field gas plants and at large fractionation plants.

Those who appeared at the hearing are listed in the following table.

THOSE WHO APPEARED AT THE HEARING

Principals and Representatives (Abbreviations Used in Report)	Witnesses
CE Alberta BioClean Ltd. (BioClean) S. C. McNaughton D.C.I. Lucky BioClean Fuels Inc.)	D. E. Hallburg (of BioClean Fuels Inc.) M. S. Powders (of BioClean Fuels Inc.) N. E. Anderson, P.Eng., Ph.D. (of S. M. Goodman (of BioClean Fuels Inc.) C. H. Sambells, P.Eng. (of Kilborn Western Inc.) N. Maybee (of HFP
Acoustical Consultants)	P. Thanawala, P.Eng. (of 2000 Environmental Services) D. Cooper, P.Eng. (of Stanley Consulting) K. W. Otto (of Purvin & Gertz, Inc.)
Trans Mountain Pipe Line Company Ltd. (Trans Mountain) J. M. Boyle	
Alberta Barley Commission Eugene Boyko	Eugene Boyko
City of Fort Saskatchewan (the City) Mayor K. Hodgins	Mayor K. Hodgins
Strathcona County (the County) L. J. Burgess, Q.C.	Mayor V. Hartwell R. Powell R. G. Klassen B. Horton, P.Eng. Fire Chief L. Burton
Alberta Envirofuels Inc. (Alberta Envirofuels) G. S. Dunnigan	Dr. D. J. Hawkins, P.Eng.

THOSE WHO APPEARED AT THE HEARING (cont'd)

Principals and Representatives (Abbreviations Used in Report)

Witnesses

A. Dzurny et al (the Local Residents)
 H. I. Shandling, Q.C.
 E. C. Gerlock

A. M. Dzurny
 N. E. Demeule
 E. Schotte
 A. Finch
 M. Chartrand

Mr. V. M. Anez

Alberta Department of Environmental Protection (AEP) staff
 C. S. Liu, P.Eng.

Alberta Energy and Utilities Board staff
 T. H. Donnelly, Board Counsel
 W. A. MacDonald, P.Eng.
 D. C. DeGagne, C.E.T.
 D. D. Fraser

The Board also received letters of interest from Imperial Oil Limited, Petro-Canada and Petro-Canada Oil and Gas, although they did not submit evidence or take an active part in the hearing. The Confederation of Regions Party and Daren and Sandra Krebs filed letters of objection but did not appear at the hearing.

2 BACKGROUND AND PROCESS OVERVIEW

The BioClean project is based on the multiple oxygenates production (MOP) process which is described in detail in the attached appendix.

BioClean emphasized that the MOP technology offers a number of advantages including that it is efficient and optimizes the utilization of raw materials to produce high-value, environmentally friendly, and clean finished products. The process converts each tonne (t) of barley into four useful products: starch, which is converted into 0.33 m³ of ethanol; high grade protein, which is concentrated into 0.39 t of DDGS; barley hulls, which provide 0.04 t of high fibre animal feed; and 0.25 t of carbon dioxide (CO₂) which is fully utilized as feedstock for methanol production.

BioClean maintained that the overall energy efficiency of the MOP process is 77.8 per cent, which is equivalent to or higher than that of other similar plants around the world. It stated that there would probably be further improvements in efficiency as detailed engineering proceeded.

BioClean also noted that, in the early stage of its detailed engineering, it would look for places to realize improvements in process efficiency, the economics, and the operability of the process.

BioClean submitted that its project would ultimately serve as the steam host to a joint-venture co-generation project which would be owned jointly by TransAlta Enterprises Corporation and Air Liquide Canada Inc. (TEN/CLA) and which would be the subject of a separate application to the Board. This natural gas-fired co-generation plant would be located on, and would generate up to 125 megawatts (MW) of electrical power for, Dow's complex. Some 300 t per hour of steam would be delivered to the BioClean site via a utility corridor. A smaller co-generation plant, also to be jointly owned by TEN/CLA, would be located on the BioClean site and would provide about 10 MW of electrical power to the BioClean site.

Having regard for the evidence, the Board is satisfied that the MOP process represents an efficient use of Alberta's energy resources and meets the technical requirements under the statutes.

3 ISSUES

The Board believes the most significant issues to be considered with respect to this application to be:

- the need for the project,
- the ownership of the project,
- the cost/benefits of the project,
- the availability of field butanes,
- the environmental and other impacts of the project,
- the adequacy of the emergency response plan and need for risk assessment, and
- the general land-use conflict in the area.

4 PROJECT NEED

4.1 Views of the Participants

BioClean submitted that its project is a direct consequence of new environmental legislation and attendant market forces in the United States (U.S.). The U.S. enacted the Clean Air Act Amendments in 1990 which contained provisions for use of cleaner, reformulated gasoline, which in turn required major changes in gasoline composition in the country. A two-stage process, occurring in January 1995 and January 2000, imposes strict standards of environmental emissions and promotes the use of oxygenated fuels. BioClean explained that the U.S. legislation essentially

targets several major pollutants and associated health threats arising from mobile sources, including volatile organic compounds (VOCs), benzene, and oxides of nitrogen (NO_x).

BioClean stated that currently one-third of the approximately 113 billion litres of gasoline sold in the U.S. each year is reformulated to meet the federal requirements. It noted that the State of California has imposed an even tighter gasoline specification, called CARB II, which would reduce smog-forming emissions from motor vehicles by 15 per cent. To comply with these rules,

gasoline refiners have had to take several initiatives. The first was to substantially reduce the amount of butanes in gasoline followed by a substantial reduction in the levels of benzene and aromatics which account for 85 per cent of benzene emissions in the country. Thirdly, refiners also had to eliminate the major sulphur emissions by replacing or reducing the use of high octane olefins. Given that butanes, aromatics, and olefins are high octane components of normal gasoline, it became necessary to use ethers such as MTBE and ETBE to maintain performance in vehicles. BioClean further noted that cleaner gasoline standards are being adopted in Europe, Asia, and other parts of the world; and that Canada also will implement a similar clean gasoline standard in January 1999. All of these factors in turn increase world-wide demand for MTBE and ETBE. BioClean indicated that its preferred market would be California, the same target currently being served by another Alberta plant owned by Alberta Envirofuels Inc., several plants in Houston, and others in the Persian Gulf and Venezuela, all of which have been built over the past 5 years.

Trans Mountain concluded that transportation and markets were not major or contentious issues. It agreed with BioClean's market analysis and observed that its pipeline system is a suitable means of transporting ethers bound for the California market.

4.2 Views of the Board

The Board is aware of the requirements in the U.S. for cleaner, reformulated gasoline and the even stricter requirements in the State of California. It also accepts that Canada will follow the direction in the U.S. towards the use of cleaner gasolines. The Board acknowledges that ethers such as MTBE and ETBE already have played and should continue to play an important role as high octane additives; and it agrees with the applicant that the market for reformulated gasoline, and hence for ethers, will continue to grow into the future. The Board is satisfied that there is a need for the proposed project based on the increasing demand for MTBE and ETBE. The Board notes that Alberta Envirofuels also sells the majority of its MTBE product into the same market that BioClean is targeting, but believes that the market can accommodate products from both plants.

5 PROJECT OWNERSHIP

5.1 Views of the Participants

BioClean, an Alberta corporation owned by Kiewit Energy Group, Inc. (Kiewit), submitted the application on behalf of the two project sponsors, Kiewit and ConAgra Inc. (ConAgra). It indicated that the sponsors anticipate forming and collectively owning, with additional participants, an entity or entities which would design, construct, own, and operate the proposed facility. The final corporate ownership/legal structure and the project financing remain to be concluded. BioClean requested that the permit be issued in its name and that, once the legal structure is finalized, it would request a permit amendment to reflect the change. It anticipated that the legal structure of the corporation would be finalized in the next few months. BioClean recognized that the Board would have to review the final corporate structure and satisfy itself that the eventual operator met a public interest test.

Notwithstanding, BioClean noted that ConAgra, which trades on the New York Stock Exchange, is one of the world's largest agricultural trading and processing companies. It has had a long-standing role in Canada, being the third largest marketer of Canadian grain and a joint venture owner of companies such as Canada Malting Co Limited and Maple Leaf Foods Inc. ConAgra would be responsible for all aspects of the grain handling and protein feed supplement marketing. Kiewit, the other sponsor of the project, is a large diversified company based in Omaha, Nebraska, whose ultimate corporate parent, Peter Kiewit and Sons, Inc., is a large conglomerate established over 100 years ago. One of its subsidiaries, Kiewit Construction Group, has been active in the Edmonton area for over 50 years. BioClean Fuels Inc. is the patent holder, owner, and licensor of the MOP process on a world-wide basis as well as a developer of projects to use this process.

While BioClean acknowledged at the hearing that it did not have a fully staffed company, it expected things to happen fairly quickly once the project was approved. It noted that first the new company would have to be well funded and well staffed with top management. This core group of managers would then establish, in conjunction with the project's lending institutions, a clear framework for the operations plan. Part of this plan would be to establish an operating team of approximately 50 people. BioClean anticipated that most of this team would come from experienced labour in the Fort Saskatchewan area.

5.2 Views of the Board

The Board is satisfied that the two project sponsors, Kiewit and ConAgra, have the financial and technical capability, and the experience to undertake and complete the proposed project. Should the Board find the project to be in the public interest, the Board would expect BioClean to satisfy it that the final corporate arrangements are satisfactory. Such arrangements should be made prior to construction or at such other time as the Board finds appropriate.

6 PROJECT COST/BENEFITS

6.1 Views of BioClean

BioClean identified a number of factors critical in determining the viability of its project and its selection of Alberta as the site for a new facility. The first critical factor was to satisfy itself of an adequate supply of field butanes along with storage capacity. It noted that Alberta is one of the primary butanes supply basins in the world where volumes are available, prices are reasonable, and there are storage caverns in abundance. (Section 7 discusses feedstock availability.) It further noted that there is extensive fractionation and pipeline capacity available in the area.

Another important factor for BioClean was the availability of barley and the corresponding "net starch" (ie. what is left over after the protein has been sold) costs. If the project proceeds, the annual barley output of over 5000 farms would be purchased, representing some 10 per cent of the total current Alberta barley production. BioClean noted that the "net starch" costs of Alberta barley have, on a historical basis over the past 10 to 15 years, been the lowest in North America.

A third factor BioClean cited was access to markets and logistics. It noted that the existence of the Trans Mountain Pipeline and other pipelines for providing cost effective and safe transportation of its products to market was a key consideration. Access to both the Canadian National (CN) and Canadian Pacific (CP) rail lines for moving barley and DDGS was also important. Equally important factors that contributed to selecting the Fort Saskatchewan area included an extensive and skilled labour pool for construction and operation of the facility and the efficient infrastructure and utilities systems available in the region.

BioClean estimated its total project cost to be approximately \$650 million. It submitted that plant construction, scheduled for 1998 through 2000, would provide about 1700 person years of direct employment and inject approximately \$100 million in wages into the Alberta economy during the 2-year engineering and construction phase. BioClean submitted that once fully commissioned, the plant would create a total of 148 new permanent jobs. BioClean also identified a number of benefits of its project during its operating life. The total annual expenditures on field butanes and natural gas consumed by the facility would be approximately \$87 million and \$4.5 million, respectively. BioClean estimated that the plant would generate approximately \$3.2 million in annual tax revenue for the County. A summary of the direct impacts of the project indicated total average operating costs of \$240 million and total average revenue of \$436 million/yr over a 12-year period.

With regard to the impact on the price of field butanes in Edmonton, BioClean submitted that this was essentially a market issue. BioClean recognized that Alberta Envirofuels did not suggest that its proposed facility would make the Alberta Envirofuels' facility uneconomic or that both projects could not be economic. BioClean believed Alberta Envirofuels was indicating that to prevent butanes from moving east, there would have to be an incentive to keep the

butanes in Alberta. BioClean noted that, since the Alberta Envirofuels project entered the market and increased demand in the Edmonton area for field butanes, the differentials between the Edmonton and Sarnia price have not been reduced. BioClean submitted that its analysis of the viability of this project was based on historical price differentials and, based on that information, it was satisfied that the project is an economic proposition. In addition, BioClean disclosed that it had included declining margins over time in its projections in order to provide a greater comfort level as to the viability of its project.

6.2 Views of the Interveners

The Alberta Barley Commission expressed its support for BioClean's project, which it stressed would use a renewable resource, barley, to produce clean-burning fuel additives, while providing employment benefits and new markets in Alberta. The City also affirmed its support for the project, subject to BioClean meeting all legislative and environmental requirements.

Alberta Envirofuels questioned the viability of the project and requested that BioClean provide additional detailed supporting information. It expressed concern that another large user of field butanes, such as the BioClean project, could cause a substantial increase in the price of field butanes and potentially render its own plant uneconomic.

Alberta Envirofuels stated that, in addition to the need for more fractionation capacity in the Edmonton area to ensure a sufficient supply of field butanes for the BioClean facility, there would have to be an economic incentive in terms of a higher price to attract to Edmonton the butanes that are currently going to Sarnia. But over and above this increase in price, Alberta Envirofuels submitted that physical changes would also have to occur to the hardware at Superior and perhaps elsewhere on the Interprovincial Pipeline Lakehead (IPL) System in order to continue the movement of unfractionated NGL through the IPL System. Currently this system has severe vapour pressure limitations at the Superior, Wisconsin breakout facilities; and butanes and heavier components of the mix are used to control the vapour pressure. Alberta Envirofuels noted that the pentanes-plus content of the NGL mix carried on this line is already being minimized; and if butanes are also removed, then a major new investment in breakout facilities would be required and part of the existing facilities would be rendered redundant. In its view, the installation of injection and breakout facilities would pose a major economic hurdle. Because the price of mix in the Edmonton area tends to be set by the Sarnia market and because there is investment in existing facilities that operators would want to protect, Alberta Envirofuels indicated that, in essence, each market would tend to bid against the other for the same butanes supply.

6.3 Views of the Board

Given the evidence, the Board believes the proposed project is economically viable and offers significant benefits to the community and the province. It notes that the potential benefits of BioClean's project are quite substantial and that no one disputed these benefits. The primary cost/benefit concerns that were expressed centred on availability and price of feedstock due to

the increased demand for field butanes. Feedstock supply is discussed in section 7. With respect to the effect on price, the Board notes that BioClean considers field butanes to be a commodity and that the applicant is prepared to pay the prevailing market price for field butanes. While the Board acknowledges some price impact could occur as demand increases, it does not believe such impacts would be significant. The Board expects a project proponent to make the necessary arrangements to secure adequate feedstock and fuel supplies, in advance of developing the project, which should ensure the long term viability of the undertaking. As a rule, the Board believes that projects should be based on market forces without undue regulatory influence unless substantial public interest issues are affected. In the Board's view, existing plant owners have a number of advantages over potential newcomers, including contracts for feedstock and fuel supplies as well as contracts with customers. The Board sees no compelling reason to interfere with normal market forces in this instance.

7 FEEDSTOCK AVAILABILITY

7.1 Views of BioClean

BioClean submitted that Alberta currently produces some 6×10^6 m³/yr of total butanes³ and that, based on its studies, there is a present and projected surplus of total butanes in Alberta. It indicated that the existing Alberta demand for field butanes is about 3×10^6 m³/yr, thus leaving a surplus of 3×10^6 m³ of the total butanes available for processing into field butanes in the province. In BioClean's view, this would be more than sufficient to meet the requirements of its proposed facility.

BioClean also noted that of the 3×10^6 m³/yr of field butanes currently available in Alberta, approximately 1×10^6 m³/yr are being exported to other parts of Canada and the U.S. If there were additional demand for field butanes in the Edmonton area, BioClean submitted that the exported volumes coming from the existing capacity and current field butanes production could be used to meet this demand.

The lack of fractionation capacity and ability to convert more of the total butanes supply into field butanes was also raised by participants at the hearing. It was BioClean's position that additional butanes fractionation capacity has already been approved by the EUB, and this would add significantly to the availability of field butanes in the Edmonton area. As an example, it cited the new Redwater fractionation facility of Novagas Canada Ltd. (Novagas) which is currently under construction and which would produce approximately 700×10^3 m³/yr of field butanes in the Edmonton area. In addition, the applicant provided historical data of Alberta field butane production from 1987 through 1996 showing a relatively flat production profile, with the

³ In this report, the term "butanes" is used to refer to the total butanes supply including that contained in natural gas liquids (NGL) mix as well as specification product.

exception of 1992 and 1993, when a small production peak occurred. The difference between this peak and current field butanes production is roughly $500 \times 10^3 \text{ m}^3/\text{yr}$. BioClean submitted that this peak capacity is still available and, with the new Novagas capacity included, would total some $1.2 \times 10^6 \text{ m}^3/\text{yr}$, which would be more than sufficient for its proposed facility.

BioClean also referred to other available NGL recovery capacity at the Empress straddle plants not directly connected to the Edmonton area at this time. As this is already existing capacity in the province, it is possible that the existing movement of NGL mix and fractionated field butanes moving east out of Alberta could be made available in Alberta by displacement. The applicant noted that historically, the fractionation capacity has essentially kept pace with the demand for field butanes. BioClean indicated that there is no physical reason why the necessary fractionation capacity cannot be developed; and it suggested additional capacity is in the process of being developed.

Finally, BioClean pointed out that, while the new U.S. rules create a substantial new demand for clean-burning oxygenates like MTBE and ETBE, they also reduce the demand for butanes that would otherwise be blended into gasoline. This in turn would reduce Canada's need to export butanes to the U.S. in future years and increase availability here.

In summary, BioClean submitted that the evidence before the Board shows that there is a sufficient, available supply of butanes and fractionation capacity in the Edmonton area to meet the requirements of its proposed facility.

7.2 Views of the Interveners

Alberta Envirofuels opposed the application based on the issue of feedstock availability. It expressed concern about the strain that a 28-per cent increase in demand would have on the availability of field butanes for existing users. Alberta Envirofuels submitted that the BioClean evidence indicated that there were no confirmed feedstock supply contracts in place for its project. Furthermore, no additional fractionation capacity was demonstrated to be currently available to produce the required butanes feedstock, no agreements had been made with respect to the infrastructure needed to deliver field butanes and/or NGL mix from the existing Empress straddle plants to the Edmonton area, and no contractual arrangements were in place to divert supply from Sarnia. Alberta Envirofuels described the market for field butanes in Edmonton as being tight, and indicated that it has had difficulty in obtaining supplies for its plant on occasion.

Alberta Envirofuels acknowledged that the supply and demand imbalances are not Canada-wide, but are specific to Alberta, and in particular, to the Edmonton area. It contended that additional fractionation capacity does not mean new molecules (ie. sources) of butanes. It explained that one would need a source of butanes, a delivery system for the NGL, and an infrastructure to separate out the field butanes. In Alberta Envirofuels' view, the applicant had simply stated that a 28-per cent increase in demand in this tight market would have no affect on prices, without providing the analysis specific to that market. Alberta Envirofuels submitted evidence to the contrary. Alberta Envirofuels emphasized its position that the goal of upgrading Alberta's

resources can only be assured through accurate and specific projections, or through confirmed contracts for infrastructure and supply.

Alberta Envirofuels conceded that it was assuming no change in infrastructure in the Edmonton area but that if the price were right, a butane supply could potentially be available. However, it did not consider this likely to occur for the reasons discussed in section 6.2. Further, it was Alberta Envirofuels' view that the price structure needed to attract butanes from the Sarnia market to the Edmonton area would make the economics of having both plants very difficult.

Alberta Envirofuels concluded that, if the BioClean project were to prove marginal and limp along while damaging existing businesses in Alberta, all the while precluding use of this butanes resource for other opportunities, no value would be added to this resource.

7.3 Views of the Board

The Board has reviewed the evidence provided and believes there is a substantial long term supply of butanes available in Alberta. It notes that the concern of Alberta Envirofuels as to field butanes supply in the Edmonton area, is based on a specific hypothesis that there would be no change to the existing processing capacity to produce field butanes in the future. The Board does not believe this to be a reasonable assumption in a freely operating market environment. The Board believes that the market would respond to an increased demand by installing the necessary infrastructure to move the butanes from their recovery point to where they are needed, in this case in the Edmonton area. As examples of infrastructure changes occurring, the Board is aware of the Novagas fractionator at Redwater as well as a new NGL pipeline from Northeastern British Columbia/Northwestern Alberta, both of which are currently under construction. If project economics permit, the Board would not rule out the possibility that proponents would need to rely on butanes produced in other parts of Alberta. The Board is of the view that gas production in Alberta will continue to increase above current levels which should assure the long term supply of NGL. Therefore, the Board is confident that there is and will continue to be sufficient field butanes available to meet the current needs as well as to accommodate the BioClean project over the requested term.

8 PROJECT IMPACTS

8.1 Flaring

8.1.1 Views of BioClean

BioClean stated that it does not expect flaring to be a concern at its proposed facility. It noted a number of factors that would minimize the number of occurrences of flaring and make its proposed project unique compared to other industrial facilities in the area. Given that flaring would only be required in emergency situations, the flare would not operate continuously and would not be used to vent or burn waste fuel. BioClean pointed out that the emergency situations that can cause flaring typically result from a power loss, a steam loss, an equipment malfunction, or a process upset. It noted that a complete loss of power or steam accounts for over 90 per cent of the flaring at these types of plants. BioClean noted steps that would be taken to minimize potential emergency situations. It noted that its proposed project would have essentially 100-per cent redundancy in the steam system through the installation of three back-up steam boilers. Therefore, it would be able to maintain the steam balance within the system by adding boilers as necessary in the event the steam source (from the co-generation unit) were lost. The electrical system would also have three independent sources of electricity. If one source should fail, the plant could still be run on power from the other sources without having to depressure the system to the flare. A third benefit of its process was that it would be able to accommodate an emergency shutdown of the ethers plant and continue to process the hydrogen-rich gas stream instead of flaring.

BioClean emphasized that its "fourth generation" technology is quite advanced compared to earlier technology such as that used at Alberta Envirofuels' plant. This generation of technology calls for more rigorous specifications and the incorporation of process improvements that have occurred over time. As a result, BioClean concluded that the potential for flaring would be greatly reduced, although it could not guarantee no flaring whatsoever. In the event of an emergency, the extent of flaring would be a 5- to 10-minute release to depressure certain critical equipment. Under normal circumstances, there would be no flaring during start up and during ongoing operation of the facility. Based on the extreme lengths to which it was going to prevent flaring, BioClean stated that its facility would have a better performance record than existing plants such as that of Alberta Envirofuels, which it noted had a good track record and very few complaints.

With respect to stack height questions, BioClean responded that the flarestack was required to protect the plant and the personnel and was designed to American Petroleum Industry (API) standards.

8.1.2 Views of the Interveners

The Local Residents indicated that flaring is one of their biggest concerns. They expressed their distrust of BioClean's flare because of their experiences with other plants in the area. They noted that, while Dow had promised that there would be only occasional flaring associated with its facility, in fact, residents experienced continuous flaring which caused "appalling" levels of light, noise, and vibration as the ethylene plant began to operate. One resident mentioned that, at its worst, the Dow flare rattled her windows and forced her and her husband to leave their home in order to find some peace and quiet. The Local Residents also expressed concern about the unacceptable height of BioClean's flarestack which in their view was unnecessary

8.1.3 Views of the Board

The Board understands the residents' concerns about potential impacts resulting from flaring at the BioClean facility and it recognizes that these relate to or originate with their experience with previous flaring that occurred at other plants in the area. However, the Board believes that there are many differences between the nature of the proposed BioClean facility and its operations, and other plants in the area. This makes the comparison of flaring unreasonable in its view. The Board notes the many safeguards and redundancies that BioClean would incorporate to prevent the potential causes of flaring and thus minimize the number of flaring episodes. The Board further notes that flaring would normally occur only during an emergency upset and that if flaring were to occur, it would last no more than about 10 minutes. Given the design of the BioClean operation, the Board believes that the amount of flaring should be minimal during emergencies and non-existent during normal operations. Recognizing that flaring for emergencies is essential for safety reasons, the Board finds the proposal by BioClean appropriate.

With respect to the concern expressed about the height of BioClean's flarestack, the Board notes that the height of the flarestack is determined by the maximum radiant heat intensities allowed by API guidelines and therefore, is based on safety considerations.

8.2 Noise

8.2.1 Views of BioClean

BioClean carried out a noise impact assessment to evaluate if the plant could meet the requirements of the EUB's Noise Control Directive ID 94-4⁴ (ID 94-4). BioClean noted that the results from the computer modelling, conducted as part of the noise impact assessment, resulted in many conceptual design changes to equipment within its proposed plant.

To meet permissible sound levels, BioClean had pursued two strategies. The first was to use

⁴ Interim Directive ID 94-4 Noise Control Directive. Alberta Energy and Utilities Board, 12 August 1994.

noise-reduction technology to minimize the noise impacts on its surrounding neighbours. BioClean committed to achieving a design sound level some 5 decibels (dBA) below the actual permissible nighttime value to recognize and accommodate possible future industrial noise sources in the area. To augment the noise control technology options already identified within the noise impact assessment, BioClean submitted that it would meet ID 94-4 by conducting further noise impact assessments once detailed design had commenced. BioClean proposed that, as detailed design proceeds, it would be able to incorporate best available technologies that would serve to further reduce noise from the facility. For example, BioClean indicated that in the selection process between two similar pieces of equipment, it would select the quieter equipment. Consequently, final engineering would be dependent on equipment vendor selection. BioClean committed to re-analyze the data made available during detailed engineering to determine its progress in reducing potential noise levels and to advise the Board and interveners of the results.

BioClean also stated that it had pursued a land purchase strategy to create an adequate buffer between its facility and the nearby residents. Three of the closest landowners/residents to the facility would be affected by the proposal. If its project is approved, BioClean had agreement from the landowners to purchase their land or to negotiate mutually acceptable terms to allow the land to become a buffer zone.

To ensure compliance, BioClean committed to conduct a comprehensive noise monitoring survey once the plant was operational and then take whatever steps were necessary to reduce noise levels if they were shown not to comply with the provincial directive.

In response to questioning regarding flare noise, BioClean indicated that its facility would flare only under emergency conditions. (Section 8.1 discusses flaring in more detail.) The noise level would depend on flare size and intensity, but typically would be high for only a short period of time.

With respect to noise arising from transportation, BioClean committed that grain trucks would travel, and that railcar loading and unloading within the plant site would occur, only during daylight hours. This would minimize noise that could potentially be generated in the evening and nighttime hours. BioClean also committed to working with rail carriers, municipal officials, representatives of the community, and other industry operators to develop a plan that would address transportation noise on a regional scale.

In conclusion, BioClean stated that through the use of appropriate noise-control technology and adequate buffer zones, it would be able to achieve the design sound levels. Table 1 presents the nighttime design sound levels for seven residential locations committed to by BioClean along with the predicted facility sound level contribution before noise control technology is implemented. The continuing noise impact assessment process will result in the necessary noise mitigation to achieve the design sound levels which are 5 dBA equivalent continuous sound level (Leq) at night below the permissible sound levels established through ID 94-4.

TABLE 1 Predicted Noise Levels At Nearby Residence Locations Without Noise Control Technology			
Resident	Design Sound Levels (dBA Leq at Night)	Predicted Facility Sound Level Contribution (dBA Leq at night)	Nighttime Margin of Safety
Dueck	47	55	-8
Chartrand	47	50	-3
Finch	43	45	-2
Mosey	40	38	2
Yaschuk	42	49	-7
Lindsay	42	45	-3
Dzurny	42	43	-1

8.2.2 Views of the Interveners

The Local Residents expressed considerable concern that noise, both from the facility itself and from the expected increase in related transportation sources, is one of the most significant potential impacts arising from this project. They indicated that noise, together with other impacts, has already affected their quality of life in the area to a point where they have concluded that their only option is to relocate. They also indicated that noise should be reduced to acceptable levels for all residents in the area. The residents were of the view that BioClean's proposal to purchase the three existing parcels of land situated nearest its proposed facility, should be extended to the rest of the community.

The Local Residents expressed a number of concerns about BioClean's noise impact assessment. Among these was that the baseline studies conducted in the noise impact assessment did not include the residences of all of the interveners. They stated their belief that the predicted sound level contribution from the BioClean facility did not take into account the higher levels that might be caused by being downwind of the source. The residents identified construction and start-up noise as another concern that had not been addressed satisfactorily and asked the EUB to consider initiating conditions and limits to address this concern. They also expressed a concern about noise during flaring episodes. Their experience with existing industrial plants in the area suggested that such noise has been a problem and would remain so. In addition, they expressed concern about existing traffic noise and the noise impacts which increased traffic might have on the area. Finally, the residents expressed concern that, despite BioClean's efforts to minimize noise from its facility, that noise would combine with existing and future sources of noise from other industry in the area to the point where the permissible sound levels would be exceeded.

For example, there was concern expressed that the proposed TEN/CLA co-generator to be located on Dow's property would add additional noise, which it was alleged, had not been suitably accounted for in any noise impact assessment to date.

8.2.3 Views of the Board

The Board notes that BioClean has selected a design sound level for its facility which is some 5 dBA lower than the nighttime sound levels permitted by ID 94-4. This will allow for new industry, such as the TEN/CLA co-generation unit on the Dow site, to locate in the area and potentially meet the permissible nighttime sound levels. With respect to this co-generation unit, the Board notes that it will require a separate application to the Board and that the cumulative noise impacts will still have to meet the existing permissible nighttime sound levels at the nearest residences.

The Board also notes BioClean's commitment to conduct a noise survey following start-up of the facility in order to verify that the design sound levels have been met and are being complied with. The Board considers BioClean's approach of conducting periodic noise impact assessments followed by the post-construction noise survey, to be reasonable and commendable. The Board expects BioClean to report to it and the local residents about the progress of its continuing noise impact assessment program.

The Board is aware of the residents' concern relating to construction and start-up noise and agrees that this concern should be addressed, although some measure of elevated noise during construction should be expected. While ID 94-4 is not applicable to construction and start-up noise, the Board would expect BioClean to take the following reasonable mitigative measures to reduce the impact of construction and start-up noise at nearby residences:

- limit construction activities which result in elevated off-site sound levels to daytime hours (7:00 a.m. to 10:00 p.m.),
- advise nearby residents of significant noise-causing activities and schedule these to create the least disruption to the residents,
- ensure that all internal combustion engines are fitted with appropriate muffler systems, and
- take advantage of any obvious acoustical screening on site to shield residential locations from construction equipment noise.

The Board will also expect a quick and effective response by BioClean to any noise-related concerns expressed by residents in the area.

While the Board understands that the residents would prefer having an actual sound level

measurement at each of their residences, it does not believe this is necessary. BioClean's approach is acceptable to the Board for determining compliance with ID 94-4. In addition, the Board believes that the noise assessment does adequately account for predicted sound levels downwind of the source. With respect to flare-related noise, the Board concludes that such noise should not be a problem at the BioClean facility. For the reasons discussed in section 8.1.3, the Board concludes that there should be a minimal number of flaring episodes and that, while a flaring episode itself could be relatively noisy, it would be for only a short duration. In summary, the Board expects BioClean to incorporate all commitments made to limit noise from its facility, and subject to that undertaking, is satisfied that BioClean can meet the requirements of ID 94-4.

8.3 Air Emissions

8.3.1 Views of BioClean

BioClean stated that in general, air emissions from its facility would be relatively minor and would be within the limitations imposed by Alberta Environmental Protection's (AEP's) regulations. To confirm the expectation, it categorized emissions into three sources: continuous, intermittent, and fugitive, although no intermittent sources were identified. These sources were quantified and used as the input for the plant-wide dispersion modelling study, which was used to determine environmental impacts and verify compliance with the Alberta Environmental Protection and Enhancement Act⁶.

The major continuous emission source associated with the ethanol unit would be the dryer system which would use natural gas in direct-fired rotary drum dryers. The exhaust gases would be recycled to the combustion zones in order to reduce combustion temperatures, and improve overall combustion efficiency. The net exhaust gases would be passed through a water scrubber prior to discharge to the atmosphere in order to reduce VOC and particulate emissions. The pollutants emitted would include low levels of sulphur dioxide (SO₂), NO_x, carbon monoxide (CO), hydrocarbon, and particulates. Continuous emissions from the barley milling section and pneumatic transfer systems, as well as general milling and grain elevator dust control systems could also be a significant continuous emission source of fine particulates. BioClean noted, however, that all exhaust air systems would be equipped with high-efficiency fabric filters that are guaranteed to have a 99.9-per cent mass efficiency rating on the dust laden incoming air stream. The on-site co-generation steam boiler, located adjacent to the ethanol plant, would operate at only 40 per cent of its rated capacity during normal operation in order to maintain spare capacity for short periods when the main co-generation system is down for maintenance. This boiler would emit low levels of SO₂, CO, NO_x, and hydrocarbon. BioClean noted that it has provided for the use of state-of-the-art low NO_x burners in order to minimize NO_x emissions. Another source of combustion emissions of SO₂, CO, and NO_x, would be the TEN/CLA gas turbine which would be located adjacent to the ethanol plant. This gas turbine would generate a

⁶ Alberta Environmental Protection and Enhancement Act, S.A. 1992, c. E-13.3.

portion of the electricity used by the BioClean facility (about 10 MW) and would operate for only 5 to 8 hours daily to minimize the impact of the cost of on-peak electricity from the electrical grid. It would also be used to provide back-up power if the on-site steam turbine generator was down for maintenance.

The major continuous emission sources for the methanol, MTBE, and ETBE portions of the facility would be the process-fired heaters which would use natural gas and by-product gas as fuel. These heaters would emit SO₂, CO, NO_x, and CO₂. BioClean noted that current low NO_x burner technology can achieve emission levels well below those mandated by current laws and regulations. The vent gas from the continuous catalyst regeneration system would include CO₂, NO_x, and very small amounts of hydrogen chloride and chlorine. BioClean indicated that organic chloride would be used as a catalyst promoter in the butane isomerization process. It would be converted into hydrochloric acid (HCl) and would be all contained in the stabilizer offgas stream. Caustic scrubbing would be used to remove HCl before sending the stream to the fuel gas system and no measurable quantities of HCl or organic chloride would be expected to be emitted to the atmosphere from the butane isomerization process.

In order to minimize fugitive emissions of VOCs, BioClean stated that it would design and build its facility to comply with the C.C.M.E.⁷ "Environmental Code of Practice for the Measurement and Control of Fugitive VOC Emissions from Equipment Leaks". This includes practices for the application, performance, testing for compliance, record-keeping, and measurement of emissions. In BioClean's view, the application of these practices would significantly reduce fugitive VOC emissions from equipment leaks.

BioClean recognized the concerns raised by interveners about leaks in the chlorine system. To help minimize any chlorine emissions, BioClean indicated that it planned to use special leak-proof valves instead of flanges and to employ a stringent monitoring system to maintain control. It noted that chlorine would be received at the site in cylinders and whatever was not physically consumed in the process, would be scrubbed out to prevent it from entering the atmosphere. BioClean pointed out that chlorine is used as a disinfectant in the water treatment business and therefore its handling is well understood. By normal standards, BioClean's chlorine-injection facilities are small. It further noted that there had not been any reported release of chlorine from other similar types of plants (MTBE) in North America. BioClean indicated the amount of chlorine to be brought on site and used would be a very small quantity, less than would be used in most municipal swimming pools. It also noted that chlorine would not be brought to the site in bulk.

BioClean anticipated no adverse impacts on the cumulative ambient air quality in the adjoining airshed. It submitted that the long term concentrations of CO, NO₂, SO₂, and total suspended particulates (TSP) would be well within the AEP guidelines. While it expected the short-term average concentrations of CO, NO₂, and SO₂ to be well within AEP guidelines, it noted that

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there could be marginal exceedances of the 24-hour average cumulative TSP concentrations on some occasions near the east side of the grain-handling plant boundary. BioClean emphasized that it would be using best practical control technology (ultra-high efficiency baghouses and scrubbers) at its ethanol and grain-handling plant to control dust emissions. See section 8.5 for more details. BioClean anticipated that its facility would have a low or no incremental impact on ground-level ozone directly and that its emissions of NO_x and hydrocarbons which can contribute to ground-level ozone formation, would be low. BioClean noted that its facility would not emit any ozone. In the larger scheme of things, BioClean noted that its ether products have been proven to reduce the NO_x and VOC emissions from automobile fuel combustion; and hence by analogy, the formation of ground-level ozone.

8.3.2 Views of the Interveners

The Local Residents requested "that the air emissions from the facility be reduced and monitored very closely". Particular concern was expressed regarding chlorine gas leaks, given the incidents of such leaks at other plants in the area. One resident mentioned an incident in July 1997, which caused severe irritation and swelling of his eyes. Another resident summed up her view on air pollution by stating that "with the combination of all the plants in [the] area, I no longer feel safe in my home."

Mr. Anez indicated that his concerns related to the emissions from the flare and other parts of the facility as well as the potential to recover flue gases.

8.3.3 Views of the Board

The Board recognizes that the BioClean facility would incorporate significant design features to prevent or limit emissions. Emissions are expected to meet all AEP air quality guidelines and requirements and the cumulative impact of the facility on the airshed is expected to be relatively modest. The Board also notes that BioClean intends to utilize the latest technologies, such as low NO_x burners, to help minimize emissions. Stringent ambient air quality monitoring is expected to be ongoing to ensure the BioClean facility remains in compliance in future. Therefore, the Board concludes that the impacts of the facility's emissions would be acceptable. In addition, the Board appreciates that the ether products, when used as a fuel additive, would generally help to reduce air pollution in other jurisdictions.

Respecting the residents' concerns about chlorine leaks, the Board notes that the amount of chlorine to be used on site is very small, will be purchased and delivered in cylinders, and that BioClean will use special components to minimize the potential for fugitive emissions. The Board does not see as appropriate a comparison of this facility to other operations in the area where chlorine gas is produced on site.

8.4 Odours

8.4.1 Views of BioClean

BioClean indicated that, while its ethanol plant has a fermentation process, it is not a brewery. Given that it captures and reuses the CO₂ that would normally be vented to atmosphere, the odours associated with fermentation are minimized. Another key aspect was the proposed ethanol manufacturing technology which allows for a 90-per cent reduction in the amount of VOCs released from the dryers compared to other technologies, thus reducing the odours associated with the drying step. BioClean noted that it would also install water-scrubbing systems to treat the exhaust-gas stream from the dryers, thus reducing particulate emissions and further reducing that source of odours. BioClean stated that it would install floating roofs on the main tankage and vapour recovery systems at the ethanol rail-loading station in order to minimize odours associated with hydrocarbon fugitive emissions.

8.4.2 Views of the Interveners

The Local Residents were sceptical about emissions from the proposed facility and indicated that any level of odour was unacceptable. Concern was expressed that there was no guarantee that things would work as promised, and there appeared to be no evident mechanism to address the concerns.

8.4.3 Views of the Board

The Board appreciates that any significant odours, either continuous or intermittent, present a serious irritant to local residents. However, the Board believes the essentially closed-loop nature of the MOP process offers some advantages over other processes. It reduces venting which is a potential source of odour problems. Further, the Board notes that BioClean will employ technologies that will minimize releases of VOCs and particulates which are other potential odour sources. Given these features, the Board believes that odours should not be significant enough to present a problem at the BioClean facility.

8.5 Dust

8.5.1 Views of BioClean

BioClean submitted that the main source of dust from its proposed facility is the grain-handling area. It stated that good housekeeping is critical to control dust at any grain-handling facility and that it would be rigorous in its housekeeping measures. BioClean stated that its grain-handling equipment would be state-of-the-art compared to similar other such facilities in Alberta. To begin with, the high rate grain unloading systems would be located indoors. It indicated that trucks carrying grain to the facility would have to be covered and that they would travel on paved roads both outside and inside the facility. Both rail and truck unloading would take place inside a building where the air would be filtered to control dust. In addition, all conveyors and

pneumatic handling systems for moving the grain would be enclosed and have dust removal equipment associated with them.

BioClean noted that ConAgra would provide management operations oversight of the elevator, which was based on its established record and considerable experience in operating existing world-class elevators. BioClean emphasized that a unique aspect of an ethanol plant is that most of the dust associated with grain is in fact starch which is intended for conversion to ethanol. Since all of the dust collected would become feedstock for the ethanol process, there is an economic incentive to minimize dust emissions. BioClean also emphasized that it would be using the same, more stringent dust emission standards used for chemical plants in its design of the grain-handling facility. It viewed this as being unusual in the grain industry.

Notwithstanding that there would be an increase in dust emissions as a result of the grain-handling facility being on site, BioClean noted that its dust emissions would be within the permissible limits established in Alberta's ambient air guidelines. The only exception to that was one small area on the east side of the plant site where the particulate emissions would be close to the guidelines. However, BioClean indicated that it was still reviewing types of baghouses as well as the possibility of installing an even higher efficiency type of bag and filters than was used in the design and modelling for the facility. In its view, dust would not be a major issue or even noticeable to the public as long as the roads were paved and the operation was being run correctly.

8.5.2 Views of the Interveners

The Local Residents expressed concern about dust from BioClean's facility as part of their overall concern about emissions.

8.5.3 Views of the Board

The Board believes the very strict dust control measures which BioClean would incorporate into the design of its facility are appropriate. Among the more progressive measures are the use of buildings to enclose loading and unloading equipment and very high efficiency dust filters. Given these measures, the Board does not consider that dust should be a problem. The one area where dust deposits may exceed the accepted levels, would be on BioClean-owned land. While BioClean appears to be considering some remedial design measures to address the issue, the Board would expect BioClean to monitor this area after facility start-up to determine whether a dust problem actually exists. The Board would expect BioClean to address the issue to remediate any problem found.

8.6 Rail and Road Traffic and Local Residents' Access

8.6.1 Views of BioClean

Rail access to BioClean's site would be required for the import of grain, liquid hydrocarbons and to export grain, grain by-products, and hydrocarbon products. BioClean anticipated that natural gas, nitrogen, hydrogen, and field butanes would all be supplied to the project by pipeline. In turn, the majority, if not all, of the product would be exported from the site by pipeline.

BioClean estimated that 3 to 4 one-hundred-car unit trains per week would service its facility. Two new sidings capable of handling these unit trains would be constructed with connections to both the CN and CP Railway. BioClean indicated that the marshalling of all the rail cars on its site would be carried out by a locomotive owned and operated by the facility. This operation would be completely segregated from any rail traffic on the CN Railway mainline. BioClean stated that the shunting of rail hopper cars would occur only on BioClean-owned land although CN might push rail cars across Range Road 220 once it takes possession.

BioClean also estimated that between 50 and 100 trucks per day, depending upon the average truck capacity, would deliver grain to its facility. To address concerns from homeowners that the truck traffic would be closer to the residences along existing roads and to minimize the noise and impact of the trucks, BioClean subsequently proposed to relocate the truck access to its plant. The proposed new roads would run on the north side and parallel to the CN Scotford siding. Based on its traffic studies, BioClean concluded that the intersection of Highway 15 and Range Road 220 would also require some improvements to better accommodate the turning of BioClean's staff accessing the site. Its traffic study also recommended improvements to the intersection of Secondary Highway 830 and Highway 15, and closure of Range Road 215 at approximately the north boundary of the proposed rail right-of-way to Highway 15.

In summary, it was BioClean's view that the traffic and access concerns of the local residents could be managed by implementing its proposed road changes regarding access to its site and twinning Highway 15. However, BioClean indicated that its understanding was that Alberta Transportation and Utilities would extend the twinning of Highway 15 to east of Range Road 214, but that there was still a process and other discussions which the government would have to complete before the twinning could occur.

8.6.2 Views of the Interveners

The Local Residents considered themselves to be innocent parties because they would have to absorb the impacts of the project yet they were in the area long before industry encroached. They emphasized that if the BioClean project were approved and built, they would be completely surrounded by heavy industry. In their view, this, coupled with the impacts of increased truck and rail traffic associated with the BioClean project, would make an already dangerous situation much worse if a disaster were to occur because of the nature and proliferation of industrial facilities in the area and the lack of access/escape routes for the residents. The Local Residents provided illustrations of the problems they currently experience in accessing and leaving their homes due to the existing train movements and rail traffic.

8.6.3 Views of the Board

The Board appreciates the concerns raised by residents about the traffic and access, and believes

that BioClean's proposed truck access to its site, in conjunction with the twinning of Highway 15 and the intersection improvements, should help to minimize the road access/egress concerns. The Board also agrees with BioClean that closure of Range Road 215 is required for safety reasons. The Board notes BioClean's commitment to not cross Range Road 220 when shunting its hopper cars; although it recognizes that BioClean cannot be responsible for CN's train or car movements on its mainline. The Board expects BioClean to use its influence to bring this concern to the attention of the railroad.

8.7 Visual Impacts/Buffer Zones

8.7.1 Views of BioClean

BioClean submitted that it would maintain a green belt around its facility. The soil from the construction areas would be removed and bermed at the edges of the property for reclamation at a later date. Trees would be planted around the plant site in order to create a buffer between the plant and residences to the north, Range Road 220, and Highway 15. BioClean also indicated that it would use any other land that it purchased to buffer the effects of the facility on neighbouring property owners. In its view the proposed site would minimize the impact on the local residents and the community.

BioClean rejected the need to apply a 3-kilometre (km) setback advocated by some residents. It stated that it had been advised by County officials that its proposed location was appropriate for a facility of this type and that it had adhered to County policy for buffers. BioClean indicated that part of its site had been zoned for heavy industrial use for a significant period of time. It noted that it had received the rezoning of the remainder of its site in the appropriate forum and in the appropriate manner, which included a public hearing. It understood the 3-km buffer zone applied to residential areas and the area adjoining its facility is not considered such an area. In response to questioning, BioClean indicated that it had paid attention to what other facilities of this type have done in other areas of North America and that its project is consistent with good land-use policy in its view. Respecting future expansion of its buffer zone, BioClean indicated that it would have to be within the context of the foreign ownership restrictions imposed by the Agricultural and Recreational Land Ownership Act⁸, and involve further discussions with some of its industrial neighbours, the municipality, and the Province. While it hoped that some sort of a much broader buffer zone policy could ultimately be implemented, BioClean argued that it could not be the only one to carry that policy forward.

⁸ Agricultural and Recreational Land Ownership Act, R.S.A. 1980, c. A-9.

8.7.2 Views of the Interveners

The County indicated that the sector to the east of Fort Saskatchewan and north of Highway 15, also referred to as the Scotford Heavy Industrial Area in its Municipal Development Plan, represented an area designed to accommodate major industrial developments. It stated that BioClean's proposed development site had been the subject of a municipal development plan and land-use bylaws, and after a formal public hearing, was designated for heavy industrial use in November 1996. The BioClean site was found to represent a perfect location for an industrial development of this nature. It further stated that no lands within the north-east industrial area are specifically zoned or planned for residential development, although a number of smaller parcels are located to the north of the proposed development site, mostly within an area designated for potential industrial use in the municipal development plan.

The County noted that traditionally 10 or 12 years ago, agricultural lands were viewed as being a natural buffer to heavy industry. It indicated that its present Municipal Development Plan provided for a 3-km buffer between heavy industrial use and existing and future residential development, unless an environmental impact study demonstrated to the County's satisfaction that a lesser separation was warranted. However, in no case could future industrial sites be located less than 1.5 km from lands designated for residential use. It also indicated that the Scotford area is an area in transition, an area where the County currently has no lands zoned residential and has no plans to classify any lands zoned residential. Its long term plan is to ensure that this industrial area is well protected and isolated from residential uses.

The County stated that it had initiated a review of its municipal development plan. Under new provincial land-use policies which replace the regional plan, there is greater flexibility to conduct a comprehensive review of land based on all development factors. In this area, key considerations for future policy recommendations include existing and planned adjacent heavy industrial use, pipelines, geotechnical conditions, and road and rail access. Lands which remain as potential industrial or agricultural within the north-east industrial area will be reviewed and may be considered for medium or heavy industrial uses in the future.

The Local Residents considered that existing land-use conflicts and the impacts from encroachment by existing and new heavy industrial projects on their residences must first be addressed and resolved before the approval of any new projects or the expansion of existing facilities. They asserted that any new or additional expansions would further affect their quality of life and add to the cumulative impacts which are already unacceptable. They emphasized that the land on which the BioClean project would be built currently acts as a buffer to the residents to the north.

Mrs. Schotte, one of the Local Residents, noted that the "General Municipal Plan, now the [Municipal] Development Plan, refers to the 3-km [buffer] distance that shall be maintained between heavy industrial and existing and future residential development". She disagreed with the County's statement that there was no residential development in the area affected by the heavy industrial sites. She indicated that she had served on the Municipal Planning Commission in the past and that she was assured that the definition of residential meant all residential development including rural, residential, and small holdings and not just urban residential as the County was now interpreting it. She quoted from the County bylaws and stressed that the Planning Commission should establish use on the basis of the use and compatibility of neighbouring lands and land-use districts. She further referenced both the County bylaws and Major Industrial Accident Council of Canada (MIACC) Land-Use Planning Guidelines stressing the importance of avoiding or eliminating land-use conflicts.

They also objected to the County rezoning a valuable piece of agricultural land to industrial when many acres of vacant land having poor topsoil conditions existed in the northeast part of the county.

8.7.3 Views of the Board

The Board takes no position on the 3-km setback. It can accept the position of the County on the interpretation of the Municipal Development Plan. While the current plan appears to present some anomalies, the Board believes they can and should be addressed as other land-use conflicts in the area are addressed.

The Board notes that the BioClean project would be located on land zoned for industrial purposes. The Board also notes that the rezoning that was required was done through a public process pursuant to the bylaws of the County. The Board believes that an adequate buffer around the facility will be necessary to minimize the project's adjoining impacts and desirable from an aesthetics point of view. BioClean's facility will represent a further visual intrusion on adjoining residents, although it appears to have provided adequate land surrounding the site to buffer unacceptable impacts.

8.8 Other Impacts

8.8.1 Views of BioClean

Water Use and Discharge - BioClean submitted that it would obtain its total plant water requirements from a municipal water system, either through the Strathcona County Raw Water System or the Fort Saskatchewan Industrial Water System. Waste water would be directed to a municipal sewage collection system for eventual transfer and treatment in the Capital Regional Sewer Commission System. BioClean submitted that there would be no process liquid effluent produced from the ethanol unit because of the high level of re-use and recycling of water within the process. Overall, it noted that its facility would produce only very small quantities of liquid

and waste water streams requiring disposal. BioClean pointed out that there would be no sewer outfall from its site into the North Saskatchewan River.

In order to minimize the impact on groundwater, BioClean submitted that waste-water holding ponds would have synthetic liners and a sub-drain system. The storage tank areas (for methanol, MTBE, and ETBE) would be located in a bermed area having both clay and synthetic liners. There would also be a comprehensive monitoring system installed consisting of a number of monitoring wells which would measure the groundwater and take samples around the facility to check for leakage. BioClean noted that this was a normal, well understood procedure used by other industries in the area.

Fog - BioClean submitted that the impact caused by fog arising from its cooling towers would be minimal. It stated that the towers were quite insignificant compared to those of other industries in the area and that it would be using air coolers for certain process cooling requirements to further limit the impact.

Wastes - BioClean submitted that the MOP process essentially eliminates waste of feedstocks by using virtually 100 per cent of the raw materials. It noted that minor amounts of other wastes, such as spent caustic, spent catalysts, sour process condensate, and condensed moisture from the flare knockout drum, would be produced by the facility. These would be collected and either removed by a licensed waste-disposal company or recycled offsite as appropriate.

Health and Safety - BioClean submitted that it would operate its facility in a manner that would facilitate the protection, safety and well-being of its plant personnel and its rural and industrial neighbours. Section 9.1 discusses emergency response planning for the facility. BioClean indicated that an independent safeguard system would be installed, in addition to the Distributed Control System, which would guard against plant equipment or associated instrumentation malfunctions which could present hazards to workers, rural residences, or cause high economic loss.

Lighting - BioClean did not specifically address the concerns raised by one of the Local Residents concerning the off-site impacts of lighting during either the construction or operational phase.

8.8.2 Views of the Interveners

The Local Residents expressed a general concern about the effect of existing industry on their stress levels, health, and safety and indicated that they were opposed to any further expansions of these plants or new industry development because it would add to the effects on their health, safety, and environment. By way of example, one resident noted the serious danger posed by past chlorine leaks from existing plants, which had forced some of them to seek medical attention. Another resident indicated that the neighbourhood seemed to be in a constant state of emergency and that he had been forced to seek therapy to deal with this industry-caused stress. Another resident stated that "... they no longer have fresh air or quiet nights." One local resident

requested the Board to stipulate that construction lighting and normal lighting of the facility not interfere with local residences.

8.8.3 Views of the Board

The Board concludes that, because BioClean would be using existing municipal systems for its water supply and effluent discharges, there should be no related problems or impacts associated with its facility. With respect to groundwater, the Board concludes that BioClean's proposed protective measures, such as the use of dikes and liners for tanks, and a groundwater monitoring system, would provide adequate protection as well as an early warning if a problem were to occur. The Board is satisfied that fog caused by cooling towers at this facility should not cause any material impact on local residents. The Board is also satisfied that BioClean would design its facility with the health and safety of its workers and the local residents in mind, and that this will not be a problem area. To address lighting, both during the construction and operational phases, the Board expects BioClean to design its facility to minimize sky glow and ensure that light trespass does not unduly impact nearby residences. The Board recognizes, however, that a prudent measure of lighting at the site will be necessary for safety reasons.

Notwithstanding those positions, the Board acknowledges the concerns of residents with the gradual deterioration of lifestyle in the area caused by industrial expansion. While the impacts to be caused by BioClean at this time are possibly less intrusive than those of other major industrial sites, the cumulative impact represents a significant invasion on the lifestyle of the residents. In the Board's view, the only realistic option to deal with these concerns is to address the general land-use concerns identified in section 10.

9 SAFETY CONCERNS

9.1 Emergency Response Planning/Risk Assessment Need

9.1.1 Views of the Participants

BioClean submitted that it was working through the Northeast Region CAER⁹ Association (NR CAER) to produce a coordinated mutual aid emergency response plan to address public safety concerns about its plant. This plan brings together 60 members and four existing mutual aid plans for the area. The plan will ultimately coordinate all emergency response plans in the Northeast Region and follow the Canadian Standards Association's Emergency Response Planning Guideline, as well as meet the Canadian Chemical Producers Association's Responsible Care Community Awareness and Emergency Response Code of Practice. The plan would be developed with the participation of residents and citizens in the area as well as outside emergency response planning expertise to ensure it meets all necessary expectations.

The County, a key player in the NR CAER system, confirmed the working relationship with BioClean. It noted the commitment of BioClean given that it was the first company to

⁹ Community Awareness and Emergency Response.

participate in the NR CAER process prior to the construction of the plant. The County indicated that NR CAER has already produced an emergency response planning document for the area which was available for public review, in any firehall in the County or in any one of the industrial facilities that is a member. The County also stated that the public plays a key role in NR CAER activities including emergency response planning.

The Local Residents stated that they "... no longer feel safe in the area..." in view of the incidents, such as chlorine leaks, that have occurred recently. They maintained that the proposed BioClean facility needs to have a complete risk assessment conducted in accordance with the MIACC Risk Assessment Guidelines (MIACC Guidelines). They indicated that, using the MIACC Guidelines for the project would ensure that the emergency response plan is effective.

9.1.2 Views of the Board

The Board is satisfied that BioClean, in conjunction with NR CAER, will be able to develop an effective emergency response plan, with input from potentially affected residents, that will meet or exceed industry standards. The Board believes that in applying the MIACC Guidelines to the proposed facility, the potential risk to the public can be quantified and this should help to reduce the concerns of the residents regarding safety. The Board expects BioClean to develop such a plan and satisfy the Board prior to plant startup that its operating personnel are capable of implementing the measures proposed.

10 LAND-USE CONFLICT

10.1 Views of BioClean

BioClean indicated that it had met frequently with the residents, municipal officials, and other companies regarding land-use conflicts and had worked diligently to find solutions. It stressed its belief that the process set up by the County would ultimately lead to a successful conclusion because the parties involved genuinely wanted to see a resolution. BioClean reaffirmed its long-term commitment to work with the municipalities and the other industry stakeholders to further the process and seek a satisfactory resolution.

10.2 Views of the Interveners

The County stated that it was aware of the landowners who reside in the area who have brought forward issues which relate to impacts beyond the BioClean application. It stated that the request of the landowners for an opportunity to have their properties purchased so that they could relocate raised considerations that go well beyond the traditional municipal role. However, the County acknowledged the unique land-use circumstances of the area, including the long term regional benefits of existing and potential industrial development in this area, as well as the significance for the Province as a whole. Therefore, the County has agreed to work with

the major industries in the area, the City, the provincial government, and any other potential participants in order to reach a solution. The County viewed itself as acting as a facilitator/coordinator between the residents and industry through meeting with the residents, understanding their concerns, and trying to identify proposals which would address those concerns. It noted for the record that it supports the resolution of the long term land-use issue because of the general agreement among all parties that this area will only be for industrial use in the long term.

The County indicated that discussions which had taken place to date were largely at an administrative level. A working group had been established that consisted of representatives from the County, the Fort Saskatchewan Regional Industrial Association, Shell Chemicals, Shell Canada Products Ltd., Dow, and BioClean. The County also indicated that it had participated in some discussions with the City and that there had been some discussions between industry and the provincial government. It noted that the provincial government would also be invited to participate in the working group. At the time of the hearing the County had tabled a possible framework for a solution with a core group of potential industry participants. However, this group was still reviewing the nature and extent of its involvement. Ultimately, a draft letter of intent would be prepared on behalf of the group, outlining a possible offer to address the residents' concerns. It noted that final organizational arrangements remain to be worked out and a negotiation process which neither advantaged or disadvantaged the residents still had to be determined. Until the group of potential participants sorted out among themselves what their position was going to be, it would be very inappropriate to make the nature of the discussions public. The County estimated that it could take a further 4 to 6 months for completion of this organizational process and expected negotiation with the residents to follow.

The County also indicated that it had met with some of the residents and had kept them apprised of the progress of the initiative. In response to questioning about having a neutral person to chair the group, the County indicated that this should be the group's decision.

The City agreed that it was appropriate for the County to take the lead role in finding a solution to the concerns of the residents, since both the proposed project site and the affected landowners were located in the County. The City also indicated that it already works closely with the County in a number of areas, and it expressed its willingness to participate in all discussions relating to finding a solution to the residents' concerns. While, in its view, such a solution would be difficult to find and negotiations could take from 6 months to a year to complete, the City was confident that a solution could be found. However, it cautioned that a thorough review of the consequences of whatever final solution was reached would be required to ascertain potential impacts on other municipalities and other industry in other regions.

The Local Residents stated that it was incomprehensible for BioClean's application to be dealt with now when the outstanding land-use issues have not been fully addressed and a solution implemented. Despite their discussions with the County and the possible process that could lead to the purchase of their properties, the residents had little or no confidence in that process. They maintained that the lack of progress and the reluctance of the parties to engage the residents in the initiative were clear signs that the parties have little commitment to address their concerns. They requested the Board to postpone consideration of this application and involve itself more in a resolution of the land-use problem. The Local Residents viewed the Board as having the

responsibility as well as the power to rectify this conflict. Therefore, they asked the Board to be instrumental in the directing and choosing of a neutral chairperson, mutually acceptable to all stakeholders, and to include all landowners in these talks.

10.3 Views of the Board

The Board understands and is sympathetic to the concerns of the Local Residents and notes their ongoing interest to relocate. The Board continues to be of the view that the relocation of the residents in the area offers the only viable long term solution to the growing industrial encroachment in the area.

The Board also notes the residents' belief that the resolution of these problems lies within the Board's jurisdiction and their request for the Board to take a more active role in finding a solution. Based on the regulatory role defined by its governing statutes, the Board does not believe it appropriate for the Board to take on an active role in dealing with options proposed by the residents. The Board notes that BioClean's proposed project will be located on land zoned by the County for major industrial developments and that the proper procedures were followed by BioClean in rezoning the additional land it required. The Board also notes the County's long-term plans to maintain this area exclusively for industrial use. Therefore, the Board remains of the view that the resolution of the land-use conflict issues must rest with the local and provincial governments working in consultation with the local industries.

The Board notes the County's recognition of the land-use problems and its willingness to take a leadership role in facilitating an overall solution among the various stakeholders. The Board is encouraged that a collaborative process with all affected parties has been started that should result in an offer for consideration by the residents. While the Board understands the residents' frustrations at the apparent lack of progress, it can accept that a proper terms of reference and framework has to be agreed to among proponents before a settlement formula can be negotiated. Given the evidence by the County, the parties appear to be willing to work to find a solution. In the Board's view the timely resolution of the land-use conflict is paramount to the long term prospects for development in the area.

11 DECISION

Having carefully assessed all of the evidence on all of the issues, the Board believes that the impacts of the proposed project can be satisfactorily mitigated and the development is in the Alberta public interest. The Board will approve the project and issue an industrial development permit to CE Alberta BioClean Ltd., subject to receiving the approval of the Lieutenant Governor in Council. The following conditions will be applied:

1. BioClean will satisfy the Board that satisfactory corporate and financial arrangements are in place to develop the project in advance of the start of construction.
2. BioClean will satisfy the Board that a satisfactory emergency response plan has been developed and implemented before the start up of the project.

DATED at Calgary, Alberta, on 19 January 1998.

ALBERTA ENERGY AND UTILITIES BOARD

<Original signed by>

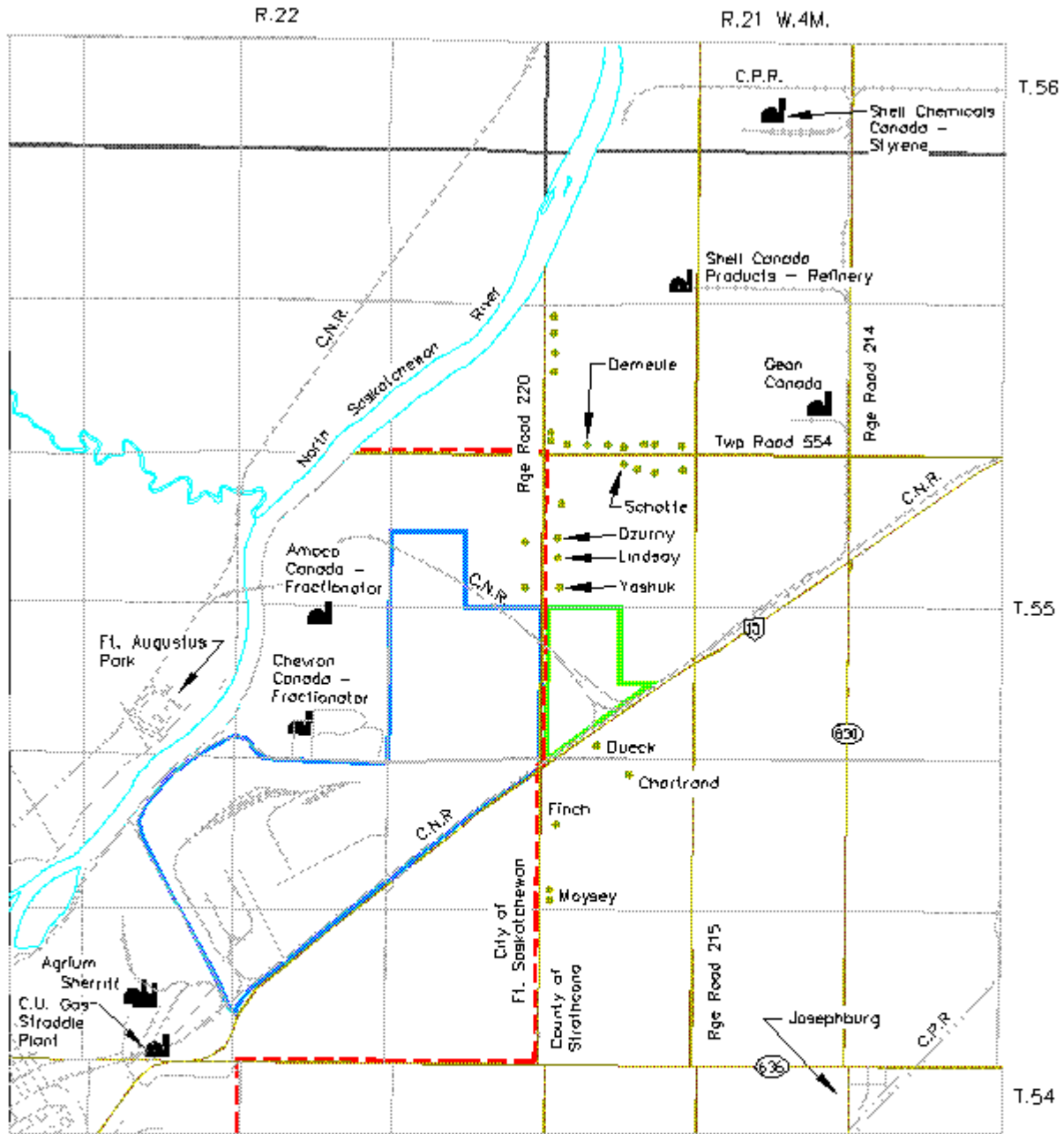
F. J. Mink, P.Eng.
Presiding Member

<Original signed by>

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

<Original signed by>

W. J. Schnitzler, P.Eng.
Acting Board Member



LEGEND.

-  Existing Petrochemical Plant
-  Dow Chemical Canada Complex
-  Proposed Bioclean Site
-  Residents Indicated In Application

**PROPOSED BIOCLEAN PLANT SITE AND SURROUNDING AREA
FORT SASKATCHEWAN AREA**

Application No. 960864

Decision 98-1

CE Alberta Bioclean Ltd.

APPENDIX OVERVIEW OF MOP PROCESS

The MOP process represents a unique integration of existing, fully commercialized, process operations to convert barley, a renewable resource, and field butanes into ethanol, methanol, and their ether derivatives, MTBE and ETBE in a fully integrated complex. Offgas CO₂ from the fermentation process would be combined with offgas hydrogen recovered from the dehydrogenation unit to substantially reduce the quantity of natural gas required as feedstock for the methanol plant. The process would be essentially a closed-loop in which offgases from one area would be used as feedstock and/or fuel in another area in order to minimize emissions. The process can generally be divided into two parts, the agricultural side and the chemical-producing side as described below, along with a simplified process description.

The agricultural side consists of barley handling equipment and milling equipment to separate out the hulls, an elevator for barley storage, equipment for drying the DDGS which results from producing the ethanol, and an ethanol plant. Rail car and truck loading and unloading facilities as well as pneumatic systems for transporting barley hulls and DDGS and a CO₂ liquefaction plant for recovering the fermentation by-product CO₂ would also be necessary.

Barley feed received at the plant would be processed in a conventional ethanol fermentation plant to produce anhydrous ethanol, by-product CO₂, DDGS and barley hulls. The ethanol would be subsequently used in the production of ETBE; the CO₂ would be compressed, liquefied, and used as feedstock in the production of methanol; and the DDGS and barley hulls would be sold as a high quality animal feed supplements to the U.S. Pacific Northwest and local markets.

The chemical-producing side consists of a number of different units leading to the production of the ether products. The field butanes, which consist of about 65 per cent normal butane and 35 per cent iso-butane (*i*-butane), would be first separated into components in the De-isobutanizer column. A small amount of pentanes-plus would also be recovered as a by-product and sold off-site. The n-butane would subsequently be fed to a Butamer unit for conversion to *i*-butane, which is combined with the *i*-butane recovered from the De-isobutanizer column and sent to the Oleflex unit. Here, the *i*-butane would be converted into isobutylene and by-product hydrogen. This hydrogen would be used as feedstock in the methanol unit. A small amount of natural gas would be steam reformed in the methanol unit to supplement the by-product feedstocks in order to produce the required amount of methanol. The resulting methanol, and the ethanol from the fermentation plant described above, would then be processed with the isobutylene in parallel Ether-Synthesis units, to produce high quality MTBE and ETBE products which would be shipped to market by pipeline.