



Environmental Appeal Board

Fourth Floor 747 Fort Street
Victoria British Columbia
Telephone: (250) 387-3464
Facsimile: (250) 356-9923

Mailing Address:
PO Box 9425 Stn Prov Govt
Victoria BC V8W 9V1

APPEAL NOS. 1999-WAS-022 & 2001-WAS-031

In the matter of an appeal under section 44 of the *Waste Management Act*, R.S.B.C. 1996, c. 482.

BETWEEN: Friends of Granby Environmental Society **APPELLANT**

AND: Assistant Regional Waste Manager **RESPONDENT**

AND: Roxul (West) Inc. **THIRD PARTY**

BEFORE: A Panel of the Environmental Appeal Board
Alan Andison, Chair
Glen Ewan, Q.C., Member
Phillip Wong, Member

DATES OF HEARING: January 15-17, 2002, and concluded
in writing on February 4, 2002

PLACE OF HEARING: Penticton, B.C.

APPEARING: For the Appellant: Wendy Baker, Counsel
For the Respondent: Dennis Doyle, Counsel
For the Third Party: Nicholas Hughes, Counsel

APPEALS

The Friends of Granby Environmental Society (the "Environmental Society") appealed the February 22, 1999 issuance and the September 13, 2001 amendment of Waste Permit PA-15832 (the "Permit") by Peter Jarman, Assistant Regional Waste Manager (the "Assistant Manager"). The Permit is held by Roxul (West) Inc. ("Roxul"), and authorizes the emission of air contaminants from Roxul's mineral wool processing plant in Grand Forks, British Columbia. These appeals were heard together by the Environmental Appeal Board (the "Board").

The Board has the authority to hear these appeals under section 11 of the *Environment Management Act* and section 44 of the *Waste Management Act* ("the Act"). Section 47 of the Act gives the Board the power to confirm, reverse, or vary the decision being appealed, send the matter back to the person who made the

decision, with directions, or to make any decision that the original decision-maker could have made and that the Board considers appropriate.

The Environmental Society requests that the Board rescind the amended Permit, and issue an order that no such permit shall be issued unless a full air quality impact analysis demonstrates that the operation of Roxul's plant will result in no adverse impacts on the local airshed and population of Grand Forks. Alternatively, the Environmental Society requests that the Board order amendments to the amended Permit that would require continuous air quality monitoring, the development of an airshed management plan, and disclosure of the results of emissions tests conducted at the Roxul plant.

BACKGROUND

Air quality in the Grand Forks airshed is affected by pollution from a number of sources, the local terrain, and meteorological conditions. There are 4 main industrial point sources of air pollution in an industrial park near downtown Grand Forks, all of which discharge emissions under permits issued under the *Act*: Roxul's insulation plant, an asphalt plant, a particle board plant, and a sawmill.

Roxul's plant was built in 1980. Since that time, several different owners have operated the plant, although the plant was shut down between May 1992 and November 1997. The plant manufactures mineral wool insulation from rock discarded from mining operations. The plant produces fibre insulation that may be blown into building spaces (such as walls or attics), formed into batting by the application of a resin containing formaldehyde, or formed into sectional pipe insulation. Air emissions from the plant include formaldehyde and particulate matter.

Particulate pollution is one of the main concerns in the Grand Forks airshed. In this appeal, the parties agree that the inhalation of fine particulates, that is, particulate matter with a mean aerodynamic diameter of 10 microns or less (PM₁₀), has been linked to adverse health effects, including respiratory and cardiac problems.

The Ministry of Water, Land and Air Protection, (the "Ministry") monitors PM₁₀ levels in the Grand Forks airshed. Since January 1993, the Ministry has monitored ambient concentrations of PM₁₀ at a monitoring station atop City Hall in downtown Grand Forks. In 1997, the Ministry conducted a year-long intensive air quality study using a mobile monitoring station, resulting in a draft report, *Results of a Year-Long Intensive Air Quality Study in Grand Forks, British Columbia*, by Peter D. Reid and Steven C. Josefowich (the "Reid Report"). Among other things, the Reid Report concluded that industrial point sources, residential wood stoves, open burning, and "fugitive" dust (such as dust from roads) are the main sources of PM₁₀ in the Grand Forks airshed.

The Permit was originally issued to Enertek Products International Inc. ("Enertek") on February 22, 1999. Among other things, the Permit authorized maximum rates of discharge from 9 different sources within the plant, and set limits on the concentrations of particulate matter, PM₁₀, and formaldehyde for a number of these

discharges. The Permit also required the permittee to visually monitor the discharges, and sample certain discharges at prescribed intervals.

On March 24, 1999, the Board received the Environmental Society's Notice of Appeal with respect to the Permit. The Environmental Society's grounds for appealing the Permit were virtually identical to its grounds for appealing the amended Permit, which are set out below.

In a letter dated October 4, 1999, the Environmental Society requested that the appeal be held in abeyance while the parties attempted to reach a negotiated settlement of the appeal. By a letter dated October 5, 1999, the Board agreed to hold the appeal in abeyance.

In November 1999, Roxul acquired the plant from Enertek. Since it acquired the plant, Roxul has made a number of changes and upgrades at the plant, including reconfiguring some of the stacks and equipment that discharge air pollution.

In a letter dated October 27, 2000, the Environmental Society advised the Board that it wished to proceed with the appeal, as negotiations had been unsuccessful.

By a letter dated November 16, 2000, the Board advised that the appeal was scheduled to be heard in May 2001.

However, in letters dated March 9, 2001, April 19, 2001, and July 17, 2001, the Environmental Society requested that the hearing be postponed to successively later dates. Consequently, the Board advised the parties in a letter dated July 18, 2001, that the hearing had been re-scheduled to January 2002.

Meanwhile, on September 13, 2001, the decision amending the Permit was issued. The amended Permit sets the following maximum limits on the concentrations of certain pollutants that are emitted from sources at the plant:

- concentrations of particulate matter in discharges from the dust collection - charging plant system, cooling zone, and PSM - curing stack shall not exceed 30 mg/m³;
- concentrations of particulate matter in discharges from the spinner/curing oven stack shall not exceed 26 mg/m³;
- concentrations of particulate matter in discharges from the fume hood- curing oven - east and fume hood - curing oven - west shall not exceed 15 mg/m³;
- concentrations of particulate matter in discharges from the dust collection - line and PSM - dust collection shall not exceed 10 mg/m³;
- concentrations of particulate matter in discharges from the 2 PSM - room vents shall not exceed 5 mg/m³;
- concentrations of formaldehyde from the spinner/curing oven stack and PSM - curing stack shall not exceed 20 mg/m³;

- concentrations of formaldehyde from the cooling zone and fume hood - curing oven - east shall not exceed 15 mg/m³;
- concentrations of formaldehyde from the 2 PSM - room vents shall not exceed 10 mg/m³;
- concentrations of formaldehyde from the fume hood - curing oven - west shall not exceed 5 mg/m³;

The amended Permit places no limits on PM₁₀ concentrations specifically. However, the amended Permit requires Roxul to sample and monitor PM₁₀ and PM_{2.5} levels in the discharges from 9 emission sources at the plant. Roxul is also required to sample and monitor the discharge rate, total particulate, and, where applicable, total formaldehyde, from authorized emission sources within the plant.

On September 28, 2001, the Environmental Society appealed the amended Permit. Its grounds for appealing the amended Permit are summarized as follows:

1. The Assistant Manager erred in granting the amended Permit without conducting, or requiring to be conducted, a full and appropriate air quality impact analysis to assess the impact of the plant on the local airshed and population.
2. The Assistant Manager erred in granting the amended Permit in the absence of input from an Air Quality Specialist or meteorologist.
3. The amended Permit allows air contaminants to be released into the environment which cause or may cause an odour nuisance.
4. The amended Permit allows air contaminants to be released into the environment which will significantly contribute to the ozone and other air quality problems in the local airshed, and therefore inadequately protects human health and the environment.

The Assistant Manager and Roxul both request that the Board dismiss the appeal. They submit that the Assistant Manager did not err in issuing the Permit or amended Permit. They also submit that the amended Permit adequately protects human health and the environment.

Additionally, Roxul requested that the Board consider an order of costs against the Environmental Society. However, Roxul did not pursue that application at the appeal hearing. Therefore, the Panel will not consider this issue further.

ISSUES

1. Whether the Assistant Manager erred by granting the Permit and amended Permit based on inadequate information.
2. Whether the permitted emissions will cause an unacceptable adverse effect on human health or the environment.

3. Whether the permittee should be required to monitor ambient air quality in the Grand Forks area, and participate in an air quality management program for the area.

RELEVANT LEGISLATION

Waste Management Act

Definitions and interpretation

- 1 (1) In this Act:

“**environment**” means the air, land, water and all other external conditions or influences under which humans, animals and plants live or are developed;

Permits

- 10 (1) A manager may issue a permit to introduce waste into the environment, to store special waste or to treat or recycle special waste subject to requirements for the protection of the environment that the manager considers advisable and, without limiting that power, may in the permit do one or more of the following:

...

(c) require the permittee to monitor in the way specified by the manager the waste, the method of handling, treating, transporting, discharging and storing the waste and the places and things that the manager considers will be affected by the discharge of the waste or the handling, treatment, transportation or storage of the waste;

(d) require the permittee to conduct studies and to report information specified by the manager in the manner specified by the manager;

(e) specify procedures or requirements respecting the handling, treatment, transportation, discharge or storage of waste that the permittee must fulfill;

...

Amendment of permits and approvals

- 13 (1) A manager may, subject to this section and the regulations, and for the protection of the environment,
 - (a) on the manager’s own initiative if he or she considers it necessary, or
 - (b) on application by a holder of a permit or holder of an approval,

amend the requirements of the permit or approval.

...

(4) A manager's power to amend a permit or approval includes all of the following:

...

(e) authorizing or requiring a change in the characteristics or components of waste discharged, stored, treated, handled or transported;

(f) authorizing or requiring a change in the quantity of waste discharged, stored, treated, handled or transported;

...

(i) authorizing or requiring a change in the method of discharging, storing, treating, handling or transporting the waste;

(j) changing or imposing any procedure or requirement that was imposed or could have been imposed under section 10 or 11.

...

DISCUSSION AND ANALYSIS

1. Whether the Assistant Manager erred by granting the Permit and amended Permit based on inadequate information.

The Environmental Society submits that the Assistant Manager erred because he granted the Permit and amended Permit based on inadequate technical information. In particular, the Environmental Society submits that the models considered by the Assistant Manager in estimating the impacts of the plant's emissions were inadequate. The Environmental Society submits that the Permit and amended Permit should not have been issued until the Ministry had enough information to complete a "rational analysis, as opposed to guessing" about the effects of the plant's emissions. The Environmental Society maintains that the Assistant Manager should have conducted, or required to be conducted, a "full and appropriate" air quality analysis to assess the impact of plant emissions on the airshed and population in Grand Forks.

The Environmental Society submits that, in 1997, Peter Reid, author of the Reid Report, identified the need for a complete air quality monitoring program in Grand Forks. The Environmental Society provided a copy of an email dated October 30, 1997, from Mr. Reid to another Ministry employee, with respect to a request that Mr. Reid assess Enertek's application for an approval to discharge air pollution from the plant. Mr. Reid states, in part:

This [request] dovetails nicely with the recommendations of a report I'm finishing up in the next 2 to 3 weeks. I'm recommending that all the

industries in the industrial park area that have substantial discharges jointly model their emissions...with full meteorology.

...Modelling will tell us how much of the incremental increase above background is due to industrial sources, and how much is fugitive, domestic and otherwise (eg, the remainder).

I will endeavour to look at the application soon, however completing the analysis is integral to understanding the local air quality. I need to do that before assessing the application...

I suggest we inform all involved that they're going to have to cooperatively fund a modelling exercise (and no, they can't do their own part piecemeal by different consultants or by themselves). We can broker a deal to split the costs fairly.

The Environmental Society submits that the Ministry has taken no concrete steps since 1997 to gather the information needed for such studies.

Additionally, the Environmental Society submits that there is little understanding of ambient concentrations of PM_{2.5}, fine particles with a diameter of 2.5 microns or less, in the Grand Forks airshed, as the monitoring for PM₁₀ does not distinguish PM_{2.5} from larger particles within the PM₁₀ group. The Environmental Society submits that, while PM₁₀ are dangerous because they can enter breathing passages, PM_{2.5} are even more dangerous because they can enter the lungs. With respect to the health effects of PM₁₀ generally, and PM_{2.5} in particular, the Environmental Society referred to a 1995 report, *Health Effects of Inhalable Particulates: Implications for British Columbia*, prepared by Dr. Sverre Vedal, M.D., for the Ministry (the "Vedal Report"). The Vedal Report states that "the smaller the particle, as a rule, the deeper, it can be breathed into the lungs." The Environmental Society submits that no permit should be issued until there is a better understanding of ambient PM_{2.5} concentrations in the airshed.

The Environmental Society submits that the models that were considered by the Assistant Manager to assess the potential effects of the plant's emissions failed to adequately account for the effects of inhalable particulates and building "downwash." The Environmental Society submits that building "downwash" occurs when pollutants emitted from short stacks on the roof of a building become entrained in the turbulent wake in the lee of the building, and can result in highly concentrated emissions reaching ground level very close to the point of emission. The Environmental Society submits that building downwash is an important factor in this case because most of the stacks at the plant are short (1.3 to 5.5 metres tall) and are located on building roofs, and, therefore, are susceptible to downwash. Further, The Environmental Society submits that a number of homes are located within the area affected by downwash from the plant.

In support of these submissions, the Environmental Society provided a report titled, *Report on Appeal of Waste Management Permit PA 15832 (Roxul West)*, by Dr. Douw G. Steyn. Dr. Steyn, a professor of atmospheric science at the University of

British Columbia and an Accredited Consulting Meteorologist, testified at the hearing as an expert in air pollution meteorology.

Dr. Steyn noted that the Assistant Manager considered results from 3 modelling exercises. One modelling exercise was performed by Ministry staff on March 4, 1999, and two were performed by Levelton Engineering Inc. ("Levelton"), on July 11, 2000 and March 8, 2001. Dr. Steyn noted that the exercises used "screening level" models, which simulate worst case conditions. Dr. Steyn stated that screening models do not realistically capture the full state of the environment because they use scenario input rather than actual meteorological data. Dr. Steyn stated that, although these types of models are an appropriate tool for assessing worst case scenarios, the assessment of air quality risks generated by the models was inadequate in this case due to weaknesses in the models' applications. In addition, Dr. Steyn noted that operating conditions at the plant, particularly emission rates and stack configurations, were changing between 1999 to 2001 due to Roxul's reconfigurations and upgrades. Therefore, the information on which the 3 models were based was continually shifting, and the results generated by the models are difficult to directly compare.

Dr. Steyn reviewed each of the 3 models that were considered by the Assistant Manager. First, he noted that the modelling of formaldehyde dispersion performed in 1999 by the Ministry employed a wide range of meteorological, stack, and terrain conditions, including building downwash, to determine whether public exposure to formaldehyde was below acceptable limits. Based on the results from that model, the Ministry concluded that public health was being protected from formaldehyde exposure. Dr. Steyn stated that, in his opinion, the modelling of formaldehyde dispersion was reliable, and there is no need for further modelling of formaldehyde emissions. He also stated that the results of this modelling exercise demonstrated the importance of building downwash in assessing the effects of emissions from the plant.

However, in Dr. Steyn's opinion, the other 2 modelling exercises provided inadequate information about the effects of particulate emissions because they failed to account for building downwash. He noted that the modelling performed in 2000 was designed to simulate the dispersion of pollutants from all sources at the plant, using emission rates obtained from tests at the plant. He stated that the model used a method for merging stack parameters into a hypothetical single, equivalent source, without taking into account building downwash. He stated that the results from this model exceeded the British Columbia provincial ambient air quality objective of $50 \mu\text{g}/\text{m}^3$ on a 24-hour average for PM_{10} . Given that this air quality objective was exceeded, Dr. Steyn submitted that the modellers were obligated to conduct more detailed modelling to determine the real impacts of the emissions. He submits that this was particularly necessary given that the model generated an exceedence without accounting for downwash.

Dr. Steyn testified that the model used in 2001 to investigate PM_{10} and formaldehyde dispersion was based on new stack emission data, in which the emission concentrations were lower than the maximum concentrations in the amended Permit. Further, Dr. Steyn stated that this model inappropriately

excluded the effects of building downwash. Therefore, in his opinion, the results from this model are not reliable as an estimate of worst case scenarios.

Dr. Steyn concluded that:

- Under a wide range of atmospheric conditions, downwash will be a feature of emissions from the plant, because all of the stacks except the curing oven stack are short in relation to the building dimensions. Therefore, a screening model for this plant must explicitly account for building downwash if it is to accurately capture worst case conditions.
- In particular, the modelling of PM₁₀ dispersion from the plant has low reliability for demonstrating worst case scenario conditions because of the failure to account for building downwash effects.
- The need for more realistic modelling where an air quality objective exceedance is generated by the screening model cannot be avoided by the modeller deciding that the model is conservative and, therefore, unlikely to reflect real impacts.

In cross-examination, Dr. Steyn agreed that the modelling results for formaldehyde could be used to determine the **location** of PM₁₀ impact, but stated that those results would be inappropriate for determining the **concentration** of PM₁₀ at a given location.

Finally, the Environmental Society submits that the Assistant Manager did not make an adequate assessment of the health effects of the plant's emissions, as he failed to provide the technical assessments for the Permit or any of the modelling results when the application was referred to the Ministry of Health. Further, no assessment was done on the local population to assess the potential effects of the plant's emissions on those most affected by inhalable particulates, including asthmatics, children, or the elderly.

Based on these submissions, the Environmental Society argues that the Ministry is obligated to require further analysis before issuing any permit for the plant.

The Assistant Manager submits that he considered sufficient information to determine whether the plant's emissions would have an unacceptable adverse effect on human health or the environment. The Assistant Manager submits that he considered ambient air quality monitoring data, and carried out industrial source comparisons which showed that the plant accounts for a small proportion of the industrial emissions in Grand Forks. He submits that ambient air quality measurements record actual conditions, and are a more conclusive indicator of the impact of emissions on air quality. While he considered the modelling results, he submits that models simply provide estimates and have varying reliability depending on the quality of input data.

The Assistant Manager testified that he treated the original application for the Permit as a new application. A comprehensive emissions inventory was prepared, and the emissions were modelled and evaluated in the context of ambient

monitoring data from the air quality monitor located at City Hall in Grand Forks. He also referred the application to the Ministry of Health for review. He noted that the Ministry of Health had no objections to issuing the Permit.

The Assistant Manager stated that, while the modelling conducted by the Ministry using a short stack scenario demonstrated the occurrence of building downwash, the Environmental Society failed to acknowledge that further modelling with a higher curing oven stack scenario demonstrated reduced downwash conditions. The Assistant Manager also noted that Roxul raised the curing oven stack to address the issue of downwash after that modelling exercise was done. In addition, the Assistant Manager testified that he did consider the potential effects of downwash containing PM₁₀ by scaling the results of the formaldehyde modelling to predict worst case PM₁₀ concentrations resulting from downwash up to 400 metres from the plant.

The Assistant Manager concluded that, in his opinion, more detailed modelling was not necessary because the plant is a relatively small contributor to air pollution in Grand Forks, the models indicated only modest exceedences of air quality objectives, and the wind conditions that cause downwash are infrequent in Grand Forks. Further, in his opinion, there is no justification for incurring the effort and expense of detailed modelling of the plant's emissions until a monitoring program is implemented to allow segregation of emission sources and assessment of their relative contributions to airshed loading.

In support of these submissions, the Assistant Manager referred to a "Technical Report (Major)" dated February 8, 1999, and a "Technical Report (Minor)" dated September 4, 2001. He testified that he considered these respective reports before issuing and amending the Permit. Both Technical Reports were prepared by Edward Nield, a Pollution Prevention Officer with the Ministry.

The Assistant Manager also referred to a report dated September 5, 2001, by Ralph Adams, an Air Quality Meteorologist with the Ministry. The Assistant Manager submits that he referred the application to amend the Permit to Mr. Adams, who conducted a thorough review of the available modelling and monitoring data in preparing his report.

Mr. Adams testified on behalf of the Assistant Manager as an expert in micrometeorology. Mr. Adams stated that, when he reviewed the application to amend the Permit, he considered the merits of the application based on ambient air quality recordings in Grand Forks from 1993 to 2000, the Reid Report, the results of stack testing conducted in January 2001, and the modelling conducted by Levelton. Mr. Adams testified that he conducted his own calculations using the ambient pollutant concentrations recorded in Grand Forks and the results generated by the model, as described in his report.

Mr. Adams stated that more detailed modelling would not be useful in this case. Mr. Adams stated that the model is designed to give conservative estimates, and given the low PM₁₀ values generated by the model, it is unlikely that further information would be obtained from more sophisticated models. He submitted that,

at this stage, the most valuable information for determining the effect of the plant's emissions on ambient air quality is the fact that there was no discernible change in ambient air quality monitoring data in the 2 years (1999 to 2001) after the Permit was issued.

Roxul submits that the Assistant Manager considered sufficient information to adequately assess the likely impacts of the plant's emissions. Roxul notes that the Assistant Manager considered the Reid Report, the modelling results for formaldehyde that accounted for downwash, modelling results for particulates, stack tests carried out by Levelton, ambient air quality data, and Mr. Adams' report. Roxul notes that Dr. Steyn concluded in his report that the Assistant Manager identified and addressed "all appropriate air quality concerns" and the Ministry "used appropriate evaluation methods."

With respect to the Environmental Society's submissions regarding the need for more detailed modelling, Roxul agrees with Mr. Adams' opinion that no valuable information would be derived from such an exercise. Roxul submits that Mr. Adams went far beyond simply reviewing the modelling results against the province's air quality objectives. Mr. Adams critically analyzed the modelling conducted by Levelton, carried out additional modelling exercises using different criteria, and then compared all of the results against different objectives, including the Level "A" National Ambient Air Quality ("NAAQ") objective of $25\mu\text{g}/\text{m}^3$ for PM_{10} .

With respect to the Environmental Society's concerns about the failure to account for downwash, Roxul submits that the Assistant Manager considered downwash and concluded that it would be insignificant outside of the industrial park. Roxul further submits that Dr. Steyn provided no way of measuring whether downwash is anything more than a hypothetical concern in this case, given that the stack configurations have changed since the formaldehyde modelling was completed. Roxul submits that, in considering the materiality of downwash in this case, it is important to bear in mind that its effects are localized and infrequent, and the 2 stacks that discharge most (72 percent) of the particulates are least susceptible to downwash. Specifically, the PSM curing oven stack is protected from downwash due to its height and location, and the spinner oven curing stack is protected due to its high velocity, temperature, and volumetric flow. Roxul submits, therefore, that there is no need to conduct more detailed modelling to account for downwash.

In specific reply to Roxul's submission regarding downwash protection of the spinner oven curing stack, the Environmental Society responded that it relies on the evidence of Dr. Steyn to the effect that the spinner oven curing stack would clearly be impacted by building downwash, and that it is the stack which emits the highest proportion of PM_{10} and $\text{PM}_{2.5}$.

With respect to the Environmental Society's concerns around $\text{PM}_{2.5}$, Roxul submits that there is little understanding of $\text{PM}_{2.5}$ in most parts of the province outside large urban areas. In Roxul's view, to accept that no permits should be issued until there is a better understanding of $\text{PM}_{2.5}$ in a given airshed would lead to a virtual moratorium on industrial development in many parts of the province until ambient monitoring data could be obtained.

Dr. Robert G. Humphries, Manager of Levelton's Air Quality Modelling and Assessment Group, testified on behalf of Roxul as an expert in air quality modelling and meteorology. Dr. Humphries testified that his decision to model the plant in the way that he did was largely based on instructions from the Ministry to determine the effects of changes that were made under the amended Permit.

The Panel has considered all of the submissions on this issue, including the expert evidence, and finds that the Assistant Manager had sufficient technical information to determine whether the plant's emissions, as permitted, will cause an unacceptable adverse effect on human health or the environment. In particular, the Panel notes that the testing that was carried out showed no increase of PM₁₀ in the Grand Forks airshed since the Roxul plant began operation under the Permit. It is noted that PM_{2.5} is a subcategory of PM₁₀. Given the ambient air quality monitoring that has been conducted in Grand Forks, and the 3 modelling exercises that were considered by the Assistant Manager, the Panel is satisfied that the Assistant Manager had adequate information to issue and amend the Permit.

2. Whether the permitted emissions will cause an unacceptable adverse effect on human health or the environment.

The Environmental Society submits that air quality in the Grand Forks airshed is already "severely compromised" without the addition of further emissions from the Roxul plant. The Environmental Society submits that, in issuing and amending the Permit, the Assistant Manager failed to meet his obligation to protect human health and the environment, and failed to take precautionary measures in the face of uncertainty arising from the modelling results and other available technical information. The Environmental Society argues that the introduction of any new air contaminants into the Grand Forks airshed represents a threat to human health and the environment.

The Environmental Society's submissions on this issue focused on the adverse effects of particulate emissions, especially PM₁₀ and PM_{2.5}. The Environmental Society also provided evidence that some residents of Grand Forks object to odours emitted by the plant. In its Notice of Appeal, the Environmental Society also raised concerns about formaldehyde and ozone discharges from the plant. However, at the appeal hearing, the Environmental Society provided no submissions with regard to ozone emissions from the plant. Further, the submissions provided by the parties, including those of the Environmental Society, indicate that the plant's formaldehyde emissions have been significantly reduced in recent years, and are no longer an issue in this appeal. Therefore, the Panel has made no findings with respect to whether formaldehyde or ozone emissions from the plant cause any unacceptable health effects.

The Environmental Society submits that there is a linear increase in human health consequences associated with increases in PM₁₀ concentrations, and says that scientific research is now focusing on the effects of PM_{2.5}. The Environmental Society referred to a number of documents that discuss the adverse effects of inhalable particulates on human health, including the Vedal Report.

The Environmental Society also referred to the NAAQ Report, which states that chronic exposure to particulate matter impacts "the severity of respiratory symptoms associated with airway obstructive disease, chronic bronchitis, and asthma", while "minor" effects of exposure include small reductions in lung function, coughing, and wheezing.

The Environmental Society maintains that particulates generated by combustion are more harmful to human health than those of "crustal" (natural) origin. Therefore, this further focuses attention on PM_{2.5}, given that these particles are not significantly generated by natural sources. In this regard, the Vedal Report states that "while PM₁₀ measurements can include substantial amounts of particulates of natural origin (windblown dust), PM_{2.5} measurements are not substantially influenced by these particles."

The Environmental Society submits that, although there is no known threshold for effects of PM₁₀ or PM_{2.5} exposure, the current provincial air quality guideline of 50µg/m³ for PM₁₀ is inadequate for protecting human health, as indicated by the NAAQ recommended objective of 25µg/m³ for PM₁₀.

The Environmental Society submits that the Roxul plant's contribution to the airshed's air quality problems cannot be ignored, despite the fact that it may be a relatively small contributor to total particulate pollution in the airshed. This is because a large proportion of the plant's emissions is PM_{2.5}.

The Environmental Society further submits that there are residences within 200 metres of the Roxul plant. According to Dr. Steyn, peak downwash effects from the plant would occur within 200 metres of the plant, and there would be elevated effects up to 1000 metres from the plant. Accordingly, the Environmental Society submits that the downwash effects of PM_{2.5} would negatively effect any resident that lives within a 1000 metre radius of the plant.

With respect to the effects of odours generated by the plant, Bob Grieve, a local resident, who gave evidence on behalf of the Environmental Society, testified that, when the plant's emissions are blowing towards his home, the odour is so strong that he cannot be outdoors.

David Simm, President of the Environmental Society, also testified that he is concerned about the adverse effects of pollution generated by the Roxul plant.

Given the adverse effects of inhalable particulates on human health and the poor air quality in the airshed, the Environmental Society submits that the Assistant Manager's issuance and amendment of the Permit violates the spirit and intention of the *Act*, which is, in the Environmental Society's view, to control the release of pollutants into the environment so that people and the environment are not harmed by such pollutants. The Environmental Society submits that the Permit ought not to have been issued or amended until the impacts of the Roxul plant's emissions on local air quality are better understood, especially with respect to PM_{2.5}.

The Assistant Manager submits that there is no evidence that air quality in Grand Forks is influenced to any significant degree by the emissions permitted from the Roxul plant. He submits that the overall contribution of the Roxul plant is insignificant, given that the plant accounts for approximately 2 percent of the particulate load in the Grand Forks airshed.

He also notes that the worst case scenario PM₁₀ concentration projected by Mr. Adams represents a modest 10 percent exceedence of the NAAQ objective of 25µg/m³, and is below the current provincial objective of 50µg/m³. He notes that the NAAQ objective has been recommended but not yet adopted in B.C. The Assistant Manager also submits that ambient air quality monitoring results for Grand Forks indicate that exceedences of provincial air quality objectives mainly occur in the winter in the Grand Forks airshed, when factors such as road dust and smoke from wood stoves are known to create additional particulate loading.

With respect to the health effects of the permitted emissions, the Assistant Manager notes that the initial application for the Permit was referred to the Ministry of Health, and that Ministry had no objections to the application. He also notes that an air quality hotline was established with the assistance of the Ministry of Health to track health and air quality, and has not resulted in any action being taken by Health officials.

With respect to the effects of downwash on residences located near the plant, the Assistant Manager submits that downwash conditions rarely occur, and when they do, most of the emissions dissipate before leaving the industrial park. Although Mr. Nield's 1998 Technical Report indicated that homes were located 200 metres from the plant, the Assistant Manager submits that the nearest residence is approximately 400 metres from the plant, based on a current map.

With respect to the Environmental Society's allegations concerning odours, the Assistant Manager submits that odours have not been identified as an issue that is directly related to emissions from the Roxul plant, with the possible exception of a short period of time in 2000 when Roxul was experimenting with the use of new solvents in the curing process. The Assistant Manager maintains that most odour complaints received through the air quality hotline were attributed to the local asphalt plant, and not the Roxul plant. He maintains that the only evidence connecting the Roxul plant to odours is that of Mr. Grieve

With respect to the purposes of the *Act*, the Assistant Manager submits that the question in issuing a new permit is not whether the permitted emissions protect the environment, but rather, whether their impacts are reasonable in the circumstances. The Assistant Manager notes that section 10 of the *Act* authorizes him to issue permits subject to requirements for the protection of the environment that he considers advisable. He submits that his mandate in this case is to ensure that any permits authorizing discharges include such conditions that he deems necessary for the protection of the environment. While he concedes that the permitted emissions in this case are air contaminants, there is no evidence that these emissions are having a measurable impact on air quality in Grand Forks.

Roxul submits that, in issuing the amended Permit, the Assistant Manager fulfilled his mandate under the *Act* to ensure that the permitted emissions cause no unacceptable adverse effects on human health or the environment. Roxul agrees that there are issues regarding particulate emissions in the Grand Forks airshed, but argues that approximately 74 percent of those emissions arise from non-industrial sources. Roxul further submits that its plant is a minor contributor of particulates within the 26 percent emitted from industrial sources. Roxul suggested that the plant's contribution to particulates in the airshed would be in the order of 2 percent. Roxul maintains that the particle board plant located next to it emits over 7 times more particulates. Roxul submits, therefore, that even a 50 percent reduction in particulate emissions from its plant would, at best, only amount to a 1 percent reduction in the total airshed.

Moreover, Roxul submits that it has spent over \$24 million over the past 2 years in upgrading its plant in Grand Forks, and that these upgrades have provided significant environmental benefits. For example, one of the Environmental Society's complaints concerning the Permit as issued in 1999 related to formaldehyde emissions. Roxul submits that improvements at the plant have resulted in an 8-fold decrease in formaldehyde emissions, to the point that Dr. Steyn acknowledges that formaldehyde is no longer an issue in these appeals.

(a) Nature of a manager's authority under sections 10 and 13 of the *Act*

In light of the Environmental Society's submissions concerning the Assistant Manager's mandate in issuing and amending the Permit, the Panel has considered the Legislature's intentions with respect to a manager's authority to issue and amend permits under sections 10 and 13 of the *Act*.

The Panel notes that section 10(1) provides that a waste manager "may issue a permit *to introduce waste into the environment...subject to requirements for the protection of the environment that the manager considers advisable.*" [emphasis added] Section 13(1) authorizes a waste manager to amend a permit "subject to this section and the regulations, and for the protection of the environment." The Panel finds that, together, these sections provide managers with discretion to issue permits that allow the introduction of waste into the environment, and to impose conditions for the protection of the environment when issuing and amending such permits.

The Panel notes that the Board considered a similar issue in *Fleischer v. British Columbia (Ministry of Environment, Lands and Parks)*, B.C.E.A. No. 1, Appeal No. 98-WAS-29(d) (Q.L.) (hereinafter "*Fleischer*"). In that appeal, the Board considered whether the Respondent had exceeded his authority by extending the deadlines for a mill to comply with particulate and sulphur emission objectives. The Appellants submitted that section 13 of the *Act* does not authorize the amendment of a permit for the purpose of lessening or weakening the protection of the environment. The Respondent argued that section 13 should not be interpreted too narrowly, and that the legislature contemplated that a manager may in some cases make decisions that, when viewed in isolation, may not technically increase the amount of environmental protection. The Respondent also referred to section 1(2)

of the *Waste Management Act Public Notification Regulation* which defines a "minor amendment" as an amendment authorizing an "increase in the authorized quantity of a discharge, emission or stored material that does not exceed 10% of the authorized quantity." The Board held that:

On a plain reading of section 13(4), the Panel agrees that there is a requirement that an amendment be for the protection of the environment. *This requirement is consistent with one of the main purposes of the Act, which is to allow discharges of substances in a manner that will protect the environment.*

However, it would be unreasonable to interpret this phrase in such a way that officials would be unable to deal with real world situations, such as delays in meeting deadlines. Section 13(4)(h) of the Act specifically contemplates these situations as it expressly authorizes a manager to amend a permit by "altering the time specified for the construction of works or the time for other requirements imposed on the holder of the permit." In the Panel's view, the alteration of deadlines cannot be limited to reducing those deadlines.

The Panel finds that, read together, the *Act* and the *Public Notification Regulation* indicate that the legislature contemplated that there would be circumstances where extending time lines to meet requirements under a permit could be granted.

[emphasis added]

This Panel agrees with the approach taken in *Fleischer*. Specifically, the Panel agrees that one of the main purposes of the *Act* is to allow discharges of substances in a manner that will protect the environment, and that this purpose must be taken into account when issuing and amending permits that authorize the discharge of air contaminants. The Panel also agrees that it would be unreasonable to interpret the language concerning protection of the environment in sections 10 and 13 in such a way that managers would be unable to deal with real world situations.

In particular, the Panel does not accept the Environmental Society's view that any "new" introduction of waste into the Grand Forks airshed violates the intent of the *Act*, and that Roxul should not be granted a permit until more information is known about the effects of the plant's emissions on ambient air quality. To adopt this view would lead to the conclusion that the Assistant Manager should refuse to issue a permit until the completion of studies that could take years, despite his discretion to impose appropriate conditions for the protection of the environment. That would result in the plant being shut down for an indeterminate period of time, causing the loss of jobs and revenues in the local economy. The Panel finds that such an approach would be unreasonable. Further, the Panel notes that, although the Assistant Manager treated the Permit application as a new application, the plant was not a "new" source of emissions in the airshed. The Roxul plant had operated in Grand Forks for many years, and emitted particulates and formaldehyde, among other things, before the Permit was issued. Consequently, for practical purposes,

the Permit did not authorize a "new" introduction of air contaminants into the airshed.

Accordingly, the Panel concludes that the appropriate question in this case is not whether the Permit should have been issued at all, but rather, whether the Permit, as amended, includes appropriate conditions for the protection of the environment. Thus, the Panel has considered whether the permitted discharges will have an unacceptable adverse effect on human health and the environment.

(b) Effects of the permitted emissions on ambient air quality and human health

Odour

The Panel accepts that objectionable odours can reduce residents' enjoyment of their environment, and diminish opportunities for activities that benefit from less objectionable odours in the air. The Panel notes that the amended Permit does not explicitly regulate the emission of odours from the Roxul plant.

In this appeal, limited evidence was presented concerning the effects of odours allegedly generated by the Roxul plant. The only evidence in this regard consisted of testimony from Mr. Grieve about his personal experiences, and the Assistant Manager's testimony that most odour concerns reported to the air quality hotline attributed the odours to an asphalt plant.

The Panel finds that the balance of evidence does not support a conclusion that the Roxul plant is a significant source of objectionable odours in Grand Forks, with the possible exception of events that occurred in or about October 2000 when Roxul was testing new solvents. Further, the Panel finds that there is insufficient evidence that any odours emitted from the plant have a significant adverse effect on human health or the environment.

Inhalable particulates

There is no dispute that the inhalation of particulate matter is known to have adverse effects on human health. In this case, the Panel accepts that the permitted emissions from the Roxul plant are air contaminants. The Panel also accepts that current medical and scientific research identifies PM_{2.5} as a special concern for human health because these particles can travel further into the respiratory system than larger particulates, although the exact processes by which these particles harm the respiratory system are not yet fully understood.

However, the Panel finds that there is insufficient evidence to conclude, on a balance of probabilities, that the Roxul plant is a significant contributor to particulate loading in the airshed, or that any of the permitted emissions from Roxul will have a significant effect on ambient air quality and human health. The preponderance of evidence indicates, and the Environmental Society accepts, that the Roxul plant is a minor contributor to total particulate emissions in the airshed. The Panel also accepts that ambient air quality monitoring results for Grand Forks

between 1993 and 2001 indicate that exceedences of provincial air quality objectives mainly occur in the winter, when factors such as road dust and smoke from wood stoves are known to create additional particulate loading.

With respect to PM₁₀, the Panel has considered the modelling results for the plant and ambient air quality monitoring data for Grand Forks, in the context of the current provincial objective of 50µg/m³. Given that the more stringent NAAQ standard has not been adopted in B.C., the Panel is not prepared to hold Roxul strictly to that standard. However, the Panel has considered the NAAQ standard as a guideline for the purpose of this appeal. The Panel accepts Mr. Adams' evidence that the estimated worst case scenario PM₁₀ concentration for the plant represents a modest 10 percent exceedence of the NAAQ objective of 25µg/m³, and is well below the current provincial objective of 50µg/m³. In these circumstances, and given that the plant is a minor contributor to particulates in the airshed, the Panel finds that the plant's emissions of PM₁₀ is not likely causing any unacceptable adverse effects on the environment or human health.

With respect to downwash from stacks at the plant, the Panel finds that there is insufficient evidence at the present time to conclude that the emissions from the plant will result in negative health effects due to downwash. It may well be that downwash will affect residences that are within 1000 metres of the plant. However, without evidence that the emissions from the plant will cause an adverse health effect, the Panel is not prepared to make a finding on the adverse effects of downwash in the area surrounding the plant.

In summary, the Panel concludes that the Environmental Society has not shown, on the balance of probabilities, that there is an unacceptable risk to human health or the environment as a result of the permitted emissions, or that the Permit was not issued or amended in accordance with sections 10 and 13 of the *Act*, respectively.

Finally, the Panel directs the Assistant Manager to review Roxul's stack monitoring results on an annual basis to determine if levels are such that they may cause an unacceptable risk to human health or the environment. In the event that such levels are detected it is recommended that the Assistant Manager review the effects of building downwash and consider the possibility of increasing stack height, if necessary.

3. Whether the permittee should be required to monitor ambient air quality in the Grand Forks area, and participate in an air quality management program for the area.

The Environmental Society submits that, if the amended Permit is to be allowed, then at a minimum it must contain significant requirements for ambient air quality monitoring and participation in air quality management programs, in order to protect the local population and allow the Ministry to complete a full airshed analysis. The Environmental Society maintains that such programs should include continuous monitoring for PM₁₀ and PM_{2.5}, modelling of the airshed, and the creation of an integrated air quality management plan which includes an episode management plan. The Environmental Society submits that the amended Permit

contains no such requirements, even though Ministry staff have repeatedly recommended that these steps be implemented. The Environmental Society notes that the federal government indicated that it was prepared to provide a continuous PM_{2.5} monitor for the community if the Ministry was willing to fund its maintenance. The Environmental Society argues that the amended Permit should be amended to require Roxul to fund the maintenance of a continuous PM_{2.5} monitor, in the event that the Ministry is unable to secure funding by June 2002.

In summary, the Environmental Society submits that the amended Permit, if upheld, should be amended to include:

- a requirement that a continuous PM_{2.5} monitor be situated in the community, and that a fixed date be set in the amended Permit for installation of the monitor;
- a clear air quality management plan be put in place for Grand Forks, as described above, with an episode management plan enforced through requirements in the amended Permit; and
- a requirement that results of any emissions testing in relation to the plant be provided to the Environmental Society, within 30 days of such results being obtained by either Roxul or the Ministry, depending on who conducts the testing, and that such results be similarly produced to any member of the public who informs the Ministry of his or her request for such information.

The Assistant Manager submits that these issues cannot and should not be addressed in the context of a single permit. He says that he is in the process of reviewing air pollution authorizations for the major point source emissions in Grand Forks, and has established as a priority the implementation of a monitoring program that will allow for the segregation of fugitive dust from crustal sources and smoke to assess their relative contribution to overall particulate loading. He submits that the Ministry has recommended enhanced monitoring where resources can be strategically allocated to identify major influences on air quality in the airshed. Additionally, the Assistant Manager notes that the amended Permit includes a section indicating that Roxul may be required to participate in ambient air quality monitoring and/or related studies.

However, the Assistant Manager acknowledged that he made an omission with respect to the amended Permit, in that he failed to specify when or how often Roxul is required to conduct stack sampling and monitoring and submit an annual report. He agreed that a provision prescribing the frequency of sampling and timing for report submission should be added to the amended Permit.

Roxul maintains that it is willing to participate in any community-wide program to address particulate loading in the airshed. However, Roxul submits that the alternate relief sought by the Environmental Society is unworkable and would unnecessarily inhibit the Ministry's ability to develop a workable airshed management plan for Grand Forks. Roxul submits that ordering such relief would amount to the Board making policy decisions in the absence of full knowledge of the

direction of, or constraints on, the Ministry. Therefore, Roxul argues that the Board should decline to grant the alternate relief, and should limit its intervention to making recommendations, beyond minor amendments to set dates for stack monitoring results.

The Panel has considered the sampling and monitoring requirements that are imposed on Roxul under the amended Permit. The Panel notes that section 3.1 of the amended Permit requires Roxul to sample and monitor authorized discharges, including total particulate, PM₁₀, and PM_{2.5}, from 9 emission sources at the plant. Roxul is required to comply with sampling and analytical procedures specified in section 3.4 of the amended Permit. However, the Assistant Manager omitted to include a provision specifying when or how often Roxul must conduct stack sampling and monitoring. In comparison, the Panel notes that section 3.3 of the original Permit required Roxul to sample certain authorized discharges "once during the operating year, as a formal stationary source emission test" and "carry out a sufficient number of separate routine operational measurements of formaldehyde." The Panel finds that a provision specifying the frequency for stack sampling should have been included in the amended Permit, but notes that this is a minor omission and is not fatal to the amended Permit.

Accordingly, the Panel orders that the Assistant Manager add a clause to the amended Permit that specifies the frequency for stack sampling and monitoring.

The Panel also notes that under section 3.5, Roxul must submit a report compiling the "data and emission information as directed in section 3.1" to the Regional Waste Manager "once per year, commencing in 2002." However, no date for submitting that report is specified in the amended Permit. The Panel notes that the original Permit specified a date on which the first report was to be received by the Regional Waste Manager. The Panel finds that the amended Permit should also specify a date on which Roxul should commence submitting its reports to the Assistant Manager. However, the Panel finds this is also a minor omission and is not fatal.

Accordingly, the Panel orders that the Assistant Manager add a clause to the amended Permit that specifies a date by which Roxul must submit the report required under section 3.5.

The Panel also finds that it is reasonable to require that the results of emissions testing at the plant be provided to the public. The Panel notes that both provincial and federal legislation is in place to ensure the public has access to information. Corporations now routinely provide information that previously would have been considered to be confidential. This instills confidence in the public that it will be better informed of events that affect their lives. Further, it is the Panel's view that public access to emission information may help avoid appeals in the future.

For these reasons, the Panel orders that the Assistant Manager add to the amended Permit a requirement that the stack sampling results be made available to the public within a reasonable period of time after such results are obtained by either Roxul or the Ministry, depending on who conducts the testing.

With respect to the remaining alternate relief sought by the Environmental Society, the Panel notes that sections 3.6 and 3.8 of the amended Permit clearly provide that the Regional Waste Manager may require Roxul to undertake or participate in additional monitoring programs. Specifically, sections 3.6 and 3.8 provide that:

3.6 Environmental Impact

Inspections of the site may be carried out by Pollution Prevention Program personnel as a part of routine administration procedures. Based on these inspections, and any other information available to the Regional Waste Manager, with regard to the effect of the discharge on the receiving environment, the permittee may be required to undertake additional monitoring and/or install additional pollution prevention measures.

3.8 Ambient Air Quality

The Regional Waste Manager may require that the permittee, in conjunction with other parties, undertake or participate in, ambient air quality monitoring and/or related studies. The Regional Waste Manager may impose limits on the daily emission contaminant loading, based on these and/or other studies of air quality impact.

However, the Panel finds that it would be inappropriate to impose conditions in the amended Permit that would make Roxul responsible for implementing a continuous PM_{2.5} monitoring program and an air quality management plan for Grand Forks, without imposing similar requirements on other point source polluters. The Environmental Society acknowledges that air quality in the Grand Forks airshed is affected by many emission sources, and not just by emissions from the Roxul plant. The Panel agrees with the Assistant Manager that these issues cannot and should not be addressed in the context of a single permit. Additionally, the Panel accepts that the Assistant Manager has established as a priority the implementation of a monitoring program that will allow for the segregation of particulate sources to assess their relative contribution to overall particulate loading. In these circumstances, the Panel recommends that the Assistant Regional consider imposing PM_{2.5} monitoring requirements on Roxul, and other point source polluters, after he has completed a review of air pollution authorizations for the major point source emissions in Grand Forks and an assessment of other contributing sources such as smoke and fugitive dust. As well, the panel recommends that, after completion and evaluation of the discharge and ambient air monitoring program, the need for additional modelling of emissions and episode management plans should be assessed.

DECISION

In making this decision, the Panel of the Environmental Appeal Board has considered all of the relevant documented and oral evidence, whether or not specifically reiterated herein.

The Panel finds that the Assistant Manager considered sufficient technical information before issuing and amending the Permit.

The decisions of the Assistant Manager to issue and amend the Permit are confirmed, subject to the directions and recommendations noted below:

1. The Panel orders that the Assistant Manager add to the amended Permit a clause that specifies the frequency for Roxul to conduct the stack sampling and monitoring required under section 3.1.
2. The Panel orders that the Assistant Manager add to the amended Permit a clause that specifies the date by which Roxul must commence submission of the report required under section 3.5.
3. The Panel orders that the Assistant Manager add to the amended Permit a requirement that the stack sampling results be made available to the public within a reasonable period of time after such results are obtained by either Roxul or the Ministry, depending on who conducts the testing.
4. The Panel directs the Assistant Manager to review Roxul's stack monitoring results on an annual basis to determine if levels are such that they may cause an unacceptable risk to human health or the environment. In the event that such levels are detected it is recommended that the Assistant Manager review the effects of building downwash and consider the possibility of increasing stack height, if necessary.
5. The Panel recommends that the Assistant Manager explore options for developing an airshed management program, including enhanced monitoring with continuous PM2.5 monitoring and, if warranted based on monitoring and modelling results, an episode management plan. The Assistant Manager should ensure that Roxul and other major point source dischargers participate in the program.

Alan Andison, Chair
Environmental Appeal Board

May 3, 2002