Air Quality Implementation Committee July 4, 2007 Comments on Pacific BioEnergy Corporation's Application to Re-locate its Pellet Plant (Permit PA-18312)
Role of the Prince George Air Quality Implementation Committee

The Implementation Committee provides recommendations to the Steering Committee and to the provincial and local government decision makers. The primary role is to implement the Air Quality Plan, which mainly provides strategic direction on air quality management rather than measures to manage specific sources, especially the industrial sources that are under Ministry of Environment permits. The pellet plant permit application to relocate and expand the existing operation is being reviewed by the Committee because it is the first new permit application for an industrial source since the Plan was initiated in 1999. As a potentially new source of fine particulate (PM) emissions, the project is a test of the Plan objective of preventing further increases in levels in the airshed. It is also a test of the recommendation that new industrial emission sources should be located in heavy industrial areas outside the airshed. The main purpose of this review is determine if the relocated pellet plant is expected to add new PM emissions, and if so, whether or not emission offsets can be found that would allow this source within the airshed. The Committee's role in this permit review is to advise the Ministry on emission management approaches, including the monitoring necessary to achieve the objective of preventing air quality degradation.

Notwithstanding the general statement above, the Committee needs to determine on a case-by-case basis if individual permit applications should be reviewed. Therefore, we would appreciate being notified of all applications for new or amended permits.

Significance of the Pellet Plant Emissions in the Airshed

Estimates of the overall point source emission from the PBEC pellet plant have mushroomed from the original permitted level of about 60 tonnes per year (tpa) total particulate matter to over 300 tpa over the life of the operation. We would expect that assessing the effect of such an increase would require modelling of the effects on sensitive receptors in this airshed regardless of whether or not the re-location was proposed. The assessment done for this application fulfills this requirement, and provides a perspective on the effect of the plant emissions relative to the cumulative contributions of other sources of PM10 and PM2.5, as indicated by ambient levels monitored at various locations in the airshed. Ranking of this source relative to other specific emission sources will be provided when the source identification and apportionment studies are completed for the Phase III Air Quality Plan.

Predicted Changes in Ambient Levels at Sensitive Receptors

The Air Quality Modelling report, as submitted on June 20, 2007, provides predictions that ambient levels of PM2.5 are not expected to increase at the nearest residential air quality monitoring locations (i.e. Gladstone and Van Bien) due to the point source emissions. Cumulative PM10 levels at these same locations are also predicted to be about the same, or slightly lower than current background levels, which include the contributions from the existing pellet plant emissions. These results are summarized in Section 6.8 (pages 91 to 93 and Tables 6-10 and 6-11). The predicted PM2.5 increments resulting from the plant re-location are small relative to background levels, both for the 24-hour average (2 µg/m3 or less) and annual average (less than 0.1 µg/m3), in the College Heights, and Van Bien areas (Figures 5.2-8 and 5.2-9). The relatively small predicted pellet plant contributions reinforce the conclusion that a cumulative increase in levels in the nearest residential areas is unlikely, subject of course to the uncertainties in the impact assessment.

An increase in PM10 and PM2.5 levels is predicted for the Canada Post facility and other BCR Industrial Area workplaces in the vicinity of the new plant, as shown in Figures 5.3-4 and 5.3-8. At the Canada Post facility the extent of expected increases in PM10 and PM2.5

levels is depicted in Figure 6.5-9, showing increases of up to 15 µg/m3 and 4 µg/m3, respectively. In Table 6-8, a predicted increase of 0.6 µg/m3 in the highest PM2.5 annual average is reported for this facility. Although no baseline is available for that specific location, PM10 is measured about 4 kilometres north at the BC Rail Warehouse. Using the ratio of PM10 multi-year annual averages at Van Bien and BCR provides an extrapolated PM2.5 average of 12.4 µg/m3 at the BCR monitoring site, which is expected to be most representative of the Canada Post site. The predicted PM2.5 maximum annual average increase of 0.6 µg/m3 at Canada Post is about a 5% increase, which is relatively insignificant. However, 24-hour average PM10 and PM2.5 levels may be significantly increased at the Canada Post facility due to the re-located plant, and monitoring of indoor PM levels, including pre-start-up levels, should be done to determine the effect on worker exposure. Workers at Canada Post and other facilities predicted to be exposed to increased PM levels should be notified of the potential health risks by the appropriate agency.

Based on the isopleths of percent change in the ambient objectives for 24-hour and annual average PM10 and PM2.5 levels (Figures 5.3-4/5 and 5.3-8/9), ambient levels are expected to decrease at residences on the east side of the valley relative to current levels. Since there are no ambient monitoring stations no analysis of cumulative change has been provided for this area.

Contributions from dust have not been assessed due to the high level of uncertainty in estimating and modelling emissions from these fugitive sources. Crustal dust emissions are mainly a source of the coarser portion of PM10; however, the more effective management measures proposed for the relocated plant relative to the existing plant should result in reduced fine particulate contributions in all areas except for the nearest workplaces. While the relocated plant is now closer to residences on the west side of the valley, reduced emissions and the relatively short settling times of the coarser particles reduce the likelihood that dust will contribute to increased PM2.5 or even PM10-PM2.5 levels in residential areas.

Uncertainties in the Effects Predictions

The applicant indicates that the inventory of point source emissions has been derived from a combination of actual emission testing at the current plant and application of emission factors from other, most-similar emission sources including other wood products plants. Because of the paucity of direct emission measurements from the existing sources, there are considerable uncertainties in this inventory which, despite the use of some conservative factors, may result in actual emissions being significantly greater than the estimated levels. There are uncertainties in the model predictions, in addition to those introduced by the emission inputs, including inputting errors for the meteorological components.

The level of uncertainty in impact assessment should be balanced with a corresponding level of contingency built into the emission management system. The permit should reflect the uncertainties in emission estimation by inclusion of appropriate conditions for compensating or adjusting for un-predicted emission increases. Recommendations on permitting approaches are provided below.

Compatibility with AQ Plan Objectives

A key objective of the Phase I and II Air Quality Management Plans is the prevention of further degradation of ambient air quality, and of PM levels in particular. Use of improved emission control technology (the primary dryer and baghouse) helps accomplish this objective. The proposed relocation of the PBEC pellet plant includes reductions in point source PM emissions through a number of changes to the existing operation, including:

1. Upgrading of the secondary dryer pollution control technology to a high efficiency cyclone;

2. Reducing the need for drying feedstock by increasing the bypassing of the primary dryer from 25% to 75% of the processed material;
3. Recirculating of primary dryer exhaust to reduce to reduce emission volumes;
4. Installing a new baghouse with significantly improved PM removal capacity; and
5. Using a combined emission stack for the dryers, to provide better buoyancy and atmospheric mixing, while eliminating the open emission point for the secondary dryer cyclone.

As well as reducing emissions, the proposed plant relocation also meets the Air Quality Plan objective by protecting ambient air quality at the nearest residences. However, because the plant will now be located closer to the nearest workplaces, PM10 and PM2.5 levels are predicted to increase at these locations. The model predictions don't include contributions from crustal dust, but the project proposal includes measures for substantial reduction in dust through paving of traffic areas and covering of feedstock piles and handling areas. Therefore, ambient levels of coarser particulate, including the PM10 - PM2.5 size fraction, may not increase at the nearest workplaces to the same degree as predicted by the model. However, because of the relocation an increase to some degree is expected at workplaces that are now closer to the plant, such as the Canada Post facility, as reviewed earlier.

The Air Quality Plan recommendation that new emission sources utilize "lowest achievable discharge rates" (Recommendation #13) has not been met with this expanded source even though use of improved control technology for some point source emissions is proposed. Lowest emission rates could be achieved with the use of electrostatic precipitators (ESP), which have been installed on wood combustion sources at new wood products plants in this area, including the Canfor Intercon and PG Pulp cogeneration boilers in Prince George, and on the dryers at the LP-Canfor OSB plant in Fort St. John. In addition the LP OSB plant in Dawson Creek has been retrofitted with an ESP for the dryer emissions. It is our position that all new emission sources in this airshed should use control technology that will achieve the lowest achievable emission rates. Because this project is predicted to produce a reduction in emissions relative to the existing operation, it is not considered a new emission source and, therefore, should not be subject to this condition, at this time. Any increase in emissions, due either to further production expansion or to inaccuracy in the modelled emission estimates as demonstrated through actual emission testing, should not be approved without application of the lowest achievable emission rates for the relevant sources.

All emission sources in this airshed, especially combustion sources, including this proposed facility, should upgrade periodically to meet lowest achievable discharge rates, consistent with the principle of continuing improvement that is particularly relevant to pollutants, such as fine particulate matter, that lack thresholds for human health effects. It is expected that this principle will be incorporated into the Phase III Air Quality Plan and that, based on the source apportionment studies, will include higher-ranked facilities than the re-located pellet plant, provided that the estimated emission levels are not found to be significantly under-estimated.

Recommendations on Permitting Approaches

We are making recommendations on permitting approaches in four areas:

- Conditions for requiring further reduction of emission levels;
- Balancing uncertainty and emission management contingencies;
- Management of fugitive dust; and
- Evaluating the accuracy of ambient effect predictions.
- We recommend the following hierarchy of conditions for requiring pollution control upgrades be incorporated into the permit, or otherwise adopted by the Ministry.
- Actual point source emission levels higher than existing contributions;
- Non-compliance with emission limits or emission levels greater than those modelled;
- A proposal to increase emission levels (e.g. greater than 5%); and

- A pre-set permit timeframe for upgrading.

Uncertainties in estimating future emissions should be balanced by requiring a relatively frequent level of emission testing on the re-located facility. As well, if an emission source fails a test it should be re-tested as soon as possible, and if a second failure or significantly-higher emission level than originally estimated occurs, throughput from that source should be reduced to the existing level until an acceptable emission test result is obtained. Production levels may or may not be affected by a reduction in throughput in an affected emission source depending on whether or not production can be increased through an equipment bypass. Shutdown of the facility until acceptable emission levels have been achieved should be included in the contingency plan.

Because of the uncertainties in estimating emissions and modelling effects, fugitive dust must be managed adaptively by monitoring and adjusting suppression methods based on the ambient results. A monitoring program for dustfall, or another indicator of deposited material, should be designed so as to segregate the pellet plant emissions from other sources. The effectiveness of the proposed fugitive dust reduction measures must be assessed, including maintenance of paved work and access areas so as to achieve the emission estimates provided in the application.

Over a short period of time, such as one-to-two years, comparison of the effects of emission changes cannot be effectively assessed using ambient monitoring data. This is particularly the case with this application because the ambient impacts have been assessed over a five-year period. Ambient levels will vary over the short-term due to variations in meteorological and other emission sources. Therefore, the primary indicator of the accuracy of the point source effects predictions is comparison of actual emission levels with levels estimated for the permit application. Significant increases in actual emissions would be expected to result in increased ambient levels, but a more accurate assessment could be provided by modelling any emission changes using the meteorology for the same timeframe.

The permit should contain a requirement that the permittee should comply with any recommendations in the Prince George Air Quality Management Plan that apply to its operations, including any recommendations produced during the term of the permit. The Phase III AQ Plan may contain recommendations that all, or at least the highest-priority combustion sources must meet the lowest achievable discharge rate, commensurate with emission rates associated with other ESP-equipped sources.

Finally, a fixed expiry date should be included in the permit, to require the permittee to evaluate the effectiveness of emission management measures in protecting the ambient environment, to enable new developments in emission management, monitoring and impact assessment to be incorporated, and to give the public and other stakeholders the opportunity to provide input.

Submitted to Ministry of Environment and Pacific BioEnergy – July 4, 2007