DELG Draft Approval to Operate I-3159
Weyerhaeuser Company Ltd. - Miramichi Oriented Strand Board Facility

Comments and Recommendations submitted by
Conservation Council of New Brunswick
December 20, 2006

General Comments - Facility Profile

The Weyerhaeuser Oriented Strand-Board (OSB) facility in Miramichi releases the greatest amount of carcinogens of any industrial facility in the province (Table 1). Province-wide, seven of the top ten industries that release cancer-causing pollutants into the atmosphere also release formaldehyde and/or acetaldehyde (Table 1). They are wood-based products industries. (The Smurfit-Stone facility in Bathurst closed in 2005.)

Community	Company	Total Release of Carcinogens in 2003 (mt)
Miramichi	Weyerhaeuser	**188.0**
St. Stephen	Flakeboard	**63.4**
Atholville	AV Cell	**60.2**
Saint John	Irving Oil Refinery	**39.8**
Edmundston	Nexfor Fraser	**33.3**
Saint John	Irving Pulp & Paper/Tissue	**16.3**
Bathurst	Smurfit-Stone	**14.9**
Miramichi	UPM-Kymmene	**14.6**
Bathurst	Brunswick Mine	**10.0**
Belledune	Brunswick Smelter	**9.3**
Total		**450.0**

Table 1. Top ten companies in New Brunswick that released carcinogens in 2003. Source: Compiled by PollutionWatch based on Environment Canada's National Pollutant Release Inventory

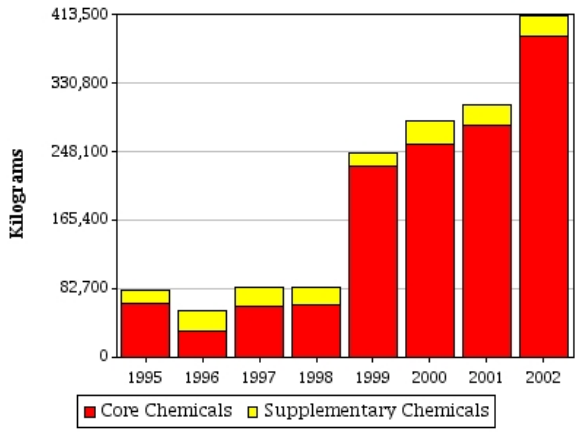

Figure 1. Release of cancer-causing pollutants in New Brunswick. Source: PollutionWatch

The community of Miramichi is under a severe toxic burden. Two other facilities within a 7-km area of the Weyerhaeuser mill also release pollutants that cause cancer and a wide range of other health effects: UPM-Kymmene paper mill and the Atcon plywood mill. The Atcon facility, formerly called Nelson Forest Products, was destroyed in a fire in 2002 and re-opened in 2004. The plywood mill is a source of formaldehyde and/or acetaldehyde emissions as well as other pollutants such as particulate matter. The facility is classified as a Class 2 source under the province's *Air Quality Regulation* and, therefore, their operating permit is not subject to public review. There is no data on Acton's emissions listed in Environment Canada's National Pollutant Release Inventory (NPRI).

As noted above, not all polluters report their emissions data to the NPRI. However, based on the emission of those facilities that do report, there has been an overall increase in the release of carcinogen in New Brunswick since 1998 (Figure 1). According to the 2004 New Brunswick Department of Health report on cancer in the province, the incidence rates of all cancers are expected to increase by 23%

over the next decade.

In 2005, Weyerhaeuser released 155 mt of formaldehyde and acetaldehyde which are recognized carcinogens as well as suspected developmental, immuno-, kidney, neuro-, respiratory, and skin toxicants. The facility also releases a large volume of other air pollutants that cause a wide range of health problems. These include carbon monoxide (a developmental/ reproductive toxicant), nitrogen oxides (respiratory toxicant), sulphur dioxide (respiratory and neuro-behavioural toxicant), particulate matter (respiratory toxicant) and phenols (respiratory, skin and liver toxicant)(Table 2).

Pollutant	2003 mt	2004 mt	2005 mt
formaldehyde	117.65	97.5	97.5
acetaldehyde	70.3	66.6	57.4
carbon monoxide	1676.0	1001.7	943.2
nitrogen oxides	114.5	83.9	111.6
particulate matter (total)	232.5	206.2	211.2
phenols	15.9	14.35	16.9

Table 2. Main pollutants (by volume) released from Weyerhaeuser's Miramichi OSB facility between 2003-2005.

Emissions Limits

General

The annual amount of pollutants reported by Weyerhaeuser to the NPRI are estimated values only. They are based on an emissions test (usually reported as the average of three one-hour stack tests) and not on actual daily continuous emissions monitoring. A stack test very likely represent an underestimation of the actual pollutants released. For example, when NB Power's facilities in Minto, Belledune and Dalhousie began reporting pollutants based on continuous emissions monitoring rather than a stack test, the amount of particulate emissions reported in 2005 increased by 300 - 700% over the values reported in 2004.

The technology is currently available to monitor a wide-range of pollutant on a continuous basis.

Recommendation: The Approval to Operate must require the company to report emissions of key pollutants (particulate matter, carbon monoxide, nitrogen oxides, sulphur dioxides, formaldehyde, acetaldehyde, total non-methane hydrocarbons and phenols) based on continuous emissions monitoring data not on an annual stack test.

Formaldehyde

Weyerhaeuser's Approval to Operate (AO) sets formaldehyde emission limits on the main stack and press vents. Emission rates (mass discharge limits) for formaldehyde (4 kg/hr or1.1 g/sec) are set on the press vents only. There is no emission rate set for acetaldehyde which is also a recognized carcinogen.

According to compliance source emissions testing reports, **Wyerhaeuser chronically violates the formaldehyde emission limit set in their AO on their main stack.** In 2005, the main stack emission limit for formaldehyde was exceeded by almost 300% (Table 3). In 2004, it was exceeded by over 350 % and, in 2003, the limit was exceed by 400 %. In 2002, the limit was exceeded by over 600%. The main stack represents the single largest source of formaldehyde emissions.

Table 3. Formaldehyde Emissions Inventory for Weyerhaeuser's Miramichi Facility

Source Testing Date	Main Stack[1]		Press Vents[2]	
	Formaldehyde (HCHO) Concentration mg/m^3 **(20 mg/m^3 - Limit in AO)**	HCHO Emission Rate g/s **(No limit in AO)**	HCHO Concentration mg/m^3 **(20 mg/m^3 - Limit in AO)**	HCHO Emission Rate g/s **(1.1 g/s - Limit in AO)**
June 2002[3]	**130.83**	6.0	11.47	0.12
Sept 2003[3]	**85.63**	3.89	6.07	0.05
Dec 2004[3]	**70.23**	3.28	4.93	0.04
Sept 2005[4]	**57.22**	11.1	5.26	0.04

[1] The main stack values are reported as the average of three 1-hour emissions tests conducted over a one- or two-day period.

[1] There are six press vents at the Weyerhaeuser facility. Emissions tests are done on each press vent and reported as an average of three 1-hour tests conducted over a one- or two-day period. The values in Table 3 are averages of all six press vents.

[3] Jacques Whitford. Air Quality Dispersion Modelling Study of Formaldehyde Emissions: Weyerhaeuser Company Limited, Miramichi. July 29, 2005. Project number NBF16659. Page 25-26.

[4] Jacques Whitford. Compliance Source Emission Testing 2005. Weyerhaeuser Company Ltd. Project No. 1004955, page iii-iv.

If the stack emission limit for formaldehyde in Weyerhaeuser's AO was enforced by the Department of Environment, the release of carcinogens to the community would be decreased by an estimated 100 mt.

Recommendation: The facility must be required to meet the emission limit for formaldehyde (20 ug/m^3) on the main stack. The formaldehyde discharge limit set for the press vents (1.1 g/s or 4 kg/hr) must also apply to the main stack. The facility AO must define emission limits for acetaldehydes.

Particulates

Weherhaeuser's AO sets emission limits for particulate matter on the main stack (200 mg/m^3) and press vents (200 mg/m^3). Mass discharge rates for particulate matter are set only on the main stack (34 kg/hr or 9.4 g/s) only. Total particulate matter reported by Weyerhaeuser in 2005 was 211 metric tonnes (mt). This value represents an increase over the amount reported in 2004 (206 mt). Over 85% of the total particulates reported are PM2.5 (particulate matter less than 2.5 micron in size). PM2.5 are universally acknowledged as causing a range of health effects including premature mortality and heart and lung diseases.

New Brunswick allows wood-based products industries like Weyerhaeuser to operate at higher particulate emission limits and rates than would be permitted in other jurisdictions in Canada, the United States and Europe (Table 4).

Four other wood-products industries also discharge particulate matter into the Miramichi airshed.

These industries, concentrated in a 7-km area of each other, operate directly in the middle of a highly populated community. They include Anderson's sawmill, Atcon Plywood, UPM-Kymmene Groundwood Mill and UPM-Kymmene paper mill. Based on just those facilities that report to the NPRI (UPM-Kymmene and Weyerhaeuser), an estimated 500 mt of particulate matter are discharged into the airshed. (Information on particulate discharges from Atcon and Anderson are not available and particulate estimates from UPM and Weyerhaeuser are based on an annual stack test only). According to the 2004 provincial cancer report, Health Region 7, which includes the Miramichi, has the highest incidence of lung cancer among males.

Jurisdiction	Main Stack		Press Vents	
	Emission Limit **mg/m^3**	Emission Rate **g/s**	Emission Limit **mg/m^3**	Emission Rate **g/s**
New Brunswick[1]	**200**	**9.4**	**200**	_
Québec[1]	50	-	50	-
Ontario[1]	90	-	90	-
Manitoba[1]	-	5.4	-	2.18
Maine[1]	-	1.97	-	1.55
Texas[1]	-	-	-	0.14
England[2]	50	-	-	-

Table 4. Comparison of regulatory limits on particulate matter for oriented strand board facilities. Source: [1]Industry Canada and [2]Department for Environment, Food and Rural Affairs, England.

The province-wide 24-hour ambient air quality guideline for particulate matter is 120 ug/m^3. Other jurisdictions (California and Vancouver) have significantly lower standards (50 ug/m^3). Based on the information provided in the provincial air quality monitoring reports for 2004, if the 50 ug/m^3 standard was applied to New Brunswick, the air quality monitors operated by Weyerhaeuser would record the greatest number of violations of all monitoring stations in the province and the greatest number of violations of any community in the province.

Recommendation: The emission limit for particulate matter on the main stack and press vents must be lowered to at least 50 mg/m^3. The emission rate for particulate matter on the main stack must be lowered to ensure that the 50 mg/m^3 concentration limit is met. The facility AO must define a particulate matter emission rate on the press vents.

Carbon Monoxide

Carbon monoxide (CO) can cause reproductive and developmental health problems.. The AO for Weyerhaeuser which expired on January 15, 2002, set the CO emission limit on the main stack and the press vents at 100 mg/m^3. The subsequent (current) AO increased the CO emission limit to 1000 mg/m^3. In 2005, the facility released 943 mt of CO.

Recommendation: The carbon monoxide emission level on the main stack should be re-set at 100 mg/m^3.

Formaldehyde Emission Action Plan

As part of a *Formaldehyde Emission Action Plan*, Condition 37 of Weyerhaeuser's AO required the company to complete an emission source characterization and air quality dispersion model for formaldehyde by July 30, 2005. Jacques Whitford was contracted by the company to do the modelling study.

The model predicted that the highest maximum 1-hour, 8-hour, 24-hour and annual average ground-level concentration of formaldehyde would occur with a 1 km radius of the facility. Since New Brunswick has no regulatory standards for ground level concentrations for formaldehyde, the consultants, with approval from the Department of Environment, selected 65 $\mu g/m^3$ (the standard in Alberta, Ontario and Newfoundland) as the standard to compare the model results. (In British Columbia, the 1-hour action level is 60 $\mu g/m^3$.)

The model's conclusion were based on estimated annual formaldehyde emissions at the facility (average of stack tests conducted in 2002, 2003 and 2004), estimates of baghouse emissions and meteorological data from the Moncton airport and Sept- Îles (Québec).

The study did not factor in background levels (cumulative effects) of formaldehyde because the terms of reference for the study did not require incorporating background levels. The consultants pointed out that historic ambient formaldehyde monitoring conducted by Weyerhaeuser indicated levels were less than 5 $\mu g/m^3$ averaged over 24-hour period. However, the consultants did not present historic one-hour ambient formaldehyde concentration recorded by Weyerhaeuser. (The modelling study predicted that highest 1-hour concentration of formaldehyde, 37.5 $\mu g/m^3$ occurred outside boundary of the facility.) (See: Jacques Whitford correspondence to DELG Approvals Branch, September 23, 2005, page 2). The terms of reference for the study did not require measuring actual ground-level concentrations to verify the model predictions.

According to Health Canada, the average concentration of formaldehyde in Canadian homes is 30-40 $\mu g/m^3$. (Health Canada. 2006. Residential Indoor Air Quality Guideline. Formaldehyde. Cat.: H128-1/06-432-1E). The sources of indoor formaldehyde include cigarette smoke, open fireplaces and off-gassing from building material, varnishes, paints, carpeting, drapes and curtains. Formaldehyde emissions from industrial sources can also accumulate in homes and add significantly to the pollution burden of residents.

Exposure Period	Concentration		Critical Effect
	ug/m³	ppb	
1 hour	123	100	Eye Irritation
8 hours	50	40	Respiratory symptoms in children

Table 5. Residential Indoor Air Quality Guidelines for Formaldehyde. Source: Health Canada 2006

Since the modelling study predicted that formaldehyde levels outside the boundary of the plant would not exceed recognized ambient air quality criteria, Weyerhaeuser is not required to do the next phase (human health risk assessment) of the *Formaldehyde Emission Reduction Plan*. Without verifying the model's predictions with actual monitoring results and considering cumulative effects, the conclusions of the study are merely hypothetical and should not be the basis on which the Department decides whether or not to proceed with the next phase of the *Formaldehyde Emission Reduction Plan*.

Recommendation: The formaldehyde air quality dispersion model must be re-run using formaldehyde concentrations based on continuous emissions data and meteorological data from the Chatham Airport and Weyerhaeuser's on-site stations at Hay Lane and the Fire pond. The model's 1-hour, 8-hour and 24-hour predictions must be compared with actual monitoring data from key receptor sites.

Recommendation: The Department of Environment should undertake a study to evaluate formaldehyde levels in the homes located within the pollution footprint of the plant. The study should determine what contribution emissions from Weyerhauser's facility make to the overall residential indoor air quality.