

Health Consultation

Pechiney Plastic Packaging Inc.

Minneapolis, Hennepin County, Minnesota

November 20, 2000

Prepared by the Minnesota Department of Health
Under Cooperative Agreement with
The Agency for Toxic Substances and Disease Registry

FOREWORD

This document summarizes public health issues related to levels of allowable emissions in the proposed Pechiney Plastic Packaging Inc. Air Permit Application. It is based on a formal site evaluation prepared by the Minnesota Department of Health (MDH). A number of steps are necessary to do such an evaluation:

- ! **Evaluating exposure:** MDH scientists begin by reviewing available information about environmental conditions at the site. The first task is to find out information on the stack and fugitive emissions from a facility, and how people might be exposed to these emissions. Usually, MDH does not collect its own environmental sampling data. We rely on information provided by the Minnesota Pollution Control Agency (MPCA), U.S. Environmental Protection Agency (EPA), and other government agencies, businesses, and the general public.
- ! **Evaluating health effects:** If there is evidence that people are being exposed—or could be exposed—to hazardous substances, MDH scientists will take steps to determine whether that exposure could be harmful to human health. The report focuses on public health—the health impact on the community as a whole—and is based on existing scientific information.
- ! **Developing recommendations:** In the evaluation report, MDH outlines its conclusions regarding any potential health concern posed by facility emissions, and offers recommendations for reducing or eliminating human exposure to emitted pollutants. The role of MDH in dealing with industrial emissions is primarily advisory. For that reason, the evaluation report will typically recommend actions to be taken by other agencies—including EPA and MPCA. However, if there is an immediate health threat, MDH will issue a public health advisory warning people of the danger, and will work to resolve the problem.
- ! **Soliciting community input:** The evaluation process is interactive. MDH starts by soliciting and evaluating information from various government agencies, the company responsible for the emissions, and the community surrounding the facility. Any conclusions about the facility are shared with the groups and organizations that provided the information. Once an evaluation report has been prepared, MDH seeks feedback from the public.

A Health Consultation is a working document. It describes site conditions using data available at a specific time. If more data become available in the future, MDH can write follow-up documents to describe newly available data, information, or changing conditions.

If you have questions or comments about this report, we encourage you to contact us.

Please write to: Community Relations Coordinator
Site Assessment and Consultation Unit
Minnesota Department of Health
625 Robert St. North
Box 64975
St. Paul, MN 55164-0975

Or call us at: (651) 201-4897 *or* 1-800-657-3908
(toll free call—press "4" on your touch tone phone)

Introduction

Pechiney Plastic Packaging Company (Pechiney) is located at 150 26th Avenue Southeast, Minneapolis, Hennepin County, Minnesota. Pechiney packages individual servings of condiments and other foods for food services, as well as medical care products. In the spring of 2000, the Minnesota Department of Health (MDH) was asked by the Minnesota Pollution Control Agency (MPCA) to review proposed limits for an air permit for Pechiney. This document contains a review of the reported air emissions from the facility, screening dispersion modeling of these emissions, and the potential impact of these emissions on public health.

This review does not include any review of special requirements for this industry which may be administered or enforced by the U.S. Food and Drug Administration, the U.S. and Minnesota Departments of Agriculture, the U.S. Environmental Protection Agency (EPA), and the MPCA. MDH assumes that Pechiney follows federal and state requirements related to the use of specific chemicals in food packaging.

At the request of the MPCA, an original draft copy of this document was submitted to Pechiney for a review of factual information. A copy of their response, with MDH comments, is appended to this document (Pechiney Plastic Packaging Inc., 2000a). Factual changes have been incorporated into this document where appropriate.

The Facility

Pechiney Plastics is located in Southeast Minneapolis, about 1 mile east of the main University of Minnesota campus. The facility is 3 to 5 stories high, covers one city block and is bordered by Essex Street SE to the southwest, 26th Avenue SE (northwest), Delaware Street SE (northeast), and 27th Avenue SE (southeast) (see Attachment #1). Land around Pechiney slopes gently from east to west. Single family and two family dwellings are directly across the street from Pechiney to the south and within a block of the facility to the east and north. There are businesses to the northwest, west, southwest, and south of the facility

Pechiney uses multiple printing and coating materials in several processes to produce packaging materials for the food and health care industries. Solvent printing and coating materials are used in these processes and are exhausted to the atmosphere through stacks on the roof. A thermal oxidizer is used to control one process as required by the MPCA. The oxidizer was installed with the process in 1990.

Regular Stack and Fugitive Emissions

There are numerous short stacks (less than 10.1 meters high) on the roof of the Pechiney Plastics building. These stacks vent chemical compounds and particulates listed in the emissions inventory (See Tables 1 and 2). Some of these same compounds are also probably vented as fugitive emissions through doors and windows.

'Potential' and 'Actual' Emissions

'Potential' emissions, as defined for permitting purposes, assume that a manufacturing process is operational 24-hours a day, 365 days a year (8760 hours/year). 'Actual' emissions are determined from material usage records and control efficiencies for the processes. 'Actual' emissions for natural gas are determined from emission factors. 'Limited potential' emissions are emission maximums which the company and MPCA agree on for the facility.

For the purpose of applying for an air operating permit, representatives of Pechiney Plastics calculated emission rates for their Minneapolis facility. Using these emission rates, 'potential' emissions and 'actual' emissions were calculated. Table 1 below contains a list of 'potential' and 'actual' annual emissions, as well as limits initially proposed in the permit application.

Table 1 - Proposed Emission Rates				
	Emission rate	Potential to emit		Actual
	Pounds per hour	Unlimited Tons per year	Limited Tons per year	Tons per year
NO _x	6.67	29.21	29.21	2.26
VOC	2,176.05	9,529	1,540	699
CO	3.55	15.54	15.54	1.87
MEK*	657.6	2,880.4	1500	65.9
Toluene*	698.7	3,060.5	1500	56.85
1,4-Dioxane*	525.1	2,299.8	1500	4.81
PM	0.323	1.41	1.41	0.14
PM10	0.323	1.41	1.41	0.14
SO _x	0.478	2.09	2.09	0.014
Pb	2.12E-05	9.20E-05	9.20E-05	1.10E-05

*Compliance with 40 CFR 63 Subpart KK will further limit total hazardous air pollutants (HAPs: which include MEK, toluene, and 1,4 dioxane) (Pechiney Plastic Packaging Inc., 2000b). Compliance with this National Emission Standard for HAPs (NESHAPS) could limit total HAPs emissions to about 300 tons per year (tpy) (Pechiney Plastic Packaging Inc., 2000a).

MDH requested additional information, from MPCA, about the specific Volatile Organic Compounds (VOCs) used on-site (MDH, 2000b) and was provided with the following list (Table 2) specifying quantities of solvents used in 1999. Note:

- ! the total of identified VOC emissions reported in Table 2 is 392 tons.
- ! the 'actual' VOC emissions from the facility, calculated by Pechiney from 1998 data and listed in the proposed permit, are 699 tons. Therefore, if 1999 usage was similar to 1998 usage or the 'actual' VOC usage as listed on the proposed permit, 44 % of the 'actual' 1999 VOC emissions remain unidentified.
- ! the 'actual' usage of methyl ethyl ketone (MEK), toluene, and 1,4-dioxane (dioxane) in 1999 (Table 2) was about 1/4 of the 'actual' emissions of individual chemicals in the proposed permit (and the 1998 'actual' usage).

! the 'actual' dioxane usage (Table 2) is greater than the 'actual' emissions in the proposed permit.

Table 2 - VOC usage - 1999			
Solvent	CAS #	Usage Pounds	Usage Tons
Methyl Ethyl Ketone	78-93-3	31,926	15.96
Toluene	108-88-3	22,502	11.25
1,4-Dioxane	123-91-1	11,159	5.58
Isopropanol	67-63-0	17,003	8.50
n-Propyl Acetate	109-60-4	217,568	108.78
Ethanol	64-17-5	58,087	29.04
n-Propanol	71-23-8	249,316	124.66
Ethyl Acetate	141-78-6	168,576	84.29
PGME	107-98-2	1,760	0.88
Heptane	142-82-5	4,699	2.35
Isopropyl Acetate	108-21-4	403	0.20
1,3-Dioxolane	646-06-0	1,162	0.58
Totals		784,161	392.08

Public exposure to emitted compounds

Upon release, chemicals mix with outdoor air and are dispersed and diluted. Exposures to released compounds depend upon proximity of people to the site / release points, release parameters (stack height and location, release temperature and velocity), site characteristics (proximity to buildings and hills), and meteorological conditions. Concentrations of hazardous compounds in ambient air can be determined by sampling or can be estimated with modeling techniques. Due to the variability of conditions, the costs associated with monitoring chemical concentrations off-site, and the uncertainty that the worst conditions are ever monitored, it is more efficient to model ambient air concentrations by applying varying emissions amounts and conditions to dispersion models. Furthermore, models can be used to add a margin of safety, or conservativeness, to exposure estimates. Problems associated with the application of models are especially prevalent with the use of short-term models and are often related to the lack of reliable background concentration information and extreme short-duration meteorological conditions.

The MPCA has developed Screening Emission Rates (SERs) which are the maximum amount of an emitted compound which is conservatively modeled to result in time-averaged maximum ambient air concentrations no higher than the health criterion or standard. The SER model applies health criteria or standards, and using a conservative dispersion model, calculates the amount of release which may, under worst-case facility characteristics, reasonable worst-case meteorological conditions, and flat terrain, lead to an exposure equivalent to the health standard (MPCA, 1996). Due to the built in conservativeness, especially in default parameters intended to model the physical characteristics of a facility, SERs may be overly protective for some facilities.

Under some extreme short-term meteorological conditions the calculated SERs may not be protective.

Exceedance of this screening model implies that: emissions should be better characterized, the dispersion model should be refined using site-specific information, potential site-specific exposure conditions should be quantified, and / or emissions should be decreased.

The SER for each chemical released can be calculated from the following formula:

$$\text{SER} = \text{HBV} \times \text{dilution factor} \times \text{stack gas flow rate} \times \text{conversion factor}$$

HBV = health-based value (includes HRVs, RELs, RfCs, ... described below)

Dilution factors, stack gas flow rate, and conversion factors used for facilities with non-GEP stacks (stacks subject to downwash), such as Pechiney, are listed in Table 3.

Table 3 - SER Model Defaults			
Assumed (Non-GEP) Stack-Flow Rate			
0.196 m ³ /sec			
Dilution Factors			
1 hour	8 hour	24 hour	Annual
260	800	2200	23000
Conversion Factors			
1 hour	8 hour	24 hour	Annual
7.94E-06 lbs/hr	6.35E-05 lbs/8 hr	1.91E-04 lbs/day	0.06857 lbs/year

III. Public Health Criteria

Standards, Criteria, and Uncertainty

Draft Health Risk Values, Minnesota Department of Health

MDH has developed draft Health Risk Values (HRVs) for some hazardous compounds found as pollutants in air (MDH, 2000a). The general population, including sensitive sub-populations (e.g. children, asthmatics, and the elderly), should be protected during one hour exposures to hazardous compounds at concentrations at or below the acute draft HRVs. Draft chronic HRVs are annual average exposures which, if not exceeded over a lifetime, should protect exposed populations, including sensitive sub-populations. MDH does not have specific criteria, either chronic or acute, indicating safe levels of NO_x's, SO_x's, sulfates, particulate matter (PM), or a

number of other compounds released from Pechiney. Therefore, MDH applies criteria developed by other health or environmental agencies in the U.S. when available.

Minnesota Ambient Air Quality Standards

Minnesota has promulgated rules for Minnesota Ambient Air Quality Standards (MAAQS) (MPCA, 2000) to protect human health and the environment. Many of the compounds regulated are also covered by national standards (see below). MAAQS primary standards are applied by MDH as standards which can be considered an upper limit, not to be exceeded. MAAQS secondary standards are not generally applied for assessment of health risk by MDH, because they were enacted to limit detrimental effects to the environment.

National Ambient Air Quality Standards and Reference Concentrations, US EPA

The EPA, as required by the Clean Air Act Amendment of 1970, established National Ambient Air Quality Standards (NAAQS) in 1971 to protect the public from exposure to harmful levels of six common air pollutants including NO₂, SO₂, and particulate matter (PM) (EPA, 1997). NAAQS criteria are concentrations of specific pollutants, not to be exceeded from 0 to 3 times (standard dependent) during a specified averaging period. The 24-hour PM₁₀ NAAQS for particulate matter less than 10 microns in diameter (PM₁₀) was recently changed from: “not to be exceeded more than once per year,” to: “not to be exceeded 98 % of the time.” There are 3 NAAQSs for SO₂: a 3 hour (secondary) standard of 1,300 micrograms per cubic meter (Fg/m³), not to be reached or exceeded more than once a year; a 24-hour (primary) standard of 365 Fg/m³, not to be reached or exceeded more than once a year; and an annual (primary) standard of 80 Fg/m³, not to be reached or exceeded. While the NAAQS (and MAAQS) may set legal limits for ambient air, MDH believes that the general public should not be exposed to concentrations of these pollutants which approach these levels. Research has shown that health effects may result from exposure to certain pollutants at levels equal to or below the NAAQS (Klemm et al., 2000; Lippmann & Schlesinger, 2000).

There are 2 types of NAAQS (and MAAQS): primary and secondary. Primary standards were enacted to protect human health including sensitive populations such as asthmatics, children and the elderly. Secondary standards were set to protect the environment and ‘quality of life’ measures such as visibility, vegetation, animals, and buildings.

Nitrogen oxides are a primary component of photo-chemical smog (others being hydrocarbons, and ultra-violet light) (Manahan, 1991; Finlayson-Pitts & Pitts, 1997). Nitrogen oxides are very reactive, reacting with oxygen, ozone, ammonia, hydrocarbon compounds, and water. Products of these reactions include ozone and reactive oxygen and peroxide species.

Sulfur oxides are colorless and typically form sulfuric acid and ammonium sulfate or other sulfate aerosols prior to removal from the atmosphere by wet or dry deposition (Manahan, 1991; Durham & Brock, 1986).

Particulates (i.e. PM₁₀ or PM_{2.5} - PM less than 2.5 microns in diameter) act as physical substrates and help catalyze chemical reactions which produce tropospheric ozone and photochemical smog (Manahan, 1991; Finlayson-Pitts & Pitts, 1997; Durham & Brock, 1986).

The NAAQS for PM_{2.5} was established by the EPA in 1997 because of research which demonstrated that the small particles have a greater impact on human health than large particles regulated in the PM₁₀ standard. The PM_{2.5} NAAQS is being reviewed in court, and therefore, is not enforceable at this time. The EPA has also determined chronic reference concentrations (RfCs) for some toxic compounds, which are annual averages, unlikely to cause health effects for a lifetime of exposure (EPA IRIS, 2000). RfC's are not regulatory maxima, but like the HRV's, are used to give advice for protection of human health.

Reference Exposure Levels, California EPA

The California Environmental Protection Agency also has health-based criteria which were developed from peer-reviewed scientific studies (CA OEHHA, 2000). The RELs have been incorporated as California's legal standards. California Acute Reference Exposure Levels (RELs) are concentrations of specific compounds which are unlikely to cause health effects in a population exposed for one hour. California Chronic RELs are concentrations which are unlikely to cause health effects to the general population exposed for their lifetime. Acute and chronic RELs are conservative and protective of sensitive populations, including young children, fetuses, and the elderly, although not necessarily the most sensitive (hypersensitive) individuals in these populations. California has also adopted cancer potency factors for evaluating cancer risk (CA OEHHA, 1999).

Reference criteria for compounds without published health criteria

There are about 80,000 chemical compounds used worldwide by industry. Of these, about 600 have been quantitatively evaluated for toxicity to humans; however, most of these chemicals have not been evaluated for all relevant exposure durations (e.g. acute or chronic) or for all possible health endpoints (e.g. cancer). At some level of exposure, all chemicals can be toxic. Therefore, to determine the hazard presented by exposure to a specific chemical, it is important to be able to estimate its toxicity.

The EPA reported in 1998 that, *"The US produces or imports close to 3,000 chemicals (excluding polymers and inorganic chemicals) at over 1 million pounds per year. A fundamental question concerns whether, and to what extent, basic toxicity information is available to the public on these major commercial chemicals in the United States. One might assume that basic toxicity information is available for these chemicals so that producers, users, workers, and consumers could be aware and be able to evaluate the hazards and risks posed by the chemicals they encounter in their daily lives. Based on results from a recent analysis done by EPA, this is not a prudent assumption. EPA's analysis found that no basic toxicity information, i.e., neither human health nor environmental toxicity, is publicly available for 43% of the high volume chemicals manufactured in the US and that a full set of basic toxicity information is available for only 7% of these chemicals."* (EPA, 1998)

For the purpose of risk assessment it is important to be able to quantitatively estimate the toxicity, or risk associated with exposure to all compounds of interest. Estimating the toxicity of chemicals usually entails a comparison of a compound's structure with the structure of a compound with a known toxicity. Sometimes there is specific information known about the mechanism of toxicity of both compounds which allows one to predict the relative toxicity of two compounds. As an example:

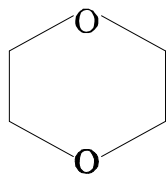
The acute HRV for methanol is 25,000 F g/m³. There is not a published HRV, REL, or RfC for ethanol. The structures of the 2 compounds are similar, and they have similar physical characteristics. It is known that ingested methanol can have serious neurological and developmental effects. While ethanol can have serious developmental effects, the acute neurological effects of ethanol exposure are generally reversible and generally, ethanol is less toxic than methanol. Therefore, the use of methanol health criteria as surrogate criteria for exposure to ethanol is protective of exposed individuals.

It may also be necessary to use surrogates for chronic toxicity (or, conversely, acute toxicity) of a compound for which there is an acute (or chronic) health guideline. There are acute health (REL) and NAAQS standards for carbon monoxide, but there are no maximum exposure level criteria for chronic exposure to carbon monoxide. There is much evidence that chronic exposure to low levels of carbon monoxide is associated with adverse health effects (Myers et al., 1998; Tolcos et al., 2000; Loennechen et al., 1999); therefore, in some circumstances it may be appropriate to either use the chronic toxicity of a similar compound and sensitive endpoint as a surrogate (e.g. cigarette smoking or cocaine use which can also result in fetal ischemia and developmental effects) if a health number cannot be developed from available carbon monoxide research on humans or animals.

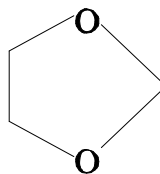
In order to protect public health, MDH uses surrogates for many compounds. The EPA recommends the use of surrogate criteria when there are no health criteria for compounds of interest at Superfund sites (EPA, 2000). MDH has used the toxicity of benzo[a]pyrene (BaP) as a surrogate for total polyaromatic hydrocarbons (tPAH) in groundwater; atrazine as a surrogate for atrazine metabolites; and currently, MDH is developing surrogates for petroleum fractions. Since standards or criteria cannot be reasonably expected to exist for all chemicals emitted from industrial facilities, in its absence MDH recommends the use of surrogates chosen for individual sites, or the development of provisional criteria from available toxicity information, for site or facility evaluation. MDH recognizes that for some compounds of interest there may be numerous potential surrogates. For that reason, MDH may accept the use of surrogates other than those which we propose. Furthermore, MDH will consider use of quantitative scientific studies to determine reference criteria, or site-specific reference criteria, which could be applied appropriately to a site.

1,4-dioxane and 1,3-dioxolane

This health consultation uses 1,4-dioxane (dioxane) as a surrogate for 1,3-dioxolane (dioxolane). The selection of this surrogate is based on the similar structure of the two compounds (see below). Further, MSDS's for the two compounds identify similar health effects including skin, eye, and gastrointestinal irritation as well as liver effects.



Dioxane



Dioxolane

Unfortunately, dioxane and dioxolane have not been characterized with an identical battery of toxicological experiments. Similar lethal inhalation concentrations have been calculated from experiments on laboratory animals, but these experiments do not provide much instruction in determining human health effects or levels of concern. Acute human health data are available for dioxane (CA OEHHA, 2000), but not for dioxolane.

Dioxane has been classified as a probable human carcinogen by the US EPA (EPA IRIS, 2000), the International Agency for Research on Cancer (IARC, 1999), and the California Office of Environmental Health Hazard Assessment (CA OEHHA, 1999). The EPA, IARC, or CA OEHHA have not classified dioxolane as to whether or not it may be a carcinogen. However, a brief review of mutation studies with dioxane and dioxolane discloses some similarities in experimental results. Both chemicals produce negative results in *in vitro* mutagenicity assays. But, both dioxane and dioxolane tested positive in micronucleus tests: dioxane in an *in vivo* mouse liver micronucleus assay (Morita & Hayashi, 1998) and dioxolane in an *in vivo* mouse bone marrow erythrocyte micronucleus test (Przybojewska et al., 1984).

Results of some laboratory experiments also demonstrate that 1,3-dioxolane may be a developmental toxin (Syracuse Research Corporation, 2000). (Complete studies and data from a Hoechst Celanese Corporation developmental toxicity study have not been peer reviewed and are not immediately available.) Similar experiments do not appear to have been conducted with 1,4-dioxane.

Under some circumstances, MDH may add an uncertainty factor to the exposure guidelines developed for a proposed surrogate to assure a reasonable level of protection against adverse effects. Given the relatively low acute toxicity in animals of both of these compounds and the cancer potency-based criteria for 1,4-dioxane, MDH believes that application of an additional uncertainty factor for 1,3-dioxolane will not result in a significant increase in protection.

While physical characteristics and toxic effects may be similar, MDH notes that the human odor threshold for dioxolane is about 30 times higher than the odor threshold for dioxane (198,000 Fg/m³ to 6,600 Fg/m³) (Verschueren, 1977).

Nitrogen oxides and particulate matter

Nitrogen dioxide is used as a surrogate for nitrogen oxides emitted from Pechiney. Furthermore, listed PM₁₀ emissions from Pechiney are assumed to be less than 2.5 microns and, therefore, all PM₁₀ emissions are also assumed to be PM_{2.5}. Other surrogates are not proposed in this document.

For the purpose of estimating the potential health effects of emissions from Pechiney, surrogates for compounds with significant emissions need to be proposed and agreed upon by all interested parties. MDH recommends that appropriate surrogates be proposed by Pechiney and be subject to review by MPCA and MDH.

Health criteria tables

Specific criteria of interest, for comparison with data and information related to short-term emissions from Pechiney, are contained in the following table (Table 4). Toxicological endpoint, averaging time, secondary standards (NAAQS) and odor recognition thresholds for 50% of exposed individuals (Verschueren, 1977) are identified.

TABLE 4
Acute Health Criteria

Compound	Acute (1 hr) HRV	Toxicological Endpoint	Odor Threshold (50% recognition)
1,4-Dioxane (1,3-Dioxolane)	* 3,000 F g/m ³	Irritant - eye	6,600 F g/m ³ 198,000 F g/m ³
Methyl ethyl ketone	* 10,000 F g/m ³	Eye, respiratory irritation	16,000 F g/m ³
Toluene	* 37,000 F g/m ³	Irritant; impaired reaction	6,700 F g/m ³
Compound	Acute (1 hr) REL	Toxicological Endpoint	
Nitrogen dioxide	470 F g/m ³	Respiratory irritation	
Isopropanol	3,200 F g/m ³	Eye, respiratory Irritation	19,000 F g/m ³
	NAAQS	Averaging Time	
Carbon Monoxide **	40,000 F g/m ³	1-hour	
Carbon Monoxide	10,000 F g/m ³	8-hour	
Sulfur dioxide ***	365 F g/m ³	24-hour	(secondary std.)
	1,300 F g/m ³	3 hour	
PM ₁₀	150 F g/m ³	24-hour	
PM _{2.5} *	65 F g/m ³	24-hour	(under court review)
	MAAQS	Averaging Time	
Sulfur dioxide	1,300 F g/m ³	1-hour and 3-hour	

* proposed

** 1 hr CA REL 23,000 F g/m³

*** 1 hr CA REL 660 F g/m³

Specific criteria of interest, for comparison with data and information related to long-term emissions from Pechiney, are contained in the following table (Table 5). Toxicological endpoint, cancer risk level, averaging time (NAAQS, MAAQS only) and secondary standards are identified.

TABLE 5

Chronic Health Criteria

Compound	Chronic HRV	Toxicological Endpoint
Toluene**	* 400 F g/m ³	Nervous sys./ upper respiratory
Chronic REL		
Propylene glycol monomethyl ether	2,000 F g/m ³	Central nervous system
1,4-Dioxane	3,000 F g/m ³	Alimentary, Kidney, Cardiovascular
EPA RfC		
Methyl ethyl ketone	1,000 F g/m ³	Decreased fetal birthweight
Negligible Risk Level		
CA Cancer		
	Unit Risk	1:100,000
Lead	1.2e-5(F g/m ³) ⁻¹	1:100,000
1,4-Dioxane	7.7e-6(F g/m ³) ⁻¹	
Averaging Time		
	NAAQS	quarterly
Lead	1.5 F g/m ³	annual
Nitrogen dioxide***	100 F g/m ³	annual
Sulfur dioxide	80 F g/m ³	annual
PM ₁₀	50 F g/m ³	annual (under court review)
PM _{2.5} *	15 F g/m ³	
	MAAQs	annual (secondary std)
Sulfur dioxide	60 F g/m ³	

* proposed

** CA REL 300 F g/m³*** CA REL 20 F g/m³**Emission Modeling Results and Discussion**

Using the compiled list of health criteria, standards, or guidelines for chemicals released from this facility and the MPCA screening emission rate model (SER model), safe emission levels can be calculated. The SER model calculates emission rates that will result in chemical concentrations in ambient air near a generic industrial site that are safe for the general public including sensitive sub-populations. For purposes of reviewing emissions from Pechiney, dispersion factors were back-calculated from the SER model. Multiplying the dispersion factor by the emission rate for each compound results in a potential maximum offsite concentration. These calculated ambient air concentrations can then be compared to health criteria to determine any associated health hazard or risk. Hazard quotients were calculated by dividing the potential concentration in ambient air by the health criteria concentration. Cancer risk per 100,000 assumes a 70-year exposure and is calculated by multiplying the calculated concentration, times the unit risk, times 100,000.

It must be noted that there are a number of conditions under which hazard quotients below one could result in adverse effects on public health. These include: simultaneous exposure to compounds with similar or related health endpoints; the presence of significant background concentrations of like compounds or compounds which affect similar or related health endpoints; the occurrence of extreme meteorological conditions which could substantially increase short-term exposures; and exposure of hypersensitive individuals.

The available data on total 'actual' VOC emissions are from 1998. These data were listed as the 'actual' emissions for the proposed permit (see Table 1). Unfortunately, the 'actual' emissions data by chemical are available for 1999 only (see Table 2). The MDH will be requesting additional information from Pechiney (through MPCA) to clarify 'actual' emission data.

The use of 'actual' emission data can be appropriate for evaluating historic, or long-term exposure issues. However, a permitted company is not bound to limit their emissions to 'actual' emission level, but may emit up to the 'potential' emissions, or 'limited potential' emissions levels. Therefore, it is appropriate to evaluate potential exposures associated with emissions at 'potential' and 'limited potential' levels. 'Potential' emission rates (PERs) should always be evaluated when characterizing potential health impacts of short-term emissions, because maximum emission rates may be achieved over short periods of time.

Attachments #2 and #3 are spreadsheet comparisons of the SERs and the emissions from Pechiney. The SER is a screening model, and MDH recognizes that exceedance of the SERs does not mean that concentrations of compounds released in air exceeded levels of health concern outside the fenceline of Pechiney, or that individuals have been exposed to levels of health concern. However, exceedance of the SERs for any chemical does imply that there may be a health hazard associated with this facility and that further investigation is necessary to determine if emissions need to be reduced. Alternatively, if permitted emissions are below the SERs, and the above-mentioned caveats are addressed, there is negligible health risk associated with emissions from a facility.

As noted in a previous section above, exceedance of the SER suggests that emissions and potential exposures should be limited or better characterized. MDH recognizes that NAAQS pollutants, especially NO_x and PM, are emitted by all industrial sources and residences that use natural gas. Levels emitted from many of these stationary sources may approach or exceed the SERs. In addition, mobile sources emit these criteria pollutants. Monitored background levels of NO_x and PM₁₀ in the Twin Cities can exceed 30 to 50% of the NAAQS (MPCA, 1997). Therefore, it is appropriate to review the local source contributions of these pollutants. MDH has concerns about NO_x and PM pollution not only as a general urban issue, but also as a site-specific issue at locations where: natural gas is used for purposes other than as an energy source for heating, or where NO₂ and PM₁₀ are emitted as part of the production processes.

Annual emissions: Annual SERs

Attachment #2 contains calculations of annual SERs for compounds reported to be released from the Pechiney facility. Chemicals of concern for chronic exposure are noted in Table 6 below.

Reported releases of individual volatile organic compounds (VOCs) in 1999 total 392 tons. Health criteria have not been determined on compounds accounting for 358 tons, or 91% of these identified emissions.

MDH does not review 'actual' emission levels in a permit closely, because they may fluctuate from year to year depending on facility production needs. (e.g. note that dioxane emissions in 1999 exceeded the 'actual' emissions level in the proposed permit.) However, a quick review of 'actual' data can provide information about emissions during a single year.

'Actual' VOC emissions in 1998, and the proposed 'actual' emissions are 699 tons. Table 1 identifies 128 tons (18% of 1998 VOC emissions) as MEK, toluene, and dioxane. Therefore, 571 tons of VOCs emitted in 1998, and in the proposed permit, remain unidentified. Similarly for 1999, potential (screening level) chronic health impacts can be estimated for only 4.9% to 9% of the VOCs (34 tons of MEK, toluene, and dioxane in 392 - 699 tons total VOCs).

Similar data gaps are identified when attempting to calculate SER exceedances using limited 'Potential-to-emit' (PTE) data. Three VOCs are listed in the PTE data. They are methyl ethyl ketone (MEK), toluene, and dioxane. The limited PTE for VOCs is 1,540 tons per year (tpy), and the limited PTE for MEK, toluene, and dioxane are each 1500 tpy. If any of these three compounds are emitted at their limited PTE, annual average concentrations in ambient air near the facility may exceed health criteria. Furthermore, if emissions are limited to 300 tpy, which may be the case if there is compliance with the NESHAPS (40 CFR 63 Subpart KK), annual average concentrations in ambient air near the facility still may exceed health criteria.

The SER model predicts that there may be exceedances of the current NO₂ annual NAAQS and the proposed PM_{2.5} annual NAAQS in the vicinity of Pechiney. Furthermore, exceedance of the NO₂ chronic REL, the MEK chronic HRV, the toluene chronic HRV and the dioxane chronic REL may result from emissions from Pechiney. In addition cancer risk, calculated from the California unit risk for dioxane and dioxolane (as dioxane), may be significantly elevated. MDH defines negligible risk as an incremental risk of less than 1 increased incidence of cancer in 100,000 individuals exposed for 70 years.

MDH is especially concerned about the dioxane PTE and 'actual' dioxane emissions. Dioxane emitted at the limited PTE exceeds the SER using California REL chronic health criteria by 3 times, and the cancer criterion by 7,300 times. Regular emissions at the 1998 'actual' emission rate, may also be associated with a cancer risk (up to 3 cases per 10,000 people exposed for 70 years). Since dioxane is a surrogate for dioxolane, substitution of dioxane with dioxolane in the manufacturing process will not decrease the estimated health risk.

A chronic hazard index for nervous system, respiratory irritation, or other endpoints were not calculated since: calculated hazard quotients are available for only a fraction of the 'actual' VOC emissions as discussed above; many chemicals have secondary endpoints which have not been evaluated quantitatively for this assessment; and potential additional health impacts due to simultaneous exposure to particulates cannot be inferred given our understanding of interactive effects.

Table 6 is a list of chemicals of concern for chronic exposure as well as hazard quotients and / or cancer risk for those chemicals.

Table 6
Chronic hazard quotients or Cancer risks

Compound of Concern	Emission data source	Averaging Time	Criterion	Hazard Quotient or (Cancer Risk)
Nitrogen Oxides (as NO ₂)	PTE	annual	NAAQS	1.9*
PM _{2.5}	PTE	annual	NAAQS - (proposed)	1.3 (incl. backgrnd)
MEK	Limited PTE	annual	HRV	10
Toluene	Limited PTE	annual	HRV	20
1,4-Dioxane	Limited PTE	annual	REL	3
	Limited PTE	70 yr exp.	HRV	(CR) 7 / 100
	1999 Actuals	70 yr exp.	HRV	(CR) 3 / 10,000
1,3-Dioxolane (as 1,4-Dioxane)	1999 Actuals	70 yr exp.	HRV	(CR) 3 / 100,000
VOCs	PTE 1999 Actuals	[significant unknown emissions - compounds and amounts]		

Note: all values 1 significant figure except when criterion is a NAAQS.

*Hazard quotient for NO_x as NO₂ using the chronic REL = 9

Hourly emissions: hourly, 8 hour, and 24 hour SERs

Attachment #3 contains calculations of 1, 8, and 24 hour SERs for compounds reported to be released from the Pechiney facility. Chemicals of concern for short-term exposure are noted in Table 7 below. The reported potential hourly emission rate (PER) for VOCs is 2176 pounds per hour (lbs/hr). This rate assumes concurrent operation of all processes at maximum capacity. While simultaneous emissions of all compounds at the maximum rate is not expected to occur at this facility given the nature of their product, this rate provides a gross number for determining the percent of emissions from Pechiney have been enumerated in their permit application. Individual PERs are reported for three VOCs: MEK, toluene, and dioxane. The total PER for these chemicals is 1881 lbs/hr or 86% of the *potential* hourly VOC emissions. In contrast to the potential emissions, emission of these compounds at this rate would make up only about 5% of the 'actual' 1998 VOC emissions from Pechiney. Therefore, while there is a potential to emit large amounts of MEK, toluene, and dioxane, only a small amount of the potential was used in 1999. Conversely, there were no data on the individual PERs for VOCs other than MEK, toluene, and dioxane, but it is assumed that their emission rates total 14% of the total VOC PER. On the other hand assuming total VOC emissions in 1999 were similar to those in 1998, 44% of

the emitted VOCs are unidentified and information on the PER of 51% of emissions is not currently available to MDH.

It is not possible to use reported 1999 usage data to back-calculate potential short-term exposures with the SER model parameters. Usage data can only be averaged over a year, whereas the 'actual' emissions took place during a shorter time period when a particular process was being performed in the facility. Therefore, in order to determine the potential maximum 1, 8, and 24 hour averaged concentrations offsite, it is appropriate to use PER data and not yearly usage data. If hourly usage data were available, refinements could be made to the calculated estimates in this health consultation.

A review of the SER model-generated data from Attachment #3 projects that PM₁₀ concentrations in ambient air near Pechiney may approach the current 24 hour NAAQS. Exceedance of this NAAQS may be dependant the background levels at this location. According to the model, the PM₁₀ contribution by this facility to ambient air may, at times, approach 2/3rds of the NAAQS. PM_{2.5} concentrations may exceed the proposed PM_{2.5} NAAQS near this facility. Sulfur dioxide (SO₂) concentrations near Pechiney may approach the 1 hour MAAQS, and SO₂ concentrations may exceed the 1 hour REL. Acute health criteria (1-hour HRVs and RELs) for MEK, toluene, and dioxane may also be exceeded near this facility. Hourly emissions data for other VOCs, including up to 14% of the potential hourly VOC emissions and 95% of the 'actual' hourly VOC emissions, are not available. Furthermore, appropriate acute health criteria have not been identified for 8 of the 12 reported VOCs emitted from this facility.

Table 7 contains a list of the identified chemicals of concern for short-term exposure and hazard quotients for those chemicals. If emissions of these chemicals occur simultaneously, the health effects could be more severe. This table does not include VOCs for which there are no hourly emissions or health data nor does it include a measure of the potential additional health impact of simultaneous exposure to particulates.

Table 7
Acute hazard quotients

Compound of Concern	Emission data source	Averaging Time	Criterion	Hazard Quotient
Nitrogen Oxides (as NO ₂)	PER	1 hour	REL	40
PM ₁₀	PER	24 hour	NAAQS	0.97 (incl. bckgrnd)
PM _{2.5}	PER	24 hour	NAAQS -	1.9 (incl. bckgrnd)
SO ₂	PER	1 hour	REL	2
MEK	PER	1 hour	HRV	200
Toluene	PER	1 hour	HRV	50
1,4-Dioxane	PER	1 hour	REL	400
VOCs	PER	[significant unknown emissions - compounds and amounts]		

Note: all values 1 significant figure except when criterion is a NAAQS.

Children's Health

As part of the Health Consultation process, MDH explicitly addresses issues related to children's health at sites which are evaluated. The quantitative evaluation of emissions in this document uses criteria and standards which are considered to be protective of children and other sensitive individuals. On the other hand, uncertainties described in the previous sections indicate the potentially more severe impacts on children in comparison with adults. This is because children have higher respiration rates and surface-to-volume ratios than adults. Further, their bodies are growing rapidly, which could make them more susceptible to genetic mutation and the onset of cancer than similarly exposed adults. Their bodies are developing, which could make them susceptible to the effects of developmental toxins. For these reasons, MDH believes that it is very important that the emissions from Pechiney be further characterized and controlled.

Conclusions

Pechiney is located in a populated area of the Twin Cities. Residences are in close proximity to the facility. The University of Minnesota and other businesses are also nearby. Chronic exposures of residents to emissions from this facility, as well as acute exposures of people working or living in the vicinity of this facility are of concern to MDH.

While MDH recognizes the shortcomings of the SER model, it is a screening model that can be used to identify a need for further study of a facility. The results of application of the SER model

to the Pechiney facility suggest that emissions from this facility may, under some conditions, be detrimental to the health of people offsite. This site is categorized by ATSDR as an indeterminate public health hazard since critical information necessary to make an exposure estimate is not available.

There are critical data gaps in the information available to MDH. The following data are needed to complete a quantitative screening evaluation:

- identification of all VOC emissions;
- individual, yearly actual emissions for all VOCs;
- individual maximum hourly emission rates for all VOCs;
- selection of health criteria for all emitted VOCs.

Given the available data, MDH identified the following as areas of concern, deserving better characterization or better controlling of emissions:

- Unidentified VOC emissions
- Emissions of VOC for which there are no established health criteria
- Annual emissions of dioxane and dioxolane at the PTE, Limited, or 'Actual emissions' rate
- Hourly emissions of dioxane, MEK, and toluene at the PER
- Annual emissions of dioxane, MEK and toluene at the PTE
- Hourly emissions of NO_x at the PER
- Annual emissions of NO_x at the PTE
- Exposure to multiple chemicals with similar or related endpoints

Additionally, SO₂ and PM emissions may be of concern.

Recommendations

Exceedance of the screening emission rate model implies that: Emissions should be better characterized, the dispersion model should be refined using site-specific information, potential site-specific exposure conditions should be quantified, and/or emissions should be decreased.

! Further investigation of this facility should include:

- " identification of all VOCs emitted;
- " complete reporting of 'potential' emission rates;
- " agreed upon 'limited potential' emission quantities;
- " site-specific modeling of emissions;
- " determination of appropriate health criteria for emitted compounds;
- " calculation of hazard quotients and appropriate health indexes.

! Emissions from this facility should be controlled so that they are below levels of health concern. Special attention should be given to:

- " Unidentified VOC emissions
- " Emissions of VOC for which there are no established health criteria
- " Annual emissions of dioxane and dioxolane at the Potential-to-emit or 'Actual emissions' rate
- " Hourly emissions of dioxane, MEK, and toluene at the Potential emission rate

- " Annual emissions of dioxane, MEK and toluene at the Potential-to-emit
- " Hourly emissions of NO_x at the Potential emission rate
- " Annual emissions of NO_x at the Potential-to-emit
- ! Potential emissions and potential emission rates should be characterized. Special attention should be given to:
 - " Unidentified VOC emissions
 - " Hourly and annual potential emissions of identified VOC for which there are no established health criteria
 - " Hourly and annual potential emissions of dioxane and dioxolane
 - " Hourly and annual potential emissions of MEK and toluene
- ! Complete 'actual' emission data should be reported for:
 - " Unidentified VOC emissions
- ! Health criteria for emitted chemicals should be selected or developed, and adopted.
- ! Hazard indexes for similar or related health endpoints should be calculated when emission and health criteria are further characterized.

This consultation was prepared by:

Carl Herbrandson, Ph. D.
 Toxicologist
 Site Assessment and Consultation Unit
 Environmental Surveillance and Consultation Section
 Minnesota Department of Health

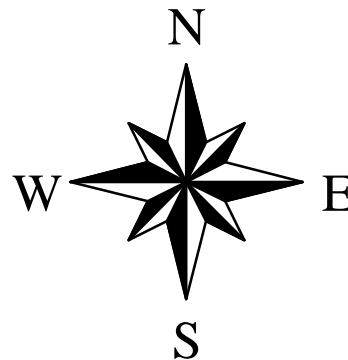
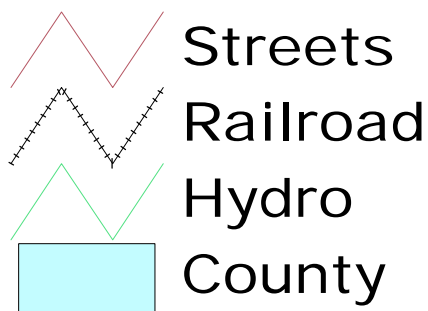
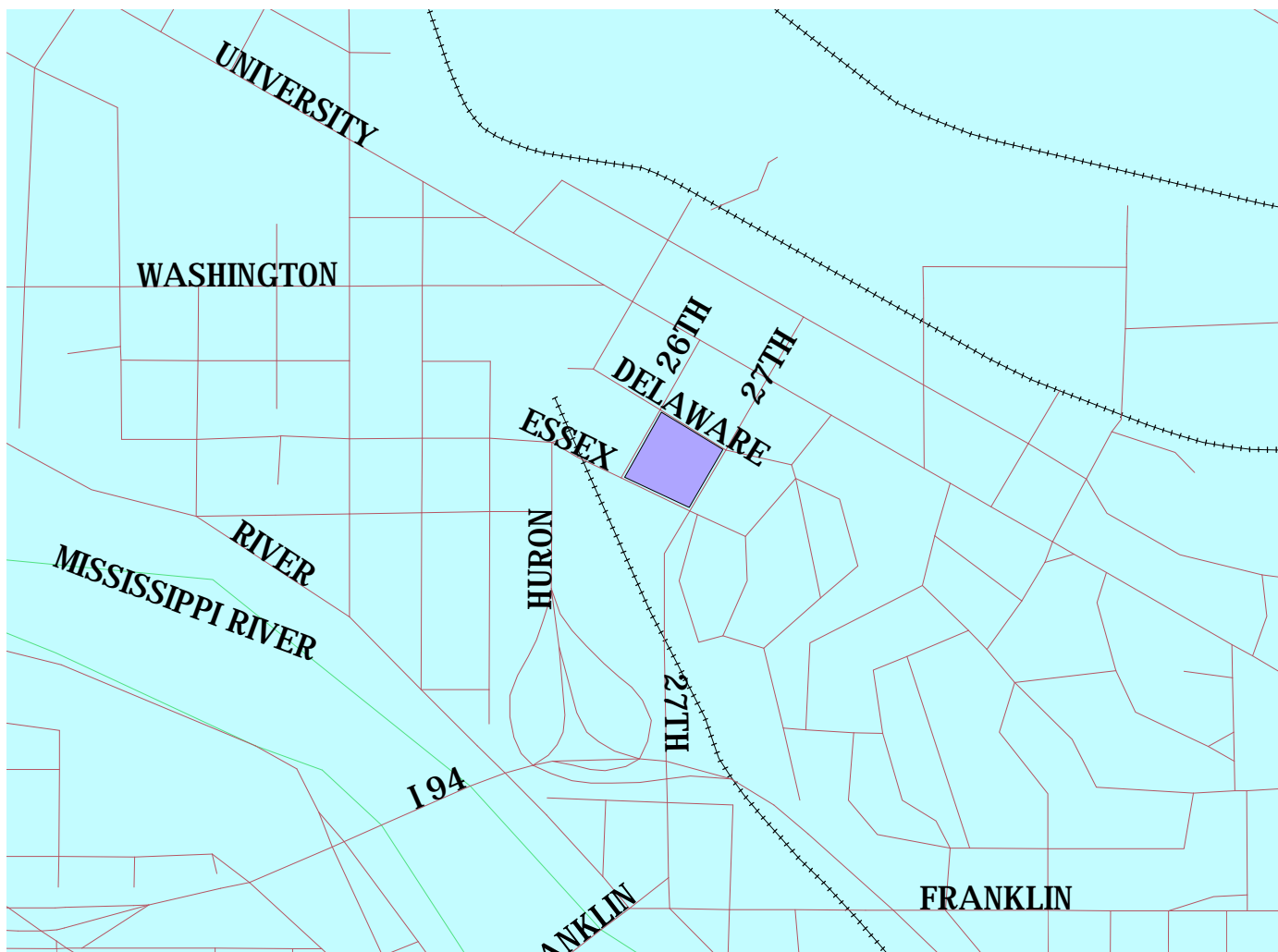
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Attachment #1

Pechiney Plastic Packaging



Long-term Model - Annual Average

Compound	Potential Emissions	Limited Potential Emissions	1999 Usage Pounds	1999 Usage - Average hourly	Maximum Annual Average Offsite Concentration - Default SER model factors			Background	Criterion (Annual)	PTE Chronic "Hazard Quotient"	Limited PTE Chronic "Hazard Quotient"	1999 Usage Chronic "Hazard Quotient"	Cancer Risk - assumes 70 yr exposure
					Dispersion factor (annual) = 27.9 (ug/m ³)/(lbs/hr)								
					at Potential Emission Rate	at Limited Average Emission Rate	at Actual 1999 Usage amount						
NO _x as NO _x NO _x as NO _x	29.2 tons/yr 29.2 tons/yr				186 ug/m ³ 186 ug/m ³			Chronic REL 20 ug/m ³ NAAQS 100 ug/m ³	9.3 1.9				
VOC		1540 tons/yr		160 lbs/hour	9,810 ug/m ³			Itemization needed	????	????	????	????	
PM PM ₁₀ PM ₁₀ as PM _{2.5}	1.4 tons/yr 1.4 tons/yr 1.4 tons/yr				9 ug/m ³ 9 ug/m ³ 9 ug/m ³		26 ug/m ³ 10 ug/m ³ est.	NAAQS 50 ug/m ³ NAAQS (proposed) 15 ug/m ³	0.70 1.30				
SO ₂ SO ₂	2.1 tons/yr 2.1 tons/yr				13 ug/m ³ 13 ug/m ³			MAAQS 60 ug/m ³ NAAQS 80 ug/m ³	0.22 0.17				
Lead Lead	9.2E-05 tons/yr 9.2E-05 tons/yr				5.9E-04 ug/m ³ 5.9E-04 ug/m ³ *			Cancer REL 0.83 ug/m ³ Quarterly NAAQS 1.5 ug/m ³	7E-04 0.0004				<<1E-6
Individual VOCs													
MEK	2880.4 tons/yr	1500 tons/yr	31,926 lbs/yr	3.64 lbs/hour	18,300 ug/m ³	9,550 ug/m ³	102 ug/m ³	RfC 1000 ug/m ³	18	9.6	0.10		
Toluene	3060.5 tons/yr	1500 tons/yr	22,502 lbs/yr	2.57 lbs/hour	19,500 ug/m ³	9,550 ug/m ³	72 ug/m ³	HRV 400 ug/m ³	49	24	0.18		
1,4-Dioxane	2299.8 tons/yr	1500 tons/yr	11,159 lbs/yr	1.27 lbs/hour	14,600 ug/m ³	9,550 ug/m ³	35.5 ug/m ³	Cancer REL 1.3 ug/m ³	11000	7300	27	<1E-1 to <3E-4	
1,4-Dioxane	2299.8 tons/yr	1500 tons/yr	11,159 lbs/yr	1.27 lbs/hour	14,600 ug/m ³	9,550 ug/m ³	35.5 ug/m ³	Chronic REL 3000.0 ug/m ³	4.9	3.2	0.012		
Isopropanol			17,003 lbs/yr	1.94 lbs/hour			54.2 ug/m ³	Surrogate needed	????		????	????	
n-Propyl Acetate			217,568 lbs/yr	24.8 lbs/hour			693 ug/m ³	Surrogate needed	????		????	????	
Ethanol			58,087 lbs/yr	6.63 lbs/hour			185 ug/m ³	Surrogate needed	????		????	????	
n-Propanol			249,316 lbs/yr	28.5 lbs/hour			794 ug/m ³	Surrogate needed	????		????	????	
Ethyl Acetate			168,576 lbs/yr	19.2 lbs/hour			537 ug/m ³	Surrogate needed	????		????	????	
PGME			1,760 lbs/yr	0.20 lbs/hour			5.61 ug/m ³	Chronic REL 2000 ug/m ³	????		0.0028		
Heptane			4,699 lbs/yr	0.54 lbs/hour			15.0 ug/m ³	Surrogate needed	????		????	????	
Isopropyl Acetate			403 lbs/yr	0.05 lbs/hour			1.28 ug/m ³	Surrogate needed	????		????	????	
1,3-Dioxolane as 1,4-Dioxane			1,162 lbs/yr	0.13 lbs/hour			3.70 ug/m ³	Cancer REL 1 ug/m ³	????		2.8	<3E-5	
1,3-Dioxolane as 1,4-Dioxane			1,162 lbs/yr	0.13 lbs/hour			3.70 ug/m ³	Chronic REL 3000 ug/m ³	????		0.0012		

* quarterly dispersion factor = 160 (ug/m³)/(lbs/hr)

Annual SER Model application

ATTACHMENT # 2

Short-term Model - 1 - 24 hr Averages

Compound	Process Emission Rates	1999 Usage Pounds	Maximum 1-24 hr Average Offsite Concentration - Default SER model factors	Background	Criterion	Acute "Hazard Quotient"	Acute Health Hazard Endpoints
NO _x as NO ₂	6.67 lbs/hour		16,500 ug/m ³ *		REL 470 ug/m ³	35	Respiratory Irritant
VOC	2,176 lbs/hour		5,370,000 ug/m ³ *		Itemization needed	????	????
CO	3.55 lbs/hour		8,760 ug/m ³ *		REL 23,000 ug/m ³	0.38	Cardiovascular System
CO	3.55 lbs/hour		8,760 ug/m ³ *		1 hr NAAQS 40,000 ug/m ³	0.22	Cardiovascular System
CO	3.55 lbs/hour		2,850 ug/m ³ **		8 hr NAAQS 10,000 ug/m ³	0.28	Cardiovascular System
PM	0.32 lbs/hour		797 ug/m ³ *				Respiratory Irritant / Function
PM ₁₀	0.32 lbs/hour		94 ug/m ³ ***	52 ug/m ³	24 hr NAAQS 150 ug/m ³	0.97	Respiratory Irritant / Function
PM ₁₀ as PM _{2.5}	0.32 lbs/hour		94 ug/m ³ ***	30 ug/m ³	NAAQS (proposed) 65 ug/m ³	1.9	Respiratory Irritant / Function
				est. winter weekday avg.			
SO ₂	0.48 lbs/hour		1,180 ug/m ³ *		REL 660 ug/m ³	1.8	Respiratory Irritant
SO ₂	0.48 lbs/hour		139 ug/m ³ ***	22 ug/m ³	24 hr NAAQS 365 ug/m ³	0.44	Respiratory Irritant
SO ₂	0.48 lbs/hour		1,180 ug/m ³ *	30 ug/m ³	1 hr NAAQS 1,300 ug/m ³	0.93	Respiratory Irritant
				est. winter weekday avg. - midday hour avg.			
Individual VOCs							
MEK	658 lbs/hour	31,926 lbs/yr	1,620,000 ug/m ³ *		HRV 10,000 ug/m ³	160	Eye, Nose, Throat Irritant
Toluene	699 lbs/hour	22,502 lbs/yr	1,720,000 ug/m ³ *		HRV 37,000 ug/m ³	47	Irritant; Impaired reaction
1,4-Dioxane	525 lbs/hour	11,159 lbs/yr	1,300,000 ug/m ³ *		REL 3,000 ug/m ³	430	Eye Irritant
Isopropanol		17,003 lbs/yr			REL 3,200 ug/m ³	????	Eye, Respiratory irritation
n-Propyl Acetate		217,568 lbs/yr			Surrogate needed	????	????
Ethanol		58,087 lbs/yr			Surrogate needed	????	????
n-Propanol		249,316 lbs/yr			Surrogate needed	????	????
Ethyl Acetate	Hourly Emission Data Needed	168,576 lbs/yr	Hourly Emission Data Needed		Surrogate needed	????	????
PGME		1,760 lbs/yr			Surrogate needed	????	????
Heptane		4,699 lbs/yr			Surrogate needed	????	????
Isopropyl Acetate		403 lbs/yr			Surrogate needed	????	????
1,3-Dioxolane as 1,4-Dioxane		1,162 lbs/yr			REL 3000 ug/m ³	????	Irritant

1, 8, 24 hr SER Model Application

ATTACHMENT # 3

Dispersion Factors:
 * 1-hour = 2468 (ug/m³)/(lbs/hr)
 ** 8-hour = 802 (ug/m³)/(lbs/hr)
 *** 24-hour = 292 (ug/m³)/(lbs/hr)



CERTIFIED MAIL RETURN RECEIPT REQUESTED

November 6, 2000

Mr. Carl Herbrandson, Ph.D.
Minnesota Department of Health
121 East Seventh Place, Suite 220
St. Paul, MN 5514

RE: Comments on Health Consultation Draft Report for Pechiney Plastic Packaging, Inc.
Minneapolis, MN

Dear Mr. Herbrandson:

Pechiney Plastic Packaging, Inc (PPPI) submits these comments on the draft Health Consultation Report prepared by the Minnesota Department of Health (MDH), dated October 2000. PPPI has not formally been requested to provide comments, but is providing these comments as result of an E-mail received from Greg Kuval of the Minnesota Pollution Control Agency (MPCA).

PPPI demands that MDH not issue this document[CH1]. There are many factual errors, and data that have not been considered by MDH. MDH suggests the analysis is over conservative, but the document is extremely inflammatory. The document is based on opinion[CH2], not regulatory requirements and not scientific analysis or data. The tone suggests that people are probably falling over in the street due to the air emissions.

PPPI also offers the following specific comments:

Foreword[CH3]

MDH has not visited the site to conduct any evaluation as indicated in the opening paragraph. In the first bullet MDH indicates that the first task is to find out how much "contamination" is present. There is no contamination present at the facility and no records indicate such. Please provide records that indicate contamination is present at the facility.

In the third bullet the plant is referred to as a hazardous waste site. The plant is a manufacturing facility for the production of packaging for the food and health care industry not a hazardous waste site.

Introduction

The last sentence of the second paragraph should be deleted. There is no relevance to this report. PPPI complies with all rules required for producing food packaging[CH4].

The Facility

The second paragraph under this section should be reworded as follows:

PPPI uses multiple printing and coating materials in several processes to produce packaging materials for the food and health care industries. Solvent printing and coating materials are used

in these processes and are exhausted to the atmosphere through stacks on the roof. A thermal oxidizer is used to control one process as required by the MPCA. The oxidizer was installed with the process in 1990. The MPCA does not require the emissions from any other processes to be controlled[CH5].

The word “short” should be removed from all references to stacks[CH6].

The paragraph on the top of page two should have the two sentences on defining actual emissions removed and replaced with the following sentences: “Actual emissions” are determined from material usage records and control efficiencies for the processes. “Actual emissions” for natural gas are determined from emission factors[CH7].

In Table I the potential emissions for unlimited and limited are the same since PPPI and the MPCA have agreed to specific permit conditions[CH8].

Table I should also have the pounds per hour, unlimited and limited emissions numbers changed for MEK, toluene and 1,4 dioxane. The National Emission Standards for Hazardous Air Pollutants (NESHAP) rule will limit the total combined usage of these compounds to approximately 300 tons per year. This will also limit the hourly usage to comply with the annual usage. The total emissions of the three will be less than 600 pounds per hour[CH9].

MDH has never requested VOC usage data from PPPI[CH10]. The MPCA asked via E-mail if we had records on various solvents used. On April 7, 2000, PPPI furnished the usage data in Table 2. PPPI indicated the constituent usage for non-HAPs containing materials was an approximation based on total VOC usage. PPPI is not required to track non-HAP constituents. These are not the solvent emissions[CH11]. Hazardous waste is not subtracted and the control efficiency for one process was not used[CH12]. The data in Table 2 was for 1999. It does not include all constituents and exact usage of each constituent. The 699 tons referred to in the report was the VOC usage for 1998 and does not compare to the data in Table 2[CH13].

The document, Screening Emission Rates (SER) for Air Toxics, developed by the MPCA has not gone through rulemaking or public notice or is it required by any statute. Therefore, MPCA and MDH cannot use this document to implement rules or require facilities to meet requirements[CH14]. Court cases have demonstrated that using guidance documents or policies as a rule are not allowed. In addition, this document has one major technical error. The analysis is driven by one number which is the flow rate of 0.196 m³/sec (415 ft³/min). The total airflow from the processes at PPPI is approximately 100,000 cfm, which excludes room exhaust and exhaust through open windows and doors[CH15].

The SER values generated for NO₂ and PM₁₀ are a perfect example of how ridiculous this analysis is. The NO₂ and PM₁₀ emissions are all from natural gas combustion. These are truly low emissions and are considered de minimis and exempt from regulatory requirements by the MPCA. Most if not all office buildings, industrial facilities and some residential sources would exceed these levels for NO₂ and PM₁₀[CH16].

MDH continues to stress the use of surrogates for materials that do not have health risk values established. MDH has yet to furnish any regulatory requirement that requires such demonstration. PPPI has also requested guidance from both MPCA and MDH on generating surrogates and no such information has been provided. PPPI has also conducted internet

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Mr. Carl Herbrandson, Ph.D.

searches, contacted consultants and has found no information on surrogates. If MDH is going to require the development of surrogates, regulations and sound scientific data must support it. The development of surrogates in this document is based purely on opinion and speculation[CH17].

The discussion on page 12 comparing actual emissions from 1998 (699 tons of usage) to the values in Table 1 (approximate constituent usage for 1999[CH18]) should be removed. It is not correct. The discussion on potential to emit (PTE) should also be removed. The facility has accepted an annual limit on PTE of 1540 tons per year. Any value above this is unrealistic and cannot be achieved by the facility[CH19]. As mentioned above, in order to comply with the NESHAP rule for the printing industry, the facility HAPs usage will be approximately no greater than 300 tons per year. Therefore the potential emission for HAPs (MEK, toluene and others) is limited by the NESHAP rule, which is included in the permit language[CH20].

PPPI requests that MDH consider these comments and in light of the comments demands that MDH not issue any Health Consultation.

If you have any questions please contact Chuck Bergren, Plant Manager (612) 378-3362 or myself at (920) 727-6027.

Sincerely,

David G. Ellison
Manager Environmental Engineering

cc: Gary Gengel, Oppenheimer
Greg Kuval, MPCA
Chuck Bergren, PPMM
Thomas Miller, PPMM
File Copy (PPMM-110)

Page: 1

[CH1]The document, as it stands is a public document. As a courtesy, MDH agreed to a request by MPCA to have Pechiney review potential issues of fact in the report prior to announcing the availability of the document to the public.

Page: 1

[CH2]The document is based on an analysis of uncertainties and datagaps following a review of information released by the company on emissions from their facility.

Page: 1

[CH3]MDH regrets that the foreword attached to this document is 'boiler-plate' for hazardous waste sites, and will change the foreword accordingly. (Foreword)

Page: 1

[CH4]The last sentence is meant to frame the limits of our investigation and, therefore, should remain. However, it is probably more appropriate to use 'food packaging' rather than 'food processing' in the last sentence. (pg.1)

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[CH5]Suggested changes have been adopted with the exception of the last sentence. MPCA is in the process of deciding what controls may be necessary at Pechiney. (pg.1)

Page: 2

[CH6]The statement in the Health Consultation that the company has 'short stacks' is a qualitative assessment of the stacks as 'non-GEP (non-Good Engineering Practices)' stacks. A GEP stack is related to building height and dimensions, and nearby terrain as defined in 40CFR51.1 (ii). In the SER model the default stack height of a GEP stack is 10.1 meters, but a GEP stack is typically 2.5 times taller than the tallest nearby structures. The company stated that their stacks were 'short' in a meeting 6/5/00. (pg.1)

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[CH7]Changes accepted. (pg.2)

Page: 2

[CH8]Unlimited emissions are calculated maximums, whereas limited emissions are agreed-to limits.

Page: 2

[CH9]Changes made in table and footnote added (pg.2) At the time this document is being reviewed, MDH understands that MPCA and Pechiney have agreed to the lower limited emission totals now included in the health consultation. Any further changes can be made in subsequent documents, following agreement between MPCA and Pechiney on possible further reduction of the limited emissions and possible reduction of the maximum emission rates.

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[CH10]MDH requests for additional data typically go through MPCA - - this was noted in the text. (pg.2)

Page: 2

[CH11]Table as received from MPCA cited 'solvent usage' - - changed (pg.3)

Page: 2

[CH12]Permit limits should not include hazardous waste. MDH suggests that limits should be lowered to reflect non-emitted wastes.

Page: 2

[CH13] **Changes reflect new information** (pg.2-3)

Page: 2

[CH14]SERs were developed as tools for screening emissions, as outlined in the document. The following was added to the paragraph describing the SER model - **'Exceedance of this screening model implies that: emissions should be better characterized, the dispersion model should be refined using site-specific information, potential site-specific exposure conditions should be quantified, and / or emissions should be decreased.'** (pg.4)

Page: 2

[CH15]The SER model uses default parameters which can be further refined using a site-specific dispersion model. However, MDH disagrees with the Pechiney characterization of the flow rate default as

a 'major technical error'. It is not appropriate to sum airflow as if it, and all pollutants, come from a single stack.

Page: 2

[CH16]We have discussed the specific issue of SER exceedances by criteria pollutants many times with MPCA. For clarification of this issue, we have added the following paragraph. **'As noted in a previous section above, exceedance of the SER suggests that emissions and potential exposures should be limited or better characterized. MDH recognizes that NAAQS pollutants, especially NO_x and PM, are emitted by all industrial sources and residences that use natural gas. Levels emitted from many of these stationary sources may approach or exceed the SERs. In addition, mobile sources emit these criteria pollutants. Monitored back-ground levels of NO_x and PM₁₀ in the Twin Cities can exceed 30 to 50% of the NAAQS (MPCA, 1997). Therefore, it is appropriate to review the local source contributions of these pollutants. MDH has concerns about NO_x and PM pollution not only as a general urban issue, but also as a site-specific issue at locations where: natural gas is used for purposes other than as an energy source for heating, or where NO₂ and PM₁₀ are emitted as part of the production processes.'**(pg.12-13)

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[CH17]The use of surrogates and / or available toxicity data to develop site-specific toxicity criteria is not based purely on opinion and speculation. There is a large amount of scientific information validating the use of quantitative structure activity relationships (QSAR) for estimating the toxicity of organic compounds. The relationship presented in this document was not quantitative, but is clearly defensible given the available toxicity data on dioxolane.

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[CH18]It appears that Pechiney really means Table 2.

Page: 3

[CH19]The annual 'limited' PTE for VOCs showed 1540 tpy. Given new information from the company and MPCA, the annual PTE for the 3 listed VOCs was lowered to 1500 tpy each, and comments on the larger numbers were removed.

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[CH20]Discussion of these issues has been added to the document(**pg.2,13,14**), **but limited PTE's should reflect true permit limits.** Furthermore, on the list of individual chemicals released (12 in 1999), only MEK, toluene, and dioxane are listed as HAPs. Therefore given available information, the reduction in HAPs may not mean a reduction in total VOCs.