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May 8, 2006

Abstract: Perspectives of an Environmentalist on Volatile Organic Compounds (VOCs)

This presentation is intended to articulate to the industry association “Toronto Society of Coating Technologies” (TOSCOT) the views of the environmental community on emissions of VOCs and impending federal regulation. While the draft regulation is briefly discussed and critiqued, the main focus of the presentation is to speak to the role of industry in reducing emissions of and exposure to VOCs (and other harmful substances). The industry is urged to place its efforts in seeking safer alternatives to their products thereby addressing the fundamental issue of pollution prevention and incorporating the protection of human health and the environment as uppermost considerations in their operations.

Presentation on
Perspectives of an Environmentalist on Volatile Organic Compounds (VOCs)

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Topics

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- Health effects – sensitive populations
- Targeting the sector

Proposed Regulation

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Summary

Introductory Comments

In addressing this group, I will give you my impressions as an environmentalist, on what is being done in terms of federal action, what I think needs to be done, and where I recommend this industry place its efforts.

Like any consumer of solvent products, I am particularly concerned about exposure, safety, disposal, as well as quality. A case in point recently is my attempt to remove layers of paint from a Gibson guitar. Trying to find a “safe” product is a challenge – but I, like other consumers am willing to pay the price for a product that works but has minimal impact. So while I will focus on Volatile Organic Compounds (VOCs), this presentation will go beyond the immediate and try to show the way to a final goal that will be good for everyone. So I feel that it is appropriate to start with the health effects of VOCs, move on to a discussion of the proposed regulation for the AIM sector and then conclude with remarks and observations of what should lie ahead.

Health Effects

VOCs are known precursors to particulate matter (PM) and ground-level ozone, a chemical soup commonly referred to as smog. The health effects of exposure to these precursors of smog, both acute and long-term, are well documented – asthma, atherosclerosis and bronchial disease, as well as cardiovascular disease. There is no threshold at which these effects are not found. Children in particular, who breathe more air relative to their body weight than adults in their developing stages, have a higher proportion of unique and specific vulnerabilities to environmental risks from exposure to pollutants.

In addition to smog-related respiratory issues, exposure to VOCs (and other chemicals) can cause numerous adverse health effects such as irritation to the respiratory system, depression of the central nervous system, possible organ damage (kidneys, liver) and cancer. Over the long term, even at relatively low levels, symptoms of such disorders can manifest themselves. Occupational exposure related to chemicals used or manufactured in numerous industries has placed many workers at an excess risk of developing illnesses.

The increasing exposure to multiple chemicals including VOCs is likely to produce health effects that may have not been contemplated or understood. Many individuals have developed multiple chemical sensitivities, which in turn results in even greater reactions to low levels of exposure to chemicals such as VOCs. We have created an artificial and altered environment that has severely compromised our health to a degree that deserves attention and action now if we are to alter the course.

The rising public concern over the increasing health effects from air pollution has pressured governments to take action – and so they should, as the appropriate parties responsible for the health and welfare of their citizens. The question is whether they are doing enough in light of the merging and complex problems caused by exposure to the plethora of pollutants in the environment today.

Targeting the Sector

A number of industry members in the Architectural and Industrial Maintenance (AIM) coating sector have expressed their view that they are being unfairly targeted, particularly in comparison with VOC emissions from other industrial sectors (in particular, upstream oil and gas). For example, out of a total of 2400 kilotonnes (kt) of VOCs emitted nationally, 19 % (477 ktonnes) are emitted from the solvent sector (60 kt estimated from AIM coatings) while emissions of VOCs from the upstream oil and gas sector amount to about 700 kt¹.

As has been pointed out, exposure to VOCs is a serious health concern that goes well beyond the health effects of smog in localized urban environments. This means that all sources of VOC emissions must be considered and treated accordingly. There can be no free riders. Efforts to reduce emissions of VOCs from all pertinent sectors, such as AIM coatings, are necessary and if such efforts are effective and result in major reductions of VOC emissions, one would expect benefits overall – both in terms of health and the reputation of the company that strives to improve their product line with safer products.

Further to that, solvent use is forecast to overtake transportation as the largest anthropogenic source of VOC emissions in urban environments by the year 2010². This is primarily due to reductions in emissions from the transportation sector combined with projected growth of the solvent sector. So regulation of the sector is clearly needed, but at the same time, this does not diminish the need to target other industries as well. The sheer magnitude of the emissions of VOCs from oil and gas operations certainly calls for action regarding that sector.

Proposed Regulation for the (AIM) coating sector

a) Background

In 2001, Environment Canada, under the Federal Agenda, committed to following a regulatory path to reduce VOC emissions for 3 sectors that are major users of solvents, namely, the AIM coatings sector, consumer products, and auto refinishing coatings. Additional drivers for such regulation are Canada's obligations under CEPA 1999, under which VOCs have been declared toxic³, Canada-wide Standards for PM and Ozone, and commitments under the Ozone Annex of the U.S. Canada Air Quality Agreement to reduce VOCs and align with U.S. standards.

AIM coatings include a variety of products - paints, stains, varnishes and sealing products, all of which are commonly and routinely used in residential, commercial, institutional and industrial settings. This sector, which contributes to about 13 % of solvent-use emissions, is the first of the three sectors to undergo the regulatory process.

¹ Figures are based on the 2000 Criteria Air Contaminant (CAC) National Inventory.

² Source: Canada's 2000 inventory of Criteria Air Contaminants (CACs).

³ On July 2, 2003, VOCs were added to Schedule 1 of the *Canadian Environmental Protection Act 1999* (CEPA, 1999) due to their role as precursors of ground-level ozone and particulate matter

The regulation is certainly timely and needed. For years, Canada has followed the voluntary route to achieve reductions in VOC emissions with little results, lagging well behind its major trading partner, the U.S., in regulating VOC limits for this sector to reduce emissions.

The regulation is intended to align Canada with U.S. VOC content limits. Currently, the U.S. has three different sets of limits for VOC content, namely federal limits (under the EPA National Rule, 1998); California's Air Resources Board (CARB) limits⁴; and the Ozone Transport Commission (OTC) limits. The OTC limits have been adopted by six states and are under development in another three states⁵. The CARB limits are essentially the same as those of OTC except for a few cases where they are more stringent. The EPA limits are considered to be outdated.

The proposed regulation has adopted the VOC OTC limits for 47 out of 50 categories of AIM coatings⁶. The rationale for choosing OTC limits is based on climate considerations (e.g. temperature and humidity in Canada are similar to those in the north-eastern states), as well as harmonization and the provision of a level playing field for manufacturers and importers of AIM coatings.

The final regulation is expected by the end of 2007. Implementation is to follow the next year, with the exception of some categories.

b) Comments on the Regulation

1) VOC Limits

The VOC limits (in grams of VOC per litre of coating) apply at the point of application of the coating. While VOCs in thinners added to a coating at the time of application are included in the calculation of limits, VOCs in colourants added to a tint base are not included. A “most restrictive limit” provision is triggered where a coating can be used in more than one category. In that case, the category with the lowest VOC limit applies, with the exception of 16 categories.

Specific issues with these limits specifically and categories are as follows:

- CARB limits are the most stringent of the existing U.S. limits. The justification for not using them has not been made or is not acceptable.
- The effectiveness of the OTC rule is unknown. With only one year in practice to date, products have not been sufficiently tested and it is premature to be able to gauge the effects of the OTC.

⁴ The most recent set of VOC content limits under CARB were released in 2000 and are referred to as *Suggested Control Measure* (SCM) for reducing VOC emissions from the AIM coatings sub-sector.

⁵ The OTC, representing 12 north-eastern States and the District of Columbia, developed its *Model Rule* for state regulations in 2000.

⁶ The 3 exceptions are extremely high durable coatings; flow coatings and recycled coatings. Limits for these categories are higher than those in the OTC. Also, the proposed limits for 5 additional categories are higher than the respective CARB limits.

- A number of categories have not been included in the regulation, such as adhesives and aerosol coating products. Is this because of alignment with the U.S. and if so, what is their use in Canada, and would they be a significant source relative to the other categories included in the regulation?

2) Exemptions

- **Small containers:** The regulation would apply only to AIM coatings sold in containers larger than 1 L, exempting small containers. This exemption is included in all US AIM rules and regulations and affects several categories included in the AIM regulation such as faux finishing coatings, lacquers, clear/semitransparent stains and clear varnishes. A significant portion of sales in these categories are in small containers. Environment Canada has suggested that the volume of sales is too small to address. However, this exemption would allow the continued use of potentially high VOC content coatings in niche markets. Manufacturers could continue to use small containers in cases where larger containers might be more practical. This needs to be addressed.
- **Colourants:** The VOC content of a tint base is calculated without the colourant. Without knowing the range of VOC content in these colourants, it is not possible to assess whether this is an issue that needs to be examined.
- **Exempted categories:** There is no satisfactory explanation for the exemption of 16 categories from the most restrictive limit provision or assessment of the potential impacts of this exemption.

3) Record-Keeping and Reporting

Record-keeping requirements have been outlined for manufacturers and importers that include information such as VOC content of a product, use, and quantity sold (in containers greater than and less than or equal to one litre). These records are to be maintained for 5 years and made available to the Minister upon request. In other words, there is no indication if there will be a review or audit of these records or whether any of the information would be available to the public. Furthermore, beyond record-keeping, there appear to be no specific requirements for any other type of reporting or frequency thereof to government and/or the public.

4) Labelling

Labelling requirements under the proposed regulation stipulate manufacturer's thinning requirements and either the VOC content of the coating or the VOC content limit specified in the regulation. The reason for labelling of products is to inform the consumer of the contents as well as explicit information as to hazards, health risks of exposure, appropriate use, and disposal. The proposed labelling does not do this.

5) Exceptions and Timelines

The deadline for the achievement of VOC limits is one year after the regulation comes into force with the following exceptions i) recycled coatings (6 years) and ii) other categories that include bituminous roof coatings/primers, traffic marking coatings, form release compounds (3 years). Issues related to these categories have to do with weather and work techniques. The additional time periods, in particular, the 6-year period, is inordinately generous and potentially creates an uneven playing field for the industry. It

is difficult to determine the impacts of these extensions on VOC emissions per se. These time periods should be re-visited and shortened considerably.

Furthermore, products manufactured prior to the effective date for achieving the VOC limits (that is compliance with the regulation) may be sold, supplied or offered for sale up to one year after the date the limits are applicable. What portion of the market will this represent? Does this not extend the time it will take for most categories to come into compliance with the regulated limits? What happens to those products that do not meet the limits? Are they taken off the market?

6) Effectiveness of Regulation

The VOC limits are anticipated to result in a 30% reduction in VOC emissions from this sector. However, with an anticipated average of 2% growth annually, these reductions may amount to less than 20% by 2010. With all the constraints in the elements of the regulation, it is difficult to know what reductions in VOC emissions can be realized or for that matter, what significance could be attached to any percentage figures given.

- What categories would give the greatest decreases in emissions? Why not target these?
- Are the proposed limits long-range in thinking or convenient for now?
- How will the effectiveness of the regulation be ascertained?

7) Compliance and Enforcement – Monitoring and Review

The enforcement component has not been developed. So at this stage, it is not known whether there will be random testing, imposition of penalties or the like. This is a major shortcoming. Unless there is adequate and appropriate enforcement to accompany a regulation and measures to monitor these products, a market for inappropriate products may result and the effectiveness of the regulation is easily compromised. At the same time, just as CARB and OTC undergo reiterations, this regulation must do likewise and have built-in a review and assessment period – probably 3 years after coming into force.

8) Export

The regulations apply to manufacturers and importers of AIM coatings sold in Canada but not to exports from Canada. Thus, Canada can continue to manufacture AIM coatings with higher VOC content for export purposes. This should not be permitted.

9) Public Awareness

Unfortunately, there is no effort to develop public awareness on VOC emissions per se, the sectors that emit VOCs, and the ensuing health and environmental impacts. Nor, not surprisingly, is there any awareness of this government regulation, despite the widespread use of the products of this sector.

Summary

Public representatives have consistently expressed concerns on the numerous adverse impacts on human health by exposure to VOCs. These concerns are the overriding factors for their interest in having industry make a fundamental shift to safer alternatives. At the same time, it is also in industry's best interest to produce safer products.

The proposed regulation only represents a very small step towards addressing the issue of VOC content in an industry. And many companies are already aligning or planning to align with the U.S. rules. The regulation itself should not be an issue for those companies. On the other hand, it should have an impact on the so-called "bad actors".

But let's move beyond regulation. There is clearly a market for many of the current products and unless safer alternatives are made available, this regulatory initiative on its own will not have the kind of impact that is needed in both the short and the long-term to accomplish significant reductions in VOC emissions.

Eventually, there will be little tolerance from the public for keeping highly toxic products on the market, and this will be matched by an increasing demand that safer products be made available. Already people are willing to pay a higher price for the products that are least toxic, and some of the major retailers advertise brands with this in mind. It makes good business sense for companies to place their efforts in taking a life-cycle approach to their products and develop non-toxic products that are both durable and biodegradable. So I ask industry to rise to the challenge to implement changes that will be beneficial for all in the long term.

Finally, I appreciate having the opportunity to present to TOSCOT and trust that you have found my talk informative.