VCC Submission to MOL on 1mg/m3 PVC Dust OEL Proposal – March 16, 2000

1) The Ontario Vinyl Industry

Responsible Industry: This industry is concerned about worker health and is committed to ensuring that any exposures are minimized for any materials which would have an adverse effect on health, and supports MOL initiatives to improve worker health where this would flow from reduced exposure As evidence of this commitment the Vinyl Council has recently introduced an Environmental Management Program (EMP) modeled on the principles of Responsible Care® and compatible with ISO 14001 The ethic of the EMP, combined with the good business sense of maintaining a healthy workforce, clearly encourages the vinyl industry to protect workers from any health hazards posed by dust It is with this mind-set that the industry approaches the issue of limits for vinyl dust

Vinyl Council of Canada (VCC): The VCC is an operating council of the Canadian Plastics Industry Association VCC's 23 members work together, to protect our environment during the manufacturing, use, recycling and disposal of vinyl products VCC produces educational materials about the safety and performance of vinyl and promotes the benefits of vinyl products The VCC is leading the industry's participation in the current OEL consultative process

Structure: The industry in Ontario consists of two polymer resin plants, several separate compounding facilities and ~150 sites where vinyl is processed into products such as pipe, siding, flexible and rigid sheet, film, window and door profiles, flooring, wire and cable etc The larger processors have their own compounding facilities The industry is growing at ~5% per annum Some larger processors are branch plants of multinational companies, whereas the smaller companies are generally Canadian owned

Sales: The sales value of the monomer, polymer and processing operations is estimated at $2 5 to 3 billion Based on US research, the full economic value to Ontario, of this industry and its peripheral activities, amounts to $5+ billion

Employees: The labour intensity per unit of sales grows through the chain It is estimated that ~10,000 work in the resin and processing components of the industry

Eco-efficiency: Vinyl products are eco-efficient due to their durability and resulting long life, high strength to weight ratio, low maintenance, low rate of failure and minimal consumption of non-renewable resources

2) Sources of PVC dust

The three distinct steps in producing most vinyl products, such as pipes, siding, window profiles or sheet, are polymerization, compounding and processing Certain items will require a further fabrication or converting step Polymerization is done in the presence of water so dust is only possible towards the end of the process, after the dryer Potential sources could be the flanges, seals and valves from the pneumatic transfer system, as well as the bag-houses that filter out the transport air The screens and bulk loading areas are sources of dust, which is why these are usually equipped with dust extractors

Compounding can be done at a stand-alone facility or be part of a large processor's operation When PVC resin is moved pneumatically from bulk transport to the storage silos, as well as from storage to dry blending, the PVC resin and any associated dust is contained, so the only sources of dust are possible leaks from flanges etc and filtering of transport air However PVC is also moved in 1000kg Super Sacs, which can create dust on filling and emptying Dry blending can be open, though with dust extraction usually in place During compounding the lighter filler, pigment and impact modifier particles, added manually from bags, are more likely contributors to dust than PVC For long runs in large processing facilities, the compound is often pneumatically transported either as pellets or powder, to the shape making equipment, such as an extruder or injection moulding machine For smaller runs, and smaller operations, compound is contained in 600kg boxes or 25 kg bags and introduced manually or by vacuum Pellets offer minimal dust generation for the compound The processing step does not give rise to any dust, but subsequent cutting, trimming and fabricating can generate dust, which should be extracted away and reprocessed

3) Practicality of 1mg/m3 limit, cost implications and cost benefit

Exposure objective: A company would have a legal responsibility to meet the proposed 1 mg/m3 TWA standard at all times, and would have to be able to satisfy itself, and the MOL if necessary, of compliance In practice, compliance testing in the workplace would be done at intervals, rather than on a continuous basis, and workers' exposures are inherently highly variable due to their changing duties and work conditions To address these wide variabilities and uncertainties, testing must demonstrate continuous compliance with a high degree of statistical certainty In other words, the results of intermittent testing must show that levels are sufficiently low that both the company and the MOL can be confident, at the 95% confidence level (at a minimum), that results are consistently below the standard In practical terms, using basic statistical concepts coupled with accepted professional industrial hygiene standards, the average of the exposure determinations from intermittent testing will have to be around 0 3mg/m3 or less in order for a company to be able to defensibly demonstrate that it is in compliance Therefore, in practical terms, the target level for companies needs to be 0 3 mg/m3 This is a much more onerous limit to meet than the proposed total dust TWA of 1 mg/m3 might suggest

Capital costs: The resin plants have estimated costs of over $1 million each to make significant reductions, and would not be surprised by the need for further spending, based on the new exposure data turning out to be above the average of 0 3mg/m3 One mid-size compounding plant estimated between $0 8 and $1million capital Larger processor estimates vary from $3,000 to $12,500 of capital per million in their sales Smaller companies can be expected to have higher capital costs per $million of sales, because of the dis-economies of small scale, though not all processing companies may have to undertake such expense Our members are not convinced they can reduce dust levels by a factor of 5 that this would require, even with major spending This industry has already been active in reducing dust levels, despite being well within the 10mg/m3 limit on average, leaving only difficult, expensive and non-guarranteed engineering options left It is difficult to assess a figure for the total industry, based on a limited sample, but the capital costs for all the vinyl operations in the Province could be up to $20 to $25 million, based on an average of $8,000 per $1million sales The most serious issues in relation to costs are that there is no evidence to suggest that these expenditures will result in any benefit to workers and it is not clear this spending will achieve the required results

Operating costs: One of the resin plants estimated an increased cost of $0 5 million, the other $0 25 million, without accounting for depreciation expense for capital Key concerns, in addition to the direct expenditures are an expected 10 – 15 % decrease in productivity and the cost of frequent monitoring, given the potential for being on the borderline of compliance To achieve compliance with an exposure limit, administrative and engineering (A&E) controls must first be determined and implemented, whenever technically and economically feasible Respiratory protection should only be used as an interim measure, or to augment A&E controls if exposures are above acceptable limits, or as a second line of defense should A&E controls fail Respiratory protection has its own inherent risk and discomfort Workers are reluctant to use respiratory protection where there is a lack of health benefit It is expected that processors will have similar problems in imposing respiratory protection

Speciation for PVC in mixed dusts: A major issue for processing companies will be the mixed components of the dust, yet with no recognized method to be able to selectively determine the PVC content This is another reason to focus on the same nuisance* dust regulation for both PVC resin and for dust mixtures from compounding facilities that would also contain pigments, additives and fillers The nuisance* dust regulation would apply equally to all components of dust in compounding and processing facilities

Cost Benefit: This is impossible to assess because there is no demonstrable worker benefit. There is no current worker health problem to be solved and the literature indicates that PVC is not a specific risk (i e just a general insoluble nuisance* dust – see Section 7)

*The current MOL Regulation 833 refers to "nuisance dusts" We understand this may be changed to "insoluble particulate matter, not otherwise classified"

4) Impact on Competitiveness

Ontario's market share and export position: Ontario is currently the principal vinyl processing province producing approximately 70% of vinyl products, made in Canada – key strengths are flexible sheet, siding and other construction profiles Approximately 25% of the resin used in vinyl processing is imported However, a high proportion of the output is exported, with particular success in construction profiles pipe and siding where exports range from 30 to 50 % of output Ontario has the 2nd largest number of pipe, siding and other profile producers in North America, behind Ohio and ahead of California and Texas It is estimated 35% of Ontario's total vinyl output is exported to the USA, helping Ontario achieve about a 10 % N American market share This compares with a potential 4% share, if it were based solely on demographics This high market share would be at significant risk should the 1mg/m3 limit go ahead

Capital Investment Decisions: Companies will be reluctant to authorize capital expenditures that will not yield health benefits and which may well not achieve the new regulated limit The processor multinationals will have the option to divert production to other jurisdictions in North America, where the regulated limit is 15 times higher than that proposed by the MOL (note that a few State OSHAs such as California and Washington use the ACGIH 10mg/m3 limit) Smaller companies will be tempted to move in the face of increased competition from other provinces and the US New production will become difficult to justify in Ontario and the balance of trade will be negatively affected

Alternate materials: Competing materials (e g out of province aluminum) will gain advantage despite their potential for higher environmental impacts (lower insulation values for windows, water losses from frequent breakages in cast iron water mains)

Obstacles to business: In the longer run the global plastics industry (critical for a portion of the well paying, higher knowledge jobs in Ontario), and not just the vinyl industry, may become hesitant to invest in Ontario, if the province enacts a standard more strict by a factor of 10 or 15 than anywhere else in N America, particularly without a compelling technical or health justification (see Section 7) The 1mg/m3 limit, currently proposed by the MOL is inconsistent with the Ontario Government's stated targets of encouraging investment and employment, as well as eliminating Red Tape

5) Comparison of proposed requirement with other jurisdictions and current approach

Other jurisdictions: No other N American jurisdiction singles out PVC – all use the "insoluble nuisance* dust" classification OSHA is at 15mg/m3 for insoluble nuisance dust and therefore PVC dust too, compared to 1mg/m3 for this proposal Provinces, which follow ACGIH, are at 10mg/m3 Some State OSHAs use the ACGIH "nuisance* dust" limit ACGIH has not seen fit to create a special limit for PVC

Current Ontario practice· Since the industry has been unaware of the WEG, companies have been adhering to a limit of 10 mg/m3 Industry performance, with some results around 30% of the 10mg/m3 and most generally lower, appears to provide protection to workers as none of the industry members putting this presentation together are aware of any pneumoconiosis or increased respiratory disease in their companies Research via IAPA and WSIB appears to confirm this Below are examples of dust levels determined, though not all companies have data on their dust levels as dust has not been identified as a problem

Company	# Samples	Arith. average	Range (in mg/m3)	% above 1mg	% above 0.3mg
A	9	1 7 mg/m3	0 4 to 3 8	78%	100%
B	18	1 2 mg/m3	0 2 to 3 3	33%	92%
C	23	1 6 mg/m3	0 05 to 4 2	70%	78%
D	13	1 0 mg/m3	Non-detect to 4 3	15%	69%
E	3	0 6 mg/m3	0 4 to 1 3	33%	100%
F	11	1 3 mg/m3	0 5 to 2 6	55%	100%
G	4	0 2 mg/m3	Non-detect to 0 5	0%	25%
H	2	1 5 mg/m3	0 2 to 2 7	50%	50%

6) Proposed meaningful, protective and acceptable limit for PVC dust

Our proposal: Ontario vinyl companies might be expected to propose a value of 15mg/m3 so as to be competitive with the majority of their US counterparts who conform to the OSHA nuisance* dust limit In fact, we propose a stricter standard - the ACGIH nuisance* dust limit, of 10mg/m3 for total dust We support the addition of a 3 mg/m3 respirable fraction limit to the nuisance* dust OEL A number of companies have raised dust issues at Joint Health & Safety Committees – this issue does not appear to be a concern for workers Further, one company reported that there was worker/supervisor consensus that the nuisance* dust limit provided a suitable safeguard

The 10mg/m3 total dust limit is consistent with health performance and relevant reviews of the literature and reflects chemical and physical properties of PVC today If the WEG were left in place it would be a negative icon to senior managers in the plastics industry making investment decisions over the next few years The Q&A produced when the WEG was created in 1986 advised that it was only an interim guideline, awaiting data on no-effect levels for pneumoconiosis in the industry The apparent lack of any pneumoconiosis cases, while the industry was using 10mg/m3 as the relevant limit, suggests, in retrospect, that this precaution was not needed Use of the ACGIH limit also prevents the complication of trying to speciate for PVC in dust from a vinyl processor or compounder, where other materials are much more likely to give rise to dust If different limits were in effect for the different components, measurements for these mixtures would be very difficult to interpret, particularly as there is no approved method to isolate and determine PVC content

7) Issues regarding studies quoted in the '86 guideline. Chemical/physical changes since studies

High loadings of a nuisance* dust and not PVC, per se, the cause: Studies reviewed by the MOL when the WEG was generated in 1986 do not show that PVC, per se, was the problem, effects noted can be explained by high loadings of a nuisance dust Reviews conducted later, such as covered in Patty's Industrial Hygiene and Toxicology 4th Edition (1994), which is considered a very credible reference for Industrial Hygienists, confirm on page 3770 that PVC itself possesses little or no biologic activity, and that high dust concentration is the issue This is reinforced by a review in Regulatory Toxicology and Pharmacology, Volume 20, Number 1, August 1994, pages S139 to S141 in Part 2

Historic exposure data are too limited to support any particular limit: The case histories and epidemiological studies did not quantify exposure levels sufficiently to suggest any particular exposure level, and there was no evidence for selecting the exceptionally low level of 1mg/m3 All studies reviewed by the MOL appeared to look at relatively high dust levels versus current conditions

Average PVC resin particle size has changed: The typical particle sizes mentioned in most of the 70's and early 80's reference papers were in the respirable range Since then there has been a significant move to use larger particle size resin The product currently being produced in Ontario has an average particle size 10 to 100 times larger than most of the particles being studied in the 70's, and a negligible quantity below 50 micron The likelihood of any respiratory impact from such non-respirable resin particles is extremely low since they do not enter the lungs

Major reductions in monomer content: Since the mid 70's, monomer content in PVC has dropped steadily, such that typical levels today are 500 to 750 times less than the levels in the early to mid 70's – when many of the studies were in progress, even though some were not published until the early 80's Any potential impact from leaching of monomer has been reduced to almost zero over the last 15 – 20 years

Contact Information: *For further information concerning this submission please contact*
Graham Knowles at the Vinyl Council of Canada
Telephone 905 678 7405 Ext 232, Fax 905 678 0774, E-mail gknowles@cpia c