

Ontario Public Service Employees Union (OPSEU)

OCCUPATIONAL EXPOSURE LIMITS (OELs)

Submission to the Ontario Ministry of Labour

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Introduction

The Ontario Public Service Employees Union (OPSEU) is pleased to offer this submission in response to the Ontario Ministry of Labour's (MOL) proposed changes to the occupational exposure limits (OELs) announced on September 20, 2004.

As one of Ontario's largest unions, OPSEU represents more than 100,000 workers from a variety of jobs and sectors. With over 70,000 industrial chemicals in use worldwide, and another 1,000 to 2,000 new chemicals being adopted for commercial application yearly, OPSEU members in every field suffer some type of chemical exposure in the workplace. Occupational exposure limits restrict the airborne concentration of chemical agents to which workers legally can be exposed.

OPSEU members in the health care sector are exposed to chemicals, such as solvents and formaldehyde, as well as radiation and biological hazards on a daily basis. Laboratory workers are exposed to a multitude of hazardous chemicals daily. Office workers in all sectors suffer daily exposures to various cleaning solvents, volatile organic compounds (VOCs), electromagnetic fields (EMFs) and other hazardous materials in their work.

Earlier in 2004, the MOL announced in Ontario that will regularly review and update OELs to ensure that the limits are set by using "the most current scientific and medical knowledge." Ontario plans to update the OELs based on the Threshold Limit

Values (TLVs) published yearly by the American Conference of Governmental Industrial Hygienists (ACGIH). The MOL's current proposal includes changes to the exposure limits of 66 chemical agents (making 63 more protective and 3 less protective), and setting limits for 26 agents not currently regulated.

OPSEU congratulates the government for continuing in the process to bring Ontario's OELs in line with the current ACGIH levels.

ACGIH process remains flawed

OPSEU supports reducing Ontario's OELs, at a minimum, to the current TLV levels set by the ACGIH as described in the MOL's proposal. We also believe that Ontario's OELs should be decreased or new OELs added whenever new information and research lowers TLV limits or adds new substances to the list set by the ACGIH.

However, our union continues to have reservations about the process by which the TLV levels were and still are established by the ACGIH. Essentially we agree with the Ontario Federation of Labour's view (OFL) that the ACGIH process has protected the interests of employers, often at the expense of workers' health.

In 1987, Ontario's new Liberal government adopted occupational exposure limits for some 600 substances under a new sweeping regulation. These limits, however, were based primarily on the ACGIH's list of TLVs. This occurred almost at the same time that

Dr. Grace Ziem and Barry Castleman were uncovering the scandalous state of ACGIH documentation for its TLVs. Some had not been updated since the 1950s, one not since 1939. Others were based on brief communications between company doctors and toxicologists; few were based on studies that met scientific criteria. The scientists were unable to obtain copies of these materials, and learned that some of the information was simply given verbally over the telephone.

In addition, some committees established to review substances were packed with professionals from the same companies producing the substances under review. Castleman and Ziem concluded that many of the limits were not scientifically defensible, but reflected corporate biases and priorities.¹

Similarly, Roach and Rappaport, in their investigation of ACGIH documentation for TLVs, found that a large number of TLVs were set at levels above those shown in the ACGIH documentation to produce adverse health effects. They concluded that the TLVs were not health based limits.² They recommended that worker exposure should be kept below one tenth of the TLVs. This research is consistent with our union's belief that ACGIH TLV levels were set to protect the interests of employers, NOT the health of workers.

¹ Castleman B.I., Ziem G.E., "Corporate Influence on Threshold Limit Values." *Am J Ind Med* 13 (1988): 531-559.

² Roach S.A., Rappaport S.M. "But they are not thresholds: A critical analysis of the documentation of threshold limit values." *Am J Ind Med* 17 (1990): 727-753.

In effect, these limits have often been set at levels that major employers are already meeting and as such are more an indication of what the market place will bear, than a “scientifically proven” safe level.

In follow-up work in 1989, Castleman and Ziem noted that as early as 1970, industry representatives, working as “consultants” to the TLV committee had prepared “documentations” for more than 100 substances. Of these, at least 36 substances were considered carcinogens by official bodies—but not by the TLV committee. It is staggering that these “consultants” overlooked the carcinogenicity of 36 substances—especially when enough information was available for other official bodies to classify them as carcinogens.

An example of sloppy science occurred when the ACGIH TLV Committee drafting its TLVs for 1986, relied upon a 1975 study of benzene workers which demonstrated “no excess mortality among benzene-exposed workers” while totally ignoring the 1977 follow-up study which indicated, “a significant excess of leukemia” among the same workers. That this committee could ignore such important evidence is astounding and helped reduce our faith in ACGIH processes and in the resulting TLVs.

In the years after the criticisms were leveled at the ACGIH, not much changed to improve matters. Essentially, Castleman and Ziem concluded in 1994 that rather than eliminating corporate influence, the ACGIH simply concealed it.³ In their report, they

³ Castleman B, Ziem, G. American Conference of Governmental Industrial Hygienists: low threshold of credibility. *Am J Ind Med* 26 (1994): 134.

noted that in its 1991-1993 version of *Documentation of TLVs and BEIs*, the ACGIH had removed citations to unpublished corporate communications and replaced them with references to published literature. However, the authors point out that 85% of the TLVs that were based on the old “references” were not reviewed based on the new citations. In rare cases, such as ethylene oxide, where a committee member did recommend that a TLV be reviewed based on the data found in revising a documentation, the recommendation was voted down.

Also, in its conflict of interest policy, the ACGIH stopped short of explicitly prohibiting committee members from being involved in developing TLVs for substances produced by firms with which they had financial relationships.

Furthermore, TLV committee and Board of Director minutes were still not being made available. One set of minutes that were “uncovered,” showed that more than 40 Dow Chemical products were assigned to Dow toxicologist Theodore Torkelson, and 20 of DuPont’s products were assigned to two DuPont employees.

The continued lack of transparency and disclosure in the process, combined with the lack of evidence to support the TLVs contributes to our reluctance to accept the TLV levels as “safe” levels to which workers may be exposed without experiencing negative health effects. Therefore, while OPSEU supports lowering Ontario’s OELs, we believe that the ACGIH TLV levels are often too high and consequently we are not convinced that they should be considered safe.

Instead, OPSEU supports establishing as legal limits, levels that represent the lowest possible achievable levels of hazardous substances in workplaces. Occupational exposure limits should exist to serve one critical purpose: to protect workers from excessive exposure to toxic chemicals in the workplace. Suffering exposure to hazardous substances at work is not part of a worker's wage bargain. Moreover, the very placement of a substance on the OEL list means that evidence already exists that the substance negatively affects human health at some level of exposure. And all too often, this evidence has been provided by the deaths or illnesses of workers exposed during the production process.

Therefore, limiting exposures to substances already shown to negatively affect human health is a priority for our union.

New substances—toxicity testing

OPSEU supports a process that will ensure that substances are safe before they are introduced into the workplace. The OFL has repeatedly voiced labour's concerns on this issue; a regulation should require that chemicals receive toxicity testing prior to being allowed into workplaces.

Too often the workplace serves as a testing ground for new substances. Employers continue to introduce chemicals into workplaces with little knowledge about their toxicity and without prior testing for health and safety. In 1988, the Environmental

Protection Agency reported that sparse information was available for the 3,000 highest production chemicals of which there were over one million pounds in use. Ninety three percent lacked basic chemical screening data and 43 per cent had no basic toxicity data.⁴

Therefore, instead of employers and industry having to show that substances are safe, the burden rests unfairly with workers, their families, and their unions to demonstrate that these substances cause harm to workers' health and often to their lives. We believe this approach is backwards. It is OPSEU's position that the government should adopt a more responsible approach—one that protects workers and shifts the burden where it belongs.

OELs based on healthy adult exposure to a single substance

OPSEU also supports lowering the OEL levels because we believe that lower allowable levels will protect additional workers from negative health effects. We point out that OEL levels are based limits to which it is believed healthy adults can safely be exposed. However, not all workers are healthy all the time and consequently many less healthy workers may suffer ill effects from exposures at OEL levels. Furthermore, workers are often exposed to numerous substances in small amounts. It is not known what the synergistic effects are of these types of exposures.

⁴ Environmental Protection Agency, *United States National Profile on Management of Chemicals*, Office of Prevention, Pesticides and Toxic Substances, **Environmental Protection Agency**, 1997.

We also believe that the OELs do not take into account the cumulative effects that workplace stressors have on the health and well-being of workers. For example, work overload, long hours, shift work, staffing shortages, poor working conditions, and having to do more with less take their toll on today's workers, making them more vulnerable to illness from their exposures and less protected by OEL levels meant for healthy adults.

Finally, we want to point out also that OELs do not consider the existence and vulnerability of "secondary victims." For example, a recent study done through Motherisk, published in *Archives of Pediatrics and Adolescent Medicine* found that children of women with workplace exposures to solvents had lower scores on a variety of language, memory and dexterity tests in comparison to a control group of children. These results occurred even where the women wore personal protective equipment (PPE) while working with these solvents. We agree with the OFL that providing workers with real protection from toxic substances will also reduce the toll of secondary victims.

Precautionary principle versus scientific basis

Another reason OPSEU supports lowering the OELs relates to the fact that OELs are prepared by national scientific institutes and scientific committees based on the concept of "no observed adverse effect levels" (NOAELS). The truth is—workers can attest to the fact that many substances have harmed their health long before there was the scientific evidence to tell them so. Workers may become ill or die in the time it takes to

gather the required scientific information and go through the processes that lead to a substance being listed as one requiring an OEL.

We believe that the precautionary principle should be applied when dealing with substances in the workplace. That is, when an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically.

The question of whether action should or should not be taken in the light of scientific uncertainty is not a scientific question. In fact, these decisions involve questions of whose priorities should prevail when weighing the risks and benefits of over and under-protecting workers. These are ethical, political and economic questions, not scientific ones.

One recent example in OPSEU illustrates that the more protective precautionary principle directly conflicts with the employer's desire to rely on strong scientific proof that a substance is harmful to workers before agreeing to provide any intervention.

In this OPSEU workplace, workers are exposed to fumes from deteriorating microfilm, which give off the smell of vinegar. Research on film deterioration and its effects is scant in Canada; however, a 2002 report from the National Library in Australia, titled "Storage of Cellulose Acetate Collections" outlines the hazards of deteriorating film, and provides guidance on appropriate storage conditions. The report states that

cellulose acetate is susceptible to deterioration over time through a process called vinegar syndrome, which initially involves the release of acetic acid. Acetic acid is a known respiratory irritant even at low levels. The effects of long term low exposure to acetic acid are not well documented.

The precautionary approach would be to reduce worker exposure by instituting appropriate storage facilities for the microfilm that are temperature and humidity controlled to minimize or prevent film deterioration, and subsequent release of acetic acid even before testing the acetic acid levels. Instead, the employer cites a lack of scientific information in Canada regarding vinegar syndrome and is reluctant to institute appropriate precautions. Worker perseverance may eventually cause the employer to embark on a battery of tests to evaluate the whether the levels of acetic acid exceed the current OEL. If testing indicates that the legal exposure levels are not being exceeded, the employer may be allowed to take no further action and workers will continue to be exposed and suffer the resulting health effects.

The truth is that exposure variation between workers and between days is substantial and a few samples may not come near to capturing worker exposures over time—even if the tests reflect levels less than the current OEL. One researcher has shown that an average air sample measurement which is 25% of the OEL may reflect exposures which exceed the exposure limit as much as 5% of the time. As this case shows, the precautionary principle best protects workers from exposures; yet the

scientific methods (that give rise to the OELs) are still relied upon, often at the expense of other types of evidence.

Action limits

One way to bridge the divide between the scientific method and the precautionary principle is to utilize action limits, which trigger exposure reduction efforts before the Time Weighted Average (TWA) is reached. In the case described above, an action limit well below the TWA could help compensate for the exposure variations in testing described above.

In the United States, action limits are set at 50% of the OEL to trigger increased monitoring for some substances. The National Institute for Occupational Safety and Health (NIOSH) recommends general application of the 50% action limit, although some researchers say this limit is too high.

Whenever possible however, documented health effects in workers at any level of exposure should be a trigger which requires action to reduce exposures in the workplace.

Proposed increases to butane, 1-hexene, and toluene diisocyanate

The MOL proposes to make allowable levels of exposure less protective for butane, 1-hexene, and toluene diisocyanate (TDI). OPSEU does not support raising

levels of allowable exposure in workplaces for any substances that negatively affect human health.

In particular, the proposed increased OEL for butane from 800 ppm to 1000 ppm exceeds both the ACGIH and NIOSH levels of 800 ppm. Butane is used as a fuel for household or industrial purposes, can be used as an extractant, solvent, and aerosol propellant. If inhaled at high levels, butane can cause unconsciousness.

The MOL proposal to replace the current ceiling limit of 0.02 ppm for toluene diisocyanate (TDI) with a short term exposure value (STEV) of the same amount is less protective. TDI is a colourless, yellow or dark liquid or solid used to make resins for various materials, such as foams, padding, insulation, molds, coatings, rubbers, adhesives, paints and textile finishes. If inhaled, ingested or absorbed through the skin, TDI may cause irritation of eyes, respiratory tract and skin which may be severe enough to produce bronchitis, pulmonary edema, nausea, vomiting and abdominal pain. Some decrease in lung function in the absence of symptoms has been observed in some workers exposed to TDI for long periods of time.⁵

Given that both NIOSH and the IARC classify this substance as possibly carcinogenic, and the health effects of TDI, OPSEU does not support the proposal to increase the legal exposure level making it less protective.

⁵ Sittig, Marshall. *Handbook of Toxic and Hazardous Chemicals and Carcinogens*. Noyes Publications. New Jersey, 1985, p 872.

Formaldehyde

OPSEU strongly supports lowering the OEL for formaldehyde in this round of changes, especially since this level was first supposed to be reduced in 1999. OPSEU supports reducing the exposure levels for formaldehyde to match the current ACGIH TLV ceiling levels of 0.3 ppm. Ontario's current time weighted average exposure over an 8 hour work day (TWAEV) for formaldehyde is 1ppm, and the current maximum short term exposure for 15 minutes (STEV) is 2 ppm.

Formaldehyde is an irritant to the eyes, mucus membranes and to the respiratory system. It can cause acute and chronic health effects. It is a dangerous substance and should be well-controlled with exposures as limited as possible.

In June 2004, formaldehyde was formally labeled a carcinogen by the International Agency for Research on Cancer (IARC), based on the work of 26 scientists from 10 countries who evaluated the available evidence on the substance. They concluded that, "there was adequate data available from humans that there was an increased risk of a rare form of cancer (nasopharyngeal cancer) of the nasal cavity and para nasal sinuses, and strong but not sufficient evidence for leukemia."

OPSEU members regularly suffer exposures to formaldehyde in the health care sector; for example, formaldehyde is used in autopsy rooms. Other OPSEU members suffer exposures through vehicle emissions, building materials, carpets, paints and

varnishes, disinfectants, resins, and plastic products. It is our experience that hospitals, particularly in the morgue area, are barely keeping formaldehyde levels down to current allowable levels. We believe that lowering the allowable level will not only make the level more protective, but will force employers to take measures that they should be currently taking to lower exposure levels in workplaces.

OPSEU notes that formaldehyde does not appear on the 2004 list of proposed changes announced by the MOL, although we understand that it was scheduled to be reduced in this round. We strongly encourage the MOL to ensure that this carcinogenic substance is added to the list and its OEL reduced accordingly.

Conclusion

Given our union's beliefs that the history of standard setting has been problematic, and that current TLV and OEL standards are not protective enough in many cases, OPSEU supports lowering Ontario's OELs to the ACGIH TLV levels as a necessary, first step.

We urge the Ministry of Labour to address the other important issues raised in this submission: toxicity testing for new substances, synergistic effects of substance combinations, action limits, consideration of secondary victims, and our specific comments on formaldehyde, butane and toluene diisocyanate.

In particular, we would like to emphasize that exposure to a hazardous substance at any level does not change the fact that the substance is indeed hazardous. OPSEU encourages the MOL to adopt and enforce the precautionary principle instead of relying purely on scientific data and excluding other important evidence. Workers should not have to become ill or die to build up the unequivocal scientific data required to trigger regulatory action regarding particular substances.

We appreciate the opportunity to comment on your proposal to reduce Ontario's OELs and we look forward to your actions in regard to the issues we have raised in this submission.

Bibliography

- ACGIH. *Guide to Occupational Exposure Values 2002*. ACGIH Inc. Ohio, 2002.
- Castleman B.I., Ziem G.E. "Corporate Influence on Threshold Limit Values." *Am J Ind Med* 13 (1988): 531-559.
- . Threshold limit values: historical perspectives and current practice. *Am J Occ Med*, 31 (1989): 910-918.
- . American Conference of Governmental Industrial Hygienists: low threshold of credibility. *Am J Ind Med*, 26 (1994): 133-143.
- Environmental Protection Agency, *United States National Profile on Management of Chemicals*, Office of Prevention, Pesticides and Toxic Substances, 1997.
- International Agency for Research on Cancer (IARC). *IARC classifies formaldehyde as carcinogenic to humans*. Retrieved 15 June 2004.
www.iarc.fr/pageroot/PRELEASES/pr153a.html
- Laslo-Baker, D, Maru Barrera, etc. Child Neurodevelopmental Outcome and Maternal Occupational Exposure to Solvents. *Arch Ped Adol Med*. 158 10 (2004): 956-961.
- National Library of Australia. "Storage of Cellulose Acetate Collections: A preliminary survey of Issues and Options." February 2002. [ww.nla.gov.au/anica/storagecontents.html](http://www.nla.gov.au/anica/storagecontents.html)
- Roach S.A., Rappaport S.M. "But they are not thresholds: A critical analysis of the documentation of threshold limit values." *Am J Ind Med* 17 (1990): 727-753.
- Sittig, Marshall. *Handbook of Toxic and Hazardous Chemicals and Carcinogens*. (New Jersey: Noyes Publications, 1985)
- The Ontario Federation of Labour (OFL). *Occupational Exposure Limits: Submission to the Ministry of Labour*. March 2000.
- Workers Health and Safety Centre. *Environmental Scan: Trends that Impact Occupational Health and Safety in 2004 and beyond*. Toronto, March 2004.