

**OCCUPATIONAL  
EXPOSURE LIMITS**

**SUBMISSION  
TO THE  
MINISTRY OF LABOUR**

**BY THE  
ONTARIO FEDERATION  
OF LABOUR**

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The Ontario Federation of Labour (OFL) is the central labour organization in the province of Ontario. It has an affiliated union membership of over 600,000 members from all regions of the province. With most unions in Ontario affiliated, membership includes nearly every job category and occupation.

As a province-wide central labour body, the OFL works to develop and coordinate policy as passed at our conventions and by our executive bodies. One of the key roles of the OFL is to try to influence public policies that affect all working people, their families and communities. One of the most important areas of public policy that we try to influence is the prevention of work related injuries and illnesses, including occupational cancers.

We welcome the opportunity to comment on the proposed revisions to the Occupational Exposure Limits for Ontario.

## **Introduction**

The American National Research Council reports that presently there are 70,000 industrial chemicals currently in use, with another 1,000 to 2,000 new chemicals being put into commercial use each year. The overwhelming majority of occupational exposure limits which were set here in Ontario in 1986 were actually established 15 to 40 years ago, as recommended Threshold Limit Values (TLV) by the American Conference of Governmental Industrial Hygienists (ACGIH). These limits were set based on what the average healthy white male worker could acutely tolerate. Little or no regard was made for the risks of long-term damage to worker's health or reproductive health effects.

The overwhelming lack of data on the health effects of industrial chemicals has been reported time and again over the years. As recently as 1998, the American Environmental Protection Agency produced a report showing the lack of available health information for the top 3,000 high production volume chemicals, those with over one million pounds in use. The study noted that 93% lack some basic chemical screening data; 43% have no basic toxicity data; 51% of the chemicals lack basic toxicity information; a large percentage of available information is based only on acute toxicity.

The chemical manufacturers and producers of the substances in commercial use provide virtually no information on the long-term health effects to the workers or their families. Nor do they provide information on the repercussions that can occur where these substances are mixed with others already present in the workplace or the environment.

Industry can introduce chemicals into the workplace and the burden is placed on society to demonstrate that these substances cause harm, rather than requiring industry to

demonstrate that these substances are safe before introducing them into the workplace and, in the end, our environment.

Most often, by the time it is realized that a chemical is harming workers or the environment, the substance is firmly entrenched into the economy. The result is that workers suffer illnesses and premature death due to their exposures. For too many years, workers have had to count the tombstones of their fallen sisters and brothers and use that information to gain improvements in prevention.

By 1996, approximately 300,000 Ontarians had contracted cancer and close to half will die from this disease. In the 1930s, one in ten Canadians contracted cancer; in the 1970s, this increased to one in five. Today, one in three Canadians risk cancer. If we include non-melanoma skin cancers, then one in two Canadians are at risk of developing cancer over the course of their lifetime.

Research has shown that cancer is largely a disease of industrialization and, therefore, preventable. In the 1800s and early 1900s, physicians who were providing health care to indigenous populations, as yet untouched by modern civilization, reported on the almost entire absence or infrequency of cancer in these populations. Medical missionaries who worked with these populations for decades at a time reported malignant disease as extremely rare. Some would see one or two cases during the years that they serviced the population. Some reported seeing no cancer among the population at all.

Estimates regarding the number of cancer deaths attributable to workplace exposures vary greatly. Researchers who act as apologists to the corporations argue less than 5% are related to occupation. Research done by the National Institute of Occupational Health and Safety and the National Institute of Environment Health Sciences in the U.S. estimated that between 20% to 40% of all cancer is related to occupation.

Closer to home, Cancer Care Ontario has estimated that workplace exposure is accountable for nine percent of cancer deaths in Ontario. In 1998, there were 23,100 cancer deaths in Ontario. If the nine percent figure were to be accepted, then 2,079 working people died prematurely last year from cancer as a result of their exposures at work. At 20%, this becomes 4,620; and at 40%, this would mean that 9,240 workers died of cancer in 1998, as a result of their workplace exposure to toxic substances. These figures do not consider those workers who contracted cancer but survived the disease, nor does it consider the number of workers who have died as a result of other diseases.

Ontario's Workplace Safety & Insurance Board (WSIB) allowed a total of 119 fatal claims for all diseases in 1998. There were only 217 fatal claims for all types of disease made to the WSIB in 1998.

Clearly, there is a gross discrepancy between even the most conservative estimates for occupational cancer deaths in Ontario and the number of fatal disease claims filed with the WSIB.

Research has proven 24 substances to be human lung carcinogens. Out of this number, 23 of the substances have been proven to cause lung cancer as a result of studies on the workers who were exposed to them. Of all the substances now known to cause cancer in humans, more than half were discovered as a result of the studies on the workers who worked with the substances.

It is important to remember that, at some point, each chemical or industrial process was new and not an essential part of an important productive process. Many more products and processes which will become integral to our economy are under development now.

If we are to prevent future occupational disease, we must aim now to reduce the use of existing toxic substances or processes and provide the framework for development of new, non-toxic substances and processes in production. This goal has much in common with environmental objectives. The successful reduction of toxic substances and processes in the workplace will also play a key role in diminishing environmental pollutants.

### **Labour's Concern Over the Use of TLVs**

For years, labour had been suspicious of the exposure guidelines called TLVs developed by the ACGIH and adopted as legal limits by Ontario in 1986. This was done without consultation and over the objections of labour.

We watched with frustration as hygienists working for our employers and our enforcement agencies compared our workplace exposures to the limits which the ACGIH claimed "workers may be repeatedly exposed day after day without adverse effect". We had seen our headaches, dizziness, nausea and shortness of breath dismissed when air samples have shown that our exposures were below the TLVs.

Numerous scientific reports published in the late 1980s and early 1990s documented what labour had long suspected: **the ACGIH TLVs have been set at levels that protect the interests of employers, not the health of workers.**

The first report, prepared by scientists, Castleman and Ziem, and published by the American Journal of Industrial Medicine in 1988, documented in incredible detail the sloppy science and corporate bias involved in the development of the ACGIH TLVs.

Castleman and Ziem found that many of the TLVs were based on confidential information of questionable scientific value. The TLVs for at least 89 substances were based on unpublished corporate "communications" while those for 15 other substances were based on unpublished corporate studies or reports.

In most cases, Castleman and Ziem were unable to obtain copies of these unpublished materials from either the ACGIH or the original corporations. Members of the TLV Committee admitted that some of the information was never conveyed in writing; it was simply given over the telephone. They also learned that the TLV Committee considered information as published when it merely appeared in a manufacturer's Materials Safety Data Sheet.

Furthermore, Castleman and Ziem found that corporate representatives would be given the responsibility of reviewing the TLVs for major products of their own companies. For example, an industrial hygienist from Dupont and a toxicologist from Dow were two of four representatives to sit on the ACGIH subcommittee for cancer-causing agents in the 1970s, when a number of chemicals produced by Dow and Dupont were being considered.

In his 1975 letter of resignation from the ACGIH TLV Committee, Hervey Elkins, an occupational health official, expressed his outrage at the duplicity of corporate representatives on the Committee:

"In spite of his knowledge he seems to come up with some recommendations for TLVs that are way too high, in my judgement. The same can be said for most of the other industry representatives we have had. In many cases they recommend a TLV much above the action levels used in their own plants."

This long standing member of the TLV Committee had raised concerns as far back as 1966 when he wrote, "It annoys me to no end, that any action that could possibly adversely affect a certain chemical company is immediately objected to by a consultant to said company, and the objection is always accepted by the chairman."

In 1980, Dr. Hector Blejer, a member of the TLV Committee for 10 years, resigned protesting the "increasingly stronger pro-industry bias...particularly among all the Committee consultants and among the members who consult privately for private industry."

Castleman and Ziem completed their report with an historical account of the actual TLVs for particular substances. For example, when drafting its TLVs for 1986, the ACGIH TLV Committee 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.

Castleman and Ziem followed up their original report with additional research and published additional results in the American Journal of Occupational Medicine in 1989. They questioned the scientific quality of the TLVs and found more evidence of the corporate influence in establishing the TLVs. They stated, "Industrial experience reflect a pattern of uncritical acceptance of assertions from financially interested parties, based on scant data of poor quality. These assertions, absent explanations of materials and methods used, would never be accepted for publication in medical or other scientific literature." They went on to state, "There is no question of the economic impact of the TLVs on the chemical industry generally and on Dow, DuPont, and Bayer in particular, has been enormous. There seems no reason to doubt that chemical industry employees working on the TLV Committee were implementing corporate policies of their firms."

They found 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. The Dow representatives was assigned at least 30 Dow products. The DuPont representatives made recommendations for many of the company's pesticides. The individual listed as representing the German MAK Commission actually worked for Bayer which owned Mobay in the USA. He prepared documentation for eight Bayer or Mobay products and was responsible for the decision to double the TLV for one Mobay product.

Castleman and Ziem also discussed the issue of "Toxic Torts" and the "TLV defence". They wrote, "An increasing number of persons are appearing before the courts with conditions medically attributed to chemical exposures. The courts are interested in knowing the state of medical knowledge when these people's exposures to chemical products and wastes occurred. A rationale often used to parry charges of negligence and assessment of liability is known as the TLV 'defence'. This amounts to: We thought that the exposures here would be below the TLVs, and we also thought the TLVs were safe, so what happened is not our fault."

Then in 1990 the American Journal of Industrial Medicine published an article by Roach and Rappaport. They had written a critical analysis of the documentation cited by the ACGIH for the Threshold Limit Values. When these researchers analysed the reports on which the TLVs were based, they found little relationship between health effects and the TLVs supported. In fact, they found that one out of every six or seven workers exposed to levels below the TLV were actually suffering from health effects, and this was according to the reports used by the ACGIH committee itself.

Roach and Rappaport found a very clear relationship between the TLVs set and the levels of exposure found in the workplaces studied. They concluded that **the ACGIH TLVs are**

**not based on health effects as the ACGIH claims, but on practical levels with which industry can readily comply.** The summary of their article is as follows:

“Threshold Limit Values (TLVs) represent conditions under which the TLV Committee of the American Conference of Governmental Industrial Hygienists (ACGIH) believes that nearly all workers may be repeatedly exposed without adverse effect. A detailed research was made of the references in the 1976 Documentation to data on ‘industrial experience’ and ‘experimental human studies.’ The references, sorted for those including both the incidence of adverse effects and the corresponding exposure, yielded 158 paired sets of data. Upon analysis it was found that, where the exposure was at or below the TLV, only a minority of studies showed no adverse effects (11 instances) and the remainder indicated that up to 100% of those exposed had been affected (8 instances of 100%). Although, the TLVs were poorly correlated with the incidence of adverse effects, a surprisingly strong correlation was found between the TLVs and the exposures reported in the corresponding studies cited in the Documentation. Upon repeating the search of references to human experience, at or below the TLVs, listed in the more recent, 1986 edition of the Documentation, a very similar picture has emerged from the 72 sets of clear data which were found. Again, only a minority of studies showed no adverse effects and TLVs were poorly correlated with the incidence of adverse effect and well correlated with the measured exposure. Finally, a careful analysis revealed that authors' conclusions in the references (cited in the 1976 Documentation) regarding exposure-response relationships at or below the TLVs were generally found to be at odds with the conclusions of the TLV Committee. These findings suggest that those TLVs which are justified on the basis of ‘industrial experience’ are not based purely upon health considerations. Rather, those TLVs appear to reflect the levels of exposure which were perceived at the time to be achievable in industry. Thus, ACGIH TLVs may represent guides of levels which have been achieved, but they are certainly not thresholds.”

Roach and Rappaport recommended that **worker exposure should be kept below one tenth of the currently recommended TLVs.**

Despite the criticisms, the ACGIH bitterly resisted any real change to guard against conflicts of interest in the review of TLVs. In 1994, the American Journal of Industrial Medicine published a commentary by Castleman and Ziem which critiqued the ACGIH's handling of conflicts of interest by those recommending changes to the TLVs. They commented, “the conflict of interest ‘policy’ consists of a mere understanding that, if a member of a committee suspects that he or she may have a conflict of interest, that should be discussed with the TLV Committee chair and resolved. This ensures that, to the extent that conflicts of interests are of concern on the committee, they will be handled in such a way that there is no public disclosure of the issues involved or the manner of their

resolution. ACGIH declined to explicitly prohibit committee members from being involved in developing TLVs for substances produced by firms with which they have financial relationships.”

They also commented on the ACGIH method for addressing the issue of unpublished corporate communications which were used in establishing many TLVs. “Removed were citations to unpublished corporate communications that were critical in setting TLVs for over 100 substances. The problem is, the TLVs that were based on the old references were not subjected to review in the course of this process. By revising the documentation but not the TLVs, ACGIH concealed corporate influence instead of eliminating it.”

Castleman and Ziem concluded their commentary with the following statement, “ACGIH has had five years to deal responsibly with criticisms of the impropriety in the process for setting TLVs and has chosen to do little if anything that would inspire public trust. The organization yielded to the most recalcitrant elements on the TLV Committee and on the Board of Directors in refusing to repudiate discredited procedures and by changing as little as possible. Through the combination of intransigence and lack of resolve, ACGIH leadership has failed its members and the public once again on the TLVs. The winners in this sad affair are the business interests and lawyers that continue to use the TLVs and ACGIH’s tattered credibility as a shield from liability in personal injury lawsuits.”

The Ontario Federation of Labour has steadfastly opposed and continues to oppose the use of these threshold limit values as legal exposure limits for Ontario workers. We know, based on the health responses of our membership and on the scientific evidence, that workers exposed at these levels will continue to become ill, develop diseases and die from horrible premature deaths.

The sad reality is, as bad as the TLVs are, many are better than what is currently in place for Ontario workers.

We are being told that the ACGIH has since revised how TLVs are set but very few substances have had TLVs set or revised by this newer process. This means that all but perhaps 100 of the limits (at most) are still suspect.

### **As Low As Reasonably Achievable**

The As Low As Reasonably Achievable (ALARA) principle is widely used in the nuclear industry to reduce worker exposure to levels much lower than the legal limit. The use of OELs tends to be interpreted as permission to expose workers up to the limit. Legal exposure limits, when they are obeyed at all, tend to be treated like highway speed limits. That is, if the employer finds the workplace at or below the limit, then there is no incentive



to reduce exposure further, even when the limits are known to be inadequate. It would be better to treat exposure limits like minimum wage legislation as a minimum standard upon which most workplaces should be expected to improve.

The evidence that the ACGIH TLVs will not protect the health of workers is clear. The government should introduce the ALARA principle as another tool to control worker exposure to toxic substances.

### **Action Limits**

The use of "action limits" to trigger exposure reduction efforts before the Time Weighted Average (TWA) limit is reached can be another tool to protect the health of workers.

Several investigators have demonstrated that exposure variation between workers and between days in many workplaces is substantial and that a few air samples may not come near to capturing worker exposures to hazardous substances over time. One researcher shows that an average air sampling measurement which is 25% of the OEL may reflect exposures which exceed the exposure limit as much as 5% of the time.

In the U.S., action limits set at 50% of the OEL are used to trigger increased monitoring requirements for some substances. NIOSH recommends general application of the 50% action limit. However, this action limit has been criticized by a number of investigators as too high.

A number of approaches are possible for using action limits. One approach is the use of a 25% action limit. Where air sampling shows average exposures exceeding 25% of the OEL, then it is almost certain that some unmeasured exposures will exceed the OEL and the employer can be deemed out of compliance. He will then be required to improve controls and decrease exposures to below the action limit.

Another approach is to use a sliding scale of action limits, depending on the extent of sampling. An employer who takes few air samples may use an action limit as low as 10%; greater numbers of samples may be associated with larger action limits. In this scheme, employers who carry out extensive sampling and can better show that real exposure levels are consistently below the exposure limit, are allowed to use a higher action limit.

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

## Prior Toxicity Testing

One method of preventing new toxic substances or processes from being introduced to the workplaces is to require prior toxicity testing. The requirement to add toxicity testing to the research and development phase of new products and processes will help to bring occupational health concerns into the earliest stages of planning and design of production instead of being afterthoughts.

Prior toxicity testing is a realistic regulatory option. It is part of current regulations governing the introduction of new food additives, pharmaceuticals, and pesticides. Before new additives, drugs or pesticides enter the market, they must be tested, results reviewed by the appropriate government agency, and approved. Licenses are then issued for the manufacture, distribution, and sale of these products.

The intention of this protective effort was to limit harm to the consumer and the public, rather than to workers. However, the model needs to be extended to include the explicit goal of protecting workers who produce and use these and other toxic products.

If we are to rely on pre-testing of chemicals, we must be able to trust the testing process. Safeguards must be erected to prevent a repetition of the Industrial Biotest Laboratory (IBT) scandal in the late seventies, in which the laboratory was found to be fabricating most of its research data on the health effects of 43 pesticides. (Many pesticides approved on the basis of information from IBT are still on the market.) This is a potential problem wherever employers pay for programs in which they have a vested interest. Safeguards could include:

- certification of testing laboratories by a government agency;
- requirements of test laboratories to follow strict guidelines and international protocols in carrying out tests;
- inspections of laboratories;
- random checking of test results, including the reproduction of some experiments to verify results;
- bipartite review of experiment reports and results.

Prior toxicity testing assumes that, once health information is known about particular substances, a decision can be made about whether to allow its introduction into general use. And when new substances are approved, more information will be available on which to base protective measures.

A number of important judgements will have to be incorporated into the regulation to govern these decisions. Substances may have to be ranked for seriousness of health effects and potency, for example, in order to decide which new substances to veto. If new

substances are proposed as substitutes for existing ones, the health effects for both will have to be compared.

This is not always a straightforward process. It is fairly easy to compare one effect of a toxic substance to the same effect of another. For example, we can compare strong and weak carcinogens or substances which have severe developmental effects on the fetus of an exposed worker and those for which effects are weaker or appear less frequently. It is more difficult to rank different types of health effects.

Another complicating factor is that most substances have multiple effects. Lead, for example, causes reproductive effects, damage to the nervous system, gastrointestinal disorders, anaemia, and other problems. It may be hard to compare this substance and its effects to other substances with a different mix of effects and decide which is safer.

Most or all of the testing information on new substances will depend on animal experiments and, more and more, on in vitro testing. Interpretation of this information should be laid out in clear, public protocols that accompany the regulation so that decisions on the toxicity of substances are consistent and accountable.

It is important to recognize the limits of this regulatory option. It does not affect the vast number of toxic substances and processes already in use in the workplace.

It may not weed out all substances which cause chronic damage after many years of exposure. It also has the potential to slow the introduction of safer, new substances and processes as well as toxic ones. This is not necessarily bad, since it is preferable to deal with a known danger than an unknown one.

Despite the difficulties, uncertainties, and limits of prior toxicity testing, it is an important part of a preventive regulatory strategy to stop the introduction of new, highly toxic substances into the workplace. It forces health and safety considerations to the top of the agenda in the introduction of new substances to the workplace and to the economy.

## **Construction**

Those working in the construction trades do not have even the same minimal protection for toxic substances provided to workers in other sectors.

These proposed limits will not protect the thousands of workers who work in the construction trades as construction projects are exempt from the regulations the Ministry intends to revise.

Section two of Ontario Regulation 833 Respecting Control of Exposure to Biological or Chemical Agents specifically excludes construction workers from any restriction in the amount and duration of exposure to hazardous chemical substances in their workplace. This section reads, "This regulation does not apply at a project to an employer who primarily carries on the business of construction or to workers of such employer."

If the Ministry of Labour is serious about its stated commitment to make Ontario workplaces among the safest in the world, it needs to end this discrimination against construction workers. It can begin to provide real health protection for these workers by removing this section of Ontario Regulation 833.

The transient nature of the trades means that those workers who exercise the right to refuse hazardous work, quickly find their services are no longer required on the site. Those who have a history of refusing hazardous work on construction sites can find themselves blacklisted and unable to find work in their trade. The prohibition against employer retaliation on workers exercising their rights under health and safety legislation means little in the construction industry.

### **Agricultural Workers**

These workers are specifically excluded from the protection of Ontario's *Occupational Health Safety Act* and regulations. Therefore, agricultural workers do not have the same minimal health protection provided many other workers, as the exposure limits do not apply to them. These workers also do not have the benefit of the right to know through the WHMIS legislation. Nor are they able to negotiate collective agreements which could include provisions in occupational health and safety.

While the agri-business community would like to maintain the "Little House on the Prairie" mystique, the reality is that many agricultural operations in Ontario today do not resemble the small family farms of our past.

In keeping with the Ontario Federation of Labour's position that all workers should be protected under the *Occupational Health and Safety Act*, we are requesting that this government act to remove the exemption which excludes farm workers from the protection of the occupational health and safety legislation, including the occupational exposure limits as well as the Workplace Hazardous Materials Information System (WHMIS). This can be done by regulation without amending the *Act*.

Application of the WHMIS regulation will provide a better understanding of the health hazards involved in the use of other toxic substances and would lead to safer handling of the substances. This would protect the farm workers but would also protect their families.

We have seen with tragic consequences that toxic substances can be brought home on work clothing, etc., if the worker is not aware of the hazards.

### **Secondary Victims**

Controls protecting workers also protect family members and those in the surrounding community. The spread of toxins are not stopped at the employer's door. Toxic substances are often unknowingly brought home, exposing members of the worker's family. There are known cases where spouses and children of asbestos workers have died as a result of contracting mesothelioma. The only known cause of mesothelioma, a cancer of the lining around the lungs, is inhalation of asbestos fibres.

In addition, many substances affect the reproductive outcomes of workers and their spouses. These outcomes include visible birth defects, learning disabilities, or problems with social integration. For women workers, even after delivering a healthy baby, there is the issue of breast milk contamination. Some toxic substances are stored by the body in the tissues of a woman that are used to produce milk. These contaminants then concentrate in the breast milk. In the case of the environmental contaminant, dioxin, the average breast-fed baby receives its total recommended maximum lifetime dose of dioxin in the first six months of its life.

Providing workers with real protection from toxic substances will also reduce the toll of secondary victims. Unlike working people, these victims have the right to sue for damages.

### **Electro Magnetic Field**

Advances in technology introduce new hazards for workers. The use of computers, fax machines, printers, etc. has introduced a hazard that workers cannot see, feel or smell. It is the electromagnetic field (EMF) generated by electrically operated devices now surrounding many workers. In addition there is massive exposures to EMF from transformers and conduits in buildings. Evidence is mounting that exposure to these energy fields causes health problems in the workers exposed. The main concern is the development of cancer, specifically leukemia, lymphoma, brain cancer and breast cancer (of both sexes).

Prevention of occupational disease measures will need to include requirements to protect workers from exposure of hazardous physical agents as well as toxic substances.

## **Ergonomics**

The ACGIH 1999 TLV booklet has a section dealing with ergonomics. The provinces of British Columbia and Saskatchewan have regulations requiring prevention measures for ergonomic hazards. The Federal government is in the process of developing similar requirements. Ontario needs a regulation to protect workers from ergonomic hazards. Adopting the ACGIH provisions on ergonomics is a good place to start.

The incidence of repetitive strain injuries (RSI) is a massive problem that crosses all sectors and continues to grow. Unlike many other chronic conditions that result from ongoing exposure, its latency period is much shorter. Therefore, it is much easier to demonstrate cause and effect.

It has been reported that a leading North American automotive manufacturer revealed that, on average, each of its ergonomic problems affected four people, cost almost \$6,000.00 and 20 weeks to correct. Other auto industry manufacturers have revealed that, where they have considered ergonomic issues in designing the job and how the product is made, ergonomic hazards are eliminated before they are a problem. This has often meant that the job design is done right the first time with little or no cost to the employer.

In the food warehousing industry our affiliates have had experience with employers setting a "pick rate" standard without consultation. Then refusing to consider the high pace of repetitive work a health and safety issue.

## **PRECAUTIONARY PRINCIPLE**

The precautionary principle is an approach to eliminating hazards before they cause harm. Simply put, the philosophy behind precautionary principle reads, *"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 precautionary principle has been used internationally, primarily around issues of environmental concern. One of the most important times the principle was used was at the 1992 United Nations Conference on Environment and Development.

The precautionary principle was incorporated into a declaration passed at the conference which stated:

*"In order to protect the environment, the precautionary approach shall be widely applied by states according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost effective measures to prevent environmental degradation."*

The principle of precautionary action has four parts:

- People have a duty to take action to prevent harm before it happens. If there is a reasonable suspicion that something bad may happen, then there is an obligation to try to prevent it.
- The burden of proof of harmlessness of a new technology, process, activity, or chemical lies with those who wish to use or introduce it, not with the general public.
- Before using a new technology, process, or chemical, or starting a new activity, people have an obligation to examine a full range of alternatives including the alternative of doing nothing.
- Decisions applying the precautionary principle must be opened, informed, and democratic and must also include affected parties.

The precautionary principle is not really new. The essence of the principle is captured in common sense aphorisms such as *“an ounce of prevention is worth a pound of cure”*, *“better safe than sorry”*, and *“look before you leap”*. These were the thoughts of public health officials in the 1920s when the petrochemical and automobile corporations announced they were going to start putting lead into gasoline. Public health officials argued that this should be delayed and possible repercussions studied. The corporations argued that, in the absence of convincing evidence of widespread harm, they had the right to proceed. In the end, the corporations won out and this set the standard for corporate behaviour for the next 50 plus years. Industrial chemicals were given the equivalent of civil rights where they were treated as innocent until proven guilty. In the face of scientific uncertainty, corporations have been allowed to proceed with dangerous activities until sufficient evidence has been gathered requiring those corporations to implement control measures. Millions of people and our environment have suffered as a result.

In conducting general research, scientists have defined scientific certainty as being 95% sure that cause and effect have been correctly identified. Corporations have taken this research principle and demanded scientific certainty before controls should be implemented. Even when the evidence has become clear, they try to roadblock implementation of controls by arguing economic or technical feasibility. The corporations have even committed job blackmail by threatening job loss if protective requirements are made mandatory. They have twisted a research principle and use it as a weapon when health and safety or community activists are arguing that a chemical or process being used may be dangerous and are demanding that precautions be taken.

Parents do not need to know with 95% certainty that their child is going to be hit by a car when they tell the child do not play in the street. They just need to know there is a reasonable danger to that child. We, as a society, need to take precautionary action for prevention to keep people out of harm's way.

While this principle has primarily been used internationally around environmental health issues, other groups are adopting this philosophy to protect the health of workers. In 1996, the American Public Health Association passed a resolution entitled, "*The Precautionary Principle and Chemical Exposure Standards for the Workplace.*" This resolution recognized the need for implementing the precautionary approach, including the shifting of burdens of proof of every chemical considered potentially dangerous until the extent of its toxicity is sufficiently known, and the establishment of strict, preventive chemical exposure limits. This resolution is reprinted in Appendix 1.

This government has an opportunity to become proactive in the approach to protecting the health of working people and their families. This can be done by adopting the precautionary principle approach to the introduction of new substances, processes or job designs into a workplace.

### **Banning / Licensing Toxic Substances**

Prohibiting or restricting the use of highly toxic substances is an effective method to protect workers from the unnecessary use of highly toxic substances. Implementing a licensing system for these substances when there is a demonstrated need for their use with requirements to protect workers can be a very effective control strategy. Employers using such substances will be registered and this can be used as part of an enforcement strategy. Employers who do not properly protect workers exposed would stand to lose their right to use the substance.

### **Enforcement**

Enforcement of Ontario's occupational health and safety legislation is a vital element of a comprehensive approach to occupational health and safety. It is an approach that includes the development of up-to-date health and safety legislation and strong enforcement of that legislation by the Ministry.

Up-to-date occupational health and safety legislation would include regulations for the control of occupational exposure to toxic substances and hazardous physical agents, not just the reduction in occupational exposure limits. It would also include regulations which address the hazards which lead to repetitive strain injuries and other musculoskeletal injuries.



Elements of an effective enforcement system include:

- A highly visible inspectorate;
- Inspectors who are given a clear mandate to enforce the law and supported to issue orders and penalties for violations.

Inspectors must be provided with the enforcement tools which have an immediate impact such as summons, offense notices, and an administrative monetary penalty system.

The employers are ultimately responsible for ensuring a safe and healthy workplace. Knowing that they will be held accountable and prosecuted for not maintaining a safe and healthy workplace will force employers to fulfill their responsibilities under the *Act*. It will also provide good reason for them to deal with the worker committee members in good faith.

Unfortunately, this government has gutted the occupational health resources of the Ministry of Labour. The inspectors do not have the resources they need to enforce the current exposure limits, never mind lower limits for 102 substances and the addition of 111 new exposure limits. The Ministry of Labour has no strategy to be proactive in the area of occupational health.

To become proactive, the government will need to rebuild the Ministry's occupational hygiene resources. The Ministry should reinstate and expand the air quality technician positions in addition to creating a minimum of 100 occupational hygiene positions, if it is to enforce these new limits effectively.

Except for the few Designated Substance Regulations, there is no requirement for employers to conduct an assessment and implement a control program for regulated substances in their workplace. Labour's experience with the Joint Steering Committee on Hazardous Substances in the Workplace process proved what we had long suspected. We learned that, with a few exceptions, employers have no idea what the level of exposures are in their workplaces or whether they are in compliance with the legal limits.

Our affiliates have raised concerns over the lack of enforcement of the current regulations dealing with hazardous substance. These include employer adherence to occupational exposure limits, WHMIS (including the workplace hazard specific training) and other provisions requiring employers to protect the health of workers.

It has been our experience over the last few years that too many employers feel they no longer need to take health and safety seriously. The attitude of many employers seems to

be that there is a business friendly government in place and they no longer have to work cooperatively with workers to address concerns. Some of our affiliates have reported that employers are telling worker members of the joint health and safety committee, "We don't have to do that any more."

We call upon the Government of Ontario for strict enforcement of the occupational health and safety legislation to protect the health of workers.

It is labour's position that to deliberately endanger is violence against a person and must be treated as an act of violence. Employer gross negligence that leads to injury, illness or death must be dealt with under criminal law. Such incidents should be handed over for police investigation and Crown prosecution.

### **Metalworking Fluids**

On November 8, 1999, the Minister of Labour, Chris Stockwell, met with representatives of the Windsor and District Labour Council as well as a number of local unions. He discussed a number of issues including the issue of reducing exposure limits. Following that meeting, the Minister made a public commitment in front of the media that he would reduce exposures to metalworking fluids. In fact, it was reported on the front page of the Windsor Star that this would be done.

Despite this public commitment to reducing exposures to machining fluids, this substance is not included in the Ministry's proposed list of new and reduced exposure values.

These fluids are part of Labour's "Dirty Dozen." This is a list of 12 substances commonly found in Ontario workplaces, all of which are known or suspected human carcinogens. Labour has been demanding immediate reductions for these. British Columbia has a limit of 0.2 mg/m<sup>3</sup> for mildly refined oils and 1 mg/m<sup>3</sup> for severely refined oils. Since this limit is already in place in another Canadian jurisdiction, we feel there is justification in moving immediately to this lower limit for this known human carcinogen.

The Industrial Disease Standards Panel's (IDSP) Report to the Workers' Compensation Board on Lung Cancer in the Hardrock Mining Industry in March, 1994 had this to say about oil mist,

"Over time, the composition of lubricating oils has changed. There are few, if any, records of the types of oils used. In pre-World War II mining, the type of oil used was likely straight oil, a mineral oil-based cutting fluid. Water soluble oils became available in the 1940s, and these contained many different types of additives: emulsifiers, biocides, corrosion inhibitors, etc. In the 1970s, synthetic oils were

introduced containing at least traces of polycyclic aromatic hydrocarbons (PAHs), a known human carcinogen.”

“...other suspected carcinogenic components of the oils include long-chain aliphatics, nitrosamines, formaldehyde, and chlorinated paraffins which may form dioxins. It is also thought that some of these combine with metal particles and as a result become more carcinogenic.

“One recent study found that the concentration of PAHs in lubricating oil increased over three to nine months. Benzo(a)pyrene, for example, was measured at 2.7  $\mu\mu\text{g/g}$  oil at the outset, increasing to 48.3  $\mu\mu\text{g/g}$  after nine months. The authors found that in assay testing, the oils also increased in mutagenicity.”

In 1992, the American Journal of Industrial Medicine published a study by Eisen et al which looked at 46,000 workers and metalworking fluids. This Harvard University study is the most comprehensive epidemiologic research involving exposure to metalworking fluids. The researchers found higher rates of cancer among the workers. They reported, “Relative risks of 1.2-3.1 have been observed for several specific respiratory and digestive cancers of a priori interest, including cancer of the stomach, large intestine, pancreas, lung and larynx. In addition, elevated risks for leukemia and asthma were noted.”

This was one of the reasons the Canadian Auto Workers (CAW) recently reached agreement with the Big Three automakers to reduce exposure to metalworking fluids in their plants below the current legal limits. The employers have agreed to reduce exposure limits down to 1  $\text{mg/m}^3$  for existing equipment and down to .05  $\text{mg/m}^3$  for new equipment.

In the mid-1990s, the Occupational Disease Panel (ODP) investigated the available scientific research on the health effects of exposure to metalworking fluids. In 1995, 1996 and 1997, the panel issued reports to the Ontario Workers’ Compensation Board. Based on the available scientific information, they made the following findings:

“... a strong probable connection between metalworking fluids and primary cancer of the larynx exists.”

“There is a probable connection between primary cancer of the esophagus and occupational exposure to metalworking fluids.”

“There is a probable connection between occupational exposure to petroleum based metalworking fluids and primary cancer of the rectum.”

These oils and worker exposure to them cross many industry sectors. The WSIB has already recognized diseases caused by the exposure to metalworking fluids as compensable. This government needs to act now to provide better protection for workers from this known human carcinogen.

## **Diesel Emissions**

These emissions are another of Labour's "Dirty Dozen" of known or suspected human carcinogens. Presently, there is no exposure limit for diesel emissions, only restrictions on the individual constituent components. The Ministry needs to consider the synergistic effects of these components.

The IDSP Report to the Workers' Compensation Board on Lung Cancer in the Hardrock Mining Industry in March, 1994 had this to say about diesel emissions,

"The exhaust from diesel engines has been found to contain various known and suspected human carcinogens: benzo(a)pyrene which is a polycyclic aromatic hydrocarbon (PAH), benzene, soot, nitrites and formaldehyde. In its 1989 monograph, IARC found 'Diesel engine exhaust is *probably carcinogenic* to humans.' This complex mixture is present in the form of particulates, gases and vapours."

"How these various components may interact with each other, with other carcinogens and with human tissue is in itself complex. PAHs, for example, are known to have a special affinity for lung tissue. Sulphur dioxide enables and promotes PAHs to become more carcinogenic in its presence."

"Smith and Stayner point out that PAHs adsorbed to diesel particles may be only one link to lung cancer. In fact, the gas phase of diesel exhaust may be carcinogenic or co-carcinogenic as well. The authors conclude that diesel exhaust is a potential human carcinogen and exposures should be reduced to the lowest feasible concentrations."

"In an Ontario study, Westaway postulated that even ventilation may not help reduce exposure as was assumed since PAHs remain in the mine air longer than particulate and are not removed completely with the ventilation."

The City of Toronto's Board of Public Health considered the issue of diesel emissions as part of their program to improve air quality in the city. One of the points they considered was the level of sulphur in the diesel fuel. There are currently two different kinds of diesel fuel available for purchase on the market. Diesel fuel used in vehicles driven on public

roads and highways is regulated with a maximum of 500 ppm of sulphur. In Ontario, the average level of sulphur in the on road diesel fuel is about 270 ppm. Diesel fuel used in vehicles and equipment considered off road does not have its level of sulphur regulated. In Ontario, the average level of sulphur found in the off road diesel fuel averages 2,200 ppm.

Higher sulphur levels in fuel can adversely affect efficiency and performance of emission control technologies. Clearly, the quality of fuel going into the equipment and vehicles also has a direct impact in the level of toxins found in the emissions.

The off road diesel is what would be used in Ontario's workplaces to operate forklift trucks, generators, etc. Significant reductions in the level of toxins workers are exposed to, as a result of diesel emissions, can be made by requiring employers to use low sulphur diesel at the workplace or job site. Substantial reductions in ambient air levels for sulphates, fine particles as well as sulphur dioxide would be immediate.

Environment Canada set up a number of expert panels to deal with issues related to sulphur levels in gasoline and diesel fuel. From a public health perspective, the health and environmental impact panel calculated that, if a limit of 400 ppm of sulphur for off road diesel was set, the health benefits outweighed the compliance costs by a 2:1 ratio. They also looked at the public health impact for seven Canadian cities of reducing the sulphur level in off road diesel to 400 ppm. They determined that, over a twenty-year period, this reduction in sulphur in diesel would result in 756 fewer premature deaths, 2,660 fewer chronic respiratory disease cases and ten million fewer acute respiratory symptoms. It stands to reason that a reduction in the amount of sulphur in the diesel used in Ontario workplaces would result in a reduction in occupational disease.

The best control would be to phase out the use of diesel in the workplace or job site and switch to equipment and vehicles that use cleaner sources of energy. A move to diesel with low sulphur content should be considered one of a number of interim measures that should be taken to reduce toxic exposures.

The scientific evidence linking diesel emissions to ill health is overwhelming. The government must act now to protect workers from this toxic, human carcinogen.

### **Occupational Health Resources**

Increasing efforts by unions and community groups to prevent occupational disease, legislative changes and the public awareness that these generate are placing greater demands on the resources of the Occupational Health Clinics for Ontario Workers (OHCOW) as well as the Workers Health & Safety Centre (WHSC). The funding for

OHCOW & WHSC should be increased to allow them to improve the resources necessary to respond to the emerging trends around occupational disease.

## **Ventilation Controls**

The regulation should contain a clause requiring any new or existing ventilation system intended to limit inhalation exposure to a regulated substance to meet or exceed the applicable design specifications and operating parameters recommended in the ACGIH Industrial Ventilation Manual.

Unlike the TLVs, the ACGIH ventilation design specifications and operating parameters found in its Industrial Ventilation Manual are based on good science and engineering practice. The manual is based on many years of practical experience and a compilation of research data and information on design, maintenance, and evaluation of industrial exhaust ventilation systems. It has found wide acceptance as a guide for official agencies internationally. It is used as the standard for industrial ventilation designers. It is also used at the university level as a textbook for occupational hygiene courses.

The manual provides best practices, solid science as well as practical solutions for employers who just need to know what is needed. The manual also contains ventilation duct design examples or preferred designs as well as examples of how they should not be designed.

This manual is designed to present accurate and authoritative information. Topics which are covered include: general principles of ventilation; general industrial ventilation; local exhaust hoods; air cleaning devices; exhaust system design procedures; replacement and re-circulated air; ventilation systems; as well as details for specific operations.

Adopting the design specifications and operating parameters of this manual would be a significant step forward in protecting workers from inhalation hazards of toxic substances.

## **Mandatory Substitution**

Out of the 70,000 plus substances in commercial use, there is Ontario legislation which requires the employer to conduct an assessment and implement control measures for just 11 substances. Unlike the federal jurisdiction, there are no provisions for mandatory substitution of toxic substances.

Where a regulated substance is used for any purpose in the workplace and the use of a less hazardous substance can substantially serve the same purpose, employers should

be required to substitute the less hazardous substance for the regulated substance currently used.

The Canada Labour Code and regulations in Newfoundland and Quebec contain substitution requirements. These regulations require the employer to use non-toxic or less toxic substitutes for more toxic substances where the substitutes can do the job.

To be enforceable, mandatory substitution regulations need to include the following:

**i) Criteria for deciding which substances are less toxic**

Many of the same considerations that go into a decision about whether to approve a pre-tested substance or whether to ban a substance currently integrated into the workplace must also be made in comparing the relative toxicity of substances which may be substituted one for another. In some cases, this comparison is easy. For example, vegetable oil may be used instead of VM&P Naphtha as a print roller cleaner. Naphtha is not a highly toxic substance but vegetable oil is not at all toxic and should be substituted for the solvent in this application.

But the comparison may be more complicated than this example if the potential substitutes have quite different toxicological or safety properties, which make them difficult to compare. A substance with unpleasant, acute effects may not be successfully substituted for a chemical with serious, long-term, chronic effects. For example, unions in B.C. pressed the forest industry to find a substitute for chlorophenol wood preservatives known to cause cancer. Early substitutes caused such extreme, acute effects in workers that they refused to work with them. (Only after a European ban on B.C. treated lumber, were satisfactory substitutes for chlorophenol found.) The flammable or explosive properties of potential substitutes also have to be taken into account.

**ii) A requirement that employers survey highly toxic substances present in the workplace and look for alternatives**

A mandatory substitution regulation should, as a minimum, target potent carcinogens, respiratory sensitizers, reproductive toxins, neurological toxins, and substances with highly acute effects or those that cause pulmonary fibrosis for workplace review and potential substitution. Employers should be required to document, in writing, their efforts to search for substitutes and to justify choices made.

### **iii) Promotion of Innovation in Development of Non-toxic Inputs, Safe Processes, and Healthy Products**

The above sections represent, to a certain extent, negative regulatory approaches to the use of toxic substances. A comprehensive approach to this issue should also incorporate some means of stimulating the search for non-toxic inputs and safe processes which provide the goods and services we need. This may be outside the purview of health and safety regulation per se but, nevertheless, constitutes a vital element in weaning industry from its dependence on toxic substances and processes.

Toxics reduction legislation in some American states has partially addressed this issue by supporting the development of research and training institutes geared to the development and implementation of alternatives to toxic substances and processes.

This government could set up technical assistance programs to help small and medium size firms wanting to make changes to toxic production processes but without technical resources to do so.

This government must set the example and initiate a program to look for non-toxic alternatives for use by its ministries and set policy which requires any firm contracting with the government to do the same.

### **Process Specific Regulations**

Process-specific regulations, also called "design" or "procedural" regulations or "specification" standards, give clear direction to employers about the control measures which must be applied to particular workplace operations which utilize or produce specific toxicants. They may prescribe any or all of the following: control equipment, enclosures, ventilation systems, work practices, hygiene facilities, training requirements, personal protective equipment, and emergency procedures.

Process-specific regulations have been widely applied to safety hazards in construction and mining. They have also been used in the nuclear industry for the protection of workers potentially exposed to radioactive substances. However, process-specific regulations have not been widely developed for the area of industrial production and use of chemicals. This needs to change. Process-specific regulations are necessary as an integral part of regulating exposure to hazardous substances in the workplace.



Process-specific regulations could easily be developed to improve working conditions and enforcement where known hazards are produced by relatively common industrial operations and processes. A few examples of these types of regulations already exist. OSHA has a ventilation regulation covering open surface tanks, abrasive blasting, grinding, polishing and buffing operations, and spray finishing operations. This regulation gives employers very clear directions as to the ventilation requirements for the protection of workers involved in these processes. Great Britain has recently developed extensive control guidelines for a number of industrial operations. These could be readily adapted as enforceable regulations.

This type of regulation could also be used to protect workers where renovations take place using toxic substances. This has been a major concern in the retail sector where renovations take place but the store remains open. These retail workers then become exposed to high levels of dust, epoxy resins, spray painting and other coatings. These exposures take place in structures without the ventilation systems to properly address the exposures. Several years ago, Ontario passed a regulation outlining procedures which must be followed in all construction or demolition projects involving asbestos. A similar regulation for renovations in existing workplaces should be developed.

These types of regulations would also benefit workers in situations where exposures to hazardous substances are difficult to characterize or monitor. This may occur where:

- a wide range of chemicals are used in small amounts;
- the materials used or produced are a complex mixture of chemicals;
- substances contain variable levels of toxic contaminants;
- work is carried on outdoors or in environments which change from day-to-day;
- renovations using toxic substances take place in existing workplaces;
- there exists exposure to substances for which there is no accepted sampling or analytical methodology.

Process-specific regulations, which are enacted for workplaces with multiple chemical uses, may also protect workers against the unknown effects of mixed chemical exposures, even where individual exposures are maintained below the occupational exposure limit.

Stringent process-specific regulations could be developed for the use of certain high toxicity substances. As a by-product, this may have the effect of pressuring employers to look for less hazardous substitutes.

The advantages of process-specific regulations are:

- ease of enforcement (compliance can be determined through visual inspection and/or worker reports rather than air sampling);
- inducement to control exposures to levels achievable through good hygiene practice rather than allow exposure to rise to exposure limits;
- more limits set on employers who choose to use or produce toxic materials in common processes;
- to ensure that employers take health and safety into account as a basic and ongoing operating expense.

These regulations do not have to be completely inflexible. On the contrary, where employers believe that control measures already in place in their workplaces or alternate control measures from those provided for in the regulations may provide equal or better protection for workers than control measures prescribed by process-specific regulations, they could apply for a variance from the requirements of the regulations. In this situation, the onus would be on the employer to provide sufficient evidence to prove that the alternate control measures are protective.

### **The Ontario Experience**

Recent efforts by labour and community activists in the Sarnia area have been uncovering literally hundreds of workers suffering from occupational diseases. These workers and their families had been suffering in silence for many years. The investigations, which began with just two workplaces, exposed a tragedy of monumental proportions. The investigations also revealed that the employers and the government knew the extent of the toxic exposures and of the future health repercussions, but chose to do nothing. It was a rude awakening for the workers and the community. The investigations revealed that family members were exposed to toxins brought home on the clothes of the workers. Also, because these toxins were not confined to the plant boundaries, the community as a whole was exposed to the same toxic substances. While activists attempt to deal with the enormity of what has been uncovered to date, they are realizing that it is only the tip of the iceberg for the community of Sarnia.

What has occurred in Sarnia is not unique, the working conditions that led to the workers developing these diseases have occurred, and continue to occur, in workplaces and communities across this province.

### **Process**

The OFL objects to the behind closed door consultation process. They have provided employers with a 90-day period to present their arguments on why the government should not move on these proposed new limits. These discussions with the employers will take

place behind closed doors. Employers can freely and grossly inflate the cost of compliance or threaten massive job loss if these proposed limits are made into law. The Ministry has no method to determine whether the employer's economic or technical arguments are truthful and the unions representing the workers of those employers will not be given opportunity to counter any technical or economic issues raised by the employer.

As a minimum, the Ministry should review and compare submissions made by employers and their representatives when the Joint Steering Committee on Hazardous Substances in the Workplace was reviewing possible lower exposure limits.

Any future process to review exposure limits should have labour and employer involvement and be open to keep the process honest. The purpose of such a process should include the development of regulations as referenced above to protect all workers in this province from suffering any material impairment of health as a result of their exposure on the job. Ontario's occupational health regulations should be aimed at achieving the ILO and the World Health Organization's definition of occupational health:

“the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations, the prevention among workers of departures of health caused by their working conditions...”

The Ontario Federation of Labour would be prepared to discuss the establishment of an ongoing process to review and reduce occupational exposure limits, as well as other measures to eliminate or reduce worker exposure to toxic substances.

## **Summary**

A key principle in preventing occupational disease is not to use or produce the toxic substances or toxic processes which cause it. Much current industrial production is based on the use of toxic substances or on processes which produce hazardous byproducts. It is a challenging task to alter this situation.

It will take more than a public relations exercise. It requires a fundamental shift in how government views the introduction and use of potentially deadly substances into Ontario workplaces.

The investigations that we, in Labour, working with community activists have conducted has been uncovering occupational disease that is of massive proportions. Occupational disease in Ontario is a ticking time bomb, for the workers whose health has been compromised; for the politicians who will be faced to deal with the fallout; for those officials

in positions of trust who knew what was and is happening, yet have chosen to do little to correct the situation.

Respectfully submitted by

**THE ONTARIO FEDERATION OF LABOUR**

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IDSP Report to the Workers' Compensation Board on Lung Cancer in the Hardrock Mining Industry. March, 1994

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Correspondence

City of Toronto Medical Officer of Health, October 9, 1998; July 10, 1998; June 25, 1998

## APPENDIX 1

American Public Health Association Policy Statement - 1996

### **9606: The Precautionary Principle and Chemical Exposure Standards for the Workplace**

The American Public Health Association,

Understanding that the “precautionary principle” that was adopted internationally as a starting point for environmental policy in 1992 at the global United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil, states that “where there are threats of serious or irreversible environmental damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent degradation,”<sup>1</sup> that chemicals that are carcinogenic or genotoxic and those that have toxic effects on reproduction have potentially serious or irreversible effects and thus must be considered in the application of the precautionary principle to the workplace environment; and

Recognizing that 75% of current occupational exposure limits (OELs) were established 15 to 40 years ago; that historically, these values have been set near the maximum acutely tolerable level, with little regard for the risks of long-term serious or irreversible damage for men, women, and children such as cancer or reproductive health effects, effects on growth and development, and toxic illnesses;<sup>2</sup> and that for many substances to which millions of workers are exposed, working at current exposure limits is expected to cause death rates from occupational cancer greater than 1 per 100;<sup>3</sup> and

Knowing that in the United States and other countries, since 1946, workplace chemical exposure limits have been substantially based on the threshold limit values (TLVs) established by a private organization (the American Conference of Governmental Industrial Hygienists or ACGIH); that TLVs historically have tended to represent long-existing levels of exposure to toxic substances in industry, rather than guidelines to control exposures to levels below those shown to cause harm;<sup>4</sup> that the minutes of the TLV committee show that, starting in 1970, employees of various multinational chemical companies have played central roles as committee members in developing TLVs for over 120 chemicals;<sup>5</sup> and that this company role was not balanced by those representing of workers’ interests, such as union representatives; and

Recognizing that an alternative approach to setting standards for occupational exposure to chemicals has been proposed, which reverses the burden of proof in that every chemical is considered potentially dangerous until the extent of toxicity is sufficiently known;<sup>6</sup> that this alternative approach reflects an attitude of risk avoidance, instead of the

attitudes of risk regulation or risk acceptance implicit in the TLV concept; that for substances with adequate available experimental toxicological data, a precautionary exposure limit is derived from the lowest observed effect level, by the use of a defined set of safety factors (for example, by the use of existing environmental airborne reference concentrations as a starting point);<sup>7</sup> that these health-based exposure levels' (HBELs)<sup>8</sup> may be derived from existing environmental risk values published by governmental agencies, where available and that (for example, about 100 chemical compounds have California Office of Environmental Health Hazard Assessment [OEHHA] cancer potency numbers; that there are over 40 USEPA Airborne Reference Concentrations (RfCs); and that OEHHA is currently developing chronic reference exposure levels for 120 substances; If no such toxicological data are currently available, an interim precautionary occupational exposure limit of 0.1 mg/m<sup>3</sup> is established;<sup>6</sup> therefore

1. Finds that current US workplace chemical-exposure limits often fail to adequately protect the health of workers;
2. Encourages the development of a workplace chemical-exposure, including pesticide exposure, prevention policy based on the UNCED precautionary principle; and
3. Encourages regulatory agencies responsible for setting workplace health standards to evaluate the effects on more sensitive populations not previously considered in standard development.

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