

# **ENGOS' Comments on "A Proposed Integrated Framework for the Health-Related Components of Categorization of the Domestic Substances List under CEPA 1999"**

## **Prepared for:**

Canadian Environmental Network Toxics Caucus

## **Prepared by:**

Dr. Kapil Khatter

Canadian Association of Physicians for the Environment

Dr. Rich Purdy

Toxicologist

Fe de Leon

Canadian Environmental Law Association

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## **Contributions by:**

Barbara McElgunn

Dr. Susan Sang

Jessica Ginsburg

Delores Broten

Anna Tilman

## **Supporting Organizations:**

Canadian Association for Physicians on the Environment

Canadian EarthCare Society

Canadian Environmental Law Association

Citizens Environment Alliance of Southwestern Ontario

Citizens' Network on Waste Management

Great Lakes United

Ontario Toxic Waste Research Coalition

Reach for Unbleached!

STORM Coalition

World Wildlife Fund Canada

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## Executive Summary

Environment Canada and Health Canada are responsible for completing the categorization of the Domestic Substances List (DSL) under the *Canadian Environmental Protection Act* (CEPA) by September 14, 2006. Both departments have accomplished a great deal in a short time frame and have developed processes that will be used for identifying and assessing thousands of substances. Many of these substances have little or no toxicity or exposure data and have not been assessed for hazard to humans or to the environment, making the job tough. The methods developed may serve as models for other countries interested in addressing the problem of lack of toxicity data for substances.

The long term goal for Canada should be a shift from the current approach of government holding responsibility to demonstrate and provide evidence of harm to a reverse onus obligation where manufacturers and importers of substances are required to submit toxicity and other data demonstrating that substances on the DSL pose no harm to humans or to our environment. In addition, both departments should foster the development of safe alternatives and the use of clean technologies.

In July 2005, ENGOS submitted substantive comments specific to Environment Canada's approach to categorization on polymers and UVCBs.

This submission is intended to express ENGOS' specific concerns related to the overall approach to categorization undertaken by Health Canada. These comments provide further explanation of initial comments, submitted in March 2004, on Health Canada's Greatest Potential for Exposure (GPE) proposal. More specifically, the comments below reflect the ENGOS' views developed over the past year from regular communications and participation with several Health Canada representatives through meetings and information sessions.

The two ENGO submissions raise a number of issues that have profound effects on the final list of chemicals to be submitted for screening level risk assessment by Health Canada and Environment Canada.

A number of issues from Health Canada's approach are covered in this submission including:

- comments of the legislative requirements under CEPA 1999 for categorization,
- the specific criteria for persistence and bioaccumulation,
- inherent toxicity,
- review of the Maximal List, and
- missing substances on the Maximal List.

A total of 37 Recommendations are being submitted to Health Canada.

After careful consideration and review of Health Canada's Proposed Integrated Framework, ENGOS concluded that all substances that meet the criteria for greatest

potential for exposure and those substances that meet the criteria for persistence or bioaccumulation and are inherently toxic to humans should be categorized "in" for screening level risk assessment by September 14, 2006.

ENGOS also conclude that there are important tools, including the ComET and ComHaz tools being developed by Health Canada, that will be useful as the work proceeds beyond the categorization phase.

ENGOS provide a sample of DSL substances that were not captured in the Maximal List but should be reconsidered in light of the legislative requirements under CEPA 1999 for categorization.

Finally, in the section titled, "Path Forward," ENGOS outline the work that is necessary in order for Health Canada and Environment Canada to proceed with post-categorization work after September 14, 2006.

## 1.0 Introduction

Environment Canada and Health Canada are responsible for completing the categorization of the Domestic Substances List under the *Canadian Environmental Protection Act* (CEPA) by September 14, 2006. Both departments have accomplished a great deal in a short time frame and have developed processes that will be used for identifying and assessing thousands of substances. The job of categorization has been made all the more difficult due to the paucity of data on toxicity or exposure; many of these substances have not been assessed for hazard to humans or to the environment. Nonetheless, the methods developed by both departments could serve as models for other countries interested in addressing the problem of missing toxicity and exposure data for substances.

Despite this progress, we are concerned that both Ministries seem to be missing important opportunities to set a national agenda that will ensure the assessment and management of toxic substances in Canada remain a priority for the years to come. Both Health Canada and Environment Canada's categorization processes include areas where the departments' approaches are less than precautionary and may be missing potentially toxic substances. Categorization is merely a first elimination step and needs to be as conservative and inclusive as possible.

For years environmental non-governmental organizations (ENGOS) have advocated for a stronger co-ordination of efforts to ensure that the most toxic substances are addressed in an effective and timely manner, so that the result would be the elimination of the most hazardous substances. Environment Canada and Health Canada should address the identification, assessment, and management of substances in an integrated and forward-thinking manner. The categorization requirement in CEPA is unique and should be viewed as the first step towards regulatory action on all hazardous substances.

The long-term goal for Canada should be a shift from the current approach of government holding responsibility to demonstrate and provide evidence of harm to a reverse onus obligation where manufacturers and importers of substances are required to submit toxicity data demonstrating that substances pose no harm to humans or the environment. In addition, both departments should foster the development of safe alternatives and the use of clean technologies.

This submission is intended to express ENGOS' specific concerns related to the overall approach to categorization undertaken by Health Canada. The text expands on initial comments submitted by ENGOS in March 2004 on the Greatest Potential for Exposure (GPE) proposal.

In July 2005, ENGOS also submitted substantive comments to Environment Canada regarding their approach to polymers and UVCBs and to categorization in general. The two ENGOS submissions present a major critique of the lists of chemicals proposed for screening level risk assessment by Health Canada and Environment Canada and of the methodology used to draw up those lists.

Upon reviewing Health Canada's report, *A Proposed Integrated Framework for the Health-Related Components of Categorization of the Domestic Substances List under CEPA 1999*, as released for public comment in June 2005, we are particularly concerned that Health Canada's categorization process does not accurately follow the CEPA text. Categorization is meant to be inclusive and precautionary to capture as many substances with the potential to be toxic as possible. There is a clear role for prioritization once categorization is complete, but not for the elimination in advance of substances that should be categorized in.

In the report, Health Canada articulated the following:

To meet the intent of the provisions of CEPA 1999, the objective of the integrated framework for the health related components of DSL categorization presented here is to efficiently identify for the additional consideration in screening, substances that are highest priorities in relation to their potential to cause adverse effects on the general populations (i.e., those that are highest priorities from a human health perspective).

This passage implies that Health Canada will not categorize "in" all substances that meet the legal requirement and will therefore inadequately meet the provisions of CEPA. In our view, the proposed framework inappropriately rationalizes "the often limited potential of P or B to influence potential for human exposure in the context of more influential determinants such as use pattern." ENGOS recognize that certain substances will be lower priority for further assessment and action, but these decisions need to be made following categorization according to CEPA criteria.

**Recommendation 1: Member organizations of the Toxics Caucus emphasize the importance of establishing a strong categorization framework that effectively**

**identifies *all potentially* toxic substances, in particular those substances that meet Greatest Potential for Exposure and those substances that are persistent, or bioaccumulative and inherently toxic(to humans or non human organisms). Categorization in itself is only an initial step and therefore needs to be precautionary and inclusive.**

**Recommendation 2: ENGOS support on-going efforts by Environment Canada and Health Canada to coordinate and communicate on their categorization process to ensure that issues relating to categorization approaches are addressed in a timely and an effective manner.**

## **2.0 Transparency and Public Participation**

Opportunities for public involvement in the development of Health Canada's categorization method have been inconsistent since CEPA 1999 received Royal Assent in 2000. For the past year, Health Canada has done a good job of being open and transparent about specific aspects of their approach and we are encouraged by the recent involvement of ENGOS in this process. Despite these developments, however, there has still been very limited time to have a real dialogue with Health Canada staff on its complete integrated framework.

The lack of ENGO involvement in the initial development of Health Canada's categorization process has left us critiquing the framework with little time left. While recent information sessions with the department on its final methodology have helped clarify some of our outstanding questions, major problems remain with some aspects of the methodology.

This submission reflects our uncertainties and our only recent understanding of the full framework and Health Canada's philosophy. We believe that continuing opportunities for ENGO involvement leading up to and after September 2006 can help to improve the process.

**Recommendation 3: The finalization of Health Canada's categorization should include ongoing communication with and participation from ENGO representatives to ensure a mutually acceptable outcome that address issues raised by ENGOS.**

**Recommendation 4: A multi-stakeholder expert group should be formally established to address the path forward plans for substances following the completion of categorization in 2006.**

## **3.0 Legislative Mandate**

Section 73.(1) of CEPA 1999 states that:

The Ministers shall, within seven years from the giving of Royal Assent to this Act, categorize the substances that are on the Domestic Substances List by virtue of section 66, for the purpose of identifying the substances on the List that, in their opinion and on the basis of available information,

(a) may present, to individuals in Canada, the greatest potential for exposure; or

(b) are persistent or bioaccumulative in accordance with the regulations, and inherently toxic to human beings or to non-human organisms, as determined by laboratory or other studies.

Further the Act states that:

74. The Ministers shall conduct a screening assessment of a substance in order to determine whether the substance is toxic or capable of becoming toxic and shall propose one of the measures described in subsection 77(2) if

(a) the Ministers identify a substance on the Domestic Substances List to be a substance described in paragraph 73(1)(a) or (b);

The two sections specify that either part a) or part b) of Section 73 are sufficient criteria to categorize a substance for screening assessment. In other words, a substance that poses the Greatest Potential for Exposure (GPE), or is Persistent (P) and/or Bioaccumulative (B) and inherently toxic (iT), must be categorized “in” for screening assessment.

The proposed integrated framework does not follow the obligations of the Act. Health Canada is mixing the two streams for categorization, forcing substances to jump two hurdles, exposure potential and P/B/iT before they qualify for screening.

The department's interpretation of the intent of the legislation appears to differ from ours: for example, Health Canada's downplaying of the importance of persistence and bioaccumulation. The law should not be circumvented in order to keep Greatest Potential Exposure substances off the list due to suspicion of low toxicity or P or B substances off the list because of estimations of low exposure. These determinations will automatically take place later at the screening assessment stage. We insist that prioritizations of substances for screening assessment take place **after** categorization is complete.

The flowchart on page 13 (Figure 5) of the proposed integrated framework document, shows substances that Environment Canada considered to be P and/or B but not inherently toxic to non-human organisms (eco-iT) are to be first assessed for their potential for human exposure by Health Canada. The flowchart should be corrected to indicate that these substances be assessed for their inherent toxicity to humans. If found to be inherently toxic, the substances would then be categorized “in” for the screening assessment stage regardless of their exposure potential. The legislation does not require Health Canada to first evaluate these substances for exposure.

The other problem with Figure 5 is that substances determined to be of GPE to humans appear to subsequently go through a hazard assessment to assess their inherent toxicity. We support Health Canada's plan to use such an assessment to prioritize substances for screening assessment. However, it is not appropriate to use a hazard evaluation to determine whether high exposure substances are to be categorized "in" for screening assessment. Post-2006 work can quickly eliminate those substances that clearly have limited potential for toxicity, such as water.

The Figure 5 "integrated framework" flowchart contradicts the earlier charts in the framework document that lay out the legislative mandate more clearly. For instance, Figure 4, entitled "Legislative construct for categorization of Existing Substances on the DSL," plainly shows that substances judged to be of Greatest Potential for Human Exposure proceed directly to screening assessment without toxicity evaluation.

Page 22 of the framework proposal refers to all GPE substances going through "the initial conservative stage" of ComHaz. In fact according to page 45, the first stage of the tool has already been used to evaluate GPE substances and to classify them as "low likelihood for further consideration beyond 2006." This contradicts CEPA Section 73 which calls for all GPE substances to be categorized for screening assessment.

The emphasis and repeated discussion of prioritization is confusing. Framework references to Low Priority and High Priority for screening assessment may be relevant post-2006, but for categorization purposes substances should have only a simple "in" or "out" delineations.

**Recommendation 5: Figure 5 should be revised to demonstrate accurately that there are two routes to screening assessment: GPE, and P or B and iT to humans.**

**Recommendation 6: Health Canada's categorization process should, according to the CEPA, categorize "in" for screening assessment all substances deemed to be of GPE regardless of their hazard.**

**Recommendation 7: Health Canada's categorization should, according to CEPA, categorize "in" for screening assessment all substances found to be P or B and iT to humans.**

**Recommendation 8: ENGO's request the development of two separate lists for clarity: one for substances meeting the GPE criteria and the other for substances meeting the P or B and iT criteria.**

## **4.0 Potential for Exposure**

Health Canada has taken the role of assessing substances for their potential for human exposure, with substances presenting the greatest potential for exposure being categorized for screening assessment. As noted earlier, ENGOs submitted comments on



the GPE approach in March 2004. Although follow-up communications attempted to address concerns regarding susceptible populations (children, aboriginal communities, women and workers) and the limitations of data (quantity, use codes, number of submitters) used to determine GPE, very little change has been made in identifying GPE substances.

#### **4.1 SimET**

The primary tool for gathering information on exposure, SimET, uses three reported characteristics of DSL substances: quantity, number of submitters and use codes. ENGOS submitted comments on Health Canada's GPE approach in March 2004, though it seems to have had little impact on the use of the SimET tool. We continue to believe that the proposal for substances to meet criteria in all three areas is overly restrictive. According to Health Canada, a substance must be high volume, in the top 10% of use codes and in the top 10% of submitters to be considered of high potential for exposure. Health Canada rejected a superior proposal where these indicators would be summed and the top 10% considered of greatest potential for exposure. Health Canada has argued that this is too inclusive since substances would be considered "in" with only two of the three criteria being met.

Being in the top 10% of two of the criteria should easily be enough to consider substances of high exposure potential. Both Health Canada's precautionary approach and the potential for increases in use since the data was submitted should lead Health Canada to be as conservative and inclusive as possible. There are later opportunities with screening assessment and further assessments to measure more carefully whether exposure is high enough for these substances to be considered toxic under CEPA.

For example, a substance that is manufactured or imported at over 100,000 kg per year and is in the top 10% of use codes should not be excluded simply because there are fewer than three submitting companies. Clearly such a substance creates a high risk for exposure. One submitter may have production facilities across the country or be importing the substance into every province. In addition, many of the use codes considered to be of highest potential exposure are for consumer products, so whether they are manufactured and distributed from one location or by one company or more hardly matters.

Likewise, a substance that is 75% of the maximum volume and has the highest number of submitters and highest use code should be categorized in. It is worrisome that Health Canada would consider a widely used substance with risky use codes to not be of high potential for exposure. In addition, exposure measurement ignores three important sources:

- substances released through wastes, effluents and emissions;
- breakdown products; and
- transboundary exposure.

Health Canada is doing Canadians a disservice by being overly restrictive in its SimET evaluation. While it is positive that the department is looking further at substances considered to be Intermediate Potential for Exposure (IPE) to determine whether they should have a screening level risk assessment, many of these substances should have been captured by a more inclusive definition of GPE and not needed hazard investigation using other tools.

We previously submitted a proposal to use an exposure index involving the volume produced and the percentage of that volume to which we are exposed. Determining the highest potential for exposure by ranking substances by exposure index would provide the most consistent way of choosing these substances.

Health Canada should also adopt the REACH standard of including all substances with volumes greater than 100,000 kg/year for GPE. Although Health Canada claims to be doing this, the framework is contradictory saying that codes F and G are being used when E, F and G codes would be needed to cover 100,000 kg and over not just 1 million kilograms and more.

It is surprising that the 849 of substances considered GPE represent only 55% of the substances listed under US Environmental Protection Agency's High Production Volume (HPV) Challenge Program List or about 37% of the International Council of Chemical Association's HPV 2003 Working List. 849 substances is less than 4% of the total number of substances in the DSL. A less restrictive cut-off should be used to include more substances at this early pre-screening stage.

**Recommendation 9: The criteria for substances to be considered GPE should be reviewed to ensure that all substances on the DSL that show a potential for exposure are adequately considered for further screening.**

## **4.2 ComET**

The integrated framework document suggests that ComET will be used following SimET to further reduce the number of GPE substances and refine the Maximal List. The ComET tools look well-designed (in particular their consideration of exposure to vulnerable communities such as children) and significant progress has been made developing them. They should not however be used to take substances off the GPE list that have already been captured by SimET. They are far from exact, and, as estimations, their role should be to ensure that we are not missing important substances.

We identified several limitations of the ComET tools. The first is the use of sentinel products of near-field exposure risks while ignoring the impact of non-sentinel ones. In our examination of the ComET work it appears that if the total exposure from non-sentinel products is greater than the sentinel product exposure there will be an underestimation of exposure. Such an approach may lead to an error in final determination of exposure potential for specific substances.

The ComET tool also inappropriately excludes the assessing substance exposure to workers in general. Although it is acknowledged that workers are disproportionately exposed in greater level to substances than the general population, studies have begun to emerge demonstrating that workers exposure may also result in added exposure to other family members. For example, laundering of work clothes results in higher exposure to the household.

Another major concern is that ComET omits dust. House dust is a significant source of exposure, particularly for children. Studies of dust contaminants have found important levels of pesticides, flame retardants, organotins, phthalates and others. Exposure from dust therefore needs to be factored in.

Finally, although persistence and bioaccumulation are used in one path to screening assessment, they also have implications for exposure. Bioaccumulation does appear to be partly factored in through food exposure in ComET. Persistence is a major factor in determining the duration of a substance's exposure. For example, the length of time a substance stays in house dust influences the total exposure individuals receive. Health Canada needs to ensure that persistence and bioaccumulation are adequately accounted for in all aspects of the categorization exercise.

Related to persistence and bioaccumulation is long-range transport potential and the increased risk that this creates for those in the Canadian North. The accumulation of larger amounts of substances in the Arctic contaminates its soil and water to a greater degree. Substances move up the food chain as well. First Nations people in particular, with their diet higher in wild game and seafood, are exposed to higher levels of bioaccumulating chemicals than the average Canadian. This difference in exposure needs to be taken into account. Evaluations should always consider the most vulnerable or most exposed as the priority.

Health Canada also chooses to ignore body burden as an excellent source of information on what Canadians are being exposed to. Three major biomonitoring studies have revealed the presence of bioaccumulative substances that individuals have been exposed to, but also identify chemicals that represent ongoing sources of exposure. Phthalates, for instance, are not considered to be bioaccumulative but the constant exposure we receive in food, consumer products, etc. leads to significant levels in most people's bodies.

We reiterate here our other recommendations for strengthening the assessment of Greatest Potential for Exposure. When evaluating exposure, Health Canada should examine classes of substances with similar mechanisms of action together. Aggregate exposure is a better indicator of risk and the cumulative aspects of exposure to DSL substances have not been captured by the proposed framework that looks at exposure by single substances. Furthermore, this approach is now required in the new *Pest Control Products Act* and currently performed during risk assessment of pesticides in Canada.

**Recommendation 10: Health Canada should use an alternative method for determining Greatest Potential for Exposure through SimET that includes more to the highest exposure substances used in Canada.**

**Recommendation 11: Available information on human body burden should be included as an indication of GPE.**

**Recommendation 12: When assessing exposure Health Canada should look at classes of substances with similar mechanisms of action to determine aggregate exposure.**

**Recommendation 13: The ComET tool should be used to find GPE substances that may be missed by SimET, not to reassess substances captured by SimET and potentially remove them from the Maximal List. We object the application of the ComET at this stage of categorization for the purposes of refining the final list of substances for exposure potential before being included on a Maximal List.**

**Recommendation 14: The ComET tool should include dust in its exposure assessment for DSL substances because it is an important exposure route, particularly for children.**

## **5.0 Persistence and Bioaccumulation**

The section on Page 12 of the Proposed Integrated Framework, “The Role of Persistent and Bioaccumulative Substances in Human Health,” is of great concern. Its thesis appears to be that P and B are relatively unimportant characteristics in relation to human health. As the framework states: “P and B are rarely influential determinants of either potential for human exposure or effects on human health.” It is our view that this perspective contradicts the intent of CEPA section 73 as well as current international thinking on persistent organic pollutants (POPs) and the Canadian government’s position on POPs.

The Government of Canada backgrounder on POPs states that “the weight of scientific evidence strongly suggests that POPs have significant adverse effects on the health of ecosystems, wildlife and people.”<sup>1</sup> For this reason Canada was the first signatory to the Stockholm Convention on Persistent Organic Pollutants. Yet the proposed integrated framework suggests that persistence and bioaccumulation are primarily environmental concerns with little contribution to human toxicity or exposure.

ENGOS firmly believe that the proposed approach may create obstacles for Canada in identifying and nominating other POPs for global consideration under the Stockholm Convention. Many of the ENGOS in Canada and around the world have emphasized the

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<sup>1</sup> See information on persistent organic pollutants at [http://www.ec.gc.ca/press/2001/010509\\_b\\_e.htm](http://www.ec.gc.ca/press/2001/010509_b_e.htm).

need to expand the list of POPs currently addressed under *the Stockholm Convention on Persistent Organic Pollutants*. According to Canada's Draft National Implementation Plan, the DSL categorization exercise has been identified as a tool to identify potential POPs.

Other international processes that will draw on the DSL work include the Strategic International Approach to Chemical Management which proposes to focus on highly persistent and highly bioaccumulative substances in a coordinated international global plan for action. It is critical therefore in the context of this work that the methodology accurately meet the obligations of CEPA. By not ensuring that P is given the consideration it deserves and requires in the DSL categorization approach, Canada's ability to contribute to this global effort to eliminate and reduce POPs will be significantly diminished.

One of the indirect benefits of the DSL categorization process is the ability of Health Canada and Environment Canada to identify those substances that are P and B from its initial review of toxicity data. It would be helpful as well as cost effective in Canada's effort on POPs if substances that are identified as POPs be placed on a separate list for immediate consideration. It is well documented that Canada continues to be a recipient of POPs from domestic as well as global sources.

The existence of a separate and distinct POPs list would provide useful guidance to Canada's domestic and international POPs efforts. This would assist the POPs Review Committee that was established under the Stockholm Convention. As Parties prepare to submit nominations of POPs to the Committee, the Committee will be responsible for assessing data and information before making recommendations on which POPs should be added to the Convention for elimination or reduction under Annex A, B or C.

The framework also suggests that body burden is of minimal consequence. "The mere presence of detectable levels of persistent substances in blood or tissue," the document states, "while indicating that there has been exposure, does not necessarily imply potential harm to humans." The framework document later explains (see page 16 as well) that the contribution of P and B to exposure is limited.

This is quite dismissive of the relevance of human biomonitoring studies and appears to set up Health Canada's rationale for not using body burden as an indicator of greatest exposure. Biomonitoring surely provides better information on human exposure than other methods, based on little or no data, that compound assumptions and uncertainties. It is also dismissive of the increased Northern exposure to P and B substances mentioned above. Persistence and bioaccumulation are particularly important to exposure and risk for those living in the North and those whose diets are heavier in "country foods."

**Please see recommendations 7 and 11 above.**

**Recommendation 14: Health Canada's integrated framework should acknowledge the importance of persistence and bioaccumulation in substances' potential toxicity to humans.**

**Recommendation 15: Those substances that meet the criteria for P and B should be identified and placed on a new and distinct list for earlier consideration as POPs.**

## 6.0 Inherent Toxicity

There are two processes or tools being used to determine whether substances are inherently toxic to humans. As CEPA 1999 provides no guidance on how inherent toxicity is to be determined, Health Canada has much latitude in making those decisions. CEPA does, however, include the Precautionary Principle as one of its guiding principles, suggesting that Health Canada's inherent toxicity assessments should err on the side of caution and tend towards suspecting substances to be hazardous where there is suggestive but not conclusive evidence.

The overall process described in the framework appears to be excessively restrictive and designed to keep the number of inherently toxic substances as low as possible. Using SimHaz and then ComHaz in "stepwise" fashion, for instance, takes substances through progressively more stringent criteria.

SimHaz is an excellent screen for collecting information from various organizations and jurisdictions regarding the toxicity of substances in use. The lists used have been chosen based on strict criteria: "endpoint-specific hazard based on original review and critical evaluation of data, assessments of weight of evidence and extensive expert peer review." Lists such as those of the European Community and the International Agency for Research on Cancer (IARC) are widely respected for their scientific rigour. Currently, the proposed framework excludes such endpoints as teratogens. The following website ([www.edol.nw.ru/labs/lab38/stirov/hazard/teratogen\\_lst.html](http://www.edol.nw.ru/labs/lab38/stirov/hazard/teratogen_lst.html)) outlines a list of teratogenic substances that should be considered in the SimHaz process.

We would assume that IARC Group 1 carcinogens and Group 2A carcinogens, for example, would be accepted as being inherently toxic without debate or further analysis. These substances have, after all, already been through a weight of evidence assessment and "extensive expert peer review."

The proposed framework suggests an additional weight of evidence assessment of these substances that are already on carefully selected lists. Page 14 of the framework describes SimHaz as involving "the identification of high- or low-hazard substances by various agencies based upon formal weight of evidence criteria." It is unclear whether this weight of evidence evaluation actually applies only to substances with greater uncertainty (such as IARC Group 2B carcinogens).

An additional weight of evidence assessment seems inappropriate where a similar one has already been done by a credible agency and substances pronounced hazardous. With the tight timelines and huge responsibility of the categorization process, we fail to see why Health Canada would spend their energy here. Secondary assessments look to be an attempt to keep internationally recognized toxic substances off Health Canada's list of inherently toxic substances. Given Health Canada's mandate to use a precautionary approach and the preliminary nature of categorization, the Ministry should attempt to be inclusive of any substance that could warrant a screening assessment.

The flowchart on page 13 (Figure 5) describing Health Canada's process shows substances which have been "identified as hazardous to human health," as needing to further pass through the Complex Tools such as ComHaz. We assume that this is what Health Canada means by evaluating substances for hazard in a "stepwise fashion." The framework's proposed process, therefore, takes substances that have already been determined to be hazardous by another agency through a weight of evidence approach and expert peer review and subjects them to another weight of evidence review challenging the prior assessment, and then further evaluates them by the ComHaz tool to ensure that the SimHaz conclusions were correct.

In the context of the categorization requirements under CEPA, using ComHaz for substances already chosen through SimHaz, at this stage, is redundant and serves only to increase the chances that a substance will be removed from the list though already accepted to be of high hazard. A known carcinogen from a credible list would be looked at again in ComHaz for its carcinogenicity, and, according to the framework, would go through yet another weight of evidence assessment at this point.

Given that ComHaz considers a wide range of hazardous health endpoints in its approach, it is an appropriate tool for those substances that come to Health Canada via the Environment Canada process. Substances that are found to be P and/or B but not eco-iT are passed over to Health Canada for human inherent toxicity evaluation. In this case, if a substance has not already been captured by SimHaz, it should pass through the ComHaz tool to determine if there is an important endpoint relevant to humans. Any substance found to be inherently toxic to humans would then be categorized "in" for screening assessment. Additional exposure assessments would not be relevant.

It is our impression that substances that are P and/or B but not ecologically inherently toxic will not have a ComHaz evaluation to determine categorization. This appears to be particularly true for those considered Low Potential for Exposure. Their assessment via SimHaz alone is insufficient. CEPA calls for all substances that are P or B to be categorized "in" if they are inherently toxic to humans. Checking to see if these substances are on one of the limited number of lists used for SimHaz does not qualify as an assessment of inherent toxicity.

Health Canada needs to be more specific about the output of the ComHaz tool. The framework on page 31 states that substances presently on the Maximal List and in the "moderate likelihood" for categorization group will pass through ComHaz and will

“eventually being considered as either high or low priority for screening assessment post September 2006.” Additionally, on page 23 it appears that, in contravention of CEPA, some GPE substances may be considered “low likelihood” for moving forward towards screening if they do not meet any of the endpoint criteria in Figure 9 (page 22). While prioritization is important, these statements are vague on whether these substances will be categorized “in” for screening assessment and at what point those decisions will be made. Final outputs labeled as “high or low priority” are insufficient. There needs to be a clear determination of whether a substance will or will not receive a screening assessment.

Further, regarding the framework’s proposed hazard assessment, page 17 of the document claims that “IT human is considered for all of the approximately 23 000 substances.” This is misleading as the only opportunity that most substances are considered iT to humans is if they are on one of the limited number of lists that is being looked at by Health Canada. This approach is biased towards those substances that have enough data to show their dangers. The majority of substances on the DSL will never have a ComHaz evaluation.

If SimHaz is the most sensitive tool used to determine inherent toxicity to humans, the result is a list of only 561 substances. In other words, Health Canada has determined that only 561 of approximately 23,000 substances on the DSL are inherently toxic to humans. It is hard to believe that all inherently toxic substances have been captured.

Finally, the following statement on page 17 (final bullet point) outlining the additional benefits of the integrated framework report is of concern:

Application of the simple tools and initial stages of the ComHaz ...provided sufficient time and opportunity for interested parties to submit a limited number of data to reduce the number of substances on the final list, thereby reducing significantly the uncertainty associated with the human health aspects of the DSL categorization.

Given the provisions in CEPA section 71 that provides the Government with the authority to request data, and the precautionary nature of the categorization process itself to identify substances for further screening, Health Canada should be placing more emphasis on requiring toxicity data to enhance their understanding of DSL substances. ENGOs have articulated that the government's use of section 71 has been underutilized in the context of the categorization exercise. We highlight the relevance of the following ENGO recommendation from the July 2005 report, *ENGOs' Comments on the Categorization process and Environment Canada's Proposal on Polymers and UVCBs*.

*Recommendation 9: Where there is no data or only low quality data available for a substance, the onus should be placed on industry to supply the required information within a reasonable timeframe. In the meantime, these substances should not be categorized "out" or "set aside" but rather flagged as priorities for further action.*



**Recommendation 16: Substances found on the rigorously chosen lists used for SimHaz should be accepted as inherently toxic to humans and not go through further weight of evidence assessment before being accepted.**

**Recommendation 17: All substances deemed to be P or B but not ecologically iT and which have not been found iT to humans by SimHaz, should have a ComHaz assessment to determine human inherent toxicity. SimHaz evaluation is not sufficient for these DSL substances**

**Recommendation 18: Substances that have qualified as inherently toxic through the SimHaz process should not be required to undergo a ComHaz evaluation to be considered for the Maximal List; they should automatically be accepted as inherently toxic to humans and if P or B should be sent to screening level risk assessment or for risk management actions.**

## **7.0 The Maximal List**

The Maximal List will be used by HC to set priorities for work to be undertaken beyond 2006. It remains unclear however, how this work will go forward after 2006 and how it will be coordinated with Environment Canada. While we are encouraged by the initial meetings that have been scheduled jointly by the two departments to begin this discussion, the lack of a clear plan for these efforts makes it difficult for us to comment on the list.

The Maximal List is both crucial and necessary to moving ahead with screening assessment work, but the emphasis on prioritization before categorization is complete in 2006 is premature. The essential task at this stage is to assure that as many potentially toxic substances as possible are captured by the categorization methodology.

Generally, our view of the Maximal List is based on the perspective of Health Canada's legislative mandate to categorize in both substances that have the GPE and those that are P or B and iT to humans. Hence, the comments outlined below must be considered in the context of the issues raised prior to this section. ENGO's have had the assistance of an expert to review the Maximal List but only to a limited extent. This reality influences our submission as well.

We propose that, for the legislative requirements and the promotion of transparency, the integrated framework should include additional lists to demonstrate how substances are categorized according to the criteria of the law and how the Maximal List was derived. These separate lists would show how substances are categorized "in" based on the two different streams applicable to Health Canada (outlined on Figure 4, page 11) in the legislation and those that are categorized "in" due to uncertainty.

**Recommendation 19: Substances categorized in by Health Canada should be available in the form of three sub-lists: 1) Those meeting the GPE criteria, 2) Those**

that are P and/or B and iT to humans, and 3) Those that are uncertain due to a lack of data.

**Recommendation 20: Health Canada's post-2006 activities should include amongst its priorities, generation of data for substances "set aside" in the categorization process.**

## **7.1 General Observations**

At this time, there are three overarching concerns regarding the Maximal List. The first is the lack of legislative authority for Health Canada to do further follow-up on the chemicals beyond 2006. While the screening level risk assessment is a required CEPA obligation, it is based on the results gathered from categorization requirements in section 73. Given the approach taken to develop the Maximal List to date, ENGOS fear that the list may trigger legal challenges by interested parties as to its validity.

The second overarching concern with regards to the Maximal List is the opportunity provided to industry to provide data and information meant to reduce the Maximal List. This means that chemicals, including the 301 substances in the High category and approximately 500 substances on the Moderate category, are under threat of elimination if adequate data from industry is provided, in particular, the 388 substances that do not have P or B data and are IPE are of particular interest. As an issue of administrative balance, we note that the reverse is not true - there is no process for gathering data that may add substances to the Maximal List. ENGOS are also concerned that once a substance is taken off the Maximal List, the other CEPA feeders will be unable to capture the substances that have been categorized out.

Finally, there is uncertainty about the timeframe that will be taken to address the Maximal List. According to Part E: Next Steps in the Proposed Integrated Framework (last bullet, page 32), the focus on the Maximal List will be for the High category. There is no explanation provided as to the status of the Moderate list beyond 2006 besides the existence of the Maximal List.

The following sections will elaborate on specific concerns with regards to the Maximal List.

## **7.2 High Hazard – Low Potential for Exposure**

According to Health Canada's June 1, 2005 presentation of the Maximal List, there were 301 substances considered Low Potential for Exposure and High Hazard. At this time Health Canada considered them high probability of being categorized for screening assessment. According to Part E titled "Next Steps" in the integrated framework, these substances are also proposed for Risk Management (Figure 15).

The Industry Coordinating Group however, has proposed a process for "managing" this list of substances, a collaborative process between government and industry meant to

determine if these substances do warrant screening assessments. In particular, they predict that some or many of the substances will be in limited use with a minimal risk of exposure to the general public. Transparency, monitoring and involvement of ENGO participants in this process is essential.

While the idea of risk management on the 301 substances may be a good approach, details on how the risk management process will be undertaken is important. It is also confusing that Health Canada is treating the 301 substances as if they all fall into the same category instead of dividing them between those that are persistent, bioaccumulative or both, and those that are not. Any process for determining which of the 301 substances are to be categorized “in” must begin with the understanding that those substances that are P and/or B and high hazard are, by law, automatically scheduled to be categorized for screening assessment.

**Please see Recommendation 7 in the “Legislative Mandate” section above.**

### ***7.3 Moderate Probability***

The June 1, 2005 Maximal List included a list of 989 substances considered to be of moderate probability of being categorized “in” for screening assessment. This group of substances was divided into 480 substances of GPE, 121 substances with IPE that are either P or B, and 388 IPE substances awaiting P and B determinations.

As with the High Hazard, Low Potential for Exposure substances, it is puzzling that these substances are all grouped together as “moderate probability.” The Greatest Potential for Exposure substances, for instance, fall under part a) of Section 73 of CEPA and already fully meet the criteria for screening assessment. They do not belong in the moderate probability section of the Maximal List. GPE substances should not be removed from the categorization list based on toxicity assessment. A ComHaz evaluation would be appropriate at the next stage, after categorization.

Of the remaining substances, which are considered Intermediate Potential for Exposure, 121 have already been designated P or B and 388 are awaiting P and B information. It makes sense that their categorization status is uncertain as they are awaiting determinations of their inherent toxicity to humans. These substances should stay on the Maximal List and be sent forward for screening level risk assessment.

**Please see Recommendation 6 above.**

### ***7.4 Polymers and UVCB's***

Because Environment Canada has assumed all polymers and UVCBs to be persistent, they are assessing inherent toxicity for all of these substances. Those that are eco-iT will be categorized “in” for screening assessment. This will require Health Canada to do the same assessment, to look at all polymers and UVCBs for their inherent toxicity to humans. From our June 1, 2005 meeting it was not clear that Health Canada is prepared

to do this. The current proposed integrated framework has not articulated adequately how these substances will be categorized. Further, it is unclear how Health Canada will inform EC which polymers or UVCBs will require data for persistence or bioaccumulation.

The presence or absence of a polymer or UVCB on one of the SimHaz lists does not qualify as an assessment of toxicity. As a pioneering program, categorization needs to go beyond data-rich substances that have already been assessed by other organizations. All polymers and UVCBs need a ComHaz assessment to determine if they are inherently toxic to humans for the purpose of categorization.

**Recommendation 21: Health Canada, in coordination with Environment Canada, should outline the process and criteria by which it identifies polymers and UVCBs that require P or B data from Environment Canada.**

**Recommendation 22: The ComHaz assessment should be applied to all polymers and UVCBs to determine their iT to humans.**

## 8.0 Data Gaps and Uncertainty

An overarching issue for categorization is the lack of toxicity data for many substances. In 1997 a report by U. S. based Environmental Defense found that even the most basic toxicity test data cannot be found for 75% of high volume chemicals in commercial use.<sup>2</sup> Unfortunately little has changed since the National Academy of Sciences found the same situation in their report in 1983.<sup>3</sup> The lack of data was again supported when Environment Canada reported at a joint meeting on DSL categorization held on June 1<sup>st</sup>, 2005 in Ottawa that less than 10% of their preliminary categorization decisions were based on experimental data.

We appreciate therefore the difficulty of the task before Health Canada and the very large possibility for misclassifications of substances due to the absence of toxicity data. It will be important to continue to use conservative assumptions regarding toxicity for those substances. A weight of evidence approach should maximize potential sources by including all data available in the peer-reviewed literature - wildlife studies, in vitro studies, animal experimental toxicity data, and studies in exposed populations.

For those substances that are “set aside” and not categorized for screening assessment, data gaps and uncertainties should be noted. This would increase the transparency of the decisions and would help prioritize future data generation.

At our June 1, 2005 meeting, Health Canada officials asserted that uncertain substances, that is, those lacking enough data to make a reasonable assessment, would, by default, be

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<sup>2</sup> Environmental Defense Fund (1997) Toxic Ignorance: The continuing absence of health testing for top-selling chemicals in the United States.

<sup>3</sup> NAS/NRC (1984) Toxicity Testing: Strategies to Determine Needs and Priorities.

categorized “in.” We assume this to mean that any uncertain substance determined by Environment Canada to be P or B but not eco-iT would remain on Health Canada’s list for screening assessment. Is this interpretation correct? We would applaud this kind of conservative approach that puts the onus on scientific studies to show that P or B substances are not harmful to human health.

The framework flowchart, however, suggests that P and/or B substances automatically go through an exposure assessment, which seems inappropriate at this point. Will the status of uncertain substances be dependent on their potential for exposure? Substances that are P or B should not need exposure assessments in order for them to be considered for categorization.

The Ministry has also assured members of our caucus that important health endpoints for which specific OECD or USEPA Test Guidelines have been developed (e.g., neurotoxicity, immunotoxicity), but that are not included in the ComHaz diagram, will be included in subsequent stages. The framework should include some reference to how they will be addressed. Developmental neurotoxicity, immunotoxicity, endocrine disruption and teratogenicity should certainly be considered in a weight-of-evidence approach to developmental toxicity.

Data included in Material Safety Data Sheets (MSDS) would be useful in this regard. At least 25% of the listed industrial chemicals for which occupational exposures have been determined and referenced on the basis of their neurotoxic effects in adult systems<sup>4</sup> are found in MSDS. MSDS are being used by Environment Canada for toxicological references and to request data from industry.<sup>5</sup> These MSDS forms may also provide useful toxicity information for Health Canada's process on inherent toxicity.

Gaps in information can also be tackled by requesting or mandating data from manufacturers and importers depending on the status of the substance. Section 71 of CEPA gives Health Canada data gathering powers and should be used to make industry responsible for providing data within a reasonable timeframe. Although section 71 traditionally has been underused, its appropriate application could be an invaluable means of gathering necessary information and improving our state of knowledge about DSL substances. This, in turn, would lead to better, more defensible assessments on substances.

Section 70 of the Act also compels industry to automatically submit data that suggest substances may be toxic. Neither CEPA 1999 nor the presentations made on June 1st, 2005 make clear what kind of information is required to be submitted under this section, what the timeframe for submitting relevant information is, and whether this information is intended to be made publicly accessible. Further, it is unknown whether there have

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<sup>4</sup> Anger, WK (1985) Neurobehavioural testing of chemicals: Impacts on recommended standards. *Neurobehavioural Toxicology and Teratology*, 6147-153. (now *Neurotoxicology and Teratology*)

<sup>5</sup> Meeting with ENGOs on DSL categorization by Environment Canada on May 31, 2005 in Gatineau, Quebec.

been any violations of this requirement (i.e., have there been situations where industry has not provided necessary information on a timely basis?).

We are pleased to learn that efforts are underway to update the reporting guidelines for industry under section 70. It is extremely important that Health Canada establish a clear process for revising the section 70 guidelines. ENGOs support guidelines that include improved public access to information, broader notification requirements for facilities and the enforcement of CEPA 1999 requirements with applicable fines for noncompliance.

**Recommendation 23: Uncertain substances lacking useful data or models should be categorized “in” for further consideration and data collection.**

**Recommendation 24: Where there are no data or only low quality data available for a substance, the onus should be placed on industry to supply the required information within a reasonable timeframe.**

**Recommendation 25: Industry should be required to report what studies they are conducting and when the results will be available. This would support transparency in the process.**

**Recommendation 26: Health Canada should develop strong guidelines for information submitted under Section 70 of CEPA 1999. The guideline development process should include effective public participation.**

**Recommendation 27: Health Canada should include information and context as to how neurotoxicity, endocrine disruptors and immunotoxicity will be addressed under ComHaz tool and in the proposed integrated framework.**

## **9.0 Other Scientific Issues**

We have raised a number of issues over the course of the year with respect to the scientific approach of the integrated framework.

### **9.1 Use of scientific studies**

It is not clear to us what role original (academic/scientific) reports of toxicological studies in experimental animals or epidemiological investigations will play. The framework document states that they are to be examined “cursorily.” These studies would be valuable in a weight of evidence consideration for substances with little toxicological data, yet the framework implies that they are not particularly important in the assessments. However, such studies would be an especially important source of information for fast-emerging research endpoints like endocrine disruption and developmental neurotoxicity.

## 9.2 Endocrine Disruptors

As mentioned in a previous section, the integrated framework does not adequately consider whether substances function as endocrine disruptors. Including endocrine disruption in inherent toxicity determinations would be consistent with both international efforts to identify endocrine disruptors as well as the New Substances (NS) Program's proposed initiatives. While Health Canada has indicated that endocrine disrupting data are considered in the context of developmental toxicity data, it is our view that such an intention should be articulated clearly in its approach.

At the international level, a group within the OECD Task Force on Endocrine Disruptor Testing and Assessment has suggested that validated high throughput (or semi-high throughput) screens will soon be available for identifying endocrine disruptors and for developing databases for use with Quantitative Structure Activity Relationships (QSARs). Additionally, models currently in existence are producing promising results. Such information should be considered by Health Canada in its weight of evidence approach. In keeping with the legislative mandate for use of the precautionary principle, Health Canada should not wait for international acceptance and entrenchment of these methods before considering such information in their categorization decisions.

The Final Report of the Multistakeholder Consultations on the New Substances Notification Regulations included some strong language on the topic of endocrine disruptors. The Multistakeholder Table recognised the critical importance of identifying endocrine disruptors, and suggested that it may be appropriate to require further test data from industry where an endocrine disruptor potential is found to exist. Additionally, it was recommended that:

The NSN Guidelines Document will be revised, subsequent to these consultations, to include a section dealing with endocrine disruption. In particular, the section will describe Environment Canada and Health Canada's approach to incorporating endocrine disrupting considerations in the course of conducting an assessment and proposed risk management outcomes. *This will include development of a database of substances that have shown evidence of endocrine disrupting effects.* This database, along with other available information, will be used by evaluators to identify whether substances under review are structurally related to substances shown to have endocrine disrupting activity. Depending upon the severity of the effect and the closeness of the analogue fit, this analogue information may form the basis for a suspicion of toxicity. *The guidelines will also indicate that as applicable validated SARs become accessible, they will be used appropriately in the assessment process. Furthermore, where this information leads to a suspicion of toxicity, appropriate control measures will be imposed, or requests for further test data under section 84(1)(c) of CEPA will be made as validated test procedures are determined.* Lastly, the section on endocrine disruption will inform stakeholders of the intent to amend the NS Program (Regulations or Guidelines) to include data requirements for

determining endocrine disrupting potential as they become available [footnotes omitted] [emphasis added].

In light of these extensive recommendations, and in the spirit of maintaining consistency with other programs, ENGOs recommend that government commit to a systematic review of DSL substances for endocrine disrupting potential as substantiated SARs or screens become accessible (either pre- or post-2006). Additionally, it is hoped that ample time and resources will be devoted to the advancement of the above-mentioned endocrine disruptor database, and that, where necessary and appropriate, industry will be required to supply further test data to help inform evaluators and assist in the substantiation of QSARs.

The framework document outlines the rationale for not including “estrogen or androgen binding potential” at this time. The Japanese Ministry of the Environment however has tested twelve substances for their endocrine disrupting potential and this list is available.<sup>6</sup> Anti-thyroid agents are also important to development, and lists of these substances, referenced to scientific studies of their actions on thyroid have been compiled.<sup>7</sup> Such information should support a weight-of evidence approach to substances.

Those substances exhibiting estrogenic properties are a good example of how categorization could fail to adequately consider inherent toxicity to non-human organisms. Estrogens are both hormonally active and potentially carcinogenic. There is growing evidence that estrogens can cause harm to humans and non-humans alike. It remains to be seen whether estrogenic substances will be captured, but certainly a robust assessment of toxicity should capture estrogenic substances as inherently toxic.

**Recommendation 28: Health Canada should commit to a systematic review of DSL substances for endocrine disrupting potential as substantiated SARs or screens become accessible (either pre- or post-2006).**

**Recommendation 29: Adequate time and resources should be devoted to the advancement of an endocrine disruptor database, and, where necessary and appropriate, industry should be required to supply further test data to help inform evaluators and assist in the substantiation of QSARs.**

### **9.3 Margin of Exposure**

Though there is a Health Canada backgrounder on the department’s approach to children’s health for Existing Substances, the framework is not explicit enough about

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<sup>6</sup> See: <http://www.env.go.jp/en/topic/edcs/approach/2002.html>.

<sup>7</sup> See: Crofton, Kevin M., Elena S. Craft, Joan M. Hedge, Chris Gennings, Jane E. Simmons, Richard A. Carchman, W. Hans Carter, Jr., and Michael J. DeVito (July 2005), Thyroid Hormone Disrupting Chemicals: Evidence for Dose-Dependent Additivity or Synergism, *Environmental Health Perspective*. Available at <http://dx.doi.org/>.



extra precautions to ensure that substances that may be hazardous to children and other vulnerable populations are included.<sup>8</sup> The age-specific components of the ComET Near-Field assessment of exposure are excellent. ComHaz evaluation must keep the vulnerability of children at the forefront as well. Children are vulnerable not only because of their potential exposure per body weight but because they may be more sensitive to certain toxic effects at different stages of their development. Any weight of evidence determination of hazard must be based on the protection of the most vulnerable in our population.

We have concerns that the Margin of Exposure (MOE) method, used to determine toxicity, is a serious departure from traditional methods of risk assessment and is not robust enough to make lasting and important decisions without requiring an external independent peer review of the new process. Therefore, we are of the view that the MOE method used in the integrated framework may not be protective of children. A MOE, according to the Health Canada backgrounder, is “the magnitude of the ratio between the level (dose) at which the critical effect is observed in studies conducted in animals or, in some cases, humans and the upper-bound estimated (or measured) level of human exposure to a substance.” While the proposal to consider MOEs greater than 1000 as safe enough is parallel to the use of children’s safety factors, the proposed process allows for substances with MOEs less than 1000 to be considered not toxic.

To use past examples, the MOE for PBDEs was 300, and for PFOS 200, well under 1000, but the conclusion was that further in-depth evaluation of PBDEs from a human health perspective was a low priority, and that risk management actions should be taken based on environmental, not health, considerations. PFOS were deemed to be not toxic under provisions of CEPA.

**Recommendation 30: ComHaz evaluations and later screening assessments must be adequately protective of children and other vulnerable populations. If Margin of Exposure methods are used to define toxicity and direct risk management decisions on substances, they must be at least equivalent to adding an additional 10-fold safety factor for children.**

## ***9.4 Weight of Evidence***

The ENGOs are interested in seeing further development of the ComHaz tool (including consideration for other hazardous endpoints such as neurotoxicity, immunotoxicity and endocrine disruptors) for the purposes of identifying additional substances for categorization. With the current framework for ComHaz, one area that remains of significant concern is the application of the weight of evidence for substances that already meet the initial criteria for carcinogenicity and genotoxicity.

This approach requires a validation of the information already gathered. Substances that meet the criteria for carcinogenicity and genotoxicity should already be categorized in.

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<sup>8</sup> Children and the Health Risk Assessment of Existing Substances under the Canadian Environmental Protection Act, 1999.

The weight of evidence approach is misused in this area. The main focus of the SLRA work is to provide the additional details needed to determine if it meets the requirements of CEPA 'toxic' substances.

As mentioned in an earlier section, the proposed integrated framework suggests that even with SimHaz, where substances are taken from peer-reviewed lists, a weight of evidence approach will be used. It seems inappropriate to further challenge carefully chosen lists that meet Health Canada criteria instead of taking a precautionary approach and including all of these substances as iT to humans.

**Recommendation 31: Though weight of evidence determinations are an integral and important part of assessments, they should not be used in the categorization phase when carcinogenicity or other conclusions of inherent toxicity have already been made.**

## 10.0 Examples of Missing Substances from the Maximal List

As mentioned previously, the ENGOS with assistance from an expert undertook to review the Maximal List. This survey of the Maximal List was not comprehensive but the review was focused on specific classes of substances to identify the substances that were captured using the proposed integrated approach and what substances would be missed if the CEPA criteria were met. The results of this review are found in a separate Appendix. There are 20 Tables in this Appendix and referenced in this section of the ENGO submission.

The following comments are provided in light of this sampling exercise.

- A downside of the SimHaz process is that it only looks at substances of concern identified by others. As a leader in developing the categorization approach, Canada should emphasize the search or ability to scope for problems not yet known, not those identified by others. This is where real progress can be made. Health Canada's inherent toxicity process does not, for instance, look for substances that are structurally and/or electronically similar to problematic substances.
- Many of the substances on the Maximal List have more than one salt on the DSL. In most cases if a substance is inherently toxic to humans, other salts may also have similar toxicity. Health Canada should be specifically looking at these other salts for their eligibility for screening assessment. Likewise, exposure assessments of substances should include all potentially toxic salts. Exposure evaluation should look at the aggregate exposure of a substance's salts rather than assessing them separately. Attached is an example list of alternative salts of some of the substances on the Maximal List (Appendix).

- We have done an additional search for potentially toxic substances. Because of limited resources we looked at some but not all classes of carcinogens. It was assumed that all stakeholders and Health Canada would agree that carcinogens are inherently toxic. We also determined whether identified carcinogens were on both the Maximal List and the DSL.
- In total we found 140 probable carcinogens on the DSL that are not on the proposed Maximal List. They are listed in Table 1 of the Appendix. These probable carcinogens were found in Lewis (Carcinogenically Active Chemicals; New York: Van Nostrand Reinhold 1991), Zhang et al (Chem Biol interact 81:149-190 (1992)) and in NTP reports. Due to resource and time limitations only a portion of the carcinogens in these references was searched.
- Of those substances listed on Table 1, most belong to one of 5 classes identified by the NTP program. Representatives of each of these classes were found on the Maximal List. Listed on Table 1 are the substances of the same class not listed on the Maximal List but that are on the DSL. Two of the classes are substances that can be metabolized to dimethoxybenzidine or dimethylbenzidine. Three and two substances from each of these classes respectively are on the Maximal List. They are identified in Table 2.
- In the Table 2, we present some classes of substances that are probable human carcinogens. For example estrogen mimics, isocyanates, hydrazines and substances containing nitroso substituents are considered carcinogenic by experts. There are also classes of substances such as primary aromatic amines and brominated substances that demonstrate carcinogenic behaviour. We felt it is appropriate to consider classes that are very often considered carcinogens because categorization is the first step in an elaborate categorization and screening assessment procedure. Classes that have a high proportion of inherently toxic substances should be categorized "in" for further screening assessment since it is only a first collector step.

### **10.1 Brominated substances**

Brominated substances are usually carcinogenic because bromine is a very good leaving group in SN2 substitution reactions. Fourteen bromine-containing substances have been included in the Maximal List (Table 9), but we found 95 other bromine-containing substances on the DSL that were not on the Maximal List (Table 10). We are not sure though that we found all brominated substances on the DSL.

An example of a brominated substance not on the Maximal List is Phenol, 4,4 -(3H-1,2-benzoxathiol-3-ylidene)bis[2,6-dibromo-, S,S-dioxide, monosodium salt (62625289). The chemical has been declared persistent but not ecologically inherently toxic by Environment Canada. Presumably, it is not on Health Canada's Maximal List because it was not captured by SimHaz and therefore considered not inherently toxic to humans. ENGOs would like to see those substances as the one above, which may be quite toxic to

humans, have a better assessment for toxicity before being deemed non-toxic. There are many others like this on the DSL.

## **10.2 Isocyanates**

In Purdy (Env Health Per **104**(supp5) 1085-1094, 1996) it was observed that all isocyanates tested for carcinogenicity have been found to be carcinogenic. There are 13 isocyanates on the Maximal List (Table 3), but 189 other isocyanate containing substances that are on the DSL that are not on the Maximal List (Table 4).

## **10.3 Hydrazines**

In Purdy (Env Health Per **104**(supp5) 1085-1094, 1996) it was observed that all hydrazines tested for carcinogenicity have been found to be carcinogenic. Four hydrazines have been included in the Maximal List (Table 5). In our scoping of the Maximal List, we found 28 other hydrazine-containing substances on the DSL that were not on the Maximal List (Table 6). Because of the limited time and resources, we are unsure if this list is complete.

## **10.4 Nitroso-containing substances**

Purdy (Env Health Perspectives **104**(supp5) 1085-1094, 1996) observed that all nitroso-containing substances tested for carcinogenicity have been found to be carcinogenic. Three nitroso-containing substances have been included in the Maximal List (Table 7), but we found 11 other nitroso-containing substances on the DSL that were not on the Maximal List (Table 8). Due to limited time and resources in conducting our review, we are not sure that all nitroso-containing substances on the DSL were captured.

## **10.5 Iodinated substances**

Iodinated substances are usually carcinogenic because iodine ion is a very good leaving group in SN2 reactions. This makes substances containing iodine very good alkylators. Alkylation of DNA is a major mechanism by which chemicals are carcinogenic. The Maximal List contains two organic substances with iodine as a substituent (Table 11). We identified 37 other iodine-containing substances on the DSL that were not on the Maximal List (Table 12). Due to limited time and resources in conducting our review, we are not sure we identified all iodinated-organic substances on the DSL.

## **10.6 Epoxides**

A very high proportion of epoxide-containing organics have been found to be carcinogenic. Therefore, it would be prudent to consider such substances inherently toxic. The few that are not carcinogenic could be screened out using QSAR techniques at the screening assessment. Health Canada has listed 28 epoxide-containing substances on the Maximal List (Table 13). Nevertheless, we found another 514 epoxide-containing

substances on the DSL not listed on the Maximal List (Table 14). We are not sure we found all epoxides on the DSL.

### **10.7 Primary aromatic amines**

A very high proportion of primary aromatic amine containing organics has been found to be carcinogenic. Therefore, it would be prudent to consider such substances inherently toxic and identify them as categorized "in." The ones that are probably not carcinogenic can be set aside using SAR techniques at the second screening step. Health Canada included 41 primary aromatic amines on the Maximal List (Table 15). We found another 753 primary aromatic amine-containing substances on the DSL that were not on the Maximal List (Table 16). Due to the limited resources and time, all primary aromatic amines on the DSL may not have been captured.

There are other sources of primary aromatic amines. They can be created from aromatic amides and aromatic azo-compounds naturally via abiotic and biotic processes. There are several amides and azo-compounds on the Maximal List and the reason for the toxicity of many if not most of these substances is that they degrade into primary aromatic amines. There are 10 amides on the Maximal List that can degrade to primary aromatic amines (Table 17). We found another 300 amides that can degrade to primary aromatic amines on the DSL (Table 18). At this time we have not identified the azo containing substances that can give rise to aromatic amines.

### **10.8 Nitro aromatic substances**

A very high proportion of nitro aromatic substances have been found to be carcinogenic. Therefore, it would be prudent to treat the class of substances as carcinogenic unless shown otherwise. The ones that are probably not carcinogenic can be screened out using SAR techniques at screening assessment.

Health Canada has so far listed 21 nitro aromatics on the Maximal List (Table 19). In our review of the DSL, approximately 715 nitro aromatic substances on the DSL are not listed on the Maximal List (Table 20). We are not sure though we found all nitro aromatic substances on the DSL.

### **10.9 Likely estrogen mimics**

Estrogen mimics are usually found to be carcinogenic when tested. Substances with two electronegative atoms on a rigid structure and 9.8-12.5 angstroms apart are usually estrogenic and carcinogenic (Purdy, Env Health Per **104**(supp5) 1085-1094, 1996). This observation is also the basis of the QSAR model provided to many regulators including Environment Canada by Ovanes Mekenyan.

Substances that meet these criteria should be categorized in because a great many of them are likely to be carcinogenic and endocrine disruptors. Further evaluation can be done at screening assessment with carcinogenic and estrogenic SAR techniques. We

incompletely scanned the Maximal List and DSL for such substances. The list contained 24 likely estrogen mimics (Table 21). The DSL contained another 1057 estrogen mimics (Table 22). In our review, we are not sure if all estrogen mimics on the DSL were identified.

A review of the DSL for the above listed substances would be important to determine if there are other substances that should be considered inherently toxic to humans and that belong on the Maximal List. Many of these substances will be missed by a SimHaz assessment because they have not been adequately studied or have not been assessed.

For those substances from the above classes that Health Canada deems to be either not inherently toxic to humans or not eligible for categorization, transparent reporting on the rationale for their exclusion should be available.

**Recommendation 32: Health Canada should ensure that all substances from the above classes that are persistent or bioaccumulative and inherently toxic to humans are categorized “in.” Where substances in certain classes tend to be carcinogenic or have other reasons for being inherently toxic to humans, Health Canada should be more likely to designate other substances in the same class inherently toxic.**

**Recommendation 33: The integrated framework should include a consideration of degradation products, for example primary aromatic amines. The DSL should be reviewed for substances that are precursors to carcinogens and other toxins, like azo-containing ones that can hydrolyze to aromatic amines.**

**Recommendation 34: Environment Canada and Health Canada should prepare an annual report that summarizes the government's use of the seven feeders and provide information about its effectiveness as a CEPA tool for identifying, assessing and managing substances.**

## 11.0 The Path Forward

It is encouraging that Health Canada has been thinking about prioritization for screening assessment throughout the categorization process. There will be much work to do post-2006. A clear list of substances that have been categorized “in” for screening assessment is needed and a well-organized plan for moving forward at that point, tackling the likely worst actors first.

Post-2006 work on existing substances should be in consultation with stakeholders and closely integrated with Environment Canada's work. Most importantly, we need assurance that substances categorized “in” as P or B and inherently toxic to the non-human organisms by Environment Canada will all be assessed for their potential risk to human health. All categorized “in” substances need screening assessments by both Ministries similar to the Priority Substances Program process.

We believe as well that the post-2006 approach should reflect a mandatory reverse onus obligation whereby government departments require toxicity data from industry in order to demonstrate that substances pose no harm. In addition, priority should be given to the development of safe alternatives and to industries which employ clean technologies.

By 2016, we recommend that any substances that still pose an indeterminate risk (i.e. lack toxicity data) should be eliminated from the DSL and subject to the New Substances Notification requirements prior to further use. Furthermore, a subsequent, supplementary categorization and screening of the DSL should be planned post-2006, based upon those endpoints that are absent from, or inadequately incorporated into, Environment Canada's and Health Canada's current approach such as endocrine disruption. These steps are critical to ensuring that the path forward leads to the concrete elimination and reduction in use and generation of toxic substances.

Our recommendations for the path forward can be summarized as follows:

1. The legislative requirements for work beyond 2006 should be clearly articulated to include the following components.
2. All substances categorized for screening assessment must have an evaluation for both their toxicity to humans and the ecosystem.
3. By 2016, any substances that still lack toxicity data should be eliminated from the DSL and subject to the New Substances Notification requirements prior to further use.
4. A subsequent, supplementary categorization and screening of the DSL should be planned post-2006, based upon those endpoints that are inadequately incorporated into the current approach. For example, endocrine disruptors, neurotoxicity to humans and non human organisms.
5. Health Canada and Environment Canada need to clearly define their post-2006 responsibilities and objectives and state how the two departments will co-ordinate their efforts.
6. The Ministries should identify how other aspects of assessment and management activities will be integrated into the priorities for post-2006 work on categorization and data collection.
7. Clear timelines are needed.
8. Stakeholders and opportunities for stakeholder involvement need to be identified at the outset. As soon as possible, an expert multi-stakeholder group should be established to oversee the steps leading up to 2006 and beyond; the group should include adequate representation from ENGOS.
9. Details are needed on how the various feeders are being integrated, and how effective they are expected to be at filling the gaps identified.
10. Mechanisms should be developed to measure the effectiveness of the approach adopted.
11. Transparent public reporting out on progress is a required element of this effort.

**Recommendation 35: Members of the CEN Toxics Caucus support and encourage active engagement in discussions with Health Canada and Environment Canada as the departments develop a program on DSL substances beyond 2006.**

**Recommendation 36:** By 2016, any substances that still pose an indeterminate risk should be eliminated from the DSL and subject to the New Substances Notification requirements prior to further use.

**Recommendation 37:** A subsequent, supplementary categorization and screening of the DSL should be planned post-2006, based upon those endpoints that are absent from or inadequately incorporated into, Environment Canada's and Health Canada's current approach, including carcinogenicity, chronic toxicity, and endocrine disruption.

## **12.0 List of Recommendations**

The following is a complete list of recommendations contained in this submission.

**Recommendation 1:** Member organizations of the Toxics Caucus emphasize the importance of establishing a strong categorization framework that effectively identifies *all potentially* toxic substances, in particular those substances that meet Greatest Potential for Exposure and those substances that are persistent, or bioaccumulative and inherently toxic (to humans or non human organisms). Categorization in itself is only an initial step and therefore needs to be precautionary and inclusive.

**Recommendation 2:** ENGOS support on-going efforts by Environment Canada and Health Canada to coordinate and communicate on their categorization process to ensure that issues relating to categorization approaches are addressed in a timely and an effective manner.

**Recommendation 3:** The finalization of Health Canada's categorization should include ongoing communication with and participation from ENGO representatives to ensure a mutually acceptable outcome that address issues raised by ENGOS.

**Recommendation 4:** A multi-stakeholder expert group should be formally established to address the path forward plans for substances following the completion of categorization in 2006.

**Recommendation 5:** Figure 5 should be revised to demonstrate accurately that there are two routes to screening assessment: GPE, and P or B and iT to humans.

**Recommendation 6:** Health Canada's categorization process should, according to the CEPA, categorize "in" for screening assessment all substances deemed to be of GPE regardless of their hazard.



**Recommendation 7:** Health Canada's categorization should, according to CEPA, categorize "in" for screening assessment all substances found to be P or B and iT to humans.

**Recommendation 8:** ENGO's request the development of two separate lists for clarity: one for substances meeting the GPE criteria and the other for substances meeting the P or B and iT criteria.

**Recommendation 9:** The criteria for substances to be considered GPE should be reviewed to ensure that all substances on the DSL that show a potential for exposure are adequately considered for further screening.

**Recommendation 10:** Health Canada should use an alternative method for determining Greatest Potential for Exposure through SimET that includes more to the highest exposure substances used in Canada.

**Recommendation 11:** Available information on human body burden should be included as an indication of GPE.

**Recommendation 12:** When assessing exposure Health Canada should look at classes of substances with similar mechanisms of action to determine aggregate exposure.

**Recommendation 13:** The ComET tool should be used to find GPE substances that may be missed by SimET, not to reassess substances captured by SimET and potentially remove them from the Maximal List. We object the application of the ComET at this stage of categorization for the purposes of refining the final list of substances for exposure potential before being included on a Maximal List.

**Recommendation 14:** The ComET tool should include dust in its exposure assessment for DSL substances because it is an important exposure route, particularly for children.

**Recommendation 14:** Health Canada's integrated framework should acknowledge the importance of persistence and bioaccumulation in substances' potential toxicity to humans.

**Recommendation 15:** Those substances that meet the criteria for P and B should be identified and placed on a new and distinct list for earlier consideration as POPs.

**Recommendation 16:** Substances found on the rigorously chosen lists used for SimHaz should be accepted as inherently toxic to humans and not go through further weight of evidence assessment before being accepted.

**Recommendation 17:** All substances deemed to be P or B but not ecologically iT and which have not been found iT to humans by SimHaz, should have a ComHaz

**assessment to determine human inherent toxicity. SimHaz evaluation is not sufficient for these DSL substances**

**Recommendation 18: Substances that have qualified as inherently toxic through the SimHaz process should not be required to undergo a ComHaz evaluation to be considered for the Maximal List; they should automatically be accepted as inherently toxic to humans and if P or B should be sent to screening level risk assessment or for risk management actions.**

**Recommendation 19: Substances categorized in by Health Canada should be available in the form of three sub-lists: 1) Those meeting the GPE criteria, 2) Those that are P and/or B and iT to humans, and 3) Those that are uncertain due to a lack of data.**

**Recommendation 20: Health Canada's post-2006 activities should include amongst its priorities, generation of data for substances "set aside" in the categorization process. Recommendation 21: Health Canada, in coordination with Environment Canada, should outline the process and criteria by which it identifies polymers and UVCBs that require P or B data from Environment Canada.**

**Recommendation 22: The ComHaz assessment should be applied to all polymers and UVCBs to determine their iT to humans.**

**Recommendation 23: Uncertain substances lacking useful data or models should be categorized "in" for further consideration and data collection.**

**Recommendation 24: Where there are no data or only low quality data available for a substance, the onus should be placed on industry to supply the required information within a reasonable timeframe.**

**Recommendation 25: Industry should be required to report what studies they are conducting and when the results will be available. This would support transparency in the process.**

**Recommendation 26: Health Canada should develop strong guidelines for information submitted under Section 70 of CEPA 1999. The guideline development process should include effective public participation.**

**Recommendation 27: Health Canada should include information and context as to how neurotoxicity, endocrine disruptors and immunotoxicity will be addressed under ComHaz tool and in the proposed integrated framework.**

**Recommendation 28: Health Canada should commit to a systematic review of DSL substances for endocrine disrupting potential as substantiated SARs or screens become accessible (either pre- or post-2006).**

**Recommendation 29:** Adequate time and resources should be devoted to the advancement of an endocrine disruptor database, and, where necessary and appropriate, industry should be required to supply further test data to help inform evaluators and assist in the substantiation of QSARs.

**Recommendation 30:** ComHaz evaluations and later screening assessments must be adequately protective of children and other vulnerable populations. If Margin of Exposure methods are used to define toxicity and direct risk management decisions on substances, they must be at least equivalent to adding an additional 10-fold safety factor for children.

**Recommendation 31:** Though weight of evidence determinations are an integral and important part of assessments, they should not be used in the categorization phase when carcinogenicity or other conclusions of inherent toxicity have already been made.

**Recommendation 32:** Health Canada should ensure that all substances from the above classes that are persistent or bioaccumulative and inherently toxic to humans are categorized "in." Where substances in certain classes tend to be carcinogenic or have other reasons for being inherently toxic to humans, Health Canada should be more likely to designate other substances in the same class inherently toxic.

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**Recommendation 36:** By 2016, any substances that still pose an indeterminate risk should be eliminated from the DSL and subject to the New Substances Notification requirements prior to further use.

**Recommendation 37:** A subsequent, supplementary categorization and screening of the DSL should be planned post-2006, based upon those endpoints that are absent from or inadequately incorporated into, Environment Canada's and Health Canada's current approach, including carcinogenicity, chronic toxicity, and endocrine disruption.

## **13.0 Conclusions**

The ENGOs recognize that significant resources that have been expended in the past five years by Health Canada and Environment Canada to undertake categorization of the entire DSL. Section 73 of CEPA set out an ambitious agenda for assessing and managing substances in Canada in light of the limited data on substances that currently exist. Jurisdictions outside of Canada await for the results of this program. In light of this requirement, ENGOs want to ensure that the CEPA requirements are upheld and that all substances that meet the criteria outlined in CEPA are captured for further screening assessments after 2006.

The comments submitted by the ENGOs are intended to assist Health Canada to identify and address gaps as they complete the categorization work. It also provides a foundation from which to develop the coordinated activities post 2006. ENGOs have clearly articulated a need to apply a more precautionary approach to its categorization exercise for both exposure potential and inherent toxicity.

The ENGO vision is one of a marketplace where all substances in use have data to reassure Canadians that they are safe enough. Manufacturers and importers need to become responsible for demonstrating this safety. Categorization is a first step in a many stage process enroute to the management of substances in commerce. There are additional stages where a substances hazard or safety will be assessed. As a first screen, categorization should therefore be “sensitive,” and seek to include all eligible substances. Subsequent stages will be more “specific” and eliminate those not likely to be harmful.

We are concerned that Health Canada’s categorization process does not adhere to the inclusive and precautionary framework set out by the legislators. In interpreting the intent of the legislation, Health Canada’s methodology seeks to exclude substances that by law are to be categorized in. There is a clear role for prioritization once categorization is complete, but not for the elimination in advance of substances that should be categorized in.

A major point of disagreement with Health Canada’s philosophy is with the department’s position that persistence and bioaccumulation are not as important for human health as the legislation sets out. We are concerned that this will lead to the exclusion of substances that need a screening assessment.

CEPA creates two clear sets of criteria for categorization for screening assessment, Greatest Potential for Exposure and being either persistent or bioaccumulative and also inherently toxic. Health Canada’s proposed integrated framework mixes these two streams evaluating high exposure substances for hazard and inherently toxic substances for their exposure potential before categorizing them. There is no basis for this in the legislation.

Assignment of a substance as Greatest Potential for Exposure is primarily done through SimET, which we continue to find overly restrictive. Alternative methodologies that capture a larger percentage of substances would make a more reasonable first screen for high exposure. Exposure can occur through many routes including consumer products and house dust. The Ministry's framework should account for this. ComET could be used to keep from missing other important substances, but instead ComET appears to be designed to further reduce the GPE list.

The inherent toxicity stream is not sufficiently inclusive either. Persistence and bioaccumulation are important characteristics that increase the likelihood a substance will reach toxic levels. It is therefore extremely important that all P or B substances that have not already been categorized "in" by Environment Canada have a robust toxicity assessment. SimHaz is not sufficient. A ComHaz assessment that evaluates the full hazard potential of a substance is indicated. Where there is a significant lack of data, P or B substances should be categorized "in."

There are aspects of toxicity that have not been adequately captured though, even by ComHaz. Endocrine disruption, neurotoxicity, immunotoxicity and teratogenicity are not well covered by Health Canada's present evaluation. If these aspects are left out at this

stage, there is no guarantee that the various feeders will adequately consider these health endpoints in a timely manner. These substances, in effect, will be excluded from any screening level risk assessment if excluded from the ComHaz framework, even if progress is made scientifically in these areas.

Even for those parts of the hazard evaluation that are emphasized in ComHaz, like carcinogenicity, our work has found many potential and probable carcinogens that have not been captured. Those that are persistent or bioaccumulative should be added to the Maximal List. In addition to the sections in the report that cover missing substances, tables have been attached.

Finally, this submission outlines our expectations for the post-2006 period. ENGO's propose a multi-stakeholder group to provide input and feedback to post-categorization assessments. As well, we propose that by 2016, substances that still have no data to provide some reassurance of safety be deleted from the DSL. After that point, if anyone wants to use the substance in Canada they would be required to resubmit it via the New Substances Notification Program.

We hope that this submission will help Health Canada create a strong and protective framework for meeting CEPA's categorization requirements. Our goal, and hopefully the Ministry's as well, is a precautionary, inclusive and defensible categorization process that is the beginning of a new level of protection of Canadians from toxic substances.

## **Appendix**

See separate attachment - Results of the Review of the Maximal List.