INFORMATION BULLETIN

Issue No. 1

This series of Information Bulletins are designed to assist in understanding the *Hazardous Materials Information Review Act* (HIMRA) and *Regulations* (HMIRR) and the procedures followed by the Hazardous Materials Information Review Commission.

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- **Generic Chemical Identity**
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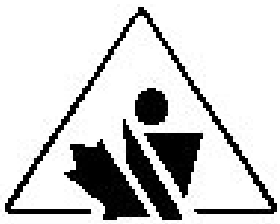
- responses to frequently-asked questions, including claim withdrawals, change in product ownership and its impact on claims for exemption, and the nature of the bibliography required by Paragraph 8(5)(b) of the Regulations **(Issue No. 2).**
- expiration of a 3-year trade secret exemption and reapplying for a trade secret exemption **(Issue No. 3);**
- background information, security measures, procedures for filing claims, and common questions and answers **(Issue No. 4)**.

A. INTRODUCTION

The *Hazardous Products Act* (HPA) in Section 16 indicates that when a supplier is exempt from disclosing the chemical identity of a controlled product or an ingredient in a controlled product under the HMIR - "the supplier shall disclose on the material safety data sheet or label the **generic chemical identity** of the controlled product or ingredient with as much precision as is consistent with the exemption. "

This is the extent of the guidance in the HPA or HMIRR regarding this concept. Nevertheless, it is clearly the intent of the Act that **a generic chemical identity (GCI) is a chemical name** which is less specific than the chemical identity, but no more general than is necessary to protect the supplier from disclosing the confidential business information (CBI).



From discussion with claimants and general observations, it is clear that there may be various reasons why a supplier chooses to claim for exemption from disclosure of chemical identity. The obvious one is to protect the formulation from their competitors. Another one, however, is to avoid disclosing the precise ingredient(s) to the downstream supplier or user. This is particularly evident when the product is a single ingredient or a simple mixture. An employer, on the other hand, may have different reasons for not disclosing chemical identity. The nature of the CBI could definitely affect the extent of masking required. Only recently, in Part IV of the revised "Form 1- Claim for Exemption", has the Commission asked the claimant to explain in what way the GCI is as precise as is required by the HPA. It is hoped that the explanation will also provide the underlying reason(s) for claiming the exemption, that is, specify the nature of the CBI.

The acceptability of GCI is determined by the Commission as part of the review process of the claim for exemption. After more than two years of reviewing GCI at the Commission, considerable experience has been gained in the application of this concept. While there may be no single correct GCI for an ingredient depending on the nature of the CBI and the approach used for masking, there are clearly good GCI and unacceptable GCI. The objective of this Bulletin is, therefore, to discuss various approaches of developing GCI and to provide examples of chemicals similar to those used on material safety data sheets (MSDS) currently in the workplace.

The usual approach is to mask some part of the actual chemical name providing a degree of anonymity or ambiguity but, at the same time, retaining some part of the parent structure of the chemical and certain important radicals to provide some link with the hazard information disclosed on the MSDS. In some cases such as for surfactants (described in more detail below), it may be expedient to start from a generic name of a chemical class and proceed towards more specification of the chemical identity until a GCI is arrived at which is as precise as it can be and still maintains the CBI. To a great extent, the level of comfort of a supplier for the GCI depends on how many similar chemicals with the same GCI (and with similar properties which are required to be disclosed) are commercially available and could have been used in the product (at least in functional terms).

B. CHEMICAL NOMENCLATURE AND GCI

The process of generating a GCI is to some extent a creative one, but it should be based on the principles of good chemical nomenclature. The two most common approaches of systematic nomenclature are the International Union of Pure and Applied Chemistry (IUPAC) and the Chemical Abstracts Service (CAS). Before the existence of these organizations, many chemicals were already known by names which are now referred to as "trivial names". These names were generally based on the natural source of the chemical at the time of discovery and, especially in the case of organic chemicals, were often coined before anything was known about their molecular structure. Many trivial names, e.g. choline, aniline or toluene, have been approved by IUPAC, whereas they have been systematized by CAS to names based on the parent structure (e.g. 2-hydroxyN,N,N-trimethylethanaminium, benzenamine and methylbenzene, respectively). Some trivial or common names of inorganic chemicals such as muriatic acid, slaked lime or soda ash are still used today in industry and popular literature,

but are more properly referred to by their chemical names - hydrochloric acid, calcium hydroxide and sodium carbonate.

From the point of view of the discussion of GCI, it is useful to differentiate between the two major groups of chemicals, inorganic and organic. In the following discussion, the words in bold-face are acceptable as GCI or as part of GCI. Because of the sheer number of chemicals in the group and the nature of products in commerce, it is not surprising that organic chemicals are more commonly the subject of claims for exemption from disclosure of chemical identity.

The simplest organic chemicals are saturated acyclic or straight chain hydrocarbons referred to generically as **alkanes**. Unsaturated hydrocarbons are **alkenes** (also referred to as **olefins**) or **alkynes** (or **acetylenes**) depending on whether there are double or triple bonds present in the parent structure. When these hydrocarbons exist as radicals (i.e. side groups on a parent structure), the prefixes **alkyl-**(or **alkan**-), **alkenyl**-(or **alken**-), and **alkynyl**-(or **alkyn**-) can be used. The descriptor **aliphatic** applies to the whole group of straight chain and branched hydrocarbons regardless of whether the structure is saturated or unsaturated. The term **alicyclic** describes both saturated and unsaturated cyclic hydrocarbons (but not **aromatics**). **Aliphatic** and **alicyclic** are very general names and should only be used as part of a GCI if a more specific name would reveal the CBI. Benzene and other related unsaturated ringed hydrocarbons can be referred to as **aromatic** or **aryl** (generally if they are a radical) or **arene** if they are the parent structure. The use of the term carbocyclic which includes **allcyclic** and **aromatic** structures should be avoided. Carbocyclic structures with more than two fused rings may include the term **polycyclic** in the GCI.

It is somewhat more difficult to generate GCI for heterocyclic organic chemicals or heterocycles, i.e. rings consisting of carbon and another atom(s) such as oxygen, nitrogen or sulphur. The simplest examples of rings which include oxygen are oxirane (ethylene oxide) and methyloxirane (propylene oxide). When these chemicals are used to alkoxYlate other chemicals such as amines or alcohols, the reaction products are referred to as **alkanolamines** and **alkoxylates** respectively. Rings containing oxygen can be called by their trivial name (e.g. furan) or by the more generic name **cyclic ethers**; those containing nitrogen can be named based on their trivial name (e.g. imidazoline, lactam) or, for example, as **cyclic (di)amine** and **cyclic amide;** whereas those with sulphur (e.g. thiophene) could be referred to as **cyclic thioethers**. When the hydroxyl of the carboxyl group of an acid has been replaced (e.g. acetyl chloride), the acid group can be referred to as **acyl** (e.g. **acyl halide**). Other trivial names such as **glycol** and **terpene** can be used to generate GCI such as **alkylene glycol ether** (for comparison, this would be equivalent to the GCI based on its systematic name, **alkoxyalkanol)** and **cyclic terpene**. Some trivial names may be used directly as GCI where the basic linkage is known, but the precise structure of the reaction product(s) is not known (e.g. **Schiff base** from condensation of ketones or aldehydes with primary amines). The use of terms such as dibasic acid, polyhydric alcohol, tertiary amine, etc. should be avoided unless a more specific name would reveal the CBI.

Petroleum-based complex mixtures may have GCI such as **naphtha** (generally with a descriptor such as **light** or **heavy**) or **petroleum distillate**. For complex mixtures involving

long chain **carboxylic acids** derived from animal or vegetable fats and oils, GCI such as **fatty acids** (and the related derivatives **fatty alcohol**, **fatty amine**, **fatty ester**, etc.) can be used. Petroleum-based fatty acids are generally referred to as **naphthenic acids**. Generic terms and phrases such as **(per)fluorocarbon**, **siloxane**, **phenolic epoxy resin**, **acrylate resins** (which could include methacrylates), etc. are acceptable for GCI, whereas organophosphorus, organosulphur, epoxy resin, etc. are not acceptable.

The approach used to designate the presence of certain functional groups or radicals on a chemical structure may vary depending on whether they are a terminal group or occur within the structure (see Example 1). If it is a terminal group, it may be identified generically as a term (e.g. **ester**, **alcohol**, **aldehyde**, **salt**) or as an appropriate syllable (**-oate** or **alkoxy-**, **-ol**, **-al**, **-ate**). If a radical is not a terminal group, the appropriate term could be used (e.g. **ketone**, **azide**, **ether**, **halide**, **oxide**, **alcohol**, **amine**) or the respective syllable (e.g. **keto-** or **oxo-**, **azo-**, **oxa-**, **halo-**, **epoxy-**, **hydroxyl-**, **amino-**) with the actual position on the straight chain or ringed parent structure masked. Not all groups or radicals have a suitable prefix or suffix syllable (e.g. **oxime**, **acid anhydride)**. If there are more than two of the same radical, then the addition of the prefix **poly-** should be considered. The fact is that many of the organic CBI ingredients are reaction products, so the chemistry that must be reflected by a GCI is often much more complex. It is likely, in some cases, that even if the precursor ingredients were disclosed, it would be very difficult - if not impossible - for a competitor to reproduce the precise reaction products because of the complexity and secrecy of the manufacturing process itself. Nevertheless, if a GCI must be generated for such an ingredient where the precise structure of the reaction product is not known, the best approach is to provide GCI for the precursor ingredients (see Example 4 below).

Because of the relative ease of qualitative analysis of inorganics, it would normally be a simple matter to determine, for example, which cation(s) and anion(s) are in a mixture. Nevertheless, when the claim for CBI does involve <u>inorganic</u> chemicals, it is clear that there is not very much flexibility or choices of alternative GCI. The GCI of such simple inorganic substances as those used in the example of trivial names at the beginning of this section would be **inorganic** or **mineral acid**, **inorganic base** and either **sodium salt** or **carbonate salt**. The metal portion of an inorganic chemical could be masked by using the term **alkali**, **alkali earth**, **rare earth** or **transition metal** (or, in some cases, just **metal**). For the nonmetals, most should probably be unmasked in terms of their presence in the ingredient (e.g. boron, silicon, sulphur, etc.), but the position or precise linkage could be masked. The other two major groups of nonmetals could be masked in GCI as **halides** and **noble** or **inert gases**.

C. DERIVATION OF GCI BY MASKING CHEMICAL IDENTITY

1. <u>Starting point</u>

The most obvious approach of obtaining a GCI is to mask some part of the actual chemical name of the CBI ingredient. The choice of the chemical name used as the starting point is often important. It should be unique and unambiguous, i.e. generally, a systematic chemical name should be used. Of the two common systems of nomenclature, the CAS names appear

to be more difficult to mask than IUPAC names. On occasions, non-systematic names such as trivial names can be used for masking purposes.

2. Masking procedure

Masking can be a relatively simple process of substituting or in some cases eliminating part of the starting name.

EXAMPLE 1: The IUPAC name - 2,2,3,3,4,4,5,5,6,6,6-Undecafluoro-N,N-bis(2-hydroxyethyl)hexanamide

A series of masked names or GCI can be generated depending on what portion of chemical identity is trade secret:

(a) the position and number of fluorine atoms can be masked using **polyfluoro-**, or
(b) the position, number and type of halogen can be masked using **polyhalo-**,
(c) the parent structure and its primary functional group (hexanamide) can be masked using **alkanamide**, and
(d) the presence and number or other functional groups on the nitrogen can be masked using such phrases as **N-bis**(**hydroxyalkyl**), **N-bis**(**alkyl**), **N-hydroxyatkyl**, or more general names such as **N-bis**(**substituted**), or **N-**(**substituted**). Normally, the presence of an important radical (e.g. **amide**) should not be masked, nor the fact that all of the hydrogens on the amine have been substituted (hence, "tertiary"). The choices of GCI (depending on what part(s) of the structure is trade secret) could range from masking some or most components (e.g. **polyfluoro-N**,**N-bis**(**hydroxyalkyl**)**alkanamide** or **polyfluoro-N-**(**substituted**) **alkanamide**) to more general names such as **N-**(**substituted**) **polyhaloalkanamide**, or **polyhaloalkanamide**.

EXAMPLE 2: Hydrogenated palm-oil fatty acids, esters with D-Mannitol, ethoxylated

Using the same basic approach, hydrogenation, the type of fatty acids, the Mannitol and/or the ethoxylation could be masked generating GCI such as the least specific GCI **hydrogenated fatty acids**, **esters with polyhydroxyalkane**, **atkoxylated**.

EXAMPLE 3: Sodium dimethylbenzene sulphonate

Using a CAS name, the following parts of the name could be masked: the cation, the specific alkyl and the number of alkyl groups, the aryl group, and - in an extreme case - even the presence of the alkyl group. It should be noted that the parent group, benzene or aryl, must not be dropped from the GCI. Choices of GCI include **dialkylarylsulphonate**(**salt**), **alkylarylsulphonate**(**salt**), **aryisulphonate** (**salt**).

EXAMPLE 4: 2-Propenoic acid, 3-hydroxypropyl ester, polymer with chlorethene and ethenyl acetate

Since there is no chemical name for the reaction product, the CAS name provides the three precursor ingredients. The GCI should follow the same approach. Substituting reasonable GCI for each of the precursors, the GCI could be **Poly**(**acrylate alkyl ester**/**chloralkene**/**carboxyfic acid ester**). Where more than one acrylate ester occurs in the polymer, a number in brackets could be used to indicate this fact, preceded by "acrylate esters".

D. DERIVATION OF GCI FROM CHEMICAL CLASS

The second useful approach to generate GCI is to begin with the chemical class of the CBI ingredient. The objective is the same as the masking approach, that is to obtain the most precise GCI which is consistent with the exemption. Assume, for example, that the CBI ingredient is an anionic surfactant. There are four broad classes of anionic surfactant: sulphates, sulphonates, carboxylates and phosphates. For the purpose of the HMIRR (i.e. dealing with the grouping of products for fee purposes), these classes could be considered as <u>generic names</u>. As in this example, generic names are not specific enough to be used as GCI. Within each of these classes may be one or more specific types of surfactant based on their structural similarity. The types could be considered for the purposes of WHMIS as potential GCI. The fact is that it may be possible to provide a GCI with more specificity of structure, particularly for the quaternary ammonium derivatives where the parent structure is, for example, pyridine or a **cyclic amine**.

1. Anionics - includes sulphate types such as **fatty acid sulphates** and **fatty alcohol sulphates**; sulphonate types - **alpha-olefin** or **aliphatic sulphonates**, and **atkylaryl sulphonates** (**as acids** or **salts**); carboxylate types include **sulfosuceinates** and **sarcosines;** phosphate types include **amide phosphates and atkoxy phosphates;** and metallic soaps (formed by metals heavier than sodium, e.g. cobalt, lead, zinc, etc.)

2. Nonionics - includes esters (e.g. **sorbitan esters**, **polyglycol/fatty acid esters**, **glycerides**); alkoxylates (e.g. **fatty alcohol**, **alkylphenol** and **amide alkoxylates**, **block polymers**); and alkanolamides (e.g. **fatty acid alkanolaides**).

3. Cationics - includes quaternary ammonium derivatives (e.g. **aliphatic**, **aromatic** and **heterocyclic quaternaries** and their respective **salts** such GCl as **benzalkonium chloride** or **alkylaryl quaternary salt**); amidoamines (e.g. **amidoamine salts** and **oxides**); and betaines (e.g. **N-alkylbetaines**).

4. Ampholerics - includes imidazoline derivatives (e.g. **imidazoline sulphonates** and **imidazoline carboxylates**) and aminocarboxylates (e.g. **N-alkylaminocarboxylates**).

E. UNACCEPTABLE APPROACHES

1. <u>Use of non-chemical or functional terms</u>

   It is unacceptable to use terms such as dye, surfactant (even if qualified with the type such

as anionic, cationic, or nonionic), catalyst, binder, colorant, emulsifier, inhibitor, organic solvent, etc. as the GCI. Terms such as trade secret or proprietary should not be included in the GCI.

2. Use of 12seudochemical names or misleading names

It is unacceptable to use syllables or masked syllables from the conventional chemical nomenclature in a way that misrepresents the chemical structure or creates a name that would be enigmatic even to a person who had access to the CBI. This includes using inappropriate prefix and suffix syllables in the GCI when these radicals or functional groups are not present. Juxtaposing a series of simple chemical terms such as "oxo-alcohol ether sulfate", or using creative phrases such as "oxygenated ketone" should be avoided. The order of the components of the name should relate to the actual chemical name. For example, "alkylaryl halide" would be unacceptable if the halide is on the alkyl group (in which case, the GC1 would be more correctly **arylalkylhalide** or **haloalkylarene**). Similarly, "aminoalkanol" would be unacceptable when the CBI is a secondary or tertiary amine with olle or more alkanol groups. In this case, the preferred GCI would be **hydroxyalkylamine** or **alkanolamine**). Where the precise structure of the reaction product is known, the use of a name as a GCI based on the precursor or starting ingredient(s) of a reaction (e.g. ketoxime, acetylenic) would generally be considered too ambiguous (i.e. a generic name).

3. Use of long descriptive phrases or a list of atoms

It is unacceptable to refer to a specific chemical ingredient as, for example, a "long chain hydrocarbon containing sulphur and nitrogen". The GCI should include some aspect of the chemical structure, as well as one or more functional groups or radicals e.g. **sulphurized fatty alkanolamine**

For more information about the topic covered in this Information Bulletin or how to file a claim for exemption, please contact:

Hazardous Materials Information Review Commission
200 Kent Street, Suite 9000
Ottawa, Ontario
K1A OM1
Telephone: (613) 993-4331
Fax: (613) 993-4686
www.hmirc-ccrmd.gc.ca

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