SCHEDULE I

(Section 12)

INFORMATION TO BE DISCLOSED ON A MATERIAL SAFETY DATA SHEET

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ANNEXE I

(article 12)

RENSEIGNEMENTS À DIVULGUER SUR LA FICHE SIGNALÉTIQUE

	Column I	Column II	Column III		Colonne I	Colonne II	Colonne III
Item	Category	Suggested Headings	Information in respect of controlled products	Article	Catégories	Rubriques recommandées	Renseignements sur les produits contrôlés
1	Hazardous Ingredients	Hazardous Ingredients	(1) Information required by subparagraphs13(*a*)(i) to (iv) of the Act (2) CAS registry number and product identification number (3) LD_{50} (species and route) (4) LC_{50} (species and route)	1	Ingrédients dangereux	Ingrédients dangereux	(1) Renseignements devant être divulgués en vertu des sous-alinéas 13*a*)(i) à (iv) de la Loi (2) Numéro d'enregistrement CAS et numéro d'identification du produit (3) DL_{50} (préciser l'espèce et la voie d'administration) (4) CL_{50} (préciser l'espèce et la voie d'administration)
2	Preparation Information	Preparation Information	(1) Name and phone number of the group, department or party responsible for the preparation of the material safety data sheet (2) Date of preparation of the material safety data sheet	2	Renseignements sur la préparation	Renseignements sur la préparation	(1) Nom et numéro de téléphone du groupe, du service ou de la partie responsable de la préparation de la fiche signalétique (2) Date de la préparation de la fiche signalétique

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Item	Column I Category	Column II Suggested Headings	Column III Information in respect of controlled products	Article	Colonne I Catégories	Colonne II Rubriques recommandées	Colonne III Renseignements sur les produits contrôlés
3	Product Information	Product Information	(1) Manufacturer's name, street address, city, province, postal code and emergency telephone number (2) Supplier identifier, the supplier's street address, city, province, postal code and emergency telephone number (3) Product identifier (4) Product use	3	Renseignements sur le produit	Renseignements sur le produit	(1) Nom du fabricant, numéro et nom de rue, ville, province, code postal et nº de téléphone en cas d'urgence (2) Identificateur du fournisseur, numéro et nom de rue, ville, province, code postal et nº de téléphone en cas d'urgence (3) Identificateur du produit (4) Usage du produit
4	Physical Data	Physical Data	(1) Physical state (i.e.: gas, liquid or solid) (2) Odour and appearance (3) Odour threshold (4) Specific gravity (5) Vapour pressure (6) Vapour density (7) Evaporation rate (8) Boiling point (9) Freezing point (10) pH (11) Coefficient of water/oil distribution	4	Caractéristiques physiques	Caractéristiques physiques	(1) État physique (gaz, liquide ou solide) (2) Odeur et apparence (3) Seuil de l'odeur (4) Poids spécifique (5) Tension de vapeur (6) Densité de la vapeur (7) Taux d'évaporation (8) Point d'ébullition (9) Point de congélation (10) pH (11) Coefficient de répartition eau/huile

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Item	Column I Category	Column II Suggested Headings	Column III Information in respect of controlled products	Article	Colonne I Catégories	Colonne II Rubriques recommandées	Colonne III Renseignements sur les produits contrôlés
5	Fire or Explosion Hazard	Fire or Explosion Hazard	(1) Conditions of flammability (2) Means of extinction (3) Flash point and method of determination (4) Upper flammable limit (5) Lower flammable limit (6) Auto-ignition temperature (7) Hazardous combustion products (8) Explosion data—sensitivity to mechanical impact (9) Explosion data—sensitivity to static discharge	5	Risques d'incendie ou d'explosion	Risques d'incendie ou d'explosion	(1) Conditions d'inflammabilité (2) Moyens d'èxtinction (3) Point d`éclair et méthode de détermination (4) seuil maximal d'inflammabilité (5) Seuil minimal d'inflammabilité (6) Température d'auto-inflammation (7) Produits de combustion dangereux (8) Données sur l'explosibilité - sensibilité aux chocs (9) Données sur l'explosibilité - sensibilité aux décharges électrostatiques
6	Reactivity Data	Reactivity Data	(1) Conditions under which the product is chemically unstable (2) Name of any substance or class of substance with which the product is incompatible (3) Conditions of reactivity (4) Hazardous decomposition products	6	Réactivité	Réactivité	(1) Conditions d'instabilité chimique (2) Nom des substances ou des catégories de substances avec lesquelles le produit est incompatible (3) Conditions de réactivité (4) Produits de décomposition dangereux

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Item	Column I Category	Column II Suggested Headings	Column III Information in respect of controlled products	Article	Colonne I Catégories	Colonne II Rubriques recommandées	Colonne III Renseignements sur les produits contrôlés
7	Toxicological Properties	Toxicological Properties	(1) Route of entry, including skin contact, skin absorption, eye contact, inhalation and ingestion (2) Effects of acute exposure to product (3) Effects of chronic exposure to product (4) Exposure limits (5) Irritancy of product (6) Sensitization to product (7) Carcinogenicity (8) Reproductive toxicity (9) Teratogenicity (10) Mutagenicity (11) Name of toxicologically synergistic products	7	Propriétés toxicologiques	Propriétés toxicologiques	(1) Voies d'administration, notamment le contact avec la peau, l'absorption par la peau, le contact oculaire, l'inhalation et l'ingestion (2) Effets de l'exposition aiguë au produit (3) Effets de l'exposition chronique au produit (4) Limites d'exposition (5) Propriété irritante (6) Sensibilisation au produit (7) Cancérogénicité (8) Effets toxiques sur la reproduction (9) Tératogénicité (10) Mutagénicité (11) Nom des produits toxicologiquement synergiques
8	Preventive Measures	Preventive Measures	(1) Personal protective equipment to be used (2) Specific engineering controls to be used (3) Procedures to be followed in case of leak or spill (4) Waste disposal (5) Handling procedures and equipment (6) Storage requirements (7) Special shipping information	8	Mesures préventives	Mesures préventives	(1) Matériel personnel de protection à utiliser (2) Mécanismes techniques particuliers à utiliser (3) Mesures à prendre en cas de fuite ou de déversement (4) Élimination des résidus (5) Méthodes et équipement pour la manutention (6) Exigences en matière d'entreposage (7) Renseignements spéciaux en matière d'expédition

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Item	Column I Category	Column II Suggested Headings	Column III Information in respect of controlled products	Article	Colonne I Catégories	Colonne II Rubriques recommandées	Colonne III Renseignements sur les produits contrôlés
9	First Aid Measures	First Aid Measures	(1) Specific first aid measures	9.	Premiers soins	Premiers soins	(1) Premiers soins particuliers à administrer

The nine required headings may be given different prominence on the MSDS (i.e., some may appear as subheadings under another heading. However, all nine headings **must** appear on the MSDS; {ref.: PIS No. 13}.

DISCUSSION of SCHEDULE I

A product, material or substance is a controlled product if it meets any of the hazard criteria specified in Part IV of the *CPR*. A controlled product may be a "pure" substance, a tested mixture or an untested mixture. Section 33 of the *CPR* sets out the procedures for a supplier to establish whether or not a substance is a controlled product and does not apply to the determination of the information that must be disclosed on the MSDS.

> **Note:** Although the classification criteria specified in sections 34-66 of the *CPR* may provide a useful guideline for certain MSDS information, it is section 12 and Schedule I to the *CPR* which set out what information must be disclosed on a MSDS; paragraph 13(*a*) of the *HPA* sets out what ingredients are subject to disclosure on the MSDS; section 4 of the *CPR* specifies the concentration above which those ingredients must be disclosed.

The general format and content of material safety data sheets (MSDSs) is described in Section 12 of the *CPR*. The acceptability and use of the ILO 16 heading MSDS and equivalents is also described under Section 12. For information regarding changes or revisions to MSDSs, please refer to Section 29 of the *CPR*.

The Column II headings in this Schedule **may** be combined to form one heading provided that the information contained under the combined heading includes subheadings which are similar to the heading specified in Column II of Schedule I. A combined heading such as "Preparation and Product Information" is discouraged since preparation information relates to the MSDS preparation and not the product preparation. For example, "Fire and Explosion Hazard" may appear as a subheading under the heading "Physical Data"; {ref.: PIS No. 6}. Additional headings to describe categories of information other than the nine listed categories may appear on a MSDS.

The *CPR* will be amended to explicitly require that all Column III subitems which appear on an MSDS be addressed by disclosing the relevant information or by declaring that the information is "not available" or "not applicable", as appropriate. Simply disclosing "no" could be misleading and is not considered acceptable if the decision was based on the unavailability of information rather than on professional judgement; (see subsection 12(6) of the *CPR*). If a Column III subitem such as 5(7) is renamed from "Hazardous combustion products" to, for example, "Products evolved due to heat or combustion", then the MSDS should disclose the products evolved through heat as well as through combustion.

Item 1 - Hazardous Ingredients

(1) Information required by subparagraphs 13(*a*)(i) to (iv) of the Act - Please refer to Section 13 of the *Hazardous Products Act* and the interpretation / discussion there under.

(2) CAS registry number and product identification number - The CAS registry number must be disclosed for every ingredient that is subject to disclosure if one is available. A product identification number, PIN, (if available) is required for the product as a whole, i.e., not for individual ingredients; {ref.: PIS No.7}. The terms "CAS registry number" and "product identification number" are defined in section 2 of the *CPR*. CAS numbers are assigned to a specific chemical or grouping of chemicals sequentially. The CAS numbers enable a precise means of identifying a substance.

(3) LD_{50} (species and route) - The definition in section 2 of the *CPR* states that the LD_{50} "means the single dose of a substance...". A "greater than" LD_{50} or LC_{50} value is not, technically, a "single dose" and is usually the result of a "limit test". Greater than values, as per *CPR* 12(11), are considered to be other hazard information of which a supplier ought reasonably to be aware. Where a specific LD_{50} value is not available, suppliers may wish to disclose greater than values under this subitem and, in the case of a greater than LC_{50}, under subitem 1(4). If applicable and available, "less than" values may also be disclosed under these subitems.

As required by subsection 12(10) of the *CPR*, "where the LD_{50} or LC_{50} of a controlled product that is a mixture is determined by testing the mixture, the supplier shall disclose, on the MSDS for the controlled product, that LD_{50} or LC_{50} in place of the LD_{50} or LC_{50} of the ingredients of the mixture."

Although not mandatory, suppliers may wish to disclose "percent death" values if specific LD_{50} or LC_{50} values are not available.

(4) LC_{50} (species and route) - For the formulae to convert an exposure duration of other than four hours to an LC_{50} equivalent to a four hour exposure, please refer to section 44 of the *CPR*.

Item 2 - Preparation Information

This item requires the disclosure of information regarding preparation of the MSDS and not the product.

To avoid confusion, therefore, this heading should **not** be combined with the next item, i.e., "Product Information", to form a single heading.

(1) Name and phone number of the group, department or party responsible for the preparation of the material safety data sheet - This subitem requires the disclosure of information in respect of those responsible for the preparation of the MSDS--not preparation of the controlled product.

(2) Date of preparation of the material safety data sheet - As required by paragraph 29(2)(*b*) of the *CPR*, the date disclosed here may not exceed three years from the time of sale or importation.

Item 3 - Product Information[1]

(1) Manufacturer's name, street address, city, province, postal code and emergency telephone number - Please refer to subsections 12(8) and 12(9) of the *CPR* for a description of the circumstances where the name and particulars of the manufacturer need not be disclosed. An emergency telephone number must be disclosed if it is available, i.e., this subitem does **not** require a manufacturer to establish an emergency telephone number, {ref.: PIS No. 28}. If an emergency number is disclosed, it would also be helpful to users if the hours of operation and time zone are specified. It is not acceptable to disclose an emergency telephone number for which the caller will not be able to acquire information on the product.

(2) Supplier identifier, the supplier's street address, city, province, postal code and emergency telephone number - Please refer to subsection 12(7) of the *CPR* for a description of the circumstance where the supplier identifier and particulars of the distributor need not be disclosed. An emergency telephone number must be disclosed if it is available, i.e., this subitem does **not** require a supplier to establish an emergency telephone number. It is not acceptable to disclose an emergency telephone number for which the caller will not be able to acquire information on the product.

(3) Product identifier - As required by section 28 of the *CPR*, the product identifier that is disclosed on the label of the controlled product or container in which the controlled product is packaged must be identical to the product identifier that is disclosed on the MSDS for the controlled product. (The CPR does not stipulate an analogous requirement for the supplier identifier.) The term "product identifier" is defined in section 2 of the *CPR*. (**Note:** PINs have been replaced by "UN Number" in the Clear Language version of the *Transportation of Dangerous Goods Regulations* and it is anticipated that the definition for "product identification number" in the *CPR* will be replaced with "**UN number" has the meaning assigned to that term by the *Transportation of Dangerous Goods Regulations*. (*numéro UN*)**".

(4) Product use - The MSDS must specify the product use(s) intended by the manufacturer or supplier of the controlled product. (As suppliers cannot anticipate all possible uses of their products, thorough

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[1] At the December 1990 WHMIS stakeholder meeting, it was agreed to amend the *CPR* to require the disclosure of the WHMIS Class(es) on the MSDS including a statement to communicate that the product is a WHMIS controlled product. There was no agreement to require the disclosure of the Division(s) nor Subdivision(s).

information on toxicological properties should be provided without limiting such information to the hazards based on presumed use.

(*) Product Identification Number - When the *CPR* are amended, this Schedule will be amended to clarify that the CAS numbers are to be disclosed in respect of the ingredients and the PIN is to be disclosed in respect of the product; i.e., the reference to the PIN in subitem 1(2) will be deleted and added as subitem 3(5).

Item 4 - Physical Data

The physical data that must be disclosed, if available and applicable, is in respect of the product as a whole, not in respect of individual ingredients of the controlled product. It is not unusual to see physical data reported over a specific range of values or by using the terms "greater than" or "less than" a specific value since some tests are terminated after pertinent cut-off values are reached. Physical data must be disclosed to the degree of accuracy and precision that have been obtained from tests conducted on the product or as determined from the literature. The acceptability of the degree of accuracy reported for a physical measurement must be determined on a case-by-case basis.

Although values for "critical temperature" and "critical pressure" for compressed gases are readily available in the literature, the disclosure of such values is not mandatory.

(1) Physical state (i.e. gas, liquid or solid) - The physical state of the controlled product (solid, liquid or gas) at room temperature (20°C) must be disclosed. More precise descriptors may also be disclosed such as, for example, powder, paste or gel.

(2) Odour and appearance - Odour is a very subjective property, especially in the case of mixtures, and is subject to professional judgement. To ensure some degree of consistency, at least in the case of pure substances, suppliers should consult available literature such as the *Harper List of Terms for Scaling Odour Quality*.

(3) Odour threshold - is the lowest concentration, often expressed in ppm, of a material in air that can be detected by odour. Odour thresholds (OTs) are generally two to three orders of magnitude lower than mucous membrane irritation thresholds and therefore, from a health perspective, the use of OTs represents a more conservative approach. This approach also compensates for the hypoadditivity of odours.

(4) Specific gravity - is the ratio of the weight of a volume of a substance to the weight of an equal volume of water (usually at 4°C unless otherwise specified). Insoluble materials which have a specific gravity greater than 1.0 will sink in water. The majority of flammable liquids have a specific gravity of less than 1.0 and, if insoluble, will float on water. This can be a vital consideration for fire suppression and spill cleanup. Regarding the French version of Schedule I, «Densité» will be changed to read «Poids spécifique» when the *CPR* are amended.

(5) Vapour pressure - is the pressure exerted by a saturated vapour above its own liquid or a volatile solid in a closed vessel. It is a characteristic associated with liquids and some solids, like iodine, which have a tendency to sublime. Vapour pressure is usually expressed in millimetres of mercury (mm Hg) at 20°C and normal atmospheric pressure. A material with a high vapour pressure such as ether (440 mm Hg) will tend to evaporate more readily than one with a low vapour pressure such as water (17.5 mm Hg).

(6) Vapour density - is the weight of a given volume of vapour or gas compared to the weight of an equal volume of air. Materials lighter than air have vapour densities of less than 1.0. Materials heavier than air have vapour densities greater than 1.0.

(7) Evaporation rate - is the rate at which a material will vapourize in air from the liquid or solid state relative to the rate of vapourization of a reference material. The reference material is usually normal butyl acetate with an evaporation rate designated as 1.0. For gases, "evaporation rate" is not applicable; for liquified gases, the rate of evaporation is rapid enough so as to render the term meaningless for such substances.

(8) Boiling point - is normally determined at 760 mm Hg and is the temperature at which a liquid becomes a gas; it is the temperature at which the vapour pressure is equal to 760 mm Hg. The disclosure of the sublimation point in respect of a solid is not considered to be required information.

(9) Freezing point - is the temperature at which a material changes from a liquid to a solid at 760 mm Hg pressure, i.e., the temperature at which the liquid and solid phases of a substance are in equilibrium at normal pressure. The term *melting point* is used when the equilibrium temperature is approached by heating a solid. The terms *freezing point* and *melting point* are used interchangeably depending on whether the substance is being heated or cooled.

(10) pH - is a measurement of the acidity or basicity of a solution ranging on a scale from 0 (acidic) to 7 (neutral) to 14 (basic), as contrasted with the total quantity of acid or base in a substance. The pH is the logarithm to the base 10 of the reciprocal of the hydronium (H_3O^+) ion concentration expressed in molarity. Although pH is usually determined from relatively dilute aqueous solutions, the pH can also be measured for concentrated organic systems/organic liquids. Its reliability as an indicator of corrosivity, however, is less certain for such organic materials. pH is not applicable to a controlled product that is a solid; the disclosure of the pH of a solution of the solid should be considered optional. If, however, the pH of a solution of the solid is disclosed, the MSDS must also disclose the concentration of the solution on which the pH was determined.

(11) Coefficient of water/oil distribution - (also known as the water-octanol (n-octanol) partition coefficient), is the ratio, (and thereby unitless), which provides a relative measure of a substance's solubility in water versus oil. A substance with a coefficient greater than one indicates better solubility in water and thereby, a potentially greater tendency for the substance to be absorbed by the mucosal tissues of the eyes or lungs. A substance with a coefficient less than one indicates better solubility in oil and thereby, a potentially greater tendency for the substance to be absorbed by the fatty tissue under the skin.

Item 5 - Fire or Explosion Hazard

The fire or explosion data that must be disclosed, if available and applicable, is in respect of the product as a whole, not in respect of individual ingredients of the controlled product. However, if, for example, a product separates upon normal storage to form a distinct solvent layer, information in respect of the solvent may be applicable to the product as a whole and may be disclosed in this section.

(1) Conditions of flammability - The MSDS should disclose all conditions of flammability during reasonable foreseeable use including unintentional misuse.

(2) Means of extinction - Some chemicals react violently with water. The MSDS must disclose the appropriate type of fire extinguisher and/or extinguishing method for the controlled product.

(3) Flash point and method of determination - The flash point is the lowest temperature at which a flammable or combustible liquid will give off sufficient vapour to form an ignitable mixture with air just above the surface of the liquid. Four methods for determining flash point are referenced in Schedule IV to the *CPR*.

(4) Upper flammable limit - The upper flammable limit (UFL), also known as the upper explosive limit (UEL), is the highest concentration of a flammable gas or vapour that will burn or explode in the presence of a source of ignition. Concentrations above the UFL are too “rich” to burn.

(5) Lower flammable limit - The lower flammable limit (LFL), also known as the lower explosive limit (LEL), is the lowest concentration of a flammable gas or vapour that will burn or explode in the presence of a source of ignition. Concentrations below the LFL are too “lean” to burn.

(6) Auto-ignition temperature - The minimum temperature to which a substance must be heated without application of a flame or spark to cause that substance to ignite. Materials with low auto-ignition temperatures, such as the vapours of diethyl ether (160°C), can present fire risks. The majority of flammable and combustible liquids in common use have an auto-ignition temperature ranging between 250 to 600°C. For a pure substance, either the lowest value or range may be disclosed. The auto-ignition temperature of the ingredient of an untested mixture having the lowest value may not be applicable to the controlled product as a whole.

(7) Hazardous combustion products - The MSDS must disclose the hazardous combustion products to the degree of specificity that is available and applicable. The disclosure of an overly generic class of substances such as "oxygen containing hydrocarbons" is not considered useful.

(8) Explosion data--sensitivity to mechanical impact - The MSDS must disclose if the material can explode if subjected to mechanical impact such as being dropped or impact during transportation. Metal azides, for example, are sensitive to physical shock.

(9) Explosion data--sensitivity to static discharge - The MSDS must disclose if the material may

explode if it comes in contact with a spark generated by static electricity. When it is prudent to ground containers of flammable liquids or gases during transfer in order to guard against potential fire or explosion hazards, this information must be disclosed on the MSDS. The need for grounding will be influenced by the quantity of material.

Item 6 - Reactivity Data

(1) Conditions under which the product is chemically unstable - This includes conditions under which the controlled product will undergo vigorous polymerization, decomposition, condensation, polycondensation or otherwise become self-reactive.

(2) Name of any substance or class of substance with which the product is incompatible - The MSDS may disclose a "class" of substance. If, for example, the MSDS discloses that a controlled product such as sodium hypochlorite or sodium cyanide in an aqueous alkaline solution is "incompatible with mineral acids", it is not necessary to name specific mineral acids. A substance is considered incompatible with the controlled product if the two substances, upon contact, react dangerously (see section 66 of the *CPR*) and produce a flammable, toxic or corrosive gas or vapour meeting the criteria in *CPR* 36, 41, 46(*c*) or (*d*), 49(*c*) or 65(*b*) to (*e*); excessive heat; or they explode.

(3) Conditions of reactivity - The MSDS should disclose the conditions under which the controlled product will self-react or react with other materials to produce undesirable effects such as pressure build-up, temperature increase or formation of hazardous byproducts.

(4) Hazardous decomposition products - The MSDS must list the hazardous substances that will be released by the controlled product upon, for example, aging, heating and oxidation.

Item 7 - Toxicological Properties

Under the OSHA Hazard Communication Standard[2], where at least one positive scientific study exists which is statistically significant and demonstrates adverse health effects, the MSDS must disclose the adverse health effects identified through the study. Recognizing that not all toxicity studies are designed to demonstrate "statistical significance", this rule of thumb can be used as a general guideline for WHMIS MSDS disclosure; i.e., **MSDS disclosure is not limited to the *CPR* criteria which determine a product's classification under WHMIS**. For example, the fact that the *CPR* do not specify ocular corrosivity as a criterion for inclusion in Class E does not preclude the supplier's obligation to disclose this hazard on the MSDS if applicable. The MSDS, however, need not disclose information on studies that

[2] ref.: OSHA Instruction Directive No. 2-2.38D, March 20, 1998; www.osha-slc.gov/OshDoc/Directive_data/CPL_2-2_38D.html

show that the product produces virtually no toxic effect; the disclosure of such information is at the discretion of the supplier. (Refer to the interpretation of section 13 of the *CPR* for information regarding MSDS disclosure for "conflicting" studies, etc.).

Depending upon the species tested and the route of administration, the toxicological response to a given test substance may vary to a large degree. As a result, it is possible that a test substance may elicit a positive result in the rat via the oral route and a negative result in the mouse via the dermal route. Such results are considered to be neither contradictory nor conflicting. Therefore, the positive result in the rat study should form the basis for determining the appropriate MSDS disclosure.

Most products are mixtures as opposed to being "pure" substances. Any toxicological information resulting from tests on a mixture must be disclosed if available and applicable to the mixture. In the absence of scientific evidence to the contrary, it should be assumed that, taking into account possible synergistic interactions, the toxicological properties to be disclosed for an untested mixture are the same as those of the mixture's ingredients which are subject to disclosure. Information relating to ingredients subject to disclosure must be disclosed **if** this information is applicable to the mixture. The information disclosed on the MSDS should correlate the toxicological information to the ingredient with which the adverse effect is associated.

The Intergovernmental WHMIS Coordinating Committee's "Guidelines for the Disclosure of Toxicological Information on a MSDS" can be accessed from the "**MSDSs**" page on the Health Canada WHMIS website; (**www.hc-sc.gc.ca/whmis**). Much of the information from these guidelines has been incorporated into this section of the reference manual.

(1) Route of entry, including skin contact, skin absorption, eye contact, inhalation and ingestion - Of these five potential routes of entry, those routes which can present health risks to workers during reasonable foreseeable use must be specified. These routes of entry will relate to the nature and properties of the substance under consideration as well as its uses; for example:

Substance	Route of Entry
silica	inhalation
n-hexane	inhalation, skin absorption
acetone	inhalation, skin absorption, eye contact
phosphoric acid	skin and eye contact
sodium fluoride	ingestion, inhalation

If available, the MSDS must disclose significant human health effects reported in epidemiological studies, and case reports in the literature, relevant to occupational exposure. Since evidence of health effects to humans is typically not available, it is reasonable to disclose information, considered statistically significant,

based on "relevant" animal testing. Relevant testing relates to the normal routes of occupational exposure such as inhalation, ingestion, skin and eye contact, and skin absorption as opposed to routes such as intraperitoneal, intramuscular, subcutaneous, etc.

(2) Effects of acute exposure to product - The classification criteria for acute lethality is set out in sections 33 and 46 to 51 of the *CPR*. The term "acute lethality" is defined in section 32 of the *CPR*. The MSDS must disclose the adverse health effects resulting from short-term exposure to the controlled product. A "short-term" exposure is generally considered to be a single or multiple exposure within a 24-hour time frame. Acute toxicity relates to toxic effects provided by a single or multiple exposure to a substance by any route for a short period of time. The MSDS must disclose both immediate and delayed effects resulting from short-term exposure; for example, skin corrosion (immediate) or pulmonary edema (delayed) from exposure to nitric acid. The information that must be disclosed on the MSDS is not limited to the results of tests for acute lethality specified in the classification section of the *CPR*.

(3) Effects of chronic exposure to product - Sections 33(3)(*b*)(i), 52 and 59 of the *CPR* set out the classification criteria for chronic toxic effects. The term "chronic toxic effect" is defined in section 32 of the *CPR*. The effects of "subchronic" exposure must also be disclosed under this subitem.

Chronic toxic effects include any target organ effects from prolonged, repeated or seasonal exposures. The MSDS must disclose significant human health effects reported in epidemiological studies and case reports in the literature. Since human evidence of health effects is typically not available, it is reasonable to disclose information based on mammalian animal testing which is judged to report significant information on toxicological properties. It is important to include the route of exposure when disclosing the effects of chronic exposure.

For chronic toxicity animal studies, the exposure time is considered to be approximately 80 percent of the life-span; for subchronic toxicity, the exposure time is approximately 10 percent of the life-span. In the absence of data on chronic or subchronic exposure, the results of studies of shorter duration (i.e., "subacute" studies) should be evaluated.

(4) Exposure limits - The supplier must specify which type of exposure limit is disclosed on the MSDS. The *CPR* will be amended to require that whatever exposure limit is used, the limit is to be qualified by indicating the source of the exposure limit and that a statement to the effect "consult local authorities for acceptable exposure limits" appears on the MSDS. Up to the present time, no source, North American or other, has been identified as publishing unacceptable exposure limits, {ref.: PIS 24}.

Exposure limits are recommended by bodies such as the American Conference of Governmental Industrial Hygienists (ACGIH) and National Institute for Occupational Safety and Health (NIOSH) or are legislated by federal, provincial and territorial agencies responsible for occupational safety and health. Various types of exposure limits, short-term and long-term, may be applicable depending on the working conditions. The MSDS must disclose appropriate values for the controlled product. The MSDS should also disclose values for ingredients of a mixture if this information is applicable to the mixture.

Since 1946, Threshold Limit Values (TLVs) have been devised and published by the ACGIH. The ACGIH

publication *Threshold Limit Values and Biological Exposure Indices*, states that "TLVs refer to airborne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effect." In 1971, the United States Occupational Health and Safety Administration (OSHA) adopted the ACGIH's 1968 TLVs as official workplace standards called PELs (permissible exposure limits). The National Institute for Occupational Safety and Health (NIOSH) provides scientific advice to OSHA. In the last 25 years, NIOSH has developed and published RELs (Recommended Exposure Limits) for over 160 chemicals.

The American Industrial Hygiene Association (AIHA) sets guidelines for Workplace Environmental Exposure Levels (WEELs) for chemicals for which neither a PEL nor a TLV has been developed. The AIHA have included the WEELs in their handbook “Emergency Response Planning Guidelines and Workplace Environmental Exposure Level Guides” which can be ordered from their customer service line (703) 849-8888.

The ACGIH has defined three principal types of exposure limits:

- *Time Weighted Average* (*TWA*) - the concentration at which the majority of workers can be repeatedly exposed without adverse effect for an 8 hour workday or 40 hour workweek.

- *Short-term Exposure Limit* (*STEL*) - the maximum concentration for a continuous exposure period of 15 minutes (with a maximum of four such periods per day, with at leat 60 minutes between exposure periods and provided that the daily TWA is not exceeded).

- *Ceiling Limit* (*C*) - the concentration that should never be exceeded in the workplace.

For the precise definition of these terms, the ACGIH's *Threshold Limit Values and Biological Exposure Indices* should be consulted.

If exposure limits are not available from the ACGIH or other jurisdictional authorities but are recommended by the supplier, the appropriate bodies recommending those limits should be disclosed on the MSDS. Up to the present time, no source, North American or other, has been identified as publishing unacceptable exposure limits. The *CPR* will be amended to require that whatever exposure limit is used, the limit is to be qualified by indicating the source of the exposure limit and that a statement to the effect "consult local authorities for acceptable exposure limits" appears on the MSDS. Disclosure of the term: "TLV (TWA) - 10ppm" would suffice as all "TLVs" are issued by the ACGIH, and consequently the ACGIH is the source of all TLVs. (The term "TLV" is a registered trade mark of the ACGIH). In the case of other exposure limits, the MSDS should disclose the source.

Where it is known that the use of the product could give rise to potentially lethal conditions, such as high airborne concentrations of solvent vapours from use of degreasers or furniture strippers, the supplier should disclose an IDLH limit if available. IDLH is the acronym for **I**mmediately **D**angerous to **L**ife and **H**ealth. The IDLH is the concentration at which, in the event of respirator failure, a worker could evacuate within 30 minutes without experiencing any escape-impairing or irreversible health effects.

(5) Irritancy of product - Sections 33(3)(*b*)(ii) and 60 of the *CPR* set out the classification criteria for irritation. The information disclosed on the MSDS must indicate the severity of the irritant effect, i.e., whether the effect is slight/mild, moderate or severe. A product will fall within the classification criteria for eye or skin irritation if the irritant effect is greater than "slight". The effect relates only to chemical reaction, not to the effect of mechanical abrasion.

Numerical irritation scores, such as those obtained through testing in accordance with OECD Test Guidelines 404 (Acute Dermal Irritation/Corrosion) and 405 (Acute Eye Irritation/ Corrosion) or the Draize test, may be disclosed but this information is not generally comprehensible to the majority of MSDS users.

(6) Sensitization to product - Sections 56 and 61 of the *CPR* set out the respective criteria for "respiratory tract sensitization" and "skin sensitization" . The terms "respiratory tract sensitization" and "skin sensitization" are defined in section 32 of the *CPR*. It is probable that any chemical, natural or synthetic, is capable of causing an allergic reaction in some individuals. However there are chemicals that cause sensitization in a "substantive proportion of exposed" individuals who come into contact with these substances such as, for example, formaldehyde. Whether or not to disclose information related to the fact that one individual has been sensitized when exposed at the workplace must be determined through professional judgement on a case-by-case basis.

A statement summarizing the results from the tests specified in sections 56 and 61 of the *CPR* (or from other relevant animal tests) must be disclosed on the MSDS if available. Positive human experience data must also be disclosed on the MSDS. It is important that the disclosed information identify the sensitizing agent. Non-occupational situations may be included if considered relevant.

(7) Carcinogenicity - Section 54 of the *CPR* sets out the classification criteria. Information to be disclosed on the MSDS is not limited to the classification criteria; (i.e., to the IARC and ACGIH lists). Other sources which are considered applicable include:

- lists of carcinogens from other countries;
- the U.S. National Toxicology Program list and related studies;
- academic studies;
- unpublished studies.

Information from these other sources must be disclosed on the MSDS if it is available to the supplier and applicable to the controlled product.

(8) Reproductive toxicity - Section 55 of the *CPR* sets out the classification criteria for reproductive toxicity. Reproductive toxicity relates to effects on the parents such as sterility or other impairment of reproductive capability in either males or females. In animal bioassays, adverse effects on parental reproductive functions may occur at doses above or below those producing signs of toxicity in the parent animals. The handling, storage or use of controlled products may occasionally produce exposures resulting in mild parental toxicity thereby resulting in potential reproductive toxicity hazards. For the purpose of MSDS disclosure, any indication of an adverse effect on reproductive parameters must be disclosed on the MSDS irrespective of whether or not there is an adverse effect on the parents. Any

relevant epidemiological evidence must also be disclosed.

(9) Teratogenicity - Subparagraph 33(3)(*b*)(iii) and section 53 of the *CPR* sets out the classification criteria for "teratogenicity and embryotoxicity". Developmental toxicity relates to toxicity and abnormalities in offspring, e.g., teratogenicity (malformations), embryotoxicity and fetotoxicity. In animal bioassays, adverse effects on fetal development may occur at doses above or below those producing signs of toxicity in the parent animals. The handling, storage or use of controlled products may occasionally produce exposures resulting in mild parental toxicity thereby resulting in potential developmental toxicity hazards. For the purpose of MSDS disclosure, any indication of an adverse effect on fetal development must be disclosed on the MSDS irrespective of whether or not there is an adverse effect on the pregnant female. Any relevant epidemiological evidence must also be disclosed.

"The four major manifestations of an effect on the developing organism are death, structural anomaly, altered or retarded growth, and functional deficiency. For many substances, these manifestations are related to dosage and to the development timing and duration of exposure. While high doses produce death, low doses that permit survival may produce malformed, retarded, or functionally deficient offspring.... When developmental effects are found in the presence of maternal toxicity, the primary cause is often left to speculation. Without sufficient evidence to support the premise that developmental toxicity is always a secondary toxic effect in the presence of maternal toxicity, a default is needed. Developmental effects that occur in the presence of minimal maternal toxicity are thus considered to be evidence of developmental toxicity, unless it can be established that the developmental effects are unquestionably secondary to the maternal effects;" {Ref.: Food and Drug Administration Proposed Testing Guidelines for Developmental Toxicity Studies; Thomas F. X. Collins et. al.; Regulatory Toxicology and Pharmacology 30, 39-44, 1999}.

> (The Motherisk Program at the Hospital for Sick Children in Toronto was created in 1985 to provide evidence-based information and guidance concerning the potential risks to the developing fetus or infant, from exposure to drugs, chemicals, diseases, radiation and environmental agents: www.motherisk.org).

(10) Mutagenicity - Subparagraph 33(3)(*b*)(iv) and sections 57 and 62 of the *CPR* set out classification criteria for mutagenicity. These criteria are limited to:

i) epidemiology results for human populations, or
ii) *in vivo* tests carried out on living mammals.

Positive results from studies that meet the above criteria must be disclosed. Results of tests on bacteria (e.g. Ames Salmonella Mutation Test), insects (e.g. Drosophila) or cells studied in cultures outside the living animals, must also be disclosed on the MSDS if this information is available to the supplier and applicable to the controlled product.

(11) Name of toxicologically synergistic products - The MSDS must list any substances, materials or products which interact with the controlled product to produce a toxic effect greater than the sum of their separate effects.

A synergistic effect occurs when the combined toxicological effect of two chemicals is greater than the sum of the effect caused by each agent alone. For example, both carbon tetrachloride and ethanol are hepatotoxic compounds. Together they produce much more liver injury than the sum of their individual effects on the liver would suggest. Available relevant information regarding toxicological interactions between the product, including its ingredients, and other chemicals must be disclosed if applicable to the controlled product. Exposure to two or more chemical agents may result in various types of toxicological interaction other than synergism, including additivity, antagonism and potentiation:

***Additivity*:** An additive effect occurs when the combined toxicological effect of two chemicals is equal to the sum of the effect caused by each agent alone. For example, when two organic phosphate insecticides are given together, the cholinesterase inhibition is usually additive.

***Antagonism* (or *Inhibition*):** Antagonism occurs when two chemicals interfere with each other's actions or when one chemical interferes with the action of the other chemical, the net effect being a reduction in toxicity. For example, the prevention of absorption of a toxicant by ipecac or charcoal.

***Potentiation*:** A potentiator is a substance which produces no toxic effects itself but when administered in conjunction with another substance which does cause toxic effects, it makes the latter much more toxic. For example, isopropanol is not hepatotoxic but when isopropanol is administered in addition to carbon tetrachloride, the hepatotoxicity of carbon tetrachloride is much greater than when administered in isolation.

Item 8 - Preventive Measures

(1) Personal protective equipment to be used - The employer has the ultimate responsibility for providing a worker with the appropriate PPE. For example, depending on workplace conditions and, thus, potential exposure levels and routes, it is the employer who must provide safety glasses, hand gloves and a labcoat versus a face shield, gauntlet gloves and a rubber suit, (note: for chemicals, faceshields should only be worn over primary eye protection). The information disclosed on the MSDS, however, must be consistent with the intended use of the product.

If gloves are recommended, the MSDS should specify the material (e.g., polyvinyl chloride (PVC), neoprene, polyvinyl alcohol (PVA), nitrile (NBR), natural rubber, etc.), with which the controlled product is resistant. The MSDS should also disclose with which materials the product is not resistant. Usually, the effectiveness of materials to protect against chemicals is based on their resistance to penetration, degradation and permeation. As a general guideline, the best protective material against a specific chemical is one that has a low permeation rate (if any) and a long breakthrough time. However, as these two properties do not always correlate, to err on the side of safety, a long breakthrough time is usually desired. For mixtures and formulated products (unless specific test data are available), a glove should be selected on the basis of the chemical component with the shortest breakthrough time since it is possible for solvents to carry active ingredients through polymeric materials.

Before purchasing a particular type of glove, it is the employer who should request documentation from the manufacturer demonstrating that the gloves meet the appropriate test standard(s) for the anticipated hazard(s).

Suppliers have indicated that employer versus supplier obligations regarding PPE are unclear. The *CPR* provide no indication of the specificity with which information relating to PPE must be disclosed on the supplier MSDS. The Intergovernmental WHMIS Coordinating Committee has adopted the following as enforcement policy in relation to MSDS disclosure of PPE information:

Under general duties specified in provincial and federal (non-WHMIS) occupational safety and health legislation, the employer has the ultimate responsibility for the use and selection of PPE. Proper selection of PPE must be determined on a case by case basis taking into account the identity and physical form of the material(s) being handled and their potential biological effects on the worker based on the expected conditions of workplace handling, use and disposal. Considerations should include the identification of all other potential hazards, duration of use, performance characteristics of the PPE, the limitations of the PPE and how to properly wear and adjust PPE. Employers must also ensure worker training for the proper use, care, maintenance and disposal of PPE.

Information disclosed on the supplier MSDS regarding the selection of PPE can serve as the starting point from which employers can determine when, where and what PPE will be required. Alternately, an employer may determine that the PPE recommended by the supplier MSDS does not adequately address the potential hazards of a particular task and may choose alternate means to reduce worker exposure. Employers may also contact the supplier for additional information. Employers should discuss their particular circumstances with manufacturers or vendors of PPE in order to determine which one of their materials or products will provide the best performance. For example, a recommended glove material, if purchased from two different manufacturers, may not provide similar protection with the same product due to material grade, thickness, etc.

As part of an effective workplace safety and health program, employers must adapt information provided by suppliers on MSDSs to their particular workplace circumstances. Since the recommended PPE may only be applicable to the "product use" disclosed on the supplier MSDS (under the Product Information Section of the MSDS), other uses may pose additional risks to workers. OSHA recommends that employers should select the protective equipment which ensures a level of protection greater than the minimum required to protect employees from the hazards; (ref.: OSHA 1910.138).

Since conditions of use are uncertain, liability considerations might preclude suppliers from providing categorical statements, particularly where a variety of acceptable equipment would be appropriate under specific conditions.

In conjunction with the “Factors to Consider for Each Form of PPE for Suppliers and Employers” (see below), the following has been adopted as **enforcement policy** by Canadian WHMIS regulatory agencies:

a) Recommend PPE for each applicable route of entry (skin, eye/face, inhalation).
b) Emphasize the importance of minimizing or preventing contact with or exposure to the product.

c) Base the recommendations on the specific properties and hazards of the controlled product coupled with a general note on the circumstances requiring the recommended PPE.
d) Disclose at least the minimum PPE required to protect workers from the hazards of the controlled product consistent with the "product use" disclosed on the MSDS.
e) If appropriate, explain recommendation for varying circumstances, i.e., for emergency situations, accidental release or where exposure levels have not been established.
f) If appropriate, add a statement that since local conditions of use and exposure are not known, users should reassess PPE recommendations for differing conditions.
g) Provide specific or qualified terms where possible.
h) Assume employers are trained in respirator selection and use.

Factors to Consider for Each Form of PPE for Suppliers and Employers:

GLOVES: If gloves are recommended because the product is, for example, a dermal irritant which may come in contact with skin during use, the MSDS should specify materials which are resistant to the product. It should also indicate which materials are not resistant. Glove materials may include polyvinyl chloride (PVC), neoprene, polyvinyl alcohol (PVA), nitrile (NBR), natural rubber, etc. The use of the term "impermeable or impervious gloves" should be not be used since there are no protective materials that are completely impermeable. Generally, any "chemical resistant" gloves can be used for dry powders; (ref.: OSHA 1910.138).

The best protective material against a specific chemical is one that has a low permeation rate (if any) and a long breakthrough time. Tests are usually conducted using pure substances as opposed to mixtures. Since it is possible for solvents to carry active ingredients through polymeric materials, unless specific test data are available, for mixtures and formulated products, gloves should be selected on the basis of the chemical component with the shortest breakthrough time, (ref.: OSHA 1910.138).

Important local factors which fall within the domain of employers include quantity of product handled, process equipment, ventilation, confined space conditions, contact time, temperature, material grade and humidity.

In addition to manufacturers' data, a general reference for the selection of CPC is the ACGIH 1991 *Guidelines for the Selection of Chemical Protective Clothing*. This guideline includes degradation and permeation test data from manufacturers, vendors and independent labs with recommendations for over 300 chemicals. As no analogous guideline has been published in Canada, many organizations in Canada use the ACGIH guideline as a reference.

FOOTWEAR: Where normal footwear is not appropriate, suppliers should specify the material of the footwear, height on the lower leg, nature of tread, etc..

CLOTHING/OTHER: If appropriate, other types of clothing may also be recommended such as aprons, vests, coveralls, suits, etc., and material type, e.g., neoprene, nylon, etc.

EYE/FACE: If the product is likely to pose an eye hazard, eye protection should be recommended. CSA Standard Z94.3-M1982 "Industrial Eye and Face Protectors" provides selection information for eye and facewear.

RESPIRATOR: A supplier's recommendation for respiratory protection should also be consistent with the "product use" disclosed on the MSDS and should afford a level of protection against overexposure to the chemical or product (i.e., to prevent exceeding regulated exposure limits).

Important local conditions to be considered by the employer include: period of time the respirator is required, chemical concentration, activity level of workers, functional capabilities and limitation of respirators of various types, respirator protection factors, respirator fit, etc..

The Canadian Standards Association (CSA) has published Z94.4-93, Selection, Use and Care of Respirators. This standard has been adopted by the federal government and by most provinces. In general, this standard states criteria that must be considered in the selection of respirators. It also describes the suitability of a particular respiratory protective device for oxygen deficient or immediately dangerous to life or health (IDLH) atmospheres.

Canadian and OSHA regulations require the use of an approved respirator. In the U.S., respirators are tested at the NIOSH Testing Laboratory in Morgantown, West Virginia, in accordance with the requirements of 42 CFR Part 84 (previously 30 CFR Part II). Under the new Part 84 (effective July 10, 1995), respirators are now approved solely by NIOSH. Under the old Part II, respirators were jointly approved by NIOSH and the Mine Safety and Health Administration (MSHA). CSA recognizes the NIOSH approvals.

Sample PPE Recommendations

- A NIOSH approved air purifying respirator with an organic vapour cartridge or canister may be permissible under certain circumstances where air borne concentrations are expected to exceed exposure limits. Protection provided by air purifying respirators is limited. Use a NIOSH approved positive pressure air supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection.

- This material does not have established exposure limits. Wear a NIOSH approved positive pressure air supplied respirator in situations where there may be potential for airborne exposure.

- Wear a NIOSH approved full-facepiece airline respirator in the positive pressure mode with emergency escape provisions.

- A NIOSH approved air-purifying respirator with organic vapour/acid gas cartridge(s) required for concentrations up to *x* mg/m^3 and an atmosphere supplied respirator if concentrations are higher or unknown.

- For most conditions, no respiratory protection should be needed, however, in dusty atmospheres, use a NIOSH approved dust respirator.
- Wear safety glasses with side shields (or goggles) and a face shield.
- Nitrile rubber and PVC are not suitable protective materials; Neoprene is recommended.
- The following glove(s) materials may provide adequate protection against permeation: butyl rubber, neoprene, natural rubber. Gloves of other chemically resistant materials such as polyvinyl chloride may not provide adequate protection.
- Where splashing is possible, full chemically resistant protective clothing (e.g., acid suit) and boots are required.
- Neoprene gloves are recommended for prolonged contact with the liquid.
- For brief contact, no precautions other than clean body-covering clothing should be needed. When prolonged or frequently repeated contact could occur, use chemical protective clothing made from butyl rubber. Selection of specific items such as gloves, boots, apron, full-body suit, etc. will depend on local operation.
- Safety glasses, splash goggles or face shield. Contact lenses should not be worn.

(2) Specific engineering controls to be used - The ACGIH publication "Industrial Ventilation: A Manual of Recommended Practice" provides recommended dilution factors (volumes) for several organic solvents. Information related to the type of package in which the product is used may also require specific precautions. When, for example, it is prudent to ground containers of flammable gases or liquids during transfer or use, in order to guard against potential fire or explosion hazards, the supplier should disclose this type of information either under this or another MSDS subitem, such as 5(9).

(3) Procedures to be followed in case of leak or spill - This subitem requires the disclosure of protective equipment for emergency workers; neutralizing, adsorbing or other control materials; specific clean-up procedures, etc.

(4) Waste disposal - Where a supplier is aware that specific requirements do apply, the MSDS may disclose, at the supplier's discretion, a statement such as "waste disposal regulations do apply in some jurisdictions in Canada; contact local authorities to ensure full compliance". The following references may be useful:

- **Environment Canada** - Environment Canada Enquiry Centre: (819) 997-2800; http://www.ec.gc.ca/ecocycle
- **Canadian Standards Association (CSA)** - (publications which can be ordered from the CSA at 1-800-463-6727):

- Competing Leaner, Keener and Greener: A Small Business Guide to ISO 14000 (Cat. #PLUS 1117)
- Environmental Management in Canada (Cat. # 5618)
- First Steps to Environmentally Responsible Management: A Comprehensive Workbook for Environmental Policy Development (Cat. # PLUS 1113)
- User's Guide to Environmental Life Cycle Assessment: Conceptual LCA in Practice (Cat. # PLUS 1107)
- Life Cycle Review (LCR) (Cat. # Plus 1115)
- Life Cycle Assessment (Cat. # Z760-94)
- Design for the Environment (Cat. # Z762-95)
- Guideline for Pollution Prevention (Cat. # Z754-94)
- Environmentally Responsible Procurement (ERP) (Cat. # Z766-95)
- Guideline on Environmental Labelling (Cat. # Z761-93)
- Environmental Terminology for Canadian Business (Cat. # PLUS 1109)

♦ **International Organisation for Standardisation (ISO)** - ISO 14000 Series of Standards on Environmental Management Systems includes documents on the following subjects:

- Environmental Management Systems
- Environmental Auditing
- Environmental Labelling
- Environmental Performance Evaluation
- Life Cycle Assessment
- Terms and Definitions
- Environmental Aspects of Product Standards

(The ISO documents are available through the Canadian Standards Association (see above) or the Standards Council of Canada at 1-800-267-8220.)

(5) Handling procedures and equipment - This subitem requires the disclosure of the procedures and equipment necessary to protect workers from the hazards posed by the controlled product during use.

(6) Storage requirements - Information for safe storage must be disclosed relating to, for example, temperature, isolation from sources of ignition, separation from incompatible products, etc..

(7) Special shipping information - The disclosure of the TDG classification or classification under any other domestic or foreign regulatory program is optional and at the discretion of the supplier.

Item 9 - First Aid Measures

(1) Specific first aid measures - The intent of this section is to provide information necessary for the immediate on-site treatment of a person who has experienced adverse acute effects resulting from an accident with or overexposure to the controlled product. If applicable, the first aid measures disclosed must be specific to the route of entry, i.e., inhalation versus skin or eye contact, etc..

The MSDS must disclose first aid measures if they are applicable to the product. If the product's toxicity

is negligible, first aid measures would not be applicable and the MSDS should disclose "not applicable". If the toxicity is low, first aid advice must be provided that is applicable to the product. The first aid measures should be consistent with the physical state of the product as sold, i.e., to distinguish between, for example, the specific first aid measures to be administered in the event of contact with a solid versus a solution of the solid.

The use of professional judgement will be required on a case-by-case basis to determine the appropriate first aid measures that should be disclosed for controlled products subject to the labelling and MSDS requirements of the *Hazardous Products Act* and *Controlled Products Regulations*. The following guidelines, which are based on those developed by the Canadian Centre for Occupational Health and Safety (CCOHS) as reflected in their report *The Material Safety Data Sheet, A Practical Guide to First Aid* (CCOHS - P91-E), are recommendations as opposed to compliance guidelines. Depending on the hazards of the product, other first aid measures, such as those set out in ANSI Z129, may also be acceptable / preferable.

A. Inhalation Exposure

1. The MSDS for a controlled product that is corrosive, severely irritating, or interferes with the body's use of oxygen should disclose a statement that conveys the following information:
   - remove source of contamination or move victim to fresh air;
   - obtain medical attention immediately.

2. The MSDS for a controlled product that is a CNS depressant should disclose statements that convey the following information:
   - if breathing has stopped, trained personnel should begin artificial respiration immediately;
   - if the heart has stopped, trained personnel should begin cardiopulmonary resuscitation (CPR) immediately;
   - obtain medical attention immediately.

B. Dermal Exposure

1. The MSDS for a controlled product that is a moderate to severe irritant should disclose statements that convey the following information:
   - wash gently and thoroughly with water (and non-abrasive soap, for non-water soluble products) for 20 minutes or until chemical is removed;
   - under running water, remove contaminated clothing, shoes and leather goods;
   - obtain medical advice immediately.

2. The MSDS for a controlled product that has short term toxicity affecting breathing or heart function should disclose statements that convey the following information:
   - if breathing has stopped, trained personnel should begin artificial respiration immediately;
   - if the heart has stopped, trained personnel should begin cardiopulmonary resuscitation (CPR) immediately;
   - obtain medical attention immediately.

3. The MSDS for a controlled product that is either a penetrating or non-penetrating corrosive should disclose statements that convey the following information:
   - under running water, remove contaminated clothing, shoes and leather goods.
   - continuously flush contaminated area with lukewarm, gently flowing water for at least 20-60 minutes.
   - obtain medical attention immediately.

4. The MSDS for a controlled product for which the pH is unavailable, or which has a neutral pH but contains an ingredient at ≥1% that falls within WHMIS Class E based on biological criteria, in the absence of other information, should disclose statements consistent with properties exhibited by products with similar compositions.

C. Eye Exposure

1. The MSDS for a controlled product that is a moderate or severe irritant should disclose statements that convey the following information:
   - immediately flush the contaminated eye(s) with lukewarm gently flowing water for 20 minutes or until chemical is removed, while holding eyelid(s) open;
   - take care not to rinse contaminated water into the unaffected eye or face (on a case by case basis, depending upon the actual MSDS disclosure);
   - obtain medical advice immediately.

2. The MSDS for a controlled product that is either a penetrating or non-penetrating corrosive should disclose statements that convey the following information:
   - immediately flush contaminated eye(s) continuously with lukewarm, gently flowing water for at least 20-60 minutes, while holding the eyelid(s) open;
   - take care not to rinse contaminated water in to the unaffected eye or face(on a case by case basis, depending upon the actual MSDS disclosure);
   - obtain medical advice immediately.

D. Ingestion Exposure

Note: Following the recommendation from a Poison Control Centre specialist that administration of water and/or milk following ingestion should only be performed under medical supervision, this practice was deleted from the guideline below.

1. The MSDS for a controlled product that is corrosive should disclose statements that convey the following information:
   - never give anything by mouth if victim is rapidly losing consciousness, unconscious or convulsing;
   - do not induce vomiting (Note: it may be appropriate to induce vomiting in some cases when the LD50 of the product is low or severe systemic toxicity can be expected in cases of accidental ingestion; this will have to be assessed on a case-by-case basis;

- if vomiting occurs naturally, have victim lean forward to reduce risk of aspiration;
- obtain medical advice immediately.

2. The MSDS for a controlled product that is a severe or moderate irritant, produces short-term toxicity, or presents a serious aspiration hazard, should disclose statements that convey the following information:
   - never give anything by mouth if victim is rapidly losing consciousness, unconscious or convulsing;
   - do not induce vomiting;
   - if vomiting occurs naturally, have victim lean forward to reduce risk of aspiration (for products that present a serious aspiration hazard. Controlled products should be considered to pose a significant aspiration hazard if they contain alcohols, ketones, petroleum distillates, chlorinated solvents, hydrocarbon solvents, and have a product viscosity of no more than 75 SSU (14 cSt) at 38^0C;
   - obtain medical attention immediately.

3. The MSDS for a controlled product that causes CNS depression, or interferes with the body's use of oxygen, should disclose statements that convey the following information:
   - if breathing has stopped, trained personnel should begin artificial respiration immediately;
   - if the heart has stopped, trained personnel should begin cardiopulmonary resuscitation (CPR) immediately;.
   - obtain medical attention immediately.