Prophetic law – the art of predictive legislation classifying hazardous substances

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A paper presented to AUSA conference Brisbane July 2011

Abstract

This paper compares the three classification systems which affect New Zealand laboratories. The classification systems are the United Nations Recommendations on the Transport of Dangerous Goods, United Nations Globally Harmonised System and New Zealand Hazardous Substances and New Organisms Act. Each of these three systems contains classification systems for hazards associated with chemical substances. The New Zealand hazardous substances classification legislative system is completely unique internationally and poses additional significant overheads for organisations which seek to be compliant.

The difference between the systems is detailed and recommendations made for specification requirements for inventory and tracking information systems purchased for use in New Zealand.

The paper concludes with a recommended for non–compliance with the unique New Zealand requirements. The justification, risks, and mitigation for using an international classification system for describing hazardous properties of chemicals is detailed.

Classification systems

There is emerging discussion on the communication of chemical hazards. In 2001 the society of chemical hazard classification (SCHC) was formed which epitomises the discussion within the United States of America.

This paper is confined to that discussion within New Zealand laboratories. Three classification systems are considered. The systems are the United Nations Globally Harmonised System (GHS), United Nations Recommendations on the Transport of Dangerous Goods (UNRTDG), and the New Zealand Hazardous Substances and New Organisms Classification system (HSNO). These systems have been developed over time. The GHS was published in 2003 (1^{st} Edition), the New Zealand HSNO system in 2001, and the UNRTDG is in its 14^{th} Edition (2005).

All of the classification systems include hazard classes which cover substance properties of:

1. Explosiveness,
2. Compressed gases,
3. Flammable liquids,
4. Flammable solids, self reactive substances, and substances dangerous when wet,
5. Oxidizing substances and organic peroxides,
6. Toxic substances ,
7. Radioactivity,
8. Corrosive substances,
9. Environmentally hazardous and miscellaneous substances.

Definitions

Within each class there are a number of subclasses which may be linked to hazards. In comparing subclasses the scope of coverage is detailed by a definition. For example a definition of extremely flammable liquid and vapour means in general terms: a liquid having a flash point < 23 °C using a closed cup flash point test, and initial boiling point <= to 35 °C. There may be notes attached and a decision tree on using the definition. The exact wording will vary according to the system.

Systems can be compared by considering how a common definition is described by each classification system. For example the above definition occurs in all three systems and variously described as detailed below:

Example of description variations for one definition				
Classification System	Classification	Class	Subclass	Hazard Statement
GHS	1	Flammable liquid		Extremely flammable liquid and vapour
HSNO	3.1A	Flammable	Liquids	Very high hazard
UNRTDG	3 (a)	Flammable	Liquids	PG I

It is important to appreciate that not all definitions are congruent. For example in the USA the following list details the differences that occur with definitions for extremely flammable liquid and vapour. Only one USA definition agrees with the three systems addressed in this paper

- "Flammable Liquid": Any liquid having a flash point below 100°F (37.8°C) – *OSHA (Occupational Safety and Health Administration) 29 CFR 1910.1200*
- "Extremely Flammable Liquid": Any liquid having a flash point at or below 20°F (-6.7°C) OR any liquid having a flash point of not more than 141°F (60.5°C) and a boiling point of not more than 95°F (35°C). *ANSI (American National Standards Institute) Z129.1-2006*
- Ignitable and spontaneously combustible OR having a flash point less than 140°F(60 °C) *RCRA (Resource Conservation & Recovery Act) - EPA (Environmental Protection Agency)*
- "Flammable Liquid": A liquid having a flash point of not more than 140°F(60°C) OR Any material in a liquid phase with a flash point at or above 100°F(37.8°C) that is intentionally heated and offered for transportation or

transported at or above its flash point in a bulk packaging. *DOT (Department of Transportation) 49 CFR 173.120*

- "Extremely Flammable": Any substance with a flashpoint at or below 20°F(-6.7 °C) CPSC *(Consumer Product Safety Commission) 16 CFR 1500.3*
- Class IA: Flash point less than 73°F(23°C); boiling point less than 100°F(38°C) *NFPA 30 (National Fire Protection Association) (Flammable and Combustible Liquids Code)*

Comparison of three chemical hazards classification systems

The extent to which each classification system affects New Zealand laboratories in the way it describes the hazard of substances is considered next.

UNRTDG (14th Edition)

The UNRTDG classification system has some 81 hazard types.

For any one substance or mixture a chemical class is assigned which reflects the most significant hazard characteristic of that substance, mixture or solution. The UNRTDG has a system for precedence of hazard characteristics. For substances, mixtures or solutions that have more than one risk the most stringent packing group of that item takes precedence over the other packing groups. If packing groups are equal then there is a precedence of hazard characteristics in order as follows:

1) Substances and articles of Class 1
2) Gases of Class 2
3) Liquid desensitised explosives of Class 3
4) Self-reactive substances and solid desensitised explosives of Division 4.1
5) Pyrophoric substances of Division 4.2
6) Substances of Division 5.2
7) Substances of Division 6.1 with Packing group I Inhalation toxicity
8) Substances of Division 6.2
9) Material of Class 7

There is a table in UNRTDG which details the precedence of hazards based on Class, packing group and substance state.

The advantage of a single or primary chemical class is that it identifies the most significant hazard. It also allows easy determination of segregation and storage requirements.

Globally harmonised system of classification and labelling of chemicals (GHS)

The Globally Harmonized System of Classification and Labelling of Chemicals (GHS) arose from an agreement reached at the UN Environment Program's World Summit held in Rio de Janeiro June 1992 (aka Rio Earth Summit). The intent was to produce a set of criteria to define hazardous substances that was applicable to all stages of a substance's life cycle and should address transport, worker, consumer and

environmental safety. Once developed this system would be adopted internationally. The task was also to standardise hazard communication by way of standardised labelling components and Safety Data Sheets.
It was hoped that it would provide a recognised framework for those countries without an existing system, and reduce the need for testing and evaluation for chemicals along with facilitating international trade as hazards had been properly assessed and identified on an international basis.
A co-ordinating group was set up to manage this task. One of their early decisions was the GHS should be modelled on the UN Recommendation for the Transport of Dangerous Goods (UNRTDG).
Hazardous Substances that meet the definition of Dangerous Goods for Transport are contained in appropriately strong packaging or containers. Exposure to the substance occurs infrequently, usually as a result of an accident resulting in a loss of containment. Consequently the UNRTDG focuses on the high hazard substances and is not concerned with multiple exposures or routine exposures. Workers and consumers on the other hand can be exposed on a regular basis, thus exposure to less hazardous substances can be of concern. In many ways the GHS can be viewed as an extension of the transport system
The GHS was published by the United Nations in 2003, with the second revised edition having just been released.
The GHS contains some 80 hazard classification characteristics which are described in the attached spreadsheet. The GHS does not use a hazard code but comparison of class definitions allows close mapping to the UNRTDG.

The major differences to the UNRTDG are listed below. The 2nd edition of GHS does allow for subdivisions to be modified for regulatory purposes.

- Class I explosives – The GHS does not require assignment to compatibility subgroups but rather deals with the hazard at a subclass level.

- Compressed Gases are assigned a number of subgroups depending on their flammability, container size (aerosol) and the nature of the gas – i.e. whether it is compressed, liquefied, refrigerated or dissolved gas. In contrast the UNRTDG segregates gases into three classes based on flammability, non-flammable/nontoxic or toxic. UNRTDG does not specifically define corrosive gases.

- The GHS does not contain the classifications for liquid desensitised explosives that are of interest to the UNRTDG.

- The solid desensitised explosives that are described in the UNRTDG are not included in the GHS.

- In terms of oxidising and organic peroxides there is some grouping of classes by hazard type in the GHS, using the same definitions as UNRTDG.

- The GHS contains a number of toxicity characteristics such as serious eye damage, skin damage, mutagenicity, reproductive, developmental, target organ specificity and aspiration hazards that are not described by UNRTDG classification system.

- Radioactive materials are described by the UNRTDG but not in the GHS.

- Corrosive substances are described by the UNRTDG that are not described by GHS. Apart from metal corrosivity the effects of substance corrosion on biological tissue is dealt with in terms of toxic effects (Class 6). The definitions used are identical, just that different classes are assigned.

- The GHS contains more detail on aquatic toxicity, defining acute verses chronic, and duration of testing for Class 9 Miscellaneous Hazards.

- The UNRTDG classifies substances that are transported with elevated temperatures and also genetically modified organisms. These classifications are not described by the GHS system.

New Zealand Hazardous Substances and New Organisms (HSNO) system

The New Zealand HSNO system draws both from the GHS and the UNRTDG classification systems.

A substance is considered to be a hazardous substance when it triggers any one or more of the thresholds (minimum degrees of hazard) of the following intrinsic properties:

- explosiveness
- flammability
- oxidising capacity
- corrosiveness
- toxicity
- eco-toxicity.

The New Zealand system is described by the Environmental Risk Management Agency (ERMA) as adopting the UN recommendations for the transport of dangerous goods for the threshold and classification system for explosiveness, flammability and oxidising capacity. The thresholds and classification schemes for corrosiveness, toxicity and eco-toxicity are based on the GHS system. ERMA goes on to describe the threshold and classification categories as reflecting international trends towards harmonisation (ERMA Summary, 2001).

The New Zealand HSNO legislation does not cover radioactive or infectious substances. As such the New Zealand classification system omits these two significant hazard classes.

HSNO has 112 hazard types, which is more than the GHS.

Consideration of the New Zealand classification system by definition shows the following:

- The explosive classification system used by HSNO is the same as the UNRTDG with the omission of unstable explosives.

- For compressed gases the New Zealand HSNO classification confines itself to only flammable gases or aerosols. Oxidising gases are classified as oxidising substances. As such, the New Zealand HSNO system fails to adequately describe the hazards associated with compressed gases, liquefied gases, refrigerated liquefied gases, and dissolved gases. Compressed gases which are non-flammable and non-toxic are not described by the HSNO system, despite these cases being capable of causing death by asphyxiation.

- Gases which are toxic are described in terms of toxicity. The definitions for toxicity are however in class 6.1.

- The GHS system has two classification hazards for flammable aerosols which do not align with the single classification used in New Zealand HSNO.

- Flammable liquids are allocated four degrees of hazard by the New Zealand HSNO system. The New Zealand HSNO system then goes on to include three liquid desensitised explosive categories which are used only by the UNRTDG system and not differentiated by GHS.

- Readily combustible solids (Class 4.1) are assigned two degrees of hazard by the New Zealand HSNO system which is consistent with the GHS and UNRTDG.

- There are seven categories of self-reactive substances. This is slightly more than the GHS which combines some categories. The UNTRDG does regulate category G substances for transport.

- The New Zealand HSNO system contains three categories for solid desensitised explosives. This is out of alignment with the GHS. UNTRDG treats them as a single category of class 4.1.

- There are three categories of spontaneous combustible self-heating substances which is consistent with the GHS and UNRTDG.

- The New Zealand HSNO classification has no category for self-heating substances in large quantities. This is in contrast to the GHS and UNRTDG which distinguish large quantities of self-heating substances in a separate category.

- There are three categories of substances which are dangerous when wet which is consistent with GHS and UNRTDG.

- Oxidising substances are allocated three degrees of hazard by the New Zealand HSNO system. The New Zealand HSNO system does not distinguish on the state of the substance (i.e. liquid or solid). This is in contrast to GHS and UNRTDG which allocates six categories to oxidising substances - three for liquids and three for solids.

- Oxidising gases are assigned a category of 5.1.2A in the New Zealand classification system. This is in contrast to GHS which uses a separate classification while in UNRTDG they are assigned as a subsidiary hazard under Compressed Gases (Class 2).

- There are seven sub-categories of organic peroxides which is consistent with the UNRTDG. The GHS combines some sub-classes in terms of hazard. UNTRDG does regulate category G substances.

- The New Zealand HSNO system assigns five categories to toxicity. This is the same as used by the GHS. UNRTDG only uses the first three categories.

- There is no assignment for infectious substances in the New Zealand HSNO legislation and classification system. The GHS takes the same approach and omits infectious substances. However for transport systems the UNRTDG assigns Class 6.2 with two degrees of hazard for infectious substances. There is considerable manufacture as a byproduct and transport of infectious substances in New Zealand.

- The GHS assigns three degrees of hazard to substances that cause skin irritation. In contrast the HSNO assigns two. Skin irritation is not included in the UNRTDG system.

- The GHS assigns three degrees of hazard to substances that cause eye damage or eye irritation. In contrast, New Zealand HSNO only assigns two sub-classes for eye hazard – one under toxicity and the other corrosivity. The UNRTDG classification does not include eye irritation.

- Substances which cause sensitisation and/or mutagenic effects, and carcinogens are assigned two degrees of hazard both by the New Zealand HSNO legislation and the GHS. None of the properties of sensitisation, mutagenicity and carcinogenicity appear in the UNRTDG system.

- New Zealand assigns three degrees of hazard to substances which cause reproductive or developmental effects in contrast to the GHS which only assigns two degrees of hazard.

- The GHS has an additional category which covers the effects on lactation. This hazard is added to reproductive development classification by HSNO.

- The GHS has five categories for target organ effects. Three of these are assigned on the basis of single exposure, and two are assigned on the basis of repeated exposure to substances. In contrast the New Zealand HSNO legislation only has two classifications depending on the degree of hazard for target organ effects.

- The GHS assigns two classifications which have an aspiration hazard. There is no equivalent classification system in the New Zealand HSNO substances or UNRTDG.

- Radioactive materials are outside of the scope of the New Zealand HSNO legislation and as such no classification system is assigned. Likewise the GHS also does not consider radioactive material hazards. The UNRTDG assigns some six sub-class classifications to radioactive material depending on the activity and surface contamination. The sub-classification used by the UNRTDG system does not fit readily with the hazard associated with radioactive material substances. Often several different types of radioactive materials are transported in one particular package. As such the packing classification system does not readily fit the degrees of hazard posed by radioactive materials.

- The New Zealand HSNO system assigns a classification 8.1A to substances which are metallic corrosive. An equivalent classification exists within the GHS. There is no specific classification for metallic corrosives in the UNRTDG, instead this is covered by minor danger corrosive substance packing group III.

- The New Zealand HSNO system assigns three degrees of hazard to substances which are skin-corrosive which is consistent with the approach used by the UNRTDG. There is some degree of overlap with the GHS and New Zealand HSNO system which handles skin-corrosive/irritation properties as a toxic property (Class 6.3).

- One degree of hazard (Class 8.3) is assigned to eye corrosives by the New Zealand HSNO system. This particular hazard is described by the GHS in terms of toxicity, as “serious eye damage”. The GHS defines two sub-categories of eye irritant. HSNO combines these into one category (Class 6.4).

- Aquatic eco-toxicity is assigned four degrees of hazard by the New Zealand HSNO classification system. In contract the GHS assigns three categories of acute aquatic toxicity and four levels of chronic depending on the degree of hazard and persistence. The UNRTDG assigns one classification to substances which are environmentally hazardous and have acute effects, and two degrees of hazard to environmentally hazardous substances with chronic effects.

- The UNRTDG has recently included in the criteria for classification as Class 9 the criteria of acute aquatic toxicity category 1 or chronic aquatic toxicity Category 1 or 2 (with no other hazardous properties that would cause the substance to be classified in a different DG Class). Other criteria that for Class 9 included elevated temperature substances and Genetically Modified Micro-Organisms (GMMO) or Genetically Modified Organisms (GMO). GMMOs and GMOs are not Dangerous Goods when authorized under HSNO.

- The New Zealand HSNO system assigns four degrees of hazard to substances which have eco-toxic effects on soil. There is no equivalent classification in the GHS or UNRTDG.

- The New Zealand HSNO system assigns three degrees of hazard to terrestrial vertebrates and terrestrial invertebrates. There is no equivalent classification in the GHS or UNRTDG.

- The UNRTDG also assigns substances which have to be transported at elevated temperatures and also a hazard category for substances which are genetically modified. There is no equivalent classification system in the New Zealand HSNO legislation or the GHS.

Labelling of hazardous substances in New Zealand

The HSNO legislation requires that all hazardous properties of a substance are disclosed. This is in contrast to the UNRTDG which requires only identification as a primary class. Some substances can qualify for 20 – 30 hazardous substance properties. For example chromium oxide satisfies the HSNO hazard thresholds for; 5.1.1B, 6.1B, 6.5A, 6.5B, 6.6A, 6.7A, 6.8A, 6.9A, 8.1A, 8.3B, 8.3A, 9.1A, 9.2B, 9.3B (NZ Gazette notice 35, 2004).

It is also possible for the concentration of a substance to affect which hazard classifications the substance satisfies. For example, acetic acid in a greater than 80% aqueous solution satisfies hazard classifications for 3.1C, 6.1D, 6.9B, 8.1A, 8.2B, 8.3A, 9.1D, 9.3C. In contrast a 10 – 30% aqueous solution of acetic acid satisfies the hazard classification of 6.1E, 6.9B, 8.1A, 8.2C, 8.3A.

There is a case to be made for recording secondary classifications in the inventory system in order to determine substances which satisfy a particular type of hazard class. For example, if a search was being made for all highly corrosive substances (8.3A) then concentrated acetic acid would not be detected based on its primary classification as a flammable liquid (3.1 c).

Since the entire hazard classification for a substance is dependent on concentration it is not possible to attach the hazard classification to the chemical abstracts number (CAS) assigned to a substance. The hazard classification would need to be attached to the product to indicate the concentration of the substance.

Secondary hazard labelling in New Zealand laboratories

The New Zealand Code of Practice for CRI and University Exempt Laboratories does not require re-labelling of containers providing they meet with EU, US, Canadian, or Australian regulations (CoP Section 4.3.1(b)). As such it is acceptable to label in New Zealand laboratories with only the primary hazard classification.

However this approach presents incomplete information in managing hazard-associated substances. Within the Code of Practice there are three additional controls which are imposed for specific hazard types. The three additional controls are:

1) warning required

2) trackable substance
3) substance-specific Safe Method of Use required.

As such there is a case to be made for recording subsidiary classes in order to determine the additional requirements that are invoked by the Code of Practice for CRI and University Exempt Laboratories, particularly when the sub-classification is a secondary hazard of the substance. The allocation of secondary sub-classes also allows determination of warnings required.

Requirements for laboratory inventory systems

There are very real difficulties for New Zealand laboratories seeking to set up inventory systems, in that the above discussion demonstrates the New Zealand HSNO system is internationally unique, and does not readily connect with the time tested UNRTDG, or the emerging GHS. The failure to connect with GHS is due to the New Zealand HSNO regulations (gazetted 2001) being based on a predicted GHS. The first GHS was only agreed in 2003. Once implemented it is particularly difficult to change a classification system, as the subsequent regulatory control instruments will depend on the classification system.

A laboratory chemical inventory system specification would include:

- Container level risk management tool that stores detailed chemical information needed for compliance, safety, cost, use and asset control.
- Records of; chemical identification including the vendor catalogue number, chemical abstract service number and formula; quantity details in the original and calculated common units of measure; location details in building, room, cabinet or controlled zone level; hazards including those required by the local regulatory authority, applicable regulatory listings; personal protective equipment recommendations; NFPA and HMIS hazard data (adapted from ChIM website).
- Ability to answer questions such as; who has a particular substance; what substances are in this room, building or site; what classes of substances are in this building; what substances are under an individual's control.
- And ideally what subclasses are in this room? For example which substances are hazardous to pregnant or hope to be pregnant staff?

The identification substance used by the laboratory inventory system also needs to be considered. Inventory system that use Chemical Abstracts Service number (CAS), as a unique substance identifier would need to use other keys that makes distinctions between different concentrations of same substance as required by HSNO. As such, substance identification keys need to either be CAS-concentration or CAS-vendor-product.

Options to amend existing proprietary inventory systems

Most proprietary inventory system accommodate the UNRTDG information as this is essential for transport purposes.

The extent to which other regulatory information is recorded in inventory systems reflects the country in which the inventory system is developed or intended for market. Prior to considering the implications for inventory vendors and more significant problem emerges, in relations to the availability of information.

The New Zealand classification system is predicated by a concept of positive approval New Zealand. This implies there is some authority which will classify substances according to the classification system of the country. The reality of information on each substance occurring in a world of *de novo* synthesis and where scientific chemical supplier catalogues expand available substance by some 500 new products per annum, is not practical. As such, the access to information that specifies multiple classify substances becomes more important than the classification system.

If a decision is taken to use GHS in a country with it own classification system is taken then a regulatory risk occurs.

HSNO Compliance risk issues using GHS

The mapping of the two classification systems then considered. Mapping showed the following risk between GHS and HSNO. Mapping issues are classified using system terms of one to one (1:1), 1 to many (1:M) or no correspondence (1:Null).

1 HSNO:1 GHS

Where the two classification systems use the same definition then the GHS would equal the HSNO classification giving one to one matching. The hazardous property may be described slightly differently. The bulk of substances are likely to fall into this category.

1 HSNO:M GHS

This is a situation where the GHS uses a finer definition of the hazardous properties, for example, Class 4.2a in HSNO refers to pyrophoric substances. The GHS system splits pyrophoric material by state, that is, liquids or solid. Using the GHS system would not produce non-compliance; the GHS simply defines things in more detail than is required by the New Zealand HSNO regulatory regime.

M HSNO:1 GHS

In this scenario there are several HSNO codes required but GHS lumps all the hazardous properties together. This occurs principally in Class 1 where the New Zealand system requires segregation A through to S. The GHS would simply describe all mass explosives in a single division and not indicate the segregation codes.

As such, the decision to use GHS would produce non-compliance particularly with explosive materials. However if the UNTRDG codes are also held the segregation class would still be available, all be it in a separate table in IM.

1 HSNO: 1 GHS with different number/descriptor

In this situation there is simply a different way or order of referring to hazardous materials. For example, HSNO considers an oxidising gas as firstly oxidising and secondly compressed. GHS considers the substance to be in a compressed gas cylinder, and the substance has an oxidising property. In this situation there is a unique one to one matching, it is just that different numbers or orders are used to describe the hazardous property. Use of the GHS system would ensure compliance, but just use a different terminology.

1 HSNO: GHS null
This is a situation where a hazardous substance property exists in HSNO but there is no corresponding value in GHS. This occurs in ecotoxic material and desensitised explosives.

Substances ecotoxic to soil environment, ecotoxic to terrestrial vertebrates, ecotoxic to terrestrial invertebrates, would not be reported in IM. In proposed changes to NZ HSNO these classes which are not used by the rest of the world would only be required for large scale application of agrichemicals. The proposed regulatory change would remove the non compliance for substance in laboratories.

Substances in IM that are used on grounds or farms would be non compliant. This could be addressed by allowing user defined codes and manual data entry.

The term desensitised explosives is derived from UNRTDG. As such the hazardous property would still be available but in a different table in IM.

Null HSNO:1 GHS
In this scenario a hazard classification exists in the GHS but there isn't a corresponding definition of that hazard in the New Zealand regulatory system. Some of the HSNO omissions pose serious risks to health and safety illustrating the inadequacies of the HSNO classification system. For example, HSNO does not recognise aspiration hazards. As such cylinders of carbon dioxide are considered non-hazardous in the New Zealand regulatory regime. Yet death will occur quite quickly if the carbon dioxide displaces the oxygen in a confined space. As such the GHS presents a more complete picture for health and safety purposes rather than the shortcomings of the HSNO system. Similar arguments apply to flammable aerosols - compressed gases, liquefied gases, refrigerated liquefied gases, dissolved gases and specific target organs systemic toxicity

Conclusion

Given the above factors it is recommended that Massey University uses the GHS system in its chemical inventory system.

The key reasons for this recommendation are:

1. The University uses approved and not yet approved (unapproved) substances. The unapproved substances account for a significant portion of substances used in small scale teaching and research. Use of GHS data will allow data on hazards of almost all substances used in small scale teaching and research within the University. Complying only with HSNO would present incomplete information in small scale teaching and research, as unapproved substances are not gazetted in HSNO regulatory information.
2. The New Zealand regulatory HSNO system produces an inadequate information profile for risks associated with hazardous substances. The

GHS presents a fuller picture of the risks given its more comprehensive classification system.

Where HSNO categories reflects UNRTDG (explosive substances, desensitised explosives) then the absence of these classes in GHS are covered by using UNRTDG as long as the explosive or desensitised explosive characteristic is the primary hazard.

There will be non-compliance in using the GHS as the classification system for soil and terrestrial vertebrates/invertebrates ecotoxicity. These properties are not applicable in small scale teaching and research. As such, the non compliance is of no consequence in the laboratory setting. It is likely the legislation will be amended to only require the codes for large scale application which would remove non compliance for laboratories. For substances used in agrichemical application the codes could need to be entered manually which is tedious, but would resolve the non-compliance.

Post script

In 2009 the ERMANZ signalled its intention to address the non-alignment of HSNO classification with the GHS classification.

As New Zealand uses a positive approval regime for substances this will potentially require re-gazetting of all substances within New Zealand. The proposal to change the classification system is akin to rearranging the foundations on a building. For the most part the change will be invisible except for alignment that coincides with the boundary of the building. The point of the analogy is a change in classification is not a matter to be undertaken lightly and will involve considerable resource and time. ERMANZ estimate it will take some five years to re-gazette the substances which have been approved for use in New Zealand.

There is an equivalent compliance cost to organisations who seek to be compliant. If the University elects to use the HSNO system then the bulk of its substances which are not approved will by definition be required to be assigned GHS values. This introduces the spectre of two systems within the inventory system IM. Obtaining the data is complicated and subject to revision by Gazette changes in the New Zealand regulatory regime. When and if New Zealand moves to the GHS system all the HSNO codes would need to be updated with the GHS classification.

Given the scope of New Zealand approved substances is less than that typically used in small scale teaching and research, a decision to use the HSNO classification would require prediction of unapproved substance hazards or some kind of aggregate table which encompasses both classification structures.

If the GHS is used at the outset only one classification system is needed in the inventory.

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