

# ACHIEVING CHEMICAL COMPLIANCE IN THE WATER INDUSTRY

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## ABSTRACT

Recent investigations into the regulatory requirements of the storage and handling of chemicals used for water treatment have identified the need for further communication and education in this area. During these investigations it was found that a number of barriers exist to finding, understanding and applying safety standards that relate to hazardous substances. Many in the industry seem unaware of their responsibilities under the law as they relate to chemical safety.

This paper aims to identify the key barriers to achieving chemical compliance in the water industry and highlight some tools that make understanding and applying chemical compliance requirements easier. The impact of the reform of health and safety legislation in New Zealand will also be discussed as it relates to the roles and responsibilities of those dealing with hazardous chemicals.

## KEYWORDS

**chemical compliance, HSNO, safety**

## 1 INTRODUCTION

The process of treating raw water taken from the natural environment to obtain potable municipal water involves dosing of a number of hazardous chemicals. These substances can include among others chlorine gas, lime slurry, sodium hydroxide, sodium hypochlorite, polymer, aluminum sulphate, polyaluminum chloride, carbon dioxide gas and hydrogen peroxide.

These chemicals are subject to both national and international regulations and standards to ensure that the public, operating staff and environment are protected from the harmful effects of the chemicals being used. Recent investigation into the regulatory requirements of the storage and handling of chemicals used for water treatment has identified the need for further education in this area. This investigation has included compliance assessment of nine of Whangarei District Council's water treatment facilities, as well as the design of upgrades to the Branxholme Water Treatment Plant in Invercargill. This paper aims to identify some of the barriers that exist within the water industry in New Zealand to chemical safety and chemical safety compliance.

All those involved in the design, construction and operation of water treatment facilities should be aware of the health and safety requirements of all the chemicals encountered. This task can be quite daunting giving the complex and ever changing scientific knowledge, opinions and perception around chemicals, their hazards and best practices for ensuring safety when storing or handling chemicals.

## 2 BARRIERS TO CHEMICAL COMPLIANCE

### 2.1 IDENTIFYING SAFETY STANDARD REQUIRED

Owners, operators and designers are under obligation to meet the legal requirements of the Hazardous Substances and New Organisms Act 1996 including the 22 regulations and 9 transfer notices under the act. These include among others the Hazardous Substance (Classes 1 to 5 Controls) Regulations 2001, Hazardous Substance (Classes 6 to 8 Controls) Regulations 2001 and the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004. While these documents provide the required safety controls

under law they do not provide a complete description of the best practices for the safe storage and use of chemicals.

The Health and Safety in Employment Act 1992 requires that all practicable steps to ensure safety in the workplace are taken. The water industry should thus look to employ best practice for storage and handling of chemicals. Current best practice information for the storage and handling of chemicals should be adopted for the relevant Australian and New Zealand standards. These standards are prepared with industry experts and provide more comprehensive and descriptive requirements for the design, construction, operation and handling of chemicals and chemical plants.

Standards of particular relevance to the water industry include:

AS/NZS 2927:2001 The Storage and Handling of Liquefied Chlorine Gas

AS 3780-2008 The Storage and Handling of Corrosive Substances

AS/NZS 4452:1997 The Storage and Handling of Toxic Substances

AS 4326-2008 The Storage and Handling of Oxidizing Substances

## **2.2 CLARITY OF INFORMATION**

A major barrier to achieving chemical safety compliance is sorting through the large amount of safety regulations and standards to find the relevant sections for a particular application. This has been the most challenging aspect of chemical safety reviews undertaken to date. HSNO is particularly difficult to manage with a multitude of regulations, transfer notices, group standards and codes of practice to review. A recent Cabinet Economic Growth and Infrastructure Committee paper has identified the complexity of HSNO regulations and lack of incentive to apply the current HSNO legislation (MBIE, 2015).

Furthermore the wording of the Hazardous Substance and New Organisms Act mean that changes or new additional regulations can be introduced at any time. These changes are often not very well communicated which leads to confusion and non-compliance. An example of this is the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004 which introduced the requirement that all tanks over 5000L (2500L for flammables, 500L for hazardous gases and 250 L for below ground tanks) holding hazardous chemicals must obtain a stationary containment certificate. Tanks that predate the transfer notice where required to have been assessed by test certifier before 2006. A compliance plan should be prepared for these tanks that do not meet the stationary containment standards, outlining the extent to which the existing stationary containment system does not comply and methods and timeframes for bringing the containment up to standard. This has not been communicated clearly and some local councils are still unaware of the stationary containment requirements of their chemical stores.

Owners, operators, designers and engineering professional bodies must work with chemical suppliers, health and safety experts and legislation writers to ensure that new and existing legislation is appropriate, clearly written and communicated effectively with all involved. The author believes that an effective way is to identify in the regulations clearly the Australian and New Zealand standards relevant to safe use and storage of chemicals of certain classes and provide some additional clearly defined requirements/amendments to these that are deemed appropriate. In this way all involved will have a more clear understanding of what the requirements are and how they can meet these requirements.

### **2.2.1 TOOLS FOR NAVIGATING HSNO**

Worksafe New Zealand and the Environmental Protection Authority (EPA) provide a number of useful online tools to search, navigate and simplify the complex HSNO legislation. Those wishing to review their current chemical safety requirements should consider the following tools to save time and avoid confusion. It is important to note that these tools do not cover all aspects of the HSNO legislation and as such a comprehensive knowledge of HSNO is still the only surefire method to ensure full HSNO compliance.

The Chemical Classification and Information Database (CCID) allows searching of a particular chemical to find the HSNO classifications assigned to it (EPA,2015a). It should be noted that scientific knowledge and opinions about chemicals, changes over time and that those working in industry should periodically review current safety datasheets about the chemicals in which they encounter to ensure the information that they have is up to date. A good example of this is the chemical aluminum sulphate which has been reclassified from an irritant to a class 6 toxic substance and a class 8 corrosive substance.

EPA's Approved Hazardous Substances with Controls database can be searched via chemical to identify relevant HSNO regulations that apply to that chemical (EPA,2015b). However this tool will not identify all compliance requirements such as the need for stationary containment certificates specified in the Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004.

Worksafe New Zealand provides a number of tools designed to simplify HSNO requirements in its hazardous substances toolbox (Worksafe NZ, 2015a). A series of simple guides are available on requirements such as labelling, test certificates, hazardous substance approvals and storage. The HSNO toolbox also allows users to enter an inventory of hazardous goods and outlines the main HSNO requirements such as location certificates and approved handler requirements.

## **2.3 RESPONSIBILITY OF CHEMICAL SAFETY**

In some cases compliance shortfalls may occur as a result of confusion over which party is responsible for chemical safety.

The European Union's, Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) legislation puts a large emphasis on the obligations of chemical importers and suppliers to ensure that the chemicals being manufactured are safe and are used in a safe fashion. Downstream users are required to implement safety measures specified by their supplier and prepare chemical safety reports (CSR) if the use is outside the conditions described in any exposure scenario provided with the chemical (ECHA, 2015).

In New Zealand, HSNO legislation puts more emphasis on downstream users with regular reference to the responsibilities of the person in charge, which is the owner, occupier or person in effective control or possession of the hazardous substance. Furthermore, in the new health and safety reform bill and corresponding Health and Safety at Work Act (HSW) which is currently before parliament, the primary duty to ensure health and safety lies with the 'Person Conducting a Business or Undertaking (Worksafe, 2015b)'. This puts more onus on owners and operators to ensure health and safety of those they employ. Chemical suppliers are still required to ensure that the hazards of chemicals they supply are known and clearly communicated. Owners, operators and designers should not rely solely on chemical suppliers to ensure the safe handling and use of the chemicals they are supplying, but rather work with chemical suppliers to identify the hazards and risk associated with the chemicals they are delivering and that they meet the safety and legal requirements.

### **2.3.1 NEW LEGISLATIVE CHANGES**

The new legislation seeks to integrate hazardous substances management as it relates to safety in the workplace, into the Health and Safety at Work Act. The new act is set to include some workplace specific controls as well as more extensive referencing of the HSNO act which will remain responsible for setting base controls (e.g. packaging, labelling, and safety data sheets) chemical controls, non-workplace controls, and environmental controls (Cabinet Economic Growth and Infrastructure Committee, 2015; MBIE, 2015).

Preempting these legislative changes, as of September 2014, Work Safe New Zealand have been made responsible on behalf of the EPA for a number of functions of the HSNO legislation (Worksafe NZ, 2015c, EPA 2015c). These include the following functions:

- Issuing test certifier approvals, renewals and extensions
- Oversight of the test certification regime
- Issuing controlled substance licences

- Issuing approvals for plant and equipment used in the workplace
- Approval of HSNO codes of practice

## **2.4 HISTORIC COMPLIANCE**

Many water treatment and dosing facilities utilising hazardous chemicals predate hazardous substances legislation. The design construction and operational procedures of these sites often do not meet current safety standards.

The New Zealand drinking water standard states that “safe drinking-water, available to everyone, is a fundamental requirement for public health”. As such importance of water treatment and reticulation is identified as important at both government and local government levels. This has resulted in the water industry receiving a large amount of leniency with respect to hazardous substances non-compliance due to the societal importance of clean drinking water.

However a more concerted effort needs to be made within the industry to identify areas of non-compliance with legislation and prioritisation of safety and chemical safety in planned upgrades to existing infrastructure. Now is an important time to consider this as councils are required to upgrade existing infrastructure from the 1950's and 1960's that is meeting the end of its design life.

In providing upgrades the industry should, where practical, be looking at best practices for chemical safety as opposed to meeting minimum standards for chemical safety compliance. Legal debates over the exclusions and wording of chemical standards and regulations do little to improve chemical safety.

## **3 CONCLUSIONS**

It has been identified that current HSNO legislation in New Zealand is overly complicated and poorly communicated. The water industry must make a concerted effort to work with those involved in chemical legislation, classification, controls and supply to understand the legal and ethical obligations to store and use chemicals for water treatment in a way that is safe to those in operations, the public and the environment.

Worksafe New Zealand and the Environmental Protection Authority provide some tools and guides to help hazardous chemical users navigate and understand HSNO regulations. These are useful to help guide and navigate users through the HSNO legislation, but chemical compliance still requires an extensive knowledge of HSNO requirements.

Those in the industry should be aware of upcoming changes associated with health and safety reform and keep an eye out for changes in enforcement and controls as they are introduced with the new Health and Safety at Work Act. This legislation is set to integrate hazardous substances with workplace health and safety and put more onus on workplaces to ensure hazardous substances are used and stored safely.

## **REFERENCES**

### *New Zealand Legislation*

Hazardous Substances and New Organisms Act 1996

Hazardous Substance (Classes 1 to 5 Controls) Regulations 2001,

Hazardous Substance (Classes 6 to 8 Controls) Regulations 2001

Hazardous Substances (Dangerous Goods and Scheduled Toxic Substances) Transfer Notice 2004

### *Australian and New Zealand Standards*

AS/NZS 2927:2001 The Storage and Handling of Liquefied Chlorine Gas

AS 3780-2008 The Storage and Handling of Corrosive Substances

AS/NZS 4452:1997 The Storage and Handling of Toxic Substances

AS 4326-2008 The Storage and Handling of Oxidizing Substances

### ***Other References***

EPA (2015a), Chemical Classification and Information Database (CCID) [Online] Available from: <http://www.epa.govt.nz/search-databases/Pages/HSNO-CCID.aspx> [Accessed: 27 June 2015]

EPA (2015b), Approved Hazardous Substances with Controls [Online] Available from: <http://www.epa.govt.nz/search-databases/Pages/HSNO-CCID.aspx> [Accessed: 27 June 2015]

EPA (2015c), Key changes to HSNO and health and safety law [Online] Available from: <http://www.epa.govt.nz/hazardous-substances/hsno-reform/Changes-HSNO-HS/Pages/default.aspx> on [Accessed: 21 June 2015]

MBIE (2015) Cabinet Economic Growth and Infrastructure Committee: Improving Health and Safety at Work: Occupational Health and Management of Hazardous Substances, [Online] Available from: <http://www.mbie.govt.nz/what-we-do/workplace-health-and-safety-reform> [Accessed: 27 June 2015]

Worksafe New Zealand (2015a), Hazardous Substances Toolbox, [Online] Available from: <http://www.hazardoussubstances.govt.nz/> [Accessed: 28 June 2015]

Worksafe New Zealand (2015b), Health and Safety Reform Bill Update: 18th February 2015, [Online] Available from: <http://www.business.govt.nz/worksafe/about/reform> [Accessed: 27 June 2015]

Worksafe New Zealand (2015c), Hazardous Substances, [Online] Available from: <http://www.business.govt.nz/worksafe/information-guidance/guidance-by-industry/hsno> [Accessed: 27 June 2015]

European Chemicals Agency ECHA (2015), Downstream user roles and obligations [Online] Available from: <http://echa.europa.eu/web/guest/regulations/reach/downstream-users/downstream-user-roles-and-obligations> [Accessed: 27 June 2015]

MBIE (2015) Cabinet Economic Growth and Infrastructure Committee: Improving Health and Safety at Work: Occupational Health and Management of Hazardous Substances [Online] Available from: <http://www.mbie.govt.nz/what-we-do/workplace-health-and-safety-reform> [Accessed: 27 June 2015]

Cabinet Economic Growth and Infrastructure Committee (2015), Cabinet Minute, Improving Health and Safety at Work: Occupational Health and Management of Hazardous Substances, CAB Min (13) 24/13, [Online] Available from: <http://www.mbie.govt.nz/what-we-do/workplace-health-and-safety-reform> [Accessed: 27 June 2015]