# Health and Safety at Work (Hazardous Substances) Regulations 2017; Staff Training and Supervision

## Comparison between industry training and laboratory training

## Historical Summary:

The Approved Handler regime pursuant to the Hazardous Substances and New Organisms (HSNO) Act 1996 and the Hazardous Substances (Personnel Qualifications) Regulations 2001 was in place from commencement 1st April 2004. That changed with the transfer of the HSNO Regulations to the Health and Safety at Work (Hazardous Substances) Regulations 2017.

The requirement for a person to be an Approved Handler when handling, using, storing, transporting or disposing of hazardous substances of classes 2-9, subclasses and letter (hazard) categories at the quantity triggers in the HSNO Scheduled Tables, or to supervise staff who were not certified handlers was discontinued except for Classes 6.1A and 6.1B.

### HSNO Approved Handlers:

The situation under HSNO was that Approved Handlers, where required for substances of classes 2-5 on site in excess of the tabled quantities, were able to supervise staff who were not certified but were not required to be on site, just available to provide guidance. The legislative intent was that there should be sufficient certified personnel to cover all shifts, holidays and sick leave etc., and, with a knowledge of the substances, the site, the processes, the regulatory controls, the Approved Codes of Practice, and the personnel being supervised.

Classes 6-9 required the Approved Handler to be on site to provide that level of supervision.

All current Approved Handler certificates will remain in force for the substance classes, lifecycles and conditions on the certificate till expiry, and may be deemed to be a means of demonstrating compliance with Regulation 4.5 detailed below. Latest possible expiry date of an Approved Hander Certificate is 30.11.2022.

### HSWA Certified Handlers:

The Health and Safety at Work (Hazardous Substances) Regulations 2017, to reiterate, covers only classes 6.1A and 6.1B, (and 6.1C where the substance requires a ‘Controlled Substance License’).

The regulations are at:

http://www.legislation.govt.nz/regulation/public/2017/0131/latest/DLM7309401.html?search=ts_act%40bill%40regulation%40deemedreg_health+and+safety+_resel_25_a&p=1

Regulation 4.1 requires; where for the purposes of section 206 of the Act, work that these regulations are required to be carried out by a Certified Handler, Regulation 4.1 states; may be carried out only by a person who holds a compliance certificate as a Certified Handler i.e. 100% coverage. This is however at variance with Regulation 13.9(2)(a)(i)(ii)&(iii) which continues to allow direct supervision and guidance by a Certified Handler on site and available to provide assistance at all times.

The competency requirements for Certified Handlers for classes 6.1A and 6.1B differ only in minor respects to the previous HSNO controls:

NB: A Laboratory Manager is not required to be a Certified Handler or the holder of a Controlled Substance licence under Regulation 18.9 but a parallel can be drawn , and arguably should be drawn between the knowledge requirements in Regulation 18.13 and Regulations 4.3 and 4.5, the differences really relating only to the differences in terminology and operational differences between laboratories and industry.

Similarly, a parallel can be drawn between the knowledge requirements for laboratory workers including those working under the supervision of the Laboratory Manager on Classes 6.1A and 6.1B in Regulation 18.14 and Regulation 4.5.

Since Regulation 18.9 states in (1) that substances must be handled, packaged and stored in the laboratory in the way in which substances with the same hazard classification must be managed under the applicable provisions of Part 9-13 (the classification specific controls), the training and supervision provisions of Part 4 should not be ignored. Given the vast range of laboratory types and activities carried out in them, any risk identified shortfall in the coverage of Regulations 18.13 and 18.14 that can be managed by compliance with Part 4 should see those provisions applied as Best Practice.

WorkSafe New Zealand has provided the following Good Practice Guidance on Regulation 18.14 et al. Note the use of the modal verbs must (mandatory), may and should (desirable recommendations). To deviate from a recommendation of the regulator will require a significant element of risk assessment and justification if adopting an alternative approach unless supported by appropriate and applicable regulation – using Part 4 to bolster and support Part 18 with respect to training and supervision is exampled and described throughout this document.

Under the Health and Safety at Work (General Risk and Workplace Management) Regulations (GRWM Regulations), the laboratory manager must assess and manage risks associated with hazardous substances and provide appropriate information training and supervision.

A standard operating procedure (SOP) should be developed by the laboratory manager, in consultation with health and safety representatives, for undertaking a risk assessment and recommending mitigating measures.

While persons handling hazardous substances in a laboratory (including students) do not need to be certified handlers, they must be provided with training and knowledge appropriate to the activities they will be undertaking in the laboratory itself.

A safety induction programme for all authorised persons prior to them starting work in the laboratory and ongoing training, supervision and instruction where relevant.

The laboratory manager must ensure that every person handling a hazardous substance in the laboratory is provided with the following information before handling the substance:

- Procedures to prevent the contamination of any equipment, clothing, or part of the laboratory
- Laboratory's method of management of the substance
- Disposal requirements for the substance
- Actions required under the laboratory's emergency response plan in the event of an accident or accidental exposure to the substance.

This information may be included in relevant SOPs and SMOUs.

An induction should include, at a minimum:

- Laboratory manager and laboratory users' responsibilities
- Laboratory practices for labelling of containers
- How to read and use SDSs and their location
- Types of hazardous substances and their risks and controls
- Precautions for handling the hazardous substances managed or used in the laboratory
- SOPs/SMOUs
- Storage locations, uses and requirements for separation and control
- Use, storage and maintenance of PPE
- Familiarisation with the ERP
- Arrangements for reporting hazards, accident and incident
- Emergency response equipment and procedures including first aid
- Disposal requirements, equipment and procedures.

Training and induction should include the requirement to notify the laboratory manager prior to introducing any new procedure, process, equipment or hazardous substance to the laboratory.

A laboratory user may cease, or refuse to carry out, a procedure if the user believes that carrying out the procedure would expose the user, or any other person, to a serious risk to the user's or other person's health or safety arising from an immediate or imminent exposure to a hazard.

The PCBU in control of a laboratory where substances are stored in a dedicated store supplying the laboratory with Classes 6.1A and 6.1B is required to appoint a Certified Handler to be in charge of the store at any time the store is not secured; (see Regulation 13.9). And to supervise any person who is not a Certified Handler when transferring the substances from the store to the laboratory. The Certified Handler is responsible for maintaining the Tracking records for the substances under Part 19. See document - 'Tracked substances as they relate to laboratories.'

(1) Before being certified as a certified handler at a workplace, a person must know and be able to describe the following matters:

a) the hazard classifications (found at https://www.epa.govt.nz/database-search/approved-hazardous-substances-with-controls/ and accessed using either the substance name, synonym or CAS number), properties, and adverse effects of those hazardous substances (from the Safety Data Sheet, Product Safety card or Safe Method of Use) for which he or she is to be a certified handler:

b) the requirements that are imposed by these regulations in relation to those hazardous substances

(from: http://www.legislation.govt.nz/regulation/public/2017/0131/latest/DLM7309401.html?src=qs ); and https://www.epa.govt.nz/industry-areas/hazardous-substances/group-standards/2017-group-standards/

c) the requirements that are imposed under the HSNO Act in relation to those hazardous substances. This relates to [a] above and any environmental controls imposed by the EPA. This is because the Health and Safety at Work legislative suite covers only workplace safety and excludes class 9 ecotoxic environmental controls. See EPA Hazardous Substances (Property Controls) Notice 2017 at: https://www.epa.govt.nz/industry-areas/hazardous-substances/rules-for-hazardous-substances/epa-notices-for-hazardous-substances/

In addition, for Teaching and Research and Development Laboratories that are permitted to use non-approved substances; the conditions in s.33 of the HSNO Act apply. The Act is at: http://www.legislation.govt.nz/act/public/1996/0030/latest/DLM383514.html

The EPA website is at: https://www.epa.govt.nz/

d) any proposed conditions on the person's compliance certificate as a Certified Handler. It is worth noting here that Location Compliance Certificates for classes 6.1A-C and 8.2A & B came into force 1st December 2019 but that Certified Handlers for classes 6.1A and 6.1B continued from commencement i.e. they already needed to have been in place from 2004 and applicable to Laboratory dedicated stores under HSNO.

A Laboratory Manager deemed to be a Certified Handler and holder of a Controlled Substance License has no conditions imposed by regulation; but, they may be imposed by a PCBU job description for the position or on a person designated in writing to be in charge of the laboratory or part of the laboratory in the absence of the laboratory Manager i.e. with a lesser designated condition on his or her work practice:

e) the precautions required to prevent injury or illness to any person at the workplace caused by any of those substances. Relates to knowledge from the SDS and process documentation and is specific to the substances – the first aid knowledge for every substance in other words. The Health and Safety at Work (General Risk and Workplace Management) Regulations 2016 places duties on the PCBU to manage substances hazardous to health in Regulations 28-30 and for health monitoring in Part 3 at: http://www.legislation.govt.nz/regulation/public/2016/0013/latest/DLM6727530.html?search=ts_act%40bill%40regulation%40deemedreg_health+and+safety+_resel_25_a&p=1

A generic first aid kit in a laboratory may not be adequate to provide the resources needed to treat injuries for the substances in the laboratory. In a large laboratory space where particular chemicals are in use in specific areas, a dedicated first aid kit in each of those areas may be necessary.

Similarly, generic first aid training is not usually adequate to meet this regulatory requirement. Additional or top up first aid training based on the substance SDS may be needed. That includes (practical) exercises with eye wash and emergency showers. Regulation 5.7 Duty to prepare emergency response plan (3)(a)(iii) requires an action to help or treat any person injured in the emergency. The regulation is at: http://www.legislation.govt.nz/regulation/public/2017/0131/latest/DLM7309767.html?search=ts_act%40bill%40regulation%40deemedreg_health+and+safety+_resel_25_a&p=1

f) the procedures to adopt in an emergency involving those substances An emergency plan is required in Part 5 of the Regulations, from Regulation 5.7 – 5.13 at the trigger quantities in Schedule 5 but also from the Health and Safety at Work (General Risk and Workplace Management) Regulations 2016, comes a duty to prepare, maintain and implement emergency plans generally regardless of quantity triggers. (This is an extension of the HSNO emergency planning at Levels 1 & 2 in that provision is required for 'testing and consideration of the frequency of testing') For laboratories, Regulation 18.15 requires an emergency plan for every quantity of every chemical compliant to Part 5 and tested annually – see document 'Some thoughts on emergency planning. For dedicated stores supplying laboratories the trigger limits in Schedule 5 apply – those are not necessarily conservative figures when considering the life risk and congested proximities to buildings and high traffic areas of a typical campus. It is incumbent on the PCBU to assess risks and reduce them So Far As Is Reasonably Practicable (SFAIRP):

g) any variations of requirements, alternative means of compliance with requirements, or additional requirements or provisions specified in a relevant safe work instrument (see: http://www.legislation.govt.nz/regulation/public/2017/0131/latest/DLM7309691.html?search=ts_act%40bill%40regulation%40deemedreg_health+and+safety+_resel_25_a&p=1 for the relationship between Safe Work Instruments (SWI) and the regulations; and the status of the disallowable instrument of a SWI in the Act in: http://www.legislation.govt.nz/act/public/2015/0070/latest/DLM5977229.html?search=ts_act%40bill%40regulation%40deemedreg_health+and+safety+_resel_25_a&p=1

(2) The person must also—

(a) know, and demonstrate a working knowledge of, the procedures and plant (including personal protective equipment) necessary to manage those hazardous substances at the workplace for which the person is to be a certified handler.
Or which the Laboratory Manager is responsible for

(b) have received information, training, and instruction in accordance with regulation 4.5. Or Regulation 18.14

(3) A written record is sufficient evidence on which a compliance certifier may decide whether to issue or renew a compliance certificate as a certified handler to that person if that record—

(a) is signed by the provider of a course of instruction or a work supervisor; and

(b) describes the method used to assess a person's knowledge and practical skills and the results of that assessment.

In line with Regulation 4.5 below in (5)(a&b) the PCBU is required to keep a record of training and instruction provided under this regulation; and ensure the record is available for inspection by an inspector or compliance certifier.

## Duty to provide information, training, instruction and supervision:

Regulations 4.5 and 4.6 represent the main changes in intent in that it formalises the requirements much more concisely than was evident under the previous HSNO regulations or the Health and Safety in Employment legislative suite.

HSNO with its reliance on the Approved Handler system, and allowance for staff to receive guidance and supervision, provided little in the way of requirements on the (now repealed; HSNO defined) 'Person in Charge' to formalise training and record keeping for staff being so guided and supervised.

One of the prime drivers for the Approved Handler regime originally was to ensure that there would be persons on site or available to that site, and the personnel on that site, who understood the applicable legislation i.e. the regulations governing the work practices, substances used, equipment and processes; and were generally at supervisory level in the organisation.

As identified above; for classes 2-5 – the gases, flammables and oxidisers, the requirement was for someone to be available – not necessarily on site. To provide an example of the breadth to which that could be legally applied would be to look at the supply of LPG in cylinders. Unless a staff member was connecting cylinders at a facility in excess of the Approved Handler trigger of 100kg, (where an Approved Handler was required to be available to guide and supervise; whether onsite of offsite), the legislative requirement for a certified handler could and had been met by way of the gas suppler 0800 contact phone number.

For classes 6 & 8 the requirement was for the Approved Handler to be available onsite. The WorkSafe New Zealand interpretation of that and the advice given by the Regulator was that the person must be available to provide 'direct control and direct supervision.' This on the logic that if something went wrong and the Approved Handler had not been present then the legal test would not have been met.

This is the situation for classes 6.1A&B going forward for Certified Handlers as detailed above.

For the remainder of the classes, the PCBU, needs to make an evaluation of the formal instruction and training and resulting record keeping for staff. And; in the workplace, the degree to which information is made available to staff, for on the job training, instruction and supervision.

The requirements are contained in Regulations 4.5 and 4.6 inserted here with comments:

Regulation 4.5 commenced on the 1st June 2018.

### 4.5 Duty of PCBU to provide information, training, and instruction

(1) In addition to complying with regulation 9 of the Health and Safety at Work (General Risk and Workplace Management) Regulations 2016, a PCBU must ensure that every worker who uses, handles, manufactures, or stores a hazardous substance (including hazardous waste) is, before the worker is allowed to carry out or supervise work involving those substances, provided with—

(a) the information referred to in subclause (2); and

(b) the training and instruction referred to in subclause (3).

Emphasis is placed on 'every worker.'

It needs to be noted here also that hazardous wastes are included in this for the first time in Regulation 1.4 and applied from 1st June 2019 – (legislative Explanatory Note: Part 1, referring to Regulation 2 - Commencement). Despite having the Hazardous Substances (Disposal) Regulations 2001 which described how the waste was to be disposed of in the end, once a substance was declared a waste, none of the HSNO control regulations previously applied to the waste substance. Should they have – yes absolutely, but the difficulty was that a waste may only be marginally contaminated through to mixtures significantly different to the original components. SDS should be formulated by the PCBU on such wastes identifying the applicable controls established around the safe storage and identification for transport etc. and, included in general duties; the requirement for an inventory under Regulation 3.1(3).

The effect of this is to place the requirements for legislative compliance and emergency management on the producer of the waste rather than on the disposer at the other end.

WorkSafe New Zealand has provided the following Good Practice Guidance:

"Some hazardous chemicals may be destroyed in the laboratory. However, this should only be done by workers who have received appropriate training and who are thoroughly familiar with the potential hazards and chemistry of the substance to be destroyed and any reagents used for that destruction."

(2) The information is—

(a) any operations in the worker's work area where hazardous substances are present; and

(b) the location and availability of known reference material on the hazards, safe handling, and storage of the hazardous substances found in the workplace, including (without limitation) safety data sheets.

The EPA has released an EPA Notice (a legally enforceable document) on Safety Data Sheets. Refer also to Regulation 2.11. https://www.epa.govt.nz/industry-areas/hazardous-substances/rules-for-hazardous-substances/epa-notices-for-hazardous-substances/

But, SDS are only one component of the information that needs to be made available to the worker as covered above for Approved Handlers in Regulation 4.1 and below in the explanatory notes on where to access that information

(3) The training and instruction must include—

(a) training and instruction in the following:

(i) the physico-chemical and health hazards associated with the hazardous substances the worker uses at work: This should be read in conjunction with the Health and Safety at Work (General Risk and Workplace Management) Regulations 2016: in particular Regulation 9

(ii) the procedures (if applicable) for the safe use, handling, manufacture, storage, and disposal of the hazardous substances:

(iii) practice in the safe use of plant (including personal protective equipment) necessary to manage the hazardous substances:

(iiia) the worker's obligations under these regulations: The 'a' indicates an addition to the original draft and brings in the element from the Approved Handler regime that workers must know and understand the legislation they work under and which govern their work practices.

(iv) the actions that the worker should take in an emergency involving the hazardous substances having regard to both emergency plans required under these regulations at the same triggers as the Hazardous Substances (Emergency Management) Regulations 2001; Level 3 and the Health and Safety at Work (General Risk and Workplace Management) Regulations 2016: Regulation 14, and Regulation 18.15 for laboratories.

(b) an appropriate period of practical experience of the matters described in paragraph (a), under direct supervision in the workplace. There are a number of such undefined wordings in the Regulations as 'appropriate' and 'suitable and adequate' with only 'reasonably practicable' having been subject to legal interpretation and guidance. Strict liability applies – essentially if it all goes wrong then clearly the interpretation that will be placed on the level of training and supervision by the Regulator will be that it did not pass the test of suitable and adequate by (plain English) definition thus leaving the PCBU liable. This, unless it could be proven that the incident, accident, fire, spillage, injury or death was caused by a worker acting outside of his or her written job description, scope of work, SMoU, SOP, Job Safety Analysis or written instructions, and a written record of training and supervision as required by (5) below: In other words, the worker's actions were an anomaly and that the PCBU had exercised every reasonably practicable action to prevent such an occurrence. And, in the event of the occurrence, acted to limit the effects of the event through activation of emergency plans addressing the incident elements previously identified SFAIRP as a reasonably likely potential scenario.

(4) The information provided under subclause (2) and the training and instruction provided under subclause (3) may cover specific hazardous substances or groups of hazardous substances with the same hazardous properties. i.e. individual substance approvals as issued by the EPA at:

https://www.epa.govt.nz/database-search/approved-hazardous-substances-with-controls/

or under Group Standards – linked at:

https://www.epa.govt.nz/industry-areas/hazardous-substances/group-standards/2017-group-standards/

(5) A PCBU must—

(a) keep a record of training and instruction provided under this regulation for each worker; and

(b) ensure the record is available for inspection by an inspector or compliance certifier.

(6) A PCBU who can demonstrate, by documentation or certification, that a worker's previous experience or training (or both) has resulted in training equivalent to that described in subclause (3) is not required to provide training and instruction in accordance with subclause (3) unless the PCBU considers refresher training to be necessary. This is where the evaluation of previously certified Approved Handlers is pertinent.

(7) Despite subclause (6), a worker with equivalent training who is new to the workplace must receive site-specific induction and have appropriate supervised experience at the new workplace.

### 4.6 Duty of PCBU to provide supervision

(1) Without limiting regulation 9 of the Health and Safety at Work (General Risk and Workplace Management) Regulations 2016, a PCBU must provide a worker at the workplace with the supervision that is necessary to protect the worker from risks to his or her health and safety arising from the worker's work, if the worker—

> (a) uses, handles, manufactures, or stores hazardous substances at the workplace; or
> (b) operates, tests, maintains, repairs, or decommissions plant used in the use, handling, manufacture, or storage of hazardous substances at the workplace; or
> (c) is likely to be exposed to hazardous substances at the workplace.

'Decommissions' was new and affects contractors, bringing in the requirements for PCBU to PCBU 'Duty of Care' and the need to have been provided with and have had made available the training records, and an evaluation of the knowledge and experience of the individual personnel provided for the job by the contracting PCBU. And, for the primary PCBU to provide the requisite level of instruction and training and evaluation of the particular hazards intrinsic to the work to be carried out that is unique to the particular task and environs.

To comment on (c) above – **'likely to be exposed to'** introduces a number of risk elements including but not limited to personnel transiting the work area. Exposure may be of a very limited nature but the potential toxic body upload for a person not regularly used to working with a particular chemical at what would normally be an acceptable percentage of the Workplace Exposure Standard (WES – STEL or TWA) could, under some circumstances lead to unacceptable risk and liability.

They may be particularly susceptible to the chemical, or allergic to it, or sensitized to it meaning that even the slightest exposure through contact or inhalation could be life threatening. The person (and their doctor) may be completely unaware of the condition until the onset of an anaphylactic like shock reaction. There is a need to conduct a thorough study of the SDS to determine if this is a possibility. If a substance is classified as a 6.5A or 6.5B it is a reasonable indicator of the need to exercise a Duty of Care to staff and others who could be potentially exposed. It also raises the question of whether at interview of a new employee or student the question should be asked as to susceptibilities to immunotoxic chemicals or any known allergies to substances, foods or latex PPE.

The variations in people are just too vast to be able to predict which is why the normal workplace exposure standards are not safe guidelines to rely on, and why PPE including fume hoods may not be enough protection.

In the event of an adverse reaction the question is whether the symptoms are:

1. the same following each exposure; or
2. linearly progressive i.e. have continued to get worse over time; or
3. most worrying, but unlikely – exponential

And that could occur now or years in the future and from a seemingly unrelated event in private life or another occupation. There is court precedent on this – cases taken years following exposure. That raises an ethical question about career progression with another employer, PCBU to PCBU Duty of Care, and disclosure of information, and the legal test of 'knows, or ought reasonably to know.'

Scenario 1. Can be dealt with by PPE including fume hoods.

Scenario 2. PPE could be tried but if the conditions persist, the person must not be asked to undertake the tasks in future but can continue to work in the lab with care taken.

Scenario 3. Even entry to the lab could present an unacceptable risk to both the worker and the PCBU.

I would draw your attention to another potential scenario – a person, perhaps laboratory administrative assistant or workplace assessor, walking into or through a laboratory where solvents and other chemicals are in use - that of a young woman of child bearing age, possibly intending to become pregnant, perhaps pregnant already and not yet knowing, being exposed to toxic fume inhalation or exposure through skin absorption. The danger in that scenario of a toxin crossing the placenta and doing irreparable damage to a foetus during, in particular, the first trimester is unacceptable. Allied to that would be a woman breast feeding as toxins are expressed in breast milk. The significance here is that a foetus or infant has an entirely different toxic body upload to an adult; what would be comfortably within an adult's tolerance level may be fatal to a child or foetus.

I would also draw your attention to the Health and Safety at Work (General Risk and Workplace Management) Regulations 2016; Regulation 44 in particular 2(c) school tours of a workplace for persons under the age of 15 years with respect to elements of the above scenario.

To provide perhaps a little more clarity and information in support of this area of enquiry:

Workplace Exposure Standards (WES) and Biological Exposure Indices establish levels of exposure for a wide variety of workplace factors. The WES may be a Short-Term Exposure Limit (STEL), Time Weighted Averages (TWA), and Peak or Ceiling exposure levels. These relate to potential exposure duration. Consideration of relevant exposure standards and monitoring to assess conformance can be complex and must be undertaken by a competent person, normally a certified Occupational Hygienist, in the first instance at least. If an adverse reaction is experienced and depending on type, severity and progression profile of symptoms, the engagement of a toxicologist, dermatologist, possibly an ophthalmologist and obviously along with the person's GP will be necessary.

Based on the risk assessment for each substance, as well as any mixture of substances, and together with the SMoU, task, or process analysis that the hazardous substances is to be managed under, a health monitoring profile needs to be established to enable consistent monitoring and surveillance practices.

Health monitoring and surveillance relates to the process of reviewing the health of workers exposed or potentially exposed to particular hazards and refers to tests conducted, examinations of, and records maintained on a worker's health resulting from possible exposure to substances hazardous to health.

The process of health monitoring and surveillance extends beyond individual workers and includes regular exposure monitoring of the laboratory or workplace. This means assessing or testing the laboratory or particular work environment or piece of equipment, or services (drains, vents etc.) to ensure exposure levels to hazardous substances are identified and appropriately managed.

The PCBU has a responsibility to manage workers' exposure to hazardous substances and other substances hazardous to health, but each worker or student also has a responsibility to prevent or minimise their exposure to any hazardous substance by following correct procedures and established controls, and immediately reporting any unintended or accidental exposure to the Laboratory Manager.

Workers are entitled to information about the substances they are working with or exposed to, along with the results of their own personal health exposure monitoring.

(2) The PCBU must ensure that the supervision provided under subclause (1) is suitable and adequate having regard to—

(a) the nature of the risks associated with the hazardous substance; and
(b) the knowledge and experience of the worker. Which would need to be evaluated

The above while closely referencing the Regulations is intended to provide some thoughts on risk management and compliance around training and supervision. The reader or indeed the regulator may disagree with some points made. Alternative means may be adopted. The information and views presented are intended only to stimulate the conversation, to provide background and texture to the legal test of So Far As Is Reasonably Practicable.

They are the thoughts of a practitioner in the field of legislative compliance and adult education with 30 years of direct experience in those disciplines, with practical experience in firefighting, fire safety and fire engineering stretching back nearly 50 years and supported by qualifications in explosion prediction and mitigation, emergency management of hazardous chemicals, and toxicology all at post graduate level.