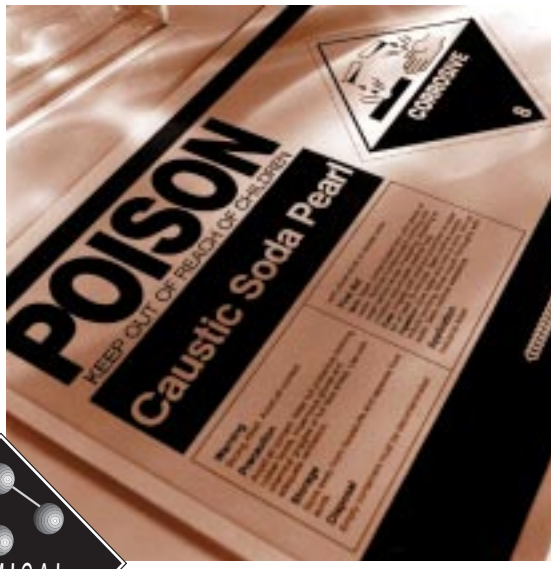
HEALTH AND SAFETY IN EMPLOYMENT ACT 1992

A PRACTICAL GUIDE AND WORKBOOK FOR

COMPLETING A MOSHH ASSESSMENT

In your workplace



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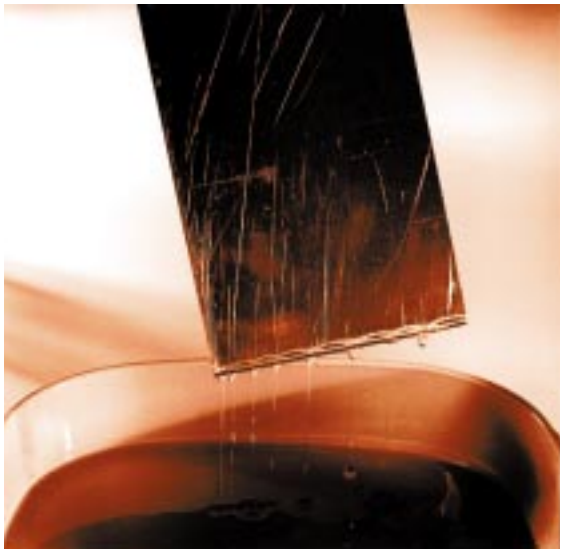

OCCUPATIONAL SAFETY & HEALTH SERVICE

DEPARTMENT OF LABOUR
TE TARI MAHI

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ABOUT THIS WORKBOOK

This workbook provides practical guidance on completing an assessment and taking appropriate actions to control exposure to substances in accordance with the Approved Code of Practice for the Management of Substances Hazardous to Health (MOSHH).

It is not feasible to provide a blueprint that will address all situations, because of the broad range of work activities and the variety of means that can be taken to control exposure to hazardous substances. Examples are given in the workbook to illustrate particular points — they should not be taken as a formula for completing any particular assessment. The workbook does, however, set out one approach to performing a systematic assessment, and can be used as a checklist to ensure that the relevant tasks are completed.

The MOSHH assessment should not be seen as a paper exercise, and the focus should be maintained on ensuring that all practicable steps have been taken to minimise the risk faced by those working with hazardous substances.

An important point to consider is that the detail of the assessment required depends on the complexity of the situation and the degree of risk. For example, an assessment to establish the risk associated with solvent exposure from items such as marking pens and correcting fluid in offices may take a person a few minutes. At the other end of the spectrum, an assessment at a chemical manufacturing site may require a team approach involving several days' work.

KEY DEFINITION

A **substance hazardous to health** is defined as any substance, or product containing a substance, to be used or produced in a workplace that is known or suspected to cause harm to health. This includes:

- Those substances that are classified as hazardous under the Hazardous Substances and New Organisms Act 1996 (HSNO Act), excluding micro-organisms;
- Scheduled substances as defined by the Toxic Substances Regulations 1983;
- Those substances that are listed in the publication *New Zealand Workplace Exposure Standards*; and
- Any other airborne dust likely to be present in significant concentrations.

DOCUMENT UPDATE

It is intended that this document will be reviewed from time to time. Any suggestions for improving the contents or format are welcome and should be addressed to:

Manager, Marketing and Product Development
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OVERVIEW OF THE ASSESSMENT PROCESS AND FOLLOW-UP

1 Gather information about the substances and workplace

- Decide who will carry out the assessment.
- Define the area to be assessed.
- Identify the substances hazardous to health.
- Obtain information on hazards to health.
- Consider who could be exposed and how.

2 Evaluate the risks to health

- Estimate the degree of exposure.
- Draw conclusions and make recommendations about the risk.

3 Record assessment and actions required for:

- Preventing or controlling exposure.
- Monitoring controls and/or exposure.
- Monitoring health.
- Reviewing training.

4 Implementation

Carry out the actions identified in 3.

5 Review

To ensure the effectiveness of your hazard management.

EXAMPLE.

THIS WORKBOOK USES AN EXAMPLE

Throughout the workbook various aspects of the assessment process are illustrated by referring to a typical manufacturing business. The examples are designed to illustrate how an assessment may be approached and to provide indications as to the practicable steps that may be taken in various situations.

This hypothetical business — let's call it "Safeways Enterprises"— consists of:

1. An office with computers, printers, photocopiers, etc.
2. Inwards goods and store.
3. Woodwork shop.
4. Metalwork shop.
5. Paint shop.
6. Assembly area.

While "Safeways Enterprises" would appear to be a relatively large business, the examples are also applicable to smaller businesses that may have one or more of these operations.

1. GATHER INFORMATION ABOUT THE SUBSTANCES AND WORKPLACE

1(A) DECIDE WHO WILL CARRY OUT THE ASSESSMENT

POINTS TO ADDRESS

Does the organisation have staff with the skills and experience required to carry out the assessment?

If no, what expertise will be required?

Who from the organisation will be responsible for co-ordinating the assessment?

BACKGROUND

The overall responsibility for the assessment lies with the employer and it is expected that the employer, or nominated representatives from the organisation, will often be able to carry out the assessment. Where special expertise is required, assistance may be sought from a relevant professional, such as an occupational hygienist.

The decision as to which course to follow will depend on the complexity of the assessment task and the availability of people with the relevant skills within the organisation. Where the assessment task is relatively complex, a team approach is recommended, as it is unlikely that any one person will have the range of skills required.

A representative from the organisation should be involved throughout the assessment to ensure that the assessment is made with a thorough understanding of the process and that the employer retains ownership of the assessment.

Competency to perform assessments

A person carrying out an assessment is considered competent if they:

- Understand what is required to complete the MOSHH assessment in the industry in question; and
- Have the ability to gather and interpret the relevant information systematically.

EXAMPLE.

Safeways decide that their production manager is to be responsible for co-ordinating the MOSHH assessment. It is recognised that expert help will have to be obtained for some aspects of the assessment. This will be provided by the occupational health consultant currently contracted to carry out health monitoring.

1(B) DEFINE THE AREA TO BE ASSESSED

POINTS TO ADDRESS

Will the workplace be assessed as one unit?

☐ Yes ☐ No

or will the assessment be by:

☐ Jobs ☐ Tasks ☐ Processes

Describe

If the assessment is to be divided, it may be appropriate to use separate worksheets from this point and later combine the information.

BACKGROUND

In larger workplaces where several distinct processes take place, the work that involves hazardous substances should be divided into jobs, tasks or processes to simplify the assessment. Floor plans should be utilised to ensure that all sections of the workplace are covered.

See also 1(e), which discusses who could be exposed and how.

EXAMPLE.

There are several distinct areas at Safeways where exposure to hazardous substances may occur.

It is decided that the MOSHH assessment will be divided between the following areas:

- Office
- Inwards goods and store
- Woodwork shop
- Metalwork shop
- Paint shop
- Assembly area

Some workers move between areas — note is made of the need to ensure that they are included in the assessment.

1(C) IDENTIFY THE SUBSTANCES HAZARDOUS TO HEALTH

POINTS TO ADDRESS

List all substances or products hazardous to health and note whether or not a current MSDS is available on site.

Product/substance	*MSDS available?*

BACKGROUND

Identify all substances hazardous to health — whether solid, liquid, dust, gas, vapour, mist or fume — that are, or will be, used or produced in each work areas. Include all substances possibly hazardous to health, regardless of the controls that may be in place to limit exposure.

Note: A substance hazardous to health is defined in the MOSHH code of practice as "any substance, or product, containing a substance, to be used or produced in a workplace that is known or suspected to cause harm to health".

Where a product is used that contains a number of hazardous substances, or the emissions from a process are complex, at this stage identify the product or emission. The components can be identified from the manufacturer's MSDS or other sources of technical information.

Hazardous substances may be identified by:

- Referring to stock lists, inventories, registers, MSDS and labels;

cont.

Product/substance	*MSDS available?*

- Checking on all locations where hazardous substances are used or stored;
- Considering what hazardous substances might be produced during any work process as intermediates, by-products, finished products or given off as wastes, residues or fugitive emissions (a substance which briefly escapes from a process);
- Considering all hazardous substances that are used in or arise from ancillary work such as maintenance and repair, cleaning, research or testing; and
- Considering hazardous substances that can arise from work on a building (for example, disturbance of insulation materials), or from work on machinery (for example, emission of fumes from welding or thermal cutting of metal parts).

Product/substance	*MSDS available?*

EXAMPLE.

During a walk-through survey the following hazardous substances are identified.

Office
- Vapours from photocopier
- Typists' correction fluids

Inward goods store
- Containers of paint, varnishes and adhesives
- Fumes from LPG forklift
- Cleaning chemicals

Metalwork shop
- Welding fume
- Cutting fluid
- Anti-splatter spray
- Trichloroethylene

Woodworking shop
- Wood dust
- Formaldehyde (from composite board)

Paintshop
- Paints
- Solvent thinners
- "Two-pot" polyurethane enamel

Assembly area
- Polishing fluid
- Adhesives

Material safety data sheets are available for all of the products purchased. Further information is required for wood dust, formaldehyde and the fumes from the LPG forklift.

1(D) OBTAIN INFORMATION ON HAZARDS TO HEALTH

POINTS TO ADDRESS

For each substance or product identified at 1(c) ensure that adequate information is available on the hazards to health.

Note the source of information for those substances for which an MSDS is not available.

Product/substance	*Source of information*

BACKGROUND

MSDS obtained from the manufacturer or supplier is likely to be the main source of this information. For hazardous substances produced in a place of work it will be necessary to locate equivalent information from other sources. Also, where the nature of the hazard is very serious, or chemical processes are complex, more detailed information may be required. Sources of this information include:

- The National Poisons and Hazardous Chemicals Information Centre, tertiary and scientific institutes;
- Codes of practice and other guidance on specific hazardous substances and processes such as those published by OSH, Standards New Zealand, professional institutions, employee or employer organisations such as the New Zealand Chemical Industry Council;
- Technical reference sources, for example, textbooks, scientific/technical papers, computerised databases, etc; and
- Experience and information from previous use of similar hazardous substances or processes.
- The Internet

EXAMPLE.

The material safety data sheets are checked by the occupational health service provider. With the exception of the data sheet for one of the adhesives, they all contain sufficient information on the products including the chemical composition of the ingredients and toxicity data.

The supplier is contacted and more detailed information is obtained for the adhesive.

Codes of practice for vapour degreasing and isocyanates are also obtained from OSH, along with a guidance note on emissions from office copying machines.

The Current NZ Workplace Exposure Standards are obtained for all substances identified.

1(E) CONSIDER WHO COULD BE EXPOSED AND HOW

POINTS TO ADDRESS

List employees, or groups of employees with potential for exposure to the hazardous substances noting how they come into contact with the substance and what is the likely route of exposure.

Job	*Hazardous substance exposures*	*Exposure most likely by*

EXAMPLE

Considering the metalwork shop at Safeways — there are four people working in the area. Exposure to hazardous substances is related to the tasks performed.
The potential exposures are summarised as follows:

Job	*Hazardous substance exposures*	*Exposure most likely by*
General hand	Trichloroethylene	Inhalation mainly
Operates vapour degreasing		— possible skin contact
bath and metal saw	Cutting fluid	Skin contact
Welders	Welding fume	Inhalation
	Welding anti-splatter agent	Inhalation

BACKGROUND

Generally, it is more useful to group employees by activity rather than by the substances they are exposed to. This will usually identify employees with similar exposures and provide for a more logical approach to control. Note the way they come into contact with the substance e.g, whether they work with it directly or indirectly.

The potential route of absorption of each hazardous substance should be considered. In assessing existing processes, it is important to talk to employees in each area regarding practical information about work practices and procedures. For example, employees could describe what happens during a breakdown, maintenance, changes in personnel or volume of production, weather conditions or other changes that can affect the work with a hazardous substance.

If a job, process or other work unit is being planned but not yet in operation, then you will evaluate the relevant work process, plan or design. Consider the potential for exposure by:

- Breathing in the substances (inhalation);
- Swallowing, usually as a result of the hazardous substances settling on food or from eating or smoking with contaminated hands;
- Absorption through the skin, either directly or from contact with contaminated surfaces or clothing; or
- Injection into the body by high-pressure equipment or contaminated sharp objects.

2 EVALUATING THE RISKS TO HEALTH

2(A) ESTIMATE THE DEGREE OF EXPOSURE

BACKGROUND

Consider the degree of exposure people have to hazardous substances by taking into account:

- The concentration of the hazardous substances during exposure;
- The duration of exposure;
- The frequency of exposure; and
- The control measures in place.

An assessment of the level, duration and frequency of exposure requires careful consideration of the actual work process. For example, the level of exposure to a volatile substance will vary with the surface area exposed. Decanting the substance may result in minimal exposure, but, alternatively, if it is used as a cleaning agent, the exposure may be significant.

The physical form of a substance may also influence the effective level of exposure. For example, inhalation exposure will be influenced by the size of particles in a powder or dust.

Specific working conditions must also be considered. The intensity of exposure could change considerably if the ventilation around the job is restricted, for example, work in confined spaces.

Consideration should be given to the persistence of a substance in the work environment. Contamination of work surfaces or clothing is likely to infuluence the overall exposure.

All measures in place to control expoure should be noted, including:

- Engineering controls, such as isolation, local exhaust ventilation and general ventilation;
- Correct storage;
- Good housekeeping;
- Safe work practices;
- Emergency procedures and equipment such as eye wash and safety shower; and
- Appropriate personal protective equipment used and maintained.

Consider everyone who could be exposed

Everyone potentially exposed to the substance in the course of work should be considered. This may include maintenance workers, contractors, cleaners and others in the vicinity, as well as those directly involved in the work with the hazardous substances.

The need for measuring exposures

After considering the information gained to this point, measurement of actual exposure levels experienced by the employees may or may not be required. Generally, measuring exposure would only be required in situations where the degree of exposure is uncertain, and where there is a valid test method.

Job or area	*Controls in place to limit exposure*

EXAMPLE.

Considering the woodworking shop at Safeways. Six people work there and the tasks can be divided into two categories—machining and cabinetmaking.

Machining area

Exposure to hazardous substances is limited almost exclusively to pine and rimu wood dust. The following assessment is made.

The controls in place to limit exposure: All but one of the saws are fitted to the dust extraction system. Apart from the extraction from the machines, there is no other means of ventilation. Two of the workers wear disposable-type respirators when machining rimu.

The intensity of exposure: There is visible dust in the working area throughout the day. Two of the workers are concerned that the wood dust is affecting their breathing.

Exposure time: The usual working week is 40 hours, and overtime is worked during times of peak production.

The need for exposure measurements: It is concluded that measurements are required to establish actual exposure levels.

POINTS TO ADDRESS

For each worker or groups of workers with similar working environments make an assessment of the exposure they receive noting:

- **The controls in place that limit the exposure;**
- **The intensity or concentration of the exposure;**
- **Over what period this occurs; and**
- **Whether or not measurements are required to determine the actual exposur**es.

As you master the assessment process it may be more convenient to combine steps 2a) and 2b) on one sheet of paper or a computer spreadsheet.

Intensity or concentration of exposure	*Period of exposure*	*Is measurement of actual exposures required?*

Cabinetmaking

Those working in the area are exposed to wood dust from pine, rimu and composite board. The possibility of exposure to formaldehyde vapour from the composite board was also identified earlier in the assessment.

The controls in place to limit exposure: All the fixed machines are fitted to the extraction system. The area is also served with a general ventilation system.

The intensity of exposure: The air in the area is relatively dust free. Some of the jobs involving the use of hand-held sanders and routers create localised dust exposures.

The use of composite boards is not extensive. Information provided by the supplier indicates that formaldehyde emission from the product is minimal. Dust exposure in the cabinetmaking area is noticeably lower in comparison with the machining area.

Exposure time: The usual working week is 40 hours, and overtime is worked during times of peak production.

The need for exposure measurements: It is concluded that there is no need to measure exposure levels. This will be reviewed when the results from the machine area become available.

2(B) DRAW CONCLUSIONS AND MAKE RECOMMENDATIONS ABOUT THE RISK

BACKGROUND

To evaluate the overall risk and to determine what actions are required, it is necessary to draw together the information relating to the hazardous substance itself and how it is used in the place of work i.e, the following should be considered:

- The quantity of the substance used;
- The properties of the hazardous substance involved;
- The nature and severity of potential health effects;
- The possibility of mixed exposure having an increased health response;
- The presence of individuals within the exposed group that may be at greater risk because of a pre-existing health condition, sex, age, etc;
- The degree of exposure; and
- The existence and performance of control measures.

To ensure that the appropriate action is taken to manage the use of the hazardous substance it is important that a conclusion be reached at this stage. When considering the adequacy of control measures it should be borne in mind that exposure to any substance should be prevented, or kept as low as practicable, and that there is a preferred hierarchy of control.

Hierarchy of control

The hierarchy of control is designed to ensure that the protection offered to workers is as comprehensive as practicable. The *Approved Code of Practice for the Management of Substances Hazardous to Health* expands on the hierarchy of control required by the Act. Starting with the question "Can the use of a hazardous substance be eliminated?" the following preference of control must be explored:

1. Elimination
Substitution

2. Isolation

3. Minimisation
Engineering control
Administrative control
Personal protective equipment

Job or area	*Have all practicable steps been take to prevent or control exposure?*

EXAMPLE.

Safeways reached conclusions about the risks from exposure to hazardous substances in these areas:

Office
The correcting fluids do contain solvents, but the quantity used precludes a risk to health.
All copiers and printers are maintained on a service contract. Data provided by the agent indicates that ozone levels will not be significant.

Inward goods and store
The long-term health risk from exposure to the various containers of paints and adhesives passing through the store is considered to be negligible.
An emergency plan is developed for dealing with spills.
Carbon monoxide monitoring carried out in the area indicated levels approaching the Workplace Exposure Standard. Elimination is feasible, and in the long-term the plan is to replace the LPG forklift with a battery powered machine. It is concluded that all practicable steps have not been taken to control the current exposure. The use of a catalytic converter is considered, but it is found that the periodic use the machine gets would not be conducive to efficient operation of the converter. Instead, regular

POINTS TO ADDRESS

Using the information gathered previously comment on the overall risk to health. Consider specifically:

- **Whether or not all practicable steps have been taken to prevent or control exposure (see p15 of this booklet and section 2.3 of the code of practice);**
- **Monitoring required;**
- **Health monitoring required; and**
- **Review of training.**

n	*Monitoring required*	*Health monitoring required*	*Review of training*

maintenance and tuning of the engine will be used to limit carbon monoxide emission during running. The ventilation in the area will be upgraded and the carbon monoxide monitoring repeated.

Paint shop

In some areas of the paint shop heavy reliance had been placed on respirators to provide protection. Some small objects were being sprayed in the general work area. Although solvent monitoring carried out in the past indicated that the levels likely to be experienced by workers without respiratory protection were 25% of the Workplace Exposure Standard, there are practicable steps that can be taken to further reduce the exposures — for example, the installation of a cabinet booth or changing to a dipping process.

The type of solvents used was investigated but there were no obvious changes that could be made that would reduce the health risk.

Isocyanate finishes are sprayed in a booth that complies with the requirements set out in the *Approved Code of Practice for the Safe Use of Isocyanates*. Substitution with a less hazardous paint system is not yet considered practicable, as there is customer demand for a hard, stain resistant surface, and alternatives are not easily available. This will remain under review.

The painters are not under health surveillance — this is to be arranged with the health service provider.

The need for further training is also identified for the workers in this area.

3 RECORDING AND FOLLOW-UP REQUIREMENTS

Where the assessment has determined that there is no risk to health

Where this is the case, the report should simply record that decision with sufficient information to justify it. This should include the date the assessment was completed, the MSDS or equivalent information that was reviewed and, if applicable, a note that the controls in place were adequate.

The conclusion that there is no risk to health would generally only be made where:

- The current exposure is considerably below the level that is considered to be hazardous, and under foreseeable circumstances, including a breakdown in the controls, this would not change; and
- The hazardous substance does not produce an acute risk to health.

Where the assessment determines that there is a risk to health

In this case the report should be kept as a permanent record. It should include:

- The health and safety risk to employees for each operation involving a hazardous substance;
- What monitoring is necessary, including that needed to ensure that the control measures are functioning properly;
- The control measures required, and the basis for the recommendations;
- Whether health surveillance is necessary;
- The training required for employees;
- Information relevant to the MSDS and the use of the hazardous substance;
- The names and positions of those making the assessment; and
- The circumstances under which a review may be needed.

The assessment should be signed off by the person or persons responsible for the validity of the assessment. It is important to ensure that conclusions are arrived at and any recommendations implemented. This may not be the responsibility of those that completed the assessment, and clear lines of responsibility need to be established.

Where improvements are required, the date of completion should be specified.

ALL PRACTICABLE STEPS

The MOSHH code of practice provides guidance on meeting duties prescribed by the HSE Act with respect to hazardous substances. The recommendations of the code are made subject to their being reasonably practicable. Of particular relevance in the MOSHH code is the need to take "all practicable steps" to prevent or control exposure to hazardous substances.

The phrase "all practicable steps" applies to the general duties that must be carried out by employers, employees, self-employed people, people in control of workplaces, and principals.

These people are required to take all steps that are **reasonably practicable**. A step is practicable if it is possible or capable of being done. Whether a step is also reasonable takes into account:

- The nature and severity of any injury or harm that may occur**;**
- The degree of risk or probability of injury or harm occurring;
- How much is known about the hazard and the ways of eliminating, isolating or minimising the hazard; and
- The availability and cost of safeguards.

The degree of risk and severity of potential injury or harm must be balanced against the cost and feasibility of the safeguard. The cost of providing safeguards has to be measured against the consequences of failing to do so. It is not simply a measure of whether the person can afford to provide the necessary safeguards. Where there is a risk of serious, or frequent injury or harm, a greater cost in the provision of safeguards may be reasonable.

Any judgement of whether a safeguard is "reasonably practicable" should be made taking common practice and knowledge throughout the industry into account.

A claim by an individual that she or he did not know what to do about a hazard would not be successful if the hazard was widely known to others in the industry and safeguards were in place. There are a number of sources of information that may assist in decisions on reasonable practicability in particular circumstances, including:

- Codes of practice;
- OSH guidance documents;
- Accepted industry standards of good practice (may not be the same as usual practice); or
- Published reports on steps that have been successfully taken.

One obvious test towards deciding whether or not it is reasonably practicable is to ask the questions — Can it be done? and, Has it been done before?

Hazardous substances

Unlike the risks of physical injury, the risks to health presented by exposure to hazardous substances often involve considerable uncertainty. Typically the risks at very high exposure levels are reasonably well documented, but at lower exposures there is often insufficient information to quantify the risk. Some argue that for most hazardous substances there is a threshold of exposure below which harm will not occur, others contend that the risk remains at lower exposures — but just difficult to measure (e.g, the "one fibre kills" asbestos theory).

Workplace Exposure Standards can be used as a reference point in judging the adequacy of control measures, in that personal exposure to hazardous substances should always be maintained below the relevant standard. However, exposure standards do not represent a "no effect" level at which workers can be guaranteed protection, and compliance with the relevant standard does not preclude further efforts to reduce exposure.

To sum up, the concept of "reasonableness" is based on the hypothetical "reasonable person" and the way that he or she might behave in a particular situation. It is based on the values of society of the day and, in the end, will involve a value judgement.

The overall test is: What would a reasonable and prudent person do in all the circumstances? There are no firm guidelines. The question of what is reasonably practicable is always a matter of fact and degree in each situation.

EXAMPLE 1

A court case illustrates what is expected for "all practicable steps"

A crown health enterprise pleaded guilty to a charge under section 6 of the HSE Act after two nurses became affected by exposure to glutaraldehyde, a chemical used widely in the

healthcare industry to disinfect medical instruments.

The nurses, who suffered severe headaches and respiratory irritation, were exposed to the chemical while performing their duties in the sluice rooms attached to the hospital's four operating theatres. Used theatre equipment was placed in large open containers filled with 2% glutaraldehyde solution. Nurses and other staff working in the sluice rooms were exposed to glutaraldehyde fumes. There was no ventilation system.

The problem occurred in an old part of the hospital due for replacement. Closure of the operating theatres even temporarily was not practicable, leaving the hospital two options: installing ventilation (estimated to cost up to $250,000) or replacing glutaraldehyde with an alternative chemical. The latter course was eventually adopted.

Hospital authorities had recognised the problem posed by glutaraldehyde as far as providing respirators, gloves and aprons for the nurses to wear. However, the respirator was regarded as uncomfortable to wear for any length of time.

In summarising what was expected of the hospital, the judge recognised the restraints of health budget requirements. However, the judge agreed that closing down the area where the fumes were affecting workers until the fumes were taken away, or providing some other disinfectant system were reasonably practicable steps available to the hospital that should have been taken.

EXAMPLE 2

Another example illustrates considerations in deciding what is practicable.

In a manufacturing company workers were required to open bags of chemicals and empty the contents into hoppers as part of a process to blend and package a powdered product. Exposure control had traditionally been achieved with respirators and protective clothing. Biological monitoring demonstrated that these measures were not completely effective, and there was resistance from other workers in the area to wearing respiratory protection.

While it was feasible to install local exhaust ventilation that would reduce the exposure, more reliable control could be achieved by purchasing the chemicals in bulk containers, removing the need to manually open the bags.

It was decided that, because alternatives were available, relying on personal protection should not be seen as a long-term option. Scheduled plant maintenance presented the opportunity for upgrading the controls for hazardous substances and, with adequate protection of workers in the meantime, the substitute process was chosen as the best option.

FURTHER INFORMATION

Refer to the *Approved Code of Practice for the Management of Substances Hazardous to Health in the Place of Work* for a list of further sources of published information.

You will find your nearest office of the Occupational Safety and Health Service listed in the *Blue Pages* at the front of your telephone directory.