

Occupational Health and Safety Bulletin



Guideline for Developing a Code of Practice for Chemical Hazards

Injuries and ill health can ruin lives and affect an employer's business if production is lost, machinery and equipment damaged or insurance costs increase. Part 4 of Alberta's Occupational Health and Safety (OHS) Code requires an employer to have a written code of practice for the procedures to be followed when substances listed in Table 1, Schedule 1 are present in specified amounts at the work site. This Bulletin provides guidance for preparing a code of practice for chemical hazards to meet the requirements of the OHS legislation. It does not provide procedures for specific chemical hazards; however some resources are identified that can assist with this.

What is a "Hazard"?

Alberta's OHS Code defines a hazard as "*a situation, condition or thing that may be dangerous to the safety or health of the worker.*" Part 2 of the OHS Code requires employers to assess and control hazards at their work site.

A hazard has the potential to cause an injury, illness or loss. Some people think of a hazard as an incident waiting to happen. Potential hazards that are foreseeable can be mitigated.

Identifying hazards requires a thorough assessment process. This will identify and evaluate conditions that could lead to workers getting hurt or becoming ill. Assessing hazards involves taking a look at what could harm workers at a workplace – the typical question to ask is "What could go wrong?" A hazard assessment takes into account the hazards specific to the work task being done. It also takes into account hazards present in the surroundings that may adversely affect the worker performing the task; for example materials used in a process.



Chemical hazards for which a code of practice is required include chemicals present in a product (such as isocyanates in paints and crystalline silica in masonry products) or as part of an operation or process (such as benzene in oil and gas operations and styrene in fiberglass manufacturing). Chemical hazards can be raw products at the start of a process, by-products generated at any stage of a process or the finished product itself.

To prepare a code of practice, the hazards of the chemicals present must be known. The hazard assessment needs to be reviewed on a regular basis and revised if conditions change at the work site, when new work processes are introduced or work processes or operations change. The employer must involve workers who may be affected by the hazards.

What is a “Code of Practice”?

A code of practice is a document that describes the procedures to be followed to protect workers when they may be exposed to a chemical hazard. Section 33 of the Alberta *OHS Act* requires a code of practice to include “*practical guidance on the requirements of the regulations or the adopted code applicable to the work site, safe working procedures in respect of the work site and other matters as required by a Director, the regulations or the adopted code*”. A code of practice must be in writing and available to workers at the work site who are affected by it.

A code of practice is intended to provide safe work procedures that address issues specific to the hazard to which it applies. For example the code of practice can address procedures for safely handling a chemical, actions to take when there is a spill as well as personal protective equipment that must be worn when handling the product. The employer must ensure that workers to whom the code of practice applies receive appropriate education, instruction or training on the content of the code of practice.

Workers should be involved when developing the code of practice as they often have the best understanding of the hazards involved in their work. The help of health and safety professionals such as occupational hygienists or professional engineers is also useful when preparing the code of practice, especially for complex situations.

Developing a Code of Practice for Chemical Hazards

The code of practice must identify locations at the work site where workers could be exposed to chemical hazards. The code of practice must be maintained and periodically reviewed to ensure that its procedures are up-to-date and continues to reflect the work activities for which it was originally written.

There are two basic steps when preparing a code of practice for chemical hazards:

1. Identify chemical products at the work site for which a code of practice is required
2. Develop the code of practice

A code of practice contains more than just safe work procedures. It also includes information on:

- Controls used to protect workers;
- Measures to be taken to prevent releases;
- First aid procedures;
- Emergency procedures;
- Decontamination procedures;
- Waste handling practices;
- Monitoring and follow-up;
- Worker training requirements; and
- Site contacts.

1. Identify the Chemical Products at the Work Site

Chemicals can be found at almost any workplace. The first step is to inspect the workplace and identify the chemicals used and stored. Once a complete inventory is done, the employer must identify whether there are products or ingredients in the products are listed in Table 1, Schedule 1 and present in the quantities listed in Section 26 of the OHS Code. If so, the employer must develop a code of practice. The flowchart provided in Appendix A can assist with this process.

When conducting the inventory, the employer should focus on products used as well as finished products, including:

- Raw materials used in manufacturing
- Products used for specific work procedures (for example degreasing, painting, welding, abrasive blasting, office products)
- Building materials (such as asbestos, insulation, paint, fluorescent lights)
- Cleaners

To determine whether the products contain one or more of the target substances, the employer can refer to ingredient information, the product material safety data sheet (MSDS), other information from the manufacturer or information on similar products. Caution should be used, however, when looking at similar products for comparison as product ingredients can vary between manufacturers. In some cases, if the product is made on site or information cannot be found, bulk analysis may be required.

2. Develop the Code of Practice

A code of practice is usually specific to a particular substance since the hazards associated with chemicals differ. However, if the chemical hazards for the products at the work site are the same and require similar procedures, the employer can develop one code of practice that applies to all activities for that class of chemicals or products. An example of this would be for a masonry company where crystalline silica may be found in dry mortar, cement and masonry blocks. In this case, the employer could develop one code of practice for crystalline silica that addresses all of the work procedures where these various products are used.

A work sheet that may assist in the development of the code of practice is provided in Appendix B.

There are several steps to developing a code of practice:

- a) Identify where and when workers may be exposed to the chemical
- b) Develop controls and work procedures to prevent exposure to the chemical
- c) Develop protocols to address emergency situations and releases
- d) Develop decontamination procedures
- e) Develop methods to handle and control wastes
- f) Determine training requirements and training resources
- g) Identify protocols for follow-up and monitoring
- h) Identify who the appropriate site contacts are

a) Identify when and where workers may be exposed

To properly evaluate whether controls are required in the workplace to protect workers, the employer must first determine what the worker is exposed to. An exposure assessment must be done properly. If the employer is doing the assessment to determine compliance with an occupational exposure limit for the substance, the measurements must be taken using one of the methods specified in Section 20 of the OHS Code. Some references that can assist with this are provided later in this document.

The exposure assessment should include the following elements:

Background Information:

- Description of the work site including normal worker activities and site operations
- Types of samples collected (personal, area, task-related) and the rationale for the sampling strategy
- Locations where samples were collected

Sample Collection Data:

- Date samples were collected
- Specific name of the method followed to collect and analyze the samples
- Identification of the worker job titles or job functions for which occupational samples were collected, including the location of the worker at the work site
- Description of the equipment used to collect the samples and confirmation of equipment calibration (pre- and post-sampling) including a clear indication of who calibrated the equipment. This includes circumstances where a direct-reading instrument or a sampling pump was used to conduct the assessment.
- Time period for which samples were collected. The time period should be representative of worker exposure times at the work site.
- Flow rate of sampling pumps (if used)
- Volume of sample collected (if applicable)

Observations During Sample Collection:

- Environmental conditions at the time of sampling, particularly where samples were collected outdoors as this could affect exposures. This should include temperature, wind speed, amount of precipitation during the sample collection period (rain or snow) and whether there was snow cover on the ground.
- Description of worker activities during sample collection (this should be based on direct observations from the person collecting the samples)
- Description of controls in place to protect the worker during sample collection (e.g. ventilation systems, personal protective equipment worn) and whether they were used

Calculations and Discussion:

- Description of quality control/quality assurance (QA/QC) samples. QA/QC samples should include at least one field blank. Duplicates, if collected, should comprise at least 10 per cent of the total samples collected
- Method(s) used by the laboratory to analyze the samples including a description of any area from which they deviated from the specified method and why
- Laboratory QA/QC protocols and results including limits of detection
- Calculated exposure concentrations based on the mass detected by laboratory and volume of air sampled—these numbers may be expressed in either mg/m^3 or ppm depending on the substance (for example, mg/m^3 for airborne particulate, ppm for airborne vapours)
- Discussion of the results with respect to whether they represented typical worker activities and work site conditions as well as the QA/QC sample results
- Identification of the person who collected the samples and prepared the report and their competencies

Additional Useful Report Content:

- Concise executive summary that presents the results of the assessment
- Comparison of the exposure measurements to the applicable occupational exposure limits
- Detailed discussion of the implications of the results (potential for over-exposure, effectiveness of controls in place, issues related to site activities or work procedures that could impact on the results)
- Use of blind duplicates to evaluate laboratory analytical performance.
- Surface sampling results (may be recommended for certain substances where a large component of worker exposure may be due to contact with contaminated surfaces, such as lead)
- Evaluation of control methods (ventilation system assessment, evaluation of the appropriateness of the personal protective equipment worn)
- Recommendations based on the findings of the exposure assessment

An exposure assessment checklist is included in Appendix C.

b) Develop controls and safe work procedures

Part 2 of the OHS Code requires an employer to follow the hierarchy of controls when controlling chemical hazards in the workplace. This means that the first step is to determine whether the substance can be eliminated or replaced by another product. If the product cannot be eliminated, exposure must be controlled using engineering controls, such as ventilation or enclosure. Where engineering controls are not practical or sufficient, administrative controls, such as reducing exposure time, may be used. Finally, if engineering or administrative controls (or some combination) are not practical or sufficient, personal protective equipment may be used to protect workers from exposure.

Once the employer has identified how exposure will be controlled, procedures must be developed for workers who work with or near the chemicals. These procedures should incorporate information from the product MSDS or other manufacturer instructions, as appropriate. The work procedures should include steps to be used to prevent spills or other accidental releases when the product is used. Workers must be trained on and use these procedures.

If the employer decides to use personal protective equipment, the code of practice should list the specific equipment that is required, who must use it and when it must be used. In some cases, different levels of protective equipment may be needed for different tasks. Personal protective equipment may include respiratory protective equipment, protective clothing such as gloves, coveralls or aprons, eye protection and other specific task-related equipment (for example welding helmets, blasting hoods). If respirators are required, the information provided should reference and be consistent with the employer's respiratory protective equipment code of practice.

c) Emergency Procedures

Part 7 of the OHS Code provides the requirements for emergency preparedness and response, including the specific elements that must be included in an emergency response plan. The specific steps for dealing with releases of chemical products that are outlined in the code of practice should be consistent with and reference the emergency response plan developed by the employer.

Emergency situations that should be addressed include:

- Leaks or spills
- Worker exposure from splashes or spills that contact the skin or eyes
- Acute health effects due to inhalation exposures
- Fire

d) Decontamination procedures

Where a worker may become contaminated by a harmful substance, the employer must provide appropriate decontamination facilities and ensure that contaminated articles and clothing are not removed from the work site until they have been properly decontaminated. The type of facilities provided could vary widely site from showers to much simpler washing implements (bucket and sponge) depending on the nature of the work. A source of clean water must be available to workers to clean up. Contaminated articles or clothing must be bagged for disposal or later cleaning if that cannot be done at the work site (for example, laundering of coveralls). Procedures may also be required to clean the interior or exterior of equipment. The use of compressed air to clean equipment or other articles must be avoided as this may create a potential exposure hazard. Specific procedures may be required for spills or contamination from certain chemicals (mercury) or may be more general (wet wiping, use of a HEPA vacuum, use of absorbents). The employer must ensure that workers are aware of the decontamination procedures, provided with the appropriate equipment and training and use them.

e) Handling and control of wastes

Wastes may be produced when chemicals are used, or may arise from decontamination of articles or clothing. The employer should first consider evaluating work procedures to determine if the amount of waste produced can be eliminated or reduced. For example, the employer may choose to use non-disposable protective clothing and have procedures in place to ensure that the clothing is cleaned off site or use non-disposable respirators and provide training to workers on how these should be cleaned and maintained. If the wastes cannot be eliminated, then procedures are needed that identify the types of waste produced, disposal procedures and how waste is handled, including types of containers used, labeling as well as worker personal protective equipment requirements.

f) Worker training

A code of practice includes procedures to prevent exposure to harmful substances at the work site and training requirements for workers who use procedures. These procedures are based on the specific tasks done that may create a potential for exposure. The employer will determine this information from the exposure assessment (see a); the training will focus on how workers may be exposed, identifying situations or conditions that could create an exposure and the controls in place to prevent exposure. Instruction on how and when to use the controls provided must be included. This training may be incorporated into other training provided to workers at the work site. The code of practice should list the specific training requirements that relate to the chemical(s) of concern. If details are provided elsewhere, such as in work site training manuals, the appropriate reference should be provided.

g) Follow-up and monitoring

A code of practice is a living document and must be revised if conditions at the work site change. The employer needs a procedure to ensure that review of the code of practice is done routinely and to revise the document as required. This section should identify who is responsible conduct the ongoing review, the process of review and how frequently the review will be done. Follow-up may also include periodic, on-going exposure monitoring and evaluation of controls.

h) Site contacts

This section should identify who on site, is the point of contact for dealing with emergencies as well as for providing more information on work site procedures and controls, chemical hazards or other health and safety information. This section is site specific and should be consistent with contact information provided in the employer's emergency response plan.

Resources

Alberta OHS Legislation

<http://humanservices.alberta.ca/ohs-legislation>

OHS Code Explanation Guide

<http://humanservices.alberta.ca/ohscode-guide>

Respiratory Protective Equipment: An Employer's Guide

<http://humanservices.alberta.ca/ppe001>

Guideline for the Development of a Code of Practice for Respiratory Protective Equipment

<http://humanservices.alberta.ca/ppe004>

NIOSH Occupational Sampling Resource Manual, January 1977:

<http://www.cdc.gov/niosh/docs/77-173/pdfs/77-173.pdf>

NIOSH Manual of Analytical Methods Chapters: <http://www.cdc.gov/niosh/docs/2003-154/chaps.html>

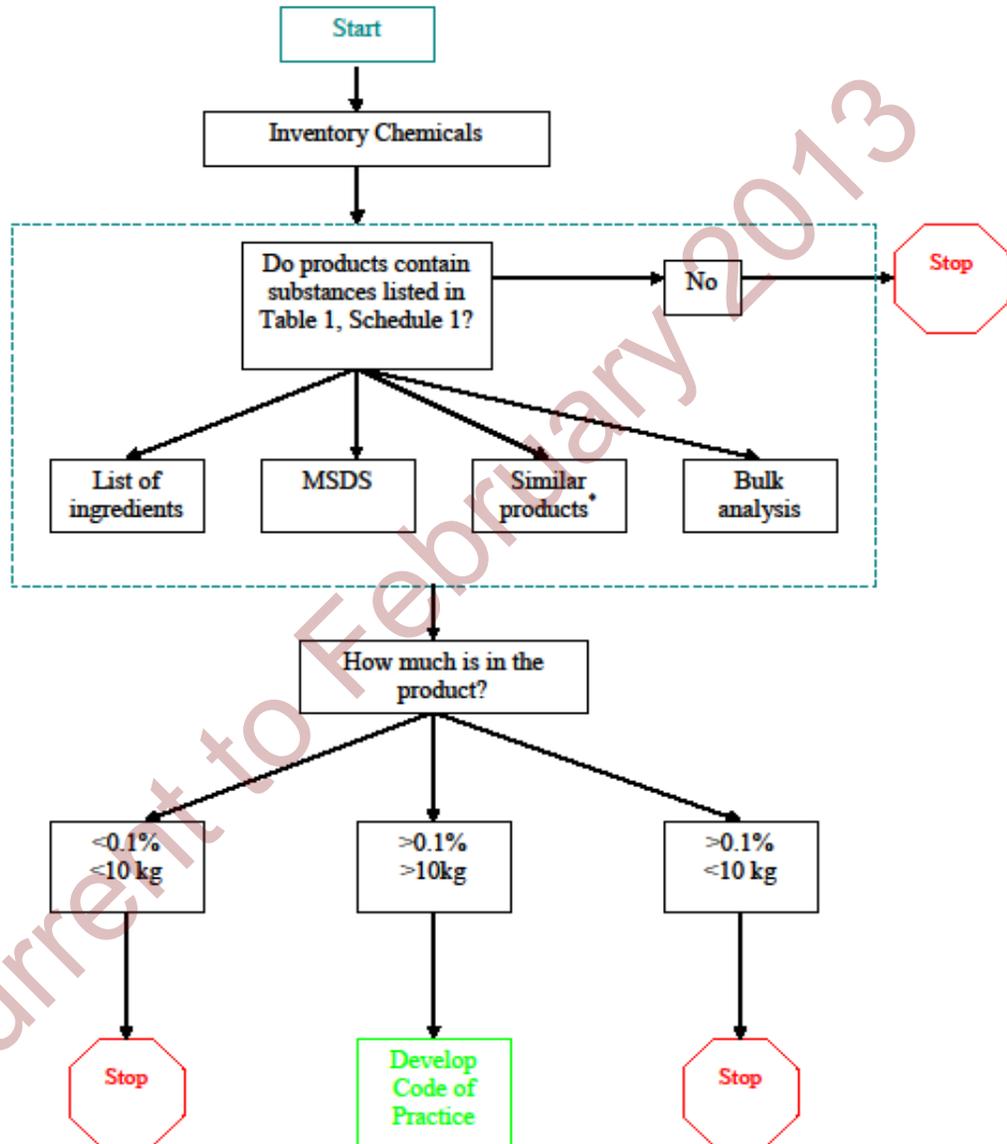
NIOSH Pocket Guide to Chemical Hazards <http://www.cdc.gov/niosh/npg/npg.html>

NIOSH Recommendations for Chemical Protective Clothing

<http://www.cdc.gov/niosh/ncpc/ncpc2.html>

OSHA Technical Manual, Section II: http://www.osha.gov/dts/osta/otm/otm_toc.html

Appendix A: Do I Need a Code of Practice?



*Use with caution, products may have varying ingredients that change from manufacturer to manufacturer.

Appendix B: Code of Practice Work Sheet

Date: _____
Company Name: _____
Work Site: _____
Task Location: _____
Chemical: _____
Code of Practice Prepared By: _____
Name: _____ Telephone Number: _____

Description of the chemical hazard:

Identification of work procedures or areas where workers may be exposed to the chemical hazard

Controls to be Used to Prevent Exposure
Engineering:

Administrative:

Personal Protective Equipment:

Has a code of practice been completed
for respiratory protective equipment?

Yes No

Respiratory Protective Equipment

Yes No

Type(s)

Protective Clothing

Yes No

Type(s)

Footwear

Yes No

Type(s)

Headwear Type(s)	Yes <input type="checkbox"/> No <input type="checkbox"/>
Protective Eyewear Type(s)	Yes <input type="checkbox"/> No <input type="checkbox"/>
Gloves Type(s)	Yes <input type="checkbox"/> No <input type="checkbox"/>
Other Describe:	Yes <input type="checkbox"/> No <input type="checkbox"/>
Emergency Procedures / First Aid	

Decontamination Procedures
Waste Handling Procedures
Follow-up and Monitoring
Site Contacts
Other comments:

Current to February 2013

Appendix C: Exposure Assessment Checklist

Background Information	
Employer	
Site Location	
Description of the work site and worker activities/site operations	Yes <input type="checkbox"/> No <input type="checkbox"/>
Types of samples collected:	
Full shift occupational measurements	<input type="checkbox"/>
Area samples	<input type="checkbox"/>
Short term measurements	<input type="checkbox"/>
Other	Describe <input type="checkbox"/>
Area samples, if yes, describe	
Short-term or task related samples, if yes, describe	

Sample Collection Data	
Date of sample collection	
Method used to collect and analyze the samples	
Worker positions for which occupational samples were collected	
Description of the equipment used to collect the samples	Yes <input type="checkbox"/> No <input type="checkbox"/>
Equipment calibrated (pre- and post-sampling)	Yes <input type="checkbox"/> No <input type="checkbox"/>
Who was responsible for calibration?	
Time period over which samples were collected	
Flow rate of sampling pumps	
Volume of sample collected	

Observations During Sample Collection	
Environmental (weather) conditions at the time of sampling	
Description of worker activities during sample collection	Yes <input type="checkbox"/> No <input type="checkbox"/>
Typical of normal operations	Yes <input type="checkbox"/> No <input type="checkbox"/>
If no, describe	
Description of controls in place to protect the worker	Yes <input type="checkbox"/> No <input type="checkbox"/>
Controls used by the workers	Yes <input type="checkbox"/> No <input type="checkbox"/>
If no, describe	

Calculations and Discussion	
Quality Assurance/Quality Control (QA/QC)	
Field Blanks	<input type="checkbox"/>
Duplicates	<input type="checkbox"/>
Blind Duplicates	<input type="checkbox"/>
Void Samples	<input type="checkbox"/>
Other	<input type="checkbox"/>
If other, describe	
Method(s) used by the laboratory to analyze the samples	
Laboratory QA/QC protocols and results	Yes <input type="checkbox"/> No <input type="checkbox"/>
Calculated exposure concentrations	Yes <input type="checkbox"/> No <input type="checkbox"/>
Substances	
Results	
OEL Values	
Discussion of results	Yes <input type="checkbox"/> No <input type="checkbox"/>
Identification of the person(s) who collected the samples and reviewed the report and their competencies	Yes <input type="checkbox"/> No <input type="checkbox"/>

Current to February 2013

Contact us:

Province-Wide Contact Centre

-  Edmonton
780-415-8690
-  Other locations
1-866-415-8690
(Toll Free)

Web Site

-  www.worksafe.alberta.ca

-  Deaf or hearing impaired
 - Edmonton 780-427-9999
 - Other locations 1-800-232-7215
(Toll Free)

Getting copies of OHS Act, Regulation & Code:

Queen's Printer

-  www.qp.alberta.ca

Occupational Health and Safety

-  <http://humanservices.alberta.ca/ohs-legislation>

-  Edmonton 780-427-4952

Call any Government of Alberta office toll-free
Dial 310-0000, then the area code and telephone number you want to reach

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