

## Crystalline Silica Management Code of Practice

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1.1	<u>COP refreshed to provide a framework for a silica management program and additional information on control strategies</u>	January 09, 2015	Occupational Health	MOC discussion board reviewers; Occupational Health; H&S Programs and Projects	H&S Leadership

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## **1.0 Purpose**

The purpose of the Crystalline Silica Management Code of Practice (COP) is to set a minimum standard and to provide operational guidance for controlling worker exposure to silica.

## **2.0 Scope**

This Crystalline Silica Management COP applies to all Cenovus worksites and work activities where crystalline silica may be present.

## **3.0 Process Requirements Practice**

### **3.1 What is Crystalline Silica?**

Silica is one of the most abundant minerals on earth and makes up nearly all of what we call sand and rock. Silica exists mostly in crystalline (structured) form; and a small proportion exists in amorphous (not structured) form. Many types of crystalline silica exist, with quartz being the most abundant. Other types of crystalline silica include cristobalite and tridymite.

Airborne crystalline silica can be generated when silica-containing material is chipped, cut, drilled, ground, or blasted.

The respirable fraction (very small particles) of crystalline silica can be readily inhaled and deposited in the alveolar region (deep region) of the lung where it may cause illness.

### **3.2 What are the Health Effects?**

Exposure to respirable crystalline silica can lead to the development of lung disease. Silicosis (scarring of the lung) can develop over an extended period of time (15–20 years) following exposure to low concentrations of silica dust, or it can develop after a few months of high exposures. Silicosis can be debilitating or even fatal. Due to reduced lung function, people suffering from silicosis are also prone to other lung diseases such as tuberculosis. Additionally, crystalline silica is known to cause cancer.

### **3.3 Crystalline Silica Management Program**

As a result of the health risks associated with worker exposure, all Cenovus worksites where crystalline silica is present require a silica management program. The silica management program must be implemented by the respective asset team and shall consist of the following items:

- Recognition of crystalline silica on site
- Pre-job hazard assessment for crystalline silica
- Control of airborne crystalline silica
- Health assessment
- Training
- Review of the program every two years

### 3.3.1 Recognition and Evaluation of Crystalline Silica

Crystalline silica exposure can occur in a variety of work environments depending on the products used and the activities conducted. Exposure to crystalline silica may be a concern in the following areas:

- Fracking operations
- Drilling operations (e.g. cementing operations, handling of mud additives)
- Construction (e.g. concrete cutting, jack hammering, parging, sweeping)
- Road construction
- Handling solid desiccants
- Abrasive sand blasting
- Handling or removing refractory ceramic fibres (e.g. during maintenance of boilers)

Exposure to crystalline silica is regulated in Alberta and Saskatchewan. The occupational exposure limits (OELs) are as follows:

**Table 1: Occupational Exposure Limits to Crystalline Silica**

Jurisdiction	Crystalline Silica (mg/m <sup>3</sup> )	
	Cristobalite	Quartz
Alberta	0.025	0.025
Saskatchewan	0.05	0.05

When working with crystalline silica in the absence of engineering controls the airborne concentrations are often many times the OELs. A person qualified and trained on exposure assessments, such as an occupational hygienist, will evaluate workers' exposures to crystalline silica and recommend appropriate control strategies. All assessment reports will be retained on file permanently as per Cenovus Records Classification and Retention Schedule.

### 3.3.2 Pre-Job Hazard Assessment

When working with products containing crystalline silica, a pre-job hazard assessment is required. Exposure to silica should be maintained as low as reasonably achievable. All affected workers (i.e. the work crew and other workers in the surrounding area) must be included in the pre-job hazard assessment and in the identification and control of crystalline silica.

### 3.3.3 Control of Airborne Crystalline Silica

Cenovus will reduce workers' exposures to crystalline silica at Cenovus worksites by ensuring control strategies are implemented in the following order, and in combination where necessary:

1. Elimination/substitution
2. Engineering controls
3. Administrative controls
4. Personal protective equipment (PPE)

#### 3.3.3.1 Elimination/Substitution

If practical and feasible, a silica-free or low-silica product should be chosen over a product containing crystalline silica, provided the substitute material has no greater health, safety and/or environmental impacts.

#### 3.3.3.2 Engineering Controls

Engineering controls are mechanical processes used to eliminate or minimize exposure to crystalline silica by removing the dust from the air or providing a barrier between the worker and the hazard. Examples of engineering controls include:

- Local exhaust ventilation
- Dust collection systems attached to machines or equipment
- Dust suppression (e.g. wet cutting, wet abrasive blasting)
- Dust control additives
- Barriers or enclosures restricting or isolating work activities
- Automated processes

#### 3.3.3.3 Administrative Controls

Where airborne crystalline silica is anticipated, work practices shall be implemented to reduce potential exposure. These include but are not limited to:

- Educating workers of the hazards associated with crystalline silica. Workers must participate in training and monitoring programs.
- Practicing good hygiene – workers must not eat, drink or use tobacco products in areas where crystalline silica is present. The hands and face should be washed before eating, drinking or smoking.
- Conducting pre-job hazard assessments.
- Erecting conspicuous signage to inform workers of the hazard, and limiting access to authorized persons only.
- Providing a method to protect workers from contamination (see personal protective equipment below) or to decontaminate the workers post-contamination (e.g. HEPA-vacuum cleaners).

- Positioning workers upwind of silica generating equipment or material.
- Having an inspection and maintenance schedule for engineering controls used to reduce exposure.

**3.3.3.4 Personal Protective Equipment**

Where engineering and administrative controls are neither feasible nor effective, personal protective equipment shall be used.

The level of respiratory protection required depends on the airborne concentration of silica dust, and should be determined by a competent person prior to conducting work. See the *Cenovus Respiratory Protection Code of Practice (CEN010)* for more information. Occupational Health ([occupational.health@cenovus.com](mailto:occupational.health@cenovus.com)) can assist in the selection of respiratory protective equipment.

Additionally, to prevent the contamination of work clothes, fire-retardant, disposable coveralls and gloves should be worn if crystalline silica is present in the work environment.

**3.3.4 Health Assessments**

A health assessment is required for employees who work in an area that could reasonably be expected to have airborne concentrations of crystalline silica greater than 50% of the OEL, and who conduct work in this area for 30 total days or more in a calendar year.

Health assessments must be conducted every two years and must consist of a chest x-ray, lung function test, and a review of employee’s history. These confidential records must be retained for 30 years by Cenovus’s Health and Wellness department.

Non Cenovus workers will undergo health assessments as determined and paid for by their employer.

**4.0 Roles and Responsibilities**

The following responsibilities apply to this practice:

**Table 2: Roles and Responsibilities**

Role	Description
Business Leaders and Frontline Supervisors	<ul style="list-style-type: none"> <li>• Communicate and implement the Crystalline Silica Management Code of Practice at their operations or functional areas of authority</li> <li>• Demonstrate ownership and leadership by actively setting a positive example</li> <li>• Allocate and make available the necessary financial and human resources that are required to functionally implement this Practice</li> <li>• Confirm all workers are aware of their roles and responsibilities</li> <li>• Confirm workers knowledgeable about silica</li> <li>• Provide feedback to the document owner or</li> </ul>

Role	Description
	representative concerning proposed changes or improvements to this document
Operations Health & Safety Field Teams	<ul style="list-style-type: none"> <li>• Conduct worksite observations and assessments on a regular basis to verify compliance with the expectations described in this practice</li> <li>• Coach and correct workers who do not understand or comply with the requirements of this practice</li> <li>• Assist with the implementation and communication of the documented requirements</li> <li>• Provide feedback to the document owner or representative concerning proposed changes or improvements to this document</li> </ul>
Central Health & Safety Services	<ul style="list-style-type: none"> <li>• Monitor and collect feedback related to this document to verify program effectiveness</li> <li>• Lead document reviews and revisions as per the expectations described in this document</li> <li>• Provide subject matter expertise when requested by Business Leaders or other functional teams</li> </ul>
Assurance Teams (COMS Assurance and EHSR Compliance Audit)	<ul style="list-style-type: none"> <li>• Lead, organize and conduct audits to verify compliance, identify gaps and suggest improvement opportunities</li> </ul>
Workers	<ul style="list-style-type: none"> <li>• [Staff] Complete Crystalline Silica Management eLearning on Learning Management System (LMS) every 2 years</li> <li>• [Service Provider] Complete a level of training equivalent to Cenovus’s e-learning every 2 years</li> <li>• Understand all aspects of this practice and its intent, follow this information during work operations</li> </ul>

## 5.0 Training and Competency

Competency describes the knowledge and skills required to successfully perform the technical aspects of a job. A worker must be able to demonstrate competency in safely performing work tasks or using equipment.

### 5.1 Training

It is expected that all personnel involved in this process will have training and the appropriate competency to perform their roles.

Frontline supervisors and workers should review this document prior to conducting work in environments where there is potential exposure to respirable crystalline silica.

All workers who are required to work in areas where elevated airborne crystalline silica is present must be trained every two years in crystalline silica awareness. This training will at a minimum include:

- Recognition and identification of silica hazards
- Hazard assessment and/or monitoring for the control of crystalline silica hazards
- Understanding of control strategies to reduce exposure

## 5.2 Competency Verification

Competency will be validated through formal, theory-based evaluations and practical skill demonstration. All theory-based training requires a written knowledge check (e.g. test, quiz, exam) that will be reviewed and assessed by a competent instructor. Practical skill assessments of task completion and equipment use must be conducted by a competent supervisor or mentor.

Workers may be required to attend additional training sessions or complete further on-the-job training if performance deficiencies are identified through formal assessments.

All written evaluations and practical skill assessments must be documented and retained in the worker's personnel file. Records may be maintained in hard copy or electronically.

## 6.0 Quality Assurance

### 6.1 Performance Measurement

Compliance with this practice and program effectiveness shall be assessed through program assessments and internal audits, or other measurement criteria as specified in the COMS Assurance Standard. Measurement can also be accomplished through the tracking of appropriate Key Performance Indicators (KPI).

Business functions or departments impacted by this practice must include compliance and program effectiveness verifications in their business assurance program. Performance will be monitored and reported within the responsible departments at least every two years.

Central Health and Safety Services will review Cenovus-wide program KPIs at a minimum every two years in conjunction with program review and update activities.

### 6.2 Management of Change

Proposed changes to this practice can be directed to H&S Programs and Projects.

### 6.3 Practice Verification

The document owner will complete and document reviews of this practice, as follows:

- At minimum once every two years
- If there is a significant regulation or industry best practice change that indicates the need for review
- If an incident investigation indicates the causes were related to unclear or inadequate written instructions described within this practice

If frequent and multiple variances are required due to operational needs, the reason(s) will be investigated and the document owner will determine if there is a business need to update the practice.

If submitted MOC requests indicate gaps or significant improvement opportunities, the document owner will determine if there is a business need to update the practice.

## 7.0 Glossary

Definitions and acronyms for safety documents are described in CEN-EHS243, Definitions and Acronyms. The following definitions and acronyms are specific to this document:

**Table 3: Terms and Definitions**

Term	Definition
LMS	Learning Management System
OEL	Occupational Exposure Limit
Respirable Crystalline Silica	The fraction of small silica in the crystalline (structured) form that can be inhaled deep into the lung
Quartz, Cristobalite, Tridymite	3 major stable forms of crystalline silica

## 8.0 References

### 8.1 External Documents

The following external documents support this practice:

**Table 4: External Document References**

Document Type or Number	Document Title
Work Safe Alberta	<a href="#">Crystalline Silica at the Work Site (2009)</a>
Work Safe BC	<a href="#">Developing a Silica Exposure Control Plan</a>
US Bureau of Mines	<a href="#">Crystalline Silica Primer</a>
US OSHA	<a href="#">Fact Sheet: Crystalline Silica Exposure Health Hazard Information 2002</a>
US NIOSH	<a href="#">Health Effects of Occupational Exposure to Respirable Crystalline Silica</a>

### 8.2 Internal Documents

The following Cenovus documents support this practice:

**Table 5: Internal Document References**

Document Type or Number	Document Title
Policy	<a href="#">Corporate Responsibility Policy</a>

Document Type or Number	Document Title
CEN-EHS-REG787	<a href="#">Regulatory Definitions and Acronyms</a>
CEN-EHS019	<a href="#">Hazard Assessment and Control Practice</a>
CEN-EHS010	<a href="#">Respiratory Protection Code of Practice</a>
Schedule	<a href="#">Cenovus Records Classification &amp; Retention Schedule</a>