

Note: This Code is not intended for use until January 1, 2020, which is the date on which new amendments to Ontario Regulation 490/09 will be coming into force.

# **Code for Medical Surveillance for Designated Substances in Ontario Regulation 490/09 (2019) under the *Occupational Health and Safety Act***

## **Overview**

The Ministry of Labour's Code for Medical Surveillance for Designated Substances ("Code") sets out the Medical Surveillance Program requirements for the following designated substances: asbestos, benzene, coke oven emissions, isocyanates, lead (inorganic and organic), mercury (alkyl and non-alkyl compounds) and silica.

It applies to employers that are required to provide for medical examinations required under subsection 20(4) of O. Reg. 490/09 – Designated Substances.

Worker participation in medical surveillance programs is not mandatory. In accordance with subsection 28(3) of the Occupational Health and Safety Act (the Act), a worker must consent to participate. It is recommended that the benefits and limitations, if any, of medical surveillance programs be communicated to workers to assist in this determination.

Medical surveillance programs established in accordance with this Code may assist in the detection of exposure-related adverse health effects for appropriate medical follow-up, including removal from exposure, and may direct the need for immediate evaluation of primary exposure control measures. They help protect the health of workers by:

- Providing direction to examining physicians concerning the medical examinations and clinical tests used in the determination of a worker's fitness for working in exposure to the designated substance
- Identifying workers with conditions which may be aggravated by exposure to the designated substance and establishing a baseline measure for determining changes in health;
- Evaluating the effects of exposure to the designated substance on workers;

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- Enabling remedial action to be taken in the workplace when necessary; and
- Providing health information targeted to the individual worker.

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In accordance with section 29 of O. Reg. 490/09, physicians conducting medical examinations or supervising clinical tests of a worker are governed by this Code in making a determination of whether a worker is fit, fit with limitations or unfit to continue working in exposure to the designated substance.

Physicians conducting medical examinations and/or supervising clinical tests of a worker must be competent to do so because of knowledge, training and experience in occupational medicine.

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## **Part I: Medical Surveillance Programs – General Requirements**

### **Application**

This Code applies:

In respect of the provisions for medical examinations in control programs required under subsection 20(4) of O. Reg. 490/09 - Designated Substances.

### **Worker Health Information**

1. At pre-placement and periodic medical examinations in respect of a designated substance, a worker shall be advised by their physician of:
  - a) Adverse health effects and symptoms associated with exposure to the designated substance, in the context of the individual worker's health;
  - b) The importance of notifying their employer if they are experiencing symptoms possibly resulting from exposure to the designated substance so that appropriate follow-up can be arranged (e.g. review of control measures and referral for medical assessment);
  - c) The results of any clinical tests and if not available at the time of the medical examination, the process for ensuring that the worker is notified of the results when they become available;
  - d) The importance of good personal hygiene practices in preventing exposures to the designated substance (e.g. hand washing after working with the designated substance);
  - e) The hazards associated with eating or drinking in areas where there is the risk of exposure through ingestion of designated substances such as lead and mercury;
  - f) The reproductive risks associated with exposure to certain designated substances such as lead and mercury;
  - g) With respect to asbestos, coke oven emissions, and silica, the harmful effects of smoking and exposure to the designated substance; and
  - h) Non-occupational sources of exposure to the designated substance (e.g. lead and the use of munitions) which may contribute to exposures.

## Part I: Medical Surveillance Programs – General Requirements

2. At an exit examination, a worker shall be advised:
  - a) Where appropriate, of the possible risks of future health effects associated with past exposures to the designated substance including, but not limited to:
    - For asbestos, the risk of asbestosis, lung cancer and mesothelioma.
    - For benzene, the risk of aplastic anemia and leukemia.
    - For coke oven emissions, the risk of lung and skin cancer and chronic bronchitis.
    - For silica, the risk of silicosis, lung cancer and connective tissue disease.
  - b) To inform their personal physician\* of their history of exposure to a designated substance and provide copies of their health records, as may be appropriate, to their personal physician.
  - c) That further medical follow-up should be determined by their personal physician based on the worker's individual risk profile, exposure history and current best practices.

\*Note: If different than the physician overseeing the medical surveillance.

## Notification of Results of Medical Examinations and Clinical Tests

After advising a worker and the worker's employer that the worker is fit with limitations or unfit to continue working in exposure to a designated substance in accordance with subsections 29 (2) and (3) of O. Reg. 490/09 - Designated Substances, physicians are reminded of the provisions of subsections 29 (6) and (7) concerning the notification of the workplace joint health and safety committee and the Ministry of Labour's Provincial Physician of that advice.

## Record Keeping

1. In accordance with sections 30 and 31 of O. Reg. 490/09 – Designated Substances, a physician who conducts medical examinations or supervises the clinical tests of a worker must keep a copy of a worker's exposure record, where provided by the employer in accordance with subsection 27(1)(a) of O. Reg. 490/09 (See 'Note' following paragraph 2 below), and the records of any medical examinations and clinical tests (health records).

These records must be kept in a secure place until the later of the following dates:

- a) The 40th anniversary of the date the first record was made;



## Part I: Medical Surveillance Programs – General Requirements

- b) The 20th anniversary of the date the last record was made.

If the physician is no longer able to keep the exposure records or health records, the records must be forwarded to the Provincial Physician, Ministry of Labour, or to a physician designated by the Provincial Physician.

- 2. The records required by sections 30 and 31 should include the following information:
  - a) Worker's name (in full).
  - b) Date of birth.
  - c) Gender.
  - d) The worker's occupations or jobs at the workplace, including start dates and end dates.
  - e) The kinds of operations and/or processes in which the worker was involved.
  - f) Concentrations of airborne designated substance(s) to which the worker was exposed.
  - g) Use of personal protective equipment, including respiratory equipment and type.
  - h) Medical examination reports.
  - i) Results of clinical tests (e.g. blood and urine tests, chest radiographs and pulmonary function tests).
  - j) Copies of all relevant correspondence concerning health (e.g. referral letters), and any information concerning the actions taken in response to abnormal clinical tests, and
  - k) Copies of the Health Professional's Report (Form 8) to the Workplace Safety and Insurance Board, if completed.

Note: The items listed in (a) through (g) form part of a worker's exposure record. Subsection 27(1)(a) of O. Reg. 490/09 requires employers to provide a copy of the worker's personal exposure record to a physician who conducts the medical examinations or supervises the clinical tests.

## **Part II: Medical Surveillance Program Requirements for Individual Designated Substances**

### **1. Asbestos**

#### ***Medical Surveillance Program Requirements***

#### **Medical Examinations – General**

With respect to the medical examinations required under subsection 20(4) of O. Reg. 490/09, the medical examinations for workers exposed to asbestos shall be carried out:

1. Prior to placement.
2. Periodically, as follows, while exposed:
  - At least once every five years, beginning 10 years after first exposure with any employer, or
  - More frequently, if required by the examining physician.
3. Upon exiting placement, as follows:
  - Medical examinations are required for workers with more than 10 years of exposure, unless the most recent medical examination was performed within the last 12 months\*.

\*Important: Workers not meeting this criteria and therefore not required to undergo an exit medical examination must be provided health information consistent with that given at exit medical examinations as set out in paragraph 2 of the Worker Health Information section in Part I of this Code.

#### ***Pre-placement Medical Examinations***

Pre-placement medical examinations shall include:

- i) Initial medical and occupational history including:
  - Previous exposure (both occupational and non-occupational) to asbestos, including timeframe of first exposure to asbestos with any employer.
  - History of past or present respiratory disorders.
  - Personal habits (e.g. smoking and hygiene).

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Asbestos

Note: The administration of a respiratory questionnaire is recommended.

- ii) A physical examination focusing on the respiratory system.
- iii) Provision of health information consistent with paragraph 1 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for asbestos in accordance with this Code.

### ***Periodic Medical Examinations***

Periodic medical examinations shall include:

- i) Updating of a worker's medical and occupational history including:
  - Frequency and duration of exposure to asbestos since previous examination;
  - Enquiry for signs and symptoms that may be an early indication of:
    - Asbestosis (e.g. exertional dyspnea, new or worsening cough),
    - Malignancy (e.g. new or worsening cough, hemoptysis, pleuritic pain, weight loss).
  - Personal habits (e.g. smoking and hygiene).

Note: The administration of a respiratory questionnaire is recommended.

- ii) A physical examination focusing on the respiratory system, if clinically warranted.
- iii) Provision of health information consistent with paragraph 1 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for asbestos in accordance with this Code.

### ***Exit Medical Examinations***

Exit medical examinations shall include:

- i) Updating of a worker's medical and occupational history including:
  - Frequency and duration of exposure to asbestos since previous examination;
  - Enquiry for signs and symptoms that may be an early indication of
    - Asbestosis (e.g. exertional dyspnea, new or worsening cough).

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Asbestos

- Malignancy (e.g. new or worsening cough, hemoptysis, pleuritic pain, weight loss).
- Personal habits (e.g. smoking and hygiene).

Note: The administration of a respiratory questionnaire is recommended.

- ii) A physical examination focusing on the respiratory system, if clinically warranted.
- iii) Provision of health information consistent with paragraph 2 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for asbestos in accordance with this Code.

## Clinical Tests for Asbestos

### Types

The following clinical tests are required for pre-placement, periodic and exit medical examinations with respect to exposure to asbestos:

#### 1. Imaging: Chest Radiograph (postero-anterior) (PA)

It is recommended that the chest radiographs be read by a physician certified by the Royal College of Physicians and Surgeons of Canada (RCPSC), and educated and experienced in the practice of reading chest radiographs.

Note: To avoid unnecessary X-rays, the examining physician shall, where practical, obtain the relevant medical records from another facility if the worker has been previously examined within the past year. It is recommended that chest radiographs obtained be re-read based on the potential exposure to asbestos, if required.

#### 2. Pulmonary Function Tests (PFT)<sup>1</sup>, (to be taken in conjunction with chest radiograph):

- FEV1, FVC, FEV1/FVC ratio

Note: All relevant data shall be corrected to body temperature and pressure (BTPS).

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<sup>1</sup> All pulmonary function testing must be done according to current available standards for spirometry in the workplace.

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Asbestos

#### ***Frequency***

Chest radiograph and PFT, to be done every 5 years after 10 years of exposure or as required by the examining physician.

#### **Action Levels/Removal from Exposure Criteria**

There are no specific action levels/removal from exposure criteria.

An assessment of a worker's fitness to continue working in exposure to asbestos is based on the results of the medical examination in conjunction with the results of the clinical tests. If the examining physician determines that the worker is fit with limitations or unfit, the physician shall take action in accordance with section 29 of O. Reg. 490/09.

Where the examining physician determines that the signs of asbestos-induced disease are present, the examining physician should consider whether the worker should be referred to a respirologist or other knowledgeable specialist educated and experienced in the practice of evaluating work-related lung diseases for further medical assessment.

#### **Return to Work in Exposure to Asbestos Criteria**

A worker's return to work in exposure to asbestos is to be decided on a case by case basis by the examining physician, in consultation with a respirologist or other knowledgeable specialist educated and experienced in the practice of evaluating work-related lung diseases, if any, and after careful review of sources of exposure and protective measures in the workplace to ensure worker exposure to asbestos is minimized and within acceptable levels.

**Part II: Medical Surveillance Program Requirements  
for Individual Designated Substances**

**Benzene**

## **2. Benzene**

### ***Medical Surveillance Program Requirements***

#### **Medical Examinations – General**

With respect to the medical examinations required under subsection 20(4) of O. Reg. 490/09, the medical examinations for workers exposed to benzene shall be carried out:

1. Prior to placement.
2. Periodically, as follows:
  - Annually, or
  - More frequently, if required by the examining physician.
3. In the event of an acute exposure requiring immediate medical attention.
4. Upon exiting placement, unless the most recent medical examination was performed within the last 6 months\*.

\*Important: Workers not meeting this criteria and therefore not required to undergo an exit medical examination must be provided health information consistent with that given at exit medical examinations as set out in paragraph 2 of the Worker Health Information section in Part I of this Code.

#### ***Pre-placement Medical Examinations***

Pre-placement medical examinations shall include:

- i) Initial medical and occupational history including:
  - Previous exposure (both occupational and non-occupational) to:
    - Benzene and other hematological toxins
    - Toluene
    - Ionizing radiation
    - Chemotherapy
  - Personal history of blood or bone marrow disorders including:
    - Genetic hemoglobin abnormalities

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Benzene

- Bleeding abnormalities
  - Abnormal function of formed blood elements
  - History of renal or liver dysfunction, neurological or dermatologic disorders.
  - Medication use, personal habits (e.g. smoking, alcohol consumption).
  - Family history of blood or bone marrow disorders including hematologic neoplasms.
- ii) A physical examination focusing on the systems affected by benzene, including the hematologic system.
- iii) Provision of health information consistent with paragraph 1 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for benzene in accordance with this Code.

### ***Periodic Medical Examinations***

Periodic medical examinations shall include:

- i) Updating of a worker's medical and occupational history including:
- New exposures to potential marrow toxins.
  - Frequency and duration of exposure to benzene since previous examination.
  - Changes in medication, personal habits.
  - The appearance of signs or symptoms related to blood disorders.
  - Enquiry for symptoms consistent with benzene exposure which may precede or follow clinical signs, including:
    - Headache
    - Dizziness
    - Loss of appetite/nausea
    - Shortness of breath
    - Excessive tiredness

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Benzene

- ii) A physical examination focusing on the systems affected by benzene, including the hematologic system, if clinically warranted.
- iii) Provision of health information consistent with paragraph 1 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for benzene in accordance with this Code.

### ***Acute Exposure Medical Examinations***

Medical examinations carried out in the event of an acute exposure to benzene shall include:

- i) Enquiry for symptoms consistent with benzene exposure, including:
  - Headache
  - Dizziness
  - Loss of appetite/nausea
  - Shortness of breath
  - Excessive tiredness
- ii) A physical examination focusing on the systems affected by benzene, including the hematologic system, if clinically warranted.
- iii) Clinical tests for benzene in accordance with this Code.

### ***Exit Medical Examinations***

Exit medical examinations shall include:

- i) Updating of a worker's medical and occupational history including:
  - New exposures to potential marrow toxins.
  - Frequency and duration of exposure to benzene since previous examination.
  - Changes in medication, personal habits.
  - The appearance of signs or symptoms related to blood disorders.
  - Enquiry for symptoms consistent with benzene exposure which may precede or follow clinical signs including:



## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Benzene

- Headache
  - Dizziness
  - Loss of appetite/nausea
  - Shortness of breath
  - Excessive tiredness
- ii) A physical examination focusing on the systems affected by benzene, including the hematologic system, if clinically warranted.
- iii) Provision of health information consistent with paragraph 2 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for benzene in accordance with this Code.

## Clinical Tests for Benzene

### *Types*

The following clinical tests are required for pre-placement, periodic, acute exposure and exit medical examinations with respect to exposure to benzene:

#### **Pre-Placement Medical Examinations**

1. A complete blood count (CBC) including: hemoglobin, hematocrit, erythrocyte count and erythrocyte indices [mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC)], leucocyte count with differential, band neutrophils (if present) and thrombocyte (platelet) count.

#### **Periodic Medical Examinations**

1. S-Phenylmercapturic acid (S-PMA) in urine collected at the end of a work shift.
  - In scheduling S-PMA tests, it should be understood that workers are to provide urine samples at the end of a work shift representative of typical exposures.

#### **Acute Exposure Medical Examinations**

1. S-Phenylmercapturic acid (S-PMA) in urine.

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Benzene

#### **Exit Medical Examinations**

1. A complete blood count (CBC) including: hemoglobin, hematocrit, erythrocyte count and erythrocyte indices [mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC)], leucocyte count with differential, band neutrophils (if present) and thrombocyte (platelet) count.

#### ***Frequency***

#### **Periodic Medical Examinations**

S-PMA, in urine collected at end of a work shift to be done annually or more frequently as required by the examining physician.

- i) Levels below 25 µg/g creatinine S-PMA in urine require no additional testing.
- ii) Levels at or above 25 µg/g creatinine S-PMA in urine require a complete blood count (CBC) test as soon as practicable and monthly for 3 months following the exposure, except as specified in \*Note below or more frequently as required by the examining physician.

\*Note: Repeat CBC testing should be done within two weeks where biological monitoring reveals abnormalities based on laboratory-specified normal limits or compared to the individual's baseline pre-exposure CBC.

#### **Acute Exposure Medical Examinations**

Tests for S-Phenylmercapturic acid (S-PMA) in urine, as follows:

- i) Levels below 25 µg/g creatinine S-PMA in urine require no additional testing.
- ii) Levels at or above 25 µg/g creatinine S-PMA in urine require a complete blood count (CBC) test as soon as practicable and monthly for 3 months following the exposure, except as specified in \*\*Note below or more frequently as required by the examining physician.

\*\*Note: Repeat CBC testing should be done within two weeks where biological monitoring reveals abnormalities based on laboratory-specified normal limits or compared to the individual's baseline pre-exposure CBC.

#### **Action Levels/Removal from Exposure Criteria**

An assessment of a worker's fitness to continue working in exposure to benzene is based on the results of the medical examination in conjunction with the results of the

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Benzene

clinical tests. If the examining physician determines that the worker is fit with limitations or unfit, the physician shall take action in accordance with section 29 of O. Reg. 490/09.

#### 1. Review Level:

Levels of S-Phenylmercapturic acid (S-PMA) in urine at or above 25 µg/g creatinine trigger the review of engineering controls, work practices, worker health status and personal hygiene practice.

#### 2. Removal from Exposure Criteria:

- i) Signs or symptoms consistent with benzene exposure.
- ii) Abnormalities on biological monitoring with persistent abnormalities on repeat CBC testing at two weeks.

Upon removal, the worker should be referred to a hematologist or other knowledgeable specialist educated and experienced in the practice of evaluating work-related blood disorders, for further medical investigation where there are persistent abnormalities in CBC.

### Return to Work in Exposure to Benzene Criteria

A worker's return to work in exposure to benzene is to be decided on a case by case basis by the examining physician in consultation with a hematologist, or other knowledgeable specialist educated and experienced in the practice of evaluating work-related blood disorders, if any, and after careful review of sources of exposure and implementation of protective measures in the workplace to ensure worker exposure to benzene is minimized and within acceptable levels.

**Part II: Medical Surveillance Program Requirements  
for Individual Designated Substances**

**Coke Oven Emissions**

**3. Coke Oven Emissions**  
***Medical Surveillance Program Requirements***

**Medical Examinations – General**

With respect to the medical examinations required under subsection 20(4) of O. Reg. 490/09, the medical examinations for workers exposed to coke oven emissions shall be carried out:

1. Prior to placement.
2. Periodically, as follows, while exposed:
  - At least once every five years, beginning 10 years after first exposure with any employer, or
  - More frequently, if required by the examining physician.
3. Upon exiting placement, as follows:
  - Medical examinations are required for workers with more than 10 years of exposure, unless the most recent medical examination was performed within the last 12 months\*.

\*Important: Workers not meeting this criteria and therefore not required to undergo an exit medical examination must be provided health information consistent with that given at exit medical examinations as set out in paragraph 2 of the Worker Health Information section in Part I of this Code.

***Pre-placement Medical Examinations***

Pre-placement medical examinations shall include:

- i) Initial medical and occupational history including:
  - Previous exposure to coke oven emissions, including timeframe of first exposure to coke oven emissions with any employer.
  - History of past or present respiratory or dermatologic disorders.
  - Personal habits (e.g. smoking and hygiene).

Note: The administration of a respiratory questionnaire is recommended.

- ii) A physical examination focusing on the respiratory and dermatologic systems.

## **Part II: Medical Surveillance Program Requirements for Individual Designated Substances**

### **Coke Oven Emissions**

- iii) Provision of health information consistent with paragraph 1 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for coke oven emissions in accordance with this Code.

### ***Periodic Medical Examinations***

Periodic medical examinations shall include:

- i) Updating of a worker's medical and occupational history including:
  - Frequency and duration of exposure to coke oven emissions since previous examination;
  - Enquiry for signs and symptoms that may be an early indication of:
    - Respiratory disorders, including malignancy and chronic bronchitis (e.g. new or worsening cough, shortness of breath, hemoptysis, pleuritic pain, weight loss).
    - Dermatologic disorders, including malignancy.
  - Personal habits (e.g. smoking and hygiene).

Note: The administration of a respiratory questionnaire is recommended.

- ii) A physical examination focusing on the respiratory and dermatologic systems, if clinically warranted.
- iii) Provision of health information consistent with paragraph 1 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for coke oven emissions in accordance with this Code.

### ***Exit Medical Examinations***

Exit medical examinations shall include:

- i) Updating of a worker's medical and occupational history including:
  - Frequency and duration of exposure to coke oven emissions since previous examination;
  - Enquiry for signs and symptoms that may be an early indication of:

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Coke Oven Emissions

- Respiratory disorders, including malignancy and chronic bronchitis (e.g. new or worsening cough, shortness of breath, hemoptysis, pleuritic pain, weight loss).
- Personal habits (e.g. smoking and hygiene).

Note: The administration of a respiratory questionnaire is recommended.

- ii) A physical examination focusing on the respiratory and dermatologic systems, if clinically warranted.
- iii) Provision of health information consistent with paragraph 2 of the Worker Health Information section in Part 1 of this Code.
- iv) Clinical tests for coke oven emissions in accordance with this Code.

## Clinical Tests for Coke Oven Emissions

### *Types*

The following clinical tests are required for pre-placement, periodic and exit medical examinations with respect to exposure to coke oven emissions:

#### 1. Imaging: Chest Radiograph (postero-anterior) (PA)

It is recommended that the chest radiographs be read by a physician certified by the Royal College of Physicians and Surgeons of Canada (RCPSC), and educated and experienced in the practice of reading chest radiographs.

Note: To avoid unnecessary X-rays, the examining physician shall, where practical, obtain the relevant medical records from another facility if the worker has been previously examined within the past year. It is recommended that chest radiographs obtained be re-read based on the potential exposure to coke oven emissions, if required.

#### 2. Pulmonary Function Tests (PFT)<sup>2</sup>, (to be taken in conjunction with chest radiograph):

- FEV1, FVC, FEV1/FVC ratio

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<sup>2</sup> All pulmonary function testing must be done according to current available standards for spirometry in the workplace.

## **Part II: Medical Surveillance Program Requirements for Individual Designated Substances**

### **Coke Oven Emissions**

Note: All relevant data shall be corrected to body temperature and pressure (BTPS).

#### ***Frequency***

Chest radiograph and PFT, to be done every 5 years after 10 years of exposure or as required by the examining physician.

#### **Action Levels/Removal from Exposure Criteria**

There are no specific action levels/removal from exposure criteria.

An assessment of a worker's fitness to continue working in exposure to coke oven emissions is based on the results of the medical examination in conjunction with the results of the clinical tests. If the examining physician determines that the worker is fit with limitations or unfit, the physician shall take action in accordance with section 29 of O. Reg. 490/09.

Where the examining physician determines that the signs of coke oven emissions-induced disease are present, the examining physician should consider whether the worker should be referred to a respirologist, dermatologist or other knowledgeable specialist educated and experienced in the practice of evaluating work-related lung or skin diseases for further medical assessment.

#### **Return to Work in Exposure to Coke Oven Emissions Criteria**

A worker's return to work in exposure to coke oven emissions is to be decided on a case by case basis by the examining physician, in consultation with a respirologist, dermatologist or other knowledgeable specialist educated and experienced in the practice of evaluating work-related lung or skin diseases, if any, and after careful review of sources of exposure and protective measures in the workplace to ensure worker exposure to coke oven emissions is minimized and within acceptable levels.

## **4. Isocyanates**

### ***Medical Surveillance Program Requirements***

#### **Medical Examinations – General**

With respect to the medical examinations required under subsection 20(4) of O. Reg. 490/09, the medical examinations for workers exposed to isocyanates shall be carried out:

1. Prior to placement.
2. Periodically, as follows:
  - At 6 month intervals for the first two years.
  - Annually thereafter or more frequently, if required by the examining physician.
3. In the event of an acute exposure requiring immediate medical attention.
4. Upon exiting placement unless the most recent medical examination was performed within the last 6 months\*.

\*Important: Workers not meeting this criteria and therefore not required to undergo an exit medical examination must be provided health information consistent with that given at exit medical examinations as set out in paragraph 2 of the Worker Health Information section in Part I of this Code.

#### ***Pre-placement Medical Examinations***

Pre-placement medical examinations shall include:

- i) Initial medical and occupational history including:
  - Previous exposure (both occupational and non-occupational) to isocyanates.
  - History of past or present respiratory or dermatologic disorders (e.g. allergies, asthma, skin rashes).

Note: The administration of a respiratory questionnaire is recommended.

- ii) A physical examination focusing on the systems affected by isocyanates, including the respiratory and dermatologic systems.



## **Part II: Medical Surveillance Program Requirements for Individual Designated Substances**

### **Isocyanates**

- iii) Provision of health information consistent with paragraph 1 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for isocyanates in accordance with this Code.

### ***Periodic Medical Examinations***

Periodic medical examinations shall include:

- i) Updating of a worker's medical and occupational history including:
  - A history of frequency and duration of exposure to isocyanates since previous examination.
  - Enquiry for signs and symptoms of respiratory problems and skin rashes, particularly on hands and face.

Note: The administration of a respiratory questionnaire is recommended.

- ii) A physical examination, focusing on the systems affected by isocyanates, including the respiratory and dermatologic systems, if clinically warranted.
- iii) Provision of health information consistent with paragraph 1 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for isocyanates in accordance with this Code.

### ***Acute Exposure Medical Examinations***

Medical examinations carried out in the event of an acute exposure to isocyanates shall include:

- i) Enquiry for signs and symptoms of respiratory problems and skin rashes, particularly on hands and face.
- ii) A physical examination focusing on the systems affected by isocyanates, including the respiratory and dermatologic systems, if clinically warranted.
- iii) Clinical tests for isocyanates in accordance with this Code.

If respiratory or dermatologic symptoms persist, the worker should be referred to a respirologist, dermatologist or other knowledgeable specialist educated and experienced in the practice of evaluating work-related lung or skin diseases for further medical assessment.

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Isocyanates

#### ***Exit Medical Examinations***

Exit medical examinations shall include:

- i) Updating of a worker's medical and occupational history including:
  - A history of frequency and duration of exposure to isocyanates since previous examination.
  - Enquiry for signs and symptoms of respiratory problems and skin rashes, particularly on hands and face.

Note: The administration of a respiratory questionnaire is recommended.

- ii) A physical examination focusing on the systems affected by isocyanates, including the respiratory and dermatologic systems, if clinically warranted.
- iii) Provision of health information consistent with paragraph 2 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for isocyanates in accordance with this Code.

#### **Clinical Tests for Isocyanates**

##### ***Types***

The following clinical tests are required for pre-placement, periodic, acute exposure and exit medical examinations with respect to exposure to isocyanates:

1. Pulmonary function tests (PFT)<sup>3</sup>:
  - FEV1, FVC and FEV1/FVC ratio

Note: All relevant data shall be corrected to body temperature and pressure (BTPS).

##### ***Frequency***

- i) Every 6 months for the first two years,
- ii) Annually thereafter, or as required by the examining physician.

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<sup>3</sup> All pulmonary function testing must be done according to current available standards for spirometry in the workplace.

## **Part II: Medical Surveillance Program Requirements for Individual Designated Substances**

### **Isocyanates**

#### **Action Levels/Removal from Exposure Criteria**

As long as their condition is stable, a worker should not be removed from exposure pending further medical assessment to confirm a medical condition resulting from exposure to isocyanates. Removal from isocyanates exposure may present a barrier to diagnosis and determination of work restrictions.

An assessment of a worker's fitness to continue working in exposure to isocyanates is based on the results of the medical examination in conjunction with the results of the clinical tests. If the examining physician determines that the worker is fit with limitations or unfit, the physician shall take action in accordance with section 29 of O. Reg. 490/09.

1. **Review Level:**

Individuals with respiratory symptoms and/or changes in pulmonary function testing (15% or greater fall in FEV1 from baseline) should be referred to a respirologist or other knowledgeable specialist educated and experienced in the practice of evaluating work-related lung diseases, for further medical assessment.

2. **Removal from Exposure Criteria:**

Individuals who are confirmed to have a medical condition resulting from the inhalation of, or skin contact with, isocyanates.

#### **Return to Work in Exposure to Isocyanates**

Individuals who are determined to have respiratory or dermatologic sensitization to isocyanates should not have any subsequent exposure to isocyanates.

**Part II: Medical Surveillance Program Requirements  
for Individual Designated Substances**

**Inorganic Lead**

## **5. Lead**

### ***Medical Surveillance Program Requirements***

#### **A. Inorganic Lead**

##### **Medical Examinations – General**

With respect to the medical examinations required under subsection 20(4) of O. Reg. 490/09, the medical examinations for workers exposed to inorganic lead shall be carried out:

1. Prior to placement.
2. Periodically, as follows:
  - Annually or more frequently if required by the examining physician.
3. In the event of an acute exposure requiring immediate medical attention.
4. Upon exiting placement unless the most recent medical examination was performed within the last 6 months\*.

\*Important: Workers not meeting this criteria and therefore not required to undergo an exit medical examination must be provided health information consistent with that given at exit medical examinations as set out in paragraph 2 of the Worker Health Information section in Part I of this Code.

##### ***Pre-placement Medical Examinations***

Pre-placement medical examinations shall include:

- i) Initial medical and occupational history including:
  - Previous exposure (both occupational and non-occupational) to inorganic lead.

Note: Potential non-occupational sources of inorganic lead may include but are not limited to: leaded paint and leaded pipes in the home, handling of munitions and firearm usage and some unlicensed imported medications/herbal products.

- Enquiry for signs and symptoms consistent with exposure to inorganic lead focusing on:
  - Gastrointestinal

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Inorganic Lead

- Nervous
  - Musculoskeletal
  - Hematologic, and
  - Renal systems.
  - Personal habits (e.g. smoking and hygiene).
- ii) A physical examination focusing on the systems affected by inorganic lead including:
- Gastrointestinal
  - Nervous
  - Musculoskeletal
  - Hematologic, and
  - Renal systems.
- iii) Provision of health information consistent with paragraph 1 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for inorganic lead in accordance with this Code.

### ***Periodic Medical Examinations***

Periodic medical examinations shall include:

- i) Updating of a worker's medical and occupational history including:
- Frequency and duration of exposure to inorganic lead since previous examination.
  - Enquiry for signs and symptoms consistent with exposure to inorganic lead focusing on:
    - Gastrointestinal
    - Nervous
    - Musculoskeletal
    - Hematologic, and

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Inorganic Lead

- Renal systems.
- Personal habits (e.g. smoking and hygiene).
- ii) A physical examination, if clinically warranted, focusing on the systems affected by inorganic lead including:
  - Gastrointestinal
  - Nervous
  - Musculoskeletal
  - Hematologic, and
  - Renal systems.
- iii) Provision of health information consistent with paragraph 1 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for inorganic lead in accordance with this Code.

### ***Acute Exposure Medical Examinations***

A medical examination carried out in the event of an acute exposure to inorganic lead shall include:

- i) Enquiry for signs and symptoms consistent with exposure to inorganic lead focusing on:
  - Gastrointestinal
  - Nervous
  - Musculoskeletal
  - Hematologic, and
  - Renal systems.
- ii) A physical examination, if clinically warranted, focusing on the systems affected by inorganic lead including:
  - Gastrointestinal
  - Nervous
  - Musculoskeletal

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Inorganic Lead

- Hematologic, and
  - Renal systems.
- iii) Clinical tests for inorganic lead in accordance with this Code.

### ***Exit Medical Examinations***

Exit medical examinations shall include:

- i) Updating of a worker's medical and occupational history including:
- Frequency and duration of exposure to inorganic lead since previous examination.
  - Enquiry for signs and symptoms consistent with exposure to inorganic lead focusing on:
    - Gastrointestinal
    - Nervous
    - Musculoskeletal
    - Hematologic, and
    - Renal systems.
  - Personal habits (e.g. smoking and hygiene).
- ii) A physical examination, if clinically warranted, focusing on the systems affected by inorganic lead including:
- Gastrointestinal
  - Nervous
  - Musculoskeletal
  - Hematologic, and
  - Renal systems.
- iii) Provision of health information consistent with paragraph 2 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for inorganic lead in accordance with this Code.

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Inorganic Lead

## Clinical Tests for Inorganic Lead

\*Important: For workers working in exposure to inorganic lead prior to January 1, 2020 and with a blood lead level exceeding the “Action Levels/Removal from Exposure Criteria” set out in this Code, please see section “Conditional Phase-In Period\* for Workers Participating in a Medical Surveillance Program for Inorganic Lead Prior to January 1, 2020.

### *Types*

The following clinical tests are required for pre-placement, periodic, acute exposure and exit medical examinations with respect to exposure to inorganic lead:

1. Blood lead level

### *Frequency*

- i) At a minimum, every 4 months for the first 12 months, following testing in relation to pre-placement medical examinations to address potential exposures through hygiene and work practices.
- ii) Monthly for blood lead level  $> 1 \mu\text{mol/L}$ .
- iii) Every 3 months for blood lead level  $0.5 \mu\text{mol/L} - 1 \mu\text{mol/L}$ .
- iv) Every 6 months for blood lead level  $< 0.5 \mu\text{mol/L}$ .

Note: The above schedule for blood lead level testing may be inadequate for certain situations where the exposures are very high and/or highly variable. In these situations the examining physician should tailor the blood lead level testing schedule to address the special risks of different types of work and exposures.

## Action Levels/Removal from Exposure Criteria

An assessment of a worker’s fitness to continue working in exposure to inorganic lead is based on the results of the medical examination in conjunction with the results of the clinical tests. If the examining physician determines that the worker is fit with limitations or unfit, the physician shall take action in accordance with section 29 of O. Reg. 490/09.

1. Review Levels:

The blood lead action levels for initiating a review of engineering controls, work practices, health status, personal hygiene practices and non-occupational sources of lead are:



## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Inorganic Lead

- For general population of workers:
    - Blood lead level > 0.25 µmol/L increase from baseline, or
    - Blood lead level > 0.5 µmol/L (single measure - confirmed by immediate repeat testing).
  - For women who are pregnant or of childbearing potential:
    - Blood lead level > 0.25 µmol/L (single measure - confirmed by immediate repeat testing).
2. Removal from Exposure Criteria (confirmed occupational exposure):

The levels for removal of the worker from exposure to inorganic lead are as follows:

- For general population of workers:
  - Blood lead level > 1.0 µmol/L (two repeat measures, one month apart), or
  - Blood lead level > 1.4 µmol/L (single measure – confirmed by immediate repeat testing).
- For women who are pregnant or of childbearing potential:
  - Blood lead level > 0.5 µmol/L.

### Return to Work in Exposure to Inorganic Lead Criteria

- For general population of workers:
  - Blood lead level < 0.7µmol/L
- For women who are pregnant or of childbearing potential:
  - Blood lead level < 0.25 µmol/L

and after careful review of sources of exposure and implementation of protective measures in the workplace to ensure worker exposure to inorganic lead is minimized and within acceptable levels

### Conditional Phase-In Period\* for Workers Participating in a Medical Surveillance Program for Inorganic Lead Prior to January 1, 2020.

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Inorganic Lead

Workers participating in a medical surveillance program for inorganic lead prior to January 1, 2020 with a blood lead level (BLL) exceeding the “Action Levels/Removal from Exposure Criteria” for inorganic lead set out in this Code may, in consultation with their examining physician and subject to the following conditions and restrictions, consent to be monitored for exposure to inorganic lead above an established individual baseline BLL while their overall body burden of inorganic lead declines over time.

The following conditions and restrictions apply to conditional phase-in periods:

1. All conditional phase-in periods expire on January 1, 2025. Following this date, all workers participating in medical surveillance under this Code are subject to the “Action Levels/Removal from Exposure Criteria” set out on pages 26-27 of this Code.
2. Eligible workers must have been participating in a medical surveillance program for inorganic lead prior to January 1, 2020.
3. Sources of exposure to inorganic lead and protective measures in the workplace must be examined and assessed to ensure that a worker’s exposure to inorganic lead is minimized.
4. A worker’s baseline BLL must be established and based on testing carried out no earlier than 1 year prior to, and no later than 4 months following, the introduction of this Code. A worker with BLL testing falling outside this timeframe is not eligible for participation in a conditional phase-in period.
5. Frequency of clinical tests: BLL testing shall be carried out at least once every 4 months.
6. Removal from exposure to inorganic lead: The levels for removal of the worker from exposure to inorganic lead are as follows:
  - i. Blood lead level  $> 1.9 \mu\text{mol/L}$  or  $> 0.25\mu\text{mol/L}$  increase from baseline BLL (single measure - confirmed by immediate repeat testing).
7. Return to work in exposure criteria:
  - i.  $\text{BLL} \leq \text{baseline BLL}$ , and
  - ii. Careful review of sources of exposure to inorganic lead and implementation of protective measures in the workplace to ensure worker exposure to inorganic lead is minimized.

\*Note: The conditional phase-in period recognizes that workers participating in medical surveillance programs under O. Reg. 490/09 prior to the introduction of this Code may have a blood lead level that exceeds the action levels/removal from exposure criteria in this Code and will require time for their BLL to decrease.

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Organic Lead

## B. Organic Lead

### Medical Examinations – General

With respect to the medical examinations required under subsection 20(4) of O. Reg. 490/09, the medical examinations for workers exposed to organic lead shall be carried out:

1. Prior to placement.
2. Periodically as follows:
  - Annually or more frequently if required by the examining physician.
3. In the event of an acute exposure requiring immediate medical attention.
4. Upon exiting placement unless the most recent medical examination was performed within the last 6 months\*.

\*Important: Workers not meeting this criteria and therefore not required to undergo an exit medical examination must be provided health information consistent with that given at exit medical examinations as set out in paragraph 2 of the Worker Health Information section in Part I of this Code.

### ***Pre-placement Medical Examinations***

Pre-placement medical examinations shall include:

- i) Initial medical and occupational history including:
  - Previous exposure (both occupational and non-occupational) to organic lead.
  - Enquiry for potential mild manifestations of organic lead toxicity including:
    - Insomnia and nervous excitation
    - Nausea
    - Vomiting
    - Tremor
- ii) A physical examination focusing on the nervous system (e.g. looking for tremor, hyperreflexia, ataxia), the cardiovascular system (e.g. hypertension, bradycardia) and mental status.

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Organic Lead

Note: signs and symptoms of organic lead toxicity are different from inorganic lead toxicity.

- iii) Provision of health information consistent with paragraph 1 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for organic lead in accordance with this Code.

### ***Periodic Medical Examinations***

Periodic medical examinations shall include:

- i) Updating of a worker's medical and occupational history including:
  - Frequency and duration of exposure to organic lead since previous examination.
  - Enquiry for potential mild manifestations of organic lead toxicity including:
    - Insomnia and nervous excitation
    - Nausea
    - Vomiting
    - Tremor
- ii) A physical examination, if clinically warranted, focusing on the nervous system (e.g. looking for tremor, hyperreflexia, ataxia), the cardiovascular system (e.g. hypertension, bradycardia) and mental status.

Note: signs and symptoms of organic lead toxicity are different from inorganic lead toxicity.

- iii) Provision of health information consistent with paragraph 1 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for organic lead in accordance with this Code.

### ***Acute Exposure Medical Examinations***

A medical examination carried out in the event of an acute exposure to organic lead shall include:

- i) Enquiry for potential mild manifestations of organic lead toxicity including:
  - Insomnia and nervous excitation

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Organic Lead

- Nausea
  - Vomiting
  - Tremor
- ii) A physical examination, if clinically warranted, focusing on the nervous system (e.g. looking for tremor, hyperreflexia, ataxia), the cardiovascular system (e.g. hypertension, bradycardia) and mental status.

Note: signs and symptoms of organic lead toxicity are different from inorganic lead toxicity.

- iii) Clinical tests for organic lead in accordance with this Code.

### ***Exit Medical Examinations***

Exit medical examinations shall include:

- i) Updating of a worker's medical and occupational history including:
- Frequency and duration of exposure to organic lead since previous examination.
  - Enquiry for potential mild manifestations of organic lead toxicity including:
    - Insomnia and nervous excitation
    - Nausea
    - Vomiting
    - Tremor

- ii) A physical examination, if clinically warranted, focusing on the nervous system (e.g. looking for tremor, hyperreflexia, ataxia), the cardiovascular system (e.g. hypertension, bradycardia) and mental status.

Note: signs and symptoms of organic lead toxicity are different from inorganic lead toxicity.

- iii) Provision of health information consistent with paragraph 2 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for organic lead as required by this Code.

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Organic Lead

## Clinical Tests for Organic Lead

### *Types*

The following clinical tests are required for pre-placement, periodic, acute exposure and exit medical examinations with respect to exposure to organic lead:

1. Lead in urine sample\*: Taken at the end of the work shift at the end of the work week (except in the case of acute exposure medical examinations).

\*Note: Urine lead testing is prescribed for organic lead only.

### *Frequency*

Lead in urine:

- i) At a minimum, every 4 months during the first 12 months of placement following testing in relation to pre-placement medical examinations, to address potential exposures through hygiene and work practices.
- ii) Thereafter, annually or sooner if change in work practices or primary prevention measures.

## Action Levels/Removal from Exposure Criteria

An assessment of a worker's fitness to continue working in exposure to organic lead is based on the results of the medical examination in conjunction with the results of the clinical tests. If the examining physician determines that the worker is fit with limitations or unfit, the physician shall take action in accordance with section 29 of O. Reg. 490/09.

1. Review Level:

The detection of lead in urine triggers the review of engineering controls, work practices, worker health status and personal hygiene practices.

2. Removal from Exposure Criteria:

The level for removal of the worker from exposure to organic lead is as follows:

- Lead in urine > 0.075  $\mu\text{mol/L}$  (20 $\mu\text{g/L}$ ).

## **Part II: Medical Surveillance Program Requirements for Individual Designated Substances**

### **Organic Lead**

#### **Return to Work in Exposure to Organic Lead Criteria**

Return to work in exposure to organic lead is at the discretion of the examining physician after careful review of sources of exposure and implementation of protective measures in the workplace to ensure worker exposure to organic lead is minimized and within acceptable levels.

**Part II: Medical Surveillance Program Requirements  
for Individual Designated Substances**

**Mercury and Non-Alkyl Mercury Compounds**

## **6. Mercury**

### ***Medical Surveillance Program Requirements***

#### **A. Mercury and Non-Alkyl Mercury Compounds**

##### **Medical Examinations – General**

With respect to the medical examinations required under subsection 20(4) of O. Reg. 490/09, the medical examinations for workers exposed to mercury and non-alkyl mercury compounds shall be carried out:

1. Prior to placement.
2. Periodically, as follows:
  - Annually or more frequently, if required by the examining physician
3. In the event of an acute exposure requiring immediate medical attention.
4. Upon exiting placement unless the most recent medical examination was performed within the last 6 months\*.

\*Important: Workers not meeting this criteria and therefore not required to undergo an exit medical examination must be provided health information consistent with that given at exit medical examinations as set out in paragraph 2 of the Worker Health Information section in Part I of this Code.

##### ***Pre-placement Examinations***

Pre-placement medical examinations shall include:

- i) Initial medical and occupational history including:
  - Previous exposure (both occupational and non-occupational) to mercury and non-alkyl mercury compounds.

Note: Potential non-occupational sources of mercury and non-alkyl mercury compounds include recent dental amalgam procedures that may transiently elevate urinary mercury levels.

- Enquiry for signs and symptoms associated with exposure to mercury and non-alkyl mercury compounds focusing on:
  - Nervous



## **Part II: Medical Surveillance Program Requirements for Individual Designated Substances**

### **Mercury and Non-Alkyl Mercury Compounds**

- Renal
  - Respiratory, and
  - Dermatologic systems.
- ii) A physical examination focusing on the systems affected by mercury and non-alkyl mercury compounds including:
- Nervous
  - Renal
  - Respiratory, and
  - Dermatologic systems.
- iii) Provision of health information consistent with paragraph 1 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for mercury and non-alkyl mercury compounds in accordance with this Code.

### ***Periodic Medical Examinations***

Periodic medical examinations shall include:

- i) Updating of a worker's medical and occupational history including:
- Frequency and duration of exposure to mercury and non-alkyl mercury compounds since previous examination.
  - Enquiry for signs and symptoms associated with exposure to mercury and non-alkyl mercury compounds focusing on:
    - Nervous
    - Renal
    - Respiratory, and
    - Dermatologic systems.
- ii) A physical examination, if clinically warranted, focusing on the systems affected by mercury and non-alkyl mercury compounds including:
- Nervous

## **Part II: Medical Surveillance Program Requirements for Individual Designated Substances**

### **Mercury and Non-Alkyl Mercury Compounds**

- Renal
  - Respiratory, and
  - Dermatologic systems.
- iii) Provision of health information consistent with paragraph 1 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for mercury and non-alkyl mercury in accordance with this Code.

### ***Acute Exposure Medical Examinations***

A medical examination carried out in the event of an acute exposure to mercury or non-alkyl mercury compounds shall include:

- i) Enquiry for signs and symptoms associated with exposure to mercury and non-alkyl mercury compounds focusing on:
- Nervous
  - Renal
  - Respiratory, and
  - Dermatologic systems.
- ii) A physical examination, if clinically warranted, focusing on the systems affected by mercury and non-alkyl mercury compounds including:
- Nervous
  - Renal
  - Respiratory, and
  - Dermatologic systems.
- iii) Clinical tests for mercury and non-alkyl mercury compounds in accordance with this Code.

### ***Exit Medical Examinations***

Exit medical examinations shall include:

- i) Updating of a worker's medical and occupational history including:

## **Part II: Medical Surveillance Program Requirements for Individual Designated Substances**

### **Mercury and Non-Alkyl Mercury Compounds**

- Frequency and duration of exposure to mercury and non-alkyl mercury compounds since previous examination.
  - Enquiry for signs and symptoms associated with exposure to mercury and non-alkyl mercury compounds focusing on:
    - Nervous
    - Renal
    - Respiratory, and
    - Dermatologic systems.
- ii) A physical examination, if clinically warranted, focusing on the systems affected by mercury and non-alkyl mercury compounds including:
- Nervous
  - Renal
  - Respiratory, and
  - Dermatologic systems.
- iii) Provision of health information consistent with paragraph 2 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for mercury and non-alkyl mercury compounds in accordance with this Code.

### **Clinical Tests for Mercury and Non-Alkyl Mercury Compounds**

#### ***Types***

The following clinical tests are required for pre-placement, periodic, acute exposure and exit medical examinations with respect to exposure to mercury and non-alkyl mercury compounds:

1. Spot urinary mercury test.

#### ***Frequency***

- i) At a minimum, every 4 months for the first 12 months following testing in relation to pre-placement medical examinations to address potential exposures through hygiene and work practices.

## **Part II: Medical Surveillance Program Requirements for Individual Designated Substances**

### **Mercury and Non-Alkyl Mercury Compounds**

- ii) Annually thereafter or sooner if change in work practices or primary prevention measures.
- iii) Monthly or sooner if clinically indicated, for spot urinary mercury tests > 0.15 µmol/L or 0.03 mg/L. A positive test that is > 0.15 µmol/L should be validated with a 24 hour urinary mercury test.

### **Action Levels/Removal from Exposure Criteria**

An assessment of a worker's fitness to continue working in exposure to mercury and non-alkyl mercury compounds is based on the results of the medical examination in conjunction with the results of the clinical tests. If the examining physician determines that the worker is fit with limitations or unfit, the physician shall take action in accordance with section 29 of O. Reg. 490/09.

#### 1. Review levels:

A spot urinary mercury test > 0.15 µmol/L or 0.03mg/L, confirmed with a 24 hour urinary mercury test, triggers the review of engineering controls, work practices, worker health status and personal hygiene practices.

#### 2. Removal from Exposure Criteria:

The level for removal of the worker from exposure to mercury and non-alkyl mercury compounds is as follows: Spot urinary mercury test > 0.30 µmol/L or 0.06 mg/L, confirmed with a 24 hour urinary mercury test.

### **Return to Work in Exposure to Mercury and Non-Alkyl Mercury Compounds Criteria**

Spot urinary mercury test ≤ 0.15 µmol/L or 0.03 mg/L and after careful review of sources of exposure and implementation of protective measures in the workplace to ensure worker exposure to mercury and non-alkyl mercury compounds is minimized and within acceptable levels.

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Mercury (Alkyl Compounds)

## B. Mercury (Alkyl Compounds)

### Medical Examinations – General

With respect to the medical examinations required under subsection 20(4) of O. Reg. 490/09, the medical examinations for alkyl mercury compounds shall be carried out:

1. Prior to placement.
2. Periodically as follows:
  - Annually or more frequently, if required by the examining physician.
3. In the event of an acute exposure requiring immediate medical attention.
4. Upon exiting placement unless the most recent periodic medical examination was performed within the last 6 months\*.

\*Important: Workers not meeting this criteria and therefore not required to undergo an exit medical examination must be provided health information consistent with that given at exit medical examinations as set out in paragraph 2 of the Worker Health Information section in Part I of this Code.

### ***Pre-placement Medical Examinations***

Pre-placement medical examinations shall include:

- i) Initial medical and occupational history including:
  - Enquiry for dietary sources of alkyl mercury compounds with particular emphasis on the frequency, amount and types of seafood consumed.

Note: Studies have shown that background exposure and variability in blood mercury level result primarily from methyl mercury in seafood. For example, a person who eats seafood:

- Infrequently to occasionally, would be expected to have a blood mercury level of  $<0.025 \mu\text{mol/L}$ ;
- Regularly up to 3 times per week, would be expected to result in blood mercury level in the range of  $0.075 \mu\text{mol/L}$ ;
- With high mercury levels (e.g. certain fish species) greater than 3 times per week, would be expected to have a blood mercury level of  $0.15 \mu\text{mol/L} - 0.25 \mu\text{mol/L}$ .

## **Part II: Medical Surveillance Program Requirements for Individual Designated Substances**

### **Mercury (Alkyl Compounds)**

- Enquiry for signs and symptoms associated with exposure to alkyl mercury compounds focusing on:
  - Nervous
  - Renal, and
  - Dermatologic systems.
- ii) A physical examination focusing on the systems affected by alkyl mercury compounds including:
  - Nervous
  - Renal, and
  - Dermatologic systems.
- iii) Provision of health information consistent with paragraph 1 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for alkyl mercury compounds in accordance with this Code.

### ***Periodic Medical Examinations***

The periodic medical examination shall include:

- i) Updating of a worker's medical and occupational history including:
  - Frequency and duration of exposure to alkyl mercury compounds since previous examination.
  - Enquiry for signs and symptoms associated with exposure to alkyl mercury compounds focusing on:
    - Nervous
    - Renal, and
    - Dermatologic systems.
- ii) A physical examination, if clinically warranted, focusing on the systems affected by alkyl mercury compounds including:
  - Nervous
  - Renal, and

## **Part II: Medical Surveillance Program Requirements for Individual Designated Substances**

### **Mercury (Alkyl Compounds)**

- Dermatologic systems
- iii) Provision of health information consistent with paragraph 1 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for alkyl mercury compounds in accordance with this Code.

### ***Acute Exposure Medical Examinations***

A medical examination carried out in the event of an acute exposure to alkyl mercury compounds shall include:

- i) Enquiry for signs and symptoms associated with exposure to alkyl mercury focusing on:
  - Nervous
  - Renal, and
  - Dermatologic systems.
- ii) A physical examination, if clinically warranted, focusing on the systems affected by alkyl mercury compounds including:
  - Nervous
  - Renal, and
  - Dermatologic systems.
- iii) Clinical tests in accordance with this Code.

### ***Exit Medical Examinations***

Exit medical examinations shall include:

- i) Updating of a worker's medical and occupational history including:
  - Frequency and duration of exposure to alkyl mercury since previous examination.
  - Enquiry for signs and symptoms associated with exposure to alkyl mercury focusing on:
    - Nervous
    - Renal, and

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Mercury (Alkyl Compounds)

- Dermatologic systems.
- ii) A physical examination, if clinically warranted, focusing on the systems affected by alkyl mercury compounds including:
  - Nervous
  - Renal, and
  - Dermatologic systems.
- iii) Provision of health information consistent with paragraph 2 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for alkyl mercury compounds in accordance with this Code.

### Clinical Tests for Mercury (Alkyl Compounds)

#### *Types*

The following clinical tests are required for pre-placement, periodic, acute exposure and exit medical examinations with respect to exposure to alkyl mercury compounds:

1. Blood mercury level

#### *Frequency*

- i) At a minimum, every 4 months for the first 12 months following testing in relation to pre-placement medical examinations to address potential exposures through hygiene and work practices.
- ii) Annually thereafter, or sooner if change in work practices or primary prevention measures.
- iii) Monthly for blood mercury level > 0.25 µmol/L.

### Action Levels/Removal from Exposure Criteria

An assessment of a worker's fitness to continue working in exposure to alkyl mercury compounds is based on the results of the medical examination in conjunction with the results of the clinical tests. If the examining physician determines that the worker is fit with limitations or unfit, the physician shall take action in accordance with section 29 of O. Reg. 490/09.



## **Part II: Medical Surveillance Program Requirements for Individual Designated Substances**

### **Mercury (Alkyl Compounds)**

#### 1. Review Levels:

Blood mercury level  $> 0.25 \mu\text{mol/L}$  triggers the review of engineering controls, work practices, worker health status and personal hygiene practices.

Note: Base blood mercury level for individual may vary according to diet.

#### 2. Removal from Exposure Criteria (confirmed occupational exposure):

The level for removal of the worker from exposure to alkyl mercury compounds is as follows:

- Blood mercury level  $> 0.25 \mu\text{mol/L}$ .

### **Return to Work in Exposure to Alkyl Mercury Compounds Criteria**

Blood mercury level  $\leq 0.25 \mu\text{mol/L}$  or at the discretion of physician and after careful review of sources of exposure and implementation of protective measures in the workplace to ensure worker exposure to alkyl mercury compounds is minimized and within acceptable levels.

## **7. Silica**

### ***Medical Surveillance Program Requirements***

#### **Medical Examinations – General**

With respect to the medical examinations required under subsection 20(4) of O. Reg. 490/09, the medical examinations for workers exposed to silica shall be carried out:

1. Prior to placement.
2. Periodically, as follows, while exposed:
  - At least once every five years, beginning 10 years after first exposure with any employer, or
  - More frequently, as required by the examining physician.

Note: Greater frequency of medical examinations may be recommended for heavier exposures or where there are changes in job tasks that may require additional medical surveillance.

3. Upon exiting placement, as follows:
  - Medical examination is required for workers with more than 10 years of exposure, unless the most recent medical examination was performed within the last 12 months\*.

\*Important: Workers not meeting this criteria and therefore not required to undergo an exit medical examination must be provided health information consistent with that given at exit medical examinations as set out in paragraph 2 of the Worker Health Information section in Part I of this Code.

#### ***Pre-placement Medical Examinations***

Pre-placement medical examinations shall include:

- i) Initial medical and occupational history including:
  - Previous exposure (both occupational and non-occupational) to silica including timeframe of first exposure to silica with any employer.
  - History of past or present respiratory and musculoskeletal disorders, including:
    - Silicosis

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Silica

- Chronic obstructive pulmonary disease
- Tuberculosis and other mycobacterial diseases
- Lung cancer
- Connective tissue disease
- Personal habits (e.g. smoking and hygiene).

Note: The administration of a respiratory questionnaire is recommended.

- ii) A physical examination focusing on the respiratory and musculoskeletal systems.
- iii) Provision of health information consistent with paragraph 1 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for silica in accordance with this Code.

### ***Periodic Medical Examinations***

Periodic medical examinations shall include:

- i) Updating of a worker's medical and occupational history to include:
  - Frequency and duration of exposure to silica since previous examination.
  - Enquiry for signs and symptoms that may be an early indication of:
    - Silicosis (e.g. exertional dyspnea, new or worsening cough).
    - Malignancy (e.g. new or worsening cough, hemoptysis, pleuritic pain, weight loss).

Note: The administration of a respiratory questionnaire is recommended.

- ii) A physical examination focusing on the respiratory and musculoskeletal systems, if clinically warranted.
- iii) Provision of health information consistent with paragraph 1 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for silica in accordance with this Code.

### ***Exit Medical Examinations***

Exit medical examinations shall include:

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Silica

- i) Updating of a worker's medical and occupational history to include:
  - Frequency and duration of exposure to silica since previous examination.
  - Inquiry for signs and symptoms that may be an early indication of:
    - Silicosis (e.g. exertional dyspnea, new or worsening cough).
    - Malignancy (e.g. new or worsening cough, hemoptysis, pleuritic pain, weight loss).

Note: The administration of a respiratory questionnaire is recommended.

- ii) A physical examination focusing on the respiratory and musculoskeletal systems, if clinically warranted.
- iii) Provision of health information consistent with paragraph 2 of the Worker Health Information section in Part I of this Code.
- iv) Clinical tests for silica in accordance with this Code.

## Clinical Tests for Silica

### *Types*

The following clinical tests are required for pre-placement, periodic and exit medical examinations with respect to exposure to silica:

1. Imaging: Chest Radiograph (postero-anterior) (PA)

It is recommended that chest radiographs be read by a physician certified by the Royal College of Physicians and Surgeons of Canada (RCPSC), and educated and experienced in the practice of reading chest radiographs.

Note: To avoid unnecessary X-rays, the examining physician shall, where practical, obtain the relevant medical records from another facility if the worker has been previously examined within the past year. It is recommended that chest radiographs obtained be re-read based on the potential exposure to silica, if required.

2. Pulmonary Function Tests (PFT)<sup>4</sup>, (to be taken in conjunction with chest radiograph):

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<sup>4</sup> All pulmonary function testing must be done according to current available standards for spirometry in the workplace.

## Part II: Medical Surveillance Program Requirements for Individual Designated Substances

### Silica

- FEV1, FVC, FEV1/FVC ratio

Note: All relevant data shall be corrected to body temperature and pressure (BTPS).

### ***Frequency***

Chest radiograph and PFT to be done every 5 years after 10 years of exposure or as required by examining physician.

### **Action Levels/Removal from Exposure Criteria**

There are no specific action levels/removal from exposure criteria.

An assessment of a worker's fitness to continue working in exposure to silica is based on the results of the medical examination in conjunction with the results of the clinical tests. If the examining physician determines that the worker is fit with limitations or unfit, the physician shall take action in accordance with section 29 of O. Reg. 490/09.

Where the examining physician determines that the signs of silica-induced disease are present, the examining physician should consider whether the worker should be referred to a respirologist, rheumatologist or other knowledgeable specialist educated and experienced in the practice of evaluating work-related lung or connective tissue diseases for further medical assessment.

### **Return to Work in Exposure to Silica Criteria**

A worker's return to work in exposure to silica is to be decided on a case by case basis by the examining physician, in consultation with a respirologist, rheumatologist or other knowledgeable specialist educated and experienced in the practice of evaluating work-related lung or connective tissue diseases, if any, and after careful review of sources of exposure and implementation of protective measures in the workplace to ensure worker exposure to silica is minimized and within acceptable levels.