



Ministry of
Environment and
Climate Change Strategy

PROTOCOL 30 ***FOR CONTAMINATED SITES***

Classifying Substances as Carcinogenic

Version 1.0

Prepared pursuant to Section 64 of the
Environmental Management Act

Approved: Cameron Lewis
Director of Waste Management

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Date

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1.0 Definitions

The following words, acronyms, and expressions used in this document are defined in [Procedure 8, “Definitions and Acronyms for Contaminated Sites”](#):

cancer risk	ministry
contaminant	protocol
contaminated site	Regulation
contaminated sites legal instrument	risk assessment

2.0 Introduction

A “carcinogenic substance” is defined in the Contaminated Sites Regulation (the Regulation) as any chemical classified as carcinogenic in accordance with a director’s protocol. This protocol provides the criteria for determining if a substance is a carcinogenic substance for purposes of performing human health risk assessments at contaminated sites in BC.

3.0 Carcinogens

For the purposes of the Regulation, a human health risk assessment of a carcinogenic substance at a contaminated site requires that both the non-carcinogenic and carcinogenic effect endpoints of the substance be assessed.

A substance is considered to be a carcinogenic substance if any of the criteria in section 3.1, 3.2 or 3.3 below are met.

3.1 United States Environmental Protection Agency evaluations and classifications

The United States Environmental Protection Agency (US EPA) has classified the likelihood that a substance may cause cancer by different descriptors during the development of their carcinogen risk assessment guidelines. Substances that were evaluated after 1999 (as described in [1]) were assigned a weight-of-evidence descriptor. Substances evaluated between 1986 and 1999 were assigned an alphanumeric descriptor. When using the [US EPA IRIS Database](#) any of the following descriptors may be encountered.

3.1.1 US EPA weight-of-evidence descriptors

The substance has been evaluated under the US EPA Guidelines for Carcinogen Risk Assessment [1] and has been classified based on the weight-of-evidence evaluation as:

- a) Carcinogenic to humans, or
- b) Likely to be carcinogenic to humans.

or

The substance has been evaluated under the US EPA Proposed Guidelines for Carcinogen Risk Assessment [2] and has been classified as a: "Known or likely human carcinogen".

3.1.2 US EPA alphanumeric descriptors

In the case that a US EPA weight-of-evidence evaluation is not available, the substance has been evaluated under the US EPA Guidelines for Carcinogen Risk Assessment [3] and has been classified as:

- a) Group A: Human carcinogen, or
- b) Group B1: Probable human carcinogen, with limited evidence of carcinogenicity from epidemiological studies.

3.2 United Nations World Health Organization, International Agency for Research on Cancer classification

The substance has been evaluated by the International Agency for Research on Cancer (IARC) [5] and has been classified as:

- a) Group 1: Carcinogenic to humans, or
- b) Group 2A: Probably carcinogenic to humans.

3.3 Canadian Council of Ministers of the Environment, carcinogenic classification for polycyclic aromatic hydrocarbons

The substance is a polycyclic aromatic hydrocarbon (PAH) listed in Table 1 below, and has been determined to be carcinogenic or possibly carcinogenic, by the Canadian Council of Ministers of the Environment (CCME) [6].

Table 1. CCME list of carcinogenic or possibly carcinogenic PAHs

PAH	CAS Number
benz(a)anthracene	56-55-3
benzo(b)fluoranthene	205-99-2
benzo(j)fluoranthene	207-82-3
benzo(k)fluoranthene	207-08-9
benzo(a)pyrene	50-32-8
chrysene	218-01-9
dibenz(a,h)anthracene	53-70-3

indeno(1,2,3-cd)pyrene	193-39-5
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¹ CCME also considers benzo(g,h,i)perylene (CAS number 191-24-2) to be a carcinogenic PAH. This classification is inconsistent with that of other regulatory agencies. At this time, the Director does not consider benzo(g,h,i)perylene to be a carcinogenic substance. Note also that benzo(g,h,i)perylene is not currently a prescribed substance under the Regulation.

4.0 Non-carcinogens

Substances not classified as carcinogenic substances under Section 3 of this protocol are considered to be non-carcinogenic substances under the Regulation.

5.0 References

1. US EPA, 2005. [Guidelines for Carcinogen Risk Assessment](#). Risk Assessment Forum. Washington, DC. March 2005.
2. US EPA, 1996. [Proposed Guidelines for Carcinogen Risk Assessment](#). Risk Assessment Forum. Washington, DC. April 1996.
3. US EPA, 1986. [Guidelines for Carcinogen Risk Assessment. Risk Assessment Forum](#). Washington, DC. September 1986.
4. UN World Health Organization, 2017. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. Vol. 1 – 118. International Agency for Research on Cancer. Lyon, France. Last update: 13 April 2017. Available from: <http://monographs.iarc.fr/ENG/Classification/index.php>
6. CCME, 2010. [Canadian Soil Quality Guidelines: Carcinogenic and Other Polycyclic Aromatic Hydrocarbons \(PAHs\) \(Environmental and Human Health Effects\) Scientific Criteria Document \(Revised\)](#).

For more information, please direct inquiries to site@gov.bc.ca.

Revision history

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	November 1, 2017	1.0	for stakeholder comment