# TAB #8: When is a Site "Clean"

## DESCRIPTION:

The CCME Interim Canadian Environmental Quality Criteria for Contaminated Sites (ICEQCCS) is used to determine if a site is "clean". A site is considered "clean" when it meets the CCME criteria, or when contaminants are present at background concentrations. If a criteria does not exist for a particular parameter in the Interim Environmental Quality Criteria, then assessment and remediation efforts should be based on other National, Federal, Provincial, or State standards.

## GUIDELINES AND CRITERIA FOR DETERMINING "CLEAN" SITES

A site will be considered "clean" when it meets the applicable remediation guidelines and criteria, or when contaminants are present at background levels or concentrations.

**All Federal contaminated sites should be evaluated in accordance with the CCME Interim Canadian Environmental Quality Criteria for Contaminated Sites (ICEQCCS)**

. The Interim Environmental Quality Criteria have been adopted from existing standards currently in use in various jurisdictions across Canada, the U.S., and Europe. Since contamination potential differs from site to site (e.g. site specific), the Interim Environmental Quality Criteria do not constitute values for uniform environmental quality at all contaminated sites, and use of the criteria will require consideration of local conditions prior to their implementation.

***Note:*** Remember to consult these criteria before using any other guidelines or criteria for site assessment.

There are only two conditions under which guidelines and criteria other than the Interim Environmental Quality Criteria can be consulted:

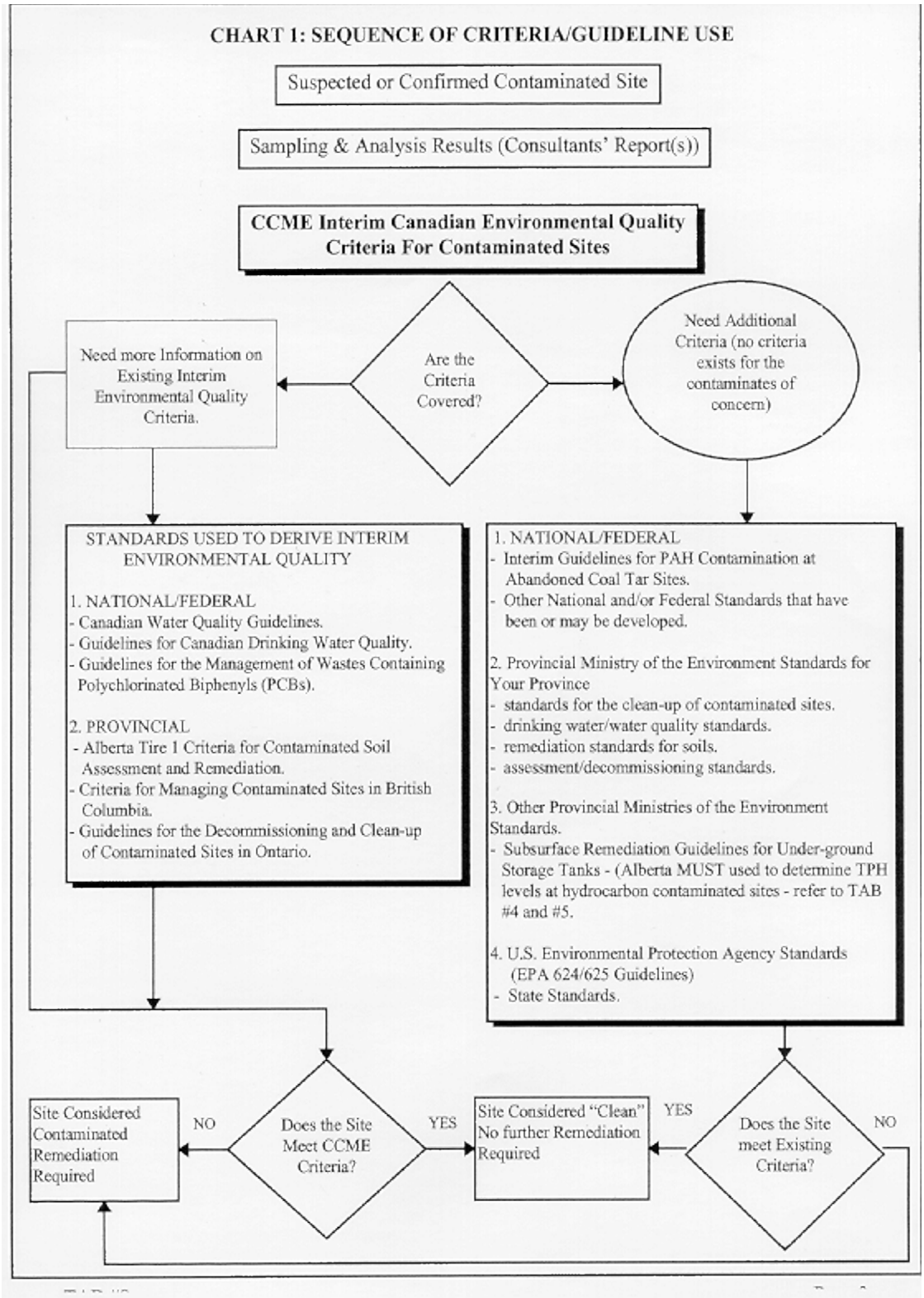
1. When more information on the existing Interim Environmental Quality Criteria is required for **site specific conditions.**

Depending on the type of contaminants found on site, it may be necessary to obtain further information to properly address the contaminants of concern by consulting the following National guidelines and criteria in addition to the CCME Interim Canadian Environmental Quality Criteria for Contaminated Sites:

- **CCME Interim Guidelines for PAH Contamination at Abandoned Coal Tar Sites.**
- **CCME Guidelines for the Management of Wastes Containing Polychlorinated Biphenyls (PCBs).**
- **CCREM Canadian Water Quality Guidelines.**
- **Health and Welfare's Guidelines for Canadian Drinking Water Quality.**

2. When no criteria exist for a particular parameter in the Interim Environmental Quality Criteria.

In the absence of National and Federal guidelines and criteria it is important to have some standard upon which to base assessment and remediation efforts. If the Federal Government does not have criteria for a contaminant of concern, refer to the standards of the Provincial Ministry of the Environment for the province in which the contaminated site is located. The provincial Ministry of the Environment (MOE) may have standards for the clean-up of contaminated sites, drinking water standards, and remediation criteria for soils, among others. If there are no provincial standards for the contaminants of concern, look to other provincial standards or refer to the United States Environmental Protection Agency or State standards. CHART 1 provides an overview of what criteria/guidelines to follow and the proper sequence of their use.




**TAB #4** and **TAB #5** outline the recommended remediation criteria for hydrocarbon contaminated soil and groundwater.

## ISSUES TO CONSIDER WHEN DETERMINING WHETHER A SITE IS "CLEAN"

**Sampling Problems**

Sampling error is often a source of concern when collecting site data. Sources of error most often include the following:

- **Improper sample containers and caps.**
- **Incorrectly obtained and preserved samples.**
- **Collection of non-representative samples.**
- **Improper handling procedures (no chain of custody records, improper transportation of samples).**
- **Improper or lack of equipment calibration and decontamination procedures.**
- **Insufficient or non-existent QA/QC protocols to be followed during sampling events.**

To **minimize or eliminate** the occurrence of these common sampling deficiencies, and to develop a consistent sampling program, the proper sampling procedures should be outlined in the Terms of Reference to ensure that the selected consultant will obtain samples that are accurate, representative, credible, and defensible. Refer to **TAB #4** and **TAB #5**, respectively, for the recommended sampling procedures for hydrocarbon contaminated soil and groundwater.

**Background Levels**

A sampling and analysis program should include determining background levels for the contaminants of concern (**TAB #4** and **TAB #5** indicate where to obtain background levels for soil and groundwater sampling). Determining contaminant background levels helps to evaluate the degree, if any, to which a site is contaminated. It also aids in determining the level of remediation necessary for the site. If background levels exceed remediation criteria, it is futile to reduce the contamination levels to meet the remediation criteria. It is only possible to remediate to background levels.

**BTEX & TPH**

Where hydrocarbon contamination is suspected or confirmed, both TPH (Total Petroleum Hydrocarbons) and BTEX (Benzene, Toluene, Ethylbenzene, Xylene) analysis should always be performed to define the type and extent of hydrocarbon contamination in the soils and groundwater. Neither BTEX nor TPH analysis alone should be performed without the other. Both analyses are needed to characterize contamination levels at suspected or confirmed hydrocarbon contaminated sites. TPH analysis will indicate if there is hydrocarbon contamination, and what type of hydrocarbon is present (e.g. gasoline, diesel, fuel oil, etc.).

Analysis for BTEX can also be used to indicate hydrocarbon contamination since it is found in all petroleum products, but its main use should only be to determine BTEX concentration levels (benzene is a carcinogen) to ensure that they do not exceed the CCME Interim Environmental Quality Criteria. However, BTEX analytical results that indicate non-detectable levels does not necessarily mean that there is no hydrocarbon contamination. **It is possible for a sample matrix (e.g. soil, groundwater) to have non-detectable concentrations of BTEX, yet still be contaminated with hydrocarbons** -a TPH analysis should be performed to confirm the presence or absence of hydrocarbons.

**Inconsistencies Between Laboratories**

The analytical methods used and the proficiency at performing analytical work differs from laboratory to laboratory, and can result in inconsistent analysis. The selection of a qualified laboratory is essential for obtaining credible results.

Many laboratories across Canada are becoming certified by the Canadian Association for Environmental Analytical Laboratories (CAEAL) to support their credibility. CAEAL was formed on the initiative of a number of public and private sector laboratories to develop a Laboratory Certification Program that will ensure a strong environmental analytical service within Canada that is capable of consistently producing quality scientific data. Certification is the formal recognition by CAEAL of the proficiency of an environmental analytical laboratory to carry out specified tests. Lack of CAEAL certification does not mean that the lab is inferior, but the consistent use of CAEAL certified laboratories will assure you that credible results will be reported on a consistent basis for the analyses for which the laboratory is certified. **Environment Canada recommends the use of CAEAL certified laboratories**, although discretion should be used since some laboratories may not be certified to analyze for all of the specific parameters of interest.

The "Directory of Certified Laboratories", published by CAEAL, indicates the analytical tests which the laboratories are certified for.

**Detection Limits vs. Remediation Levels**

There may be instances where an analytical method that can detect contaminant concentrations, as low as the remediation criteria, does not exist. If the method detection limit (MDL-the lowest concentration of a contaminant that an analytical method can detect) is above the applicable remediation criteria, then any amount detected is an exceedance of the criteria. In this case, the analyte must be non-detectable to be in accordance with the remediation criteria.

**Leachate Test**

Confusion often exists with the application of a leachate test. A leachate test is not the same as a soil analysis. A leachate test is often required by Provincial Ministries of the Environment to determine the acceptability, of soil, for disposal at municipal landfills. The test indicates the potential of a soil to release contaminants. **A leachate test does not determine the level of contamination within the soil.**

If soil passes the leachate test, it does not mean that the soil is uncontaminated, nor does it indicate that it meets the CCME Interim Canadian Environmental Quality Criteria for Contaminated Sites. Additionally, hydrocarbon contamination will not be detected in a leachate test since the test does not identify organics.

On the other hand, proper soil analysis provides for the determination of the type and amount of contamination within the soil. Furthermore, soil analysis, as outlined in **TAB #4**, will identify hydrocarbon contamination and will allow for the proper comparison of contamination levels with the CCME Interim Canadian Environmental Quality Criteria for Contaminated Sites.

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## Publications and Contacts

**Alberta Tier 1 Criteria for Contaminated Soil Assessment and Remediation.**

Alberta Environment
phone: (403) 381-5322

**Canadian Water Quality Guidelines.**

phone: (613) 953-1550
facsimile: (613) 953-0461

**Criteria for Managing Contaminated Sites in British Columbia.**

B.C. Ministry of the Environment
phone: (604) 387-4441

**Directory of Certified Laboratories.**

CAEAL
phone: (613) 233-5300

**Guidelines for Canadian Drinking Water Quality.**

(catalogue #H48-10/1989E)
Canadian Government Publishing Centre
phone: (819) 954-2788

**Guidelines for the Decommissioning and Clean-up of Contaminated Sites in Ontario.**

Ontario Ministry of Environment
phone: (416) 325-4000

**Guidelines for the Management of Wastes Containing Polychlorinated Biphenyls (PCBs).**

(publication # CCME-TS/WM-TRE008)

**Interim Guidelines for PAH Contamination at Abandoned Coal Tar Sites.**

(publication # CCME-TS/WM-TRE004)
phone: (204)948-2090

**Interim Canadian Environmental Quality Criteria for Contaminated Sites.**

(publication # CCME EPC-CS34)

**Subsurface Remediation Guidelines for Underground Storage Tanks.**

Alberta Environment
phone: (403)427-5847

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**SOURCES**


Canadian Association for Environmental Analytical Laboratories (1991). *Directory of Certified Laboratories.*

Canadian Council of Ministers of the Environment (1991). *Interim Canadian Environmental Quality Criteria for Contaminated Sites*.

Environment Canada (1986). *Users' Guide to Hazardous Waste Classification.*

Ontario Ministry of the Environment (1990). *Regulation 309.*

Wisconsin Department of Natural Resources (1992). *Leaking Underground Storage Tank - Analytical Guidance.*