



BRITISH
COLUMBIA

Ministry of Water, Land and
Air Protection

PROTOCOL 9 FOR CONTAMINATED SITES

Determining Background Groundwater Quality

Prepared pursuant to Section 53 of the
Contaminated Sites Regulation under the
Waste Management Act

Approved: _____
Director of Waste Management

Date

1.0 INTRODUCTION

This protocol provides a procedure for determining local background concentrations in groundwater. It is intended to assist persons conducting remediation pursuant to the *Waste Management Act* at sites with local background concentrations of a substance or substances above numerical water quality standards. Concentrations of a substance that occur naturally in a geographic area are considered to be representative of background concentrations.

2.0 DEFINITIONS

“background concentration” means the concentration of a substance in an environmental medium in a geographic area, but does not include any contribution from local human-made point sources”.

“contaminated site” means an area of land in which the soil or any groundwater lying beneath it, or the water or the underlying sediment, contains

- (a) a special waste, or
- (b) another prescribed substance in quantities or concentrations exceeding prescribed criteria, standards or conditions”

“local human - made point source” means a location or area at a site where, as a result of human activity, a substance was introduced into the environment causing the substance concentration to increase above the local background concentration.

“prescribed criteria, standards or conditions” mean the numerical water quality standards listed in Schedule 6 of the Contaminated Sites Regulation.

3.0 REGULATORY APPLICATION

Subsection 11(3) of the Contaminated Sites Regulation states that:

A site is not a contaminated site with respect to a substance in the soil, surface water or groundwater if the site does not contain any substance with a concentration greater than or equal to the local background concentration of that substance in the soil, surface water or groundwater respectively.

and subsection 17(2) of the Contaminated Sites Regulation states that:

A contaminated site is considered to have been satisfactorily remediated if:

(b) the soil, surface water or groundwater at the site does not contain any substance with a concentration greater than or equal to the local background concentration of that substance in the soil, surface water or groundwater respectively.

4.0 PROCEDURES FOR DETERMINING LOCAL BACKGROUND GROUNDWATER QUALITY

4.1 Rationale

The objective of this protocol is to establish a procedure, acceptable to the ministry, for determining the local background concentration of a substance in groundwater in a defined geographic area and for a defined groundwater flow system.

This protocol is not intended to allow unrestricted water uses at sites where concentrations of a substance are representative of the local background groundwater concentration. It merely provides a release from the requirement to undertake remediation at such a site.

It is the responsibility of the proponent to ensure that best professional practice is employed in the siting, construction, development and sampling of background groundwater wells and in the preparation of technical reports submitted in support of a background groundwater application.

4.2 Siting and Monitoring of Background Monitoring Wells

For the purposes of this protocol, a minimum of three background groundwater wells are required. Background wells should be located in the same geographic area and in the same groundwater flow system as close as possible to the site of interest. Background wells should not be located within the area of influence of any on-site or off-site human-made point sources of contamination.

Background groundwater wells should be located cross-gradient or up-gradient of any identified human-made point sources of contamination. Preferred locations for background wells are natural areas, parks and residential neighbourhoods. Areas which have received imported fill should be avoided unless the source and quality of the fill material is documented and the fill quality is equal to or better than residential land use quality. In built-up areas, or at large sites that have been widely impacted by human activity, a greater number of background wells and increased sampling intensities may be necessary to adequately demonstrate the absence of human-made

point source contributions.

Background groundwater wells should be sampled a minimum of two times to address temporal variability and provide a more robust data set. Where groundwater flow conditions and/or quality are expected to vary seasonally, the sampling strategy should allow for consideration of seasonal effects. Appropriate QA/QC methods should be employed.

An estimate of the representative background concentration of the substance or substances of interest must be determined based on an assessment of both the calculated average value and variability of the data set.

4.3 Reporting Requirements

An application seeking approval to establish a local background groundwater concentration of a substance in a geographic area must be supported on the basis of a Background Groundwater Investigation report prepared in accordance with best professional practice in groundwater investigations. The information contained in the report will be similar to that of a Detailed Site Investigation (DSI). Ministry review of background groundwater applications is subject to DSI review fees based on the site size and a simple classification.

The application must include a signed statement confirming that:

- a) the person carrying out the background groundwater investigations and preparing the report has demonstrable experience in the assessment of groundwater flow systems and groundwater quality of the type encountered at the site;
- b) the investigation has been carried out in accordance with best professional practice in groundwater investigations;
- c) analytical methods acceptable to the Director have been used; and
- d) the estimated background concentration for the substance or substances of interest is representative of local background conditions.