

Groundwater Quality Results – Is it Natural or Not?

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Many waste management and industrial facilities in Alberta, Saskatchewan and British Columbia require groundwater monitoring and sampling as part of the terms and conditions of various regulatory approvals. The typical analytical suite of parameters for these compliance monitoring programs is made up of both generic indicator parameters and parameters that target potential contaminants of concern. The analytical costs of compliance groundwater monitoring programs can be substantial and it is important to get value for money. Specifically, consultants must do what is required to be in compliance, but also gather sufficient information to demonstrate to the facility's owners and regulatory agencies that site activities are not adversely affecting the groundwater quality.

Several years of data, numerous sample locations and a large suite of parameters can make the interpretation of compliance groundwater quality data a challenge. The temptation is to store all data in a database, prepare trend graphs and then compare to assumed background quality, baseline data or generic guidelines. However, this approach does not always distinguish natural concentrations from potential impact and may not provide the insight needed to make compliance monitoring programs more effective. In addition, the requirement to submit a Record of Site Condition Form with each compliance monitoring report for sites that operate under an Alberta Environment Approval makes it important to state whether parameter concentrations are natural or affected by anthropogenic sources or activities.

Groundwater quality data from a number of sites will be presented to demonstrate that generic parameters such as dissolved organic carbon (DOC) or dissolved Kjeldahl Nitrogen (DKN) have been useful to detect groundwater quality impact at some sites but do not provide meaningful information at other sites. Groundwater quality data will also be used to show that even in the absence of anthropogenic sources, generic guidelines can be exceeded for a variety of parameters including total dissolved solids (TDS), sodium, chloride, sulphate, nitrate, various metals and chemical oxygen demand (COD).

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