

Kentucky Guidance for Groundwater Assessment Screening

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**Environmental and
Public Protection Cabinet**

Introduction

This document provides guidance for evaluating contaminated sites to determine whether superficial and shallow contamination in soils indicates an existing or potential groundwater contamination problem, and whether a direct assessment of groundwater conditions is necessary. This method is intended to provide the party or applicant a cost-effective approach using soils data collected as part of the site characterization for determining the need to assess groundwater quality.

Methodology

An assessment of the effect of a release of a hazardous substance or petroleum on groundwater quality may not be necessary at all sites. This process is intended for sites that lack adequate groundwater monitoring data and where the party or applicant anticipates to leave in place contaminants of concern (COCs).

This approach to evaluating impacts and potential impacts of a release on groundwater is based on the attenuation of contaminants moving through the soil profile by means of biodegradation, hydrolysis, volatilization, adsorption, and dilution. Contaminants may not attenuate similarly in all situations, and therefore conservative Dilution Attenuation Factor (DAF) values are applied. However, conditions at some sites may result in contaminant migration through the soil profile in a manner that bypasses physical, chemical, and biological processes in the soils. Caution should be applied to use of this methodology at sites where normal physical, chemical, and biological processes in the soils are bypassed, including sites underlain by soils with large, interconnected pores (macropores) that provide for the rapid transport of water and contaminants through the soil profile, sites underlain by well-developed karst terrane,

sites underlain by highly fractured media, or where contamination extends to the soil-bedrock interface. These types of sites may not provide for the soil processes assumed to be in effect in this method. In addition, this process is primarily intended for COCs that are relatively insoluble and are expected, under normal conditions, to remain in the soil profile and not to migrate to groundwater. Therefore, caution should be used in applying this methodology at sites where soluble or mobile COCs such as volatile organic compounds, nitrates, or dense non-aqueous phase liquids (DNAPL) are present; the presence of such COCs in the soils may indicate that a groundwater assessment may be necessary. The cabinet reserves the authority to require a direct assessment of groundwater at sites where it deems such investigation is prudent to understanding the extent of contamination and the risks associated with the release.

To determine whether a direct assessment of groundwater conditions is necessary, analytical data from the soil profile may be evaluated by the methods outlined in this document in combination with an evaluation of other soil conditions, and the geology and hydrology of the site. These data can be used to determine whether groundwater was likely to have been impacted, and whether these soils will serve as a future source of groundwater contamination.

In order to use this method, the horizontal and vertical extent of soil contamination must be known. An adequate number of soil borings with multiple, discrete sampling intervals of sufficient length and spacing to characterize vertical distribution of contamination are also necessary.

If it can be demonstrated using one of the following options that a release has not had and will not have an adverse effect on groundwater quality, a direct assessment of groundwater impacts may not be necessary.

1. An assessment of groundwater for a release may not be necessary if the applicable Soil Screening Levels, or SSL (DAF 1), in the U.S. EPA Region 9 Preliminary Remediation Goals (October 1, 2002) are not exceeded in the bottom two (2) sampling intervals of each soil boring.

2. Rather than using the default SSLs (DAF 1), a modified SSL may be used. This modified SSL takes into account the surface area of the site, the vertical separation between the contamination in the soil profile and groundwater, and the underlying bedrock conditions. The appropriate modified SSL is equivalent to the SSL (DAF 1) referenced in the U.S. EPA Region 9 Preliminary Remediation Goals, (October 1, 2002) multiplied by the applicable value in Table 1, below. An assessment of groundwater for a release may not be necessary if the applicable modified SSLs are not exceeded in samples from the bottom two (2) sampling intervals.

Table 1.

Vertical Separation Between Contamination in the Soil Profile and the Zone of Saturation	Surface Area of Site and other considerations		
	< 0.5 acres	0.5-10 acres	> 10 acres, or site underlain by karst or highly fractured media
0-5 ft	1	1	1
5-10 ft	5	2.5	1
10-15 ft	10	5	1
15-20 ft	15	7.5	2.5
Greater than 20 ft	20	10	5

3. A site-specific SSL may be developed and applied based on site-specific conditions, including soil types, characteristics of COCs, total organic carbon in the soil, soil porosity, infiltration rate, and the vertical separation between the contamination in the soil profile and groundwater. If the analytical results in the bottom two (2) sampling intervals do not exceed the site-specific SSLs, a groundwater assessment may not be necessary for that site.

4. A fate and transport evaluation may be developed to demonstrate that levels of COCs in the soils will not result in groundwater contamination beyond the property boundary. If a fate and transport evaluation adequately demonstrates that levels of COCs in the soils will not result in groundwater contamination beyond the property boundary, a groundwater assessment may not be necessary. However, a direct groundwater assessment will be required to make such a determination in most situations.

5. An analysis of the results of current and historical groundwater monitoring may be used to determine whether groundwater has been adequately characterized. Such an analysis shall contain sufficient information to determine whether groundwater has been affected by any releases at the site. The report of this analysis shall include:

a. The location of monitoring wells relative to the location of the soil contamination at the site, and to groundwater flow direction at the property;

b. Monitoring well construction details, including diameter of the annulus, diameter of the well casing, the depth and length of the screened interval, construction of the sand pack, and the type and manner of sealing materials used;

c. The proximity of wells to one another and to the property boundary; and

d. The results of all groundwater analyses conducted to date on samples collected at the property, including sample dates, the parameters analyzed, and the methods of collection and analysis.

A groundwater assessment is necessary and prudent in some circumstances. Any direct evidence of groundwater contamination, including seeps, contaminated wells and springs, or other similar information is compelling evidence to conduct a thorough groundwater investigation. The cabinet may direct a person or applicant to conduct a groundwater assessment in regards to a known or suspected release, regardless of the results of the methods employed above.

References

1. U.S. EPA 1996. Soils Screening Guidance: Technical Background Document, May 1996. United States Environmental Protection Agency 9355.-17a, EPA/540/R-95/128, PB96-963502.
2. U.S. EPA 2002. Region 9 Preliminary Remediation Goals and the Region 9 PRGs Table User's Guide/Technical Background Document (October 1, 2002).