

ARCHIVE: Archived because revisions made to VAP rules in 2002 in OAC Chapter 3745-300 necessitate revisions to this guidance. However, this document is accurate under the 1996 VAP rules. Refer to VA30007.03.012 for the updated document.

OHIO EPA

DIVISION OF EMERGENCY AND REMEDIAL RESPONSE VOLUNTARY ACTION PROGRAM

FREQUENTLY ASKED QUESTION #11: Qualitative Demonstration of the Protection of Ground Water Requirements

PURPOSE

This series of fact sheets is intended to provide guidance regarding the Agency's position concerning the interpretation of certain Voluntary Action Program (VAP) rule requirements. The information provided within these documents is based upon Agency evaluation of several VAP no further action letters submitted with the intent of obtaining a covenant not to sue as well as assistance provided for several VAP technical assistance projects.

QUESTION

What information, **at a minimum**, is a volunteer or certified professional expected to evaluate when making a qualitative demonstration for protection of ground water meeting unrestricted potable use standards (POGWMUPUS)?

BACKGROUND

Ohio Administrative Code (OAC) 3745-300-07(D)(3)(c)(ii) provides several options to demonstrate that ground water meeting unrestricted potable use standards (UPUS) is protected against contaminants leaching to ground water and causing UPUS to be exceeded. One such demonstration as described in OAC 3745-300-07 (D)(3)(c)(ii), is based upon the geological, hydrogeological, and physical characteristics of the property

and the consideration of the chemicals of concern present and the nature and time of their release to the environment. This option for protection of ground water demonstration is frequently referred to as the **qualitative** POGWMUPUS demonstration, as it is different than a **modeled** or **quantitative** demonstration.

The VAP has found that this **qualitative** POGWMUPUS demonstration needs to be adequately explained by the Agency since the demonstration has not been consistently or correctly applied in the no further action (NFA) letters that have been issued by certified professionals to date.

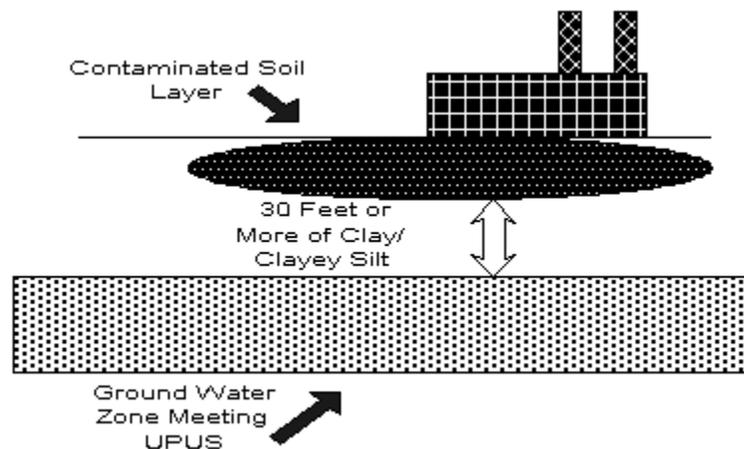
ANSWER

The VAP advises that **all of** the following information needs to be considered and provided in the NFA documentation as a part of the **qualitative** POGWMUPUS demonstration:

- **Contaminant Type and Characteristics**
 - **Type Contaminant:** A discussion of the chemicals of concern (COCs) in the vadose zone at the property, which may cause a threat to underlying ground water, should be included. This discussion should address the persistence, toxicity, and mobility (e.g., K_d , specific gravity, solubility) of these contaminants in unsaturated soils.
 - **Concentration of Contaminant:** The concentration that can be left in the soil without a potential impact to ground water will depend on the characteristics of the contaminant. For example, polycyclic aromatic hydrocarbons (PAHs) may not impact shallow ground water even at soil saturation concentrations. In contrast, low levels of more mobile contaminants, such as trichloroethene and benzene, may impact deep ground water zones. Therefore, mobile contaminants generally may require a quantitative assessment.
- **Secondary Features (if applicable):** The potential for discrete features in the unsaturated zone (both unconsolidated and consolidated deposits) to act as conduit to the water table must be assessed qualitatively, considering the presence, character, and density of any faults, fractures, joints, subsidence fissures, solution channels, significant sand seams, and other similar features that might act as conduits for contaminant travel through the unsaturated zone.
- **Soil Type and Characteristics:** The soil type at the VAP property should be described. The VAP recommends a classification and description of property soils *per* the ASTM (ASTM 2488 and 2487) or USCS classification system be utilized. In most cases, vertical hydraulic conductivity will be needed in order to determine if the material will attenuate contaminant migration. If there is more than one soil type found at the property, a depth-weighted average of vertical hydraulic conductivities can be used to determine the ability of the soil to attenuate contaminant migration.

Other soil characteristics that may assist the certified professional (CP)/Volunteer to determine the ability of the soil to attenuate contaminants include: bulk density, soil pH, mineral content, fraction of organic carbon, and cation exchange capacity.

- **Soil Stratigraphy:** The qualitative POGWMUPUS demonstration should include a discussion of horizontal and vertical variation in soil properties and horizons. This discussion should also include a description of the continuous profile of the stratigraphic units beneath the property including the thickness and lateral extent of each unit. The effects of stratification on saturated and unsaturated flow should also be covered. In addition, any anthropogenic influences (e.g. sewer pipes, conduits for utilities, etc.) that may affect the geology/hydrogeology leading to preferential pathways either horizontal or vertical, should be discussed.
- **Separation Distance:** The qualitative POGWMUPUS discussion should include information on the separation distance that exists between the deepest known soil contamination to the ground water zone for which the demonstration of protectiveness is being made. If relevant, this separation distance should also consider seasonal fluctuations in the ground water table. The minimal separation distance is highly dependent on the type of soil and on the characteristics and concentrations of the contaminant as discussed above. In general:
 - ♦ The VAP recommends that, **depending on the level and type of contaminants**, a POGWMUPUS demonstration can be made if **at least 30 feet** of clay to clayey silt exists between the deepest known soil contamination and the ground water zone being protected (see diagram below). As discussed above, more mobile contaminants may require a quantitative assessment.



- ◆ The qualitative demonstration of POGWMUPUS is **not** acceptable when the separation distance between the deepest known soil contamination and the ground water zone being protected is **less than 15 feet**. An exception to this **may be** when the material is clay to silt and the chemicals of concern are metals or highly immobile organics (e.g., heavy metals and PAHs). If the volunteer or certified professional has a property where the separation is less than 15 feet and they believe an exception to this recommendation is warranted, **the certified professional may want to consider contacting the VAP for consultation and/or technical assistance.**
- **Engineering Controls:** The volunteer or certified professional should include information related to engineering controls employed at the property that will reduce the likelihood that contaminants will migrate to the ground water zone that is meeting UPUS. **Note: if an engineering control(s) is utilized, an operation and maintenance (O&M) plan must be developed and an O&M agreement will be needed to ensure that the control(s) will be maintained.**