4720.5510 CRITERIA FOR WELLHEAD PROTECTION AREA DELINEATION.

Subpart 1. **Criteria.** A method selected to delineate a wellhead protection area must incorporate the criteria specified in subparts 2 to 6.

Subp. 2. **Time of travel.** The time of travel must be at least ten years.

Subp. 3. **Flow boundaries.** The location and influence of flow boundaries must be identified using existing information.

Subp. 4. **Daily volume.** The daily volume of water pumped must be calculated for each well in the public water supply system.

A. The daily volume calculation must be:

(1) determined by dividing the annual volume of water pumped by 365; and

(2) based on the greatest annual volume of water used during the previous five years or the greatest annual volume of water projected over the next five years, whichever is greater.

B. The daily volume of water pumped must be expressed in gallons per day.

Subp. 5. **Groundwater flow field.** The groundwater flow field must be identified for the aquifer used by the public water supply well.

A. The ambient hydraulic gradient must be measured in a location:

(1) upgradient of the public water supply well; and

(2) beyond the pumping influence of the public water supply well.

B. Except as provided in item C, when a wellhead protection area is delineated for a public water supply well, an analytical method:

(1) may use a single value for the ambient hydraulic gradient; and

(2) must delineate a composite wellhead protection area that uses the angles of ambient groundwater flow that are ten degrees less and ten degrees greater than the measured angle of ambient groundwater flow.

C. When the ambient groundwater flow field cannot be determined due to transient hydraulic conditions, seasonal differences in the hydraulic gradient and the angle of groundwater flow must be accounted for when delineating the wellhead protection area. The ambient groundwater flow field is the two dimensional representation of equipotentials and flowlines created by groundwater movement through an aquifer undisturbed by pumping or other human-caused activities.

D. The hydraulic gradient must be expressed as the ratio of vertical feet divided by the distance in horizontal feet.

Subp. 6. **Aquifer transmissivity.** The aquifer transmissivity must be calculated.

A. The aquifer transmissivity must be expressed in feet squared per day.

B. The aquifer transmissivity must be based on the first of the following methods that is applicable to the public water supply system:

(1) an existing pumping test that meets the requirements of part 4720.5520 and that was previously conducted on a well in the public water supply system;

(2) an existing pumping test that meets the requirements of part 4720.5520 and that was previously conducted on another well in a hydrogeologic setting determined by the department to be equivalent;

(3) a pumping test that meets the requirements of part 4720.5520 and that was conducted to determine the aquifer transmissivity for a new or existing public water supply well specified in part 4720.5520, subpart 1;

(4) a pumping test that meets the requirements of part 4720.5530 and that was conducted to determine the aquifer transmissivity for a new or an existing public water supply well specified in part 4720.5530, subpart 1;

(5) an existing pumping test that does not meet the requirements of part 4720.5520 and that was previously conducted on:

(a) the public water supply well; or

(b) another well in a hydrogeologic setting determined by the department to be equivalent;

(6) an existing specific capacity test or a specific capacity test for the public water supply well; or

(7) an existing published transmissivity value.

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