

**WAC 173-351-405 Performance standards for groundwater monitoring system designs.** Groundwater monitoring well placement.

The groundwater monitoring system design must meet the following performance criteria:

(1) A sufficient number of wells must be installed at appropriate locations and depths to yield representative groundwater samples from those hydrostratigraphic units which have been identified as the earliest target hydraulic pathways and conduits of flow for groundwater and contaminant movement, and storage.

(2) The number, spacing, and depths of monitoring wells must be based on the site characteristics including the area of the MSWLF unit and the hydrogeological characterization of WAC 173-351-490, and requires a demonstration based on all of the following information:

(a) A groundwater flow path analysis which supports why the chosen hydrostratigraphic unit best serves the installation of a detection or assessment groundwater monitoring well system capable of providing early warning detection of any groundwater contamination.

(b) Documentation and calculations of all of the following information:

(i) Hydrostratigraphic unit thicknesses including confining units and transmissive units;

(ii) Vertical and horizontal groundwater flow directions including seasonal, man-made, or other short term fluctuations in groundwater flow;

(iii) Stratigraphy and lithology;

(iv) Hydraulic conductivity; and

(v) Porosity and effective porosity.

(3) Hydraulically placed upgradient wells (background wells) must meet the following performance criteria:

(a) Must be installed in groundwater that has not been affected by leakage from a MSWLF unit; or

(b) If hydrogeologic conditions do not allow for the determination of a hydraulically placed upgradient well then sampling at other monitoring wells which provide representative background groundwater quality may be allowed.

(4) Hydraulically placed down-gradient wells (compliance wells) must meet the following performance criteria:

(a) Represent the quality of groundwater passing the relevant point of compliance specified by the jurisdictional health department. The downgradient monitoring system must be installed at the relevant point of compliance specified by the jurisdictional health department during the permitting process of WAC 173-351-700 or through the permit modification process of WAC 173-351-720(6). Additional wells may be required by the jurisdictional health department based upon areal extent of the MSWLF unit, complex hydrogeologic settings or to define the extent of contamination under WAC 173-351-440 and 173-351-450.

(b) When physical obstacles preclude installation of groundwater monitoring wells at the relevant point of compliance at existing units, the downgradient monitoring system may be installed at the closest practicable distance hydraulically down gradient from the relevant point of compliance that ensures detection of groundwater contamination in the chosen hydrostratigraphic unit.

(5) All monitoring wells must be cased in a manner that maintains the integrity of the bore hole. This casing must be screened or perforated and packed with gravel or sand, where necessary, to enable collection of samples. The annular space between the bore hole and well casing above the sampling depth must be sealed to prevent corruption

of samples and contamination of groundwater. All wells must be constructed in accordance with chapter 173-160 WAC, Minimum standards for construction and maintenance of water wells and chapter 173-162 WAC, Regulation and licensing of well contractors and operators. All wells must be clearly labeled, capped, and locked.

(6) The owner or operator must apply for a permit modification under WAC 173-351-720(6) or must apply during the renewal process of WAC 173-351-720(5), for any proposed changes to the design, installation, development, and decommission of any monitoring wells, piezometers, and other measurement, sampling, and analytical devices. Upon completing changes, all documentation, including date of change, new well location maps, boring logs, and well diagrams must be submitted to the jurisdictional health department and must be placed in the operating record of WAC 173-351-200(10).

(7) All monitoring wells, piezometers, and other measurement, sampling, and analytical devices must be operated and maintained so that they perform to design specifications throughout the life of the monitoring program.

(8) The groundwater monitoring system and hydrogeologic report including any changes to the groundwater monitoring system must be prepared by a geologist or other licensed professional in accordance with the requirements of chapter 18.220 RCW, Geologists.

(9) The groundwater monitoring system design and hydrogeologic report must be made a part of the permit application in accordance with WAC 173-351-730 (1)(b)(iii).

[Statutory Authority: RCW 70.95.020(3), 70.95.060(1), and 70.95.260(1), (6). WSR 12-23-009 (Order 07-15), § 173-351-405, filed 11/8/12, effective 12/9/12. Statutory Authority: Chapter 70.95 RCW and 40 C.F.R. 258. WSR 93-22-016, § 173-351-405, filed 10/26/93, effective 11/26/93.]