

## DEQ Guidance on Alternative Groundwater Monitoring Constituents and/or Frequency<sup>1</sup>

**Regulatory Reference:** OAC 252:515-9-72 and 9-73

**Applicability.** All solid waste disposal facilities for which groundwater monitoring is required.

**Purpose.** To provide guidance for submitting requests to revise groundwater monitoring constituents and/or frequency.

### Technical Discussion.

Approvals to revise groundwater monitoring constituents or frequency are considered Tier I modifications to the permit and cannot be implemented at the facility until the permit has been modified.

### Revisions to Groundwater Monitoring Constituents

OAC 252:515-9-72 authorizes owner/operators to request approval to revise the list of groundwater monitoring constituents during detection monitoring. Provided it is protective of human health and the environment, the DEQ may approve one or more of the following:

1. an alternative set of groundwater quality constituents from those identified in OAC 252:515-9-31(d) upon successful demonstration the alternative set of constituents will detect changes in groundwater quality due to the presence of the facility;
2. a reduced set of volatile and/or semi-volatile constituents from those identified in Appendix A upon successful demonstration the removed constituents are not reasonably expected to be in or derived from the waste at the facility, and that the constituents proposed for deletion are not degradation or reaction products of constituents potentially present in the waste;<sup>2</sup>
3. an alternative set of volatile or semi-volatile constituents from those in Appendix A, upon successful demonstration that the proposed substitute parameters will still indicate the presence of all volatile chemical parameters;<sup>3</sup> or
4. an alternative list of indicator constituents in lieu of some or all of the heavy metal constituents of Appendix A upon successful demonstration the alternative constituents will provide a reliable indication of inorganic releases from the facility.<sup>4</sup>

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<sup>1</sup> Additional guidance can be obtained from EPA publication EPA/530-R-93-017, Solid Waste Disposal Facility Criteria - Technical Manual.

<sup>2</sup> Such demonstration must show the owner/operator has a definite knowledge of the nature of the waste accepted at the facility. This will include a review of the Waste Exclusion Plan (WEP) and an analysis of compliance with the WEP program to show the program has been and will continue to be thoroughly implemented. Historical leachate analysis can be used in support of a request for a reduction of parameters.

<sup>3</sup> If a statistically significant increase in one or more of the alternative constituents is noted, then the owner/operator must comply with OAC 252:515-9-74(d) to assess the possible groundwater problem.

<sup>4</sup> Must be based on:

- a. types, quantities, and concentrations of constituents in wastes managed at the facility;
- b. mobility, stability, and persistence of waste constituents or their reaction products in the unsaturated zone;
- c. detectability of indicator parameters, waste constituents, and reaction products in the groundwater; and
- d. concentration or values and coefficients of variation of monitoring constituents in the background.

## Alternate Groundwater Sampling Frequency

OAC 252:515-9-73(b) and (c) also authorize an alternative groundwater detection monitoring frequency, either for all constituents in the approved groundwater monitoring program, or for one or more individual constituents, provided the reduced frequencies are protective of human health and the environment. During the active life, the DEQ will not approve a groundwater detection monitoring frequency of less than annual, but may approve a less-than-annual frequency during the post-closure period.<sup>5</sup>

### *Minimum criteria*

The following criteria must be met before the DEQ will consider a request for reduction in groundwater monitoring frequency:

1. at least ten consecutive sampling events in compliance with OAC 252:515-9, Part 7 must have been completed;
2. groundwater analyses must demonstrate no statistical exceedance for two years or more; and
3. the owner/operator must demonstrate that gas migration is not a problem at the facility.

### *Required subsurface information*

If the criteria identified above are met, OAC 252:515-9-73(b)(1) identifies certain subsurface conditions that must be evaluated for all requests for a reduction in monitoring frequency. To effectively evaluate those subsurface conditions, DEQ believes the following must be submitted as part of the request:

1. the lithology (type of rock material) of the uppermost saturated zone and the unsaturated zone based on samples collected during drilling;<sup>6</sup>
2. the hydraulic conductivity (groundwater flow rate) at each monitoring well, as measured by a slug test, tracer test, or pump test. The slug test will be the most practical for monitoring wells at a landfill;
3. the effective porosity as determined by either direct testing in each monitoring well (slug test) or from core samples and laboratory measurement. If no other data is available, a reasonable assumption for the lithology of the uppermost saturated zone can be made from information in published literature. If published data is used, either a copy of the literature or a reference to where it may be found must also be included;
4. the hydraulic gradient (used for calculating groundwater flow rate) of the uppermost saturated zone, as determined by using the greatest difference in groundwater elevations in the monitoring wells;<sup>7</sup>
5. information on seasonal differences in the groundwater flow rate and chemistry;<sup>7</sup>
6. information on the fate and transport characteristics for potential contaminants (based on the constituents in the approved monitoring program) in relation to the groundwater flow rate; and

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<sup>5</sup> Additional guidance may be obtained from EPA publications EPA/530-SW-89-026, Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Chapter 3, and EPA/530-R-93-017, Solid Waste Disposal Facility Criteria.

<sup>6</sup> Core samples would be preferred. This information should be part of the landfill records obtained when the wells were drilled.

<sup>7</sup> This information should be available from previous groundwater monitoring reports.

7. information on the seepage velocity in the unsaturated zone between the uppermost saturated zone and the landfill to quantify the transport rate of contaminants from the facility toward the saturated zone if there is a release.<sup>8</sup>

*Additional information for reduction in monitoring frequency for individual constituents*

If an owner/operator wishes to reduce detection monitoring frequency for one or more individual constituents in the approved groundwater monitoring program, then in addition to the information above, the following must also be considered:

1. the mobility, stability, and persistence of the constituents or their reaction/degradation products in the unsaturated zone;
2. the detectability of the constituents and reaction/degradation products in the groundwater; and
3. the concentration or values and coefficients of variation of the constituents in the background results.

Appendix 1 to this Guidance document may be used to assist with determining if a facility will be eligible for a reduction in groundwater monitoring frequency.

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<sup>8</sup> This information can be derived from the previously mentioned drilling information and published information for specific chemicals found in leachate. If published data is used, either a copy of the literature or a reference to where it may be found must also be included.

**APPENDIX 1**

**Flowchart for Use in Determining Eligibility for Reduction in Groundwater Monitoring Frequency**

