

**3745-56-78 Unsaturated zone monitoring.**

An owner or operator subject to rules 3745-56-70 to 3745-56-83 of the Administrative Code must establish an unsaturated zone monitoring program to discharge the following responsibilities:

- (A) The owner or operator must monitor the soil and soil-pore liquid to determine whether hazardous constituents migrate out of the treatment zone.
  - (1) The permit will specify the hazardous constituents to be monitored. The hazardous waste constituents to be monitored are those specified under paragraph (B) of rule 3745-56-71 of the Administrative Code.
  - (2) The director may require monitoring for principal hazardous constituents (PHCs) in lieu of the constituents specified under paragraph (B) of rule 3745-56-71 of the Administrative Code. PHCs are hazardous constituents contained in the wastes to be applied at the unit that are the most difficult to treat, considering the combined effects of degradation, transformation, and immobilization. The director will establish PHCs if he finds, based on waste analysis, treatment demonstration, or other data, that effective degradation, transformation, or immobilization of the PHCs will assure treatment at at least equivalent levels for the other hazardous constituents in the wastes.
- (B) The owner or operator must install an unsaturated zone monitoring system that includes soil monitoring using soil cores and soil-pore liquid monitoring using devices such as lysimeters. The unsaturated zone monitoring system must consist of a sufficient number of sampling points at appropriate locations and depths to yield samples that:
  - (1) Represent the quality of background soil-pore liquid quality and the chemical make-up of soil that has not been affected by leakage from the treatment zone; and
  - (2) Indicate the quality of soil-pore liquid and the chemical make-up of the soil below the treatment zone.
- (C) The owner or operator must establish a background value for each hazardous constituent to be monitored under paragraph (A) of this rule. The permit will specify the background values for each constituent or specify the procedures to be used to calculate the background values.
  - (1) Background soil values may be based on a one-time sampling at a background plot having characteristics similar to those of the treatment zone; and
  - (2) Background soil-pore liquid values must be based on at least quarterly sampling for one year at a background plot having characteristics similar to those of the treatment zone; and

- (3) The owner or operator must express all background values in a form necessary for the determination of statistically significant increases under paragraph (F) of this rule; and
  - (4) In taking samples used in the determination of all background values, the owner or operator must use an unsaturated zone monitoring system that complies with paragraph (B)(1) of this rule.
- (D) The owner or operator must conduct soil monitoring and soil-pore liquid monitoring immediately below the treatment zone. The permit will specify the frequency and timing of soil and soil-pore liquid monitoring after considering the frequency, timing, and rate of waste application, and the soil permeability. The owner or operator must express the results of soil and soil-pore liquid monitoring in a form necessary for the determination of statistically significant increases under paragraph (F) of this rule.
- (E) The owner or operator must use consistent sampling and analysis procedures that are designed to ensure sampling results that provide a reliable indication of soil-pore liquid quality and the chemical make-up of the soil below the treatment zone. At a minimum, the owner or operator must implement procedures and techniques for:
- (1) Sample collection; and
  - (2) Sample preservation and shipment; and
  - (3) Analytical procedures; and
  - (4) Chain of custody control.
- (F) The owner or operator must determine whether there is a statistically significant change over background values of any hazardous constituent to be monitored under paragraph (A) of this rule below the treatment zone each time he conducts soil monitoring and soil-pore liquid monitoring under paragraph (D) of this rule.
- (1) In determining whether a statistically significant increase has occurred, the owner or operator must compare the value of each constituent, as determined under paragraph (D) of this rule, to the background value for that constituent according to the statistical procedure specified in the facility permit under paragraphs (F) to (F)(3)(b) of this rule.
  - (2) The owner or operator must determine whether there has been a statistically significant increase below the treatment zone within a reasonable time period after completion of sampling. The director will specify that time period in the facility permit after considering the complexity of the statistical test and the availability of laboratory facilities to perform the analysis of soil and soil-pore liquid samples.

- (3) The owner or operator must determine whether there is a statistically significant increase below the treatment zone using a statistical procedure that provides reasonable confidence that migration from the treatment zone will be identified. The permit will specify a statistical procedure that:
  - (a) Is appropriate for the distribution of the data used to establish background values; and
  - (b) Provides a reasonable balance between the probability of falsely identifying migration from the treatment zone and the probability of failing to identify real migration from the treatment zone.
- (G) If the owner or operator determines, pursuant to paragraph (F) of this rule, that there is a statistically significant increase of hazardous constituents below the treatment zone, he must:
  - (1) Notify the director of this finding in writing within seven days. The notification must indicate what constituents have shown statistically significant increases; and
  - (2) Within ninety days, submit to the director an application for a permit modification to modify the operating practices at the facility in order to maximize the success of degradation, transformation, or immobilization processes in the treatment zone.
- (H) If the owner or operator determines, pursuant to paragraph (F) of this rule, that there is a statistically significant increase of hazardous constituents below the treatment zone, he may demonstrate that a source other than regulated units caused the increase or that the increase resulted from an error in sampling, analysis, or evaluation. While the owner or operator may make a demonstration under paragraphs (H) to (H)(4) of this rule in addition to, or in lieu of, submitting a permit modification application under paragraph (G)(2) of this rule, he is not relieved of the requirement to submit a permit alteration application within the time specified in paragraph (G)(2) of this rule unless the demonstration made under paragraphs (H) to (H)(4) of this rule successfully shows that a source other than regulated units caused the increase or that the increase resulted from an error in sampling, analysis, or evaluation. In making a demonstration under paragraphs (H) to (H)(4) of this rule, the owner or operator must:
  - (1) Notify the director in writing within seven days of determining a statistically significant increase below the treatment zone that he intends to make a determination under paragraphs (H) to (H)(4) of this rule; and
  - (2) Within ninety days, submit a report to the director demonstrating that a source other than the regulated units caused the increase or that the increase resulted from error in sampling, analysis, or evaluation; and
  - (3) Within ninety days, submit to the director an application for a permit modification to make any appropriate changes to the unsaturated zone monitoring program at the facility; and

- (4) Continue to monitor in accordance with the unsaturated zone monitoring program established under this rule.

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