**Section 724.378 Unsaturated Zone Monitoring**

An owner or operator subject to this Subpart M must establish an unsaturated zone monitoring program to carry out 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 Agency must specify the hazardous constituents to be monitored in the facility permit. The hazardous constituents to be monitored are those specified under Section 724.371(b).

2) The Agency may require monitoring for principal hazardous constituents (PHCs) in lieu of the constituents specified under Section 724.371(b). PCHs 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 Agency must establish PHCs if it finds, based on waste analyses, treatment demonstrations, or other data, that effective degradation transformation or immobilization of the PHCs will assure treatment 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 fulfill the following:

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 subsection (a). 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.

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.

3) The owner or operator must express all background values in a form necessary for the determination of statistically significant increases under subsection (f).

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 subsection (b)(1).

d) The owner or operator must conduct soil monitoring and soil-pore liquid monitoring immediately below the treatment zone. The Agency must specify the frequency and timing of soil and soil-pore liquid monitoring in the facility permit 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 subsection (f).

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 the following:

1) Sample collection;

2) Sample preservation and shipment;

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 for any hazardous constituent to be monitored under subsection (a) below the treatment zone each time it conducts soil monitoring and soil-pore liquid monitoring under subsection (d).

1) In determining whether a statistically significant increase has occurred, the owner or operator must compare the value of each constituent, as determined under subsection (d), to the background value for that constituent according to the statistical procedure specified in the facility permit under this subsection (f).

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 Agency must 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 Agency must specify a statistical procedure in the facility permit that it finds fulfills the following:

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 subsection (f), that there is a statistically significant increase of hazardous constituents below the treatment zone, it must do the following:

1) Notify the Agency of this finding in writing within seven days. The notification must indicate what constituents have shown statistically significant increases.

2) Within 90 days, submit to the Agency 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 subsection (f), that there is a statistically significant increase of hazardous constituents below the treatment zone, it 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 this subsection (h) in addition to, or in lieu of, submitting a permit modification application under subsection (g)(2), it is not relieved of the requirement to submit a permit modification application within the time specified in subsection (g)(2), unless the demonstration made under this subsection (h) 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 this subsection (h), the owner or operator must do the following:

1) Notify the Agency in writing within seven days of determining a statistically significant increase below the treatment zone that the owner or operator intends to make a determination under this subsection (h);

2) Within 90 days, submit a report to the Agency demonstrating that a source other than the regulated units caused the increase or that the increase resulted from error in sampling, analysis, or evaluation;

3) Within 90 days, submit to the Agency 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 Section.

(Source: Amended at 42 Ill. Reg. 22614, effective November 19, 2018)