7045.0536 LAND TREATMENT.

Subpart 1. **Scope.** This part applies to owners and operators of facilities that treat or dispose of hazardous waste in land treatment units except as part 7045.0450 provides otherwise.

Subp. 2. **Treatment program.** Treatment program requirements are as follows:

A. An owner or operator of a land treatment unit shall establish a land treatment program that is designed to ensure that hazardous constituents placed in or on the treatment zone are degraded, transformed to nonhazardous forms, or immobilized within the treatment zone. The agency shall specify in the facility permit the elements of the treatment program, including:

(1) the wastes that are capable of being treated at the unit based on a treatment demonstration;

(2) design measures and operating practices necessary to ensure the success of degradation, transformation, and immobilization processes in the treatment zone in accordance with subpart 4, item A; and

(3) unsaturated zone monitoring provisions meeting the requirements of subpart 6.

B. The agency shall specify in the facility permit the hazardous constituents that must be degraded, transformed, or immobilized.

C. The agency shall specify the vertical and horizontal dimensions of the treatment zone in the facility permit. The treatment zone is the portion of the unsaturated zone below and including the land surface in which the owner or operator intends to maintain the conditions necessary for effective degradation, transformation, or immobilization of hazardous constituents. The maximum depth of the treatment zone must be:

(1) not more than 1.5 meters (five feet) from the initial soil surface; and

(2) more than one meter (three feet) above the seasonal high water table. The actual separation distance must be based on soil characteristics, results of the demonstration, proposed management, and the characteristics of the waste applied. The seasonal high water table must be determined by monitoring at the unit or by other acceptable means.

Subp. 3. **Treatment demonstration.** Treatment demonstration requirements are as follows:

A. For each waste that will be applied to the treatment zone, the owner or operator shall demonstrate, prior to application of the waste, that hazardous constituents in the waste

can be completely degraded, transformed to nonhazardous forms, or immobilized in the treatment zone.

B. In making this demonstration, the owner or operator may use laboratory analyses, available data, or in the case of existing units, operating data and shall conduct field tests unless a written exemption from field testing is obtained from the commissioner. The owner or operator shall obtain a land treatment demonstration permit in accordance with the agency's permitting procedures in chapter 7001. The agency shall specify in this permit the testing, analytical, design, and operating requirements, including the duration of the tests and analyses, and, for field tests, the horizontal and vertical dimensions of the treatment zone, monitoring procedures, closure, and cleanup activities necessary to meet the requirements in item C.

C. Any field test or laboratory analysis conducted in order to make a demonstration must:

(1) accurately simulate the characteristics and operating conditions for the proposed land treatment unit including the characteristics of the waste and the presence of hazardous constituents that are reasonably expected to be in, or derived from, waste placed in or on the treatment zone, the climate in the area, the topography of the surrounding area, the characteristics of the soil in the treatment zone, including depth, and the operating practices to be used at the unit;

(2) be likely to show that hazardous constituents in the waste to be tested will be completely degraded, transformed to a nonhazardous form, or immobilized in the treatment zone of the proposed land treatment unit;

(3) be conducted in a manner that protects human health and the environment considering, the characteristics of the waste to be tested, the operating and monitoring measures taken during the course of the test, the duration of the test, the volume of waste used in the test, and the potential for migration of hazardous constituents to ground water or surface water; and

(4) provide for acceptable statistical analysis.

Subp. 4. **Design and operating requirements.** The agency shall specify in the facility permit how the owner or operator shall design, construct, operate, and maintain the land treatment unit. The owner or operator shall also comply with the following:

A. The owner or operator shall design, construct, operate, and maintain the unit to ensure the degradation, transformation to nonhazardous forms, and immobilization of hazardous constituents in the treatment zone. The owner or operator shall design, construct, operate, and maintain the unit in accordance with all design and operating conditions that

were used in the treatment demonstration. The agency shall specify the following in the facility permit:

(1) the rate and method of waste application to the treatment zone;

(2) measures to control soil pH;

(3) measures to enhance microbial or chemical reactions such as fertilization and tilling; and

(4) measures to control the moisture content of the treatment zone.

B. The owner or operator shall design, construct, operate, and maintain the treatment zone to minimize run-off of hazardous constituents during the active life of the land treatment unit.

C. The owner or operator shall design, construct, operate, and maintain a run-on control system capable of preventing flow onto the treatment zone during peak discharge from at least a 100-year storm.

D. The owner or operator shall design, construct, operate, and maintain a run-off management system to collect and control at least the water volume resulting from a 24-hour, 100-year storm.

E. The owner or operator of a land treatment unit shall submit to the agency with the permit application a plan for the treatment and disposal of run-off contained in the run-off management system.

F. Collection and holding facilities such as tanks or basins, associated with run-on and run-off control systems must be emptied or otherwise managed expeditiously after storms to maintain the design capacity of the system.

G. The owner or operator shall manage the unit to control wind dispersal.

H. The owner or operator shall inspect the unit weekly and after storms to detect evidence of:

(1) deterioration, malfunctions, or improper operation of run-on and run-off control systems; and

(2) improper functioning of wind dispersal control measures.

If evidence of the conditions described in subitems (1) and (2) is detected, the owner or operator shall notify the agency of the condition and the measures taken to correct the condition.

I. The agency shall specify in the permit all design and operating practices that are necessary to ensure that the requirements of items A to H are satisfied.

Subp. 5. **Food chain crops.** The agency may specify in the permit the specific conditions of food chain crop production. The agency shall not allow the growth of food chain crops in or on the treatment zone unless the owner or operator satisfies the following requirements:

A. No food chain crops may be grown during the active life of the unit unless:

(1) the only wastes disposed of at the land treatment unit are wastes which are hazardous only because they exhibit characteristics of ignitability, corrosivity, reactivity, or oxidativity as established in part 7045.0131; and

(2) it can be demonstrated that no substantial risk to human health exists from the production of food chain crops in or on the treatment zone. The demonstration must be conducted according to item C.

B. Food chain crops may be grown on a land treatment unit after closure if:

(1) cadmium is the only hazardous constituent present and no more than 5 kg/ha has been applied; or

(2) the cumulative addition of cadmium does not exceed 10 kg/ha if soil cation exchange capacity (CEC) is 5-15 milliequivalents/100 grams (meq/100g); and 20 kg/ha if the CEC is greater than 15 meq/100g; and

(3) it can be demonstrated that no substantial risk to human health exists or will exist from the current or future production of food chain crops in or on the treatment zone. The demonstration must be conducted according to item C.

C. The demonstration that there is no substantial risk to human health caused by the growth of food chain crops must be conducted as specified in subitems (1) to (5). The owner or operator shall make the required demonstration prior to the planting of crops at the facility. In making this demonstration, the owner or operator may use field tests, greenhouse studies, available data, or in the case of existing units, operating data.

(1) The demonstration must show that under conditions of current and future land use hazardous constituents and characteristics will not be transferred to the food or feed portions of the crop by plant uptake or direct contact, and will not otherwise be ingested by food chain animals, or that hazardous constituents will not occur in greater concentrations than in or on identical portions of the same crops grown on untreated soils under similar conditions in the same region.

(2) The demonstration must be based on conditions similar to those present in the treatment zone, including soil characteristics such as pH, CEC and texture, specific waste characteristics, application rates and methods, and crops to be grown.

(3) The demonstration must describe the procedures used in conducting tests, including the sample selection criteria, sample size, analytical methods, and statistical procedures.

(4) The demonstration must address all hazardous characteristics and all hazardous constituents which are reasonably expected to be in or derived from the wastes to be deposited at the unit.

(5) The owner or operator shall obtain a permit or letter of approval prior to the demonstration in accordance with the agency's permitting requirements for demonstration permits in chapter 7001.

Subp. 6. **Unsaturated zone monitoring.** An owner or operator shall establish an unsaturated zone monitoring program to discharge the following responsibilities:

A. The owner or operator shall monitor the soil and soil-pore liquid to determine whether hazardous constituents migrate out of the treatment zone. The agency shall specify the hazardous constituents to be monitored in the facility permit. The hazardous constituents to be monitored are those specified under subpart 2, item B. The agency may require monitoring for principal hazardous constituents in lieu of the constituents specified under subpart 2, item B. Principal hazardous constituents 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 shall establish principal hazardous constituents if it finds, based on waste analyses, treatment demonstration, or other data, that effective degradation, transformation, or immobilization of the principal hazardous constituents will assure treatment at at least equivalent levels for the other hazardous constituents in the wastes.

B. The owner or operator shall 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 be designed and maintained to prevent contamination of the unsaturated zone by migration through bore holes or along lysimeter installations. 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 and the chemical makeup 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 makeup of the soil below the treatment zone.

C. The owner or operator shall establish an unsaturated zone background value for each hazardous constituent to be monitored. The permit must specify the background values for each constituent or specify the procedures to be used to calculate the background values.

Background soil values shall be based on a sampling at the land treatment unit for new facilities, or at a background plot having characteristics similar to those of the treatment zone for existing facilities.

Background soil-pore liquid values must be based on at least quarterly sampling for one year at the land treatment unit for new facilities or at a background plot having characteristics similar to those of the treatment zone for existing facilities.

The owner or operator shall express all background values in a form necessary for the determination of statistically significant increases under item F.

In taking samples used in the determination of all background values, the owner or operator shall use an unsaturated zone monitoring system that complies with item B, subitem (1).

D. The owner or operator shall conduct soil monitoring and soil-pore liquid monitoring immediately below the treatment zone. The agency shall 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, the climate, and the soil and waste characteristics. The owner or operator shall express the results of soil and soil-pore liquid monitoring in a form necessary for the determination of statistically significant increases under item F.

E. The owner or operator shall 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 makeup of the soil below the treatment zone. The owner or operator shall implement procedures and techniques for sample collection, sample preservation and shipment, analytical procedures, and chain of custody control.

F. The owner or operator shall determine whether there is a statistically significant change over background values for any hazardous constituent to be monitored under item A below the treatment zone each time he or she conducts soil monitoring and soil pore liquid monitoring under item D.

In determining whether a statistically significant increase has occurred, the owner or operator shall compare the value of a constituent, as determined under item D to the background value for that constituent according to the statistical procedure specified in the facility permit.

The owner or operator shall determine whether there has been a statistically significant increase below the treatment zone within a reasonable time period after completion of sampling. The determination of increase must be submitted to the commissioner within two weeks of sampling unless a different reporting period is established in the permit.

The owner or operator shall 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 shall specify a statistical procedure in the facility permit that is appropriate for the distribution of the data used to establish background values and provides a reasonable balance between the probability of falsely identifying migration of hazardous constituents from the treatment zone and the probability of failing to identify real migration of hazardous constituents from the treatment zone.

G. If the owner or operator determines under item F that there is a statistically significant increase of hazardous constituents below the treatment zone, he or she shall:

(1) notify the commissioner of this finding in writing within seven days, indicating in the notice the constituents that have shown statistically significant increases; and

(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 under item F that there is a statistically significant increase of hazardous constituents below the treatment zone, he or she 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, he or she is not relieved of the requirement to submit a permit modification application within the time specified in item G, subitem (2). In making a demonstration the owner or operator shall:

(1) notify the commissioner in writing within seven days of determining a statistically significant increase below the treatment zone that he or she intends to make the determination;

(2) within 90 days, submit a report to the commissioner 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.

Subp. 7. **Record keeping.** The owner or operator shall include hazardous waste application dates and rates in the operating record required under part 7045.0478. The owner or operator shall also include in the operating record facility management practices, such as fertilization, cultivation, irrigation, and crop production, and climatological data, such as precipitation and temperature.

Subp. 8. **Closure and postclosure.** Requirements of closure and postclosure are as follows:

A. During the closure period the owner or operator shall:

(1) continue all operations, including pH control, necessary to maximize degradation, transformation, or immobilization of hazardous constituents within the treatment zone as required under subpart 4, item A;

(2) continue all operations in the treatment zone to minimize run-off of hazardous constituents as required under subpart 4, item B;

(3) maintain the run-on control system required under subpart 4, item C;

(4) maintain the run-off management system required under subpart 4, item D;

(5) control wind dispersal of hazardous waste if required under subpart 4, item G;

(6) continue unsaturated zone monitoring in compliance with subpart 6;

(7) continue to comply with any prohibitions or conditions concerning growth of food chain crops under subpart 5; and

(8) establish a vegetative cover on the portion of the facility being closed at such time that the cover will not substantially impede degradation, transformation, or immobilization of hazardous constituents in the treatment zone. The vegetative cover must be capable of maintaining growth without extensive maintenance.

B. For the purpose of complying with part 7045.0486, subpart 4, when closure is complete the owner or operator may submit to the commissioner certification by an independent qualified soil scientist, in lieu of an independent registered professional engineer, that the facility has been closed in accordance with the specifications in the approved closure plan.

C. During the postclosure care period the owner or operator shall:

(1) continue all operations, including pH control, necessary to enhance degradation and transformation and sustain immobilization of hazardous constituents in the treatment zone;

(2) maintain a vegetative cover over closed portions of the facility;

(3) maintain the run-on control system required under subpart 4, item C;

(4) maintain the run-off management system required under subpart 4, item D;

(5) control wind dispersal of hazardous waste under subpart 4, item G;

(6) continue to comply with any prohibitions or conditions concerning growth of food chain crops under subpart 5; and

(7) continue unsaturated zone monitoring in compliance with subpart 6.

D. The owner or operator is not subject to regulation under items A, subitem (8), and C if the commissioner finds that the level of hazardous constituents in the treatment zone soil does not exceed the background value of those constituents by an amount that is statistically significant when using the test specified in subitem (3). The owner or operator may submit a demonstration to the commissioner at any time during the closure or postclosure care periods. For this purpose:

(1) The owner or operator must establish background soil values and determine whether there is a statistically significant increase over those values for all hazardous constituents specified in the facility permit under subpart 2, item B. Background soil values shall be based on a sampling of the land treatment unit for new facilities, or at a background plot having characteristics similar to those of the treatment zone for existing facilities. Background values and values for hazardous constituents in the treatment zone must be expressed in a form necessary for the determination of statistically significant increases under subitem (3).

(2) In taking samples used in the determination of background and treatment zone values, the owner or operator shall take samples at a sufficient number of sampling points and at appropriate locations and depths to yield samples that represent the chemical makeup of soil that has not been affected by leakage from the treatment zone and the soil within the treatment zone, respectively.

(3) In determining whether a statistically significant increase has occurred, the owner or operator shall compare the value of a hazardous constituent in the treatment zone to the background value for that hazardous constituent using a statistical procedure that provides reasonable confidence that the presence of the hazardous constituents in the treatment zone will be identified. The owner or operator shall use a statistical procedure that is appropriate for the distribution of the data used to establish background values and provides a reasonable balance between the probability of falsely indicating the presence of hazardous constituents in the treatment zone and the probability of failing to indicate the real presence of hazardous constituents in the treatment zone.

E. The owner or operator is not subject to regulation under part 7045.0484 if the commissioner finds that the owner or operator satisfies item D and if unsaturated zone monitoring under subpart 6 indicates that hazardous constituents have not migrated beyond the treatment zone during the active life of the land treatment unit.

Subp. 9. **Ignitable or reactive waste.** The owner or operator shall not apply ignitable or reactive waste to the treatment zone unless the waste and the treatment zone meet all applicable requirements of part 7045.1390, and:

A. the waste is immediately incorporated into the soil so that the resulting waste, mixture, or dissolution of material no longer meets the definition of ignitable or reactive waste under part 7045.0131, subpart 2 or 5, and compliance with part 7045.0456, subpart 2 is maintained; or

B. the waste is managed to protect it from material or conditions which may cause it to ignite or react.

Subp. 10. **Incompatible wastes.** The owner or operator shall not place incompatible wastes or incompatible wastes and materials in or on the same treatment zone, unless compliance with part 7045.0456, subpart 2 is maintained.

Subp. 11. **Special requirements for hazardous wastes F020, F021, F022, F023, F026, F027, and F028.** The following requirements apply to the hazardous wastes indicated:

A. Hazardous wastes F020, F021, F022, F023, F026, and F027 listed under part 7045.0135, subpart 1a, item B, must not be placed in a land treatment unit.

B. Hazardous waste F028 and treatment residues and soils contaminated with hazardous wastes F020, F021, F022, F023, F026, F027, and F028 listed under part 7045.0135, subpart 1a, item B, must not be managed at land treatment units unless the owner or operator operates the land treatment unit in accordance with all applicable requirements of this part and in accordance with a management plan that is approved by the commissioner considering the following factors:

(1) the volume, physical, and chemical characteristics of the wastes, including their potential to migrate through soil or to volatilize or escape into the atmosphere;

(2) the attenuative properties of underlying and surrounding soils or other materials;

(3) the mobilizing properties of other materials codisposed with these wastes; and

(4) the effectiveness of additional treatment, design, or monitoring techniques.

C. The commissioner shall impose additional design, operating, and monitoring requirements if the commissioner finds that the additional requirements are necessary for land treatment facilities used to treat or dispose of hazardous waste F028 and treatment residues and soils contaminated with hazardous wastes F020, F021, F022, F023, F026,

F027, and F028 listed under part 7045.0135, subpart 1a, item B, in order to reduce the possibility of migration of these wastes to ground water, surface water, or air so as to protect human health and the environment.

Statutory Authority: *MS s 14.07; 116.07; 116.37*

History: *9 SR 115; 10 SR 1212; L 1987 c 186 s 15; 16 SR 2239; 33 SR 2042*

Published Electronically: *October 10, 2013*