

3745-27-12 Explosive gas migration monitoring for a sanitary landfill facility.

- (A) Applicability. This rule applies to each responsible party for any of the following facilities:
- (1) A licensed solid waste landfill facility that accepted waste on or after June 1, 1994.
 - (2) A previously licensed closed solid waste landfill facility that meets the following:
 - (a) Ceased solid waste acceptance after May 31, 1988.
 - (b) Is so situated that a residence or other occupied structure is located within one thousand feet of the horizontal limits of solid waste placement.
 - (3) A previously licensed closed solid waste landfill facility that meets the following:
 - (a) Ceased solid waste acceptance between July 1, 1970 and May 31, 1988.
 - (b) Has received notification from Ohio EPA that this rule applies, based upon site specific conditions including but not limited to explosive gas generation, migration, and the threat to human health, safety, or the environment.
 - (4) A solid waste landfill facility for which a new or revised EGMP is required pursuant to an order of the director.
- (B) Definitions. If a term used in this rule is defined in rule 3745-27-01 of the Administrative Code, the definition in rule 3745-27-01 of the Administrative Code is applicable to this rule unless the term is defined in this rule. As used in this rule:
- (1) "Alternative monitoring device" or "AMD" means any type of device other than an explosive gas monitoring probe where the presence and concentration of landfill gas can be measured with a direct reading instrument.
 - (2) "EGMP" means an explosive gas monitoring plan.
 - (3) "Facility boundary" means one of the following:
 - (a) The solid waste landfill facility boundary as depicted in the effective permit.
 - (b) The property line of all the parcels that contain the limits of solid waste placement.
 - (4) "LEL" has the same meaning as lower explosive limit.
 - (5) "Solid waste landfill facility," means any site, location, tract of land, or installation used for the disposal of solid waste.
- (C) Exclusions. This rule does not apply to the following facilities:
- (1) A solid waste landfill facility that exclusively disposes or has disposed of solid wastes generated on one or more premises owned by the person who owns the solid waste landfill facility.
 - (2) A solid waste landfill facility owned or operated by a person other than the generator of the wastes that exclusively disposes or has disposed of nonputrescible solid wastes generated by the generator at one or more of the premises owned by the generator.
- (D) Notwithstanding the exclusions contained in paragraph (C) of this rule, the director may issue an order

directing a responsible party to prepare and submit a new or revised EGMP for a solid waste landfill facility in accordance with this rule if the director determines that the potential exists for the formation and subsurface migration of explosive gases in such quantities and under such conditions as to threaten human health or safety or the environment.

- (E) Exceedances of methane by volume at or above 1.25 per cent in occupied structures or five per cent methane by volume at the facility boundary shall constitute a threat to human health, safety, and the environment.
- (F) Explosive gas monitoring plan.
 - (1) Submittal and implementation of an EGMP. Unless otherwise excluded by paragraph (C) of this rule, the responsible party shall prepare, submit, and implement an EGMP as follows:
 - (a) For a solid waste landfill facility operating on the effective date of this rule, submit an EGMP that complies with this rule in accordance with the following schedule:
 - (i) Concurrent with a request to alter an effective EGMP.
 - (ii) At the same time as the ten-year update schedule specified in rule 3745-27-19 of the Administrative Code.
 - (b) For a solid waste landfill facility that has ceased operations prior to the effective date of this rule, not later than two hundred seventy days after the effective date of this rule or not later than two hundred seventy days after receipt of a notification in accordance with paragraph (A)(3)(b) of this rule, submit an EGMP to Ohio EPA as follows:
 - (i) For a solid waste landfill facility without an approved EGMP, a new EGMP that complies with this rule.
 - (ii) For a solid waste landfill facility with an approved EGMP, a revised EGMP that complies with this rule.
 - (c) If a new occupied structure is built within one thousand feet of the horizontal limits of solid waste placement, submit an EGMP that complies with this rule to Ohio EPA in accordance with the following schedule:
 - (i) For a solid waste landfill facility without an approved EGMP, a new EGMP not later than two hundred seventy days after discovery of the occupied structure.
 - (ii) For a solid waste landfill facility with an approved EGMP, a revised EGMP not later than one hundred eighty days after discovery of the occupied structure.
 - (d) The most recent approved EGMP shall remain in effect until a revised EGMP is approved by the director in accordance with this rule.
 - (e) The responsible party shall implement the EGMP upon approval by the director.
 - (f) The responsible party shall comply with an approved EGMP until the director authorizes the responsible party to cease explosive gas monitoring in accordance with paragraph (O) of this rule.
 - (2) The responsible party shall establish a stand-alone EGMP on forms prescribed by the director and submit the EGMP to Ohio EPA that includes at a minimum, the following:
 - (a) A description of the explosive gas monitoring network that demonstrates the network conforms to

paragraph (H) of this rule and is capable of measuring explosive gas to ensure concentrations of methane do not exceed the following:

- (i) 1.25 per cent by volume or twenty-five per cent of the LEL in occupied structures.
 - (ii) Five per cent by volume or one hundred per cent of the LEL at the facility boundary.
- (b) Detailed topographical maps with a scale of one inch equals no greater than two hundred feet showing the following:
- (i) The property boundary, facility boundary, and the horizontal limits of solid waste placement of the solid waste landfill facility.
 - (ii) A zone around the solid waste landfill facility representing the area that is two hundred feet from the horizontal limits of solid waste placement.
 - (iii) A zone around the solid waste landfill facility representing the area that is one thousand feet from the horizontal limits of solid waste placement.
 - (iv) All property owners and political subdivisions located within two hundred feet of the horizontal limits of solid waste placement.
 - (v) All property boundaries and parcel numbers located within one thousand feet of the horizontal limits of solid waste placement.
 - (vi) All on-site enclosed structures where one or more human beings may be present and all off-site enclosed structures where one or more human beings may be present located within one thousand feet of the horizontal limits of solid waste placement. The EGMP shall identify those enclosed structures that are occupied structures.
 - (vii) All man-made explosive gas migration pathways within one thousand feet of the horizontal limits of solid waste placement including but not limited to roads, railroads, underground utilities, mines, storm sewers, water lines, electric cables, and pipelines.
 - (viii) All other potential sources of explosive gas within one thousand feet of the horizontal limits of solid waste placement including but not limited to oil and gas wells, landfills, and wetlands.
 - (ix) All man-made features that may act as a barrier to explosive gas migration or allow the venting of explosive gas.
- (c) The following geological information:
- (i) The ground water surface elevation in the proximity of the solid waste placement and fluctuations in ground water levels.
 - (ii) A discussion of the topography of the site and surrounding area.
 - (iii) A discussion of any natural or man-made site characteristics that may act as impervious boundaries to gas migration or allow natural venting of gas.
 - (iv) If the subsurface stratification is known, a hydrogeological cross section of the solid waste landfill facility property that equals the depth of solid waste and shows the potential natural pathways.

- (v) A discussion characterizing all known potential explosive gas migration pathways and their associated explosive gas hazard.
 - (vi) A discussion and identification of any other sources of explosive gas within one thousand feet of the horizontal limits of solid waste placement that may potentially cause subsurface migration of explosive gas.
- (d) The following solid waste landfill facility information:
- (i) The lowest elevation of solid waste placement.
 - (ii) The approximate acreage of solid waste placement.
 - (iii) A discussion of the types of waste that have been disposed or will be disposed at the solid waste landfill facility.
 - (iv) At a minimum and as applicable and available, a discussion of the following historical information pertaining to the solid waste landfill facility:
 - (a) The date of the initial solid waste license and any subsequent licenses.
 - (b) The date of initial operation.
 - (c) The date of cessation of waste acceptance, the date closure activities were completed, and the date when the closure certification report was submitted to the director.
 - (d) All previous or current authorizations regarding explosive gas management.
 - (e) The names of all prior owners for all of the real property within the facility boundary.
- (e) The following gas investigation information:
- (i) A description and an evaluation of the effectiveness of the following:
 - (a) Any existing gas monitoring system.
 - (b) Any existing gas extraction system.
 - (c) Any existing gas venting system.
 - (ii) A discussion of historical records detailing any previous explosive gas investigations including but not limited to probe sampling results and any other type of gas sampling results.
 - (iii) A discussion of any of the following that could be attributed to current explosive gas presence:
 - (a) Dead vegetation.
 - (b) Odors.
 - (c) Snow melt.
- (f) For every probe and AMD, the following:
- (i) The schematic of the design that conforms to paragraph (G) of this rule. The schematic may be a generalized construction of the probe or AMD.

- (ii) The location and the geo-coordinate on a plan drawing.
 - (iii) The total depth.
 - (iv) The total length of the screen interval, if applicable.
 - (v) The identification designation.
 - (vi) Methods of construction.
 - (vii) Materials used in construction.
 - (viii) Installation procedures and quality assurance measures.
 - (ix) Security measures capable of protecting the probe or AMD from vandalism, impact damage, and weather, as applicable.
- (g) The following appendices to the EGMP:
- (i) Appendix A. Copies of letters sent to the entities listed in paragraph (J)(2) of this rule, which specify the location of the solid waste landfill facility and the proximity of the occupied structure.
 - (ii) Appendix B. Documentation of installation of explosive gas alarms in occupied structures within two hundred feet of solid waste placement. At a minimum, this documentation shall include the following:
 - (a) Communications from the responsible party to the property owner of the occupied structure seeking consent to install an explosive gas alarm in the structure.
 - (b) Confirmatory communication from the responsible party to each owner of an occupied structure that declines consent to install an explosive gas alarm in the structure.
 - (c) A map depicting all occupied structures within two hundred feet of solid waste placement that have an explosive gas alarm installed.
 - (iii) Appendix C. Hydrogeologic boring logs, if available.
 - (iv) Appendix D. Certification reports in accordance with paragraph (G)(2) of this rule.
 - (v) Appendix E. The most recent deed for each parcel of the solid waste landfill facility property.
 - (vi) Other appendices as necessary.
- (3) If Ohio EPA determines that additional information is necessary to determine whether the criteria set forth in paragraph (F)(2) of this rule are satisfied, Ohio EPA may require that the responsible party supply such information as a precondition to further consideration of the EGMP.
- (4) The director shall not approve an EGMP unless the following are met:
- (a) The EGMP is complete in accordance with paragraph (F)(2) of this rule.
 - (b) The explosive gas monitoring system is designed and is capable of being constructed and operated in accordance with this rule and with any terms and conditions of the approved EGMP.

(c) Any existing probes or AMDs have been installed and explosive gas is being monitored in accordance with paragraphs (I), (J), and (L) of this rule.

(5) Alterations to the EGMP. The responsible party may submit to Ohio EPA a written request to revise the approved EGMP and may implement the revision only upon obtaining Ohio EPA's concurrence with the request.

(G) Probe and AMD design. The responsible party shall utilize probes and AMDs as follows:

(1) Probe design, construction, and implementation.

(a) The explosive gas monitoring network shall be designed and constructed utilizing probes that conform to the following:

(i) Accurately detect the existing levels of explosive gas.

(ii) Are screened to the entire depth of solid waste placement, unless a barrier exists that is of sufficient impermeability to prevent the migration of explosive gas beyond the barrier. The responsible party may submit a demonstration that existing probes are adequate and meet the design specifications of this paragraph.

(iii) Are designed to prevent contamination or dilution of explosive gas samples.

(iv) Are designed to prevent contamination of groundwater.

(v) Are designed to obtain liquid levels, gas pressure, and methane concentration within the probe.

(b) Ohio EPA may authorize the use of AMDs in lieu of probes if the responsible party demonstrates, based on specific site geology, location, depth of waste, or other factors, that the AMDs will be protective of human health, safety, and the environment. If AMDs are used, the AMDs shall conform to the following:

(i) Accurately detect the existing levels of explosive gas.

(ii) Be capable of detecting gas migration in the explosive gas pathway.

(iii) Be designed to prevent contamination of groundwater.

(c) If at any time Ohio EPA determines the construction, design, or operation of any probe or AMD is not capable of meeting the requirements of this paragraph, then the probe or AMD shall be re-developed by the responsible party to meet these requirements.

(d) The director may require the installation of additional probes, AMDs, alarms, or the abandonment of probes as necessary to monitor explosive gas pathways or to eliminate the potential contamination of ground water.

(2) Certification of probes or AMDs. Upon installation of new or replacement probes or AMDs, the responsible party shall submit a certification report to the director that at a minimum includes the following:

(a) A drawing showing the locations of all probes and AMDs with their associated identification designations.

(b) Geologic logs, if applicable.

- (c) Piping materials, depth and, if applicable, the length of the screened intervals.
 - (d) The initial gas monitoring results obtained from the probe or AMD.
- (3) New occupied structures or explosive gas pathways. The responsible party shall alter the EGMP and install new probes or AMDs in all new explosive gas pathways and construct the new probes or AMDs in accordance with this rule. A new probe or AMD shall be installed and sampled in the following manner:
- (a) Not later than one hundred eighty days after discovery of a new occupied structure within one thousand feet of the horizontal limits of solid waste placement.
 - (b) Upon discovery of an existing explosive gas pathway or the creation of any explosive gas pathway within one thousand feet of the horizontal limits of solid waste placement.
 - (c) Upon discovery of any topographic or subsurface construction changes occurring in the vicinity of the solid waste landfill facility that create the potential for explosive gas migration towards any occupied structure within one thousand feet of solid waste placement.
- (4) Replacement or abandonment of probes or AMDs. The responsible party shall replace or abandon a probe or AMD as follows:
- (a) For a damaged or inaccessible probe or AMD, replace in accordance with the approved EGMP and this rule prior to the next compliance monitoring event or in accordance with an alternative timeframe authorized in writing by Ohio EPA.
 - (b) As near as possible to the same location as the damaged probe or AMD to monitor the same pathway.
 - (c) Certify the installation of the new or replacement probe or AMD in accordance with paragraph (G)(2) of this rule.
 - (d) If applicable, abandon the probes and AMDs in accordance with rule 3745-9-10 of the Administrative Code.
- (H) Explosive gas network design. The responsible party shall ensure that the explosive gas monitoring network is capable of detecting explosive gas using probes or alarms as follows unless the responsible party has received authorization from Ohio EPA to use AMDs in lieu of probes:
- (1) For an occupied structure located within the horizontal limits of solid waste placement, using explosive gas alarms. Upon consent of the owner of the occupied structure, the responsible party shall install explosive gas alarms in the occupied structure in accordance with the manufacturer's instructions. At a minimum, the explosive gas alarm shall be capable of detecting gas concentrations of 1.25 per cent methane by volume or twenty-five per cent of the LEL.
 - (2) For occupied structures located within two hundred feet of the horizontal limits of solid waste placement, the following:
 - (a) Upon consent of the owner of the occupied structure, install an explosive gas alarm in the occupied structure. At a minimum, the explosive gas alarm shall be capable of detecting gas concentrations of 1.25 per cent methane by volume or twenty-five per cent of the LEL.
 - (b) Install probes between the horizontal limits of solid waste placement and the occupied structure in such location and number that explosive gas migration through the unconsolidated stratigraphic unit,

fractured bedrock pathway, or man-made pathway towards the occupied structure will be detected. If the occupied structure is outside the facility boundary, the probe shall be located as close to the facility boundary as possible. If a man-made barrier to gas migration is present, the probe shall be located between the barrier and the occupied structure.

- (3) For occupied structures located within one thousand feet of the horizontal limits of solid waste placement, install probes between the horizontal limits of solid waste placement and the occupied structure in such locations and numbers that explosive gas migration through the unconsolidated stratigraphic unit, fractured bedrock pathway, or man-made pathway towards the structure will be detected. If the occupied structure is outside the facility boundary, the probe shall be located as close to the facility boundary as possible. If a man-made barrier to gas migration is present, the probe shall be located between the barrier and the occupied structure.
- (4) For a licensed solid waste landfill facility that accepted waste on or after June 1, 1994, by installing probes that monitor explosive gas towards the facility boundary and are located between the horizontal limits of solid waste placement and the facility boundary.

(I) Compliance monitoring.

- (1) Sampling frequency. The responsible party shall conduct explosive gas compliance monitoring in accordance with the following schedule:
- (a) For licensed solid waste landfill facility in operation on or after June 1, 1994:
- (i) Monthly prior to closure if any portion of the solid waste landfill facility is not lined with a flexible membrane liner.
 - (ii) Quarterly prior to closure if the solid waste landfill facility is lined with a flexible membrane liner.
 - (iii) Quarterly during the post closure care period.
- (b) For a solid waste landfill facility that ceased acceptance of waste prior to June 1, 1994, but after July 1, 1970, semiannually.
- (c) For a solid waste landfill facility regulated under Chapter 3745-29 or Chapter 3745-30 of the Administrative Code, one of the following:
- (i) Monthly prior to closure if any portion of the solid waste landfill facility is not lined with a flexible membrane liner.
 - (ii) Quarterly prior to closure if the solid waste landfill facility is lined with a flexible membrane liner.
 - (iii) Quarterly during the post closure care period.
- (d) At an alternate frequency specified by Ohio EPA in accordance with paragraph (J)(5) of this rule.
- (2) Operating record. For a licensed solid waste landfill facility in operation on or after June 1, 1994, the responsible party shall submit all EGMP certification reports, monitoring results, contingency reports, and revisions to the approved EGMP into the operating record in accordance with rule 3745-27-09 of the Administrative Code.

(J) Contingency monitoring.

- (1) The responsible party shall implement contingency monitoring upon discovery of either of the following gas concentrations:
 - (a) Five per cent methane by volume or one hundred per cent of the LEL at any probe or AMD.
 - (b) 1.25 per cent methane by volume or twenty-five per cent of the LEL in any occupied structure.
 - (2) Notifications. Upon discovery of gas concentrations exceeding a limit specified paragraph (J)(1) of this rule, the responsible party shall immediately notify the following:
 - (a) The owner of the occupied structure.
 - (b) The appropriate Ohio EPA district office and the local board of health.
 - (c) If the exceedance is in an occupied structure, the local fire department.
 - (3) Upon implementation of contingency monitoring, the responsible party shall do the following:
 - (a) Increase the monitoring frequency for each probe and AMD that exceed the LEL to a minimum of weekly unless otherwise directed by Ohio EPA.
 - (b) Submit the contingency monitoring results to Ohio EPA and the local board of health not later than seven days following each contingency monitoring event, unless otherwise directed by Ohio EPA.
 - (4) Cessation. The responsible party may cease contingency monitoring when a minimum of four sequential weekly monitoring events no longer exceed the limits specified in paragraph (J)(1) of this rule.
 - (5) Return to compliance monitoring. Upon cessation of contingency monitoring in accordance with this rule, the responsible party shall return to compliance monitoring at a frequency specified by Ohio EPA. The first compliance monitoring event shall occur not later than two months after cessation of contingency monitoring.
- (K) Remediation procedures. If directed by a notification from Ohio EPA pursuant to paragraph (A)(3)(b) of this rule or if the responsible party is unable to mitigate or abate explosive gas exceedances that are at the facility boundary and within one thousand feet of an occupied structure after four weeks of contingency monitoring, the responsible party shall prepare, submit, and implement a remediation plan as follows:
- (1) Remediation plan. The responsible party shall prepare and submit a remediation plan to Ohio EPA not later than thirty days after receipt of the notice pursuant to paragraph (A)(3)(b) of this rule or not later than thirty days after the initial four weeks of contingency monitoring, whichever is applicable. The responsible party shall ensure that the remediation plan contains an implementation schedule and describes how the formation and migration of explosive gas from the facility will be minimized or abated such that exceedances of the LEL at the facility boundary cease.
 - (2) The responsible party shall implement the remediation plan not later than thirty days after receipt of concurrence from Ohio EPA or in accordance with an alternative schedule authorized in writing by Ohio EPA.
 - (3) If the responsible party has implemented the remediation plan and not abated or minimized the formation and migration of explosive gas from the facility such that exceedances of the LEL at the facility boundary continue to occur, then the responsible party shall do the following:
 - (a) Submit a revised remediation plan not later than thirty days following notification from Ohio EPA that the remedy was not successful.

(b) Implement the revised remediation plan not later than fourteen days after receipt of written approval from Ohio EPA.

(4) Ohio EPA may condition a remediation plan or a revised remediation plan to address any deficiencies. The responsible party shall implement the conditioned remediation plan not later than thirty days after receipt of written approval or in accordance with an alternative schedule authorized in writing by Ohio EPA.

(L) Sampling procedures, calibration, and maintenance.

(1) Sampling procedures. When conducting monitoring, the responsible party shall sample all monitoring locations as follows:

(a) Probes and AMDs shall not be vented prior to sampling gas pressure or methane concentration.

(b) The gas monitoring equipment shall have a detection limit below one per cent methane by volume.

(c) For all probes and AMDs, the following information shall be recorded:

(i) Ambient barometric pressure.

(ii) Ambient air temperature.

(iii) Observed weather conditions.

(d) For probes, information shall be recorded in the following order:

(i) Gas pressure in the probe.

(ii) Peak combustible gas concentration in per cent methane by volume or in per cent LEL.

(iii) Depth to water from the top of casing.

(e) For AMDs, peak combustible gas concentration shall be recorded in per cent methane by volume or in per cent LEL.

(2) Calibration procedures. The responsible party shall maintain documentation of the calibration of explosive gas monitoring equipment and ensure that the gas monitoring equipment used to perform monitoring is properly calibrated per manufacturer's requirements not later than twenty-four hours prior to performing any sampling. The responsible party shall ensure the following:

(a) Any gases used to calibrate the gas monitoring equipment are not expired.

(b) The calibration gas concentration is between one per cent and five per cent methane by volume, or as specified by the manufacturer.

(3) Maintenance of explosive gas alarms. The responsible party shall maintain explosive gas alarms installed in occupied structures as follows:

(a) Calibrate and assess the performance of the explosive gas alarm at a minimum annually and submit documentation of the condition of each alarm and calibration results to Ohio EPA not later than thirty days after the calibration event.

(b) Replace each defective or non-functioning alarm not later than twenty-four hours after discovery that the alarm is not operating per the manufacturer's specifications.

- (c) Immediately notify the individuals identified in paragraph (J)(2) of this rule if an alarm indicates the presence of explosive gas at 1.25 per cent methane by volume or twenty-five per cent of the LEL within the occupied structure.

(M) Reporting.

- (1) Not later than fifteen days after the date of sampling, the responsible party shall submit the explosive gas sampling results to Ohio EPA and the local board of health on forms prescribed by the director. At a minimum, the results shall include the following:
 - (a) The identification designation for each probe and AMD sampled.
 - (b) The ambient barometric pressure, ambient air temperature, and observed weather conditions on the date of sampling.
 - (c) The concentration of methane in each probe and AMD sampled.
 - (d) Any additional information specified on the form or requested by Ohio EPA.
 - (2) An alternative form may be utilized by the responsible party if the alternative form contains all of the information specified in paragraph (M)(1) of this rule.
- (N) Upon the director's finding that explosive gas formation and migration threaten human health, safety or the environment, the director may order a responsible party to perform such measures to abate or minimize the formation or migration of explosive gas.
- (O) Cessation of explosive gas monitoring. The responsible party of a solid waste landfill facility that has completed post closure care may submit to the director a written request to cease explosive gas monitoring. The request shall demonstrate that gas formation and migration from the solid waste landfill facility is no longer a threat to human health, safety or the environment.

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