



SWMP Methane Gas Migration Procedure June 2011

Methane concentrations above 2.5% by volume at facility property lines is a violation of the Missouri Solid Waste Management Law and regulations. Methane gas concentrations between 5% and 15% by volume may be flammable or explosive. Although the landfill's regulatory point of compliance for methane gas is at the property line, some facilities have chosen to place their monitoring wells nearer to the waste mass. In the absence of gas wells at the property line, the SWMP considers the wells closer to the waste mass to be compliance wells and that is where the 2.5% methane regulatory limit applies. This provides a location for landfill staff to monitor to ensure methane is not migrating out away from the waste and toward adjoining properties. At a later date, if additional monitoring wells are placed farther out from the waste toward the property boundary, these new wells become the compliance wells, where the regulatory limit would then apply. Then the older wells that are closer to the waste would be considered sentry wells. The regulatory limit would no longer apply to these sentry wells and they would then serve as an early warning of gas migration.

Methane migration from landfills can be a serious problem, particularly in an area with occupied structures in the vicinity that could be affected by the migration. When this problem occurs, it requires immediate attention to ensure that methane generated by the decomposing waste does not endanger public health or safety. You should immediately notify potentially affected property owners and occupants of adjacent properties and work diligently and timely to correct the problem. These actions are expected by the general public, and both the SWMP and the regulated community are obligated to provide assurance that these actions are performed.

In order to ensure that citizens are protected from methane migration, we must work cooperatively and quickly to address these violations. The SWMP would like to take this opportunity to inform you of the process the SWMP will follow to address methane migration violations. Actions required as part of this process are discussed in the paragraphs below.

Notification and Initial Actions in Response to the Migration

When you discover methane in excess of 2.5% by volume in any compliance well, you are required to immediately notify the SWMP. Please ensure this notification includes direct contact via telephone with a SWMP representative in Jefferson City in addition to a submission of the gas monitoring results to the SW Gas Monitoring Database (swgasmon@dnr.mo.gov). The SWMP will officially document the existence of the

violation by the issuance of a Notice of Violation (NOV). In addition to issuing an NOV to document the violation, the SWMP will send a letter requesting the landfill initiate a public notification process. The process is started with the landfill notifying all owners of properties within 1000 feet of any noncompliant gas well and advising them of the potential for gas migration. The notification process is done to ensure that nearby residents, businesses, and property owners are aware of the potential presence of methane gas on their properties so they may implement necessary safety precautions. While you are conducting notifications, the SWMP will determine, on a case by case basis, if a press release is required to better ensure all necessary parties are made aware of the potential for methane migration from the landfill. Generally, if a facility documents that all appropriate notifications have been made with the public and local officials as noted above, the SWMP will not issue a press release. Other factors SWMP will consider is proximity of residents/off site structures, responsiveness of the facility, intensity of the gas well readings and the number of wells with readings above the regulatory limit.

The SWMP will also require you to conduct methane monitoring in structures within 1000 feet of any noncompliant gas well and/or install methane detectors in these structures. If detectors are installed, you should instruct the public on what to do if a detector sounds an alarm and post a list of instructions next to the detector that reminds the occupants what to do if the detector goes off. We have observed that landfill staff often implement these actions immediately and voluntarily to protect public health and safety.

Within seven days of detection of methane above 2.5% by volume in any compliance well, you must submit a report to the SWMP. The report should document all notification and protective actions landfill representatives have taken to ensure property owners and occupants of structures within 1000 feet are aware of the potential for gas migration and confirm that the representatives have discussed with them contingency plans if any methane detectors installed in structures sound an alarm.

Once you have taken steps to immediately protect public health and safety, you must then investigate and correct the methane migration. To ensure continued safety of the public and to begin the migration investigation process, the frequency of compliance well monitoring is increased from a quarterly to a weekly basis. Weekly monitoring will be required for all compliance wells as long as they continue to have methane concentrations above 2.5% by volume. Once any compliance well ceases showing readings above 2.5% for four weeks, you may submit a written request to the SWMP to reduce the frequency from weekly to monthly for those monitoring wells that are in compliance. However, each time a designated compliance well has a recurring methane concentration above 2.5% by volume, the monitoring frequency will again return to a weekly basis to ensure you focus your attention in this area and note the direction of travel of the methane and respond accordingly to address this problem. The final requirement of the notification process is for the landfill owner/operator to submit a corrective action plan that addresses and stops the migration and returns all wells to compliance. This plan must be submitted to the SWMP within 60 days of detection of any compliance well exceeding the regulatory limit of 2.5% by volume methane.

A list of the Notification and Initial Actions discussed above is enclosed with this letter for your reference and use. Details are provided for each step you are asked to take during this process. The SWMP will also be in close contact with you and your representatives throughout the notification process to better communicate with you and coordinate actions taken to address the methane migration.

Investigation, Corrective Actions, and Resolution of Violation(s)

In order to address the methane migration, you must determine the source and pathway of the migration to be able to prevent a reoccurrence. This requires an investigation of the migration. During the investigation, you may be required to install additional temporary monitoring wells (investigative wells) on either side of the non-compliant wells to fully characterize and determine the lateral (or horizontal) extent of the migration. The level of investigation required is site-specific and dependent on many different factors such hydrologic, geologic, and topographic conditions. As the steps involved with investigating and implementing corrective actions often take a protracted period of time to complete, the timeline(s) for plan submittal and implementation of these actions must be addressed through a Settlement Agreement with the SWMP's Compliance/ Enforcement Section. This agreement will resolve the landfill's violation(s) of the Solid Waste Management Law and regulations by establishing a compliance schedule in which to perform corrective actions and paying monetary penalties. The agreement assures the SWMP and the public that landfill owner/operators are dedicated to resolving the violation(s) and will remain diligent in their actions to correct the problem. The SWMP assesses monetary penalties to ensure corrective actions are taken in a timely manner. Deadlines for various actions are often tied to stipulated or suspended penalties to ensure their completion.

There have been some questions posed to the SWMP regarding the need to issue a Notice of Violation and initiate enforcement action for facilities that have already been taking actions to stop the migrations. Although many landfill owners/operators have taken some steps to prevent migration from occurring at their facilities, concentrations of methane above the regulatory limit continue to be measured in the wells. The owners or residents on properties adjacent to or near the landfill need the assurance that there is accountability and a mechanism in place to ensure that landfill representatives implement timely corrective actions and stop methane migration. Documenting a violation and incorporating terms to resolve the migration into a settlement agreement demonstrates to the public the Department and landfill owners/operators are committed to a timely resolution. This is extremely important to a property owner or building occupant that may be impacted by methane migration, who expect the facilities to take all steps necessary to minimize any potential danger and resolve the problem as quickly as possible. These agreements demonstrate to the public a high level of commitment by you, as well, to complete corrective actions within a reasonable time frame.

Once the corrective actions implemented by the facilities have stopped the migration from occurring and all wells have returned to compliance, the monitoring frequencies

may be decreased. You must submit a written request to the SWMP to reduce the monitoring frequency and receive our approval prior to reducing your monitoring efforts. When methane concentrations detected in the compliance wells are found to be within the regulatory limits after one year, the wells will be considered “clean”. At this point, the terms of the Settlement Agreement concerning the migration will be met, and the enforcement action closed.

NOTIFICATION, INVESTIGATION, AND CORRECTIVE ACTIONS TAKEN IN RESPONSE TO METHANE MIGRATION

Per the Methane Gas Violation Procedure and the Missouri Solid Waste Management Law and regulations, the SWMP will send you a letter directing you to take the following actions when methane is measured in concentrations above 2.5% by volume in any compliance well:

- Immediately notify the local fire department and any other relevant local emergency management agencies of the elevated methane concentrations in the compliance well(s), the potential for methane migration off-site, and the associated potential threat to occupants of neighboring properties.
- Immediately notify adjacent property owners and occupants of neighboring structures (whether structures are present, or not, on the property). At a minimum, you must notify owners/occupants within 1000 feet of the compliance monitoring well(s) that exceeded the regulatory limit of 2.5% methane by volume, unless you can provide a rationale and justification for reducing this notification area (i.e. prove that gas migration is not occurring or cannot occur beyond a given area). The SWMP has an example of a notification letter to send to the owners and occupants. You may use the SWMP's example letter or create your own letter of notification that provides the same information as the SWMP's letter.
- Immediately notify utility companies that have enclosed or underground infrastructure within 1000 feet of the compliance monitoring well(s) that exceeded 2.5% methane by volume methane.
- When contact is made with owners/occupants of structures within 1000 feet of the compliance wells, offer to monitor all occupied structures for the presence of methane.
- When contact is made with owners/occupants of structures within 1000 feet of the compliance wells, offer to install methane detectors in these structures. If you install methane detectors in any occupied structures, you must provide an instruction sheet to the occupant of the structure. The instruction sheet must advise occupants on what to do in the event that the detector sounds an alarm. The SWMP also has an example of an instruction sheet. You may use the SWMP's example sheet or create one of your own that provides the same information to the occupant(s).
- Within seven (7) days of detection of methane in excess of regulatory requirements in a compliance well, you must submit a report to the SWMP that describes the steps you have taken to protect public health and safety, including a list of people that had been notified, how notification occurred (by letter, in

person, by telephone, etc.), and provide to the SWMP copies of letters/documents sent to neighboring properties owners, local governmental agencies, or local emergency planning departments.

- Once any monitoring of structures and installation of detectors has been completed, you must promptly provide to the SWMP documentation describing when and where the monitoring of structures occurred, the results from that monitoring, and when and where methane detectors were installed, if any were installed. You must provide a copy or copies of any instruction sheets provided to structure owners and occupants to guide them in case a methane detector sounded an alarm.
- Conduct weekly gas monitoring at all compliance wells (and any wells installed off-site as public safety wells) and submit the monitoring results to swgasmon@dnr.mo.gov on a weekly basis. Weekly monitoring will be required for compliance wells as long as they continue to have methane concentrations above 2.5% by volume. Once any compliance well ceases showing readings above 2.5% for four weeks, you may submit a written request to reduce the frequency of monitoring to monthly. However, each time a compliance well has a recurring methane concentration above 2.5% by volume; the monitoring frequency will again return to weekly basis to ensure that you remain aware of the direction of travel of the methane and respond accordingly to address this problem.
- Within 60 days of detection of methane in excess of regulatory requirements in a compliance well, you must submit of a landfill gas corrective action and remedial plan for review and approval by the SWMP. The proposed plan must be designed to actively prevent off-site migration of methane from the landfill and protect public health and safety.