



## **RECOMMENDED PRACTICES: Responding to Stray Gas Incidents**

# RECOMMENDED PRACTICES: Responding to Stray Gas Incidents

## 1.1 Purpose

These recommended practices address relevant considerations and guidelines for Responding to Stray Gas Incidents in oil and natural gas exploration and development areas. These recommended practices support our *Guiding Principles*.

## 1.2 Background

For the purpose of this document, “stray gas” is defined as the migration of natural gas into groundwater, surface water, soil, or a structure, resulting in a change from previous conditions.

There are numerous potential sources of stray gas, including coal beds, oil and gas wells, landfills, pipelines and microbial gas. There are also areas throughout the United States where naturally occurring methane gas is present in shallow aquifers frequently used as water supplies for private land owners. This has been well documented for decades in portions of the Appalachian basin.

Stray gas migration can be influenced by a variety of factors, such as:

- Changes in barometric pressure
- Soil and bedrock porosity, permeability
- Soil pore-space water
- Temperature contrasts
- Other weather conditions such as precipitation (rain or snow) or ground cover (e.g. a layer of snow or frozen ground)

## Safety-critical Tasks and Response Protocol

### 2.1 Notification

Upon notification of a potential stray gas incident, initial response actions will be required by the oil and gas operator, including a site visit, interviews and a reconnaissance survey. Initial response actions should be conducted as soon as possible after receiving notification.

### 2.2 Priorities

Top priorities to consider in a stray gas incident are safety of the public, safety of employees and protection against damage to property and the environment. Lines of communication should be maintained by the operator and should include emergency responders, regulatory agencies, landowners / occupants and other relevant public representatives.

### 2.3 Initial Response Actions

For the most critical situations where immediate hazards may exist from the presence of stray gas, immediate action should be taken to protect public safety and property. These measures may include evacuation and/or ventilation procedures. Because operators do not have the authority to initiate an evacuation, notification and cooperation with local emergency response organizations is critical.

For all situations, the appropriate action to protect public safety and property should be determined, and the notification and reporting requirements of the regulatory agency should be followed to ensure effective response. Early and frequent interaction with the appropriate regulatory agency is a critical component of an effective response to and mitigation of a stray gas incident. Ongoing communication with the property owner or occupant is equally important.

### 2.4 Initial Site Reconnaissance Survey

As applicable, the operator should undertake stray gas monitoring surveys of buildings, structures, water wells, soils and potential migration pathways (e.g., utility lines, drains, vaults, etc). These initial monitoring points and associated findings should be accurately described and documented.

### 2.5 Action Plan

An action plan should be developed based on the findings from the initial response. The timing for this and the plan itself must be consistent with regulatory requirements. This may involve immediate mitigation measures and the initiation of a formal investigation by appropriately trained personnel. Investigations may include defining the areal extent of stray gas, as well as efforts to identify the gas origin and potential sources, and potential mechanisms or pathways of migration. This may involve collection of samples of gas from potential sources for molecular and isotopic analyses as appropriate.

### 2.6 Initial Mitigation Measures

The following initial mitigation measures should be considered for the protection of public health and safety. It is advisable to consult with the regulatory agency when evaluating options.

- Where stray gas migration has the potential to impact buildings, structures or public health and safety, evaluate options for safely venting the methane. Methane-specific gas alarms may be installed in buildings and structures where stray gas has been detected, and in buildings and structures that may be at risk.
- Sustained concentrations of stray gas in the head space of water wells may be addressed by the installation of well vents. Vents should be constructed taking into consideration site-specific conditions.
- In the event that dissolved methane is a concern in the water source servicing a building or structure, consideration should be given to disconnecting the water source. The operator should consider providing an alternate water source.

### 2.7 Corrective Actions

Data from the investigation should be evaluated to determine whether the operator may have contributed to the stray gas migration. If so, corrective action(s) should be taken to resolve it, incorporating regulatory requirements in the action plan, as applicable. Post-remediation response actions may include long-term monitoring, further definition of the source, long-term trend analysis, refinement of mitigation measures and additional remedial work.

## Closure

### 3.1 Documentation

Documenting the findings and conclusions of a stray gas incident is a recommended practice. This may also be a requirement of the regulatory agency.

### 3.2 Regulatory Agency Agreement and Closure

If at any time during the response to a stray gas incident the investigation reveals that the origin of the stray gas is not related to an oil and gas well or associated operations, a report may be submitted to the regulatory agency to close out the incident. In the event that the operator may have contributed to the stray gas migration, the operator may document its findings, submit a closure report including curative measures and request approval from the regulatory agency to close the stray gas incident.

*This document provides general guidance on recommended practices for the subject(s) addressed. It is offered as a reference aid and is designed to assist industry professionals in improving their effectiveness. It is not intended to establish or impose binding requirements. Nothing herein constitutes, is intended to constitute, or shall be deemed to constitute the setting or determination of legal standards of care in the performance of the subject activities. The foregoing disclaimers apply to this document notwithstanding any expressions or terms in the text that may conflict or appear to conflict with the foregoing.*



24 Summit Park Drive • 2nd Fl. • Pittsburgh PA 15275  
412.706.5160 • [www.MarcellusCoalition.org](http://www.MarcellusCoalition.org)

MSC RP 2012-4 October 16, 2012