TR 23-16 – Ventilation Measures

2025 – July 9 – Editorial Section
Approved revisions to G-192-11 and 11A, and 1 edit in G-192-11A from DP/ER TG. **Ready for Public Review**.

TR Number	**23-16**
Primary Reference	GMA G-192-11 5.5(e)(1)
Secondary Reference	GMA G-192-11A 5.5(e)(1)
Purpose	Review and revise or develop GM where appropriate to address ventilation of buildings and other enclosed spaces when gas readings above the LEL are discovered.
Origin/Rationale	Approval with Comment in LB2-2023 for TR2021-23: It seems as though SOMEBODY ought to ventilate a building if gas readings exceed the LEL, otherwise the gas readings will continue to be above the LEL. Hopefully there will be a new TR taken to address this important issue. This comment also applies to G-192-11A(5.5)(e)(1). (The ventilation language was removed from revisions of GMA G-192-11 5.5(e)(1) and GMA G-192-11A 5.5(e)(1) to resolve a Disapproval in LB1-2023.)
Assigned to	DPER

Note: *Revisions are shown in yellow highlight and red font.*

GMA G-192-11

GUIDE MATERIAL APPENDIX G-192-11

(See guide material under §§192.3, 192.503, 192.557, 192.615, 192.703, 192.706, 192.723, and 192.941)

GAS LEAKAGE CONTROL GUIDELINES
FOR NATURAL GAS SYSTEMS
(METHANE)

(See Guide Material Appendix G-192-11A for petroleum gas systems)

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7 PINPOINTING

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GUIDE MATERIAL APPENDIX G-192-11

(See guide material under §§192.3, 192.503, 192.557, 192.615, 192.703, 192.706, 192.723, and 192.941)

GAS LEAKAGE CONTROL GUIDELINES FOR NATURAL GAS SYSTEMS (METHANE)

(See Guide Material Appendix G-192-11A for petroleum gas systems)

1 SCOPE

...

5 LEAK INVESTIGATION AND CLASSIFICATION

5.1 Scope.

...

5.2 Procedural Guidance – General.

(a) The following guide material is not intended to be step by step procedure in responding to leak calls but is intended to assist operators in developing their own written procedures. Certain actions may be initiated ahead of other action items based on conditions at the leak location.

(b) There are situations that warrant entering a building before checking the extent of gas migration. These situations might include the following.

(1) Broken main, service line, or customer owned fuel line.
(2) Gas blowing out of the ground.
(3) Hissing, roaring, or other sounds indicating gas leakage.
(4) Noticeable odor levels upon entry of a building.
(5) Noticeable odor levels outside a building.
(6) Gas in multiple underground structures that are normally connected by ducts or piping to houses, especially when the gas readings are high.
(7) Inside odor reports in an area of underground leakage or coincident with outside odor reports.

Note: *If a gas reading at or above hazardous concentration level or an operator established criteria is detected, the operator should consider evacuating the structure. Calling for additional resources might be necessary based on the type of building involved in the leak call (e.g., hospital, school, commercial building). The operator should also consider shutting down the gas supply upstream of the identified leak location to stop the flow of gas into the ground where an underground gas migration may cause an imminent safety threat.* For additional guide material, see 5.5 below.

...

(i) If a leak investigation is conducted where non-typical soil conditions exist, see ~~5.5~~ 5.6 below.

5.3 Procedural Guidance – Outside underground leak.

5.4 Procedural Guidance – Inside leak or odor complaint.

...

(h) Using a CGI, test around the entry door for gas indications. Do not ring the doorbell; knock on the door to get the attention of occupants. Upon entry do not operate any lights~~,~~ but do take appropriate precautions to prevent accidental ignition. Immediately sample the inside atmosphere for the presence of a combustible gas. Natural gas is lighter than air and will accumulate near ceilings or in higher floors. Petroleum gas is heavier than air and will accumulate in the low atmosphere. If a gas reading at or above a hazardous concentration or an operator-established criteria is detected, the operator should consider evacuating the structure (see 5.5 below). Calling for additional resources might be necessary based on the type of building involved in the leak call (e.g., hospital, school, commercial building).

Note: *If gas is detected, the applicable portions of the operator's emergency procedures need to be implemented* (§192.615(a)(3)).

...

5.5 *Procedural Guidance – Ventilating a Building where the Combustible Gas or Vapor is in or above the Flammable Range.*

Combustible gas or vapor present inside a building in or above the flammable range is an ~~unstable and~~ unsafe condition. Ensuring the safety of the people involved is paramount while attempting to protect the structure. The applicable portions of the operator's emergency procedures must be implemented (§192.615(a)(3)).

(a) Based on the type of building and conditions at the scene, it may not be feasible to vent the combustible gas or vapor from the building. In these situations, it may be necessary to eliminate sources of ignition, terminate the gas supply from outside the building, secure the area, and allow the gas or vapor to vent from the building through natural means.

(b) If it is decided that the building must be ventilated to lower the combustible levels inside the building, the operator should consider the following.

(1) Specific gas involved.
(2) Type and nature of the building involved.
(3) Identification of the source of the combustible gas or vapor.
(4) Ability to terminate the supply of combustible gas or vapor entering the building.
(5) Whether the building has been evacuated.
(6) Whether sources of ignition are present and if they can be eliminated or controlled.
(7) Whether combustible levels inside the building can be monitored.
(8) Whether first responders, fire departments, emergency medical technicians, and law enforcement are present.

(c) Secure the area perimeter and create a safety zone where only personnel directly involved in the "make safe" activities are allowed to be near the building (see 1.2(b) of the guide material under §192.615).

(1) If fire safety personnel are not directly involved in the venting of the building, position them a safe distance upwind of the building and the source of the combustible gas or vapor.
(2) Keep anyone not directly involved in the "make safe" work activities away from the safety zone. This would include personnel from other utilities, contractors, the public, and the media.
(3) Based on conditions at the scene, operators should determine what would be a reasonable "safety zone" to protect personnel not directly engaged in the work activities.

(d) Establish a plan to ventilate the building involved.

(1) Evaluate the risk of ~~putting~~ placing operator personnel near the building to be ventilated.
(2) If possible, terminate the supply of combustible gas or vapor entering the building.
(3) Determine if the building can be ventilated by opening doors and windows. If opening doors and windows is not possible or is insufficient, breaking windows and knocking doors down might be required.
(4) Determine if approved air-moving equipment can be used to increase the ventilation process.
(5) Continuously monitor conditions in the building until combustible levels are below the lower flammable level for the gas or vapor involved.

(e) If the local fire department is, by ordinance or by mutual agreement, responsible for ventilating a building with elevated combustible gas readings, ~~it~~ the operator may then become~~s~~ ~~the responsibility of the operator to~~ responsible for providing the fire service personnel with necessary support and assistance during the ventilation process (§192.615(a)(2)).

Note: If the local fire service is involved in the ventilation process, they may establish safety zones that differ from those established by the operator.

5.~~5~~6 *Procedural Guidance – Leak investigation and emergency response where non-typical soil conditions exist.*

Note: *See 5.2, 5.3, and 5.4 above for standard leak investigation procedures.*

(a) ...

...

(e) Ventilate, evacuate, monitor, and isolate.

If buildings are in the suspected area of migration, consider:

(1) Following operator written procedures regarding emergency response, including use of ventilation or evacuation. If detected gas readings are in the flammable range or above, ventilation may not be an option (see 5.5 above).
(2) Installing ventilation trenches between the suspected source and adjacent buildings.
...
(6) Isolating gas supply to the area until conditions improve and resources are available to do a more thorough investigation (e.g., pinpointing, isolation, pressure testing).

5.~~6~~7 Leak grades. ...
5.~~7~~8 Leak classification and action criteria. ...
5.~~8~~9 Temporary mitigative measures for Grade 1 leaks. ...
5.~~9~~10 Follow-up inspection. ...
5.~~10~~11 Reevaluation of a leak. ...
…

GMA G-192-11A

GUIDE MATERIAL APPENDIX G-192-11A

(See guide material under §§192.3, 192.11, 192.503, 192.557, 192.615, 192.703 and 192.723)

GAS LEAKAGE CONTROL GUIDELINES FOR PETROLEUM GAS SYSTEMS

(See Guide Material Appendix G-192-11 for natural gas systems)

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GUIDE MATERIAL APPENDIX G-192-11A

(See guide material under §§192.3, 192.11, 192.503, 192.557, 192.615, 192.703 and 192.723)

GAS LEAKAGE CONTROL GUIDELINES FOR PETROLEUM GAS SYSTEMS

(See Guide Material Appendix G-192-11 for natural gas systems)

1 SCOPE
2 GENERAL DISCUSSION
…
5 LEAK INVESTIGATION AND CLASSIFICATION
5.1 Scope.
5.2 Procedural Guidance – General.

(a) ...
(b) ...
(c) There are situations that warrant entering a building before checking the extent of gas migration. These situations might include the following.
(1) Broken main, service line, or customer owned fuel line.
(2) Gas blowing out of the ground.
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(5) Noticeable odor levels outside a building.
(6) Gas in multiple underground structures that are normally connected by ducts or piping to houses, especially when the gas readings are high.
(7) Inside odor reports in an area of underground leakage or coincident with outside odor reports.

Note: *If a gas reading at or above hazardous concentration level or an operator established criteria is detected, the operator should consider evacuating the structure. Calling for additional resources might be necessary based on the type of building involved in the leak call (e.g., hospital, school, commercial building). The operator should also consider shutting down the gas supply upstream of the identified leak location to stop the flow of gas into the ground where an underground gas migration may cause an imminent safety threat. For additional guide material, see 5.5 below.*

(d) ...
...

5.3 Procedural Guidance – Outside underground leak.
5.4 Procedural Guidance – Inside leak or odor complaint.

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(h) Using a CGI, test around the entry door for gas indications. Do not ring the doorbell; knock on the door to get the attention of occupants. Upon entry do not operate any lights, but do take appropriate precautions to prevent accidental ignition. Immediately sample the inside atmosphere for the presence of a combustible gas. Petroleum gas is heavier than air and will accumulate in the low atmosphere. If a gas reading at or above a hazardous concentration or an operator-established criteria is detected, the operator should consider evacuating the structure (see 5.5 below). Calling for additional resources might be necessary based on the type of building involved in the leak call (e.g., hospital, school, commercial building).
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Combustible gas or vapor present inside a building in or above the flammable range is an ~~unstable~~ and unsafe condition. Ensuring the safety of the people involved is paramount while attempting to protect the structure. The applicable portions of the operator's emergency procedures need to be implemented (§192.615(a)(3)).

(a) Based on the type of building and conditions at the scene, it may not be feasible to vent the combustible gas or vapor from the building. In these situations, it may be necessary to eliminate

sources of ignition, terminate the gas supply from outside the building, secure the area, and allow the gas or vapor to vent from the building through natural means.

(b) If it is decided that the building must be ventilated to lower the combustible levels inside the building, the operator should consider the following.
- (1) Specific gas involved.
- (2) Type and nature of the building involved.
- (3) Identification of the source of the combustible gas or vapor.
- (4) Ability to terminate the supply of combustible gas or vapor entering the building.
- (5) Whether the building has been evacuated.
- (6) Whether sources of ignition are present and if they can be eliminated or controlled.
- (7) Whether combustible levels inside the building can be monitored.
- (8) Whether first responders, fire departments, emergency medical technicians, and law enforcement are present.

(c) Secure the area perimeter and create a safety zone where only personnel directly involved in the "make safe" activities are allowed to be near the building (see guide material 1.2(b) under §192.615).
- (1) If fire safety personnel are not directly involved in the venting of the building, position them a safe distance upwind of the building and the source of the combustible gas or vapor.
- (2) Keep anyone not directly involved in the "make safe" work activities away from the safety zone. This would include personnel from other utilities, contractors, the public, and the media.
- (3) Based on conditions at the scene, operators should determine what would be a reasonable "safety zone" to protect personnel not directly engaged in the work activities.

(d) Establish a plan to ventilate the building involved.
- (1) Evaluate the risk of ~~putting~~ placing operator personnel near the building to be ventilated.
- (2) If possible, terminate the supply of combustible gas or vapor entering the building.
- (3) Determine if the building can be ventilated by opening doors and windows. If opening doors and windows is not possible or is insufficient, breaking windows and knocking doors down might be required.
- (4) Determine if approved air-moving equipment can be used to increase the ventilation process.
- (5) Continuously monitor conditions in the building until combustible levels are below the lower flammable level for the gas or vapor involved.

(e) If the local fire department is, by ordinance or by mutual agreement, responsible for ventilating a building with elevated combustible gas readings, ~~it~~ the operator may then become~~s~~ ~~the responsibility of the operator to~~ responsible for providing the fire service personnel with necessary support and assistance during the ventilation process (§192.615(a)(2)).
Note: If the local fire service is involved in the ventilation process, they may establish safety zones that differ from those established by the operator.

5.~~5~~6 *Procedural Guidance – Leak investigation and emergency response where non-typical soil conditions exist.*
Note: *See 5.2, 5.3, and 5.4 above for standard leak investigation procedures.*
(a) ...
...
(e) Ventilate, evacuate, monitor, and isolate.
If buildings are in the suspected area of migration, consider:
- (2) Following operator written procedures regarding emergency response, including use of ventilation or evacuation. If detected gas readings are in the flammable range or above, ventilation may not be an option (see 5.5 above).
- (2) Installing ventilation trenches between the suspected source and adjacent buildings.
- (3) Aspirating gas from the ground.
- ...
- (6) Isolating gas supply to the area until conditions improve and resources are available to do a more thorough investigation (e.g., pinpointing, isolation, pressure testing).

5.~~6~~7 *Leak grades. ...*
5.~~7~~8 *Leak classification and action criteria. ...*
5.~~8~~9 *Temporary mitigative measures for Grade 1 leaks. ...*
5.~~9~~10 *Follow-up inspection. ...*
5.~~10~~11 *Reevaluation of a leak. ...*
...