



## Operations and Maintenance Procedures

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O&M Section # 12 & 18	SCUD Task # 230 & 240
Section: Emergency	Revision Date: 09/06/16

### Outside Gas Leak Investigation

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#### **SCOPE AND PURPOSE**

This procedure is to provide personnel performing outside leak investigations with the necessary procedures for prompt and effective response and to protect life and property as required by §192.615.

#### **RESPONSIBILITY**

The Underground Maintenance Supervisor, Measurement Supervisor, Service Department Supervisor, or other designee, is responsible to ensure that outside leak investigations are performed as soon as possible and as described in this procedure.

#### **PERSONNEL SAFETY (Where Applicable)**

- The first person to respond to a report of gas odor shall take every necessary action to **protect life and property**.
- Turnout gear must be worn when in a gas atmosphere greater than 2% or near blowing gas.
- No open flames.
- No smoking.
- Knock on the door, DO NOT ring the doorbell.
- Establish a safety perimeter to prevent unauthorized personnel from entering the area.
- Use the required safety equipment.

#### **EQUIPMENT AND MATERIALS**

Gas Detection Equipment  
Combustible Gas Indicator (CGI) - Shows gas readings in percent (%) gas, LEL or UEL  
Flame Ionization (FI) Unit  
Probe Rod  
Locator  
Maps & Other Records (If Available)  
Communication method (Radio, Cell Phone, etc)  
Other Equipment and Materials as Needed

#### **OPERATOR QUALIFICATION**

This activity is a covered task under the Operator Qualification Plan and may only be performed by or directed and observed by an individual who is currently qualified to perform outside leak investigations. Refer to the OQ Plan for specific qualification requirements.

#### **MAINTENANCE & OPERATION OF INSTRUMENTS**

Each instrument used for leak detection and evaluation shall be operated in accordance with the manufacturer's recommended operating instructions. Turn on and zero equipment in gas free air.

#### **CALIBRATION OF INSTRUMENTS**

Each instrument used for leak detection and evaluation shall be calibrated in accordance with the manufacturer's recommended calibration instructions.

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#### **ADDITIONAL GUIDANCE & ACTION CRITERIA**

When performing outside leak investigations, or when evaluating any gas leak indication, the initial step is to determine if a leak is present, and then establish the grade/severity and perimeter of the leak area considering the following:

- Identify gas meters and regulators in the leak area.
- Identify customer owned outside gas appliances and plumbing
- If possible, locate all gas lines in the vicinity of the leak investigation. Particular attention should be paid to the location of valves, fittings, tees, stubs, and connections.
- If possible, all foreign facilities in the area of the search should be identified.
- Personnel should look for evidence of recent construction activities that may have contributed to the leakage.
- Gas may also migrate and vent along a trench or bore-hole provided for other facilities. Leaks could occur at the intersection of the foreign facility and the gas pipeline; particular attention should be given to those intersections.
- All leaks found must be graded based on the location and/or magnitude and/or migration of the leak. The migration of gas shall be determined by establishing the outer boundaries of the indications, using a CGI.
  1. Leaks shall then be graded in accordance with the SCUD leak classification criteria (see ***SCUD Procedure # MAINT015 – Leak Grading Criteria***). The judgment of the personnel at the scene is of the primary importance in determining the grade assigned to the leak.
  2. **Note: Underground leaks must be graded using a CGI.**
  3. All leaks shall be repaired / monitored according to the SCUD leak classification and action criteria (see ***SCUD Procedure # MAINT015 – Leak Grading Criteria***).
  4. When a leak is to be re-evaluated, it shall be re-evaluated and classified using the same procedure that was used in the initial classification of the leak.

#### **PRECAUTIONS**

- Caution should also be exercised to prevent damage to gas pipelines and other underground structures when bar-holing or excavating.
- Situations that may complicate investigation techniques include, but not limited to:
  - Multiple leaks
  - Gas pressure
  - Rain
  - Wind
  - Type and depth of cover
  - Frozen ground
  - Foreign gases
  - Gas detected in storm-drain or sewer systems
  - Gas detected in telephone or other duct runs
    - These indications should be considered migrating gas leakage until proven otherwise by test or analysis.

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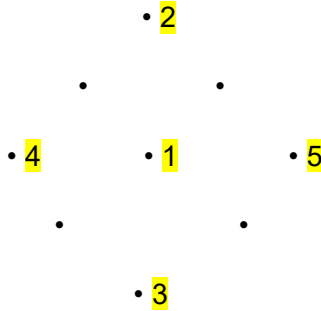
#### **INSTRUCTIONS**

- a. While approaching the area of a suspected outside gas leak, observe the area for obvious signs of a gas leak in the area (use sight, smell, and hearing), including, but not limited to:
  - Dead or dying grass, shrubs, or trees
  - Absence of growth in paving cracks
  - Cracked or crusted soil, or mildewed soil
  - Absence of grass overhang on curbing or walkways
  - Odor of gas
  - Sound of escaping gas
- b. Interview the individual(s) that reported the odor, if they are available. Begin the leak investigation in the area where the individual(s) reported the leak, if given.
- c. Check any aboveground facilities for leaks, such as, but not limited to, meter sets and regulator stations. If a leak is found, contact the Measurement Department Supervisor or his appointee.
- d. Check customer owned outside gas plumbing and appliances. If a leak is found, contact the Service Department Supervisor or his appointee. Hazardous leaks must be made safe by isolating the gas line and eliminating the leak or by repairing the leak. The customer should be advised in writing of all leaks and any action taken.
- e. Check around the perimeter/foundation edge of any structure in which gas could likely migrate for the presence of a gas leak, if applicable.
- f. If a check of the outside of a building or other structure indicates the presence of gas near or under a building or other structure or along the edge of the foundation:
  1. Contact the Underground Maintenance Supervisor or his appointee.
  2. Begin taking action as described in ***SCUD Procedure # EMER001 – Inside Leak Investigation.***
  3. If possible, expose the area around the service riser, open water meter boxes and other available openings to allow the gas to escape to the atmosphere. Care must be taken to make these openings safe for the public and to **AVOID IGNITION.**
- g. Perform underground leak investigations of any underground gas mains and services in the area.
- h. Check water, sewer, storm water, electric, and telephone structures such as water meter boxes, manholes, catch basins, sewer clean-outs, and junction boxes
- i. Check cracks and edges of driveway, sidewalk and road.
- j. Check recent excavation and construction sites in the leak area
- k. If an underground leak is found away from a structure/s, the perimeter of the structure/s must be monitored to verify that gas is not migrating close to any buildings or other structures where gas could likely accumulate.
- l. Bar-holing should begin around the perimeter of any structure in which the gas could likely migrate along the edge of the foundation and obtain readings using a CGI (Refer to your company's leak grading standards for the grading of leaks).
  - **Note: Only those instruments designed to register the % of gas-in-air may be used for grading leaks. Instruments that give audible or visual alarms for gas leaks but do not provide % of gas-in-air may not be used for grading leaks.**
- m. Consideration should also be given to bar-holing along nearby neighboring structures and utilities, especially if the leak investigation is revealing no presence of a gas leak at the present location.
- n. If gas is detected, the leak must be centered and pinpointed. The first step is to **center** the gas leak to determine the spread area in ALL DIRECTIONS. A minimum of five (5) bar-holes should be used forming a diamond pattern with a bar-hole in the middle of it. More holes may be used.

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The bar-holes must be the same size and depth. If possible the depth of the bar-holes should be the depth of the pipe.



- If the leak area is away from the gas line, start where the highest gas reading was found. Place a bar-hole there or use an existing bar-hole with the highest reading. This is bar-hole number one (#1). Place a bar-hole in front and behind bar-hole number one (#1). Then place a bar-hole to the left and right of bar-hole number (#1). The bar-holes may be eleven (11) to fourteen (14) feet apart when centering the leak. Find the bar-hole with the highest reading. This now becomes bar-hole number one (#1). Repeat the process until the bar-hole in the center of a diamond pattern is the highest reading.
- If the leak area is near a gas line, the first three (3) bar-holes must be placed as close to the gas pipe as possible. The first bar-hole (#1) should be placed where data indicates the leak should be. An example is if the highest reading or odor is three (3) feet from the service tap, the first bar-hole (#1) should be placed next to the service tap or any other known fittings. The other two (2) bar-holes should be placed eleven (11) to fourteen (14) feet apart in front and behind the first (#1) bar-hole and as close to the gas line as possible. The fourth and fifth bar-holes should be placed to the right and left of the first (#1) bar-hole. Follow the direction of the highest reading to determine where to place other bar-holes. Use the same process and pattern until the highest reading is found in the center bar-hole of a diamond pattern.
- **For Pinpointing**, the same process is used but the bar-holes are closer together (approximately three (3) to five (5) feet apart).

**REPORTING/NOTIFICATION**

The SCUD employee shall complete documentation in accordance with the Operation and Maintenance Manual. SCUD utilizes electronic forms to record and maintain all leaks. The proper electronic form for each leak shall be completed.

**ABNORMAL OPERATING CONDITIONS**

<b>AOC Main Category</b> (Examples of Specific AOCs)	<b>Reactions to AOC, as appropriate</b>	
<b><i>Unplanned escape of product from a pipeline</i></b>	➤ Protect life & Property ➤ Prevent accidental ignition	➤ Locate source/cause of AOC ➤ Use appropriate PPE

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<ul style="list-style-type: none"> <li>• Blowing/Escaping gas/Grade I leak</li> </ul>	<ul style="list-style-type: none"> <li>➤ Notify appropriate personnel</li> <li>➤ Notify Fire/Emergency Responders</li> <li>➤ Initiate Emergency Plan</li> </ul>	<ul style="list-style-type: none"> <li>➤ Stop gas flow</li> <li>➤ Make repairs/eliminate AOC</li> </ul>
<p><b>Fire or Explosion</b></p> <ul style="list-style-type: none"> <li>• Fire on a pipeline</li> <li>• Explosion</li> </ul>	<ul style="list-style-type: none"> <li>➤ Protect life &amp; Property</li> <li>➤ Prevent accidental ignition</li> <li>➤ Notify appropriate personnel</li> <li>➤ Notify Fire/Emergency Responders</li> <li>➤ Initiate Emergency Plan</li> </ul>	<ul style="list-style-type: none"> <li>➤ Locate source/cause of AOC</li> <li>➤ Use appropriate PPE</li> <li>➤ Stop gas flow</li> <li>➤ Make repairs/eliminate AOC</li> </ul>
<p><b>Unplanned Pressure Deviation</b></p> <ul style="list-style-type: none"> <li>• Unplanned Decrease in Pressure &amp; or No Press.</li> <li>• Unplanned Increase in Pressure</li> </ul>	<ul style="list-style-type: none"> <li>➤ Protect life &amp; property</li> <li>➤ Notify appropriate personnel</li> <li>➤ Initiate Emergency Plan as Needed</li> </ul>	<ul style="list-style-type: none"> <li>➤ Locate source/cause of AOC</li> <li>➤ Make repairs/eliminate AOC</li> </ul>
<p><b>Unplanned Flow Rate Deviation</b></p> <ul style="list-style-type: none"> <li>• Unplanned Increase in Flow</li> <li>• Unplanned Decrease in Flow &amp; or No Flow</li> </ul>	<ul style="list-style-type: none"> <li>➤ Protect life &amp; property</li> <li>➤ Notify appropriate personnel</li> <li>➤ Initiate Emergency Plan as Needed</li> </ul>	<ul style="list-style-type: none"> <li>➤ Locate source/cause of AOC</li> <li>➤ Make repairs/eliminate AOC</li> </ul>
<p><b>Unplanned Status Change</b></p> <ul style="list-style-type: none"> <li>• Inoperable/Failure of a Pipeline Component</li> <li>• Stray Current on a Pipeline – Electric Shock</li> </ul>	<ul style="list-style-type: none"> <li>➤ Protect life &amp; property</li> <li>➤ Notify appropriate personnel</li> <li>➤ Initiate Emergency Plan as Needed</li> </ul>	<ul style="list-style-type: none"> <li>➤ Locate source/cause of AOC</li> <li>➤ Make repairs/eliminate AOC</li> </ul>
<p><b>Inadequate Odorization or Reports of Gas Odor</b></p> <ul style="list-style-type: none"> <li>• Low odorization</li> <li>• Over odorization &amp; or Odor complaint</li> </ul>	<ul style="list-style-type: none"> <li>➤ Protect life &amp; property</li> <li>➤ Prevent accidental ignition</li> <li>➤ Notify appropriate personnel</li> </ul>	<ul style="list-style-type: none"> <li>➤ Locate source/cause of AOC</li> <li>➤ Make repairs/eliminate AOC</li> </ul>
<p><b>Improper Installation/Misalignment of Components</b></p> <ul style="list-style-type: none"> <li>• Improper fitting/component installation</li> <li>• Misalignment of fittings/components</li> </ul>	<ul style="list-style-type: none"> <li>➤ Protect life &amp; property</li> <li>➤ Prevent accidental ignition</li> </ul>	<ul style="list-style-type: none"> <li>➤ Notify appropriate personnel</li> <li>➤ Make repairs/eliminate AOC</li> </ul>

**RELATED PROCEDURES**

- EMER001 – Inside Gas Leak Investigation
- MAINT009 – Gas Leak Survey
- MAINT015 – Leak Grading Criteria