Gas Leak and Odor Investigation

Summary

This procedure describes how Pacific Gas and Electric Company (Company) field service dispatchers dispatch immediate response (IR) emergency gas service orders on a 24/7 basis, and how field service personnel investigate gas leak and odor complaints when responding to IR emergency gas service orders.

Level of Use: Informational Use

Target Audience

Directors, managers, supervisors, dispatchers, and personnel in field and dispatch services.

Safety

The potential hazards associated with gas leak and odor investigations include, but are not limited to, the following conditions and situations:

- Explosion or ignition of escaping gas.
- Traffic conditions.
- Personal injury that may occur when entering customer premises due to tripping hazards, uneven ground, or hidden objects.
- Environmental surroundings.
- Vegetation, including poison oak.
- Unrestrained animals at customer premises.

Before You Start

1.1 Read this entire procedure before performing a gas leak and odor investigation.

1.2 Compare the publication date and version number of your working copy of this document against the published version in the Guidance Document Library to verify that it is current.

1.3 Personal protective equipment (PPE) required when performing tasks described in this procedure includes the following items:

- Gloves
- Hard hat (must be available)
- Safety glasses (must be available)
- Flame-resistant (FR) traffic vest
- Proper work footwear
- FR clothing

- Ear protection
- Kneeling pad or knee pads

1.4 Qualifications

1. Personnel who perform tasks in accordance with this procedure must work under the direction of qualified personnel or receive training by the Gas Service School to do such work.

2. In addition, personnel who perform steps in this procedure must become qualified on the following operator qualification (OQ) subtasks:

   - Operator Qualification Subtask 03-04, "Atmospheric Corrosion Inspection"
   - Operator Qualification Subtask 09-03, "Field Service Leak Investigation"

1.5 Tools and Equipment

Personnel performing work described in this procedure must use only Company-approved tools and equipment. Tools and equipment required to perform this procedure include, but are not limited to, the following items:

a. Combustible gas indicator (CGI).

b. CGI bar probe attachment.

c. Impact bar or 12-inch screw driver (Phillips).

d. 12-inch adjustable wrench.

e. Two pipe wrenches (14-inch and 18-inch).

f. Squeezers for polyethylene pipe (PE) long handle emergency and a typical manual type squeezer (Numbered Document M-12.1, "Squeezers for PE Pipe").

g. Camera.

h. Blind-end fittings— ½-inch and 1-inch copper tubing size (CTS) (Numbered Document B-91.1, "Plastic System Mechanical Fittings").

i. Chamfering tools (Numbered Document B-91.1, "Plastic System Mechanical Fittings").

j. Marking pen (Sharpie).

k. Plastic cutter (Numbered Document M-13.5, "Cutters for PE Pipe").

l. 3-Electrostatic grounding cables (Numbered Document M-14.1, "Static Grounding Accessories for PE Pipe").

m. Burlap (Numbered Document M-14.1, "Static Grounding Accessories for PE Pipe").

n. Grounding device (screw driver, metallic rod, or shovel).

o. Fire extinguisher.

p. Emergency "DO NOT USE" squeeze tag (code M621727).

q. Leak detection solution.

r. Spray bottle.

s. Pipe thread sealant.

t. Grease for meter and adapter threads.

u. Non-contact voltage tester.

v. Cell phones.

w. Pager.

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Procedure Steps

1 Overview

1.1 Field service personnel must respond to gas immediate response (IR) emergency service orders in a prompt and timely manner AND adhere to the following steps should the circumstance arise:

1. When a traffic-related or other problem delays dispatched personnel from arriving to the incident within the estimated time, the dispatched gas service representative (GSR) must contact dispatch personnel to update the time.

2. IF the updated time exceeds communicated onsite time response limits, AND the IR is due to explosion or suspected transmission pipeline rupture,

   THEN dispatch personnel must dispatch another GSR.

   IF another GSR is **not** available,

   THEN contact the nearest fire department or law enforcement agency to provide emergency response escort.

1.2 Dispatch personnel must review CSR remarks prior to issuing IR orders to ensure that inside gas leaks are not dispatched as area odors.

1.3 Field service personnel must conduct an appropriate gas leak investigation when performing any of the following field activities:

- Gas leak and odor complaints.
- Gas pressure complaints.

  Inside and outside sweeps not required when investigating gas pressure complaints unless findings indicate need for same.
- Incident investigations.
- Energy cost inquiry (ECI) complaints (when entry is required)

  Inside and outside sweeps not required when investigating ECI complaints unless findings indicate need for same.

2 Dispatching an IR Field Service Order

2.1 Dispatch personnel must determine the appropriate field service personnel to receive the order.

2.2 When dispatching an IR field service order, perform the following steps:

1. To minimize dispatching multiple IR orders to one GSR, consider the nearest available GSRs in the headquarters or division when selecting a GSR to assign the IR order.

2.2 (Continued)

2. WHEN more than one IR order comes in from the same area,

   THEN attempt to dispatch the IR order to the closest field service personnel before dispatching multiple IR orders to the same GSR.

   After hours, use the appropriate 212 list.

2.3 After selecting the GSR, contact the GSR by performing the following steps:

1. Call the GSR to get a verbal acknowledgement of receipt of the IR order (e-page as a last resort).

2. If unable to contact the GSR (there is no mandated wait time), redirect the order to other field service personnel.

3. Continue attempting to contact field service personnel until successful or until the list of personnel is exhausted.

4. If no field service personnel are available, contact the dispatch supervisor for further instructions.

2.4 When field service personnel respond, dispatch personnel must perform the following steps:

1. Confirm whether or not the field automation system (FAS) is available to the field service personnel.

2. Dispatch the field order (FO).

3. Verify, via FAS, that the GSR arrives at the IR site by the estimated time of arrival (ETA) provided.

4. Contact the GSR if not onsite by the ETA provided to determine the nature of the delay.

5. IF the delay will continue to prevent a timely arrival of the GSR,

   THEN dispatch another GSR.

   IF no GSR is available AND the nature of the IR includes either explosion or suspected transmission rupture,

   THEN contact the nearest local law enforcement agency to provide emergency response assistance at the scene.

2.5 Dispatch personnel record the following information in the dispatcher remarks on the FO:

- All contact attempts.
- The ETA to the IR order site. (The arrival time, not the amount of time needed to reach the site; e.g., 13:40, not 30 min.)
- The actual time of arrival (unless recorded in FAS).

3 Closing Down Current Field Service Work to Proceed to an IR Site

3.1 IF an IR order is received while planning or conducting a Company (non-customer) work order,

THEN perform the following steps in this section (Section 3.1);

OTHERWISE, skip to Step 3.2 below.

1. Determine what to do with the current work order according to the following instructions:

   a. IF work has not started,

      THEN do not start the work order

      AND proceed to Step 2 below.

   b. IF work has started and can be completed in 10 minutes,

      THEN finish the work order before proceeding to the IR site;

      Otherwise, go to Step 1.c (next step).

   c. IF the work requires more than 10 minutes to complete,

      THEN make the work site safe for a return visit according to the instructions in Section 17, "Make Safe Actions."

      AND then return to Step 2 below.

2. If the work is not completed,

   THEN complete the order as a 0930 with the note, "Responding to an IR request."

3. Contact dispatch to request a follow-up service order or reassignment to other field service personnel for completion.

4. Press the **En Route** button on the FAS unit.

5. Proceed to the IR site.

3.1 (Continued)

6. Continue with Section 4.

3.2 IF an IR order is received while conducting a customer appointment,

THEN perform the following actions:

1. Determine what to do with the current work order according to the following instructions:

   a. IF the customer work order can be completed within 10 minutes,

      THEN perform the following steps:

      (1) Explain to the customer that the work must be interrupted because an immediate response emergency order has been received.

      (2) Notify dispatch of the need for follow-up or reassignment to other field service personnel to complete the work order.

      (3) Complete the work order as a 0930 with the note, "Responding to an IR request."

      (4) IF customer issues arise,

      THEN contact dispatch to have a supervisor contact the customer to resolve the issues.

      (5) Proceed to the IR site.

      (6) Continue with Section 4.

4 Responding to an IR Field Order

4.1 Field service personnel perform the following steps after receiving the FO:

1. Answer the call from dispatch.

2. Give dispatcher the ETA at the IR site.

   a. Field personnel must specify the arrival time, not the amount of time needed to reach the site (e.g., state "13:40," not, "in 30 minutes").

   b. When a traffic-related or other problem delays dispatched personnel from arriving to the incident within the estimated time, the following actions must be taken:

4.1.2.b (Continued)

(1) The dispatched GSR must contact dispatch personnel to update the time.

(2) IF the updated time exceeds communicated onsite time response limits,

THEN dispatch personnel will dispatch another GSR,

OR,

IF none is available AND the IR is due to an explosion or suspected transmission line rupture,

THEN dispatch personnel must contact the nearest local law enforcement agency to provide emergency response assistance (escort).

4.2 Acknowledge the IR order in FAS,

OR

IF access to FAS is not immediately available,

THEN advise dispatch personnel that FAS is not available.

4.3 Press the **En Route** button on the FAS unit.

4.4 Proceed to the IR site.

5 Responding to Multiple IR Field Orders

5.1 IF multiple IR orders are received in the same area and there are no additional field personnel able to respond within a reasonable time,

THEN perform the following steps:

1. Proceed to the closest IR site.
2. Make the first IR site safe as instructed in Section 17, “Make Safe Actions.”
3. Complete the first order as a 0930, note how the premises have been made safe, and note, “Responding to a second IR request.”
4. Advise dispatch that the first IR site is safe and request a non-emergency follow-up FO.
5. Proceed to the next IR site closest to the current location.

6 Procedures to Apply to all Inspections

WARNING

Field service personnel must test for voltage at the gas meter set before contacting or performing maintenance at same. Inspect the meter set with a non-contact voltage tester to determine if voltage is present, since electricity may be present if the customer's appliances are improperly grounded or damaged. If voltage is present, do not contact the meter set. Advise the customer of the condition and contact the local electric utility to investigate.

6.1 On all service visits, field service personnel must look for gas main and service leak indicators.

1. Check for gas main and service leakage with a CGI under the following circumstances:

   - Odor persists following a thorough "full" leak investigation including a meter clock test.
   - Gas odor is detected outdoors, regardless of the original nature of the service visit.
   - Visual evidence exists of service or main leakage (e.g., dead shrubs or grass, bubbling in wet soil).
   - The service visit is for an area odor.
   - The service visit is for outdoor leakage or leakage at the gas meter.

2. IF ruptured plastic gas service lines are discovered,

   THEN perform the following steps to protect life and property:

   a. Squeeze off ruptured plastic gas service lines that are visible and can be accessed safely.

   b. Affix blind-end fitting as described in the job definition for field service personnel.

   c. Field service personnel are qualified to install ½-inch or 1-inch CTS blind-end fittings only.

   d. If an emergency P.E. pipe squeezer was used without set gap-stops, attach tag stating: "DO NOT USE, EMERGENCY SQUEEZER USED. CUT OUT AND REPLACE BEFORE CONNECTING PE PIPE," to the body of P.E. pipe next to bind-end fitting. See Figure 1, "DO NOT USE" tag.

6.1 (Continued)

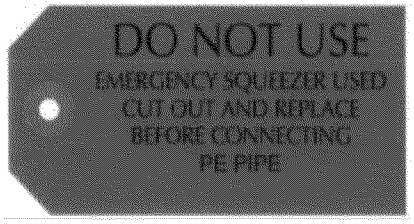

Figure 1. DO NOT USE Tag

- IF emergency squeeze point is not located in the same location of the repair (blind-end) fitting,

  THEN attach another tag at the emergency squeeze point location on the body of PE pipe or tubing.

e. Initiate Gas Incident Report (Form TD-4110P-03-F01, "Leak Survey, Repair, Inspection, and Gas Quarterly Report (A-Form)," Code 62-4060 and addendum (Form TD-4110P-03-F02,"Gas Incident Dig-in Report Addendum (A1 Addendum)," Code 61-0548).

f. Hand off gas incident report form to M&C personnel.

g. Notify dispatch personnel in the Resource Management Center (RMC) of the findings and whether further action is warranted.

6.2 Investigate all area odor complaints as follows:

1. Attempt to determine the source of the odor (e.g., mains, services, garden sprays, lumber preservatives, excessive gas odorant).

NOTE

When the source of the odor is determined to be non-gas related (e.g., garden sprays, lumber preservatives), field personnel will perform a meter spot check, an outside sweep, and, if possible, an inside sweep. No further action is required unless spot check or sweeps indicate further investigation is necessary

2. Notify dispatch personnel in the RMC of the findings and whether further action is warranted.

3. Record pertinent information on the FO as instructed in Section 6.5.

6.3 Conduct outside gas leak investigations with a CGI to test for escaping gas according to the following instructions:

6.3 (Continued)

1. Check building ventilation openings, water meter boxes, gas meter locations, gas services, gas mains, and sewer vents (if practical to do so) for the presence of gas.

2. IF a gas leak is hazardous or could become hazardous (per Utility Procedure TD-6434P-02, "Gas Leak Grading for Field Service"),

   THEN perform the steps in this section;

   OTHERWISE, proceed to Step 3 below.

   a. Notify dispatch operations.

   b. Make the site safe according to the instructions in Section 17, "Make Safe Actions."

   c. Call the PBX field helpline at **1-415-973-7000** and initiate a maintenance and construction (M&C) gas leak referral case.

   d. Record the gas leak referral reason, case ID number, and the PBX customer service representative's (CSR's) LAN ID on the FO (e.g., "1%-gas-in-air at foundation", stood by for M&C crew, Case #012345678, PBX CSR LAN ID ABC1").

   e. Explain to the customer that field personnel are standing by until construction personnel respond.

   f. Provide a Service Report form listing the case ID number to the customer.

   g. Record all required information on FO.

3. IF a non-qualified leak grading GSR determines a subsurface gas leak is **non-hazardous**, (per Utility Procedure TD-6434P-02, "Gas Leak Grading for Field Service"),

   THEN perform the following steps:

   a. Notify dispatch operations to request a DOT OQ qualified GSR to grade the subsurface leak.

      (1) IF no DOT OQ qualified GSR is available,

      THEN Dispatch creates an outage management tool (OMT) order requesting a DOT qualified gas M&C field Personnel to survey and grade leak.

      (2) The initial GSR will initiate an M&C gas leak referral case.

6.3.3.a (Continued)

(3) If unable to grade the leak the DOT OQ qualified GSR will call the PBX field helpline at **1-415-973-7000** and initiate an M&C gas leak referral case.

b. Record the gas leak referral reason, case ID number, and the PBX CSR's LAN ID on the FO (e.g., "small leak under service valve that is located outside and is not migrating into premises, referred to M&C, case #012345678, PBX CSR LAN ID ABC1").

c. Provide a Service Report form to the customer containing the following information:

- An explanation that the gas leak is non-hazardous and that PG&E (Company) construction personnel contact the customer within three business days.
- The case ID number.

d. Fill out the required information on Form TD-4110P-03-F01, "Leak Survey, Repair, Inspection, and Gas Quarterly Report (A-Form)," Code 62-4060.

e. Record all required information on FO.

f. Give Form TD-4110P-03-F01 (A-Form, Code 62-4060) to the supervisor on the following workday.

6.4 When a gas leak source is identified as another utility's gas main or service, immediately notify dispatch personnel in the RMC or the appropriate field services supervisor so that dispatch personnel can contact the proper utility.

6.5 Always include the following information on the FO:

- Gas meter number.
- Index reading.
- Results of pressure determination, when required.
- Meter information from a sub-meter.
- When a Company meter is used as a test meter, the Company meter number and read information.
- Location of each gas leak.
- Volume of leakage.
- Corrective action taken in the field.
- Inside and outside lower explosive limit (LEL) readings from the CGI.

7 Approaching the Site

NOTE

When responding to an incident where the fire department is present, field personnel must adhere to incident command procedures and report to the incident commander before reporting to the incident site.

7.1 For safety, always adhere to the following rules when conducting gas leak investigations:

- Upon entering a customer property, always check for tripping hazards, uneven ground, unrestrained animals, and other conditions that create the potential for injury.
- Never turn on unapproved flashlights or take portable or hand-held radios or pagers into a gaseous area. Only exceptions meeting the criteria specified in Numbered Document M-83, "Explosion-Proof Lights," are permitted.
- Carry cell phones and pagers at all times.
- Always turn off cell phones and pagers when in a gaseous atmosphere and immediately turn on when deemed safe.
- Always presume a gas leak exists until proven otherwise.
- If a gas leak is found, do not assume it is the only one.
- Do not rely on a lack of odor as an indication that there is no gas leak. Even when gas is properly odorized, the odorant can be stripped from the gas when it migrates through the ground.
- Do not turn on or off any lights or electric appliances until you are sure it is safe to do so.

7.2 Park vehicles away from the influence of the leak, but in the line-of-sight of the structure of concern.

7.3 Look for gas main and service leak indicators on all service visits.

7.4 Call and update dispatch personnel and the supervisor.

7.5 IF there are multiple structures of concern that have been "taped up,"

OR

IF there is a single structure of concern with multiple entry points,

THEN contact the supervisor to assess the need for additional resources to control the scene, depending on the scope of the event;

OTHERWISE, proceed to Step 7.6 below.

7.6 Take note of conditions when approaching the site by performing the following steps:

1. Be alert to indications that an outside leak may be causing an inside odor.
2. Look for indications of recent or current construction, sunken trenches, washouts, sinkholes, vegetation damage, any outside odors, etc.
3. Listen for the sound of hissing gas.
4. Check the gas meter for an indication of high consumption.

7.7 In an area free of natural gas, perform the following steps to prepare the CGI:

1. Check batteries.
2. Turn on the CGI.
3. Check the sensor cap (flow block).
4. Zero the CGI.

8 Contacting the Customer

WARNING

Ringing the doorbell could cause electricity in the doorbell circuit to ignite leaking gas, causing damage to property or injury to persons in the area.

8.1 Knock on the door.

8.2 While awaiting customer response, begin investigation by checking around the outside edges of the door, the keyhole, and, if present, the mail slot.

8.3 IF no one answers the door,

THEN see Section 9 “Inspecting When There Is No Customer Response”;

OTHERWISE, continue with Step 8.4 below.

8.4 When the customer opens the door, without entering the structure, immediately test the environment for the presence of gas.

8.5 Request admittance to the structure only after first testing the environment for the presence of gas from outside the structure.

8.6 IF the customer grants admittance,

THEN skip to Section 11, "Inspecting when Access Is Granted";

OTHERWISE, skip to Section 10, "Inspecting when Access Is Denied."

9 Inspecting When There Is No Customer Response

9.1 Perform a perimeter investigation of accessible areas, including but not limited to checking around windows, doors, crawl space vents, attic vents, and other available openings for indications of gas leakage.

9.2 With a CGI, check around the foundation wall and along the gas service at the gas service riser, sewer service entrance, and water service entrance, if available, within five feet of the structure.

9.3 IF gas is discovered with continuous readings of 1% gas-in-air or greater,

THEN perform the steps in this section;

OTHERWISE, continue with Step 9.4 below.

1. Apply "Do Not Enter" tape across all accessible entrances (e.g., front door, side door, garage door).
2. Make the site safe according to the instructions in Section 17, "Make Safe Actions."
3. Stand by.

9.4 IF the gas meter is accessible,

THEN perform the steps in this section;

OTHERWISE, skip to Step 9.5 below.

WARNING

To avoid injury or property damage, do an inside sweep of the structure whenever the CGI detects gas leakage around the structure.

1. Be aware of potential sources of leakage or odors, including leakage in mains and services and in other units in multiple-unit buildings.
2. Perform a meter spot check.

9.4 (Continued)

3. Record the actual gas flow.

4. IF the gas flow is not normal or the field order was issued as an IR,

   THEN shut off and seal the gas meter;

   OTHERWISE, leave the gas meter on.

NOTE

If the gas meter serves more than one unit
contact your supervisor or the supervisor-on-call
for guidance prior to sealing the meter.

5. Take CGI readings around the structure where access can be gained.

6. Record LEL reads and locations on the FO.

7. Leave a Service Report form advising the customer of the gas leak condition and any required action (e.g., calling the Customer Contact Center at **1-800-743-5000** to arrange for access to the premises) unless the premises are multi-unit apartments where a Service Report form cannot be left.

8. Record notes on the FO as appropriate (e.g., when a Service Report form cannot be left, record that information and the reason on the FO).

9.5 Perform the following steps if the gas meter is not accessible:

1. IF there is no indication of gas leakage (e.g., odor, CGI LEL readings, main or service leakage, or where indicated on service order),

   THEN leave a Service Report form at the premises advising the customer of the field condition;

   OTHERWISE, skip to Step 2 below.

2. IF a hazardous leak is suspected,

   THEN perform the following steps:

   a. Notify dispatch personnel in the RMC and request additional assistance (e.g., from a crew, leak surveyor, supervisor, or public agency such as fire or police).

9.5.2 (Continued)

b. Take corrective action to safeguard the property and public safety while assistance is en route (e.g., evacuating the building, ventilating buildings, investigating main and service leakage, shutting off curb valves, securing the site from foot traffic).

10 Inspecting When Access Is Denied

10.1 Inform the customer that a perimeter investigation is taking place that includes but is not limited to, a check for gas leakage around the following places:

- Windows
- Doors
- Crawl space vents
- Attic vents
- Other available openings

10.2 With a CGI, check around the foundation and along the gas service at the following places within five feet of the structure:

- Gas service riser.
- Sewer service entrance.
- Water service entrance, if available.
- Underground conduits(s), which may be attached to structure.

10.3 IF a gas leak is discovered with CGI readings greater than 2% gas-in-air and the customer continues to refuse entrance for an inside leak investigation,

THEN perform Steps 1 through 3 below;

OTHERWISE, continue with Step 10.4.

1. Advise the customer that Company personnel must shut off the gas meter and vent flammable gas from the house line.

2. Call dispatch operations to request 911 assistance.

3. Contact the supervisor to provide notification of the situation and request any necessary deviation from standard practice.

10.4 IF the gas meter is accessible,

THEN perform the steps in this section;

OTHERWISE, skip to Step 10.5 below.

10.4 (Continued)

WARNING

To avoid injury or property damage, do an inside sweep of the structure whenever the CGI detects gas leakage around the structure.

1. Be aware of potential sources of leakage or odors, including leakage in mains and services and in other units in multiple-unit buildings.

2. Perform a meter spot check.

3. Record the actual gas flow.

4. IF the gas flow is not normal,

   THEN shut the gas meter off;

   OTHERWISE, leave the gas meter on.

5. Take CGI readings around the structure where access can be gained.

6. Record LEL reads and locations on the FO.

7. Leave a Service Report form advising the customer of the gas leak condition and any required action (e.g., calling the Customer Contact Center at **1-800-743-5000** to arrange for access to the premises) unless the premises are multi-unit apartments where a Service Report form cannot be left.

8. Record notes on the FO as appropriate (e.g., when a Service Report form cannot be left, record that information and the reason on the FO).

10.5 IF the gas meter is not accessible,

THEN perform the following steps:

1. IF there is no indication of gas leakage (e.g., odor, CGI LEL readings, main or service leakage, or where indicated on the service order),

   THEN leave a Service Report form advising the customer of the field condition at the premises;

   OTHERWISE, skip to Step 2 below.

10.5 (Continued)

2. IF a hazardous leak is suspected,

   THEN perform the following steps:

   a. Notify dispatch personnel in the RMC and request additional assistance (e.g., crew, leak surveyor, supervisor, public agency – fire, police).

   b. Take corrective action to safeguard the property and public safety while assistance is en route (e.g., evacuate the building, ventilate buildings, investigate main and service leakage, shut off curb valves, secure the site from foot traffic).

11 Inspecting When Access Is Granted

11.1 Advise the customer not to turn on or off (or plug or unplug) any lights, televisions, or any other electrical appliance.

11.2 Immediately upon entry, sample the atmosphere for natural gas with the CGI.

11.3 IF a continuous reading of 1% gas-in-air or greater is obtained, indicating a potentially hazardous situation,

THEN take the actions in this step;

OTHERWISE, skip to Step 11.4 below.

WARNING

When a hazardous situation exists, people in a structure are in imminent danger of serious injury or death.

1. Immediately evacuate all people from the structure.

2. IF any customers refuse to vacate the premises OR cannot be vacated without additional assistance,

   THEN immediately call 911

   AND advise the 911 dispatcher of the hazardous condition and the need for assistance to evacuate the structure.

3. Make the site safe according to the instructions in Section 17, “Make Safe Actions,” and then return to Step 11.4 below.

11.4 IF initial tests indicate that a continuous reading is between 1% gas-in-air and 2% gas-in-air, which is considered safe for qualified field service personnel or emergency responders,

THEN take the actions in this section;

OTHERWISE, proceed to Step 11.5 below.

1. Shut off the gas supply.

2. IF LEL remains high,

   THEN contact dispatch to request assistance from the fire department AND wait for the fire department to assist with initiating ventilation before proceeding with an inside investigation, starting with Step 11.5 below.

11.5 Perform the following tests inside the structure:

1. First test with a CGI where the customer indicates the odor has been most prominent.

2. IF a basement exists,

   THEN, with a CGI, check for gas leaks from the top of the stairwell before going down into the basement to investigate.

3. Check all rooms for potential accumulation of gas (e.g., the kitchen, bathroom, laundry room, and family room).

11.6 Take the appropriate action called for by CGI readings as follows:

1. IF any continuous readings between 1% gas-in-air and 2% gas-in-air are noted,

   THEN take the following actions in this step;

   OTHERWISE, proceed to Step 2 below.

   a. Shut off the gas supply.

   b. If the LEL remains high, contact dispatch to request assistance from the fire department AND wait for the fire department to assist with initiating ventilation before continuing with the investigation.

2. IF the CGI reading is greater than 2% gas-in-air,

   THEN proceed directly to Section17, “Make Safe Actions.”

3. IF neither of the above situations exists,

   THEN proceed to Step 11.7 below.

11.7 With a CGI, perform a perimeter investigation for indications of gas leakage that includes checking the following:

1. Around windows, doors, crawl space vents, attic vents, and other available openings.
2. The foundation wall and along the gas service at the gas service riser, gas meter.
3. Sewer and water service entrances to the structure, if available, and within 5 feet of the structure.

11.8 Proceed to Section 12, "Selecting the Type of Gas Leak Investigation to Conduct," to choose and complete a full or modified leak investigation.

12 Selecting the Type of Gas Leak Investigation to Conduct

12.1 Based on the conditions that exist and the guidelines listed in this section, select the gas leak investigation method that best ensures customer and public safety.

12.2 Consider the following information when determining whether to conduct a full or modified gas leak investigation:

1. Read the entire FO.
2. WHEN the FO is dispatched by telephone or radio,

   THEN ask the dispatcher for the "Service History" and "Remarks" information to check for information that could be important in determining the type of gas leak investigation to conduct (e.g., the "Service History" section may list previous service calls at the premises, or the "Remarks" section may indicate a second request, "cannot locate odor" notation, or other pertinent information.)
3. Talk to the customer to obtain additional information and ask the following questions:
   a. Can you identify the source of the odor?
   b. Have you called Pacific Gas and Electric Company in the past to investigate a gas leak?
   c. Is the odor restricted to one location, or is the smell in the general area?
   d. Did you notice whether the range burners flared up (delayed ignition) when turned on?
   e. Is there a spa, swimming pool, gas barbecue, or gas light on the premises?

12.3 When any of the following conditions exist, field personnel must conduct a full gas leak investigation:

12.3 (Continued)

- Customer cannot identify the source of the odor.
- Responding field service personnel cannot identify the source of the odor.
- Gas houseline on the premises is buried.
- There has been a prior gas leak call at the premises, as determined by checking the order history.
- Dialog with customer indicates conditions requiring a full gas leak investigation.
- Energy cost inquiry (ECI) complaints (when entry is required).
- Odor is present at multiple appliances or locations.
- An over-pressuring condition is present (e.g., the pilot flame is higher than usual when an appliance is on).
- A meter spot check indicates excessive gas flow.

13 Conducting a Full Gas Leak Investigation (With a Meter Clock Test)

13.1 At the gas meter location, check for gas flow.

13.2 Perform the appropriate steps below according to the results of the gas flow check:

1. IF gas flow is excessive, indicating a possible high-volume leak,

   THEN shut off the gas meter service valve and determine the source of the excessive flow.

2. IF the gas flow is normal,

   THEN leave the gas meter service valve open.

3. Explain the gas leak procedure to the customer.

4. Enlist customer help in locating all gas-burning appliances to perform the following steps for each one:

   a. Close all pilot and burner valves on connected appliances (it is not necessary to shut off 100% automatic shut-off valves).

   b. Leave the main gas shut-off valve open.

   c. Soap test all upstream fittings.

   d. When deemed helpful in attempting to isolate leakage, turn off appliance valves.

   e. Open the gas meter service valve if it was closed (13.2.1 above).

13.2.4 (Continued)

f. Eliminate any leaks found.

5. IF there is a sub meter that does not have a test hand but does have swivels,

   THEN temporarily substitute the Company meter for the meter clock test.

   OTHERWISE, proceed to Step 6 below.

6. IF the sub meter does not have a test hand or swivels,

   THEN temporarily install the Company meter AND use the quick-change device for the meter clock test;

   OTHERWISE, proceed to Step 7 below.

7. Observe the gas meter test hand to ensure that all gas appliances are off.

8. IF excessive gas flow is detected, which may be due to a missed appliance or high-volume leak,

   THEN return to Step 1 above;

   OTHERWISE, continue with Step 9 below.

9. Determine the gas pressure in accordance with Utility Procedure TD-6436P-28, "Servicing Gas Regulators and Determining Gas Pressures."

10. Perform the following steps at the gas meter set:

    a. Soap test the gas meter set for leakage.

    b. Eliminate any leakage found.

    c. Perform a gas meter clock test for leakage as instructed in Section 18, "Conducting a Gas Meter Clock Test."

    d. IF leakage is detected,

       THEN follow the procedure in Section 15, "Options for Repairing Gas Leaks when Found";

       OTHERWISE, continue with Step 11 below.

11. Perform the following steps for each appliance:

    a. Relight the appliance.

13.2.11 (Continued)

b. Soap test all exposed fittings downstream of the pilot and burner valves.

c. Eliminate any gas leakage found.

d. Correct any faulty adjustments in accordance with Utility Procedure TD-6436P-32, "Gas Burning Appliance and Equipment Inspection/Service."

12. IF an odor still exists although no gas leaks are apparent,

THEN seek out other sources of leakage and/or odors.

14 Conducting a Modified Gas Leak Investigation (No Meter Clock Test)

14.1 Spot check gas meter for excessive flow.

14.2 Check for buried houseline.

14.3 Inspect the suspected appliance to determine whether the pilot is out.

14.4 Perform the following steps to continue the inspection:

1. Conduct a soap test of exposed fittings, the houseline, and the gas meter assembly.

2. Use the CGI to identify and isolate the suspected leak.

14.5 Correct any faulty adjustments in accordance with Utility Procedure TD-6436P-32, "Gas Burning Appliance and Equipment Inspection/Service."

14.6 Take action according to whether a leak is found as follows:

1. IF a gas leak is found,

THEN follow the procedure in Section 15, "Repairing Gas Leaks";

OTHERWISE, continue with Step 2 below.

2. IF no gas leak is found but the odor still exists,

THEN seek out other sources of leakage and/or odors as specified in Section 13, "Conducting a Full Gas Leak Investigation (with a Clock Meter Test)" and Section 6, Step 6.2.

14.7 Perform a meter spot check of actual gas flow as follows:

1. IF the gas flow is normal,

   THEN record the clock test finding "actual gas flow" on the FO;

   OTHERWISE, proceed to Step 2 below.

2. IF the gas flow is not normal,

   THEN conduct a gas meter clock test of the customer's houseline according to Section 13 and Section 18, "Conducting a Gas Meter Clock Test."

3. Be aware of a possible "does not register" (DR) meter. During a spot check, a DR meter would not indicate known pilot flow, appliance main burner load, or flow created by loosening the meter outlet connection to induce a small flow.

14.8 Advise the customer of any required action.

15 Repairing Gas Leaks

15.1 Attempt to permanently eliminate gas leakage found at an appliance valve, control, exposed house line, or adjacent fittings by taking the following actions:

1. Tighten any loose fittings.
2. Remove, dope, and re-tighten fittings.
3. Re-flare leaking tubing.
4. Replace ferrules.
5. Tighten screws and bolts.
6. Advise the customer of any required action.

15.2 Perform the following steps when considering or making a temporary leak repair:

1. Consider making a temporary leak repair when doing so does not endanger persons or property and allows the customer to continue conducting business.

2. IF a temporary repair is not practical or effective,

   THEN follow the procedures in Step 15.3;

   OTHERWISE, continue with Step 3 below.

3. Make the temporary repair.

15.2 (Continued)

4. Perform the following steps at the customer site after making a temporary repair:

   a. Advise the customer of both Company and customer responsibilities when a temporary repair is made.

   b. Explain the action taken to repair the gas leak to the customer.

   c. Allow time for a permanent repair to be made.

   d. Tell the customer how to expedite the permanent repair (e.g., by calling a plumber or appliance dealer).

   e. Inform the customer to expect a follow-up service visit to determine whether the leak condition is worse.

   f. Advise the customer that if repairs are not made, gas service may be discontinued or the appliance disconnected to ensure customer and public safety.

5. Issue a follow-up Multipurpose Customer Service Order to verify that required repairs are made.

15.3 Perform the following steps to deal with a hazardous gas leak that cannot be eliminated by making a permanent or temporary repair.

WARNING

A hazardous gas leak in a customer houseline (including attached appliances) is determined by a clock test of 2 cubic feet per hour (cfh) or more, or less than 2 cfh if the GSR deems the gas leak hazardous.

WARNING

A gas leak within 5 feet of a structure, or that is likely to migrate to within 5 feet of the outside wall of a building, poses a hazardous threat to life and property.

15.3 (Continued)

1. Advise the customer of the results of the investigation and the action required to correct the hazardous gas leak.

2. Tell the customer how to expedite the permanent repair (e.g., by calling a plumber or appliance dealer).

3. Explain to the customer that disconnecting the hazardous appliance or houseline can eliminate the gas leakage AND request permission to do so.

4. IF the customer **grants** permission,

   THEN disconnect the appliance or houseline segment.

   If the customer **does not grant** permission,

   THEN continue with Step 5 below.

5. Explain to the customer that isolation of the leaking appliance or houseline is done to ensure safety without interrupting gas service.

6. IF the customer **grants** permission,

   THEN disconnect the appliance or houseline segment.

   IF the customer still **does not gran**t permission,

   THEN proceed to Step 7 below.

7. Explain to the customer that because it is the Company's responsibility to protect customer and public safety, gas service to the premises must be discontinued.

8. Discontinue the gas service.

9. Perform a houseline pressure test (e.g., solid swivels or other appropriate measure) to protect the meter against over-pressure.

10. Seal the meter in accordance with the instructions in Utility Procedure TD-6435P-04, "Discontinuing Gas Service."

11. Issue a Hazard Notice.

15.4 Perform the steps in this section to deal with a non-hazardous gas leak that cannot be eliminated by making a permanent or temporary repair.

1. Advise the customer of the results of the investigation and the action required to correct the hazardous gas leak.

15.4 (Continued)

2. Tell the customer how to expedite the permanent repair (e.g., by calling a plumber or appliance dealer).

3. Leave the gas service on.

4. Do not request a follow-up service order.

16 Responding to Above-Ground Leak Orders Generated by Customers

NOTE

The repair methods in this section apply to any above-ground leak.

WARNING

Attempting to loosen, dope, and retighten valves without proper safety equipment can result in injury. For additional service valve information, refer to Gas Standards and Specification Document F-80, "Meter Valves."

16.1 Perform the following steps when responding to above-ground leak orders generated by customers:

1. Correct any leaks on the gas meter set using an approved leak repair method.

   Refer to Figure 2, "Above-ground Leak Criteria," to determine an above ground leak.

16.1 (Continued)

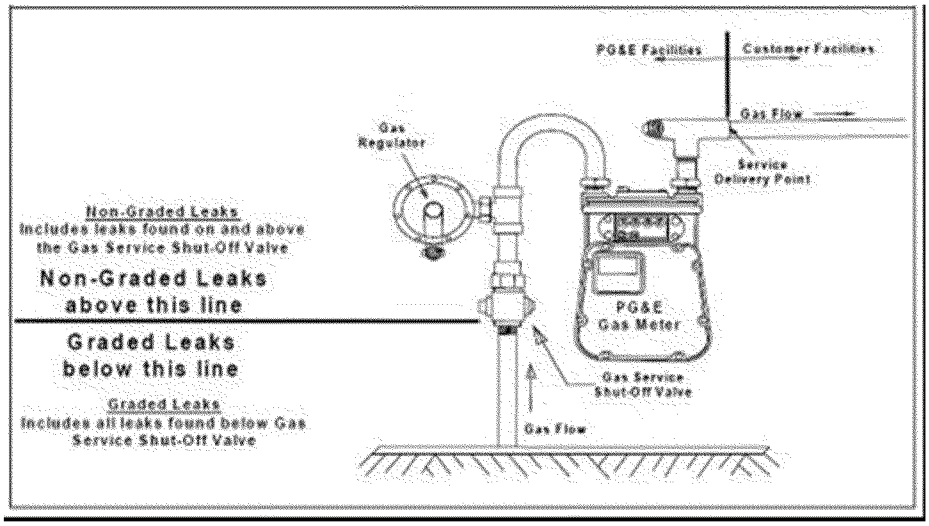

Figure 2. Above-Ground Leak Criteria

2. IF the leak is located at the riser threads (below the service valve) or any portion of the above-ground gas facilities prior to the service valve,

   THEN the leak must be graded before making the repair, if applicable. Refer to TD-4110P-09-VID-01,"Training Video-Above Ground Leak Grading Using a Soap Test," for guidance.

   Form TD-4110P-03-F01 (A-Form, Code 62-4060) must be filled out for all above-ground graded leaks.

NOTE

For all above-ground leaks graded using a soap test, the instrument type used to grade is visual "V."

3. Perform the following steps to determine and record leak grades:

   a. Determine leak grades according to the criteria in Table 1, "Gas Leaks and Gas Leak Grades," on the next page, when performing soap test leak grading for above-ground leaks.

16.1 (Continued)

Table 1, "Gas Leaks and Gas Leak Grades"

DESCRIPTION OF LEAK	LEAK GRADE
Leak can be "seen, heard or felt" on any above-ground gas facility where the presence of gas endangers persons or property or the soap solution does not hold bubbles, blowing off the facility.	Leak is considered a Grade 1 leak AND the "% gas in air" reading is 100% and the "info code" is left blank in Form TD-4110P-03-F01 (A-Form, Code 62-4060).
Soap solution holds a cluster of bubbles but is in a confined area OR is a public nuisance or anxiety.	Leak is considered a Grade 2+ leak AND the "% gas in air" reading is 0% and the "info code" is H in Form TD-4110P-03-F01 (A-Form, Code 62-4060).
Soap solution holds a cluster of bubbles and the leak is not in a confined area.	Leak is considered a Grade 2 leak.
Soap solution foams small bubbles.	Leak is considered a Grade 3 leak.

b. Enter the information on Form TD-4110P-03-F01 (A-Form, Code 62-4060) (see Figure 3 below).

For an above-ground leak repair, fill out the complete Form TD-4110P-03-F01 (A-Form, Code 62-4060) (refer to Form-A job aid for guidance).

c. Field personnel generating above-ground leak orders must use the same leak grade criteria as described in Table 1, "Gas Leaks and Gas Leak Grades."

Address: 125 PINE ST. City: OAKLAND

Description of Reading Location: AT RISER THREADS

Reported By: [X] Call-In [ ] Mobile Survey [ ] Foot Survey [ ] Other Employee

Surface At Read Location: [X] Concrete [ ] Asphalt [ ] Other [ ] Unsurfaced [ ] Water/Marsh/Tidal [X] Above ground [ ] In Substructure

Readings % Gas	Instr (a)	Grade (b)	Info Code (c)	Date	Time (24 hr Time)	Operator LAN ID	Unit Serial Number (Last 4 Digits)	Location Remarks (Not needed, if same as previous)
0	V	2+	H	10-15-11	1505	ABCI		

GRADE 2+ REQUESTED REPAIR DATE (Only needed if less than 90 days) (Repair required within 90 calendar days)

(a) Instrument Type Used to Grade: Enter, C for Combustible Gas Indicator, V for Visual, H for Hydrogen Flame Ionization (use for waterways or marsh only)
(b) Enter Grade: (1, 2+, 2, or 3). Enter 0 (zero) if no leak is found.
(c) Info code is required if leak is graded as 1, 2+, or 2 and is less than 2% gas:
A-Wall to wall and/or Continuously Paved, B-Near to, at, inside or under building, C-Odor and next to public gathering location, D-In foreign structure, E-Audible and/or visible, F-On facility in extremely poor condition, G-At least second customer call out, H-Leak is reported as 0% Gas Visual, J-Leak within the scope of work by others, M – Migration, N – Downgrade to Grade 3 is not allowed, S-Leak is suspected to be on a copper service, T – T&R Facility

Figure 3. Sample Leak Repair, Inspection, and Gas Quarterly Incident Report (62-4060)

16.1 (Continued)

4. IF unable to make repairs because of a lack of equipment or training,

   THEN perform the following steps:

   NOTE

   The initial responding GSR must complete the gas leak investigation before contacting dispatch personnel for assistance.

   a. Contact dispatch personnel to refer a FO to a DOT OQ qualified GSR; stress the urgency of the order when there is a hazardous situation.

   b. IF the situation is hazardous,

      THEN make the site safe according to the instructions in Section 17, "Make Safe Actions."

      NOTE

      IF DOT OQ qualified GSR repairs the above ground leak, THEN M&C gas leak referral case is not required.

   c. IF no DOT OQ qualified GSR is available,

      THEN Field service personnel must call PBX field helpline at **1-415-973-7000** and initiate an M&C gas leak referral case.

      (1) Record the gas leak referral reason, case ID number, and the PBX CSR's LAN ID on the field order (i.e., 1% at foundation, stood by for M&C crew, Case #012345678, PBX CSR LAN ID ABC1).

      (2) Field personnel must explain to the customer that field personnel are on standby until construction personnel respond.

      (3) Field personnel provide a Service Report form to customer listing the case ID number.

      (4) Field personnel stand by for gas M&C arrival.

5. Non-hazardous leaks must be rescheduled for monitoring or repair in accordance with Utility Standard S4110, "Leak Survey and Repair of Gas Transmission and Distribution Facilities."

16.1.5 (Continued)

a. IF the situation is not hazardous,

THEN field personnel must provide the customer a Service Report form with the explanation that the gas leak is not dangerous and that construction personnel contact the customer within 3 business days (M-F). In this case, field personnel perform the following steps:

(1) Refer non-hazardous gas main and gas service line leaks to a crew for further investigation by calling the PBX field helpline at **1-415-973-7000** and initiating an M&C gas leak referral case.

(2) Record the gas leak referral reason, case ID number, and the PBX CSR's LAN ID on the FO (e.g., small leak under service valve that is located outside and is not migrating into premises, referred to M&C, case #012345678, PBX CSR LAN ID ABC1).

(3) Provide the customer a Service Report form with the explanation that the gas leak is not dangerous and that construction personnel will contact the customer within 3 business days (M-F). The Service Report form should also list the case ID number.

(4) If the leak is below the service valve (i.e., at the riser threads), initiate a Form TD-4110P-03-F01 (A-Form, Code 62-4060) and fill out the required information.

(5) Give Form TD-4110P-03-F01 (A-Form, Code 62-4060) to the supervisor no later than following work day for review.

6. Determine whether leaks that are on or below the service valve can be safely repaired with an approved leak repair method (i.e., the riser is not heavily corroded and no digging is required).

a. IF the leak can be repaired with an approved leak repair method,

THEN perform Steps (1) and (2) below;

OTHERWISE, skip to Step 16.1.6.b below.

(1) Apply the approved leak repair method.

(2) Proceed to Step 16.1.7 below.

b. IF the leak cannot be repaired with an approved leak repair method,

THEN perform the following steps:

(1) Refer the leak to gas M&C personnel.

16.1.6.b (Continued)

(2) Call PBX at **1-415-973-7000** to create a case number to be forwarded to M&C service personnel.

(3) Record the case number on the completed service order.

7. Whether continuing work on the current FO, taking over the order as reassigned through dispatch, or picking up the order at a later date, perform the following steps:

   a. Complete the required leak repair work. Complete documentation of the leak repair as follows:

      (1) Enter the repair information into FAS with the proper code.

      (2) Add completion remarks to the FAS order: "Leak Repair" and the repairs made (e.g., "Leak Repair, changed valve to correct leak").

   b. For a job requiring an above-ground graded leak repair, complete Form TD-4110P-03-F01 (A-Form, Code 62-4060).

   c. Give Form TD-4110P-03-F01 (A-Form, Code 62-4060) to the supervisor no later than following work day for review.

8. When the field work is completed, the field service supervisor must perform the following documentation tasks:

   a. Obtain the leak number, if not already assigned.

   b. Record the leak number on Form TD-4110P-03-F01 (A-Form, Code 62-4060).

   c. Review Form TD-4110P-03-F01 (A-Form, Code 62-4060) for completeness and accuracy.

   d. Sign and date all forms.

   e. Because all completed repairs must be entered into the Integrated Gas Information System (IGIS) within 10 days, immediately forward the completed Form TD-4110P-03-F01 (A-Form, Code 62-4060) to mapping personnel for entry into IGIS.

   f. Review the weekly field service report generated with Business Objects Scorecard Drill Down to ensure that there is a completed Form TD-4110P-03-F01 (A-Form, Code 62-4060) for each address listed.

9. Field service clerical personnel must review FAS timecards for orders completed with Completion Codes 6202 and 4023 and process leak repair accounting as follows:

   - Charge Completion Code 6202 (valve changes) orders to accounting shown on FAS Timecard.

16.2 Perform the following steps when responding to above-ground leak orders generated by leak survey:

NOTE

The repair methods in this section apply to all non-hazardous gas meter set leaks. For the purposes of this discussion, all non-hazardous gas meter set leaks beyond the service valve submitted by leak surveyors under the regular leak survey cycles will be repaired by PG&E personnel within three years from the date reported and not subject to re-check requirements set forth for gradable gas leaks on PG&E gas assets.

Field service personnel are not required to perform the inside or outside perimeter CGI investigation on a Company-generated leak survey order unless dialog between the field personnel and the leak surveyor OR between the customer and Company personnel OR conditions warrant a leak investigation according to Section 12, "Selecting The Type Of Gas Leak Investigation To Conduct."

1. Determine whether the above-ground leaks that are on the meter set or below the service valve can be safely repaired with an approved leak repair method (i.e., the riser is not heavily corroded and no digging is required).

   a. IF the leak can be repaired with an approved method,

      THEN perform Steps (1) and (2) below;

      OTHERWISE, skip to Step 1.b.

      (1) Apply the approved leak repair method.

      (2) Proceed to Step 2 below.

   b. IF the leak cannot be repaired with an approved leak repair method,

      THEN notify the field service supervisor, who then consults with the M&C supervisor to determine whether to initiate a non-automated hand-off so that M&C personnel can complete the leak repair.

2. Whether continuing work on the FO or taking it over, perform the following steps:

16.2.2 (Continued)

a. Complete the required leak repair work.

b. Complete documentation of the leak repair as follows:

(1) Document the leak repair in FAS with the proper code:

- Completion Code 6202 (G Change SM SP Svc Valve) for valve changes.

(2) Add the completion remarks to the FAS order: "Leak Repair" and the repairs mad (e.g., "Leak Repair, changed valve to correct leak").

(3) For a job requiring an above-ground graded leak repair, complete Form TD-4110P-03-F01 (A-Form, Code 62-4060).

(4) Turn any Form TD-4110P-03-F01 (A-Form, Code 62-4060) in to the field service supervisor by the next workday for review.

3. When the field work is completed, the field service supervisor must perform the following documentation tasks:

a. Obtain a leak number, if not already assigned.

b. Advise field service clerical personnel of completed orders for graded leaks and instruct them to charge repair time to PM accounting listed on Form TD-4110P-03-F01 (A-Form, Code 62-4060) for each order.

c. Review Form TD-4110P-03-F01 (A-Form, Code 62-4060) for completeness and accuracy.

d. Sign and date all forms.

e. Because all completed repairs must be entered into IGIS within 10 days, immediately forward the completed Form TD-4110P-03-F01 (A-Form, Code 62-4060) to mapping personnel for entry into IGIS.

4. M&C supervisors must perform the following tasks:

a. Review the IGIS Open Leaks Report monthly and request mapping personnel to print information on all Grade 2+ leaks required to be repaired within the next 90 days.

b. Review each Form TD-4110P-03-F01 (A-Form, Code 62-4060) to identify all above-ground riser thread leaks that can be repaired by a GSR.

c. Forward the identified Grade 2+ leaks to M&C clerical personnel to issue a Customer Care and Billing (CC&B)/FAS order for field service.

16.2.4 (Continued)

d. After verifying the CC&B entry after clerical personnel enter it, deliver every identified Form TD-4110P-03-F01 (A-Form, Code 62-4060) to the field service supervisor.

5. M&C clerical personnel enter Grade 2+ leaks into CC&B as undated orders with the following information:

- A follow-up date 90 days from the date the leak was discovered.
- The leak number.
- The required repair in Office Remarks on the order. The following is an example of remarks for an order for a leak found on 12/09:

  "12/09, Leak # 1234567, PM#8765432, fuzz leak on riser threads per leak survey."

6. The field service supervisor coordinates with the scheduler and the dispatcher to ensure that field service personnel are identified and have corresponding FAS orders and Form TD-4110P-03-F01 (A-Form, Code 62-4060).

17 Make Safe Actions

17.1 When there is a continuous reading of 2% gas-in-air or greater inside a structure or within five feet from the structure, all field service personnel and first responders must perform the following actions:

1. Evacuate the structure.

   a. Immediately request 911 assistance:

   - If multiple structures are involved or assistance with evacuation is needed to ensure public safety.
   - For assisted living residences, hospitals, multi-unit dwelling structures, etc.

2. Remembering the fire triangle (oxygen, fuel, ignition), eliminate sources of ignition and fuel before ventilating the building.

3. Turn off the gas at the meter or curb meter valve, if accessible.

4. Contact dispatch to request 911assistance.

5. Isolate ignition sources (e.g., electric appliances, fixtures, telephone).

17.1 (Continued)

WARNING

Do not shut off electric service at the panel. Do not pull the electric meter to disconnect service.

6. Have the electric service cut off at the pole or splice box.

7. Notify the supervisor of the situation.

8. Attach "Do Not Enter" tape across all entryways (e.g., garage, basement) to prevent entry into the structure.

9. Wait for the fire department to assist with initiating ventilation.

10. With a CGI, check buildings in the immediate area for any indications of gas where evacuated persons have been taken.

11. With a CGI, check nearby buildings, available underground openings (such as sewers and check valve boxes), and any areas of recent excavation activities.

    - IF gas is indicated,

      THEN attempt to vent manholes, meter boxes, or similar confined spaces.

18 Conducting a Gas Meter Clock Test

18.1 Check the gas meter for the ability to register small flow according to the time requirements listed in Table 2 below.

Table 2. Time Requirements for Testing Small Flow

Test Hand Dial Size	Minimum Observation Time after Dial Gears are Engaged (seconds)
¼	10
½	15
1	15
2	25
5	25

18.2 Shut off all pilot and burner valves.

18.3 Leave the main appliance shut-off valves on.

18.4 Observe the gas meter test hand on the upsweep.

18.5 Meter clock test for leakage for at least the time specified in Table 3, "Meter Clock Test Times," below.

Table 3. Meter Clock Test Times

Meter Size (cubic feet)	Test Hand Time (minutes)	Meter Size (cubic feet)	Test Hand Time (minutes)
¼	2	2	3
½	2	5	5
1	2	10	10

19 Soap Tests

19.1 Soap tests are performed using leak detection compound fluid, Code 49-5178.

NOTE

One 4 oz. bottle of leak detection compound with water makes 4 gallons of leak detection solution.

1. Follow the manufacturer's directions.
2. IF the spray bottle has previously contained leak detection solution,

   THEN rinse spray bottle with water to remove the soap residue before making another batch.
3. Fill 16-oz. spray bottle with water.
4. Add one capful of leak detection compound.
5. Install trigger sprayer.

19.2 Perform a soap test for gas leakage on all meter set assemblies, houseline, or gas appliance connections that have been loosened, disconnected, or reconnected during the course of work or are suspected of leakage by the customer or field personnel.

19.3 When a gas leak complaint indicates a suspected leak at a specific appliance and the clock test indicates no gas leakage, soap test the fittings downstream of the main burner and pilot valves (if accessible).

19.4 On manifold installations, soap test all adjacent meters and all plumbing from the service riser threads (including the riser bypass threads and bypass valve, if applicable) to the inlet fittings of the manifold.

END of Instructions

Gas Leak and Odor Investigation

Definitions

Lower Explosive Limit (LEL): The lowest concentration (percentage) of gas exposed to air that is needed for the gas to ignite and explode in the presence of an ignition source.

Upper Explosive Limit (UEL): The highest concentration (percentage) of gas exposed to air capable of producing an explosion in the presence of an ignition source. Together, LEL and UEL are known as the flammable limits of a combustible gas.

Implementation Responsibilities

The director in charge of field services ensures that this procedure is communicated and properly implemented in all service areas.

Governing Document

Utility Standard TD-6434S, "Gas Leak and Odor Response"

Compliance Requirement/ Regulatory Commitment

Code of Federal Regulations (CFR), Title 49, Subpart M—Maintenance, Section 192.703

Reference Documents

Developmental References:

Form TD-4110P-03-F01, "Leak Survey, Repair, Inspection, and Gas Quarterly Report (A-Form)," Code 62-4060

Form TD-4110P-03-F02,"Gas Incident Dig-in Report Addendum (A1 Addendum)," Code 61-0548

Numbered Document M-83, "Explosion-Proof Lights"

Utility Procedure TD-6434P-02, "Gas Leak Grading for Field Service"

Utility Procedure TD-6436P-28, "Gas Regulator Servicing and Pressure Determination"

Utility Procedure TD-6436P-32, "Gas Burning Appliance and Equipment Inspection/Service"

Gas Leak and Odor Investigation

Utility Procedure TD-6435P-04, "Discontinuing Gas Service"

Supplemental References:

Code of Safe Practices

Utility Procedure TD-6436P-32, "Gas Burning Appliance and Equipment Inspection/Service"

Utility Standard SAFE-1001S, "Safety and Health Program Standard"

Appendices

Appendix 1, "%Lower Explosive Limit (LEL) / %Gas in Air Conversion Chart"

Attachments

Attachment 1, "Commonly Asked Questions"

Document Recision

This document supersedes Work Procedure TD-6434P-01, "Gas Leak and Odor Investigation," Rev 4, issued 02/15/2012.

Approved By

Redacted

Manager

Document Owner

Redacted

Specialist

Document Contact

Redacted

Specialist

Redacted

Specialist

Gas Leak and Odor Investigation

Revision Notes

Where?	What Changed?
Section 1.1.2	"Parameters" has been replaced with "IR onsite time response limits."
Section 4.1.2.b (2)	"Parameters" has been replaced with "IR onsite time response limits."
Section 6.2.1	Revised to read: NOTE "When the source of the odor is determined to be non-gas related; (e.g., garden sprays, lumber preservatives), field personnel will perform a meter spot check, an outside sweep and, if possible, an inside sweep. No further action is required unless spot check or sweeps indicate further investigation is necessary."
Section 6.3.3	Steps have been revised IF a non-qualified leak grading GSR encounters non-hazardous sub-surface leak, then GSR must contact dispatch and request a qualified leak grade GSR to grade leak. IF no leak grade qualified GSR are available, then initial GSR contacts dispatch, then dispatch creates an outage management tool (OMT) order requesting a DOT qualified gas M&C field personnel to survey and grade leak.
Section 9.4.4	Added text: "or the field order was issued as an Immediate Response (IR)."
Section 9.4.4	Added NOTE: "If the gas meter serves more than 1 unit contact your Supervisor or the Supervisor-on-call for guidance prior to sealing the meter."
Section 13.2.1 and 13.2.2	Revised to read: IF gas flow is excessive, indicating a possible high-volume leak, THEN shut off the gas meter service valve IF the gas flow is normal, THEN leave the gas meter service valve open.
Various locations	Changed % LEL to % gas-in-air

APPENDIX 1, % LOWER EXPLOSIVE LIMIT (LEL) / % GAS IN AIR CONVERSION CHART

Conversion Chart	
% LEL	**% Gas-in-Air**
80	4
60	3
40	2
20	1

To convert % LEL to % gas-in-air, divide by 20. Example: 100% LEL divided by 20 = 5% gas-in-air.