

Cascade Natural Gas Corporation
COMPANY PROCEDURE

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|-----------|--------|---------------------|--|--|--|
| C.P.# 750 | Page 1 | Dated July 30, 2010 | | | |
|-----------|--------|---------------------|--|--|--|

TITLE: LEAK INVESTIGATION

INDEX

COMPLIANCE

- .01 INVESTIGATION
- .02 OUTSIDE ODOR CALL
- .03 OUTSIDE LEAK INVESTIGATION
- .04 BUILDING INVESTIGATION
- .05 PROBING
- .06 ASPIRATOR
- .07 LEAK CLASSIFICATION
- .08 LEAK RE-EVALUATION
- .09 FOLLOW-UP INSPECTIONS
- .10 LEAK REPORTING
- .11 LEAK CLASSIFICATION AND ACTION CRITERIA

Cascade Natural Gas Corporation
COMPANY PROCEDURE

| | | | | | |
|-----------|--------|---------------------|--|--|--|
| C.P.# 750 | Page 2 | Dated July 30, 2010 | | | |
|-----------|--------|---------------------|--|--|--|

TITLE: LEAK INVESTIGATION

Prompt action will be taken in response to a leak report, odor call or reported hazardous condition. Leak reports, odor calls, or other reported hazardous conditions shall be investigated to determine if a hazard truly exists.

COMPLIANCE

This CP meets the requirements set forth in regulations; 49 CFR 191.5 - .25, WAC 480-93 – 200, WAC 480-93-185, WAC 480-93-186, (18601), WAC 480-93-187, ORE 860-023-00005 860-024-0050.

.01 INVESTIGATION

.011 All leak reports, odor calls and similar hazard reports are to be considered of first priority until investigation justifies a lesser urgency.

.012 Immediate steps are to be taken to identify possible ignition sources and to ensure that gas has not escaped into any nearby building or structure. Use warnings signs if applicable.

.013 If an investigation reveals a leak that originates from a foreign source or facility, such as gasoline vapors, sewer or marsh gas, or customer-owned piping, prompt action shall be taken at that time, where appropriate, to protect life and property. Leaks that represent an ongoing, potentially hazardous situation shall be reported promptly to the owner or operator of the source facility if known and, where appropriate, to the fire department, or other appropriate governmental agency. Immediately notify the General Manager of the findings.

.014 IN WASHINGTON ONLY – If the owner/adult occupant is not available to notify as noted in .013, the district must send a letter to the occupant indicating the results of the investigation within 24 hours. If the investigation is during a holiday or weekend then the letter is to be mailed the next business day. A sample of this letter is available as form number 435 in the Automated Customer Letters in the EDP MLET Menu. A copy of the letter sent is to be attached to the CNG work order and filed in the district.

.015 In the event of an explosion, fire, death, or injury, any suspected gas facility must not be removed until the commission or the lead investigative authority has designated the release of the gas facility. Once the situation is made safe, the facility must be kept intact until directed by the lead investigative authority.

.02 OUTSIDE ODOR CALL

For gas odor reported outside, the following shall be performed. A complete investigation of all possible sources of odor is required.

Cascade Natural Gas Corporation
COMPANY PROCEDURE

| | | | | | |
|-----------|--------|---------------------|--|--|--|
| C.P.# 750 | Page 3 | Dated July 30, 2010 | | | |
|-----------|--------|---------------------|--|--|--|

TITLE: LEAK INVESTIGATION

1. Check for gas inside buildings near the reported location using inside investigation techniques. If no one is in the building, then the foundation must be probed for gas.
2. Check for leaks on above ground equipment near the reported location. Meters, regulators, valves, etc. Be sure to check adjacent meters for leaks.
3. If the odor was reported on a meter or a service line:
 - a. Locate the service line and main (HP or transmission line for a HP service).
 - b. Probe the foundation of building(s) served by the meter or service line.
 - c. Probe the service line from the meter to the main.
 - d. Check the main at the tee, and 25 feet each way along the main.
 - e. Check nearby vaults, valve boxes, manholes, etc.

.03 OUTSIDE LEAK INVESTIGATION

- .031 For suspected underground leaks, the leak area shall be explored using a CGI and underground probing. The investigation shall establish the perimeter of the underground gas accumulation and pinpoint the source of the leak.
 - a. The perimeter is determined by probing until the area of gas accumulation is determined. Initial probes shall be placed approximately 10 feet apart, and readings taken with the CGI. Keep probing until zero gas is measured around an area. Probe along the gas pipe, and near other underground structures, as well as taking readings in vaults, valve boxes, manholes, etc.
 - b. The source is pinpointed by reviewing the probe readings to find the highest concentration of sustained gas accumulation. An aspirator may be used to help pinpoint, by drawing down the accumulation, and rechecking the probes.
- .032 Buildings that are close to the detected accumulation shall have their foundations checked for gas. When gas is detected at a building foundation, an investigation shall be performed inside that building.
- .033 Concurrent with excavation damage (aka third party damage) repairs, investigation shall be conducted to ensure that no additional damage or leaks exist.

Cascade Natural Gas Corporation
COMPANY PROCEDURE

| | | | | | |
|-----------|--------|---------------------|--|--|--|
| C.P.# 750 | Page 4 | Dated July 30, 2010 | | | |
|-----------|--------|---------------------|--|--|--|

TITLE: LEAK INVESTIGATION

- a. Ensure that no gas has entered into nearby buildings or underground structures (utility vaults, etc). Consider factors such as wind direction, eaves, openings, etc.
- b. Service Line Breaks – Probe the service line from the break to the main, with particular attention to near by buildings or structure walls, crawl spaces and utility vaults. Also check the main at the tee, and 25 feet each way along the main.
- c. Mains or HP Line Breaks – Probe the main each way from the damage point, with particular attention to man holes, utility vaults, service tees, and pipe bends or fittings. Probing should extend approximately 50 feet each way from the break, perhaps further depending on the nature of the damage to the pipe.

.04 BUILDING INVESTIGATION

.041 Investigating buildings with gas migrating to the foundation requires the following:

- a. Check likely rooms, or spaces (attics, crawlspace, basement) for gas accumulation with a CGI.
- b. Determine if the gas concentration is in the explosive range.
- c. Consider the source of the gas and take appropriate action to reduce possible hazards.

.042 If an investigation reveals a concentration of gas in the explosive range inside of a building, vault, or other enclosed space, the following immediate actions are to be taken, as appropriate to the hazard and location:

- a. Shut off gas supply at meter stop.
- b. Shut off and red tag the appliance or customer piping.
- c. Clear the room, building or area of all occupants and take the necessary steps to prevent their return until it is safe to do so.
- d. Ventilate the affected portion of the building or space by opening doors, covers, and Open windows from the top where possible.
- e. Use every practical means to eliminate sources of ignition. Take precautions to prevent smoking, striking matches, operating electrical switches or devices, opening furnace doors, etc. Inform occupants and others in the area of these precautions and of the need to observe them.

Cascade Natural Gas Corporation
COMPANY PROCEDURE

| | | | | | |
|-----------|--------|---------------------|--|--|--|
| C.P.# 750 | Page 5 | Dated July 30, 2010 | | | |
|-----------|--------|---------------------|--|--|--|

TITLE: LEAK INVESTIGATION

Safety flashlights designed for use in hazardous atmospheres are mandatory for use in such emergencies.

- f. Only explosion-proof exhaust fans are to be operated in explosive atmospheres.
- g. Investigate other buildings in the immediate area to determine the presence of gas therein.
- h. Recheck the space after the repairs to determine if the hazards have been eliminated.

.05 PROBING

- .051 Barholes shall be created to test underground levels of gas with a CGI (with underground probe attachment).
- .052 Barholes shall be no deeper than 12 inches unless proper locates are available for use. Bar holes shall not be driven within 2 feet of a locate mark.
- .053 Bar holes can be driven by hand in most soils. Do not break pavement if there are acceptable soil locations. Use of power tools should be limited to breaking the pavement to avoid damage to underground structures.
- .054 Bar holes for an investigation shall be of the same approximate size and depth. This limits variability in the readings. Two size classes are typical: ½ inch to ¾ inch driver, 1 inch to 1 ½ inch driver. The 1 inch to 1 ½ inch size are less susceptible to collapsing.

.06 ASPIRATOR

- .061 Aspirator tools are available from Central Stores,. They have 3 intended uses: aid leak pinpointing, follow-up investigation, hazard reduction.
 - a. **Leak Pinpointing** – The tool can be used to help pinpoint the exact location of a leak to start repairs. This reduces the amount of pavement that must be broken and/or the size of a bell hole. Some mature leaks have an area of high gas concentration that makes detecting a specific location difficult. The aspirator can be used near the suspected source of leakage to draw gas out of the soil. Once the soil is drawn down to lower levels of gas concentration, the bar holes can be checked at intervals to detect which ones are closest to the source of gas.
 - b. **Follow-up Investigation** – The tool may be used to draw out residual gas after a gas leak repair. If the readings draw down to zero gas, the follow-up may be

Cascade Natural Gas Corporation
COMPANY PROCEDURE

| | | | | | |
|-----------|--------|---------------------|--|--|--|
| C.P.# 750 | Page 6 | Dated July 30, 2010 | | | |
|-----------|--------|---------------------|--|--|--|

TITLE: LEAK INVESTIGATION

cancelled. A Supervisor must approve canceling a follow-up investigation. See the FOLLOW UP INVESTIGATION section for more explanation.

- c. **Hazard reduction** – The tool can be used to draw gas out of the ground near away from buildings or other critical locations. This method shall never be used as the only means of keeping people safe. It can be used as one tool in the emergency response toolbox.
- .062 The aspirator will remove 8 to 12 cu. Ft. of soil atmosphere or gas per minute at 80 lbs. operating pressure. The radius of effect is approximately 20 feet, depending on soil type and conditions. Soil types should be taken into consideration when using the aspirator. Soil density may affect suction of the aspirator. Example: sandy soil is less dense than clay soil types and may have different suction affects.
- .063 The aspirator should be inserted at least 28-inches down into the hole to the bottom of the neoprene bellows-type seal. This will help ensure proper suction of the aspirator. The hole can be driven with a 1 inch to 1 ½ inch drive bar. The aspirator should not be driven into the ground with a hammer. All the aspirator holes must be inside the hole. The aspirator exhaust should be pointed away from possible ignition sources, enclosed areas or structures, pedestrians and traffic. The exhaust can be flammable, so keep ignition sources away from the exhaust area.
- .064 The aspirator should be checked for operation periodically to ensure that the aspirator is not clogged and is still functioning. If the aspirator is clogged remove it from hole and remove dirt and debris from the intake holes of the aspirator.
- .065 The aspirator shall not be placed next to buildings, vaults or other enclosed spaces you are trying to protect. This would cause the gas to be drawn toward the location that needs to be protected.
- .066 For Hazard Reduction be sure to operate the aspirator for as long as it takes to reduce the concentration of gas to zero. The bar holes shall be checked periodically with CGI to confirm the results of the aspiration. The set-up and plan should be reconsidered if the reads aren't improving.
- .067 Multiple aspirators may be used to cover larger areas or protect multiple locations. Be sure to place them far enough apart so their full area of effect is realized. Example: a large amount of gas spreading over a large area, or where multiple buildings, structures, vaults or other enclosed spaces have accumulations of gas.

Cascade Natural Gas Corporation
COMPANY PROCEDURE

| | | | | | |
|-----------|--------|---------------------|--|--|--|
| C.P.# 750 | Page 7 | Dated July 30, 2010 | | | |
|-----------|--------|---------------------|--|--|--|

TITLE: LEAK INVESTIGATION

.07 LEAK CLASSIFICATION

.071 APPLICATION – Leak classification applies only to those leaks occurring on Cascade’s system, i.e. up to the outlet of the meter set.

.072 RESPONSIBILITY – The person investigating the leak shall assign the leak grade. The person investigating will take action appropriate to the leak grade found.

.073 LEAK GRADES – Based on the evaluations of the location and/or magnitude of a leak, each leak shall be classified, thereby establishing the leak repair priority.

.074 Leakage classification and control requirements are provided in Section .11. The examples of the leakage are minimum guidelines. The judgment of the people investigating the leak is of primary importance.

.08 LEAK RE-EVALUATIONS

.081 Leaks that are not stopped or repaired will be scheduled for re-evaluation. Re-evaluations shall continue until the detected leaks are repaired or no longer results in a reading.

.082 Grade 2 leaks must be reevaluated at least once every six months until cleared. The location and magnitude of the leakage condition should determine the frequency of reevaluation.

.083 Grade 3 leaks must be reevaluated during the next scheduled survey or within 15 months of the date reported whichever occurs first.

.09 FOLLOW-UP INSPECTIONS

.091 The perimeter of the leak area shall be checked with probes and a combustible gas indicator (CGI) after stopping or repairing each leak. These checks are made to ensure that all leaks have been discovered, and that residual gas in the ground does not create a hazardous situation as it dissipates.

a. If gas is detected in the ground after a repair, additional leaks or damage may be masked. A further follow-up inspection is required.

b. If no gas is detected in the ground, no follow-up inspection is needed.

Cascade Natural Gas Corporation
COMPANY PROCEDURE

| | | | | | |
|-----------|--------|---------------------|--|--|--|
| C.P.# 750 | Page 8 | Dated July 30, 2010 | | | |
|-----------|--------|---------------------|--|--|--|

TITLE: LEAK INVESTIGATION

- .092 Option – An aspirator may be used to draw residual gas out of the ground and reduce the need for a follow-up visit. After aspirating for 15 to 30 minutes, the probes shall be checked for residual gas indications. This should be used if residual gas is at a building wall, and/or the residual readings could be classified as Grade 1.
- .093 For follow-up inspections, the schedule shall be set by a Supervisor.
- a. A follow-up inspection shall usually be made within 2 to 7 days. The follow-up shall be scheduled based upon the hazards and consequences specific to the area.
 - b. Follow-ups should be postponed to allow residual gas to dissipate. The soil conditions, building proximity, and possible public safety hazards shall be considered when scheduling follow-ups.
 - c. The maximum allowable interval for the follow-up is 30 days.
- .094 A Supervisor shall review the results of all follow-up inspections.
- .095 Follow-ups shall continue until zero gas is detected, and all detected leaks are repaired, or a reasonable explanation for the gas accumulation can be found. Gas siphon techniques may also be used in this process. Consult with Safety and Compliance if needed.

.10 LEAK REPORTING

All leaks are to be reported as provided for in CP 720 LEAK REPORTING.

Cascade Natural Gas Corporation
COMPANY PROCEDURE

| | | | |
|-----------|--------|---------------------|--|
| C.P.# 750 | Page 9 | Dated July 30, 2010 | |
|-----------|--------|---------------------|--|

TITLE: LEAK INVESTIGATION

.11 LEAK CLASSIFICATION AND ACTION CRITERIA

TABLE 11A – LEAK CLASSIFICATION AND ACTION CRITERIA – GRADE 1

| DEFINITION | ACTION CRITERIA | EXAMPLES |
|--|--|--|
| <p>GRADE 1</p> <p>A leak that represents an existing or probable hazard to persons or property and requires immediate repair or continuous action until the conditions are no longer hazardous.</p> | <p>Requires prompt action to protect life and property, and continuous action until the conditions are no longer hazardous.</p> <p>The prompt action may require one or more of the following:</p> <ul style="list-style-type: none"> a. Implementation of company emergency plan (192.615). b. Evacuating premises. c. Blocking off an area. d. Rerouting traffic. e. Eliminating sources of ignition. f. Venting the area. g. Stopping the flow of gas by closing valves or other means. h. Notifying police and fire departments. | <ul style="list-style-type: none"> 1. Any leak which, in the judgment of operating personnel at the scene, is regarded as an immediate hazard. 2. Escaping gas that has ignited. 3. Any indication of gas which has migrated into or under a building, or into a tunnel. 4. Any reading at the outside wall of a building or where gas would likely migrate to an outside wall of a building. 5. Any reading of 80% LEL, or greater, in a confined space for natural gas. 6. Any reading of 80% LEL for natural gas or greater in small substructures (other than gas associated substructures) from which gas would likely migrate to the outside wall of a building. 7. Any leak that can be seen, heard, or felt, and which is in a location that may endanger the general public or property. |

Cascade Natural Gas Corporation
COMPANY PROCEDURE

| | | | | |
|-----------|---------|---------------------|--|--|
| C.P.# 750 | Page 10 | Dated July 30, 2010 | | |
|-----------|---------|---------------------|--|--|

TITLE: LEAK INVESTIGATION

TABLE 11B – LEAK CLASSIFICATION AND ACTION CRITERIA – GRADE 2

| DEFINITION | ACTION CRITERIA | EXAMPLES |
|---|---|---|
| <p>GRADE 2</p> <p>A leak that is recognized as being non-hazardous at the time of detection, but justifies scheduled repair based on probable future hazard.</p> | <p>Must be repaired or cleared within one calendar year, but no later than 15 months from the date the leak was reported. In determining the repair priority, criteria such as the following should be considered:</p> <ol style="list-style-type: none"> a. Amount and migration of gas. b. Proximity of gas to buildings and subsurface structures. c. Extent of pavement. d. Soil type and soil conditions (such as frost cap, moisture and natural venting). <p>Grade 2 leaks must be reevaluated at least once every six months until cleared. The location and magnitude of the leakage condition should determine the frequency of reevaluation.</p> <p>Grade 2 leaks may vary greatly in degree of potential hazard. Some Grade 2 leaks when evaluated by the above criteria may justify scheduled repair within the next 5 working days. Others will justify repair within 30 days. During the working day on which the leak is discovered, these situations should be brought to the attention of the individual responsible for scheduling leak repair.</p> <p>On the other hand, many Grade 2 leaks because of their location and magnitude can be scheduled for repair on a normal routine basis with periodic re-inspection as necessary.</p> | <p>A. Leaks Requiring Action Ahead of Ground Freezing or Other Adverse Changes in Venting Conditions</p> <ol style="list-style-type: none"> 1. Any leak which, under frozen or other adverse soil conditions, would likely migrate to the outside wall of a building. <p>B. Leaks Requiring Action Within Six Months</p> <ol style="list-style-type: none"> 1. Any reading of 40% LEL or greater, under a sidewalk in a wall-to-wall paved area that does not qualify as a Grade 1 leak. 2. Any reading of 100% LEL or greater, under a street in a wall-to-wall paved area that has significant gas migration and does not qualify as a Grade 1 leak. 3. Any reading less than 80% LEL for natural gas in small substructures (other than gas associated substructures) from which gas would likely migrate creating a probable future hazard. 4. Any reading between 20% LEL and 80% LEL in a confined space for natural gas. 5. Any reading on a pipeline operating at 30% SMYS or greater, in a class 3 or 4 location, which does not qualify as a Grade 1 leak. 6. Any reading of 80% LEL or greater, in gas associated substructures. 7. Any leak which, in the judgment of operating personnel at the scene, is of sufficient magnitude to justify scheduled repair. |

Cascade Natural Gas Corporation
COMPANY PROCEDURE

| | | | | | |
|-----------|---------|---------------------|--|--|--|
| C.P.# 750 | Page 11 | Dated July 30, 2010 | | | |
|-----------|---------|---------------------|--|--|--|

TITLE: LEAK INVESTIGATION

TABLE 11C – LEAK CLASSIFICATION AND ACTION CRITERIA – GRADE 3

| DEFINITION | ACTION CRITERIA | EXAMPLES |
|--|---|--|
| <p>GRADE 3</p> <p>A leak that is non-hazardous at the time of detection and can be reasonably expected to remain non-hazardous.</p> | <p>These leaks must be reevaluated during the next scheduled survey or within 15 months of the date reported whichever occurs first, until the leak is re-graded or no longer results in a reading.</p> | <p><i>Leaks Requiring Reevaluation at Periodic Intervals</i></p> <ol style="list-style-type: none"> 1. Any reading of less than 80% LEL in small gas associated substructures. 2. Any reading under a street in areas without wall-to-wall paving where it is unlikely the gas could migrate to the outside wall of a building. 3. Any reading of less than 20% LEL in a confined space for natural gas. |