CITY OF Enumclaw WASHINGTON

NATURAL GAS UTILITY
Safety Compliance and Reliability

December 2, 2009

David Lykken
Director Pipeline Safety
Utilities and Transportation Commission
P.O. Box 47520
Olympia, WA 98504-7250
1300 S Evergreen Park Dr SW

Subject: Leak detection surveys with RMLD.

Dear Mr. Lykken,

Pursuant to Docket PG-080097 City of Enumclaw Gas Utility has updated its leak detection survey procedure and purchased new technology for leak surveys.

City of Enumclaw has been updating maps to reflect accurate locations of underground services and mains. During this process we have identified service line installations that would be difficult to leak survey using measurements alone. The new RMLD allows for the leak survey technician to sweep the entire area insuring a complete survey over mains and surveys without the need for exact service line measurements.

I am requesting approval of our leak detection survey without the need for measurements on service lines to prove we have successfully leak surveyed over services without measurements and offsets.

See attached our leak detection survey procedure.

If you have any questions regarding this procedure, please contact me at (253) 261-1124

Sincerely,

William E Hawthorne
City of Enumclaw Gas Utility Manager

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1. PATROLS – DISTRIBUTION [192.721] [WAC 480-93-124]

(Return to Appendix 5-A-1)

1.1 General

(a) Patrols are conducted to observe factors affecting safe operation and to enable correction of potentially hazardous conditions which could cause failure or leakage, and consequent hazards to public safety. Patrols for line markers are conducted to ensure that they are present where required and that they are visible and legible [WAC 480-93-124(6)]. Examples of conditions that might be reported are listed on Form 2-D-1, Patrol or Leak Survey Report.

(b) Patrols may be performed in conjunction with leakage surveys.

(c) The frequency of patrolling mains shall be determined by the severity of the conditions which could cause failure or leakage, and the consequent hazard to public safety. [192.721(a)]

(d) Line markers (signs) for buried and aboveground pipelines shall be maintained. Patrols shall include observation of line markers to ensure that they are not damaged or missing. [192.707(a)] [192.707 (c)]

(e) Line markers found missing or damaged shall be replaced or repaired within 45 days. [WAC 480-93-124(5)]

(f) Regarding installation and specifications for line markers, see Procedure 2-F, Section 4.

1.2 Quarterly Patrols

(a) Mains in business districts that are in places or on structures where anticipated physical movement or external loading could cause failure or leakage shall be patrolled at intervals not exceeding 4 1/2 months, but at least four times each calendar year. [192.721(b)(1)]

(b) The City of Enumclaw currently has no such area identified within the business districts.

1.3 6-Month Patrols

(a) The following pipelines shall be patrolled at intervals not exceeding 7 1/2 months, but at least twice each calendar year.

(1) Mains, other than in business districts (see Section 2.2 below), that are in places or on structures where anticipated physical movement or external loading could cause failure or leakage. Such places or structures could potentially include the following. [192.721(b)(2)]

(A) Bridges or other spans
(B) Areas of flooding or earth subsidence
(C) Known slip areas
(D) Locations temporarily subjected to extreme weather conditions

(2) Mains and services attached to bridges or that otherwise span an area. [WAC 480-93-124(4)]

(b) Locations meeting the criteria in Paragraph (a) above are listed in Appendix 2-D-4.

(c) 6-month patrols shall be documented on Form 2-D-1 and on Form 2-D-4. Form 2-D-4 includes a description of the system and area surveyed. [WAC 480-93-124(6)(b)]

1.4 1-Year Patrols

1.4.1 High Pressure Line Patrol

(a) The high pressure line (250 psig MAOP) shall be patrolled at intervals not exceeding 15 months, but at least once each calendar year.

(b) The high pressure line patrol shall be documented on Form 2-D-5. Form 2-D-5 includes a description of the system and area surveyed. [WAC 480-93-124(6)(b)]

(c) If a high pressure line patrol is conducted in conjunction with a leak survey, both a Form 2-D-1 and a Form 2-D-5 shall be retained.

1.4.2 Business District Patrol

(a) Business Districts shall be patrolled by vehicle or foot at at intervals not exceeding 15 months, but at least once each calendar year. The frequency may be increased at any time the Gas Utility Manager feels it may be necessary due to increased construction or activities which could cause failure or leakage. The Gas Utility Manager has determined that, with cooperation from other departments, the gas company provides sufficient patrolling in the Business Districts throughout the year.

(b) Business District patrols shall be documented using Form 2-D-1 and Form 2-D-3, clipped together. Form 2-D-3 includes a description of the system and area surveyed. [WAC 480-93-124(6)(b)]

1.5 5-Year Patrols

(a) Distribution mains, other than those covered under Sections 1.2, 1.3, or 1.4 above, shall be patrolled once every five calendar years with intervals not exceeding 63 months.

(b) These patrols shall be documented on Form 2-D-1. Additionally, line markers on 5-year patrols shall be documented on Form 2-D-2. Form 2-D-2 includes a description of the system and area surveyed. [WAC 480-93-124(6)(b)]

1.6 Special Patrols

(a) If, in consideration of Paragraph 1.1(c) above, there are locations or areas which are considered potentially hazardous, the Gas Utility Manager may decide to patrol them more frequently based on the probable severity, timing, and duration of the hazard.

(b) Generally, such special patrols will be documented on Form 2-D-1.

2. LEAKAGE SURVEYS – DISTRIBUTION [192.723]

(Return to Procedure 2-P, Section 7(a))

2.1 Mains and Service Lines

The following procedure applies to all distribution mains except those addressed in Section 2.2, Business Districts or Section 2.3, High Occupancy Structures or Areas.

(a) Leakage surveys on plastic and steel shall be conducted as frequently as necessary, but at least once every 5 calendar years at intervals not exceeding 63 months.

(b) Leakage surveys shall generally consist of a portable (walking) survey using FI equipment RMLD or equivalent.

(c) Gas leak surveys shall be performed using a gas detection instrument covering the following areas and circumstances. [WAC 480-93-188(1)]

(1) Over mains and service lines including the testing of the atmosphere near other utility (gas, electric, telephone, sewer, or water) boxes or manholes, and other underground structures;
(2) Through cracks in paving and sidewalks;
(3) On all above ground piping (may be checked with either a gas detection instrument or with a soap solution);
(4) Where a gas service line exists, a survey shall be conducted at the building wall at the point of entrance, using a bar hole if necessary;
(5) Within buildings where gas leakage has been detected at the outside wall, at locations were escaping gas could potentially migrate into and accumulate inside the building; and
(6) Where the pipeline is under pavement (e.g., asphalt or concrete), locations that can allow gas to vent (such as curb boxes, cracks in the pavement, and the edge of pavement) shall be surveyed.
(7) Instruments
    (a) Company auathorized CGI (capable of indicating LEL and percentage of gas). Or
    (b) Compnay authorized RMLD (capable or indicating methane but not used to grade the leak) CGI must be used to grade the leak.
(8) Verify that accurate maps have been supplied and used to determine the survey locations.
(9) Verify all survey equipment has been calibrated to meet the manufacturers requirements.
(10) Portable FI
    (a) Walking along the route of the pipeline using the portable FI instrument (follow the manufacturer's operating instructions or procedure) continuously sample the atmosphere.
    (b) DO NOT sample more than 2 inches above the ground or pavement surface.

(c) If a leak is detected an audible alarm will sound along with a visible indication on the equipment. Perform a bar hole survey (refer to section Proc 2-D section 6.2)

(11) Perform Using RMLD

(a) Test RMLD with manufacturer tester equipped with RMLD, verify correct audible and visual alarms.

(b) Walk along above or below ground facility, instrument should be aimed 12 – 100 feet in front of surveyor. At this distance an area 2 foot in width will be covered by the instrument.

(c) Instrument may be used to survey inacessable areas, within the distance of 12-100ft.

(d) If a leak is detected an audible alarm will sound along with a visible indication on the equipment. Perform the necessary test to grade leak. (Procedure 2-D Section 5, Section 6)

(d) "*Customer's buried piping*" means piping downstream of the customer meter that is buried. "Customer's buried piping" ends at the entry of the first building downstream, or, if the customer's buried piping does not enter a building, at the inlet of the principal gas utilization equipment or the first fence (or wall) that surrounds that equipment. "Customer's buried piping" does not include branch lines that serve yard lanterns, pool heaters, or other types of secondary equipment. [192.16]

See Procedure 4-O, Section 3(a)(3)(B) for a more complete description of "buried customer piping".

(1) If there is "buried customer piping" downstream from meter sets, the leakage survey shall extend:

(A) Up to the entry of the first building downstream of the meter set, or

(B) If the customer's buried piping does not enter a building, up to the principal gas utilization equipment or the first fence (or wall) that surrounds that equipment.

(2) If an unsafe condition is found on a customer's buried piping:

(A) The gas shall be shut off, and

(B) The customer shall be advised of the need to repair the unsafe condition.

(e) For aboveground piping the sample in-take of the unit shall be moved slowly from fitting to fitting over the entire meter setting. An indication of a leak on exposed piping shall be checked with a soap-water solution (or equivalent).

(f) A leak survey shall be conducted on non cathodically protected steel service lines at least twice annually, but not to exceed seven and one-half months between surveys. These leak surveys shall be documented on Form 2-D-7. See Procedure 2-O, Section 5.5. [WAC 480-93-188(3)(d)]

(g) These leak surveys, other than those for non Cathodically protected steel service lines, shall be documented on Form 2-D-1, Patrol or Leak Survey Report (see Appendix 2-D-1). If survey does not include color coded map, a detailed description of area surveyed shall be documented on 2-D-1.

(h) In addition, the gas lines leak surveyed each day may be color coded on a map. Each day's work on a given map should be coded using a different color. The following information shall also be recorded on the map.
(1) The date,
(2) the name of the employee performing the leak survey, and
(3) the serial number of the leak detection unit used.

(i) Color coding may be used for some patrols (e.g., business districts) that extend over multiple days.

2.2 Business Districts [192.723(b)(1)] (return to Section 1.3(a)(1) above)

(a) "*Business district*" means an area where the public regularly congregates or where the majority of the buildings on either side of the street are regularly used for financial, commercial, industrial, religious, educational, health, or recreational purposes. [WAC 480-93-005(3)]

(b) A map or record shall be kept of the current location of each business district. The boundary locations indicating where the business district begins and ends shall be clearly established

(c) Leak detection surveys in business districts shall be performed with leak detector equipment at intervals not exceeding 15 months, but at least once each calendar year. Mains in the right-of-way adjoining a business district shall be included in the survey. [WAC 480-93-188(3)(a)]

(d) The survey shall include tests of the atmosphere:
(1) Over mains.
(2) Over service lines.
(3) Over both edges of the driving surface.
(4) Over inside meter sets from the building entrance to the outlet of the meter.
(5) In gas, electric, telephone, sewer, and water system manholes, catch basins, vaults, other utility openings, and at cracks in pavement and sidewalks.
(6) At other locations providing an opportunity for finding gas leaks.

2.3 High Occupancy Structures or Areas

(a) "*High Occupancy Structure (HOS) or Area (HOA)*" means a building or an outside area (such as a playground, recreation area, outdoor theater, or other place of public assembly) that is occupied by twenty or more persons on at least five days a week for ten weeks in any twelve-month period. (The days and weeks need not be consecutive.) [WAC 480-93-005(14)]

(b) Leak detection surveys at high occupancy structures or areas shall be conducted at least once annually, but not to exceed fifteen months between surveys. See gas map HOS/HOA for identified structures. The leak detection surveys may be done in conjuction with the business district leak surveys. [WAC 480-93-188(3)(b)]

2.4 High Pressure Line (Return to Procedure 1-E, item 1)

(a) The high pressure line (250 psig MAOP) shall be leak surveyed at intervals not exceeding 15 months, but at least once each calendar year. [WAC 480-93-188(3)(c)]

(b) The high pressure line leak survey shall be documented on Form 2-D-1, Patrol or Leak Survey Report. [WAC 480-93-124(6)(b)]

(c) If a high pressure line patrol is conducted in conjunction with a leak survey, both a Form 2-D-1 and a Form 2-D-5 shall be retained.

2.5 Shorted Casings [WAC 480-93-110(5)(d)]
(Return to Procedure 2-O, Section 5.1(g)(7)(B))

Whenever a short exists between a pipeline and casing, a leak survey shall be performed at least twice annually thereafter, but not to exceed seven and one-half months between leak surveys until the shorted condition is eliminated.

2.6 Special leak surveys [WAC 480-93-188(4)]

Special leak surveys shall be conducted under the following circumstances.

(a) Prior to paving or resurfacing, following street alterations or repairs where gas facilities are under the area to be paved, and where damage could have occurred to gaspipelines;

(b) In areas where substructure construction occurs adjacent to underground gas pipelines, and damage could have occurred to the gaspipeline, a gas leak survey shall be performed following the completion of construction, but prior to paving;

(c) Unstable soil areas where active gas pipelines could be affected;

(d) In areas and at times of unusual activity, such as earthquake, floods, and explosions; and

(e) After third-party excavation damage to services, a gas leak survey shall be performed from the point of damage to the service tie-in.
(Return to Procedure 4-O, Section 3) (Return to Procedure 4-O, Section 7(c))

3. COMBINATION SURVEYS [192.705] [192.706] [192.721] [192.723]
(Return to Procedure 2-C, Section 3) (Return to Appendix 5-A-1)

(a) A patrol and a leak survey may be combined into a single event. If this is the case, both the patrol and the leak survey indications shall be marked on the Patrol or Leak Survey Report.

(b) Visual surveillance may also be performed when a leak survey or a patrol is being conducted. (Return to Procedure 2-C, Section 2(b))

4. VAULTS [192.749(b)]

(Return to Appendix 2-D-1)

(a) If gas is found in a vault, the equipment in the vault shall be inspected for leaks, and any leaks found shall be repaired.

(b) The ventilating equipment, if any, shall be inspected to determine whether it is functioning properly.

(c) Each vault cover shall be inspected to ensure that it does not present a hazard to public safety.

5. LEAK GRADING,ACTION CRITERIA

(Return to Procedure 2-N, Section 4) (Return to Procedure 2-P, Section 1.1(c)) (Return to Procedure 2-P, Section 4.1(a)) (Return to Procedure 2-P, Section 4.3(b)) (Return to Procedure 2-P, Section 7(c)) (Return to Procedure 3-B, Section 4(d))

5.1 General

5.1.1 Use of Judgment

The material in this section is presented as a guideline. The judgment of the operator personnel at the scene is of primary importance in determining the grade assigned to a leak and the action criteria to be used.

5.1.2 Establishing the Perimeter

(a) When evaluating a gas leak indication, the initial step is to determine the perimeter of the leak indication area utilizing a CGI.

(b) When this perimeter extends to a building wall, the investigation should continue into the building.

5.1.3 Downgrading a Leak Indication [WAC 480-93-186(4)]

Grade 1 and 2 leaks can only be downgraded once to a Grade 3 leak without a physical repair. After a leak has been downgraded once, the maximum repair time for that leak is 21 months.

5.1.4 Assigning Leak Grades [WAC 480-93-186(1)]

Leak grades shall be assigned based on an evaluation of the location and/or magnitude of a leak to establish the leak repair priority. The same criteria used for initial leak grading shall be applied when reevaluating leaks.

5.2 Grade 1 Leak Indications [WAC 480-93-18601(1)]

5.2.1 Definition

A Grade 1 leak indication is one that represents an existing or probable hazard to persons or property, and requires prompt action, immediate repair, or continuous action until the conditions are no longer hazardous.

5.2.2 Examples

Following are some examples of leak indications that would typically be classified as Grade 1:

(a) A leak which, in the judgment of operating personnel at the scene, is regarded as an immediate hazard.

(b) Escaping gas that has ignited unintentionally.

(c) An indication of gas which has migrated into or under a building, or into a tunnel.

(d) A leak indication at the outside wall of a building, or where gas would likely migrate to an outside wall of a building.

(e) A leak indication of 80% LEL, or greater, in an enclosed space.

(f) A leak indication of 80% LEL, or greater, in small substructures (other than gas associated substructures) from which gas would likely migrate to the outside wall of a building.

(g) A leak that can be seen, heard, or felt, and which is in a location that may endanger the general public or property.

5.2.3 Action Criteria

(a) Grade 1 leak indications require:
  (1) Prompt action to protect life and property, and
  (2) Continuous action until the condition is no longer hazardous.

(b) Prompt action, in some instances, may include one or more of the following:
  (1) Implementation of the Emergency Response Manual.
  (2) Evacuating premises.
  (3) Blocking off an area.
  (4) Rerouting traffic.
  (5) Eliminating sources of ignition.
  (6) Venting the area by:
    (A) Removing manhole covers,
    (B) Bar-holing,
    (C) Installing vent holes, or
    (D) Other means.
  (7) Stopping the flow of gas by closing valves or other means.
  (8) Notifying police and fire departments.
  (9) Repairing the pipe.
  (10) Replacing the pipe.

(c) For outside leak orders near a building where the source of the leak cannot be determined, a bar hole survey shall be conducted around the perimeter of the building, over the service, and over the main in the vicinity of the building.

(Return to Section 5.3.3(e) below)

5.3 Grade 2 Leak Indication [WAC 480-93-18601(2)]

5.3.1 Definition

A Grade 2 leak indication is one that is recognized as being non-hazardous at the time of detection, but justifies scheduled repair or removal based on the potential for creating a future hazard.

5.3.2 Examples

Following are some examples of Grade 2 leak indications that would typically be scheduled for repair or removal within six months:

(a) A leak indication of 40% LEL, or greater, under a sidewalk in a wall-to-wall paved area that does not qualify as a Grade 1 leak, and where gas could potentially migrate to the outside wall of a building.

(b) A leak indication of 100% LEL, or greater, under a street in a wall-to-wall paved area where gas could potentially migrate to the outside wall of a building, and which does not qualify as a Grade 1 leak.

(c) A leak indication less than 80% LEL in small substructures (other than a gas associated substructure) from which gas would likely migrate, creating a probable future hazard.

(d) A leak indication between 20% LEL and 80% LEL in an enclosed space.

(e) A leak indication of 80% LEL, or greater, in a gas associated substructure.

(f) A leak which, in the judgment of operating personnel at the scene, is of sufficient magnitude to justify scheduled repair.

5.3.3 Action Criteria

(a) *General.* Leaks shall be repaired, removed, or cleared within one calendar year, but no later than 15 months from the date the leak was reported. (If a Grade 2 leak occurs in a segment of pipeline that is under consideration for replacement, an additional six months may be added to the 15 months maximum time for repair.) In determining the repair priority, the following criteria may be considered:
(1) Amount and migration of gas.
(2) Proximity of gas to buildings and subsurface structures.
(3) Extent of pavement.
(4) Soil type, and soil conditions (such as frost cap, moisture, and natural venting).

(b) *Frozen ground.* A Grade 2 leak which, under frozen or other adverse soil conditions, would likely migrate to the outside wall of a building should be repaired or removed prior to the ground freezing or prior to the occurrence of other adverse soil conditions.

(c) *Reevaluation.* A Grade 2 leak shall be reevaluated at least once every six months until cleared. The frequency of reevaluation should be determined by the location and magnitude of the leakage indication.

(d) *Variation.* Grade 2 leaks may vary greatly in degree of potential hazard. Some, when evaluated by the criteria, may justify scheduled repair within the next 5 working days. Others may require repair within 30 days. During the working day on which the leak is discovered, these situations shall be brought to the attention of the individual responsible for scheduling the repair. Many Grade 2 leaks, because of their location and magnitude, can be scheduled for repair on a normal routine basis with periodic reevaluation as necessary.

(e) *Gas Against Building Wall.* (See Section 5.2.3(c) above.)

5.4 Grade 3 Leak Indication [WAC 480-93-18601(3)]

5.4.1 Definition

A Grade 3 leak indication is one that is non-hazardous at the time of detection, and can be reasonably expected to remain non-hazardous.

5.4.2 Examples

Following are some examples of leak indications that would typically be classified as Grade 3:

(a) A leak indication of less than 80% LEL in small gas associated substructures, such as small meter boxes or gas valve boxes.

(b) A leak indication 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.

(c) A leak indication of less than 20% LEL in a confined space.

5.4.3 Action Criteria

Grade 3 leak indications should 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.

6. TESTING METHODS

6.1 Bubble/Soap Test:

This Procedure establishes the method for performing a bubble/soap test. The soap test is performed on a fitting or connection suspected of leaking and is also done after installing or reconnecting pipe fittings.

(a) Gently brush or spray the soap solution on the fitting, be caucious of fast or vigorous brush strokes, as this may cause bubbles.
(b) The size of the leak will determine how the bubbles will appear.

Small Leak or Fizzer: Defined as bubbles that appear to be 1/16 inch or less in diameter.

Large Leak or Pinhole: Defined as bubbles 1/8" and larger.

(c) Once completed, dry and clean the pipe to eliminate possible corrosion.

6.2 Performing a bar Test: (Return to 2-P Section 4.2)

This procedure establishes the method for performing a bar test. Leak investigator will take underground CGI reads to grade and pinpoint the area of the leak. These test holes are called barholes. This test requires a CGI capable indicating LEL and percentage of gas.

Safety Percautions:
To avoid electrical shock from contact with underground electrical lines:

- Insulated plunger bar must be in good working condition, pay special attention to the insulated hand grip.
- Keep both hands on the insulated section of the plunger when making the bar hole. If other underground utilities are not located, do not plung deeper than 12 inches.

6.2.1 Insure CGI is functional and calibration date is current.
(a) Visually inspect all equipment.
(b) If any equipment is damaged or not within calibration standards, stop the test and notify the Gas Supervisor.

6.2.2 Select locations for bar hole test.
(a) Look for predrilled holes in the pavement.
(b) If the main or service being tested is under pavement, make test holes along and behind the curb. Or utiize cracks in the hard surface.
(c) Look for indications of other underground utilities; telephone boxes, sewer lines, power lines, fiber optics, and water main
(d) If the main is within 2 ft of soft surface a modified bar hole at a 45 degree angle may be used.

6.2.3 Determine the proper hole depth.
(a) The bar hole shall not exceed the depth of the gas facility.
(b) If utilities have been located the depth shall be as needed to the depth of the facilitiy.
(c) If utilities have NOT been located a probe depth of 12 inches shall not be exceeded.

6.2.4 Spacing between samples.
(a) The bar holes should continue along your line at 10 to 15 foot intervals. Once bar holes have been made, use the CGI to sample the atmosphere to determine grade of leak.

7. APPENDICES

List of Appendices to Procedure 2-D	
Appendix Number	Title
2-D-1	Form 2-D-1, Patrol or Leak Survey Report
2-D-2	Form 2-D-2, Distribution Sign / Marker Patrol
2-D-3	Form 2-D-3, Business District List
2-D-4	Form 2-D-4, 6-Month Patrol Record
2-D-5	Form 2-D-5, High Pressure Systemand Sign/Marker Patrol
2-D-6	Form 2-D-6, High Occupancy Structure or Area Inspection Record
2-D-7	Form 2-D-7, Unprotected Service List