



# Leak Survey for Local Gas Distribution Companies

Presented to:

The Washington State Citizens Committee on Pipeline Safety

Prepared by Jody Morehouse

March 2013

## Objectives

- Overview of Avista's gas distribution system
- Overview of Regulations on Leaks
- Overview of Avista's Leak Survey Program

# SERVICE TERRITORY, HEADQUARTERS IN SPOKANE, WASHINGTON

## Avista's Gas Service

- Combined Gas & Electric Distribution Company
- 320,000 gas customers
- 12,600 miles of gas pipeline
  - 8,600 miles PE aged 1968-current
  - 4,000 miles steel, aged 1931-current
- No cast iron
- 112 miles of transmission
  - 73 miles in WA
  - 54 miles in OR



# Leak Surveying Rules

## Minimum Pipeline Safety Regulations 49CFR 192.723 Distribution System leakage Surveys

**PURPOSE:** To establish periodic leakage survey frequencies

### Survey Categories:

- Annual Surveys – Business Districts
- 5 Year Surveys
- Special Surveys

# Annual Surveys

- **Business District:** An area where the public congregates or where the buildings are primarily used for financial, commercial, industrial, religious, educational, health, or recreational purposes.
  - Frequency: *Once each calendar year not to exceed 15 months.*
  - Specific Considerations:
    - High Occupancy Buildings
    - Pipeline operating at 250 psig +
    - Transmission pipelines (may require higher frequencies)

## 5 Year and Special Leak Surveys

- **5 Year Leak Surveys:** Residential areas are surveyed 20% per year so that the entire system is surveyed in a 5-year period not to exceed 63 months.
- **Special Leak Surveys:** Leak surveys for one-time projects where damage may have occurred, special situations, or for specific programs.
  - Prior to paving or resurfacing of roads
  - In construction areas of other underground structures
  - Unstable soil areas
  - After earthquakes, flood, and fires
  - Early vintage PE pipe locations (annually)
  - During uprate procedures

# Leak Detection Instrumentation

- **Flame Ionization Detector (FI):** Very sensitive instrument measuring in parts per million (ppm). It detects the presence of methane gas by measuring the ions produced in a hydrogen flame when gas is burned.



# Leak Detection Instrumentation

- **Combustible Gas Indicator (CGI):** A thermal filament is heated, the combustible gases burn on the filament, and the changes in the temperature on the filament are converted into a % gas in air reading (0 to 100% gas in air).
- **Explosive Limits:** Gas is combustible in gas-air mixtures from 5 to 15% gas in air concentrations.
  - 5% gas in air is the Lower Explosive Limit or LEL
  - A CGI can detect % gas in air reading, or a % LEL reading. % LEL refers the level of gas between 0 and 4% gas in air. A 20% LEL reading is equivalent to 1% gas in air reading.



# Leak Detection Instrumentation

- **Remote Methane Leak Detector (RMLD):** This instrument utilizes a laser that passes through the plume of methane and measures the amount of light absorbed by the methane which is measured by spectroscopy.
- **Bubble Leak Tests:** Applying soapy water to exposed pipe. This method is used as a supplement to the other leak detection methods.



# Maps

## Annual Survey



1A117 - 2

Leak Survey: Annual  
 Year: 2011  
 Construction Office: Spokane  
 City: Spokane NW  
 Date Printed: 02-21-2012  
 FI Unit Serial # 1:

Daily Calibration 1:  
 Unit Reading: \_\_\_\_\_ ppm  
 Reference Gas: \_\_\_\_\_ ppm  
 Blocked:  Yes  No

Date: \_\_\_\_\_  
 Tested By: \_\_\_\_\_

FI Unit Serial # 2:

Daily Calibration 2:  
 Unit Reading: \_\_\_\_\_ ppm  
 Reference Gas: \_\_\_\_\_ ppm  
 Blocked:  Yes  No

Date: \_\_\_\_\_  
 Tested By: \_\_\_\_\_

# Of Map Corrections: \_\_\_\_\_  
 Leak Location Report #: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Of Non-Leak Reports: \_\_\_\_\_  
 Non Leak Report #: \_\_\_\_\_

\_\_\_\_\_

Remarks: \_\_\_\_\_

\_\_\_\_\_

Old System Grid Numbers: \_\_\_\_\_

1A113D	1A113A	1A113B
1A113D	1A113E	1A113F
1A1171	1A1172	1A1173
1A1175	1A1176	1A1177
1A1175	1A117A	1A117B



NOTICE: THIS IS NOT A LEGAL DOCUMENT  
**AVISTA**  
 Utilities

Information shown on this map should not be used to determine the location of facilities in relationship to property lines, section lines, roads, streets, etc.

No. of services: 0

Main footage: 6324 I= \_\_\_\_\_ II= \_\_\_\_\_ III= \_\_\_\_\_  
 Service Footage: 596 I= \_\_\_\_\_ II= \_\_\_\_\_ III= \_\_\_\_\_  
 No. of MSA leak indications: \_\_\_\_\_ I= \_\_\_\_\_ II= \_\_\_\_\_ III= \_\_\_\_\_

Date Completed: \_\_\_\_\_  
 Surveyed By: \_\_\_\_\_  
 Surveyed By: \_\_\_\_\_



# Survey and Pin Pointing of Leaks

Once the presence of gas is detected underground with an FI unit, the ground is bar holed (punctured with a rod) and a CGI is utilized to determine the classification of the leak based on the % LEL or % gas in air.



# Leak Classifications

- **Grade 1 Leaks:** Any leak that represents an existing or probable hazard to persons or property. It requires immediate repair or prompt continuous action until the conditions are no longer a hazard.
- **Grade 2 Leaks:** Any leak that is recognized as being non-hazardous at the time of detection, but that justifies scheduled repair based on probable future hazard. Repaired within 1 year, but must be reevaluated in 6 months.
- **Grade 3 Leaks:** Any leak that is non-hazardous at the time of detection and can reasonably be expected to remain non-hazardous. Reevaluated once per year until fixed or reclassified.