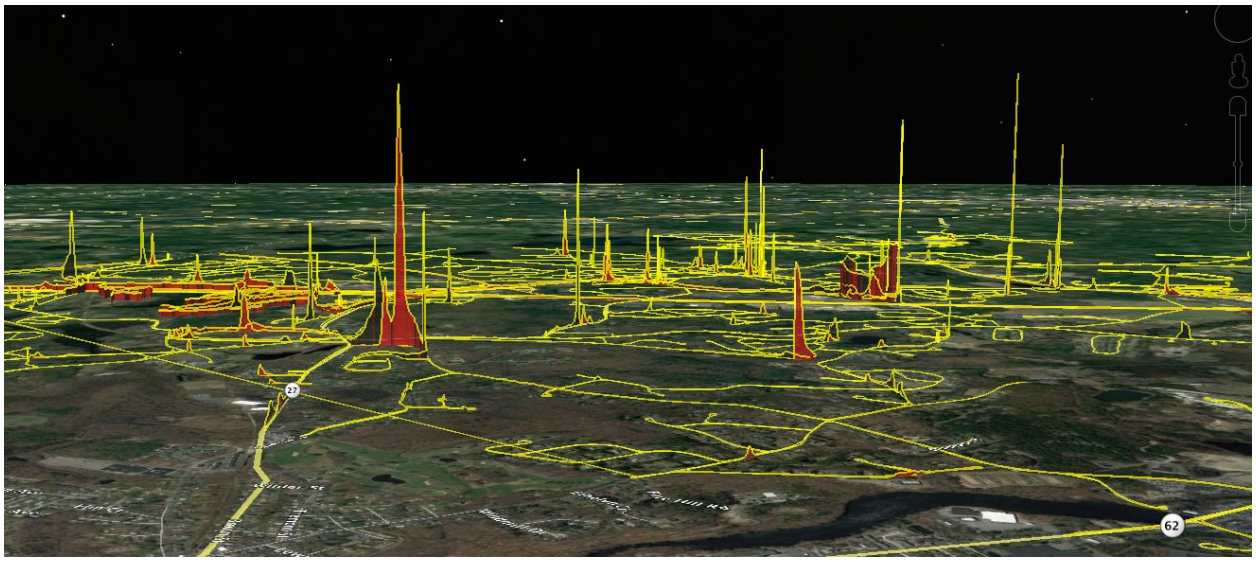
# Town of Acton
# Methane Survey
# 2017




## Gas Safety Inc
## 16 Brook Lane
## Southborough, Massachusetts 01772
## 774-922-4626

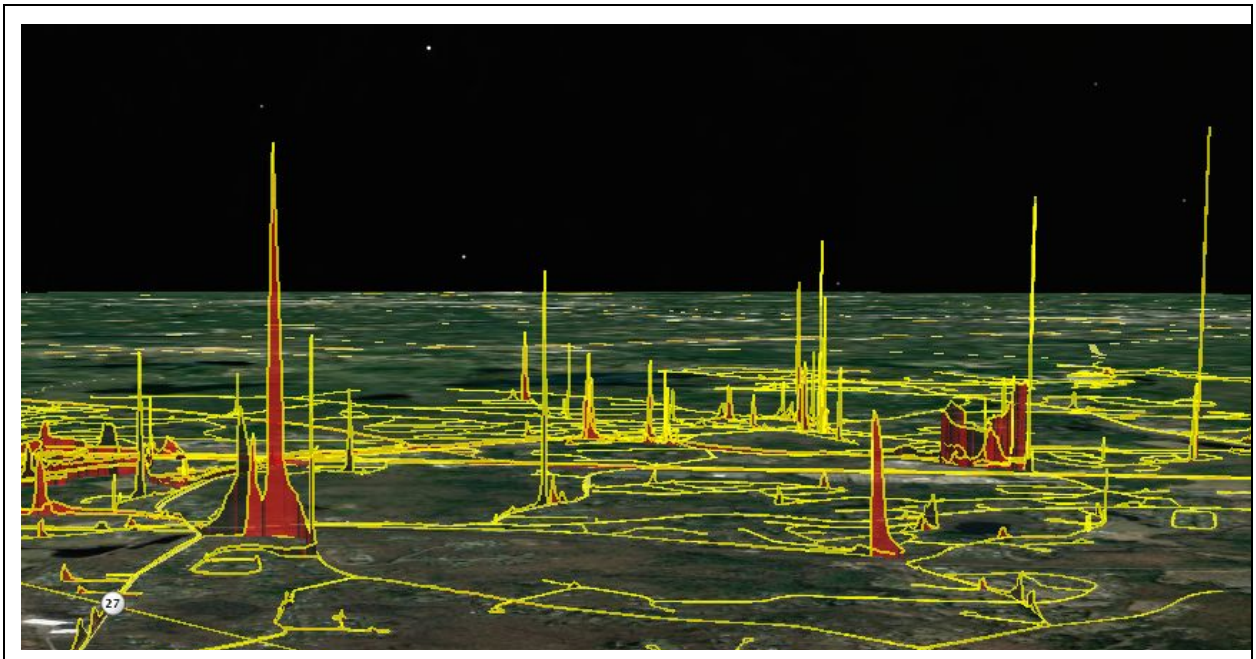
**Acton Methane Survey**

Pursuant to a contract with the Town of Acton, Gas Safety Inc. (GSI) conducted a methane survey of the public roadways in the Town of Acton, Massachusetts from 10/18/2017 to 12/31/2017.

**Procedure**:

Gas Safety Inc. conducted  a mobile driving survey of public roadways utilizing a Cavity Ringdown Spectrometer (CRDS) mobile CH4 instrument, along with an industry-standard mobile vehicle mounted Flame Ionization Unit (FIU).  All public roadways were surveyed with the analyzer on both sides of each street.

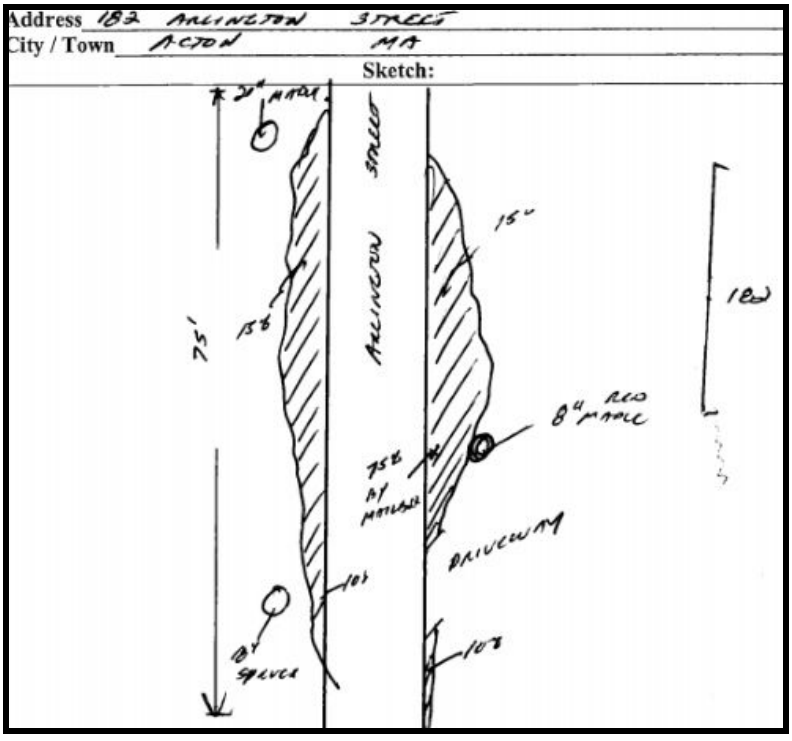
The CRDS samples the air approximately every second and records the level of methane in parts per billion while recording the corresponding GPS coordinates that facilitates mapping in GIS software such as Google Earth. Pipe-quality natural gas is over 90% methane.




The Town of Acton
Yellow lines show where the mobile survey vehicle drove.  Spikes show elevated levels of methane.


All Elevated Methane Levels (EMLS) indicated by the CRDS or vehicle mounted FIU were investigated with an industry standard portable FIU to determine the source of the elevation. Typically, methane readings from stationary sources will have easily repeatable readings, ie: pipeline leaks, landfill emissions, failed septic systems, etc. where non stationary sources (mostly vehicle and small engine exhaust) typically will not repeat upon secondary investigation with either the CRDS or FIU.

All FIU leak indications from below-ground pipes were verified with an industry standard Bascom-Turner Sentry Combustible Gas Indicator (CGI) percent gas in air readings from 6" plunger bar holes into the subsoil. Any leaks indicated on above ground exposed pipe (fit or fitting leaks) were verified with soap solution.




**Leak Grade**: Each leak was graded or classified using Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) Leak Classification Guidelines - see Appendix for more information.

**Leak Reports**: Each leak was documented on a Gas Safety Inc. leak report. The reports include each leak's address, leak grade, leak migration extent and any trees that were in the leak migration area.

Each report has a field sketch showing the street from above (not to scale).

The shaded area delineates the migration area of the gas-saturated soil as indicated by flame ionization readings and verified with combustible gas indicator gas in air readings taken from 6" plunger bar test holes. Where the soil was tested for the presence of gas, the percent of gas in air in the soil is noted (i.e. 10%). Trees, manholes and other items are noted.

Any leak discovered that was not documented on the HEET outstanding gas leak map according to National Grid reported data, were reported to National Grid via recorded emergency gas leak line 1-800-233-5325. The time of each call is recorded on the bottom of each leak report. If the leak was outstanding at the time of detection, the National Grid leak number was recorded on each leak report. All leak reports are in the attachments.

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## Reasons to Care about Gas Leaks

**Safety:**

Natural gas pipelines are an inherent safety hazard due to the fact that leaking natural gas can explode and cause harm to persons and property. Any excavation into the subsoil of more than 6” requires a call to  “Dig Safe”  that notifies all owners of underground structures that an excavation is taking place and requires the owner of any facility to mark out where these facilities exist. Third party “hits” of gas pipelines is the number one cause of pipeline incidents. Please call Dig Safe  before any excavations. It's the law.

The Acton gas system is an intermediate pressure (60 psi) system composed mostly of steel and plastic pipelines. The original steel system is old and susceptible to corrosion and the corrosion is the culprit in most of the leaks detected in Acton. With such high pressure (60 psi), small leaks could quickly turn into large leaks that may require immediate repair to avoid an incident.

A grade three leak is non hazardous at the time of detection and is ***expected to remain non hazardous.***

High volume emitting leaks and leaks that may be in close proximity to buildings or confined spaces where gas could migrate to a building during frost or frozen ground conditions or build up in a confined space such as a manhole or vault should be graded as a potential future hazard (grade 2) and scheduled for repair.

Any leak that is an existing potential hazard (grade 1) requires continuous action until the hazard no longer exists.

Existing known gas leaks that can be smelled should be called into first responders as one will never know when a new hazardous leak may occur. Many people get complacent with ongoing gas odors in their neighborhood and are now at risk for not calling in a new potentially hazardous leak that occurs in the vicinity of the non hazardous leak.

Fugitive natural gas is known to increase ozone and represents a respiratory health hazard.

**Emissions**:

Pipe-quality natural gas is over 90% methane. Methane is a greenhouse gas more than 30 times more damaging than carbon dioxide for the first 100 years it's in the atmosphere.

**Climate Impact of Natural Gas Leaks**: A 2014 Harvard/Boston University study[1] put ethane-sensors on the top of tall buildings around Boston. Ethane is a chemical marker found only in natural gas. From the amount of ethane found, the researchers calculated that 2.7% of all the gas in the state is lost into the atmosphere before it can be used.

Because of the power of methane, that small amount of unburned gas is equivalent to 10% of the state's GHG Emissions Inventory --or roughly equal to the emissions of all our stores and businesses.

**Trees:**

Leaking natural gas displaces ambient subsurface air that has approximately 20% oxygen with a balance of nitrogen (same as above ground air we breathe) thus reducing the needed oxygen for healthy root respiration. A microscopic organism, methanotroph, consumes methane and oxygen that further reduces the needed oxygen. The natural gas is also very dry and causes fine root death and subsequent decline of the tree. Weakened trees are then susceptible to disease, insects etc and usually show a slow decline and ultimately are removed if the leak is not repaired.

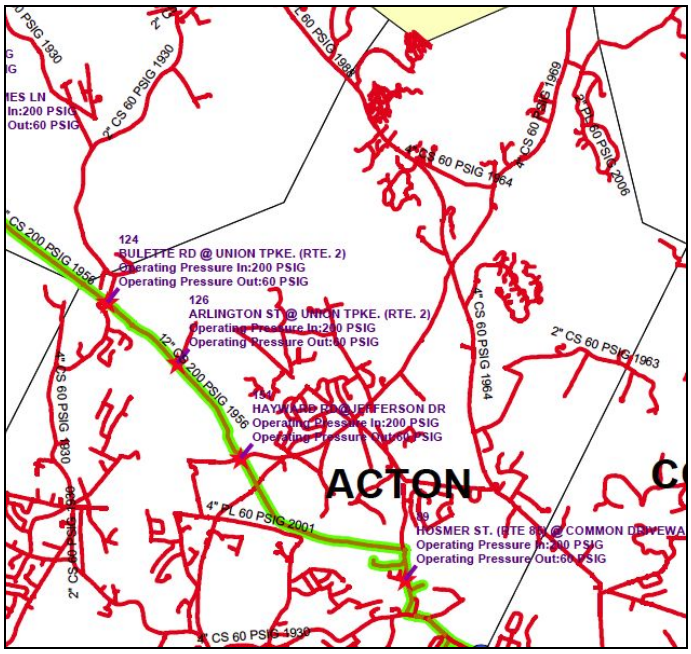
Any leak that migrates to the root zone or drip line of any tree has the potential to damage the tree and should be repaired as soon as possible to prevent any damage. Repairing leaks that have migrated to the root zone / drip line of trees will in many instances bring the tree back to good health.

**Lost and Unaccounted for Gas (LUAF) Wasted Money:**

All leaking gas is accounted for by each utility and is paid for by ratepayers. Customers pay for all of the leaking gas resulting in no incentive other than safety for a gas company to repair a leak.

[1] http://www.pnas.org/content/112/7/1941.full

**Pipeline Pressure**




Whereas urban areas such as Boston have 1/2 pound per square inch of pressure in its gas pipes, the gas pipes in Acton have 60 pounds per square inch pressure.  Any leak in an Acton pipe is thus likely to push gas out 120 times faster than the same size leak in Boston.

The image shows a detail of a National Grid Map showing pressure in the pipes.  Pipes in red are at 60 pounds per square inch.

## Acton Methane Survey Results

## Verified Leaks

Gas Safety Inc investigated 265 Elevated Methane Levels that resulted in 234 verified natural gas pipeline leaks (231 leaks from underground pipes, 3 from above ground exposed piping fitting leaks) throughout the Town of Acton, MA.  National Grid had 119 of the 234 verified leaks on record as existing grade 2 or grade 3 leaks according to NGRID annual service report  A list of all verified leak locations is in the appendix with a corresponding digital copy of leak reports and a KML file of GPS coordinates for plotting purposes.

**Large Volume Leaks:**

23 leaks in Acton were 2,000 square feet or larger.

Recent research has proven the 5/50 rule.[2] This is the rule that just 5% of the leaks are much bigger than the rest (this rule holds from gas wells all the way through to the pipes under our streets), emitting fully 50% of the emissions. Fixing these “super-emitting” leaks would of course reduce overall emissions from gas leaks in the fastest and least expensive way.

HEET’s 2016 Large Volume Leak Study[3] found that leaks with a surface area of of 2,000 square feet and larger of gas-saturated soil were likely to be super-emitting.

Fixing these 23 oversized leaks in Acton would be the fastest way to reduce emissions. A list of High Volume Leaks is in the appendix.

**Trees:**

There were 82 leaks detected that had 120 tree locations where natural gas had migrated and was recorded within the root zone / drip line of trees at the location or where evidence existed of a tree that was recently removed. These leaks should be repaired as soon as possible to prevent any injury or further injury to the trees. A list of tree locations is in the appendix.

**Non Pipeline Elevated Methane Levels**

The CRDS measures methane in parts per billion and can detect methane from any source including but not limited to sewer gas, landfills, swamps, car exhaust, ruminant animals, composting operations and natural gas pipeline leaks. Typically an ongoing pipeline leak will have repeatable readings and other stable sources will also repeat. Often times on dead end streets the CRDS will pick up a few parts per billion from vehicle car exhaust. Other times a ch4 reading will not repeat indicating a non stationary source of the original methane reading (mostly exhaust from internal combustion engines). All of the EML locations were re-tested with the CRDS and investigated with the Portable Flame Ionization Unit regardless of the CRDS readings on the second pass. Notes were taken of suspected sources of repeated positive CRDS indications that were not from pipeline leaks. All non pipeline data is included in the appendix.

**Conclusion**

GSI combination Cavity ringdown spectrometer / Flame Ionization survey detected and investigated 265 Elevated Methane Level locations that resulted in 234 verified natural gas pipeline leaks within the town of Acton with 1 grade 1, 94 grade 2 and 139 grade 3 leaks. There were 23 leaks that had migration areas of 2000 square feet or more that have been identified as potential super emitter gas leaks.There were 82 leak locations where natural gas had migrated

[2] https://news.stanford.edu/2016/10/26/super-emitters-responsible-bulk-u-s-methane-emissions/
[3] https://www.heetma.org/fixbiggasleaks/study-videos/

to the root zone / drip line of 120 trees or tree removal sites.  All verified leaks have been documented with gps coordinates and can be plotted using GIS software.There were 31 locations that had Elevated Methane Levels from other identified  sources or did not repeat the initial reading upon investigation with both CRDS and industry standard portable Flame Ionization Unit detectors and were deemed most likely from non stationary sources. Gas Safety Inc. will supply via data sharing the CRDS analyzer dat files that show all readings in parts per billion with corresponding GPS coordinates, Keyhole Markup Language (KML) processed files, leak reports and spreadsheet with notes on non pipeline associated Elevated Methane Level locations. All personnel at Gas Safety Inc. are Department of Transportation Operator Qualified in all covered tasks regarding odor complaint  investigation, leak survey and leak classification.

Please feel free to contact me directly with any questions regarding this report.

Respectfully Submitted,

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**Attachments**:

- 234 leak reports
- KML files
- Dat files

**Appendix**

**1. All Leaks**
**2. Newly Reported Leaks**
**3. High Volume Leaks**
**4. Leaks with Trees**
**5. Non Pipeline Elevated Methane Level locations**
**6. Department of Transportation Pipeline Hazardous Materials Administration Natural Gas leak Classification Guide**

**1. All Leaks**

| Date | # | Street | Suffix | Grade | Sq FT | Trees | Leak # | % Gas |
|---|---|---|---|---|---|---|---|---|
| 11/14/2017 | 29 | Alcott | Street | 2 | 350 | 2 | 12:15 PM | 50 |
| 11/14/2017 | 33 | Alcott | Street | 3 | 75 | 0 | 12:28 PM | 40 |
| 11/14/2017 | 59 | Alcott | Street | 2 | 100 | 1 | 1:30 PM | 50 |
| 11/1/2017 | 2 | Algonquin | Road | 3 | 1 | 0 | 1372123 | 25 |
| 11/2/2017 | 19 | Arborwood | Road | 3 | 25 | 0 | 1392020 | 40 |
| 11/6/2017 | 51 | Arlington | Street | 2 | fit | 0 | 1372151 | fit |
| 11/1/2017 | 182 | Arlington | Street | 2 | 2500 | 3 | 12:10 PM | 75 |
| 11/6/2017 | 250 | Arlington | Street | 2 | 2000 | 0 | 9:56 AM | 75 |
| 10/24/2017 | 306 | Arlington | Street | 3 | 25 | 0 | 1372174 | 20 |
| 10/24/2017 | 315 | Arlington | Street | 3 | 1200 | 1 | 7323442 | 75 |
| 10/24/2017 | 355 | Arlington | Street | 3 | 50 | 0 | 110929 | 10 |
| 10/26/2017 | 423 | Arlington | Street | 2 | 1000 | 1 | 248707 | 85 |
| 10/24/2017 | 5 | Betsy Ross | Circle | 3 | 50 | 0 | 1396845 | 40 |
| 12/8/2017 | 19 | Billings | Street | 3 | 75 | 0 | 2:56 PM | 30 |
| 11/9/2017 | 23 | Birch Ridge | Road | 2 | 150 | 1 | 8:30 AM | 70 |
| 11/27/2017 | 30 | Black Horse | Drive | 3 | 1 | 0 | 1:00 PM | 1 |
| 11/20/2017 |  | Broadview at Valley | Street | 3 | 1 | 0 | 10:13 AM | 50 |
| 12/5/2017 | 13 | Brucewood | Road | 3 | 100 | 0 | 12:59 PM | 40 |
| 11/13/2017 | 6 | Brucewood | Road | 2 | 50 | 1 | 8:56 AM | 15 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 11/2/2017 | | Brucewood at Driftwood | Road | 3 | 100 | 0 | 234583 | 10 |
| 11/2/2017 | | Brucewood at Piper | Road | 3 | 100 | 0 | 234587 | 15 |
| 11/15/2017 | | Carriage at River Street | Drive | 3 | 25 | 0 | 1:50 PM | 15 |
| 11/1/2017 | 2 | Central | Street | 2 | 300 | 0 | 9:05 AM | 70 |
| 11/27/2017 | 31 | Central | Street | 3 | 45 | 0 | 8:04 AM | 10 |
| 11/1/2017 | 40 | Central | Street | 3 | 120 | 0 | 43797 | 10 |
| 11/27/2017 | 45 | Central | Street | 3 | 50 | 0 | 8:13 AM | 15 |
| 11/1/2017 | 58 | Central | Street | 2 | 900 | 1 | 248714 | 60 |
| 11/27/2017 | 73 | Central | Street | 3 | 150 | 1 | 10:23 AM | 50 |
| 11/1/2017 | 143 | Central | Street | 3 | 25 | 0 | 5200466 | 15 |
| 11/1/2017 | 194 | Central | Street | 2 | 1500 | 1 | 1373756 | 40 |
| 11/1/2017 | 237 | Central | Street | 2 | 75 | 1 | 137813 | 20 |
| 12/21/2017 | 248 | Central | Street | 3 | 100 | 0 | 11:23 AM | 15 |
| 10/28/2017 | 267 | Central | Street | 2 | 175 | 2 | 1373813 | 45 |
| 12/1/2017 | 378 | Central | Street | 2 | 400 | 0 | 9:31 AM | 50 |
| 11/1/2017 | 37 | Central | Street | 2 | 2000 | 0 | 9:54 AM | 90 |
| 11/1/2017 | 54 | Central | Street | 2 | 450 | 0 | 10:37 AM | 90 |
| 11/27/2017 | 204 | Central | Street | 2 | 150 | 1 | 10:45 AM | 15 |
| 10/27/2017 | 256 | Central | Street | 3 | 1 | 0 | 12:03 PM | 70 |
| 10/24/2017 | 366 | Central | Street | 3 | 400 | 0 | 303897 | 75 |
| 10/24/2017 | | Central / Elm | Street | 3 | 350 | 0 | 3754190 | 60 |
| 11/30/2017 | | Charter by Pole 4 | Road | 3 | 100 | 0 | 12:41 PM | 50 |
| 11/1/2017 | 8 | Cherokee | Road | 3 | 20 | 0 | 191682 | 10 |
| 12/21/2017 | 1 | Conant | Street | 2 | 300 | 0 | 12:46 PM | 80 |
| 11/2/2017 | 34 | Conant | Street | 3 | 120 | 0 | 12:31 PM | 40 |
| 11/2/2017 | 42 | Conant | Street | 2 | 100 | 2 | 249167 | 30 |
| 11/2/2017 | 50 | Conant | Street | 3 | 30 | 0 | 11:32 AM | 50 |
| 11/20/2017 | 24 | Conant | Street | 3 | 750 | 0 | 9:12 AM | 30 |
| 11/20/2017 | 30 | Conant | Street | 2 | 1500 | 1 | 8:54 AM | 90 |
| 11/20/2017 | 39 | Conant | Street | 3 | 20 | 1 | 8:54 AM | 30 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 11/6/2017 | 23 | Concord | Road | 3 | 150 | 0 | 11:50 AM | 35 |
| 11/6/2017 | 27 | Concord | Road | 3 | 100 | 0 | 11:50 AM | 10 |
| 11/5/2017 | | Concord at Horseshoe Drive | Road | 3 | 150 | 0 | 123622 | 15 |
| 11/5/2017 | | Concord at Wood Lane | Street | 2 | 2000 | 1 | 8:37 AM | 80 |
| 10/28/2017 | 1 | Coughlin | Street | 2 | 25 | 1 | 249848 | 40 |
| 10/28/2017 | 1 | Coughlin | Street | 2 | 150 | 2 | 249848 | 15 |
| 10/28/2017 | 11 | Coughlin | Street | 2 | 500 | 0 | 1392140 | 25 |
| 10/28/2017 | 13 | Coughlin | Street | 3 | 750 | 1 | 234591 | 25 |
| 10/28/2017 | 14 | Coughlin | Street | 2 | 750 | 2 | 1:37 PM | 25 |
| 10/28/2017 | 15 | Coughlin | Street | 2 | 800 | 3 | 234591 | 60 |
| 10/28/2017 | | Coughlin at 1 Huckleberry Lane | Street | 2 | 50 | 1 | 12:23 AM | 45 |
| 11/2/2017 | 5 | Country Club | Road | 3 | 25 | 0 | 234597 | 10 |
| 11/13/2017 | 12 | Craig | Road | 3 | 50 | 0 | 12:56 PM | 30 |
| 11/28/2017 | | Craig At School Street | Road | 3 | 100 | 0 | 10:35 AM | 20 |
| 11/3/2017 | 6 | Doris | Road | 3 | 100 | 0 | 1371983 | 40 |
| 11/16/2017 | 20 | Duggan | Drive | 3 | 75 | 0 | 10:31 AM | 20 |
| 11/1/2017 | 31 | Elm | Street | 2 | 1500 | 1 | 1665099 | 70 |
| 12/1/2017 | 7 | Elm at Jefferson Arms Condos | Street | 3 | fit | 0 | 9:46 AM | fit |
| 11/5/2017 | | Emerson at Alcott Street | Drive | 3 | 50 | 0 | 249389 | 20 |
| 10/24/2017 | 11 | Ethan Allen | Drive | 3 | 10 | 0 | 1392180 | 30 |
| 11/9/2017 | 23 | Ethan Allen | Drive | 3 | 100 | 0 | 10:48 AM | 60 |
| 11/9/2017 | 28 | Ethan Allen | Drive | 2 | 150 | 0 | 10:05 AM | 15 |
| 10/26/2017 | 34 | Ethan Allen | Drive | 2 | 150 | 0 | 1392211 | 45 |
| 11/27/2017 | 35 | Ethan Allen | Drive | 2 | 200 | 0 | 12:37 PM | 85 |
| 11/21/2017 | 40 | Ethan Allen | Drive | 2 | 400 | 1 | 11:40 AM | 80 |
| 11/7/2017 | 2 | Evergreen | Road | 3 | 50 | 0 | 12:00 PM | 500 ppm |
| 11/3/2017 | 8 | Fairway | Road | 3 | 10 | 0 | 1:12 PM | 10 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 11/2/2017 | 21 | Faulkner Hill | Road | 3 | 25 | 0 | 10:34 AM | 10 |
| 11/20/2017 | 36 | Faulkner Hill | Road | 3 | 1 | 0 | 1394243 | 20 |
| 11/20/2017 | 44 | Faulkner Hill | Road | 3 | 5 | 0 | 9:50 AM | 5 |
| 11/3/2017 | 8 | Francine | Road | 3 | 5 | 0 | 290517 | 10 |
| 11/3/2017 | | Francine At Doris | Road | 3 | 50 | 0 | 290517 | 15 |
| 11/8/2017 | 8 | Gionconda | Avenue | 3 | 100 | 0 | 1392228 | 40 |
| 12/15/2017 | | Gionconda at Pondview Ave | Avenue | 3 | 25 | 1 | 11:36 AM | 30 |
| 11/5/2017 | 36 | Great | Road | 3 | 150 | 0 | 43799 | 25 |
| 11/5/2017 | 56 | Great | Road | 3 | 500 | 0 | 1396850 | 15 |
| 11/5/2017 | 83 | Great | Road | 3 | 1 | 0 | 5201385 | 15 |
| 11/5/2017 | 94 | Great | Road | 3 | 1000 | 0 | 237786 | 50 |
| 11/5/2017 | 132 | Great | Road | 3 | 3000 | 0 | 5034695 | 20 |
| 11/5/2017 | 411 | Great | Road | 3 | 50 | 0 | 5201880 | 20 |
| 11/5/2017 | 420 | Great | Road | 3 | 400 | 0 | 5201880 | 90 |
| 11/5/2017 | 423 | Great | Road | 3 | 300 | 0 | 5201623 | 25 |
| 11/30/2017 | 87 | Hayward | Road | 3 | 25 | 0 | 12:14 PM | 50 |
| 11/4/2017 | 13 | Hemlock | Lane | 3 | 100 | 0 | 291934 | 30 |
| 11/4/2017 | 22 | Hemlock | Lane | 3 | 500 | 1 | 9:24 AM | 30 |
| 11/2/2017 | 8 | High | Street | 2 | 3750 | 1 | 4228611 | 30 |
| 11/2/2017 | 8 | High | Street | 2 | 625 | 1 | 4228611 | 80 |
| 11/2/2017 | 39 | High | Street | 2 | 2625 | 2 | 4228683 | 30 |
| 11/16/2017 | 2 | Highland | Road | 2 | 25 | 2 | 10:03 AM | 75 |
| 11/8/2017 | 15 | Hillcrest | Drive | 2 | 60 | 0 | 5201064 | 80 |
| 11/5/2017 | 14 | Horseshoe | Drive | 2 | 100 | 1 | 1392925 | 50 |
| 11/4/2017 | 22 | Hosmer | Street | 2 | 3000 | 1 | 110149 | 50 |
| 11/6/2017 | 43 | Hosmer | Street | 2 | 800 | 0 | 1392296 | 50 |
| 11/6/2017 | 46 | Hosmer | Street | 2 | 1000 | 0 | 234592 | 50 |
| 11/6/2017 | 47 | Hosmer | Street | 3 | 600 | 1 | 1392931 | 30 |
| 11/6/2017 | 52 | Hosmer | Street | 2 | 2500 | 2 | 3746463 | 60 |
| 12/8/2017 | 21 | John Swift | Road | 2 | 25 | 0 | 12:09 PM | 75 |
| 12/8/2017 | 23 | John Swift | Road | 2 | 25 | 0 | 12:51 PM | 90 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 10/24/2017 | 3 | Juniper Ridge | Road | 3 | 50 | 0 | 190851 | 10 |
| 10/24/2017 | 4 | Juniper Ridge | Road | 3 | 500 | 0 | 7329360 | 50 |
| 10/24/2017 | 20 | Juniper Ridge | Road | 3 | 100 | 0 | 1:12 PM | 40 |
| 10/27/2017 | 4 | Kingman | Road | 2 | 75 | 1 | 3705135 | 60 |
| 11/13/2017 | 40 | Laws Brook | Road | 2 | 600 | 1 | 12:30 PM | 75 |
| 11/13/2017 | 46 | Laws Brook | Road | 3 | 50 | 0 | 12:12 PM | 10 |
| 11/20/2017 | 60 | Laws Brook | Road | 2 | 300 | 1 | 10:54 AM | 50 |
| 10/31/2017 | 53 | Liberty | Street | 3 | 25 | 0 | 1392943 | 10 |
| 11/21/2017 | 64 | Liberty | Street | 3 | 10 | 0 | 9:47 AM | 15 |
| 12/15/2017 | 4 | Lilac | Court | 3 | 75 | 0 | 12:27 PM | 20 |
| 11/4/2017 | | Longfellow Park at Hosmer St | Park | 3 | 50 | 0 | 1396893 | 30 |
| 10/28/2017 | 14 | Lothrop | Road | 3 | 1000 | 0 | 1372102 | 70 |
| 11/5/2017 | 3 | Main | Street | 3 | 50 | 0 | 12:08 PM | 10 |
| 11/5/2017 | 9 | Main | Street | 3 | 750 | 1 | 12:08 PM | 30 |
| 11/5/2017 | 13 | Main | Street | 3 | 300 | 0 | 12:08 PM | 35 |
| 11/5/2017 | 29 | Main | Street | 3 | 50 | 1 | 8:42 AM | 10 |
| 11/3/2017 | 254 | Main | Street | 3 | 1800 | 0 | 1377026 | 25 |
| 10/28/2017 | 274 | Main | Street | 3 | 10 | 0 | 7327984 | 25 |
| 10/28/2017 | 288 | Main | Street | 2 | 400 | 0 | 7327983 | 50 |
| 11/30/2017 | 315 | Main | Street | 3 | 150 | 0 | 10:12 AM | 10 |
| 11/4/2017 | 420 | Main | Street | 2 | 1500 | 2 | 5202089 | 70 |
| 11/4/2017 | 531 | Main | Street | 3 | 5 | 0 | 7327059 | 2 |
| 11/5/2017 | 750 | Main | Street | 3 | 200 | 0 | 7327948 | 20 |
| 10/31/2017 | 10 | Maple | Street | 3 | 5 | 0 | 10:07 AM | 40 |
| 10/31/2017 | 16 | Maple | Street | 3 | 10 | 0 | 237787 | 5 |
| 10/31/2017 | | Maple St at Stow Street | Street | 2 | 500 | 2 | 1392920 | 20 |
| 10/27/2017 | 8 | Marian | Road | 2 | 300 | 0 | 126723 | 45 |
| 11/16/2017 | | Marian at Duggan Road | Road | 3 | 1 | 0 | 11:23 AM | 50 |
| 11/27/2017 | 1 | Martin | Street | 3 | 5 | 0 | 8:13 AM | 20 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 10/31/2017 | 10 | Martin | Street | 2 | 1000 | 1 | 268588 | 50 |
| 10/31/2017 | 15 | Martin | Street | 2 | 1800 | 1 | 8:24 AM | 50 |
| 10/31/2017 | 21 | Martin | Street | 3 | 50 | 0 | 8:24 AM | 20 |
| 10/31/2017 | | Martin at Maple Street | Street | 2 | 750 | 0 | 2:01 PM | 40 |
| 11/28/2017 | | Mass Ave / Deacon Hunt | Ave | 3 | 50 | 0 | 10:04 AM | 7 |
| 10/28/2017 | 544 | Massachusetts | Ave | 3 | 750 | 1 | 234659 | 50 |
| 10/28/2017 | 550 | Massachusetts | Ave | 2 | 30 | 1 | 316134 | 6 |
| 12/8/2017 | 586 | Massachusetts | Avenue | 2 | 50 | 0 | 1:31 PM | 50 |
| 12/8/2017 | 590 | Massachusetts | Avenue | 2 | 25 | 0 | 1:31 PM | 6 |
| 12/21/2017 | 612 | Massachusetts | Ave | 3 | 75 | 0 | 10:48 AM | 20 |
| 10/24/2017 | 5 | Mead | Terrace | 2 | 750 | 2 | 235141 | 40 |
| 11/7/2017 | 2 | Meadowbrook | Road | 3 | 30 | 0 | 10:44 AM | 30 |
| 11/7/2017 | 12 | Meadowbrook | Road | 3 | 100 | 0 | 1:12 PM | 60 |
| 11/30/2017 | 9 | Musket at Fife and Drum | Drive | 3 | 10 | 0 | 249500 | 15 |
| 11/30/2017 | 5 | Musket at Revolutionary Road | Drive | 3 | 50 | 0 | 249520 | 40 |
| 11/4/2017 | 83 | Nagog Hill | Road | 2 | 1200 | 1 | 7331087 | 50 |
| 11/4/2017 | 84 | Nagog Hill | Road | 3 | fit | 0 | 249845 | fit |
| 11/1/2017 | 4 | Nashoba | Road | 3 | 50 | 3 | 4800810 | 10 |
| 11/1/2017 | 14 | Nashoba | Road | 2 | 600 | 1 | 4800810 | 100 |
| 11/1/2017 | 26 | Nashoba | Road | 2 | 100 | 2 | 2:04 PM | 30 |
| 11/20/2017 | 40 | Nashoba | Road | 3 | 25 | 1 | 2:23 PM | 5 |
| 12/21/2017 | 60 | Nashoba | Road | 3 | 150 | 0 | 10:13 AM | 30 |
| 11/7/2017 | 25 | Newtown | Road | 2 | 500 | 0 | 10:30 AM | 70 |
| 11/16/2017 | 3 | Notre Dame | Road | 2 | 750 | 0 | 11:40 AM | 90 |
| 11/21/2017 | 11 | Notre Dame | Road | 3 | 150 | 0 | 10:52 AM | 25 |
| 10/26/2017 | 15 | Notre Dame | Road | 2 | 1150 | 1 | 291135 | 20 |
| 11/2/2017 | | Oakwood at Brucewood | Road | 3 | 100 | 0 | 1396903 | 50 |
| 11/15/2017 | 7 | Old Meadow | Drive | 3 | 1 | 0 | 1:25 PM | 10 |
| 11/8/2017 | 6 | Olde Surrey | Drive | 3 | 1 | 0 | 5200979 | 10 |
| 11/8/2017 | 18 | Parker | Street | 2 | 125 | 1 | 5201066 | 50 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 12/15/2017 | 53 | Parker | Street | 3 | 500 | 0 | 11:15 AM | 75 |
| 11/15/2017 | 99 | Parker | Street | 2 | 300 | 1 | 2:27 PM | 70 |
| 11/15/2017 | 230 | Parker | Street | 3 | 300 | 0 | 2:52 PM | 70 |
| 11/8/2017 | | Parker at Drummer | Street | 2 | 150 | 0 | 2:42 PM | 50 |
| 11/9/2017 | 6 | Patrick Henry | Circle | 3 | 20 | 0 | 11:21 AM | 15 |
| 10/24/2017 | 7 | Paul Revere | Road | 2 | 700 | 1 | 1374101 | 40 |
| 11/9/2017 | 11 | Paul Revere | Road | 3 | 150 | 0 | 12:06 PM | 20 |
| 11/21/2017 | 21 | Paul Revere | Road | 3 | 60 | 0 | 12:18 PM | 10 |
| 11/9/2017 | 29 | Paul Revere | Road | 3 | 1 | 0 | 284679 | 5 |
| 11/2/2017 | 28 | Piper | Road | 2 | 100 | 1 | 249413 | 40 |
| 11/2/2017 | 40 | Piper | Road | 1 | 2500 | 0 | 2:47 PM | 70 |
| 11/2/2017 | 44 | Piper | Road | 2 | 500 | 0 | 2:19 PM | 80 |
| 11/8/2017 | 7 | Pond View | Drive | 2 | 2100 | 1 | 7331077 | 100 |
| 11/8/2017 | 10 | Pond View | Drive | 3 | 125 | 0 | 2982675 | 80 |
| 11/9/2017 | 3 | Powder Horn | Lane | 3 | 100 | 0 | 190878 | 20 |
| 11/9/2017 | 6 | Powder Horn | Lane | 2 | 150 | 0 | 1393062 | 20 |
| 11/9/2017 | 8 | Powder Horn | Lane | 2 | 150 | 2 | 9:33 AM | 40 |
| 11/3/2017 | 61 | Powder Mill | Road | 3 | 1 | 0 | 7327947 | 5 |
| 11/3/2017 | 18 | Prospect | Street | 2 | 3000 | 3 | 234656 | 70 |
| 11/3/2017 | 21 | Prospect | Street | 2 | 3500 | 2 | 11:41 AM | 50 |
| 11/3/2017 | 22 | Prospect | Street | 2 | 3500 | 2 | 11:41 AM | 60 |
| 11/3/2017 | 28 | Prospect | Street | 2 | 3000 | 3 | 11:41 AM | 65 |
| 11/3/2017 | 31 | Prospect | Street | 2 | 2800 | 3 | 11:41 AM | 60 |
| 11/3/2017 | 38 | Prospect | Street | 2 | 3000 | 1 | 1393096 | 80 |
| 11/3/2017 | 50 | Prospect | Street | 3 | 500 | 0 | 248887 | 25 |
| 11/3/2017 | 54 | Prospect | Street | 3 | 500 | 2 | 1373087 | 50 |
| 11/3/2017 | 132 | Prospect | Street | 3 | 75 | 0 | 290514 | 25 |
| 11/3/2017 | 138 | Prospect | Street | 3 | 60 | 0 | 9:16 AM | 60 |
| 11/3/2017 | 7 | Prospect | Street | 3 | 3500 | 0 | 1393072 | 75 |
| 10/28/2017 | | Prospect at Mass Ave | Street | 3 | 2100 | 0 | 154478 | 50 |
| 11/1/2017 | | Quaboag | Road | 3 | 1 | 0 | 1396925 | 5 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 12/5/2017 | | Redwood at Brucewood | Road | 3 | 5 | 0 | 12:42 PM | 500 ppm |
| 10/31/2017 | 18 | Robbins | Street | 2 | 1000 | 2 | 191980 | 30 |
| 10/31/2017 | 73 | Robbins | Street | 3 | 100 | 0 | 191981 | 10 |
| 11/2/2017 | 12 | School | Street | 2 | 2000 | 3 | 154544 | 45 |
| 11/13/2017 | 30 | School | Street | 2 | 180 | 2 | 11:56 AM | 60 |
| 11/13/2017 | 70 | School | Street | 2 | 350 | 2 | 10:10 AM | 35 |
| 12/15/2017 | 86 | School | Street | 3 | 25 | 0 | 193039 | 10 |
| 11/13/2017 | 124 | School | Street | 2 | 50 | 0 | 9:28 AM | 20 |
| 11/14/2017 | 246 | School | Street | 3 | 150 | 1 | 12:23 AM | 30 |
| 11/14/2017 | 256 | School | Street | 3 | 100 | 0 | 12:39 PM | 40 |
| 10/31/2017 | 10 | Stow | Street | 2 | 2500 | 2 | 248892 | 60 |
| 10/31/2017 | 14 | Stow | Street | 2 | 600 | 0 | 11:27 AM | 50 |
| 10/31/2017 | 20 | Stow | Street | 3 | 50 | 0 | 11:27 AM | 25 |
| 11/21/2017 | 24 | Stow | Street | 3 | 2500 | 0 | 5201252 | 60 |
| 11/28/2017 | 81 | Stow | Street | 3 | 750 | 0 | 9:23 AM | 60 |
| 10/31/2017 | 94 | Stow | Street | 2 | 1000 | 2 | 12:41 PM | 30 |
| 10/31/2017 | 94 | Stow | Street | 2 | 400 | 2 | 12:41 PM | 40 |
| 10/31/2017 | | Stow at Liberty | Street | 2 | 1000 | 1 | 3673944 | 30 |
| 11/5/2017 | 108 | Strawberry Hill | Road | 3 | 1800 | 0 | 7323837 | 80 |
| 10/24/2017 | 46 | Summer | Street | 3 | 50 | 0 | 290509 | 10 |
| 10/24/2017 | 56 | Summer | Street | 3 | 10 | 0 | 290510 | 10 |
| 10/24/2017 | 57 | Summer | Street | 2 | 6250 | 1 | 5200328 | 75 |
| 11/21/2017 | 74 | Summer | Street | 3 | 200 | 1 | 10:31 AM | 50 |
| 11/30/2017 | 69 | Taylor | Road | 3 | 625 | 0 | 11:31 AM | 40 |
| 11/14/2017 | 9 | Thoreau | Road | 3 | 150 | 0 | 1376922 | 15 |
| 10/26/2017 | 9 | Ticonderoga | Avenue | 2 | 25 | 0 | 1393141 | 80 |
| 11/1/2017 | 9 | Wachusett | Drive | 3 | 50 | 1 | 127106 | 40 |
| 11/7/2017 | 8 | Willis Holden | Drive | 2 | 100 | 0 | 9:01 AM | 60 |
| 11/21/2017 | 148 | Willow | Street | 3 | 200 | 2 | 12:50 PM | 50 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 11/16/2017 | 21 | Windemere | Drive | 2 | 250 | 1 | 1393119 | 70 |
| 11/28/2017 | 64 | Windsor | Ave | 3 | 150 | 0 | 9:43 AM | 30 |
| 10/27/2017 | 98 | Windsor | Ave | 3 | 50 | 0 | 3674155 | 5 |
| 11/7/2017 | 59 | Wood | Lane | 3 | 25 | 0 | 1:34 PM | 20 |
| 11/4/2017 | 55 | Wood | Lane | 2 | 150 | 2 | 1393132 | 50 |
| 11/4/2017 | 17 | Woodbury | Lane | 3 | 50 | 0 | 3705069 | 20 |
| 11/30/2017 | | Woodbury at Main Street | Lane | 3 | 375 | 1 | 10:30 AM | 60 |
| 10/24/2017 | 12 | Wright | Terrace | 3 | 450 | 0 | 1376969 | 10 |

**2. Newly Reported Leaks**

| Date | # | Street | St Suffix | grade | sq ft | trees | leak # | % gas |
|---|---|---|---|---|---|---|---|---|
| 11/14/17 | 29 | Alcott | Street | 2 | 350 | 2 | 12:15 PM | 50 |
| 11/14/17 | 33 | Alcott | Street | 3 | 75 | 0 | 12:28 PM | 40 |
| 11/14/17 | 59 | Alcott | Street | 2 | 100 | 1 | 1:30 PM | 50 |
| 11/1/17 | 182 | Arlington | Street | 2 | 2500 | 3 | 12:10 PM | 75 |
| 11/6/17 | 250 | Arlington | Street | 2 | 2000 | 0 | 9:56 AM | 75 |
| 12/8/17 | 19 | Billings | Street | 3 | 75 | 0 | 2:56 PM | 30 |
| 11/9/17 | 23 | Birch Hill | Road | 2 | 150 | 1 | 8:30 AM | 70 |
| 11/27/17 | 30 | Black Horse | Drive | 3 | 1 | 0 | 1:00 PM | 1 |
| 11/20/17 | | Broadview at Valley | Street | 3 | 1 | 0 | 10:13 AM | 50 |
| 12/5/17 | 13 | Brucewood | Road | 3 | 100 | 0 | 12:59 PM | 40 |
| 11/13/17 | 6 | Brucewood | Road | 2 | 50 | 1 | 8:56 AM | 15 |
| 11/15/17 | | Carriage at River Street | Drive | 3 | 25 | 0 | 1:50 PM | 15 |
| 11/1/17 | 2 | Central | Street | 2 | 300 | 0 | 9:05 AM | 70 |
| 11/27/17 | 31 | Central | Street | 3 | 45 | 0 | 8:04 AM | 10 |
| 11/27/17 | 45 | Central | Street | 3 | 50 | 0 | 8:13 AM | 15 |
| 11/27/17 | 73 | Central | Street | 3 | 150 | 1 | 10:23 AM | 50 |
| 12/21/17 | 248 | Central | Street | 3 | 100 | 0 | 11:23 AM | 15 |
| 12/1/17 | 378 | Central | Street | 2 | 400 | 0 | 9:31 AM | 50 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 11/1/17 | 37 | Central | Street | 2 | 2000 | 0 | 9:54 AM | 90 |
| 11/1/17 | 54 | Central | Street | 2 | 450 | 0 | 10:37 AM | 90 |
| 11/27/17 | 204 | Central | Street | 2 | 150 | 1 | 10:45 AM | 15 |
| 10/27/17 | 256 | Central | Street | 3 | 1 | 0 | 12:03 PM | 70 |
| 11/30/17 | | Charter by Pole 4 | Road | 3 | 100 | 0 | 12:41 PM | 50 |
| 12/21/17 | 1 | Conant | Street | 2 | 300 | 0 | 12:46 PM | 80 |
| 11/2/17 | 34 | Conant | Street | 3 | 120 | 0 | 12:31 PM | 40 |
| 11/2/17 | 50 | Conant | Street | 3 | 30 | 0 | 11:32 AM | 50 |
| 11/20/17 | 24 | Conant | Street | 3 | 750 | 0 | 9:12 AM | 30 |
| 11/20/17 | 30 | Conant | Street | 2 | 1500 | 1 | 8:54 AM | 90 |
| 11/20/17 | 39 | Conant | Street | 3 | 20 | 1 | 8:54 AM | 30 |
| 11/6/17 | 23 | Concord | Road | 3 | 150 | 0 | 11:50 AM | 35 |
| 11/6/17 | 27 | Concord | Road | 3 | 100 | 0 | 11:50 AM | 10 |
| 11/5/17 | | Concord at Wood lane | Street | 2 | 2000 | 1 | 8:37 AM | 80 |
| 10/28/17 | 14 | Coughlin | Street | 2 | 750 | 2 | 1:37 PM | 25 |
| 10/28/17 | | Coughlin at 1 Huckleberry Lane | Street | 2 | 50 | 1 | 12:23 AM | 45 |
| 11/13/17 | 12 | Craig | Road | 3 | 50 | 0 | 12:56 PM | 30 |
| 11/28/2017 | | Craig At School Street | Road | 3 | 100 | 0 | 10:35 AM | 20 |
| 11/16/17 | 20 | Duggan | Drive | 3 | 75 | 0 | 10:31 AM | 20 |
| 12/1/17 | 7 | Elm at Jefferson Arms Condos | Street | 3 | fit | 0 | 9:46 AM | fit |
| 11/9/17 | 23 | Ethan Allen | Drive | 3 | 100 | 0 | 10:48 AM | 60 |
| 11/9/17 | 28 | Ethan Allen | Drive | 2 | 150 | 0 | 10:05 AM | 15 |
| 11/27/17 | 35 | Ethan Allen | Drive | 2 | 200 | 0 | 12:37 PM | 85 |
| 11/21/17 | 40 | Ethan Allen | Drive | 2 | 400 | 1 | 11:40 AM | 80 |
| 11/7/17 | 2 | Evergreen | Road | 3 | 50 | 0 | 12:00 PM | 500 ppm |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 11/3/17 | 8 | Fairway | Road | 3 | 10 | 0 | 1:12 PM | 10 |
| 11/2/17 | 21 | Faulkner hill | Road | 3 | 25 | 0 | 10:34 AM | 10 |
| 11/20/17 | 44 | Faulkner Hill | Road | 3 | 5 | 0 | 9:50 AM | 5 |
| 12/15/17 | | Gionconda at Pondview Ave | Avenue | 3 | 25 | 1 | 11:36 AM | 30 |
| 11/30/17 | 87 | Hayward | Road | 3 | 25 | 0 | 12:14 PM | 50 |
| 11/4/17 | 22 | Hemlock | Lane | 3 | 500 | 1 | 9:24 AM | 30 |
| 11/16/17 | 2 | Highland | Road | 2 | 25 | 2 | 10:03 AM | 75 |
| 12/8/17 | 21 | John Swift | Road | 2 | 25 | 0 | 12:09 PM | 75 |
| 12/8/17 | 23 | John Swift | Road | 2 | 25 | 0 | 12:51 PM | 90 |
| 10/24/17 | 20 | Juniper Ridge | Road | 3 | 100 | 0 | 1:12 PM | 40 |
| 11/13/17 | 40 | Laws Brook | Road | 2 | 600 | 1 | 12:30 PM | 75 |
| 11/13/17 | 46 | Laws Brook | Road | 3 | 50 | 0 | 12:12 PM | 10 |
| 11/20/17 | 60 | Laws Brook | Road | 2 | 300 | 1 | 10:54 AM | 50 |
| 11/21/17 | 64 | Liberty | Street | 3 | 10 | 0 | 9:47 AM | 15 |
| 12/15/17 | 12 | Lilac | Court | 3 | 75 | 0 | 12:27 PM | 20 |
| 11/5/17 | 3 | Main | Street | 3 | 50 | 0 | 12:08 PM | 10 |
| 11/5/17 | 9 | Main | Street | 3 | 750 | 1 | 12:08 PM | 30 |
| 11/5/17 | 13 | Main | Street | 3 | 300 | 0 | 12:08 PM | 35 |
| 11/5/17 | 29 | Main | Street | 3 | 50 | 1 | 8:42 AM | 10 |
| 11/30/17 | 315 | Main | Street | 3 | 150 | 0 | 10:12 AM | 10 |
| 10/31/17 | 10 | Maple | Street | 3 | 5 | 0 | 10:07 AM | 40 |
| 11/16/17 | | Marian AT Duggan Road | Road | 3 | 1 | 0 | 11:23 AM | 50 |
| 11/27/17 | 1 | Martin | Street | 3 | 5 | 0 | 8:13 AM | 20 |
| 10/31/17 | 15 | Martin | Street | 2 | 1800 | 1 | 8:24 AM | 50 |
| 10/31/17 | 21 | Martin | Street | 3 | 50 | 0 | 8:24 AM | 20 |
| 10/31/17 | | Martin at Maple Street | Street | 2 | 750 | 0 | 2:01 PM | 40 |
| 11/28/17 | | Mass Ave / Deacon Hunt | Ave | 3 | 50 | 0 | 10:04 AM | 7 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 12/8/17 | 586 | Massachusetts | Avenue | 2 | 50 | 0 | 1:31 PM | 50 |
| 12/8/17 | 590 | Massachusetts | Avenue | 2 | 25 | 0 | 1:31 PM | 6 |
| 12/21/17 | 612 | Massachusetts | Ave | 3 | 75 | 0 | 10:48 AM | 20 |
| 11/7/17 | 2 | Meadowbrook | Road | 3 | 30 | 0 | 10:44 AM | 30 |
| 11/7/17 | 12 | Meadowbrook | Road | 3 | 100 | 0 | 1:12 PM | 60 |
| 11/1/17 | 26 | Nashoba | Road | 2 | 100 | 2 | 2:04 PM | 30 |
| 11/20/17 | 40 | Nashoba | Road | 3 | 25 | 1 | 2:23 PM | 5 |
| 12/21/17 | 60 | Nashoba | Road | 3 | 150 | 0 | 10:13 AM | 30 |
| 11/7/17 | 25 | Newtown | Road | 2 | 500 | 0 | 10:30 AM | 70 |
| 11/16/17 | 3 | Notre Dame | Road | 2 | 750 | 0 | 11:40 AM | 90 |
| 11/21/17 | 11 | Notre Dame | Road | 3 | 150 | 0 | 10:52 AM | 25 |
| 11/15/17 | 7 | Old Meadow | Drive | 3 | 1 | 0 | 1:25 PM | 10 |
| 12/15/17 | 53 | Parker | Street | 3 | 500 | 0 | 11:15 AM | 75 |
| 11/15/17 | 99 | Parker | Street | 2 | 300 | 1 | 2:27 PM | 70 |
| 11/15/17 | 230 | Parker | Street | 3 | 300 | 0 | 2:52 PM | 70 |
| 11/8/17 | | Parker at Drummer | Street | 2 | 150 | 0 | 2:42 PM | 50 |
| 11/9/17 | | Patrick Henry | Drive | 3 | 20 | 0 | 11:21 AM | 15 |
| 11/9/17 | 11 | Paul Revere | Road | 3 | 150 | 0 | 12:06 PM | 20 |
| 11/21/17 | 21 | Paul Revere | Road | 3 | 60 | 0 | 12:18 PM | 10 |
| 11/2/17 | 40 | Piper | Road | 1 | 2500 | 0 | 2:47 PM | 70 |
| 11/2/17 | 44 | Piper | Road | 2 | 500 | 0 | 2:19 PM | 80 |
| 11/9/17 | 8 | Powder Horn | Lane | 2 | 150 | 2 | 9:33 AM | 40 |
| 11/3/17 | 21 | Prospect | Street | 2 | 3500 | 2 | 11:41 AM | 50 |
| 11/3/17 | 22 | Prospect | Street | 2 | 3500 | 2 | 11:41 AM | 60 |
| 11/3/17 | 28 | Prospect | Street | 2 | 3000 | 3 | 11:41 AM | 65 |
| 11/3/17 | 31 | Prospect | Street | 2 | 2800 | 3 | 11:41 AM | 60 |
| 11/3/17 | 138 | Prospect | Street | 3 | 60 | 0 | 9:16 AM | 60 |
| 12/5/17 | | Redwood at Brucewood | Road | 3 | 5 | 0 | 12:42 PM | 500 ppm |
| 11/13/17 | 30 | School | Street | 2 | 180 | 2 | 11:56 AM | 60 |
| 11/13/17 | 70 | School | Street | 2 | 350 | 2 | 10:10 AM | 35 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 11/13/17 | 124 | School | Street | 2 | 50 | 0 | 9:28 AM | 20 |
| 11/14/17 | 246 | School | Street | 3 | 150 | 1 | 12:23 AM | 30 |
| 11/14/17 | 256 | School | Street | 3 | 100 | 0 | 12:39 PM | 40 |
| 10/31/17 | 14 | Stow | Street | 2 | 600 | 0 | 11:27 AM | 50 |
| 10/31/17 | 20 | Stow | Street | 3 | 50 | 0 | 11:27 AM | 25 |
| 11/28/17 | 81 | Stow | Street | 3 | 750 | 0 | 9:23 AM | 60 |
| 10/31/17 | 94 | Stow | Street | 2 | 1000 | 2 | 12:41 PM | 30 |
| 10/31/17 | 94 | Stow | Street | 2 | 400 | 2 | 12:41 PM | 40 |
| 11/21/17 | 74 | Summer | Street | 3 | 200 | 1 | 10:31 AM | 50 |
| 11/30/17 | 69 | Taylor | Road | 3 | 625 | 0 | 11:31 AM | 40 |
| 11/7/17 | 8 | Willis Holden | Drive | 2 | 100 | 0 | 9:01 AM | 60 |
| 11/21/17 | 148 | Willow | Street | 3 | 200 | 2 | 12:50 PM | 50 |
| 11/28/17 | 64 | Windsor | Ave | 3 | 150 | 0 | 9:43 AM | 30 |
| 11/7/17 | 59 | Wood | Lane | 3 | 25 | 0 | 1:34 PM | 20 |
| 11/30/17 | | Woodbury at Main Street | Lane | 3 | 375 | 1 | 10:30 AM | 60 |

**3. High Volume Leaks**

| Date | # | Street | St Suffix | grade | sq ft | trees | leak # | % gas |
|---|---|---|---|---|---|---|---|---|
| 10/24/17 | 57 | Summer | Street | 2 | 6250 | 1 | 5200328 | 75 |
| 11/2/17 | 8 | High | Street | 2 | 3750 | 1 | 4228611 | 30 |
| 11/3/17 | 21 | Prospect | Street | 2 | 3500 | 2 | 11:41 AM | 50 |
| 11/3/17 | 22 | Prospect | Street | 2 | 3500 | 2 | 11:41 AM | 60 |
| 11/3/17 | 7 | Prospect | Street | 3 | 3500 | 0 | 1393072 | 75 |
| 11/5/17 | 132 | Great | Road | 3 | 3000 | 0 | 5034695 | 20 |
| 11/4/17 | 22 | Hosmer | Street | 2 | 3000 | 1 | 110149 | 50 |
| 11/3/17 | 18 | Prospect | Street | 2 | 3000 | 3 | 234656 | 70 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 11/3/17 | 28 | Prospect | Street | 2 | 3000 | 3 | 11:41 AM | 65 |
| 11/3/17 | 38 | Prospect | Street | 2 | 3000 | 1 | 1393096 | 80 |
| 11/3/17 | 31 | Prospect | Street | 2 | 2800 | 3 | 11:41 AM | 60 |
| 11/2/17 | 39 | High | Street | 2 | 2625 | 2 | 4228683 | 30 |
| 11/1/17 | 182 | Arlington | Street | 2 | 2500 | 3 | 12:10 PM | 75 |
| 11/6/17 | 52 | Hosmer | Street | 2 | 2500 | 2 | 3746463 | 60 |
| 11/2/17 | 40 | Piper | Road | 1 | 2500 | 0 | 2:47 PM | 70 |
| 10/31/17 | 10 | Stow | Street | 2 | 2500 | 2 | 248892 | 60 |
| 11/21/17 | 24 | Stow | Street | 3 | 2500 | 0 | 5201252 | 60 |
| 11/8/17 | 7 | Pond View | Drive | 2 | 2100 | 1 | 7331077 | 100 |
| 10/28/17 | | Prospect at Mass Ave | Street | 3 | 2100 | 0 | 154478 | 50 |
| 11/6/17 | 250 | Arlington | Street | 2 | 2000 | 0 | 9:56 AM | 75 |
| 11/1/17 | 37 | Central | Street | 2 | 2000 | 0 | 9:54 AM | 90 |
| 11/5/17 | | Concord at Wood lane | Street | 2 | 2000 | 1 | 8:37 AM | 80 |
| 11/2/17 | 12 | School | Street | 2 | 2000 | 3 | 154544 | 45 |

**4. Leaks with Trees**

| Date | # | Street | St Suffix | grade | sq ft | trees | leak # | % gas |
|---|---|---|---|---|---|---|---|---|
| 11/14/17 | 29 | Alcott | Street | 2 | 350 | 2 | 12:15 PM | 50 |
| 11/14/17 | 59 | Alcott | Street | 2 | 100 | 1 | 1:30 PM | 50 |
| 11/1/17 | 182 | Arlington | Street | 2 | 2500 | 3 | 12:10 PM | 75 |
| 10/24/17 | 315 | Arlington | Street | 3 | 1200 | 1 | 7323442 | 75 |
| 10/26/17 | 423 | Arlington | Street | 2 | 1000 | 1 | 248707 | 85 |
| 11/9/17 | 23 | Birch Hill | Road | 2 | 150 | 1 | 8:30 AM | 70 |
| 11/13/17 | 6 | Brucewood | Road | 2 | 50 | 1 | 8:56 AM | 15 |
| 11/1/17 | 58 | Central | Street | 2 | 900 | 1 | 248714 | 60 |
| 11/27/17 | 73 | Central | Street | 3 | 150 | 1 | 10:23 AM | 50 |
| 11/1/17 | 194 | Central | Street | 2 | 1500 | 1 | 1373756 | 40 |
| 11/1/17 | 237 | Central | Street | 2 | 75 | 1 | 137813 | 20 |
| 10/28/17 | 267 | Central | Street | 2 | 175 | 2 | 1373813 | 45 |
| 11/27/17 | 204 | Central | Street | 2 | 150 | 1 | 10:45 AM | 15 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 11/2/17 | 42 | Conant | Street | 2 | 100 | 2 | 249167 | 30 |
| 11/20/17 | 30 | Conant | Street | 2 | 1500 | 1 | 8:54 AM | 90 |
| 11/20/17 | 39 | Conant | Street | 3 | 20 | 1 | 8:54 AM | 30 |
| 11/5/17 | | Concord at Wood lane | Street | 2 | 2000 | 1 | 8:37 AM | 80 |
| 10/28/17 | 1 | Coughlin | Street | 2 | 25 | 1 | 249848 | 40 |
| 10/28/2017 | 1 | Coughlin | Street | 2 | 150 | 2 | 249848 | 15 |
| 10/28/17 | 13 | Coughlin | Street | 3 | 750 | 1 | 234591 | 25 |
| 10/28/17 | 14 | Coughlin | Street | 2 | 750 | 2 | 1:37 PM | 25 |
| 10/28/17 | 15 | Coughlin | Street | 2 | 800 | 3 | 234591 | 60 |
| 10/28/17 | | Coughlin Street at 1 Huckleberry Lane | | 2 | 50 | 1 | 12:23 AM | 45 |
| 11/1/17 | 31 | Elm | Street | 2 | 1500 | 1 | 1665099 | 70 |
| 11/21/17 | 40 | Ethan Allen | Drive | 2 | 400 | 1 | 11:40 AM | 80 |
| 12/15/17 | | Gionconda at Pondview Ave | Avenue | 3 | 25 | 1 | 11:36 AM | 30 |
| 11/4/17 | 22 | Hemlock | Lane | 3 | 500 | 1 | 9:24 AM | 30 |
| 11/2/17 | 8 | High | Street | 2 | 3750 | 1 | 4228611 | 30 |
| 11/2/17 | 8 | High | Street | 2 | 625 | 1 | 4228611 | 80 |
| 11/2/17 | 39 | High | Street | 2 | 2625 | 2 | 4228683 | 30 |
| 11/16/17 | 2 | Highland | Road | 2 | 25 | 2 | 10:03 AM | 75 |
| 11/5/17 | 14 | Horseshoe | Drive | 2 | 100 | 1 | 1392925 | 50 |
| 11/4/17 | 22 | Hosmer | Street | 2 | 3000 | 1 | 110149 | 50 |
| 11/6/17 | 47 | Hosmer | Street | 3 | 600 | 1 | 1392931 | 30 |
| 11/6/17 | 52 | Hosmer | Street | 2 | 2500 | 2 | 3746463 | 60 |
| 10/27/17 | 4 | Kingman | Road | 2 | 75 | 1 | 3705135 | 60 |
| 11/13/17 | 40 | Laws Brook | Road | 2 | 600 | 1 | 12:30 PM | 75 |
| 11/20/17 | 60 | Laws Brook | Road | 2 | 300 | 1 | 10:54 AM | 50 |
| 11/5/17 | 9 | Main | Street | 3 | 750 | 1 | 12:08 PM | 30 |
| 11/5/17 | 29 | Main | Street | 3 | 50 | 1 | 8:42 AM | 10 |
| 11/4/17 | 420 | Main | Street | 2 | 1500 | 2 | 5202089 | 70 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 10/31/17 | | Maple St @ Stow Street | Street | 2 | 500 | 2 | 1392920 | 20 |
| 10/31/17 | 10 | Martin | Street | 2 | 1000 | 1 | 268588 | 50 |
| 10/31/17 | 15 | Martin | Street | 2 | 1800 | 1 | 8:24 AM | 50 |
| 10/28/17 | 544 | Massachusetts | Ave | 3 | 750 | 1 | 234659 | 50 |
| 10/28/17 | 550 | Massachusetts | Ave | 2 | 30 | 1 | 316134 | 6 |
| 10/24/17 | 5 | Mead | Terrace | 2 | 750 | 2 | 235141 | 40 |
| 11/4/17 | 83 | Nagog Hill | Road | 2 | 1200 | 1 | 7331087 | 50 |
| 11/1/17 | 4 | Nashoba | Road | 3 | 50 | 3 | 4800810 | 10 |
| 11/1/17 | 14 | Nashoba | Road | 2 | 600 | 1 | 4800810 | 100 |
| 11/1/17 | 26 | Nashoba | Road | 2 | 100 | 2 | 2:04 PM | 30 |
| 11/20/17 | 40 | Nashoba | Road | 3 | 25 | 1 | 2:23 PM | 5 |
| 10/26/17 | 15 | Notre Dame | Road | 2 | 1150 | 1 | 291135 | 20 |
| 11/8/17 | 18 | Parker | Street | 2 | 125 | 1 | 5201066 | 50 |
| 11/15/17 | 99 | Parker | Street | 2 | 300 | 1 | 2:27 PM | 70 |
| 10/24/17 | 7 | Paul Revere | Road | 2 | 700 | 1 | 1374101 | 40 |
| 11/2/17 | 28 | Piper | Road | 2 | 100 | 1 | 249413 | 40 |
| 11/8/17 | 7 | Pond View | Drive | 2 | 2100 | 1 | 7331077 | 100 |
| 11/9/17 | 8 | Powder Horn | Lane | 2 | 150 | 2 | 9:33 AM | 40 |
| 11/3/17 | 18 | Prospect | Street | 2 | 3000 | 3 | 234656 | 70 |
| 11/3/17 | 21 | Prospect | Street | 2 | 3500 | 2 | 11:41 AM | 50 |
| 11/3/17 | 22 | Prospect | Street | 2 | 3500 | 2 | 11:41 AM | 60 |
| 11/3/17 | 28 | Prospect | Street | 2 | 3000 | 3 | 11:41 AM | 65 |
| 11/3/17 | 31 | Prospect | Street | 2 | 2800 | 3 | 11:41 AM | 60 |
| 11/3/17 | 38 | Prospect | Street | 2 | 3000 | 1 | 1393096 | 80 |
| 11/3/17 | 54 | Prospect | Street | 3 | 500 | 2 | 1373087 | 50 |
| 10/31/17 | 18 | Robbins | Street | 2 | 1000 | 2 | 191980 | 30 |
| 11/2/17 | 12 | School | Street | 2 | 2000 | 3 | 154544 | 45 |
| 11/13/17 | 30 | School | Street | 2 | 180 | 2 | 11:56 AM | 60 |
| 11/13/17 | 70 | School | Street | 2 | 350 | 2 | 10:10 AM | 35 |
| 11/14/17 | 246 | School | Street | 3 | 150 | 1 | 12:23 AM | 30 |
| 10/31/17 | 10 | Stow | Street | 2 | 2500 | 2 | 248892 | 60 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 10/31/17 | 94 | Stow | Street | 2 | 1000 | 2 | 12:41 PM | 30 |
| 10/31/17 | 94 | Stow | Street | 2 | 400 | 2 | 12:41 PM | 40 |
| 10/31/17 | | Stow at Liberty | Street | 2 | 1000 | 1 | 3673944 | 30 |
| 10/24/17 | 57 | Summer | Street | 2 | 6250 | 1 | 5200328 | 75 |
| 11/21/17 | 74 | Summer | Street | 3 | 200 | 1 | 10:31 AM | 50 |
| 11/1/17 | 9 | Wachusett | Drive | 3 | 50 | 1 | 127106 | 40 |
| 11/21/17 | 148 | Willow | Street | 3 | 200 | 2 | 12:50 PM | 50 |
| 11/16/17 | 21 | Windemere | Drive | 2 | 250 | 1 | 1393119 | 70 |
| 11/4/17 | 55 | Wood | Lane | 2 | 150 | 2 | 1393132 | 50 |
| 11/30/17 | | Woodbury at Main Street | Lane | 3 | 375 | 1 | 10:30 AM | 60 |

5.. Non Pipeline Leak Locations

| Date | Street # | Street | | notes |
|---|---|---|---|---|
| 10/24/2017 | 294 | Arlington | Street | no repeat |
| 10/24/2017 | | Arlington at Haynes | Street | no repeat |
| 11/20/2017 | | Arlington at Houghton | Street | no read from leak to south |
| 12/8/2017 | | Aspen | Lane | no read vehicle turn around |
| 11/20/17 | | Central east of Windsor | Street | no read swamp |
| 12/8/2017 | | Clover Hill | Road | no repeat |
| 11/20/2017 | | Devon | Drive | sewage problem |
| 11/16/2017 | | Duggan Road at Willow Road | | no repeat |
| 11/30/2017 | | Durkee | Road | no repeat |
| 11/20/2017 | | Elm Street | by school | no repeat |
| 12/8/2017 | | Forest | Road | Landfill |
| 12/8/2017 | | Gabriel at Great Road | Lane | sewage problem |
| 12/8/2017 | | Harris At Great | Street | no read vehicle turn around |

| | | | | |
|---|---|---|---|---|
| 12/8/2017 | | Hawthorne | Street | no repeat |
| 10/24/2017 | 16 | Juniper Ridge | Road | no repeat |
| 12/8/2017 | | Main north of Wheeler Lane | Road | no repeat |
| 12/8/2017 | | Main Acton Sand & Gravel | Street | no repeat |
| 12/8/2017 | | Monroe | Drive | no repeat vehicle turnaround |
| 12/8/2017 | | Newtown by McKinley | Road | no repeat |
| 11/3/2017 | 21 | Patriots | Road | no repeat |
| 11/20/2017 | | Patriots | Road | no repeat |
| 11/20/2017 | | Quarry ay Granite | Road | Lincoln Tree Compost |
| 11/20/2017 | | Robinwood | Road | no repeat |
| 11/20/2017 | | Russell | Road | no repeat |
| 12/8/2017 | | Railroad Street | Street | no read vehicle turn around |
| 12/8/2017 | | River by High | Street | no read vehicle turn around |
| 12/1/2017 | | Seminole | Road | no repeat |
| 12/8/2017 | | Sylvia | Lane | no read vehicle turn around |
| 11/20/17 | | Tenney at Parker | Circle | no repeat |
| 11/30/2017 | | Tuttle | Drive | no repeat |
| 12/21/2017 | | Willow by Homestead | Street | no repeat |

**5. Federal Pipeline and Hazardous Materials Safety Administration Leak Classification Guidelines**

| GRADE | DEFINITION | ACTION CRITERIA | EXAMPLES |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1 | 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. | Requires *prompt action** to protect life and property, and continuous action until the conditions are no longer hazardous.<br>*The prompt action in some instances may require one or more of the following:<br>a. Implementation of company emergency plan(§192.615).<br>b. Evacuating premises.<br>c. Blocking off an area.<br>d. Rerouting traffic.<br>e. Eliminating sources of ignition.<br>f. Venting the area. g. Stopping the flow of gas by closing valves or other means.<br>h. Notifying police and fire departments. | 1. Any leak which, in the judgment of operating personnel at the scene, is regarded as an immediate hazard.<br>2. Escaping gas that has ignited.<br>3. Any indication of gas which has migrated into or under a building, or into a tunnel.<br>4. Any reading at the outside wall of a building, or where gas would likely migrate to an outside wall of a building.<br>5. Any reading of 80% LEL, or greater, in a confined space.<br>6. Any reading of 80% LEL, or greater in small substructures (other than gas associated sub-structures) 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. |

**TABLE 3B-LEAK CLASSIFICATION AND ACTION CRITERIA-GRADE 2**

| GRADE | DEFINITION | ACTION CRITERIA | EXAMPLES |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 2 | A leak that is recognized as being non-hazardous at the time of detection, but justifies scheduled repair based on probable future hazard. | Leaks should 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:<br>a. Amount and migration of gas.<br>b. Proximity of gas to buildings and subsurface structures.<br>c. Extent of pavement.<br>d. Soil type and soil conditions (such as frost cap, moisture and natural venting).<br><br>Grade 2 leaks should 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 condition. Grade 2 leaks may vary greatly in degree of potential hazard.<br><br>Some Grade 2 leaks, when evaluated by the above criteria, may justify scheduled repair within the next 5 working days.<br><br>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.<br><br>On the other hand, many Grade 2 leaks, because of their location and magnitude, can be scheduled for repair on a normal routine basis | A. *Leaks Requiring Action Ahead of Ground Freezing or Other Adverse Changes in Venting Conditions.* Any leak which, under frozen or other adverse soil conditions, would likely migrate to the outside wall of a building.<br><br>B. *Leaks Requiring Action Within Six Months*<br>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.<br>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.<br>3. Any reading less than 80% LEL in small substructures (other than gas associated substructures) from which gas would likely migrate creating a probable future hazard.<br>4. Any reading between 20% LEL and 80% LEL in a confined space.<br>5. Any reading on a pipeline operating at 30 percent SMYS, or greater, in a class 3 or 4 location, which does not qualify as a Grade 1 leak.<br>6. Any reading of 80%LEL, or greater, in gas associated sub-structures.<br>7. Any leak which, in the judgment of operating personnel at the scene, is of sufficient magnitude to justify scheduled repair. |

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|---|---|---|---|
| | | with periodic re-inspection as necessary. | |

**TABLE 3C-LEAK CLASSIFICATION AND ACTION CRITERIA-GRADE 3**

| GRADE | DEFINITION | ACTION CRITERIA | EXAMPLES |
|---|---|---|---|
| 3 | A leak that is non-hazardous at the time of detection and can be reasonably expected to remain non-hazardous. | These leaks should be reevaluated during the next scheduled survey, or within 15 months of the date reported, whichever occurs first, until the leak is regraded or no longer results in a reading. | *Leaks Requiring Reevaluation at Periodic Intervals*<br>1. Any reading of less than 80% LEL in small gas associated substructures.<br>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.<br>3. Any reading of less than 20% LEL in a confined space. |