

Leak Survey and Repair Procedures

Definition of Terms

Abnormal Operating Condition: A condition identified by the operator that may indicate a malfunction of a component or deviation from normal operations that may do either of the following:

- Indicate a condition exceeding design limits, or
- Result in a hazard(s) to persons, property, or the environment.

Anniversary Month: The month in which the leak was initially reported or the month that has been established in the Leak Survey Program as the month where the work will show as being scheduled.

Building: Any structure designed and used for human occupancy in which gas could accumulate.

Business Districts: The principal business areas in an urban community. In determining business districts, the following areas should be considered:

- Non-wall-to-wall areas, typically at least entire blocks, where the vast majority of the buildings on **both** sides of the street are used for commercial, industrial, religious, educational, health, and/or recreational purposes. Both the main and services should be leak surveyed in these areas annually.
- Wall-to-wall areas, typically an entire block, where the vast majority of the properties on **both** sides of the street have no lawns, green strips, or trees. There are instances of wall-to-wall areas in residential areas. Both the main and services should be leak surveyed in these areas annually.
- Areas, typically at least entire blocks, where the mains and services are in private property serving a shopping center from the roadway or parking lot. Both the main and services should be leak surveyed in these areas annually.
- Any other location or site, which in the judgment of a technically competent supervisor or a technically competent management employee, that should be leak surveyed annually. Business districts do not include small commercial areas (e.g., a small store or a strip mall) in residential areas where the mains are in the franchise area and the businesses are served from lateral services off of the mains. Strip malls in commercial areas should be included in “business districts.”

CGI (Can’t Get In): A location where there is no access to typically perform maintenance work.

CGT-Distribution: A pipeline operating over 60 pounds per square inch gauge (psig) that does not meet the definition of “Transmission” as defined in 49 CFR Part 192, Subpart 192.3.

CGT-Gathering Line: A pipeline that transports gas from a current production facility to a transmission line or distribution main.

CGT-Transmission: A pipeline operating over 60 psig that meets the definition of



Transmission as defined in 49 CFR Part 192, Subpart 192.3.

Class Locations: An area defined and classified by criteria set forth in 49 CFR 192.5, which reads as follows:

- “(a) This section classifies pipeline locations for purposes of this part. The following criteria apply to classifications under this section.
 - (1) A "class location unit" is an onshore area that extends 220 yards on either side of the centerline of any continuous 1-mile length of pipeline.
 - (2) Each separate dwelling unit in a multiple dwelling unit building is counted as a separate building intended for human occupancy.
- (b) Except as provided in paragraph (c) of this section, pipeline locations are classified as follows:
 - (1) **A Class 1 location** is:
 - (i) An offshore area; or
 - (ii) Any class location unit that has 10 or fewer buildings intended for human occupancy.
 - (2) **A Class 2 location** is any class location unit that has more than 10 but fewer than 46 buildings intended for human occupancy.
 - (3) **A Class 3 location** is:
 - (i) Any class location unit that has 46 or more buildings intended for human occupancy; or
 - (ii) An area where the pipeline lies within 100 yards of either a building or a small, well-defined outside area (such as a playground, recreation area, outdoor theater, or other place of public assembly) that is occupied by 20 or more persons on at least 5 days a week for 10 weeks in any 12-month period. (The days and weeks need not be consecutive.)
 - (4) **A Class 4 location** is any class location unit where buildings with four or more stories above ground are prevalent.
- (c) The length of Class locations 2, 3, and 4 may be adjusted as follows:
 - (1) A Class 4 location ends 220 yards from the nearest building with four or more stories above ground.
 - (2) When a cluster of buildings intended for human occupancy requires a Class 2 or 3 location, the class location ends 220 yards from the nearest building in the cluster.”

Clear a Leak: Validate through investigation that a leak is no longer present.

Combustible Material: A flammable, gaseous, or liquid material consisting of organic compounds, such as methane, benzene, etc.

Competent First Responder: A person who is qualified by training and experience concerning the nature, hazards, and properties of natural gas, e.g., a gas service representative.

Confined Space: A workspace defined by the concurrent existence of the following:

- Insufficient existing ventilation - Existing ventilation is insufficient to remove dangerous air contamination or an oxygen deficiency that may exist



or develop, and

- Limited access - Ready access or egress for the removal of a suddenly disabled employee is difficult due to the location or size of the openings.

Distribution Main: A pipeline that serves as a common source of supply for more than two service lines operating at 60 psig or less.

District Regulator Station: Facilities which contain pressure-control devices and their appurtenances, within the transmission and distribution system, that limit and control pressures in distribution mains that serve more than two services. This includes facilities from the upstream fire valve (inclusive) to the regulator station that may operate above 60 psig.

Electrical Survey: A close interval survey of electrical potential (voltage) between the buried pipe and its environment for the purpose of identifying areas of corrosive conditions.

Gas Facilities: All Company-operated gas lines and related appurtenances.

Leak: The unintentional escape of gas from containment.

Leakage Detection Instrument: An instrument capable of detecting a leak in or near a natural gas-carrying piping component or system. The leak survey instrument should be capable of detecting gas readings of 50 ppm of gas in air.

Leak Grade: A classification of a leak based on leak readings, public exposure, and location.

Leak Recheck: Any leak survey performed with a leakage detection instrument in the area of an existing Priority Grade 2, Grade 2, or Grade 3 leak.

Leak Repair: An action to restore a gas facility to sound condition by eliminating a gas leak.

Leak Survey: A search for possible gas leakage in any area where Company gas facilities exist, or where a gas leak is reported or suspected.

LEL: The “lower explosive limit” expressed as a percentage by volume of gas in air at standard conditions. For natural gas, the LEL is 5%.¹

Nominal Month: All dates that fall within the respective month. Some call this a calendar month.

Operator Qualified: Employees evaluated and qualified in accordance with UO Standard S4450, “Operator Qualification Program.”

PPM: “Parts per million” expressed by a volume of gas in a volume of gas-air mixture (1,000 ppm is equal to 0.1% gas.).

Public Assembly: All schools, hospitals, and readily identifiable churches. Other cases may include certain public assembly buildings occupied by 20 or more

¹ For this standard the LEL for natural gas is 5% and UEL is 15% as defined in the AGA Guide for American Transmission and Distribution Piping Systems, Guide Material Appendix G-192-11, “Gas Leakage Control Guidelines for Natural Gas Systems.” Some manufacturers’ models of combustible gas indicators list 4% as the LEL, which is their default setting.



persons, recreational areas, state-licensed daycare centers with licensed occupancies of 12 or more, or nursing homes with eight or more beds. At least the service lines for these facilities shall be surveyed annually.

Reading: A measurement of gas indicated on a gas detector.

Service: A distribution line that transports gas from a common source of supply to a customer meter.

SMYS: “Specified minimum yield strength.”

Station Piping: For the purpose of leak surveying, this includes all transmission gas pipes and appurtenances within the property lines of CGT:

- Compressor stations.
- Terminals.
- Storage holder facilities.
- Transmission to transmission pressure regulator stations.
- Other gas operating installations.

Substructure: Any structure, tunnel, passageway, or other confined space below ground level where gas could accumulate.

Technically Competent Supervisor: A supervisor who has been trained concerning the nature, hazards, and properties of natural gas and this standard.

Tunnel: A subsurface passageway in which a person could enter and gas could accumulate. For purposes of this standard, “tunnel” also includes large sewers, storm drains, pipelines, conduits, etc.

UEL: The “upper explosive limit” expressed as a percentage by volume of gas in air at standard conditions. For the purposes of this standard, the UEL is 15%.

Vegetation Survey: A gas leakage survey conducted by observing the conditions of the soil and the vegetation along certain gas transmission or gas gathering pipelines.

Venting: Drilling a hole or holes, or excavating above and/or around a leak to allow the gas to dissipate or vent.



Leak Survey, General

The procedures outlined are intended as guidelines to be used as minimum standards wherever applicable. Although these procedures will be found to be applicable in the majority of cases, particular situations where they would not be applicable will still require sound judgment in carrying out an effective leak survey program. Distribution plats and/or distribution maps or CGT records used to perform the leak surveys shall be as current as practical, typically within 3 months of the scheduled leak survey.

Leaks from Non-Pacific Gas and Electric Company (Company) Sources

Odors or indications from non-Company sources should be investigated using the procedures listed in the “Volatile Combustible Material in Soil” section on Page 26 of this attachment. When leak indications are found to originate from a non-Company source or facility, such as gasoline vapors, sewer, or marsh gas, prompt action should be taken where necessary to protect life and property. Leaks that are potentially hazardous should be reported promptly to the operator of the facility and, where appropriate, to the police department, fire department, or other governmental agencies.

In the case where gas indications are being detected, but are suspected not to be Company gas, samples of the gas can be taken and analyzed, or field tests can be performed by using equipment that can determine whether or not it is Company gas determined by detecting the presence of ethane.

Leaks on Customer Premises

For leaks on customers’ premises, refer to UO Standards S6434, “Gas Leak and Odor Response” and S6435, “Establishing and Discontinuing Gas and Electric Service.”

Leak Survey and Leak Repair Roles and Responsibilities

The following are roles and responsibilities for leak survey and repair coordinators, the leak survey supervisor, leak survey coordinator’s supervisor, leak surveyor, compliance lead, leak repair supervisor, and leak repair employees.

For gas transmission facilities maintained by Gas System Maintenance and Technical Services (GSM&TS) districts, the gas maintenance supervisors fulfill the roles of most of the employees listed above. Leak surveys conducted by GSM&TS are documented on the Pipeline Patrol Reports, Form 4111A, when vegetation survey is used. Plat sheets are not used for documenting transmission leak surveys conducted by GSM&TS.

1. Leak survey and leak repair coordinator (typically gas mapping employee and/or CGT gas maintenance supervisor

A. The leak survey and leak repair coordinator has overall responsibility for:

- Leak survey, recheck, and repair schedules.
- Following up concerning due or past due leak information and work.
- Coordination of Integrated Gas Information System (IGIS) information, leak, leak survey, and repair records.



B. Specific responsibilities

- Ensure that the scheduling of all leak-related activities, survey, rechecks, and repairs are timely, correct, and accurate.
- Clearly communicate the schedule to the work groups and/or to the respective supervisor of employees performing leak survey, leak investigation, and leak repair work.
- Assist the leak survey supervisor and the leak repair supervisor in ensuring the accuracy and timeliness of all leak surveys, leak investigations, and leak repairs.
 - Routine leak records should be returned to the coordinator no more than 7 calendar days following the day the respective survey for a respective map is completed.
 - Make changes that are compliant with the survey schedule and/or survey data as requested by the leak survey supervisor.
 - Rearrange leak repair schedules and/or survey data as requested by the Leak Survey supervisor.
 - Critically review the records and information returned from the field to identify potential conflicts, errors, and/or omissions.
 - Follow up concerning outstanding “no access” locations.
 - Follow up concerning any potential conflicts, errors, and/or omissions in records of information provided.
- Assist the appropriate supervisor in ensuring that all leaks are rechecked in a timely manner.
- Ensure that suspected copper service leaks are appropriately identified and graded as a Grade 1, Grade 2+, or Grade 2 leaks.
- Assist the appropriate supervisor in ensuring that all leaks are appropriately graded by evaluating the information or lack of information for each respective leak and comparing the information against the leak grading criteria in this standard.
- Assist the appropriate supervisor in ensuring that all downgrades and upgrades are justified and adequately documented.
- Assist the leak repair supervisor to ensure that all leaks are repaired in a timely manner by supplying the supervisor with leak information and by following up in an effective and efficient manner.
- Assist all work groups in ensuring accurate and timely communication of all leak-related information and schedules.
- Supply copies of leak documents, leak logs, survey logs, recheck reports, and plat sheets, as required, to survey and repair work groups.
- For the CGT-Gas Distribution Memorandum of Understanding (MOU), where plat sheets are being used to document the survey, and for all Gas Distribution leak surveys, supply a copy of the respective IGIS Survey Log for the surveyors to use. This will eliminate duplicate leak numbers from being issued and ensure the rechecks of existing leaks are appropriately documented with the survey.
(**Note:** CGT facilities that are maintained by CGT use Pipeline Patrol Report, Form F4111-A, rather than leak survey maps/plats.)
- Update maps and/or records, as needed, to reflect discrepancies noted by leak surveyors or others.
- Supply other information as requested by the survey and repair work groups.



- Ensure timely input of information into IGIS.
- Organize, maintain, and retain leak survey and repair information.
- Inform the leak survey coordinator’s supervisor of recurring and/or worsening trends concerning the quality of service from other work groups or individuals that are jeopardizing or may jeopardize the quality of the program.

2. Leak survey supervisor (typically a construction supervisor or a GSM&T gas maintenance supervisor)

A. The leak survey supervisor has overall responsibility for ensuring the following:

- Overall survey coordination.
- Critical data review.
- Supplying timely and accurate records.
- Supervise leak surveyors.
- Manage leak survey equipment, supplies and tools.

B. Specific responsibilities

- Ensure that for a CGT-Gas Distribution MOU, where plat sheets are being used to document the survey, and for all Gas Distribution leak surveys, the surveyors are being supplied a copy of the respective IGIS Survey Log for the surveyors to use and that the surveyors are using the Survey Log. This will eliminate duplicate leak numbers from being issued and ensure that the rechecks of existing leaks are appropriately documented with the survey. (Note: CGT facilities that are maintained by CGT use Pipeline Patrol Report, Form F4111-A, rather than leak survey maps/plats.)
- Return maps and records to the leak survey and repair coordinator no more than 7 calendar days following the day the respective survey for the respective map is completed.
- Critically review all Leak Survey Maps, “A” Forms, and Leak Logs for accuracy, proper grading, and completeness.
- Ensure that all downgrades and upgrades are justified and adequately documented.
- Forward any “A” Forms, “A1” Forms, survey logs, leak logs, and any completed leak survey maps to the leak survey coordinator on a daily basis.
- Notify the gas operating engineer of unusual survey findings.
- Ensure that all CGI locations are being followed up in a timely manner and resolved.
- Coordinate changes to survey schedules, frequencies, data, and techniques to all affected employees.
- Inform others to help resolve any recurring and/or worsening trends concerning the quality of service from other work groups or individuals that are jeopardizing or may jeopardize the quality of the program.
- *Supervise leak surveyors.*
 - Ensure that all survey employees are trained and Operator Qualified (OQd) to conduct leak survey activities.
 - Manage work group scheduling to ensure timely survey, leak investigation, and recheck work.
 - Monitor survey progress and resource needs.
 - Document monthly survey completion.



- Ensure accuracy and completeness of all information provided by leak surveyors.
- *Manage leak survey equipment, supplies, and tools.*
 - Ensure that only approved and authorized equipment, tools, and procedures are used by leak surveyors.
 - Ensure that all leak detection equipment is calibrated and in proper working order.
 - Ensure that adequate equipment, supplies, and tools are readily available for the surveyors.

3. Leak survey coordinator’s supervisor (typically the mapping supervisor or the GSM&TS gas maintenance supervisor)

A. The leak survey coordinator’s supervisor is responsible for the following leak survey activities:

- Monitor procedures.
- Supervise leak survey coordinators.
- Follow up on reports of recurring and/or worsening trends concerning the quality of service from other work groups or individuals that are jeopardizing or may jeopardize the quality of the program.

B. Specific responsibilities

- Ensure that an adequate scheduling process is in place and is being used effectively.
- Ensure that an adequate monthly routine leak survey progress monitoring process is in place and is being used effectively. This report must at least indicate the percentage the leak survey is complete for the month to date based on hours scheduled for the month versus the scheduled hours completed for the month, or miles of facilities to be surveyed for the month versus the miles of facilities completed for the month.
- Lead the effort to work with the gas operations engineer and the leak survey supervisor to develop and implement action plans to:
 - Improve schedule effectiveness.
 - Implement new leak software.
 - Integrate new mapping and recordkeeping processes.
- Monitor survey and recheck completion.
- *Supervise leak survey and leak repair coordinators*
 - Ensure that mappers are adequately trained to manage survey records and computer software, such as Gas FM and Excel.
 - Ensure accurate and timely schedule implementation.
 - Ensure accurate IGIS information.
 - Ensure timely follow-up concerning any potential conflicts, errors, and/or omissions in records of information provided.
 - Reinforce with the leak survey coordinator, the leak survey coordinator’s responsibility to report recurring and/or worsening trends concerning the quality of service from other work groups or individuals that are jeopardizing or may jeopardize the quality of the program.



4. Leak surveyor

A. The leak surveyor’s general areas of responsibilities include:

- Route and schedule assigned survey work to ensure timely and efficient completion of the work.
- Conduct survey activities.
- Be ready and able to explain the leak grading and leak survey procedures to the public, as needed.
- Update survey and leak records and forward them to others for action.

B. Specific responsibilities

- *Route and schedule survey work.*
 - Review and evaluate assigned work, route the assigned work, and schedule accordingly.
 - Ensure that surveys are completed on time.
 - Update all appropriate records.
- *Conduct survey activities.*
 - Use only Company-approved techniques, tools, and equipment.
 - Accurately grade the leaks based on concentration, proximity to structures, public exposure, and likelihood of migration and/or future hazard. Consideration of the soil type (sand, clay, rock, etc.) and weather shall be made before clearing a leak. A Grade 2 or 2+ leak that was graded in a dry season in a clay soil area that is currently in a wet season should be evaluated carefully before downgrading or deleting a leak. Adequately document any leak downgrades and upgrades.
 - For a CGT-Gas Distribution MOU, where plat sheets are being used to document the survey, and for all Gas Distribution leak surveys, use the copy of the respective IGIS survey log. This will eliminate duplicate leak numbers from being issued and ensure that the rechecks of existing leaks are appropriately documented with the survey.
 - Consult with a supervisor when unusual conditions are encountered.
 - Be ready and able to explain the leak grading and leak survey procedures to the public, as needed.
 - Ensure that all detection equipment is calibrated and in proper working order.
 - Notify the supervisor of specific CGI follow-up requirements.
 - Recommend additions/deletions to annual leak survey locations as conditions warrant.
 - Recommend and document changes to and/or conflicts with facility records.
 - Conduct atmospheric corrosion inspections, evaluations, and reporting in the course of the leak survey.
 - Appropriately identify and grade suspected copper service leaks on the leak logs and/or “A” Form.
 - Report and/or correct any conditions found in the field concerning Company facilities needing corrective action.
 - Standby/make safe Grade 1 leak locations as required.



- *Update survey records and forward to others for action.*
 - Note the location and leak number of each leak on the leak map records.
 - Ensure that all survey and recheck logs are timely, accurate, and complete.

5. Compliance lead (typically the operations engineer for Gas Distribution and MOU CGT facilities, or for non-MOU CGT facilities the GSM&TS district supervisor or System Integrity representative.)

- Review/audit leak survey and repair activities in accordance with the current Gas Distribution and Technical Services Compliance Plan, Leak Survey and Repair Audit Protocol, and the Senior Gas Operations Engineers Review Protocol.
- Ensure that for CGT-Gas Distribution MOUs, where plat sheets are being used to document the survey, and for all Gas Distribution leak surveys, a copy of the respective IGIS Survey Log for the surveyors to use is being issued and used. This will eliminate duplicate leak numbers from being issued and ensure that the rechecks of existing leaks are appropriately documented with the survey.
- Help ensure that the proper replace versus repair decisions are being made.
- Review other leak survey and repair activities as requested.
- Review the IGIS Leak Downgrade and IGIS Leak Upgrade Reports to ensure that appropriate documentation and grading practices are in place.
- Work with other stakeholders to develop and implement process improvement initiatives.
- Work with program lead to revise/modify standards and guidelines.
- Evaluate leak data to identify, assess, and manage leak trends, and evaluate replace versus repair situations.
- Champion the authorization of identified replacement work based on condition and/or leak history.

6. Leak repair supervisor (typically a gas construction supervisor or the GSM&TS gas maintenance supervisor for CGT)

- *Responsibilities*
 - Manage and monitor the leak repair process.
 - Supervise leak repair employees.
 - Manage repair equipment, tools, and supplies.
 - Ensure that the proper accounting is being used by the repair employees.
- *Specific Responsibilities*
 - *Manage the leak repair process.*
 - Help ensure that the proper replace versus repair decisions are being made.
 - Ensure that all repairs are completed in a timely manner.
 - Critically review leaks before repair to ensure the leak should be repaired. Consider the soil type (sand, clay, rock, etc.) and weather before clearing a leak. A Grade 2 or 2+ leak that was graded in a dry season in a clay soil area that is currently in a wet season should be evaluated carefully before downgrading or deleting a leak.
 - Ensure that any special circumstance must be clearly noted on the “A” and “A1” forms.



- Review all repaired leak “A” and “A1” forms to ensure accuracy and completeness.
- Ensure that all repaired leak “A” and “A1” forms are returned to the leak survey and repair coordinator in a timely manner.
- *Supervise leak repair employees.*
 - Ensure that all repair employees are OQd as required.
 - Provide training to all repair employees.
 - Ensure that only approved repair techniques/procedures are used.
 - Monitor individual leak repair progress and quality.
 - Monitor, evaluate, and manage leak repair costs and trends.
- *Manage repair equipment, tools, and supplies.*
 - Provide sufficient tools and supplies for all likely local leak scenarios.
 - Ensure that all repair equipment and tools are approved, in proper working order, and calibrated as required.

7. Leak repair employees (typically a gas crew lead person)

A. The leak repair employees’ general areas of responsibilities include:

- Critically evaluate the grade of the leak before repair to confirm the need for repair.
- Evaluate the situation and recommend either facility repair, deactivation, or replacement.
- Pinpoint and repair the leak.
- Fully document the leak repair work and inspection data in ink. Note that the crew leader whose crew repaired the leak shall sign-off the “A” or “A1” Form. They shall not be signed-off by a supervisor or anyone else on behalf of the crew leader.
- The respective leak number shall be included on the time record (time sheet) for the workers that worked on the respective leak repair.

B. Specific responsibilities

- *Route and schedule repair work.*
 - Review and evaluate assigned work, route the assigned work, and schedule it accordingly.
 - Ensure that repairs are completed on time.
 - Update and submit all appropriate records in a timely manner.
- *Conduct repair activities.*
 - Use only approved procedures, tools, and equipment.
 - Accurately grade the leaks based on concentration, proximity to structures, public awareness, and likelihood of migration and/or future hazard. Adequately document reasons for any leak downgrades and upgrades.
 - Consult with a supervisor when an unusual condition is encountered.
 - Ensure that all detection equipment is calibrated and in proper working order.
 - Ensure that all leak repair employees are appropriately trained and qualified.
 - Notify the supervisor of specific CGI follow-up requirements.
 - Fully document the work performed. Complete appropriate requests for additional information concerning leak records and activity in a timely manner.
 - Clearly report field-to-record discrepancies.



**Table 1
Frequency of Periodic Required Gas Leak Surveys**

Gas Facilities	Semi-annual	Annual	3 Years	5 Years	After Repairs (Note 1)	Acceptable Leak Survey Methods
Distribution Class 4 locations, in principal business districts, and in Class 3 locations covered by 49 CFR 192.5(b), (3), and (ii), and G.O. 112E Section 143.1 where, in the opinion of the supervisor, (see Note 2) conditions warrant survey.		X			X	Foot or Mobile Only
Distribution (Note 3) Buried metallic facilities not under cathodic protection, not already in an annual leak survey area.			X		X	Foot or Mobile Only
Distribution Balance of underground facilities.				X	X	Foot or Mobile Only
CGT-Distribution Class 4 locations, in principal business districts, and in Class 3 locations covered by 49 CFR 192.5(b), (3), and (ii), and G.O. 112E Section 143.1 where, in the opinion of the supervisor, (see Note 2) conditions warrant survey.		X			X	Foot or Mobile Only*
CGT-Distribution Class 1, 2, and 3 where an annual survey is not required.				X	X	Class 3: Foot or Mobile Only* Class 1 and 2: Foot, Mobile, Vegetation
CGT-Transmission Class 1 and 2		X			X	Foot, Mobile, or Vegetation
CGT-Transmission Class 3 and 4	X**				X	Foot or Mobile Only*
CGT Gathering Class 1, 2, 3, and 4		X			X	Class 3: Foot or Mobile Only* Class 1 and 2: Foot, Mobile or Vegetation
Station Piping Class 1, 2, 3, and 4		X			X	Foot or Mobile Only*
CGT-Transmission Transporting Unodorized Gas in Class 1 and 2		X			X	Foot, Mobile, or Vegetation
CGT-Transmission Transporting Unodorized Gas in Class 3	X				X	Foot or Mobile Only (No Exceptions)

* Vegetation Leak Survey may only be performed on Class 3 facilities if specific permission is granted in writing from CGT. However, for semi-annually required leak survey in Class 3 areas, if vegetation exists, a vegetation leak survey may be used for one of the leak surveys.

** CGT-Transmission that will be integrity assessed under the Pipeline Integrity Management Program requires only an annual leak survey. The list of covered pipelines that will be integrity assessed is maintained by the Risk Management Section of GSM&TS.

Notes:

- The need for a follow-up survey/post-repair check should be determined by a qualified employee, under the direction of the supervisor in charge of maintenance and based on factors such as residual gas, leak history, age, and type of system.
- All service lines to schools (www.greatschools.net), hospitals (<http://neuro-www2.mgh.harvard.edu/hospitalwebusa.html>), business districts, and churches (<http://www.churchseek.net>) must be surveyed annually (The websites provided may not be complete listings and may be used in conjunction with other records, such as historical records, phone book references, and other sources). Other cases may include certain public assembly buildings occupied by 20 or more persons, recreational areas, state licensed daycare centers with licensed occupancies of 12 or more (www.cclcd.ca.gov/docs/cclcd_search/cclcd_search.aspx) or nursing homes with eight or more beds (www.healthgrades.com).
- Three-year leak survey areas include buried metallic facilities, not cathodically protected. Also includes isolated copper services, not cathodically protected. This does not include isolated, stainless-steel metallic connector fittings that are part of the plastic system.
- Frequency definitions: Semi-annual means twice each calendar year not to exceed 7-1/2 months. Annual means once per calendar year not to exceed 14 months; 3 years means once each three calendar year period, within the anniversary month, not to exceed 38 nominal months; 5 years means once each 5 calendar-year period, within the anniversary month not to exceed 62 nominal months. If a survey is performed outside of the prescribed time period to be compliant, the late survey date will not be used as a basis to reschedule the survey. Only surveys that are performed within compliant time periods will be allowed to be used as a basis for rescheduling.
- Please note that any rescheduling that is performed by using the leak survey nominal month time windows shall be documented. Care shall be taken when rescheduling the work to not disrupt future months' leak survey workload.



Types of Special Leak Surveys

Special leak surveys shall be performed for the following situations:

1. Customer or third-party complaints of gas leakage.
2. Scheduled checks of previously identified leaks that are being checked outside of a routine leak survey.
3. Before and during maximum allowable operating pressure (MAOP) uprates of gas distribution facilities (Gas Standard A34.2, “Low, Semi-High, and High Pressure Uprating Procedure”).

Special leak surveys should be considered for the following situations:

1. On susceptible gas facilities¹ ahead of street improvements or blasting work and before, during, and/or after major third-party construction projects that involve a large trench, chamber, or vault excavations (see 2.A. below). When disruptive construction is close to gas facilities making them more susceptible to damage, give extra consideration to conducting special leak surveys before, during, and after the construction.
 1. Typically the more susceptible facilities are cast iron facilities, steel facilities with mechanical joints, and/or 12” or larger distribution facilities with miter joints.
2. Determine whether a special leak survey should be conducted after evaluating the following areas:
 - A. The most recent leak survey data.
 - B. The degree of sub-grade disruption based on the type of work being performed, e.g., scarifying the street versus overlaying the street.
 - C. The material type and age of the gas facilities involved, and after evaluating (as needed) the following supplemental areas:
 - Repaired leakage history.
 - Main and service inspection data, including cover where appropriate.
 - Active leakage data.
 - D. Only after the prior steps are completed and the evaluation suggests that there is a reasonable risk of leakage in the scope of the proposed project shall a special leak survey be conducted.
 - E. If the area is scheduled for replacement in the next ~3 years, then the division should request that the city, county, or state defer their work until the facilities are replaced.
3. After abnormal operating pressure conditions with the concurrence of the Gas Operations engineer, a GD&TS engineer, or a pipeline engineer for CGT facilities.
4. Following a substantial earthquake impacting the local division (Richter scale rating of greater than 5), landslide, flood, or other significant natural damage situation involving susceptible gas facilities¹.
 1. Typically the more susceptible facilities are cast iron facilities, steel facilities with mechanical joints, or 12” and/or larger distribution facilities with miter joints.



Leak Survey and Leak Investigation Follow-up Procedures to Inaccessible Locations

For a gas facility that cannot be accessed on the initial attempt to perform a leak survey, a follow-up method is required, such as in UO Guideline D-G0071, “Follow-Up Leak Survey Procedures for Inaccessible Locations.”

Leak Survey Method for Leak Checks and Leak Investigations

An approved and authorized gas detection unit shall be used to conduct leak surveys (except for vegetation leak surveys) or any required leak checks (e.g., required 6-month scheduled leak checks of Grade 2 leaks).

Leak Survey and Leak Investigation Method to Downgrade or Clear a Leak

The same type of instrument, or a more sensitive instrument that was used to record an original leak indication, shall be used to subsequently clear that same leak indication on a leak survey, leak check, or leak recheck. Consider the soil type (sand, clay, rock, etc.) and weather before clearing a leak. A Grade 2 or 2+ leak that was graded in a dry season in a clay soil area that is currently in a wet season should be evaluated carefully before downgrading or deleting a leak. A gas leak identified by vegetation leak survey shall be verified by using an approved and authorized gas sensing unit or procedure. Company gas leakage instrument types in order of decreasing sensitivity are:

1. Walking hydrogen flame ionization unit (most sensitive).
2. Mobile optical methane detection or mobile hydrogen flame ionization unit.
3. Subsurface combustible gas indicator.

Leak Surveyor and/or Leak Detector Person Qualifications

Gas leakage surveys and leak investigations shall be performed by employees who are OQd in the type of survey work being performed, and who are familiar with the characteristics of the natural gas and leakage detection instruments being used.

Calibration of Leak Survey and Leak Investigation Equipment

All leak survey instruments that are used to perform the leak surveys required by this standard must be checked for calibration and calibrated (if necessary) according to the frequencies recommended by the manufacturer or the gas standards covering this equipment (M-53, “Portable Combustible Gas Indicator Specification,” M-53.1, “Portable Combustible Gas Indicator Operation and Maintenance Specifications,” M-53.2, “Portable Hydrogen Flame Ionization Gas Detector,” M-53.3, Calibrating Portable Combustible Gas Indicators and Hydrogen Flame Ionization Units,” M-53.4, “Mobile Leak Survey, Hydrogen Flame Ionization,” and M-53.5, “Mobile Leak Survey, Optical Methane Detection”).



If the leak detection and/or leak survey equipment has not been calibrated within the specified calibration time spans immediately before field use, the equipment shall be checked for calibration and calibrated (if necessary) before being used as required by the respective gas standard. Records of the calibration checks, calibrations, and when the equipment is in or out of service shall be kept in accordance with the applicable gas standard and retained for 7 years.

Leak Survey Methods

Following are the acceptable methods of gas leak survey.

1. Mobile-Type Survey

Only approved equipment and procedures shall be used to conduct a mobile-type survey, as detailed in M-53.4, “Mobile Leak Survey, Hydrogen Flame Ionization” and M-53.5, “Mobile Leak Survey, Optical Methane Detection.”

2. Foot Survey

- A. A foot survey shall be conducted by using an approved portable hydrogen flame ionization instrument (as listed in M-53.2, “Portable Hydrogen Flame Ionization Gas Detector”), or other combustible gas indicator (as listed in M-53, “Portable Combustible Gas Indicator Specification”). Exposed facilities such as meter sets and risers may be tested with leak detection fluid (e.g., soap).
- B. The foot survey method may be used to leak survey mains in a street or other vehicular area where safe, effective, and efficient coverage is possible. Due to the demonstrated effectiveness and efficiency of the mobile leak survey equipment, the use of the mobile survey should be maximized where it is practical.
- C. Survey procedures
 - (1) Survey at exposed piping, gas casing vents, surface openings, pavement cracks and joints, unpaved areas, casing vents, or other locations where gas may vent.
 - (2) Survey over all services and outside meter sets or meter enclosure vents (this includes services and mains in the street area).
 - (3) Survey house foundation vents in the proximity of the meter sets for under-the-structure meter sets.
 - (4) When leak indications are found in a wall-to-wall area or in the close proximity of a structure, the use of bar holing is recommended to better define the situation.

3. Vegetation Survey

- A. A vegetation survey can be used as a leak survey method in conjunction with other methods. Vegetation leak survey may only be used as the sole leak survey method for gas transmission lines and gas gathering lines for Class 1 or 2 locations, provided gas detectors are used to verify suspected positive gas indication. For semiannually required leak surveys in Class 3 areas, if vegetation exists, a vegetation leak survey may be used for one of the semiannual leak surveys. However, the other semiannually required leak survey in Class 3 areas must be conducted by mobile-type or foot survey.
- B. A vegetation survey may not be used on any gas distribution facilities.



- C. A vegetation survey may not be used on any gas transmission lines or gathering lines in Class 3 or Class 4 locations*.
- D. A vegetation survey may be performed by foot, vehicle, or aerial patrol.

*Vegetation Leak Survey may only be performed on Class 3 facilities if specific permission is granted in writing from CGT or is one of the semiannual leak surveys (see Paragraph 3A above).

Surveillance and Repair Priorities

Response, surveillance, and repair priority shall be based on such factors as:

1. The volume, gas-air concentration, and type of escaping gas (for handling unknown gas sources, see the “Volatile Combustible Material in Soil” section on Page 26 of this attachment).
2. The size and occupancy of the area where leakage could occur, and the proximity to structures both above and below ground.
3. The presence of any type of channel or tunnel that could affect the migration or accumulation of gas underground.
4. Soil and surface conditions that influence Item 3 above.
5. The proximity to sources of ignition.
6. Public awareness and apprehension of the leak situation.
7. Soil movement caused by landslides, earthquakes, and so forth, where external stresses on the pipeline may cause leakage.

After considering such factors, grading and repair priority shall be in order of Grade 1, Priority Grade 2 (Grade 2+), Grade 2, and Grade 3 (see the “Leak Grading” section on Page 17 of this attachment).

Leak Response and Action for Suspected Leaks Reported By Others

Suspected leaks reported to the Company by other than Company employees

A gas leak reported by other than Company or Company-contracted employees shall be responded to immediately, and will be evaluated and/or graded by a competent first responder¹ or trained person.

- If the leak is not determined to be non-hazardous by a competent first responder, then OM&C or GSM&TS employees will be called upon to further evaluate, investigate, and/or grade the leak. The first responder should complete the “A” or “A1” form as completely as feasible.
- If the leak is determined to be non-hazardous by a competent first responder and not yet graded, the leak information is to be communicated to OM&C or GSM&TS by the next working day for further investigation and action via a multi-purpose tag or other formal documented method. Refer to the “Assigning Leak Numbers” section, Paragraph 2 on Page 23 of this attachment concerning leak grading. The first responder should complete the “A” or “A1” form as completely as feasible.



- For Gas Distribution, costs to investigate leaks found on or downstream of the service valve shall be charged to major work category, MWC, HY. Costs to investigate suspected leaks, where the service department has already investigated and found no physical evidence of a leak and forwarded the work to OM&C, where OM&C finds no leakage shall be charged to MWC DD.

1. A gas service representative is competent to determine if a gas leak is non-hazardous.

Leak Grading

Where readings are found in multiple locations, and the readings and conditions support that there is only one leak with gas migration, only one leak number shall be assigned and the most severe condition found shall be reported. For example, where only one leak exists and two readings are found, one would not report a 4% gas in the lawn as the leak reading or location, but rather would record a 1% gas reading at the foundation of the building, and would grade the leak based on the most severe condition found, noting the 4% reading in the lawn.

Grade 1

1. Criteria: A leak that represents an existing or probable hazard to persons or property requiring immediate repair or continuous action until conditions are no longer hazardous. This criteria includes:
 - A. Any reading of 80% LEL (4.0% gas in air, 40,000 ppm) or greater where the gas would likely migrate to the outside wall of a building.
 - B. Any gas reading in, at, or under a building or tunnel.
 - C. Escaping gas that has ignited.
 - D. Gas which can be seen, heard, or felt in a location where the presence of gas endangers the general public or property.
 - E. A gas leak which falls outside of the above criteria and poses an immediate hazard in the judgment of either:
 - The surveyor and a technically competent supervisor, or
 - The leak detector person and a technically competent supervisor.

Please note that any leak that is suspected to be on a copper service shall be graded either as a Grade 1, Grade 2+, or Grade 2 leak. Leaks that are suspected to be on copper services shall not be graded as Grade 3 leaks or be deleted¹.

1. A leak that was previously suspected as being a copper service leak can be deleted or downgraded if it is determined that the leak is not associated with a copper service as previously reported. The division can propose the condition data be corrected, which would allow the leak to be downgraded. The request shall be submitted to the program lead for critical review and authorization. If authorized, the program lead will request the changes through the IGIS administrators. If the change in IGIS is made, then all relevant local leak records will be updated with the new leak data and will be initialed and dated by local Company employees.

2. Action

- A. Take immediate and continuous corrective action to eliminate the hazard. Such action may include (but is not limited to) one or more of the following:
 - (1) Evacuate the premises.



- (2) Vent the leakage. (Any Grade 1 leak that is downgraded by venting the gas will be required to be checked at 3-month, not to exceed 4-nominal-month intervals. This will verify that the ventilation is still adequate to support the current grade until the leak has been checked for at least an entire year without requiring additional ventilation work while maintaining the downgraded leak grade. It can be released from the 3-month- not to exceed 4- nominal month recheck interval requirement and be treated as a normal Grade 2 or Grade 3 leak).
- (3) Remove the sources of ignition.
- (4) If gas is burning, prevent the spread of fire, but do not necessarily extinguish the burning gas.
- (5) Eliminate the source of gas.
- (6) Restrict public access to the area.
- B. Downgrade to a Grade 2+ leak if the leak is not hazardous to life or property, but the leak requires priority, scheduled repair based on a probable future hazard. Action taken or the reasoning behind the downgrade shall be noted on the leak record.
- C. Downgrade to a Grade 2 leak if the leak is not hazardous to life or property, but the leak only requires scheduled repair based on a probable future hazard. Action taken or the reasoning behind the downgrade shall be noted on the leak record.
- D. Downgrade to a Grade 3 leak if the leak is non-hazardous and can reasonably be expected to remain non-hazardous, and it was not previously downgraded to a Grade 3². Action taken or the reasoning behind the downgrade shall be noted on the leak record.
- E. Downgrade to a Grade 0 leak if the leak is not a valid leak or if no leakage is found. Action taken or the reasoning behind the downgrade shall be noted on the leak record. Note that any such downgrade on a suspected low pressure facility will be checked again within 6 months not to exceed the last day of the seven month.
- F. Make continuous repair efforts until the leak is repaired or conditions are mitigated to a point where the leak can be downgraded.
- G. If the leak meets the criteria for a reportable incident or a safety-related condition (per UO Standard D-S0355/S4413, “CPUC and DOT Reportable Incidents, Curtailments and Conditions and Low Pressure System Problem Reporting”), make the necessary reports.

²-See Grade 3 downgrade exceptions.

Priority Grade 2 (Grade 2+)

- 1. Any leak that falls below the Grade 1 leak criteria and above the Grade 2 leak criteria: A leak that is not hazardous to life or property, but requires a priority, scheduled repair based on a probable future hazard or requirements to meet the construction schedule of others, e.g., otherwise Grade 2 leaks within the scope of paving projects. This criteria includes:
 - A. Any previous Grade 1 leak, based on leak readings and location, where the immediate hazard has been eliminated through any crew action (for example, ventilating the leak) other than a leak repair, but requires priority repair.



- B. Any Grade 2 leak that requires priority, scheduled repair, based on a probable future hazard or requirements to meet the construction schedule of others, e.g., otherwise Grade 2 leaks within the scope of construction projects.
- C. A gas leak which falls outside of the “A” or “B” criteria and is a Grade 2+ leak in the judgment of:
 - The surveyor and a technically competent supervisor, or
 - The leak detector person and a technically competent supervisor.

Please note that any leak that is suspected to be on a copper service shall be graded either as a Grade 1, Grade 2+, or Grade 2 leak. Leaks that are suspected to be on copper services shall not be graded as Grade 3 leaks or be deleted¹.

1. See Footnote 1 under Grade 1 Criteria.

2. Action

- A. Repair or clear, as designated by the operating department, not to exceed 90 calendar days from the date reported), or ahead of ground freezing or other adverse changes in venting conditions.
- B. Downgrade to a Grade 2 if the leak meets the following criteria:
 - 1) It is not hazardous to life or property at the time of detection, but only requires the scheduled repair of a Grade 2 leak based on its probable future hazard. Action taken or the reasoning behind the downgrade shall be noted on the leak record.
- C. Downgrade to a Grade 3 if the leak meets all of the following criteria²:
 - 1) The leak is non-hazardous and can reasonably be expected to remain non-hazardous, and
 - 2) It was not previously downgraded to a Grade 3 leak. Action taken or the reasoning behind the downgrade shall be noted on the leak record.
- D. Downgrade to a Grade 0 leak if the leak is not a valid leak or if no leakage is found. Action taken or the reasoning behind the downgrade shall be noted on the leak record. Note that any such downgrade on a suspected low pressure facility will be checked again within 6 months not to exceed the last day of the seven month.

2. See Grade 3 downgrade exceptions.

Grade 2

- 1. Criteria: A leak that is not hazardous to life or property at the time of detection, but requires scheduled repair based on a probable future hazard. This criteria includes:
 - A. Any reading of 100% LEL (5% gas in air, 50,000 ppm) or greater in a Class 3 or 4 location that is in a well-ventilated area, such as a pipeline right-of-way, station yard, or a non-wall-to-wall paved area, which does not otherwise qualify as a Grade 1 or a Priority 2 (Grade 2+) leak.
 - B. Any reading greater than 40% LEL (2% gas in air, 20,000 ppm) in a wall-to-wall paved area which does not otherwise qualify as a Grade 1 or a Priority 2 (Grade 2+) leak.



- C. Any reading between 20% LEL (1% gas in air, 10,000 ppm) and 80% LEL (4% in air, 40,000 ppm) in a substructure where gas would likely migrate creating a probable future hazard, or in a confined space.
- D. A gas leak which falls outside of the above criteria and is a Grade 2 leak in the judgment of:
 - The surveyor and a technically competent supervisor, or
 - The leak detector person and a technically competent supervisor.

Please note that any leak that is suspected to be on a copper service shall be graded either as a Grade 1, Grade 2+, or Grade 2 leak. Leaks that are suspected to be on copper services shall not be graded as Grade 3 leaks or be deleted¹.

See Footnote 1 under Grade 1 criteria.

2. Action

- A. Repair or clear no later than 18 months to the day from the date reported, or ahead of ground freezing or other adverse changes in venting conditions. Consider repairing when the leak is discovered if it is located in a hard-to-access location.
- B. Copper services with Grade 1, 2+, and/or 2 leaks or that have become plugged shall be replaced in accordance with Gas Standard A-67. "Copper Pipeline Defects."
- C. For other than copper services, services with Grade 1, 2+, and/or 2 leaks shall be repaired or replaced in accordance with Gas Standard A-69. "Economic Analysis of Gas Leak Recheck, Repair, or Replace Options" or other applicable Gas Distribution bulletins.
- D. Maintain surveillance before repair at intervals not to exceed the last day of the 7th month after the anniversary month, or the month of the last leak check.
- F. Downgrade to a Grade 3 if the leak is non-hazardous and can reasonably be expected to remain non-hazardous, and it was not previously downgraded to a Grade 3.² Action taken or the reasoning behind the downgrade shall be noted on the leak record.
- G. Downgrade to a Grade 0 leak if the leak is not a valid leak or if no leakage is found. Action taken or the reasoning behind the downgrade shall be noted on the leak record. Note that any such downgrade on a suspected low pressure facility will be checked again within 6 months not to exceed the last day of the seven month.

2. See Grade 3 downgrade exceptions.

Grade 3

1. Criteria

Any reading of less than 100% LEL (5% gas in air, 50,000 ppm) in a Class 3 or 4 location that is in a well-ventilated area, such as a pipeline right-of-way, station yard, or a non-wall-to-wall paved area, which does not otherwise qualify as a Grade 1, Priority Grade 2, or Grade 2 leak. Please note that a leak is only allowed to be downgraded to a Grade 3 once².

- A. Any reading equal to or less than 40% LEL (2% gas in air, 20,000 ppm) in a wall-to-wall paved area that does not otherwise qualify as a Grade 1, Grade 2+, or Grade 2 leak.

- B. All other leaks which are non-hazardous and can reasonably be expected to remain non-hazardous, and were not previously downgraded to a Grade 3².
- 2. Recheck during the next scheduled survey or at an interval determined by the operating headquarters. This interval shall not be less than 6 months or greater than the next required scheduled leak survey.
- 3. Please note that any leak that is suspected to be on a copper service shall be graded either as a Grade 1, Grade 2+, or Grade 2 leak. Leaks that are suspected to be on copper services shall not be graded as Grade 3 leaks or be deleted¹.
- 4. Downgrade to a Grade 0 leak if the leak is not a valid leak or if no leakage is found. Action taken or the reasoning behind the downgrade shall be noted on the leak record.

- 1. See Footnote 1 under Grade 1 criteria.
- 2. -See Grade 3 downgrade exceptions.

Grade 3 Downgrade Exceptions

If there is an instance where a leak clearly should be downgraded to a Grade 3 leak and cannot be because the leak of record was previously downgraded to a Grade 3 leak, the leak’s history should be critically reviewed to establish that the grading history supports the initial and subsequent upgrade of the leak from the initial downgrade to a Grade 3 leak. If the leak history reveals that the previous leak grading was incorrect to the point that the “proposed corrected” grades would allow the leak to be downgraded, then the request shall be submitted to the program lead for critical review and authorization. If authorized, the program lead will request the changes through the IGIS administrators. If the grade changes in IGIS are made, then all relevant local leak records will be updated with the new leak grade data and will be initialed and dated by local Company employees and will include the rationale behind the regrading activity.

Leak Repair Methods

The following are acceptable methods of gas leak repair.

1. Plastic Pipe or Fittings

Plastic pipe repair methods are listed in A-93.1, “Plastic Gas Distribution System Construction and Maintenance.”

2. Steel Pipe or Fittings

Steel pipe repair methods are listed in UO Standard S4134, “Selection of Steel Gas Pipeline Repair Methods.”

3. Cast Iron Pipe or Fittings

Cast iron pipe repair methods are listed in Gas Standard A-66, “Repairing Cast Iron Pipeline Defects.”

4. Copper Pipe or Fittings

Copper pipe repair methods are listed in Gas Standard A-67, “Repair of Copper Pipeline Defects.”



Corrosion Leak Repairs

Every corrosion external leak repair on a buried steel gas distribution facility and transmission facility must have a pipe-to-soil measurement taken in accordance with Gas Standard O-16, “Corrosion Control of Gas Facilities,” and/or UO Standard-S4133, “Corrosion Control of Transmission Facilities.”

Pressure Testing of Severed or Replaced Gas Facilities

Test data for repairs of gas facilities that have been replaced or reconnected shall be recorded on the associated “A” Form in accordance with Gas Standard A-34, “Piping Design and Test Requirements,” and/or A-93.1, “Plastic Gas Distribution Construction and Maintenance.”

- A. Severed or disconnected gas services shall be tested from the point of the cut nearest to the main to the service riser.
- B. Segments of main to be installed shall be tested before installation.
- C. All fittings placed in service shall be soap tested.

Management Review of Leak Surveys and Repairs

1. Leak Survey Records Review

- A. As the leak survey is in progress, a technically competent management person shall review the results. The OM&C or GSM&TS supervisor shall ensure that periodic leak surveys are scheduled and completed in the field on time so that any necessary corrective action can be taken.
- B. All leak log forms shall be reviewed, signed (or initialed), and dated by a technically competent management person to ensure proper grading of leaks and proper completion of the form.
- C. The scope of the leak survey will be reviewed annually to ensure that new facilities and/or facility maps are added to the scope of the survey within a compliant time period and surveyed within a compliant time period. It is recommended that this step take place in the third quarter of the year, so that the scope of the work can be identified and factored into any local resource planning goals.
- D. The leak survey program shall be reviewed periodically (not to exceed 5 nominal years) by an operations engineer or other technically competent designee for regulatory compliance and operational efficiency so that long-range plans, replacement studies, or other action plans can be formulated.

2. Leak Repair Records Review

- A. For construction, each Form “A” and Form “A1” shall be reviewed, signed (or initialed), and dated by a technically competent management person to ensure proper leak grading, leak repair, follow-up actions and documentation.



- B. For mapping, each Form “A” and Form “A1” shall be reviewed by the Mapping department or CGT Records/Mapping section in GSM&TS to ensure proper facility information (cathodic protection area, type of gas facility, year installed) is recorded on the form and in the computer database as specified by Gas Distribution or in the local CGT/UO MOU.
- C. As determined by the gas operations engineer or the CGT GSM Pipeline Engineering section, completed leak repair forms and/or data should be evaluated. The gas operations engineer or the CGT GSM Pipeline Engineering section shall ensure that any appropriate follow-up actions are taken, such as:
- (1) Other investigations,
 - (2) Filing a material problem report,
 - (3) Incorporating into long-range capital plans, or
 - (4) Other actions.
- D. Each external corrosion leak repair on a previously reported cathodically protected, buried metal facility shall be reviewed and evaluated by a qualified corrosion person to determine if any cathodic protection related corrective measures are needed.
- (1) If it is discovered that the facility is not under cathodic protection and is not required to be under cathodic protection, the Form “A” CP “Yes” field should be changed to CP “No” and any needed IGIS changes shall be made. This information should be noted on the Form “A.”
 - (2) If the cathodic protection facility was reported as “down” at the time of the leak repair, this investigation shall be documented in the facility’s respective cathodic protection maintenance record. Any actions taken or findings related to a normally cathodically protected facility being down, less than 850-millivolts reading, shall be noted on the Form “A” or “A1” and on the respective facility’s cathodic protection record.

Assigning Leak Numbers

1. Leak numbers are to be initially assigned or supplied by mapping employees in the UO organization and by Gas System Maintenance mapping employees in the CGT organization.
2. Leaks that are reported and determined to be non-hazardous by a Company employee that is competent in identifying a hazardous gas leak condition, but not trained and qualified in grading leaks shall submit the leak to OM&C or GSM&TS for further investigation and grading. The initial grade to be assigned by OM&C or GSM&TS to the subject leak shall be a 2+, unless there is clear and concise information supplied by the person that allows the leak to be graded otherwise. The initial date and time checked shall be based on the initial evaluation date and time. The gas reading will be recorded as 100% visual.
3. All leak indications shall be recorded on the appropriate forms (“Leak Survey, Repair, Gas Quarterly Incident Report”; “Leak Logs;” or “Survey Logs”) and turned into the operating headquarters at least weekly. Leak indications requiring prompt action shall be transmitted to the designated operating supervisor.
4. Each initial leak indication must have a leak number assigned to it within 1 working day of the discovery of the leak.

5. A leak number shall be assigned for each different type of gas facility with a leak (e.g., if a gas service and a main are both leaking within the same bell hole, two different leak numbers should be assigned).
6. If a gas facility has multiple leaks, then one leak number should be assigned per each location that can be worked within a typical repair site (e.g., if a 4' x 4' bell hole has to be expanded to repair an additional leak, then a second leak number can be assigned).
7. Leak numbers shall not be assigned to aboveground meter set leaks (any leak above the bottom of the threads of the service valve excluding the service valve). Any such leaks found and reported to the service department will be documented via a Multipurpose Tag or by directly entering the information into FAS.

Computer Processing of Leak Numbers, Responses, and Repairs

1. Use the established computer system to automatically transfer the local leak information to the system database.
2. Enter all leaks into the leak recording computer system, including all Grade 3 leaks.
3. Ensure that each dig-in leak indication is entered into the leak recording computer system within 10 calendar days of the discovery of the leak.
4. Ensure that each non-dig-in leak indication is entered into the leak recording computer system within 14 calendar days of the discovery of the leak.
5. Ensure that each leak surveillance check and leak repair is entered into the leak recording computer system within 14 calendar days of those actions.

Approved Leak Survey and Repair Records, Forms, and Reports

The following are the records and reports to be completed in conjunction with leak survey procedures. Leak survey and findings on CGT facilities that are maintained by the CGT districts shall be documented on the "Pipeline Patrol Report" (Form F4111-A), or equivalent.

1. An approved records system made up of the appropriate records, indicating the established survey frequency, shall be prepared and maintained in each area, division, or headquarters.
2. Maps or survey records with the previous month surveyed for each respective type of survey identified for the month (1-year, 3-year, 5-year, foot, or mobile surveys). This process is to be handled within the CGT scheduling software for pipelines maintained by the CGT districts.
 - A. The last surveyed field on the stamp will be the earliest month recorded for the previous respective survey for the respective plat map
 - B. The miles or feet of main and the number of services associated with the each respective survey on the plat map record will be supplied with the record.
 - C. The total number of assigned hours associated with each respective survey will be supplied with the record before the survey. See the sample "Stamp" in Figure 1 on the following page.:



Wall Map/Plat _____		Color Coding _____					
Identify the Frequency & Type of Survey	5 Year	Last Performed _____	Name	Date	Hours	Feet/Miles of Main (Indicate Units)	Number of Services
	Mobile						
3 Year							
Annual							
Foot							
TOTAL ACTUAL WORK							
FORECAST TOTAL WORK							

Figure 1. Survey Stamp

3. If the survey is being rescheduled, the intent to reschedule the survey and the targeted new scheduled month and year will be clearly identified, as well as the original scheduled survey month and year. This will be noted on the previous and current resurvey record. For CGT, this process is to be handled within the CGT scheduling software for pipelines maintained, PLM, by the CGT districts.
4. The leak survey records will have all of the facilities to be surveyed before the survey readily identified, and have all of the facilities surveyed after the survey readily identified. For CGT, this process is to be documented on the “Pipeline Patrol Report,” Form F4111-A, for CGT pipelines maintained by the CGT districts.
5. Completed leak survey record copies shall be turned in to the operating headquarters with the following information. This process is to be documented on the “Pipeline Patrol Report,” Form F4111-A, for pipelines maintained by the CGT districts.
 - A. The scheduled month, frequency of the survey, date surveyed, miles or feet of main, number of the services surveyed, the survey method, and name or initials of the surveyor will be part of the final survey record.
 - B. Evidence that all current mains and services have been surveyed is clearly indicated by marking over main and marking each service. Where there are a readily discernable number of distinct facilities that are scheduled for survey, the survey of these facilities can be noted on a list referenced to the map record where each facility is clearly noted.
 - C. Facility record corrections required, as determined by inspection in the field.
6. A pre-numbered “Leak Log” will be supplied by mapping and shall be used by the surveyors to record leaks found on scheduled leak surveys. Pre-numbered leak logs will not be required to be used on CGT facilities maintained by the CGT districts due to the extremely small number of leaks normally found.
7. A “Survey Log” (a standard IGIS Report) that lists all open leaks on the respective plat will be supplied by mapping to the surveyor to allow the surveyor to conduct leak rechecks for leaks



within the scope of the leak survey and to prevent duplicate leak number assignments and entries.

8. For data input beyond the data included in the Survey Log, the current “Leak Survey, Repair, Inspection and Gas Quarterly Incident Report” (62-4060 or an approved equivalent), is to be used by UO employees to record computer input data, and all information relative to survey findings, main condition, and repair. CGT employees should use the most current form, as shown in the sample in Attachment 7, for this purpose. Pipeline, main and service inspection records are to be maintained in accordance with UO Standard D-S0353/GTS S4112. “Physical Inspection of Pipelines, Mains, and Services.”
9. If the leak survey is performed after the anniversary month or a planned rescheduling month, but within a compliant time period, and there are valid extenuating circumstances, the circumstances must be documented and validated by a technically competent management employee. Examples of allowable extenuating circumstances are:
 - A. Significantly more than the normal inclement weather days as compared to the “Farmers Almanac.” References must be cited along with the number of days involved.
 - B. Flame Pac and/or Optane Methane Detector (OMD) Unit down without backup. The efforts made to obtain resources to perform the survey shall be documented, initialed, and dated by a supervisor.
 - C. Catastrophic event taxing labor and/or equipment resources.
 - D. Sudden and unplanned loss of qualified leak surveyors, such as death, injury, or illness.
10. If the leak survey is performed outside of a compliant time period and there are extenuating circumstances, the circumstances must be documented and validated by a technically competent management employee. The extenuating circumstances will not justify the non-compliance, but will help explain it.

Examples of extenuating circumstances are:

- A. Significantly more than the normal inclement weather days as compared to the “Farmers Almanac.”
- B. Flame Pac and/or OMD Unit down without backup.
- C. Catastrophic event taxing labor and/or equipment resources.
- D. Sudden and unplanned loss of qualified leak surveyors.

Leak Survey, Special Leak Survey, and Repair Document Retention Requirements

1. Routine leak survey records shall be retained as follows:
 - A. For transmission facilities, the leak survey records shall be kept for a minimum of 5 years with the exception of 5-year leak survey records, which shall be kept for 8 years.
 - B. For all other lines, the leak survey records (e.g., plats, log books) shall be kept for the latest and immediately preceding survey, plus 3 years.
2. The “Leak Log,” the “Survey Log,” and the “Leak Check Log” shall be retained for the life of any gas facility, plus 1 year.



3. The “Leak Survey, Repair, Inspection, and Gas Quarterly Incident Report” shall be retained for the life of any gas facility, plus 1 year. The “Leak Survey, Repair, Inspection, and Gas Quarterly Incident Report” shall be retained for the life of any deactivated and not abandoned gas facility, plus 1 year.
4. Special leak survey records shall be retained as follows:
 - A. For transmission facilities, the leak survey records shall be kept on file for a minimum of 5 years.
 - B. For all other lines, the leak survey records (e.g., plats, log books) shall be kept for the latest and immediately preceding survey, plus 3 years.

Inspection records, in connection with leak repair or other pipe exposure, shall be maintained for the life of the facility per UO Standard D-S0353/GTS S4112, “Physical Inspection of Pipelines, Mains, and Services.”

Entries to Leak Survey and Repair Documents

Any entries on the “Survey Log,” recheck log, or “Leak Survey, Repair, Inspection and Gas Quarterly Incident, and Inspection Report” must be in ink. **Do not** make a change by erasing, obliterating, or using whiteout.

Changes to Leak Survey and Repair Documents

Any changes to the initial information recorded on the “Survey Log,” recheck log, or “Leak Survey, Repair, Inspection and Gas Quarterly Incident, and Inspection Report” must be dated and initialed by the person making the change in ink. Any grade changes must be dated, initialed and have the reason for the grade change noted. **Do not** make a change by erasing, obliterating, or using whiteout.

Volatile Combustible Material in Soil

1. If the source of the gas leak cannot be found after a thorough field investigation by Company leak surveyors or gas leak crews, one potential cause that must be considered is the presence of combustible material in the soil. When such conditions exist:
 - A. The local headquarters may use an appropriate chromatograph or other approved ethane-detection devise to determine the source of the gas and present the results to the facility or property owner, if appropriate.
 - B. If the source of the unknown gas is not clear, the local headquarters shall request that the material be further analyzed by an authorized lab or Technical and Ecological Services, as mutually agreed upon by the Company and the third party.
 - C. After the analyses are made, the ultimate decision concerning the source of the unknown gas shall include the opinion of the gas operations engineer and the local hazardous waste or environmental coordinator.
 - D. If the combustible gas is not the Company’s, the matter shall be immediately referred to the public agency, property owner, etc., having the jurisdiction and a record made of the notification.
 - E. The situation shall be monitored to keep the Company informed about the eventual abatement of the hazard and to be cognizant of it when performing future leak surveys.