Overview

This work procedure describes the actions required to survey gas transmission pipelines for leaks. This process applies to groups of pipeline facilities with a common purpose or geography rather than surveying according to geographic maps. In contrast with distribution leak surveys based on geography, this grouped-facility approach helps integrate Pacific Gas and Electric Company (Company) knowledge of pipeline conditions with patrols and cathodic protection.

This is an interim work procedure for the year 2009, to be updated for the 2010 survey year.

Governing Document

Utility Standard S4110, "Leak Survey and Repair of Gas Transmission and Distribution Facilities"

Safety

Adhering to the steps in this document results in safe gas facility operation by ensuring compliance with the leak survey process and applicable codes. Perform all gas leak survey and facility-related maintenance and operations work safely and in accordance with all applicable safety rules, the *Code of Safe Practices*, and Utility Standard Practice (USP) 22, "Safety and Health Program."

Employees following this procedure must use the following personal protective equipment (PPE) plus other PPE as applicable:

- Hard hat
- Flame-resistant (FR) traffic vest
- Proper work footwear, no sneakers allowed
- Long-sleeved shirt
- Long pants, no shorts or skirts
- Gloves (must be available)
- Safety glasses (must be available)

[redacted]

Tools (others as applicable)

- Leak survey machine
  - Hydrogen flame ionization unit
  - Combustible gas indicator
  - Remote methane leak detector (as available)
  - Optical methane detector (as available)
- Impact bar
- 12-inch adjustable wrenches
- Two pipe wrenches (12-inch and 18-inch)
- Curb valve wrench
- EZ Tech Phone
- Others as applicable

Material (others as applicable)

- Soap solution in bottle or can

Qualifications

Any person performing leak surveys must be qualified for Operator Qualification Subtask 09-01, "Conduct Survey" and Operator Qualification Subtask 09-02, "Leak Investigation."

[redacted]

Table of Contents

[redacted]

Detailed Leak Survey Procedure

1. General Information

Surveyors conduct gas leak surveys on groups of transmission pipeline facilities with a common purpose or geography, as opposed to surveying facilities according to geographic locations and maps. Surveyors in the field check gas facilities line by line, from one end of a pipeline facility to the other, on regular schedules (every 6 months, annually, or every 5 years).

Surveyors perform field work for transmission pipelines and adjacent distribution facilities separately. Separating the surveys makes it easier to use specialized tools, such as the optical methane detector (OMD), that optimize efficiency.

Transmission leak survey compliance documentation tracks the field work with work sign-off made by gas line or portions of a line rather than by reduced gas distribution plat maps. Surveyors provide signature sign-offs rather than manually highlighting surveyed pipelines.

2. Roles and Responsibilities

The transmission leak survey process falls within the Company's Gas System Integrity Management Program (GSIMP). The director in charge of integrity management and technical services is responsible for overall GSIMP implementation and performance. For this procedure the responsibility for implementation and performance is delegated to the process manager (see Table 1, "Key Roles for Leak Survey Personnel").

The GSIMP also defines the responsibility for the compliance to our standards and processes in the following order:

1. Energy Delivery Officers
2. Directors
3. Managers

Therefore, at the local level, the maintenance superintendents are responsible for compliance in their areas, being familiar with GSIMP status and results, and ensuring that their subordinates are trained on and are following the Standards and Procedures. Responsibility to execute the work is delegated from the maintenance superintendents to their designated supervisors and leak surveyors (Table 1).

Table 1 lists the key leak survey roles and the person responsible for assigning them to employees.

[redacted]

Table 1. Key Roles for Leak Survey Personnel

Key Leak Survey Role	Responsibility	Role Assigned By
Process manager	Oversee the overall execution of the leak survey process.	The lead employee in charge of transmission integrity management.
Geographic Information System (GIS) sponsor	Oversee the development of the following year's leak survey documents.	Gas engineering manager responsible for engineering support services.
Local mapping sponsor	Oversee production of the hard copies of the leak survey documents and schedules. Work with the leak survey supervisor to ensure that leak surveys are performed on schedule.	In distribution areas, the distribution superintendent. In transmission districts, the gas engineering manager responsible for engineering support services.
Leak survey supervisor	Assign leak survey work, monitor schedules, and review documentation when the work is complete.	In distribution areas, the distribution superintendent. In transmission districts, the supervisor of gas maintenance.
Leak surveyor	Conduct the leak survey and document the results.	The leak survey supervisor.

[redacted]

A. Process Manager

The process manager responsible for the overall execution of the leak survey process assumes the specific responsibilities and works to the general schedule described in this section.

1. Specific Responsibilities
   a. Maintain a control list, updated annually, of persons filling the key roles.
   b. Incorporate lessons learned in the current year with the roll-out of the training and development for the following year.
   c. Act as the single point of contact for questions and issues.
   d. Coordinate map book development and assembly, including establishment of sources of supply for various map book components.
   e. Coordinate auditing of the current year's results.
   f. Establish the leak survey schedule from input provided by local mapping departments.
   g. Establish training and development of leak survey processes.
   h. Conduct audits of the process to verify system-wide compliance and make continuing improvements.

2. Work Schedule

   In the year before the leak survey year, perform the following activities:

   October — Coordinate the preparation of leak survey documents with the GIS sponsor.

   Identify and discuss current process issues and possible solutions.

   Discuss and plan moving project assignments from one work group to another.

   Establish a schedule for completion of electronic files for next year's leak survey.

   November — Develop training module for the next year's survey work.

   December — Work with local mapping personnel to assemble map books.

   In the leak survey year, perform the following activities:

   January — Launch a new training module for transmission leak surveyors and supervisors.

   September — Identify and discuss current process issues and possible solutions with those knowledgeable about, interested in, or impacted by leak surveys.

[redacted]

B. GIS Sponsor

The GIS sponsor responsible for the development of the next year's leak survey documents assumes the specific responsibilities and works to the general schedule described in this section.

1. Specific Responsibilities
   a. Compile each year's inventory of pipelines to be surveyed.
      1) Assign any new facilities to existing pipeline groups or create new groups as needed.
      2) Remove any facilities that have been deactivated.
      3) Ensure that the most current leak survey frequencies are assigned to each pipeline segment.
      4) Ensure that high-consequence area (HCA) information is current.
   b. Create the following electronic files for each pipeline group:
      1) Leak survey frequency tables
      2) Overview maps
      3) Aerial plats
      4) Reduced gas distribution plat maps
   c. Monitor the execution of the process for GIS-related issues.
   d. Work with the process manager to resolve issues affecting work in the current year and possibly in future years.
   e. Provide a schedule for creating electronic files.

2. Work Schedule

In the year before the leak survey year, perform the following activities:

October	Coordinate the development of the following year's leak survey with the process manager. Establish a schedule for the completion of electronic files.
December	Complete schedules for surveys beginning in January of the following year no later than the third week in December.

[redacted]

C. Local Mapping Sponsor

The local mapping sponsor responsible for overseeing the production of the leak survey hard copy documents and schedules and for monitoring the schedules assumes the specific responsibilities and works to the general schedule described in this section.

1. Specific Responsibilities
   a. Participate in planning meetings called by the process manager.
   b. Purchase all binders, tabs, and materials for assembling map books.
   c. Print all records from electronic files, including those listed below:
      1) Sign-off sheets
      2) Frequency tables
      3) Overview maps
      4) Aerial plats
      5) Reduced gas distribution plat maps
   d. With guidance from the process manager, assemble records into map books.
   e. Work with the leak survey supervisor to execute the leak survey schedule.

2. Work Schedule

In the year before the leak survey year, perform the following activities:

November Attend planning meetings scheduled by the process manager.

Purchase materials for map book assembly at the direction of the process manager.

Work with the leak survey supervisor to review and verify the leak survey schedule. The schedule must reflect the following requirements:

- Code-required intervals
- Local resource requirements
- Local weather conditions

Note: Leak surveys must be scheduled in the same month(s) each time, whether the survey interval is 6 months, 1 year, or 5 years.

Communicate scheduling results to the process manager.

December Print out electronic files and assemble map books.

[redacted]

In the leak survey year, perform the following activities:

Ongoing The month before a leak survey is due, inform the leak survey supervisor of the pipeline groups that are due for survey and the survey frequencies required.

In the month in which maintenance of a pipeline group is scheduled, forward the appropriate leak survey books to the leak survey supervisor of the group performing the maintenance.

The month after leak surveys are due, collect the map books from the leak survey supervisor and safely store them.

Inform the process manager of any issues encountered with the process.

D. Leak Survey Supervisor

The leak survey supervisor responsible for monitoring schedules, assigning work, and reviewing documentation when work is complete assumes the specific responsibilities and works to the general schedule described in this section.

1. Specific Responsibilities
   a. Work with the local mapping sponsor to review and verify the leak survey schedule.
   b. Participate in annual refresher training coordinated by the process manager.
   c. Assign scheduled work to transmission leak surveyors.
   d. Monitor the leak survey process for issues and inefficiencies; report any that are encountered to the process manager.
   e. Review all work completed, including the work performed by the surveyor, the surveyor's review of work performed by others in the case of aerial patrols for leak surveys, and any aerial patrol reports.
   f. Verify that all required surveys are completed on time and that the leak survey documentation is complete and accurate before filling in the reviewer LAN ID and initialing the sign-off sheet.
   g. Verify that leak surveyors are Operator Qualified for the tasks they are assigned.
   h. Maintain a log of areas that are inaccessible for leak survey.

2. Work Schedule

In the year before the leak survey year, perform the following activities:

November Discuss and agree on a schedule of leak survey work, which must reflect the following information:

- Code-required intervals
- Local resource availability
- Local weather conditions

[redacted]

In the leak survey year, perform the following activities:

January — Attend the leak survey training and process update meetings held by the process manager.

Schedule each leak surveyor who will be surveying local gas lines for a training and process update meeting held by the process manager.

Ongoing — In the month before a survey, receive the map books from the local mapping sponsor.

Review and understand the scheduled pipeline groups and required survey frequencies.

Assign leak survey work.

Review and sign off completed work and documentation.

E. Leak Surveyor

The leak surveyor responsible for conducting leak surveys and documenting the survey results assumes the specific responsibilities and works to the general schedule described in this section.

1. Specific Responsibilities

   a. Complete the annual web-based training (WBT), and attend the leak survey training and process update meetings held by the process manager.

   b. Understand the transmission leak survey process and documentation.

   c. Understand the correct leak survey instruments required for local conditions and class locations.

   d. Understand the leak survey grading criteria specified in Utility Standard S4110.

   e. Maintain operator qualification for the methods used in transmission leak surveys.

   f. Correctly document the survey results on the appropriate forms.

   g. Ensure completion of assigned surveys on schedule with the appropriate tools and correct documentation according to this process.

2. Work Schedule

   In the leak survey year, perform the following activities:

   January — Attend the leak survey training and process update meetings held by the process manager.

   Ongoing — Execute the transmission leak survey process for pipeline groups assigned by the leak survey supervisor.

   Provide feedback about process issues to the leak survey supervisor and the process manager

   .

[redacted]

3. Requirements for Leak Surveyors

A. Office Review

Before conducting a leak survey, review the following items:

1. Sign-Off Sheet

   See Attachment 1 for a sample sign-off sheet.

   Each month, review the sign-off sheets of the assigned pipeline groups to determine the survey types required in the following month. The following month's work assignments consist of all the survey types due in that month. Survey types are identified by the following notations:

   - The required types, which are listed under "Leak Survey Schedule" on the left side of the sign-off sheet, are 6 Month, Annual, 5 Year, or some combination of the three.
   - The months are identified numerically. 1=January, 2=February, etc.
   - Five year surveys are due every fifth year. The next year a five-year survey is due is shown as the "due in" year. Five-year surveys are required only in the "due in" year.

2. Frequency Table

   See Attachment 2 for a sample frequency table.

   a. Review the frequency table for plats with the assigned survey types (6 Month, Annual, or 5 Year).

   b. Locate short sections of pipe.

      Some frequency tables indicate surveys for very short sections of pipe, 5 feet or less in some cases. It is difficult to see such short segments on aerial plats.

      1) Check the reduced gas distribution plat map for stubs or taps that could account for a short section.

      2) Survey short sections that are not visible on the reduced gas distribution plat map along with the main line.

3. Overview Map

   See Attachment 3 for a sample overview map.

   Review the overview map of the pipeline group to plan the travel route for conducting the survey.

   Note: An overview map can also show the required survey frequency on each plat, but this information may be obscured on maps crowded with plat sheet numbers.

[redacted]

4. Aerial Plat

   The aerial plat shows survey frequencies. Use it only as a general reference to locate pipes. When unfamiliar with pipe locations, refer to the associated plat drawings and use visual references to locate pipes. See Attachment 4 for a sample aerial plat.

   a. Review each aerial plat to identify the specific pipes to be surveyed.

      Note: The required survey frequencies are color-coded: blue for 6 month, green for annual, and red for 5 year. The symbols for each frequency are shown at the bottom of each aerial plat.

   b. Review each aerial plat to identify HCAs.

      An HCA is identified on an aerial plat by two parallel red bars running along its survey frequency symbol.

      Important: The leak surveyor must be aware of any HCA in the assigned survey group before going into the field.

   c. Verify that all segments listed in the frequency table are accounted for on the aerial plat.

      Small segments may be difficult to see. Contact the local mapping sponsor or the program manager for assistance in locating them.

      Important: The leak surveyor must know the location of all of the pipes in the assigned survey group before going into the field.

5. Reduced Gas Distribution Plat Map

   The reduced gas distribution plat map is an 11-by-17-inch, reduced-size copy of the gas distribution plat map that includes a drawing of the pipeline with respect to property boundaries and an occasional physical object. Property boundaries do not always correspond to what is observed in the field, but reduced gas distribution plat maps do provide information such as the side of the street on which a pipeline is located. See Attachment 5 for a sample reduced gas distribution plat map.

   a. Review the reduced gas distribution plat maps for high-pressure taps which may not appear on the aerial plats.

      Note: Survey high-pressure taps that appear on the reduced gas distribution plat map but not on the aerial plat with the transmission line to which they are attached. Limit the survey of these taps to the transmission portion up to and including the regulation to the customer ("high-to-high" sets).

   b. Review reduced gas distribution plat maps to determine the side of the street on which pipelines are located.

[redacted]

B. Leak Surveyor Field Responsibilities

1. Actions to Take when Leaks Are Found
   a. Grade each leak using the current leak grading criteria.
   b. Assign a leak number and fill out the "Daily Leak Survey Log," Form 62-0612.
   c. Indicate the leak and leak number at the leak location on the aerial plat.
   d. For leaks in an HCA, follow the special instructions in Section 3.B.3, "High-Consequence Areas (HCAs)," below.

2. Limits to Surveys

   The scope of a survey includes all gas transmission facilities associated with the pipeline group, with the limitations for subsurface vaults and aboveground facilities described in this section.

   a. Subsurface Vaults
      1) Survey the vault lids of all subsurface vaults in the pipeline group.

         Note: The object of this survey is to look for surface indication of gas. It is not necessary to open vault lids. Use subsurface grading with confirmation on a combustible gas indicator in accordance with Work Procedure WP4110-12, "Subsurface Leak Investigation," to grade leaks.

      2) Survey vault lids to district regulator sets for gas leaks in the small portion of the transmission pipe within them.
      3) Survey vault lids to "high-to-high" sets feeding single or multiple customers for gas leaks in the small portion of the transmission pipe within them.

   b. Aboveground Facilities
      1) Survey the aboveground facilities in the pipeline group.
      2) Survey service lines to transmission customers up to the point of custody transfer, which is usually the fence line at the outlet of the primary meter and regulator.

3. High-Consequence Areas (HCAs)
   a. HCAs are indicated on aerial plats by pipelines bordered with red bars on both sides.
   b. All non-grade-1 leaks which appear to be within an HCA require an evaluation of the pipe condition within 5 calendar days of discovery to determine whether the transmission pipe is the source of the leak. If it is the source, take prompt action[1] to repair the leak.

      Normal leak grading criteria apply if it is determined that the source of the leak is **not** the transmission pipe.

[1] Federal code guidance is not specific to the time allowed for "prompt" repairs. The Company's practice is that work proceeds continuously during straight time hours with resources that are readily available. Actively manage material procurement to minimize any delay. Give repair efforts priority treatment when scheduling resources.

[redacted]

c. Investigate leaks on HCA pipes to determine the root cause for the leak. Promptly contact the pipeline engineer for assistance in the investigation of all leaks in HCAs.

d. Record the actions taken in an HCA.

1) Call local mapping personnel to check for duplicate leak numbers in the area.

2) Fill out a Form 62-4060, "Leak Survey, Repair, Inspection, and Gas Quarterly Report (Form "A")" for every leak found in an HCA.

a) Check the High Consequence Area box in the Pipe Data section.

b) In the Location Sketch Comments section, enter the following information as it is known:

(1) Source of leak identified as _____

(2) Date of source determination _____

(3) Prompt repairs required? Y/N _____

e. Note any construction activities in HCAs according to the latest version of Utility Standard 4127 "Class Location Determination, Compliance, and Maintenance."

4. Follow-Up Leak Survey Procedures for Inaccessible Locations

Note: The presence of third-party barriers, dense vegetation, or uncleared rights-of-way does not remove the obligation to survey every section of transmission pipeline on the schedule.

a. Apply the following actions to perform leak surveys on locations rendered inaccessible by third-party barriers:

1) Use alternative survey instruments where possible.

2) Follow the follow-up instructions for attempting to gain access in Distribution and Customer Service (DCS) Guideline D-G0071, "Follow-Up Leak Survey Procedures for Inaccessible Locations," dated February 11, 2000, with the following exceptions:

a) Omit the instruction in DCS Guideline D-G0071 to shut off gas service (Step 5).

The typical case of an inaccessible location due to third-party barriers is a transmission line in the locked back yard of a residence. In this case, shutting off the gas service does not remove the risk of a gas leak.

b) If unable to gain access after following the instructions for doing so (Steps 1 through 4 in DCS Guideline D-G0071), contact the process manager for instructions about what to do next.

c) Document inaccessible areas on the leak survey sign-off sheet for the day the work is attempted.

(1) Note inaccessible areas in the comments column.

(2) Specify "CGI" to indicate "can't get in."

(3) Note the wall map, plat, and address.

[redacted]

d) Document follow-up surveys for inaccessible areas on the sign-off sheet for the day on which they are performed.

(1) In the Sequence Numbers column, note "CGI" and the wall map, plat, and address.

(2) On the reduced gas distribution plat map or aerial plat, indicate the location of the inaccessible area.

Note: The leak survey supervisor maintains a log of all inaccessible areas encountered during transmission leak surveys and the dates on which they are resolved.

b. Apply the following actions to perform leak surveys on locations rendered inaccessible by dense vegetation or an uncleared right-of-way for which the Company is responsible:

1) On the leak survey sign-off sheet for the day the work is attempted, note inaccessible areas in the comments column. Specify "CGI" to indicate "can't get in" and note the wall map, plat, and address.

2) Document follow-up surveys for inaccessible areas on the sign-off sheet for the day on which they are performed.

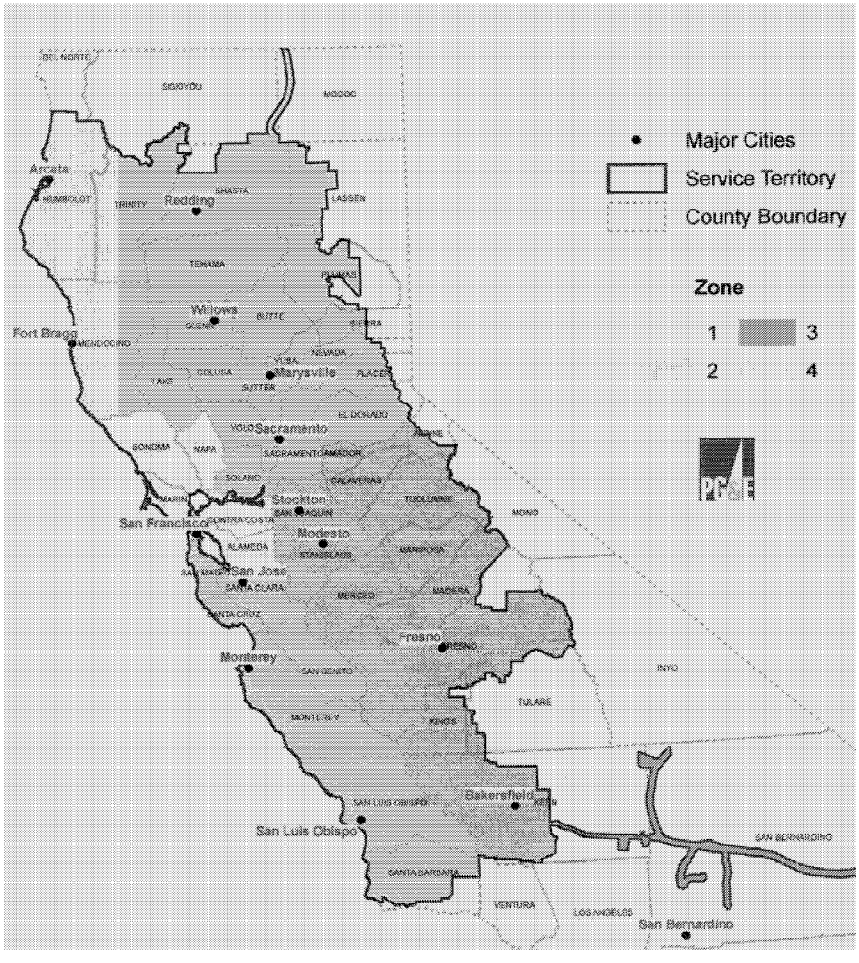
3) Advise the Company employee responsible for technical and land services, including weed abatement and right-of-way clearing, that the area needs to be cleared. See the Geographic Zones map in Figure 1,"Weed Abatement Contacts for Geographic Zones," on Page 14 for the responsible contact.

Note: With few exceptions, pipeline corrective expense orders fund weed abatement and right-of-way clearing. Check with the budget coordinator and pipeline engineer before committing to any large projects.

4) Track the follow-up surveys on the survey supervisor's log of all inaccessible areas, in accordance with DCS Guideline D-G0071. Use Page 2 of Form 62-0612, "Daily Leak Survey Log."

[redacted]

Figure 1. Weed Abatement Contacts for Geographic Zones



Zone	Contact
Zone 1	(530) 477-3274
Zone 2	(530) 246-6457
Zone 3	(530) 477-3215
Zone 4	(530) 477-3230

C. Documentation Summary

Leak survey documentation consists of the documents summarized below:

1. Sign-Off Sheet

   The sign-off sheet is a summary report that documents survey work and is signed off by the surveyor and reviewed and signed off by the leak survey supervisor.

2. Frequency Tables

   Frequency tables summarize all leak survey requirements in pipeline systems. They are organized by plat and include a sum of the footages within each plat by survey frequency.

3. Overview Maps

   Overview maps present aerial views of entire pipeline groups showing associated plats and a color-coded representation of each pipeline.

4. Aerial Plats

   Aerial plats of the pipeline rights-of-way show specific pipelines color-coded to indicate their survey frequencies: blue, every 6 months; green, annual; red, every 5 years. They also indicate the presence of HCAs. The scale is the same as that of reduced gas distribution plat maps.

5. Reduced Gas Distribution Plat Maps

   Reduced gas distribution plat maps correspond to the aerial plats with the same sequence or plat numbers. They show each pipeline with respect to the side of the street, property lines, and block numbers. They do not show objects in the field such as building footprints, trees, and terrain.

6. Aerial Patrol Documentation

   Although aerial patrols are primarily designed to address quarterly patrol requirements, they can be used for leak surveys in Class 1 and 2 areas where green vegetation exists. The leak surveyor who knows the scope of the aerial patrol and the leak survey requirements reviews the patrol results, fills in the leak survey sign-off sheet, and attaches a copy of the aerial patrol report to the sign-off sheet.

D. Compliance Documentation: Sign-Off Sheet

The leak surveyor is responsible for documenting each leak survey on the sign-off sheet.

1. General Information

   The purpose of the sign-off sheet is to provide evidence of the following items for every segment of pipe within a pipeline group:

   - The dates work is done.
   - The surveyor doing the work.

[redacted]

- The model and serial number of the instrument used to survey each pipe segment within the pipeline group.
- The results of the work.

On the sign-off sheet, record the work done daily according to the following guidelines:

- Fill out the sign-off sheet with non-erasable ink.
- Record the LAN ID and script initials for the leak surveyor and leak survey supervisor (reviewer) sign-off.
- Because the sign-off sheet documents the work performed on a daily basis, when work requires more than 1 day to complete, date and note the work done each day.

2. Data Field Requirements: Sign-Off Sheet

a. Date

Record the date the work was done.

b. Plat Sequence Numbers

Record the sequence numbers of the plats surveyed according to the following guidelines:

- Separate sequence numbers that are out of numerical order on the same line with a comma followed by a space (,). For example, "1, 3, 5, 7" means that the leak survey is completed for plats 1, 3, 5, and 7, but not for plats 2, 4, and 6.
- Separate an unbroken sequence of numbers with a hyphen (-). For example, "4-12" means that the leak survey is completed for each of the plats from 4 through 12, inclusive.
- When both unbroken and broken sequences exist, combine unbroken sequences separated by a hyphen (-) with broken sequences separated by a comma (,) For example, "4-8, 10-12" means that the leak survey is completed on plats 4, 5, 6, 7, and 8 and plats 10, 11, and 12, but not on plat 9.
- List only the plats surveyed. For example, if the annual survey calls for surveying plats 1, 2, 4 and 5, do not report the survey complete on 1-5 because plat 3 contains no pipes to survey annually.
- When all of the plats scheduled to be surveyed are completed **on the same day**, it is not necessary to list all of the plat sequence numbers; specifying "All" is adequate.

c. Survey Type

Specify one of the following notations to identify the survey type:

- 6Mo Semi-annual leak survey.
- Ann Annual leak survey.
- 5Yr Five-year leak survey.

[redacted]

d. Surveyor LAN ID

Record the surveyor's LAN ID and initial the entry.

e. Wind Speed Readings

Wind-speed readings document the surveyor's awareness of the effect of wind speed on the accuracy of the survey.

Note: Surveyors must be continuously vigilant to recognize weather changes that could affect survey results. This is especially true for gas transmission surveys that pass through several geographic areas or microclimates.

1) Record the wind speed **at least** twice per shift, once at the beginning and again midway through the shift.

2) Record the wind speed in separate geographic areas or microclimates when they are considerably different from those at the start of the day. Record the following information, at a minimum, for each survey area and each wind speed measurement:

a) The wind-speed reading, in miles per hour (MPH).

b) The geographic location.

c) The time of day on a 24-hour clock.

Note: The Leak Survey Stamp is not required to record wind speeds for transmission leak surveys.

f. Instrument Type

1) Record the appropriate code from Table 2 below to report the instrument used in the survey of the plats listed on the same line on the sign-off sheet.

Table 2. Instrument Types

Instrument	Code
Century OVA-88	CH
Century OVA-88 (truck mounted)	CM
Heath DP3 Flamepack	H3
Heath DP4 Flamepack	H4
Heath Optical Methane Detection (OMD)	HO
Heath Remote Methane Leak Detection (RMLD)	HR
Heath Laser (not approved)	HL
Heath Infrared (not approved)	HI
Southern Cross FP400	SF
Vegetation Leak Survey	VG
Visual Air Leak Survey	VA

[redacted]

2) Record further information about the instruments used in the survey according to the following guidelines:

a) Document each instrument used in the survey on a separate line of data corresponding to the day of use and the sequence numbers of the plats showing the locations of use.

Note: It is not necessary to highlight the locations where the primary instrument is used. It is assumed to be used in all areas of the survey except those identified by recording supplemental instruments.

b) Document supplemental instrument use on a separate line on the sign-off sheet.

(1) Record each plat sequence number surveyed with the supplemental instrument.

(2) In the Comments column of the sign-off sheet, indicate a different highlighter color for each supplemental instrument.

(3) Highlight the areas of the pipeline group surveyed with the supplemental instrument on the associated reduced gas distribution plat map.

Note: If the reduced gas distribution plat map does not exist, highlight the areas on the aerial plat.

g. Comments

In the Comments column on the sign-off sheet, identify the results of the survey by recording one of the following notes:

- The leak number of any leak discovered.
- "No Leaks" when no leaks are discovered.

h. Leak Survey Supervisor Reviews

Leak survey supervisors must review leak surveys assigned to their headquarters and conducted by their direct reports, contractors, or temporary employees. After completing the survey and document review, record the reviewer LAN ID and initial the entry.

3. Visual Surveys in Class 1 and 2 Areas

a. Visual Surveys Conducted by the Leak Surveyor

Leak surveyors may use visual methods in their surveys where appropriate. Visual surveys are permitted in Class 1 and 2 areas where green vegetation exists.

Record the results of visual surveys done by the leak surveyor in the same way as surveys conducted with an instrument.

b. Visual Surveys Conducted by Others

Other qualified individuals, such as aerial patrol personnel, may perform visual surveys.

The surveyor documents leak surveys done by others, such as the aerial patrol program, as follows:

[redacted]

1) Obtain the aerial patrol report for the pipeline groups requiring leak survey.

   Note: The aerial patrol report specifies results on a line and mile point basis.

2) Review the pipeline group in the map book for segments covered by the aerial patrol results.
   a) Lines must be in Class 1 and 2 areas only.
   b) Lines must have green vegetation ground cover.
   c) Lines must be explicitly listed in the aerial patrol report.
   d) The line segments to be surveyed must be within the mile points explicitly listed on the aerial patrol report.

3) With the Map Guide tool, verify that the line and mile points listed in the aerial patrol report match or overlap the segments requiring survey in the map book.

4) If the results of Items 2 and 3 above are positive, review the results of the aerial patrol for reports of leaks.

5) Fill out the sign-off sheet with the information from the aerial patrol report, as specified by the following points:
   a) The date on the sign-off sheet is the date of the aerial patrol.
   b) The plat sequence numbers are only those surveyed by the aerial patrol.
   c) For maps where only part of the line was flown, document according to the procedure for documenting supplemental instruments.
   d) Provide the surveyor LAN ID and initials of the surveyor reviewing the documents, not the third party.
   e) Wind speed is not required. Line these boxes out.
   f) Instrument type is VA.

6) Include a copy of the aerial patrol form for the vegetation survey in the leak survey book to document the work completed.

[redacted]

4. Requirements for Leak Survey Supervisor Reviews

A. Verify that the correct types of surveys have been signed off.

Note: Mapping personnel maintain the master schedule that identifies pipeline groups and survey types required by month.

B. Verify that the correct sequence numbers are listed for each of the required surveys and that commas and hyphens are used correctly.

C. Verify the LAN ID and initials of the surveyor.

D. Verify the instrument or instruments used in the survey.

E. Verify the drive order of surveys conducted over multiple days.

F. Verify that the leak numbers on any leak logs match the leak numbers on the sign-off sheet.

G. Verify that surveyors were Operator Qualified for the work when the work was conducted.

H. Verify correct use of visual surveys done by others (Air Patrol)

1. Verify visual methods are appropriate for the lines to be leak surveyed.
2. Verify air patrol report lists each line and includes all segments to be leak surveyed visually.
3. Verify proper ground cover exists for survey.

5. Compliance and Auditing

A. Process Manager Audit Role

The process manager will conduct audits to ensure compliance with requirements. Audit subjects include but are not limited to the following subjects. Subjects may be added or deleted to maintain the effectiveness of the audit.

1. Check the documented survey dates to verify that survey work was performed during the month specified on the sign-off sheet.
2. Verify that each plat received the required survey treatment during the month in which it was scheduled.
3. Compare the sequence numbers and frequency in the frequency table to those listed on the sign-off sheet.
4. Verify that the surveyor had the required operator qualification on the date of the survey.
5. Verify the instrument calibration for the instruments used.
6. Verify the status of any leaks recorded in the comments column.
7. Verify the review date and appropriate reviewer initials.
8. Verify that the drive sequence of line segments was correct.

[redacted]

9. Verify that supplemental instruments are correctly identified on the sign-off sheet and highlighted on the appropriate maps.
10. Verify that the leak numbers of any leaks found are recorded on the sign-off sheet and entered into the Integrated Gas Information System (IGIS).

B. Survey Frequency Audits - Audit the accuracy of leak survey frequencies by reviewing the snapshot of the GIS database for that year.

C. Records Requirements for Audits - Maintain the following compliance documentation on an ongoing basis:

1. The snapshot of the GIS database, which is the source database for each year's survey.
2. The frequency table, which references the GIS source database and establishes the survey frequency and the plat sequence numbers.
3. The sign-off sheet, which references the GIS source database and uses a sequence number to represent each plat. The monthly schedule of survey work is established by local resource needs and recorded on the sign-off sheet.

Note: Although it is not a part of the local compliance documentation, the company specified work management tool contains the local leak survey schedule and prompts the work group for surveys that are due.

6. Recordkeeping

Retain all leak survey documentation in accordance with Utility Standard S4110.

7. Definition of Terms

Definition of Terms

CGI: Can't get in.

CFR: Code of Federal Regulations.

GIS: Geographical Information System. The system of record for gas transmission and distribution facilities. The GIS is an electronic database that integrates, stores, edits, analyzes, shares, and displays geographic information. In a more generic sense, GIS applications are tools that allow users to create interactive queries (user-created searches), analyze spatial information, edit data, maps, and present the results of all these operations. For example, queries on gas transmission facilities using information on HCAs, class location, and transmission status are used to determine pipelines requiring semi-annual leak survey (likewise for other leak survey frequencies). The derived information can be overlaid with aerial photographs showing buildings adjacent to pipelines.

GSIMP: Gas System Integrity Management Program

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HCA: High-consequence area. As defined in 49 CFR 192 Subpart O, an area around a transmission pipeline where a pipe rupture would result in relatively high adverse consequences to life and property. HCAs are calculated by a consideration of the pipe's diameter and pressure, plus its proximity to places where people tend to congregate.

IGIS: Integrated Gas Information System. A comprehensive application to record, update, retrieve, and report on information for gas leaks, repairs, incidents, and inspections, as well as gas pipe inspections not associated with gas leaks.

Leak number: The unique identification number in IGIS for a leak.

OQ: Operator qualification.

Pipeline group: A grouping of pipeline segments within a geographic area that have the same name or number and support a common operational purpose (e.g., a distribution feeder main and all of its branch connections associated with district regulator sets and single customers).

Pipeline segment: The smallest length of a pipeline in the GIS. Segments are generally determined by lengths of pipe with uniform pipe properties such as diameter, wall thickness, and material. Where properties are uniform, segments can be quite long (greater than a mile). Short segments can be only a few feet long, as is, for example, the case with branch connections to nearby equipment.

Prompt action: Dispatching qualified personnel without delay for the purpose of evaluating and, where necessary, abating an existing or probable hazard.

Survey frequency: The time interval between surveys of a pipeline. Intervals for transmission systems are usually 6 months, 1 year, or 5 years. The minimum safety code requirements for each pipeline segment determine its survey frequency requirements.

Survey schedule: The calendar months chosen by local maintenance groups to conduct surveys and to meet survey frequency requirements. Local considerations include available manpower and weather conditions. Once a schedule is set, any changes to it must be made with care to remain in code compliance.

Six-month opposite annual: Six month leak survey requirements call for two surveys within a calendar year. One of these is scheduled along with the annual surveys. The other is 6 months out from the annual surveys or "opposite" the annuals. The surveys that are opposite the annuals require special accounting to track their costs.

WBT: Web-based training.

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Recision This is the initial issue of this document.

Reference Documents

49 CFR 192.706, "Transmission lines: Leakage surveys" and 192.723, "Distribution systems: Leakage surveys"

Utility Standard Practice (USP) 22, "Safety and Health Program."

Code of Safe Practices:
"Basic Safety Requirements"
Section 1, "General Rules"
Section 2, "First Aid"
Section 3, "Motor Vehicle Operation"
Section 13, "Gas Distribution & Transmission Systems"
Section 15, "Gas Service"

UO Policy 3-7, "Gas and Electric Operation, Maintenance, and Construction"

Utility Standard S4110, "Leak Survey and Repair of Gas Transmission and Distribution Facilities"

Utility Standard 4127 "Class Location Determination, Compliance, and Maintenance"

DCS Guideline D-G0071, "Follow-Up Leak Survey Procedures for Inaccessible Locations"

Attachments

Attachment 1, "Sample Sign-Off Sheet"

Attachment 2, "Sample Frequency Table"

Attachment 3, "Sample Overview Map"

Attachment 4, "Sample Aerial Plat"

Attachment 5, "Sample Reduced Gas Distribution Plat Map"

Attachment 6, "Calendar of Leak Survey Activities"

Contact for More Information [redacted]

Date Issued May 2009

Approved by Robert Fassett
Manager

Revision History

Chg No.	Date	Description	By (LAN ID)
00	May 2009	This is a new document.	[redacted]

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