Alagasco AN ENERGEN COMPANY **Operations Procedure Manual** Maintenance and Compliance 7-Leak Management

MC7.0 - Leak Management

MC7.1 - Detection Equipment

All leakage surveys will be performed by qualified personnel using an approved leak detection instrument and proper tools. Approved leak detection equipment is the Heath GMI 526 and 11B, the Southern Cross Flame Pack 400 (flame ionization) and the Heath RMLD. Other leak detection equipment should be approved for use by the Quality Assurance & Compliance Department. All leak detection instruments should be operated, maintained and calibrated according to the equipment manufacturer's specifications. When performing surveys and patrols, personnel should be alert to conditions which may cause a hazardous situation for life, property and company facilities. Leak detection equipment to be used by Leak Survey Contractors must be approved by the Quality Assurance & Compliance Department.

MC7.2 - Classification and Response

MC7.2.1 - Gas Leak Repair Priorities

Leakage investigation should be conducted by qualified personnel and be sufficiently thorough to properly classify the leak. Leaks should be appropriately scheduled for repair by the proper supervisor. The following guidelines should be used for classifying and repairing leaks:

Grade 1

A leak that represents an existing or probable hazard to persons or property, and requires immediate repair or continuous action until the conditions are no longer hazardous. Supervisors should be notified immediately of a Grade 1 leak. Examples are:

- Escaping gas that has ignited. 0
- Any indication of gas which as migrated into or under a building, or into a tunnel. 0
- Any reading of 20% LEL or greater at the outside wall of a building or where gas would likely 0 migrate to an outside wall of a building.
- Any reading of 80% LEL or greater in confined places. 0
- Any reading of 80% LEL or greater in small substructures (such as sewers, storm water drains, 0 water meter boxes, etc) other than gas associated structures from which gas would likely migrate to the outside wall of a building.
- Any leak that can be seen, heard, or felt, and which is in a location that may endanger the general 0 public or property.
- Any leak which, in the judgment of operation personnel at the scene, is regarded as an immediate 0 hazard.

For a Grade 1 leak while awaiting repair crews and during repair work, continuously check buildings in the immediate area and downwind for the presence of gas inside the building. If gas is found inside, the following actions should be taken:

- Open doors and windows. 0
- Cut off gas meter. 0
- Do not operate electrical switches. 0
- Evacuate buildings or entire area if needed. 0
- Remove all sources of flames. 0
- Bar test around the leak area to determine the spread of gas, especially next to buildings. Continue 0 to monitor these bar test holes with appropriate leak detection equipment.

After repairs are completed:

- Immediately recheck all work. 0
- Soap test all repairs. 0
- Bar test over the main or service in the walls of the repair excavation to determine if other leakage 0 could be present.

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- Do additional bar testing in the area around the excavation, if needed, to aerate the ground.
- Monitor all bar test holes with a combustible gas indicator to determine if the concentration of gas is decreasing. Use outside leakage survey contractors if needed. Recheck all affected buildings to verify that there is no gas present.

A **recheck** should be made as soon as practicable but not later than 1 month following the repair. If the recheck presents a positive indication but conditions no longer warrant an immediate repair, then a new order should be created consistent with established leak classifying criteria. The new case should reference the original Grade 1 leak which at that time will be cleared.

Grade 2

A leak that is recognized as being non-hazardous at the time of detection, but justifies scheduled repair based on probable future hazard. The leak should be repaired within 1 calendar year not to exceed 15 months from the time of detection. Examples are:

- Any reading of 40% LEL or greater under a sidewalk in a wall-to-wall paved area that does not qualify as a Grade 1 leak.
- Any reading less that 80% LEL in small substructures (such as sewers, storm water drains, water meter boxes, etc) other than gas associated structures from which gas would likely migrate creating a probable future hazard.
- Any reading between 20% LEL and 80% LEL in a confined space.
- Any reading between 80% LEL or greater in gas associated substructures.
- Any leak which, in the judgment of operating personnel at the scene, is of sufficient magnitude to justify scheduled repair.

Grade 3

A leak that is non-hazardous at the time of detection and can be reasonably expected to remain nonhazardous. Examples are:

- Any reading of 80% or less LEL in gas associated substructures.
- Any reading less than 100% LEL under a street without wall to wall paving where it is unlikely that gas could migrate into a building.
- Any reading of less than 20% LEL in a confined space.

The leak should be reevaluated during the next scheduled survey, or within 15 months of the reporting date, whichever occurs first, until the leak no longer results in a positive indication or is re-classified. If upon reevaluation the case is determined to be a Grade 1 or 2, the respective repair criteria should be followed. If the case again qualifies as Grade 3, the case should be re-dated with appropriate revaluation for a Grade 3 leak. Grade 3 leaks that are cleared through other work (facility replacement, clamping, etc), should be documented as cleared.

According to current ERMA work order management procedures, an **ERMA Notification and Work Order** should be prepared for all leaks giving the location and leak detection equipment readings of the leak, along with any other information supporting the leak classification. To meet federal reporting requirements, all below ground repaired leaks shall have a specified leak cause documented in ERMA. These records should be retained indefinitely. The work location should retain contract leak survey records for 6 years.

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The causes are summarized below.

ERMA Cause Code and Description		Alagasco Examples	
CORR	Internal or External Corrosion	Any leak due to visible or verified corrosion or graphitization on the pipe or any fitting.	
EQUI	Equipment	Any leak or failure on a regulator, valve (including greasing a valve), seal on a fitting, stripped threads or having to tighten a repair clamp bolt or follower ring on a coupling.	
EXCA	Excavation	Any leak due to excavation, caused by third party contractors, other utilities or company personnel. Also includes leaks due to blasting or failure to protect pipe during backfill operations.	
MAWE	Material or Weld	Any leak due to a failure at a weld, fusion, seam or at any other location due to a manufacturing damage or defect; material defects due to dents or gouges or mechanical damage (such as contact with another underground structure) & leaks on Aldyl A DuPont plastic pipe.	
NATF	Natural Forces	Any leak due to earth movement, weather events such as flooding, lightning, washouts, high winds, temperature or a tornado or any other naturally occurring circumstance.	
OOFD	Other Outside Force Damage	Any leak due to a fire, an explosion, or vandalism of Alagasco facilities. Also includes leaks caused by damage from vehicles not related to excavation.	
OPER	Operations	Any leak due to inadequate procedures, inadequate safety practices, construction/workmanship defects or failure to follow procedures.	
OTHE	Other	Any leak that cannot be assigned one of the above causes. The cause of a leak can generally be described by one of the above causes and "Other" should be used rarely.	

If a continued investigation by qualified personnel indicates a different leak grade than originally reported from an initial investigation, the specific conditions supporting the **re-classification** should be documented in ERMA and on any other paperwork associated with the leak (such as a contractor leak survey form or ERMA Field Order). The ERMA Notification and Work Order should also reflect the change in repair schedule associated with a re-classified leak. For a re-classified leak, an additional ERMA Notification should not be generated.

During the course of a leak repair activity, **if additional leaks are found** in close proximity, additional ERMA Notifications and Work orders can be generated consistent with established leak classification criteria. The respective leak classification repair criteria should be followed.

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MC7.2.2 - Notification

Gas leaks reported by any emergency organization (such as a police or fire departments), which has been perceived as an emergency should be treated as such. A Service Mechanic or Construction Crew will be dispatched as soon as practical and the proper departmental supervisor notified. The person receiving the call should be knowledgeable in reacting to such incidents. This person should begin an "Emergency Log" and record all necessary information.

Many gas leaks will be **reported by the public** to the work location. The employee receiving the call should question the customer to determine as much as possible about the severity of the leak. During this process, the customer's record will be brought up on CCS and their name, address, and telephone number should be verified as correct. If CCS is down, the order should be handwritten with all information double-checked with the customer. The "remarks" section of the form should be used to record the information received from and the information given to the customer pertaining to the leak call. Also, if the address is not complete or not very helpful in locating the leak location (as with a route and box number) specific directions should be included. If the order is taken in the Call Center, the person receiving the call should immediately inform the Service Center dispatcher that a leak order has just been received.

The dispatcher, upon receiving a leak order, will note the geographic location of the leak and read the information listed on the order to determine the nature of the leak. Orders that are not dispatched immediately are to be kept in a group and isolated from other routine orders until they are dispatched. All leak orders should be marked in such a way as to identify the order as a leak without having to read the order. Should any other work management system be utilized, a leak notification should receive the same level of attention, response, and documentation as with a printed order.

MC7.2.3 - Dispatching

If the leak reported appears to be a major leak, the order will be dispatched as soon as practical and local supervision notified. A major leak exists when it is evident that there is danger or probable danger to the safety of the public or damage to public or company property, or leak could lead to the loss of gas service to a work location or a portion of a work location. Examples of a major leak include, but may not be limited to:

- Explosion or fire reported as being caused by leaking gas.
- Any leak reported inside a school, hospital, public office building, hotel, restaurant, or other building . where a number of people may assemble.
- Meter installation or regulator station that has been damaged and gas is blowing.
- A line broken or equipment damaged and gas blowing inside, under, or long side a building or major highway.
- Any leak which the caller says is hazardous. .
- Any leak where information supplied by the caller is insufficient to determine the degree of hazard.

All gas leak calls will be given a notification type code 1 or 2, which determines whether the leak is inside (code 1) or outside (code 2)..

- Code 1: dispatched as soon as possible, but within 30 minutes
- Code 2: dispatched within two hours

If the leak is a Code 1, attempts to dispatch the order will be made in not longer than 5 minute intervals and continued until the order is dispatched. The dispatcher should consider calling Service Mechanics working other types of orders, or a Construction Crew which may be in the area. If the dispatcher is unable to assign the Code 1 order within 30 minutes, he should advise either the local supervisor or operations manager, who in turn should evaluate the situation.

MC7.2.4 - Field Investigations

All reported leaks should be considered dangerous and investigated promptly by competent, trained personnel using the appropriate methods of leak detection. The single most important factor to be considered when investigating a leak is the prevention of injury. Employees should take the actions necessary to accomplish this objective. The second major concern of the employee is the protection of property. Employees should not leave

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site of a leak complaint until the leaving prepresence and sompliance they are convinced the odor is not gas and its origin has been found.

7-Leak Management

A. Inside Leaks - Residential and Small Commercial

When investigating a report of a leak inside a building, follow the procedures in the Service Mechanics Procedures Manual, 701.1-Leakage Investigations.

B. Outside Leaks

Begin an investigation of an outside leak by talking with the customer or person who reported the leak. At the onset of an investigation, they are your best source of information. Notify property owners that you are working in the area. Use approved leak detection instruments to further aid in the search. Be sure these instruments are in proper working order. If any employee is alone and the leak is potentially dangerous, he should notify the dispatcher and request assistance. Other actions to take are:

- Check under and around buildings and at each meter and service riser. If gas is indicated by the instruments, check the inside of buildings.
- Bar test using leak detection equipment including under the foundation or as far under the building as possible.
- Check openings in the ground or pavement, such as storm sewer inlets, manholes, water meter boxes, valve boxes, and cracks in pavement.
- Walk around the area where the odor was detected. Walk behind both curbs and pavement edges. Check for odor as you walk, looking for bubbles in water and dead vegetation. Listen for the leak. Walk along the possible service line route locations.
- Check the area for recent excavations.
- Check sewer vents to determine if natural gas has migrated into the sewer lines.
- Try to locate all utility ditch lines to the building such as gas, water, telephone, sanitary sewer, cable television and electrical service. Use extreme caution in bar testing so as not to damage these facilities.
- Try to locate the gas main and bar test it. If it is under pavement, and no openings are available for putting down bar test holes, test behind the curb or pavement edge. The area surrounding adjacent buildings and buildings across the street should be bar tested as outlined above.
- If the odor is still present and there are no indications of gas in the ground, obtain a ladder and check openings on the roofs of buildings. Have gas appliances operating when checking vents. This is necessary to determine if the appliance is emitting an odor due to incomplete combustion or if the odor is the by-product of combustion.
- o Determine the area in which odor is present and is the strongest.

When the investigation is complete and there is a definite indication of a leak, it will be classified in accordance with the criteria outlined in this section.

C. Large Commercial/Industrial

The investigation of reported leaks in large commercial and industrial type buildings are similar to inside leak investigation. Special considerations are:

- Locate the person who reported the leak since this will be the best source of information.
- Enlist the help of the person in charge who knows the building layout.
- If the employee is alone and the leak is potentially dangerous, he should notify the dispatcher and request assistance.
- Evacuate all the areas where gas is present and caution the occupants near those areas not to create sources of ignition.
- Ventilate accumulations of gas directly to the outside. Isolate areas containing gas to prevent spreading.
- Avoid using the telephone if it or any telephone equipment is located in areas where the presence of combustible gas is indicated.

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- Turn on flas Maintenance and Gompliance equipment prior to entering the building. 7-I eak Management
- If gas is determined to be in a building well a standby generator, precautions should be taken prior to terminating electrical service to the building.
- Consider closing branch or riser connections which supply the area of the leak.
- Ventilate gas accumulations directly to the outside.

D. Not Home Leak Calls

Make a thorough investigation of the premises, requesting any necessary aid of resident managers, neighbors, etc., for admission. When access is gained by aid of a person other than the tenant, be careful upon the completion of your work to secure all doors and windows. Make a prompt report of work performed and precautions taken, including the name and address of the witness. If access is not gained and the meter is accessible, turn the meter off and seal it. Notify the Dispatcher and Service Supervisor of this action so that a follow-up call can be made.

If access is not gained and the meter is not accessible, notify the Dispatcher immediately. The Dispatcher will request assistance from local fire and police departments to gain access to the building. The Construction Department should be dispatched to the scene to disconnect the service line serving the building, if necessary.

E. Unidentified Odors

All calls involving unidentified odors should be treated as if they were gas leak calls. Odorant can be leached out of gas and gas could be present although another odor is present. Make every effort to identify the odor and its source. This may be time consuming, but it will prevent future leak calls. When the odor has been identified and its source found, notify the proper authorities if it is considered to be dangerous or a nuisance.

MC7.2.5 - Training

Include leak investigation training as part of the Apprentice Mechanics' training program. Employees who receive leak calls need to be trained to secure all pertinent information so that the leak's severity can be properly judged and handled accordingly. Service, construction, and maintenance personnel will be trained to locate, repair or make safe leaks according to their job responsibilities.

MC7.3 - Surveys

MC7.3.1 - Scheduling and Coordinating

Company surveys and patrols, and all leak repair scheduling and coordinating are done by work location personnel. This includes selection of survey operators, training, planning, routing, overseeing, record-keeping and budgeting. Leak surveys are conducted in the vicinity of gas lines and facilities with approved flame ionization detection equipment. The Pipeline Risk Management Department coordinates the selection and scheduling of the leak survey contractors as well as the providing contract personnel with maps and facility information used during the surveys. The Pipeline Risk Management Department will provide budget information related to contract surveys to the work locations. The work locations leak survey coordinator should oversee the activities of the contract technician. It is recommended also that the company leakage program personnel conduct field audits of the contractor technician's work on a random basis as time permits. Unscheduled surveys may be conducted at the discretion of the local operations as situations warrant. The following chart provides a general summary with additional detail following:

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Survey	Company Personnel	Contract Personnel
7.3.2 - Mains	NA	 Cast iron & unprotected steel: 3 years Protected steel/plastic: 5 years
7.3.3 - Services	NA	 Cast iron & unprotected steel: 3 years Protected steel/plastic: 5 years
7.3.4 - Regulator Vaults	Annual	None
7.3.5 - Critical Areas	 Cast iron & unprotected steel: every two months Protected steel/plastic: annual (mains and services on both) 	Annual (mains only)
7.3.6 - Public Assembly	NA	Annual
7.3.7 - Transmission lines/ROW	NA	Annual

MC7.3.2 - Mains

Surveys should be conducted with a mobile flame ionization unit by contract personnel for all distribution mains outside the critical area (*MC7.3.5-Critical Areas*) but within areas:

- containing cast iron mains or unprotected steel mains every 3 years
- not containing cast iron mains or unprotected steel mains every 5 years

In the smaller areas, all mains may be surveyed during one particular year of the periods described above. Mains may also be surveyed with a walking survey with contract personnel in combination with a leak survey for services.

MC7.3.3 - Services

Surveys should be conducted with a portable flame ionization unit by contractor personnel for all service lines and meter installations outside the critical area (*MC7.3.5-Critical Areas*) but within meter routes:

- containing cast iron mains or unprotected steel mains every 3 years
- not containing cast irons or unprotected steel mains every 5 years

The Pipeline Risk Management Department should be notified by each local office when there are changes within meter routes other than routine new services or retirements. Such changes would include creation of new routes, deletion of routes, and transfer of accounts from route to route or any other action that would affect a meter route.

MC7.3.4 - Regulator Vaults

Vaults housing regulator facilities must be inspected once per calendar year not to exceed 15 months ($\underline{192.749}$) for leakage and ventilation. The vault inspection can be done during the course of the regulator inspection ($\underline{MC4.1-District Regulators}$).

MC7.3.5 - Critical Areas

Each work location should designate and indicate on **mapping records** in the work locations and in the Quality Assurance & Compliance Department those areas classified as "critical areas" (principally "business districts") (<u>192.723</u>). The area boundaries and test points should be reviewed by October 31st of each year and the Quality Assurance & Compliance Department notified of necessary changes. If there are no changes, a negative reply should be provided.

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A **field book** should be maintained by each district with sketches indicating the facilities within the critical areas. The areas included should be the same as those indicated on the maps on file in the Quality Assurance & Compliance Department. Underground facilities should be indicated on the sketches. Test points should be selected so that surveys may be conducted with gas detection equipment. Such points may be at or near the building, near the meter, catch basins, water meter boxes, manholes, valve boxes, etc. If available openings are not sufficient for an adequate survey, approved test plugs should be installed. Test points should be serially numbered and shown in the critical area field book.

Any **leak** found in the critical area should be investigated immediately. If the investigation results in the leak being classified as a Grade 1 leak then repair should be started immediately, and action on the leak continued until the repair is completed or conditions are judged no longer hazardous. If the investigation determines the leak to be a Grade 2 leak, repair should be made on a priority basis and not delayed more than absolutely necessary. Critical area leak repair should take precedent over other routine leak repair work. All underground critical area leak repairs, regardless of grade, should be rechecked within 1 month to insure completeness of repair.

Present and immediate past **weather conditions** should be considered at the time of conducting the critical area survey. For instance, wind speeds in excess of 10 miles per hour or the ground fully saturated with water diminish the effectiveness of the survey. Surveys on low pressure systems while water is standing on paving, in gutters, or over available openings are not practical.

Critical Areas Survey - Company

All critical areas containing cast iron and unprotected steel mains shall be surveyed by company personnel with flame ionization instruments at intervals not exceeding two months. All facilities in critical areas, including services, should be surveyed. The results of each survey should be posted in the field book. A two person team should be utilized on this survey with one concentrating on the survey instrument and the other flagging traffic, opening test boxes and handling other miscellaneous duties.

During this survey, emphasis should be placed on available openings over the mains and services (cracks, paving joints, etc.) and the curb line nearest the facilities. More than one person in each work location or district should be familiar with conducting the survey.

All critical areas containing only coated (protected) steel and plastic mains shall be surveyed by company personnel with flame ionization instruments at least once annually. District personnel have the option of more frequent surveys if deemed advisable because of condition of mains and services, vehicular traffic, venting limitations, etc. All facilities up to the customer's fuel line inside buildings within the critical area should be surveyed by company personnel with flame ionization equipment at intervals not exceeding 15 months, but at least once each calendar year. Entries should be made in the field book indicating the results of the survey.

Critical Areas Survey - Contract

At intervals not to exceed 15 months but at least once each calendar year, a survey of all distribution mains in the critical areas shall be performed (<u>192.723.b.1</u>) by a private leak survey company utilizing an approved leak survey detection method. This survey may be performed at night when vehicular traffic is light. The technician performing this survey will investigate each indication thoroughly. If the investigation indicates a Grade 1 condition, the technician will notify the Alagasco dispatcher or duty supervisor immediately and stand by the location until company personnel arrive.

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MC7.3.6 - Public Assembly

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A field book should be maintained by each district with sketches showing the service line route and meter location of places of public assembly outside the critical areas. Examples of these places are schools, kindergartens, day care centers, auditoriums, hospitals, nursing homes, larger churches, theatres, and other places as selected by work location personnel. At intervals not exceeding 15 months but at least once each calendar year, contract personnel shall survey the service line and meter installation to the customer's fuel line utilizing flame ionization equipment. Entries should be made in the field book indicating the results of the survey. By August 31st of each year, this book should be reviewed to insure its accuracy. Necessary changes should be made and the Quality Assurance & Compliance Department notified of the current number of places to be surveyed.

MC7.3.7 - Transmission Lines and Rights of Way (ROW)

Each local operations should designate those mains defined by 192.3 as transmission lines. The "Transmission Line Survey" and "Transmission Line Patrol" encompasses all such lines, in public and private rights-of-way (192.706). Non-transmission mains located in easements and private ROW or other locations not subject to frequent surveillance by the public or company personnel are defined as "ROW" for purposes of a leak survey. By September 30th of each year, these lists should be reviewed by the work locations, who will notify the Quality Assurance & Compliance Department of any changes. If there are no changes a negative reply should be provided. At intervals not exceeding fifteen months, but at least once each calendar year, all of these facilities should be surveyed by using portable flame ionization leak detection equipment.

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