

Procedure Number: **60.70.10**

Title: **Reporting and Investigation of Material Failures**

1.0 Purpose

This document describes procedures to be used to report and investigate material failures involving pipeline facilities. The goal of the failure investigation is to find the root cause of the failure in order that corrective action may be taken to prevent future failures.

2.0 Scope

The procedure is applicable to material failures experienced on PHMSA jurisdictional facilities. This procedure is not applicable to customer owned equipment or piping, vehicular accidents, or occupational injuries.

3.0 General Information

- 3.1 The UGI Emergency Plan shall be implemented, as appropriate, when a material failure occurs. Not all occurrences of a failure will require the implementation of the UGI Emergency Plan.
- 3.2 If a failure results in a DOT reportable incident as defined in EP 6.1, follow the appropriate reporting requirements to PHMSA, the PUC, and/or the PSC. Information should also be recorded electronically and submitted on UGI’s internal Standards & Materials SharePoint site, or on Form 60.70.10-1: Material Investigation Failure Report to be entered electronically when available.
- 3.3 If damages occur as a result of excavation activities, the Substructure Damage Report (Form 60.40.50-1) shall be completed.
- 3.4 Reportable failures that do not qualify as a DOT reportable incident or are not caused by excavation damage must still be documented. This documentation should be completed on the top portion of Form 60.70.10-1 Material Investigation Failure Report. The bottom portion of this report shall also be filled out for mechanical fitting failures that result in a “C” leak. The forms should then be recorded electronically as indicated in 3.2.
- 3.5 Failures that should be reported could occur during installation of mains, services, etc., or may also occur any time after installation. If the cause of the failure or defect appears procedural or equipment related in nature, the forms listed in 3.7 should be submitted and reviewed for evaluation and corrective action. Examples of items to report include:

- 3.5.1 Inoperable valves that cannot be corrected with normal maintenance.

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- 3.5.2 Relief or regulator failures. Note: Pressures that exceed the MAOP plus allowable build-up shall be treated in accordance with the procedures for a Safety Related Condition (EP 6.2).
- 3.5.3 Meter failures and malfunctions not currently reported by the meter shop.
- 3.5.4 Cracks, leaks or other failures of any flanges, fittings, or other components.
- 3.5.5 Premature tool and equipment (i.e. tapping and stopping equipment, leak survey equipment, and pipe locator equipment) failures. Equipment replacement or repairs that are the result of normal usage do not need to be reported.
- 3.6 The completed form, along with the failed specimen, should be sent to the Manager, Standards and Materials. If it is not practical to send the failed facility, it should be retained in a safe location where it can be examined. If it is determined that a facility has a high rate of failure, and the reason for the failure has been established, the failed facility may not need to be preserved. The Senior Manager of Standards and Materials will communicate to Operations if certain failed facilities no longer need to be preserved. However, a particular facility may need to be retained based on Section 4.4 of this procedure.
- 3.7 Those items that have high rates of failure must be documented. Form 60.70.10-1 may be used for reporting, or another approved format may be used. For example, mechanical tee failures may be documented on a separate spreadsheet for tracking purposes. The Senior Manager of Standards and Materials shall determine when a format other than Form 60.70.10-1 may be used and will communicate this to Operations.

4.0 Failure Investigation and Preservation

- 4.1 Detailed investigation of a material failure should be conducted based on the extent applicable. Photographs should be taken of the failure site and surrounding area, when practical.
- 4.2 The failed specimen needs to be preserved and handled carefully for possible metallurgical analysis or pressure tests, etc. The failure surface shall be protected during the cutting, lifting, identifying and shipping of pipe and/or fittings.
- 4.3 The failed specimen should be preserved in the following manner:
 - 4.3.1 Avoid cutting too close to the failure so that pressure (or other) testing may occur. When possible, allow six (6) inches or two (2) pipe diameters of good pipe on each side of the fitting or joint that has failed.

- 4.3.2 Do not paint or attempt to clean the specimen.
- 4.3.3 As applicable, identify the orientation and position of the specimen with respect to the remaining facilities and fixed landmarks. Also indicate the direction of gas flow.
- 4.4 If the specimen was involved, or has not been ruled out as being involved, in a loss event (property damage or injury claim), the Claims Department should be notified. In addition, in such situations, the specimen should be treated as evidence and an evidence tag (Form 60.70.10-2) must be attached to the specimen to identify the company material potentially involved in a failure or loss event.
- 4.5 Recover and preserve all UGI owned gas equipment that survives an incident, such as a fire or explosion, even when the cause has been determined to be other than gas related. Tag and maintain this equipment as described in 4.4 above until the case has been officially closed.
- 4.6 The Materials Engineer shall coordinate the analysis of failed specimens and report findings, as appropriate. Any necessary additional follow-up action such as additional leak surveys, removal of the material from stock, etc., will be established after the cause of the failure has been determined.

5.0 Records

Completed copies of Form 60.70.10-1 shall be maintained by the Material Engineer for a period of 10 years.

6.0 Operator Qualification

There are no specific UGI Covered Tasks that apply to this procedure. Refer to the UGI Emergency Plan for any emergency response activities and qualifications that may be necessary.


7.0 References

Federal Regulations

49 CFR 192.605 Procedural manual for operations, maintenance, and emergencies
49 CFR 192.613 Continuing surveillance
49 CFR 192.617 Investigation of failures

Maryland Regulations

COMAR 20.57.02.03 Reportable Incident Investigation
COMAR 20.57.02.04 Reportable Incident Testing

UGI GAS UTILITIES MATERIAL INVESTIGATION FAILURE REPORT Form 60.70.10-1 (08/2018)					
Area Location:			Date of Failure		
Address of Failure:			Date Repaired		
			WR # or Service Order		
Repaired by:			Leak Classification		
System Pressure:		Leak Report?:		LMS or Leak ID #	
Material Involved					
Facility Type*	*If a mechanical fitting failure, complete bottom portion of form.				
Joint Type	Pipe Material Type		Size		
Failure Location	Type of Backfill		Year		
Manufacturer:	Method of Installation		Installed:		
Date of Manufacturer:	Part/Model #		Lot #		
Wall Thickness/SDR	Failure Cause				
Nature of Failure & Actions Taken (Comments)					
* Mechanical Fitting Failure Information - Only required for mechanical fitting failures					
Joint Type:			If "other", specify:		
Type of Mechanical Fitting:			If "other", specify:		
Leak Location:	1)		Year Installed**:		
	2)				
	3)		Year Manufactured**:		
**If Neither Year Installed or Year Manufactured is Known, Provide Decade Installed:					
Manufacturer:			Part or Model Number:		
Lot Number:			Other Attributes:		
Fitting Material:			If "other", specify:		
Specify the Two Materials Being Joined:			Location of Leak:		
a) First Pipe					
Nominal Size:		First Material:			
Unit:		If plastic, specify:			
		If "other", specify:			
b) Second Pipe:					
Nominal Size:		Second Material:			
Unit:		If plastic, specify:			
		If "other", specify:			
Primary Cause of Leak:					
If natural forces , was there thermal expansion/contraction?					
If excavation damage , when did damage occur?					
If material or welds/fusions , what caused the leak?					
If other , explain:					
Routing					
Form Prepared by:				Date:	
Field Supervisor:				Date:	
Material Standards:				Date:	
Form 60.70.10-1 08/22/2018					



Material Failure Reporting Guidelines			Material Failure Report Required	Material to Standards Group
For Leak or Failure of:				
Pipe	<u>CI Causes</u>			
	Break		N	N
	Graphitization		N	N
	Hit		N	N
	<u>Steel Causes</u>			
	Corrosion		N	N
	Weld		N	Determined case by case if removed
	Hit		N	N
	<u>PE Causes</u>			
	Fusion		Y	Determined case by case if removed
Pipe Failure		Y	Determined case by case if removed	
Hit		N	N	
Fitting/Joint	<u>Fitting Failure Type</u>		<u>Examples</u>	
	Nut Follower	Kerotest Valve, PosiLok, Dresser Style 90, Handley Valve	Y	N
	Stab	Perfection, Permasert	Y	Only if 2.0 version
	Bolted Coupling	Dresser	Y	N
	Other Mech Fittings	AMP Fitting; Posi Hold, Normac (Copper/Steel)	Y	N
	Threaded	Joining material directly by threads e.g. Street Tee in CI Tap	Y	N
	Other Fittings	PVC Couplings	N	Y
	Bell Joint	CI Bell Joints	N	N
	Weld/Fused Valves and Fittings	All welded/fused valves and fittings - Does NOT include greasing of valve, tee caps, threaded fittings.	Y	Determined case by case if removed
	Flanged Components	Filters, Regs	Y	Determined case by case if removed
Explanation of PHMSA responses				
PHMSA RESPONSE	EXPLANATION			
Leak Through Seal	Leak is through the seal providing gas tight fit. Leak is through compression area of fitting			
Leak Through Body	Leak is through the body of the fitting e.g. a bolted dresser body corrodes and leaks			
Pull Out	Full pull out of pipe from fitting e.g. Service Pipe pulls out completely from a stab fitting			
PHMSA Report Causes of Leak	Addition question asked if this cause is	Possible Answers	Examples of Material Causes	
Corrosion	None		Design Defect - Kerotest	
Natural Forces	Was there thermal expansion/contraction?	Yes/No	Material Defect - Stiffener cracked	
Excavation Damage	When did damage occur?	At time of Discovery or Prior to Discovery	Install Defect - Pipe was scratched	
Other Outside Force/Damage	None		Material Defect - Broken Mech Tee Bolts	
Material or Welds/Fusion	What caused the leak?	Construction/Install Defect; Material Defect; Design Defect		
Equipment	None			
Incorrect Operation	None			
Other	Provide Explanation			
<p>NOTE: ALL KEROTEST FAILURES MUST BE REPORTED AS A "MATERIAL or WELD/FUSION" FAILURE AND REPORTED AS A DESIGN DEFECT UNLESS IT WAS CLEARLY EXCAVATION DAMAGE ALL PERFECTION MECHANICAL TEE FAILURES WITH BROKEN BOLTS MUST BE REPORTED AS "MATERIAL or WELD/FUSION" AND MATERIAL DEFECT UNLESS IT WAS EXCAVATION DAMAGE PHMSA Webinar Info on Mechanical Fitting Failure Reporting is available @ http://www.phmsa.dot.gov/staticfiles/PHMSA/livemeetingphmsa.aspx</p>				