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The Risks of Flooding to a Natural Gas Distribution System

Flood Planning

- Risk Assessment
- Design Element Practices and Considerations
- Flood Emergency Preparation and Coordination
- Post Flood Recovery Issues

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Risk Assessments

- Water Intrusion and infiltration into the system
- Submergence of customers' gas meters
- Possible dislocation and exposure of sections of a distribution main due to road destruction and earth-shifting
- Damage to above ground facilities
  - Regulator Station
  - Valve
  - Pipe hanging on Structures

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Risk Assessment – Infiltration

- Generally a flood that does not cause a rupture of a gas distribution system will not damage buried gas lines.
- Gas pressure will generally be great enough to prevent infiltration and should not be shut down.

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Risk Assessment – Above Ground Facilities

- Submergence – Customers Meters and Regulating Station
- Can it still function?

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Risk Assessment – Above Ground Facilities

- Damage
  - Regulator Station
  - Hairpin / Valve
  - Pipe hanging on Structures

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Risk Assessment – Pipe Exposures

- Integrity of Pipe
- Public Safety

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- Flash Flooding
- River Flooding
- Water Main Break

Flash Flooding

- Wash Outs
- Flooding of Facilities
  - Regulator Stations
  - Customer Meters

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ADB-2016-03

Owners and Operators of Petroleum Gas and Natural Gas Facilities in Areas subject Heavy Snowfall or Abnormally Icy Weather

- Advises owner and operators of the need to take appropriate steps to prevent damage to pipeline facilities from accumulate snow or ice.
- Past event on natural gas distribution system facilities appear to have been related to either stress and ice or the malfunction of pressure control equipment due to ice blockage of pressure control equipment vents.

River Flooding – Winter Thaw

Threats can vary based on time of year

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ADB-2019-04

Water Crossings & Area Prone to Flooding

- PHMSA issued an advisory bulletin to remind all owners and operators of gas and hazardous liquid pipelines of the potential for damage to pipeline facilities caused by severe flooding and actions that operators should consider taking to ensure the integrity of the pipelines in the event of flooding, river scour, and river channel migration.

River Flooding

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Safety-Related Condition (192.23)

SAFETY-RELATED CONDITION REPORT TO
UNITED STATES DEPARTMENT OF TRANSPORTATION
Email: InformationResourcesManager@dot.gov
or FAX: (202) 366-7128

SECTION I - PREPARER
NAME & TITLE:
_____
TELEPHONE NO.: ( ) - DATE PREPARED / /

SECTION II - GENERAL INFORMATION
OPERATOR'S NAME:
_____
ADDRESS:
_____
CITY: _____ STATE: _____ ZIP: _____

LOCATION OF SAFETY-RELATED CONDITION:
CITY / TOWNSHIP:
_____
COUNTY: _____ STATE: _____ ZIP: _____
FACILITY NAME / PIPELINE NO.: _____ STATION NO: _____

NEAREST GEOGRAPHICAL REFERENCE(S):
_____
_____
_____
_____

DESCRIPTION OF SAFETY-RELATED CONDITION (Identify Commodity Transported):
_____
_____
_____
_____

CIRCUMSTANCES LEADING TO DISCOVERY:
_____
_____
_____
_____
_____

SIGNIFICANT EFFECTS OF CONDITION ON SAFETY: _____
_____
_____
_____
_____

DATE OF DISCOVERY: / / DATE DETERMINED TO BE REPORTABLE: / /

PERSON WHO DETERMINED THAT THE REPORTABLE CONDITION EXISTS:
NAME & TITLE:
_____
TELEPHONE NO.: ( ) -

- Unintended Movement or Abnormal Loading by Environmental Causes which could affect the Serviceability or Structural Integrity of the Pipeline

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Design Element Practices and Considerations

- Pressure Regulating Facilities
- Water Intrusion/Inflitration
- Bridge Crossing
- Critical Facilities Design and Review

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Flood Emergency Preparation and Coordination

- Incident Command System
- Resource Allotment
- Response Plan
- Flood Emergency Preparation and Coordination Checklist

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Post Flood Recovery Issues

- Tracking Impacted Customers
- Meters and Regulators
- Guidance to Customers
- Post-Recovery

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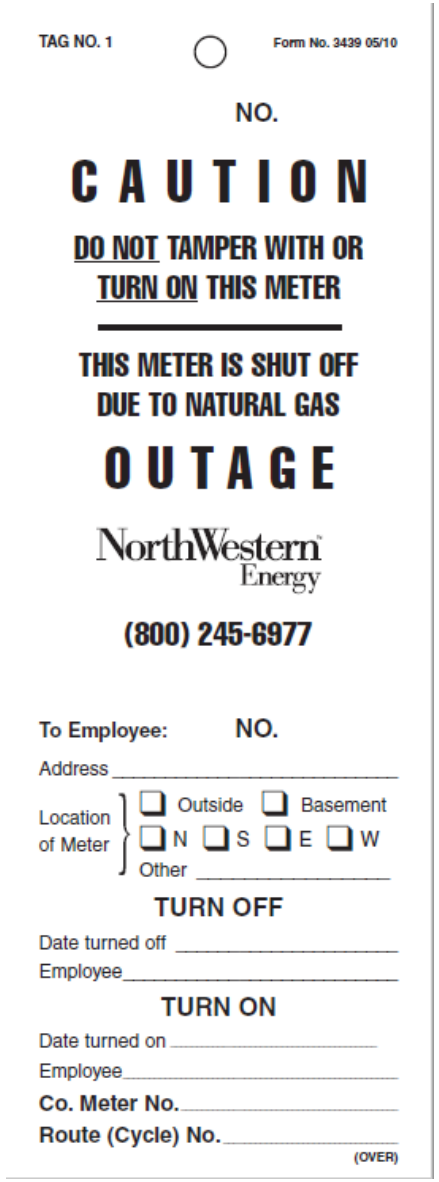
Tracing Impacted Customers



TAG NO. 1 ◯ Form No. 3439 05/10

NO.

CAUTION

DO NOT TAMPER WITH OR TURN ON THIS METER

THIS METER IS SHUT OFF DUE TO NATURAL GAS

OUTAGE

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(800) 245-6977

To Employee: NO.

Address _____

Location of Meter ☐ Outside ☐ Basement ☐ N ☐ S ☐ E ☐ W Other _____

TURN OFF

Date turned off _____

Employee _____

TURN ON

Date turned on _____

Employee _____

Co. Meter No. _____

Route (Cycle) No. _____

(OVER)

- How to track?
  - Utilize No Gas Procedures
  - Turn on process is much more staggered than a traditional no gas so interaction with your CIS is critical in tracking customers

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Customer Meters and Regulation

- Replace or Reuse
- Full Submergence
  - Replace --

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Guidance to Customers

- Gas Service to a customer's premise not turned back on unless all submerged appliances, regulators and control devices have been inspected by a qualified person and replaced or repaired as necessary.
  - As a utility our company has chosen to not accept the role qualified person to inspect appliance

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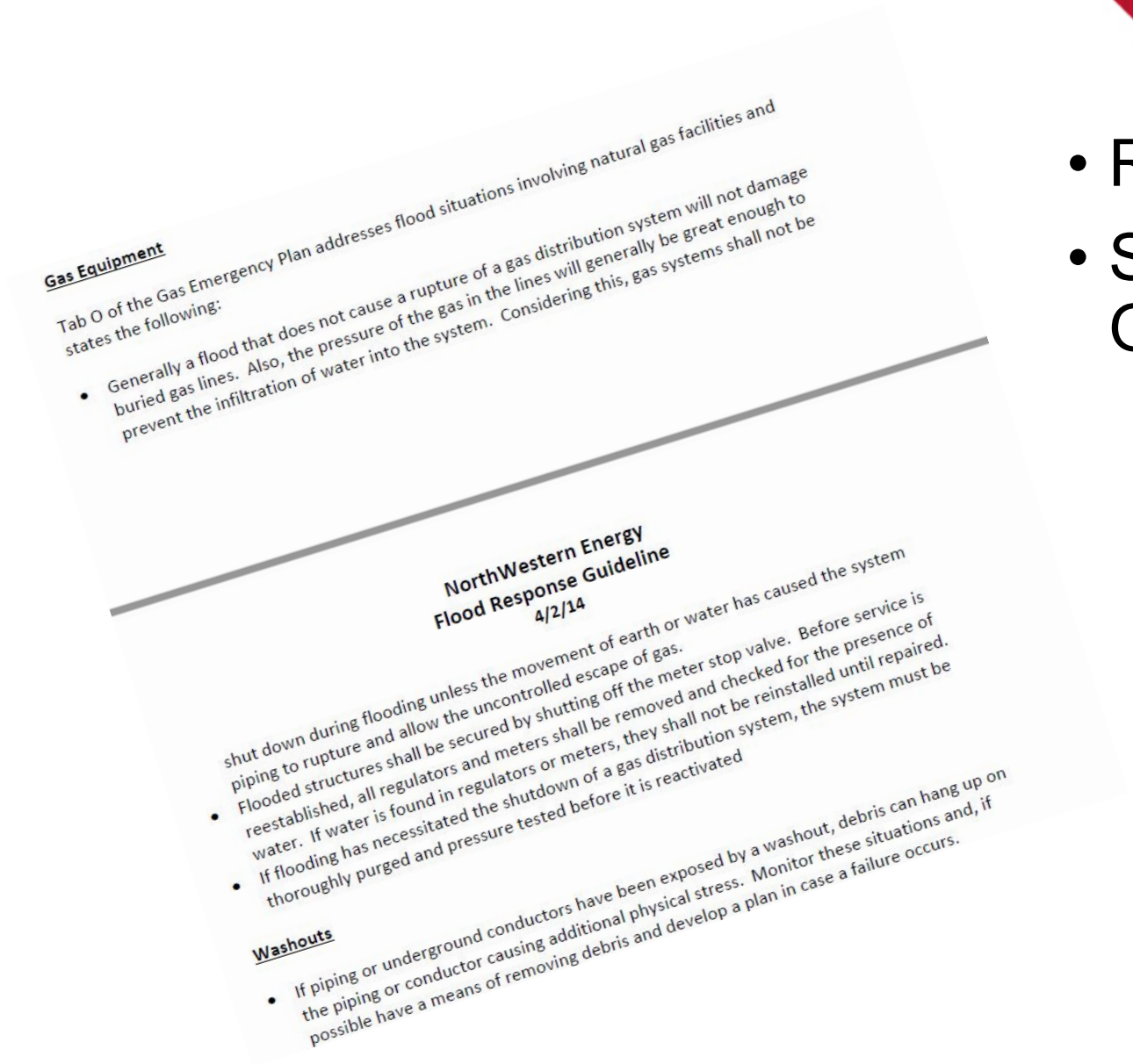
Conclusion



Gas Equipment

Tab O of the Gas Emergency Plan addresses flood situations involving natural gas facilities and states the following:

- Generally a flood that does not cause a rupture of a gas distribution system will not damage buried gas lines. Also, the pressure of the gas in the lines will generally be great enough to prevent the infiltration of water into the system. Considering this, gas systems shall not be

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Flood Response Guideline
4/2/14

shut down during flooding unless the movement of earth or water has caused the system piping to rupture and allow the uncontrolled escape of gas.

- Flooded structures shall be secured by shutting off the meter stop valve. Before service is reestablished, all regulators and meters shall be removed and checked for the presence of water. If water is found in regulators or meters, they shall not be reinstalled until repaired.
- If flooding has necessitated the shutdown of a gas distribution system, the system must be thoroughly purged and pressure tested before it is reactivated

Washouts

- If piping or underground conductors have been exposed by a washout, debris can hang up on the piping or conductor causing additional physical stress. Monitor these situations and, if possible have a means of removing debris and develop a plan in case a failure occurs.

- Response Plan
- Share Knowledge among Operating areas

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