Gary Hanson, Chair
Steve Kolbeck, Vice Chair
Dustin Johnson, Commissioner

# SOUTH DAKOTA PUBLIC UTILITIES COMMISSION

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May 23, 2008

Ms. Patricia Van Gerpen
South Dakota PUC
500 E. Capitol
Pierre, SD 57501

VIA ELECTRONIC FILING

Re: PS07-002

Dear Ms. Van Gerpen:

Attached for filing, please find the Commission Pipeline Safety Staff Report on the above referenced docket.

Sincerely,

Kara Semmler

**South Dakota Public Utilities Commission**

# Memo

**To:** Chairman Hanson, Vice-Chairman Kolbeck, and Commissioner Johnson

**From:** Nathan D. Solem

**CC:** Patricia Van Gerpen, Kara Semmler and Daris Ormesher

**Date:** May 22, 2008

**Re:** SPPUC Pipeline Safety Staff Report on the Mitchell Incident in Docket PS07-002

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## Summary of Incident Facts

On March 8, 2007 the house located at 1612 Bridle Drive in Mitchell, SD exploded at 11:31 am as shown in Figure 1 below. Two adjacent homes were also damaged. A leak on the bottom side of a two inch steel gas main located in the boulevard in front of 1612 Bridle Drive was found by the natural gas system operator, NorthWestern Energy (See attached Figure 2). Gas was released and damages in excess of $50,000 resulted. Consequently the incident was reported to the National Response Center and the Pipeline and Hazardous Materials Administration (PHSMA) Office of Pipeline Safety under the Pipeline Safety Regulations located in 49 CFR Part 191. Probable cause of the ignition source and probable route of entry of gas into the house were not determined.

Figure 1. Exploded house at 1612 Bridle Drive, Mitchell, SD

## Staff's Role

South Dakota gas pipeline safety staff has two roles in a natural gas incident investigation:

- Monitor the operator's procedures for determining probable cause and prevention of reoccurrence under 49 CFR 192.617. An analogy is that Staff must take the water temperature to see if the operator took the water temperature correctly.

- Determine operator compliance of both Parts 49 CFR 191 and 192 code sections and the operator's operations and maintenance standards applicable to the incident.

## Probable Cause

Staff hired an independent physical metallurgy laboratory and a physical metallurgical expert witness in its effort to determine if probable cause was determined correctly. Staff's expert witness concluded:

- The cause of the incident was mechanical damage.
- A mechanically created gouge caused the pipe to fail.
- The mode of failure was a circumferentially oriented brittle crack that severed the bottom three quarters of the pipe.
- No evidence of time-dependent enlargement of the gouge was found.
- External corrosion played no role in the incident.
- The pipe was adequately protected from external corrosion.
- The pipe was furnace butt-welded pipe.
- The pipe contained no manufacturing defects.
- The damage that caused the failure is not new, but it was not possible to establish when it occurred.
- Multiple impacts noted on the pipe specimen could have possibly required more than one motion of a single piece of excavating equipment. It was not possible to determine, however, whether multiple impacts were created during a single excavation or during more than one excavation.

Please note the following two pictures of the damaged pipe section:

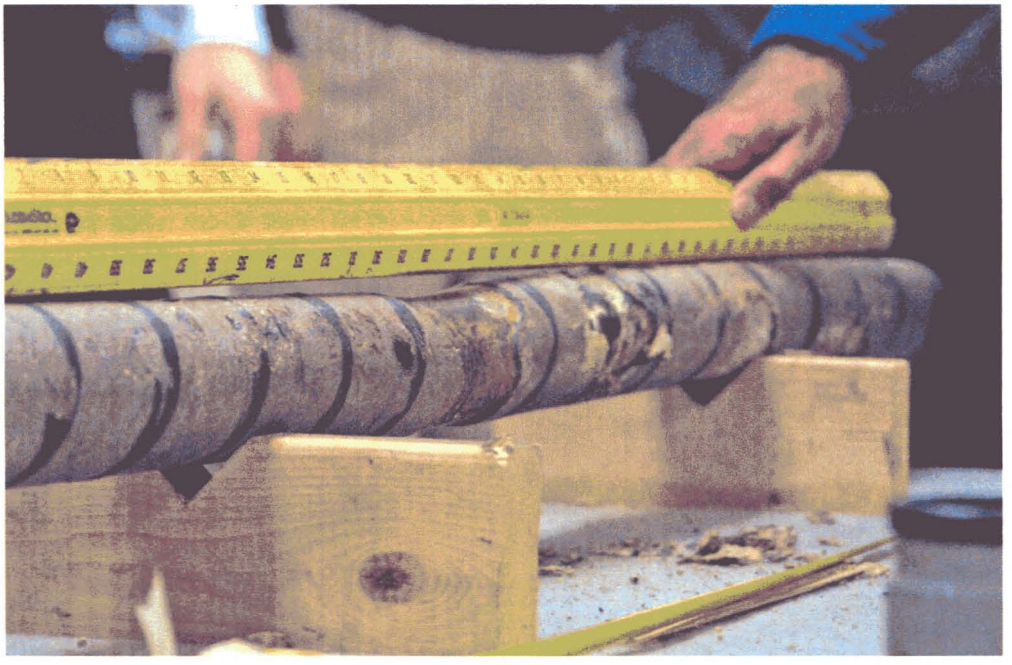


Figure 3. Pipe as received at testing laboratory

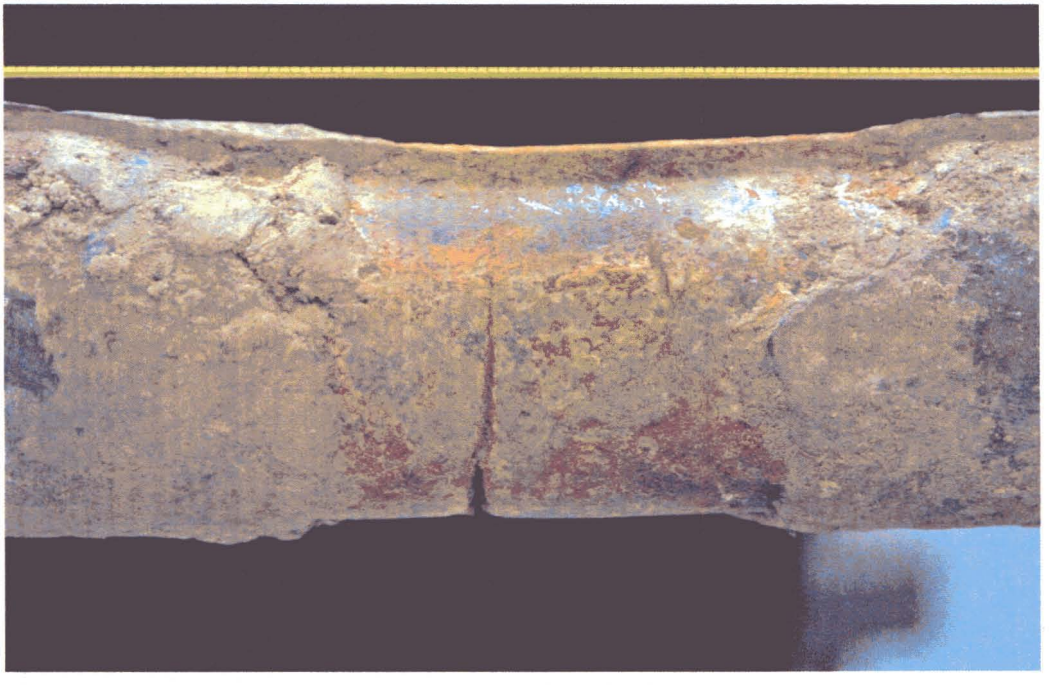


Figure 4. Pipe with crack oriented on bottom as ocurred in the ground.

## Possible Scenario

A fitting scenario based on available facts is that the freeze-thaw cycles on the pipe (which was weakened from third party mechanical damage) resulted in a sudden one-stage large volume leak (estimated by Staff's expert witness at 277 cubic feet per hour). The leaking gas may have traveled beneath the frozen topsoil through the less dense soil backfill of the 2004 waterline trench excavation, entering the house in the basement. An appliance in the basement ignited the gas when the lower explosive limit concentration was reached.

## Compliance Review Results

**Hazardous Scene.** On March 14, 2007, Martin Bettmann, the South Dakota Pipeline Safety Program Manager, requested a gas migration survey (bar hole survey) to determine probable route of entry of gas into the house. No bar hole data had been collected by the operator prior to March 14 six days after the incident.

For a bar hole survey, a small diameter rod is driven 18" to 24" into the ground, removed and a combustible gas meter probe is then inserted. A read of the gas content of the air contained in the soil is then obtained. The combustible range of natural gas in air is from about 4.5% gas in air to 15% gas in air. The lower number (4.5%) is called the lower explosive limit or LEL. The higher number (15%) is called the upper explosive limit or UEL. Bar hole surveys are used to:

- Determine if an underground leak exists
- Determine the exact location of the leak
- Determine the route of entry of gas into a facility
- Determine if gas has dissipated making the area safe for reentry

The results of the requested bar hole survey indicated readings as high as 45% gas along the south foundation of 1612 Bridle Drive (facing the street). These results and additional bar hole results at neighboring addresses clearly indicated an unsafe environment. As a result the operator closed the street, evacuated some residences and vented the soil to remediate the hazardous gas levels.

The operator's Standard 1500, Section 5.2.9 which is part of the guidelines for handling gas leaks states "If high concentrations of gas are found outside the building, ventilate around the foundation by digging holes." Clearly, a leak existed and Standard 1500, Section 5.0 does not limit Section 5.2.9 only for use in determining whether a leak occurred. Rather, Section 5.0 in its entirety is part of a response procedure. Standard 1500, Section 5.0 is attached to this report for reference. Staff consequently finds that the operator is in violation of its operating standard. The operator should have conducted a bar hole survey to determine whether high concentrations of gas existed. The operator should have then appropriately vented the soil. Having not done that, a potentially dangerous situation existed for six days after the incident itself.

Staff therefore recommends that the Commission issue a Notice of Probable Violation of 49 CFR 192.605 (a) which states:

*General. Each operator shall prepare and follow for each pipeline, a manual of written procedures for conducting operations and maintenance activities and for emergency response. For transmission lines, the manual must also include procedures for handling abnormal operations. This manual must be reviewed and updated by the operator at intervals not exceeding 15 months, but at least one each calendar year. This manual must be prepared before operations of a pipeline system commence. Appropriate parts of the manual must be kept at locations where operations and maintenance activities are conducted.*

Additionally, 49 CFR 192.615 (7) states an operator's emergency plans must provide for "*making safe any actual or potential hazard to life or property.*" In Staff's opinion, the failure to bar hole and ventilate at the close of the incident on March 8 or 9 at the latest constitutes a violation of this code section. Staff therefore recommends that the Commission also issue a Notice of Probable Violation of 49 CFR 192.615 (7).

Staff further recommends that a proposed penalty of $5,000 be assessed for each of the two notices of probable violation.

Please note that a gas migration survey after such an incident is considered standard industry practice and is not an unusual occurrence or expectation.

**Investigation of failure.** The operator's investigation of failures in compliance with 49 CFR 192.617 (see below) is found in attached Standard 1065. Section 2.1 states that a detailed analysis, especially of repeated occurrences, should be made when the analysis could be useful in minimizing a recurrence of the failure. The operator stated its detailed analysis is based on physical and photographic evidence. The results indicate the probable cause is third party damage. In Staff's opinion, proper evaluation of the physical evidence in this case requires a metallurgical opinion. Although the operator's metallurgical expert was present at the metallurgical evaluation organized by Staff, no metallurgical opinion from the operator has been offered.

49 CFR 192.617:

*Each operator shall establish procedures for analyzing accidents and failures, including the selection of samples of the failed facility or equipment for laboratory examination, where appropriate, for the purpose of determining the causes of the failure and minimizing the possibility of a recurrence.*

Staff recommends that the Commission either:

- Order the operator to produce a metallurgical report stating the metallurgical procedures the operator used to determine probable cause.

- Or, issue a Notice of Concern for not following the intent of its detailed analysis procedures in Standard 1065. In Staff's opinion, the operator's detailed analysis procedures should have been followed. Staff believes a determination of probable cause should have been based on metallurgical analysis

A Notice of Concern is used to notify the operator that although a violation may not have occurred, a change is needed to ensure that the practice does not lead to a violation in the future.

**Emergency Procedures.** The operator's Standard 1500, Section 2.2 requires annual review of emergency procedures. A review of three sample years of annual review records indicates

that in only one year was the actual Standard 1500 reviewed. In the other two years, more general emergency response procedures that covered both 49 CFR 615 b (2) and OSHA requirements were reviewed. In Staff's opinion, the operator's standard requires specific review of Standard 1500 on an annual basis. Staff therefore recommends the Commission issue a Notice of Probable Violation for non-compliance with 49 CFR 192.605 (a) which states:

*General. Each operator shall prepare and follow for each pipeline, a manual of written procedures for conducting operations and maintenance activities and for emergency response. For transmission lines, the manual must also include procedures for handling abnormal operations. This manual must be reviewed and updated by the operator at intervals not exceeding 15 months, but at least one each calendar year. This manual must be prepared before operations of a pipeline system commence. Appropriate parts of the manual must be kept at locations where operations and maintenance activities are conducted.*

**Damage Prevention and Public Awareness.** Excavator damage data in Mitchell indicates a flat to declining trend since 2001 and may support the operator's conclusion that this is an isolated incident. The Commission may still find it useful, however, for the operator to supplement its public awareness program. Specifically, it may be prudent for the operator to make extra efforts to reach Mitchell area excavators and the affected public over a five year period. Additional communications could include information related to the South Dakota One Call requirement that all line hits be reported (see SDCL 49-7A-12). The operator indicated a line hit was not reported for 1612 Bridle Drive and a review of One Call records also shows no reports.

**Operator Qualifications.** A review of operator qualification records supplied by the operator indicates that the person below performed a covered task but was not listed as having current qualification training prior to performing the task. This is shown in the table below:

| **Regulator Station Inspections:** | **Inspection Date** | **OQ Date** |
|---|---|---|
| Ryan Iedema | 2/28/05 | 5/11/05 – Pressure Regulating, Limiting and Relief Device – O&M |

Staff recommends that the Commission issue a Notice of Probable Violation for non-compliance with 49 CFR 192.805 (b). See below.

*192.805:*

*Each operator shall have and follow a written qualification program. The program shall include provisions to:*

*(a) Identify covered tasks;*

*(b) Ensure through evaluation that individuals performing covered tasks are qualified;*

*(c) Allow individuals that are not qualified pursuant to this subpart to perform a covered task if directed and observed by an individual that is qualified;*

*(d) Evaluate an individual if the operator has reason to believe that the individual's performance of a covered task contributed to an incident as defined in Part 191;*

*(e) Evaluate an individual if the operator has reason to believe that the individual is no longer qualified to perform a covered task;*

*(f) Communicate changes that affect covered tasks to individuals performing those covered tasks; and*

*(g) Identify those covered tasks and the intervals at which evaluation of the individual's qualifications is needed.*

*(h) After December 16, 2004, provide training, as appropriate, to ensure that individuals performing covered tasks have the necessary knowledge and skills to perform the tasks in a manner that ensures the safe operation of pipeline facilities; and*

*(i) After December 16, 2004, notify the Administrator or a state agency participating under 49 U.S.C. Chapter 601 if the operator significantly modifies the program after the Administrator or state agency has verified that it complies with this section.*

**Reports.** The following deviations were found on the Gas Distribution Incident Report form 7100.1 as filed with the PHMSA office:

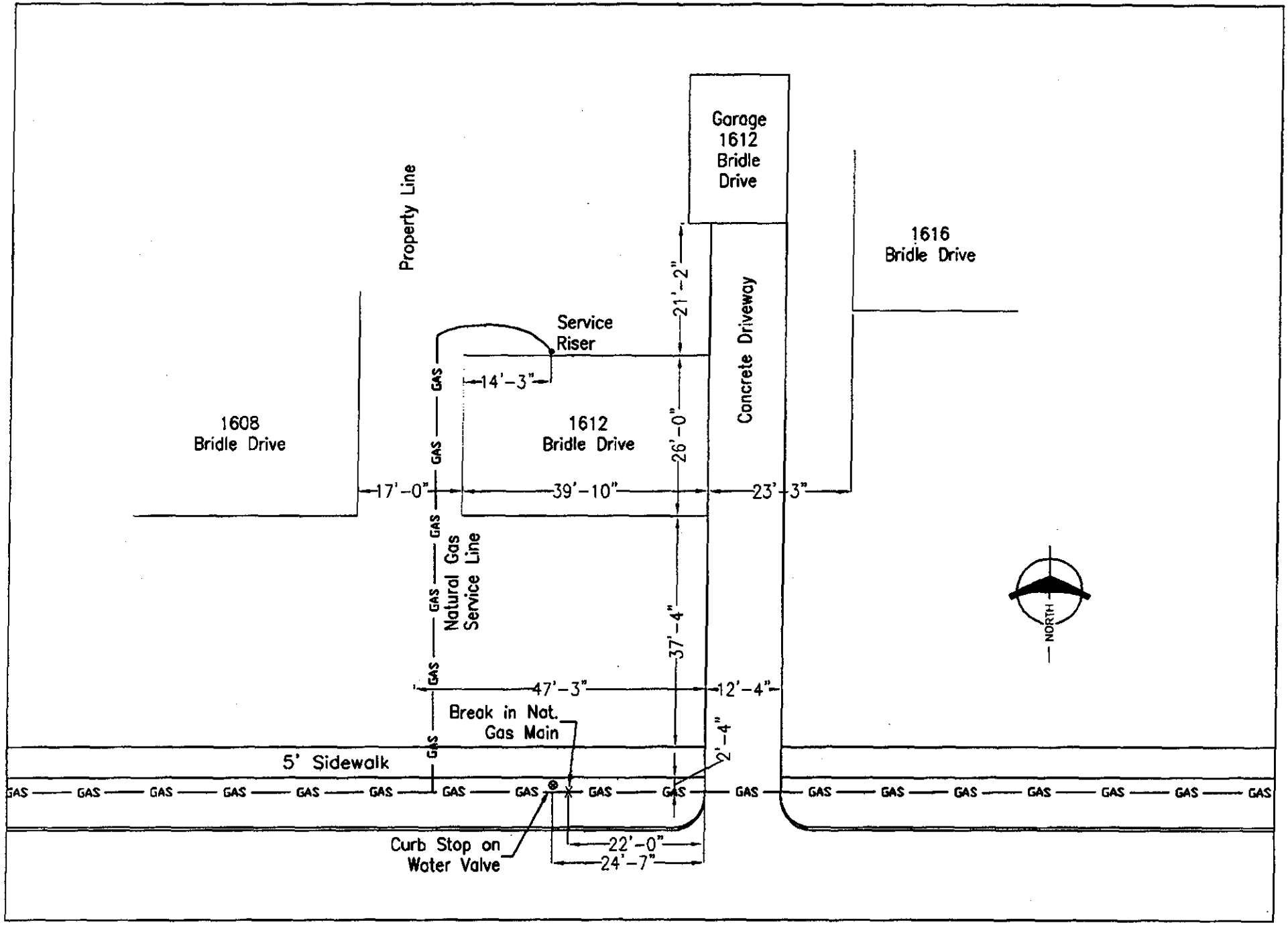
- Report number 20070060-1806 filed electronically was incomplete as Section D, Material Specifications Items 3-6, were not completed. If information is not available, N/A is to be entered as the response.

- A paper filed 7100.1 report with Section D completed was also filed with a copy to the South Dakota Pipeline Safety Office. That report was missing the signature date and title of the preparer.

Staff recommends that the Commission issue a Notice of Concern to the operator for issuing incomplete reports.

## Conclusion.

Although none of the pipeline safety violations sited above caused the March 8, 2007 incident they were discovered as a result of the incident. Clearly Staff is most concerned with the safety aspects and thus does not believe civil fines are necessary where the issue is a matter of internal record keeping. Staff feels strongly, however, that a dangerous environment did exist as a result of the delayed bar hole survey and therefore believes civil penalties are appropriate. Finally, it is unfortunate the operator did not believe it was important to scientifically determine the cause of the incident. As the system operator, Staff believes NorthWestern has an obligation to more precisely report the cause to its customers, investors and this Commission.


Garage
1612
Bridle
Drive
1616
Bridle Drive
Property Line
Service
Riser
21'-2"
Concrete Driveway
14'-3"
1608
Bridle Drive
1612
Bridle Drive
26'-0"
17'-0"
39'-10"
23'-3"
GAS
Natural Gas
Service Line
37'-4"
NORTH
47'-3"
12'-4"
Break in Nat.
Gas Main
2'-4"
5' Sidewalk
Curb Stop on
Water Valve
22'-0"
24'-7"

| Gas Standards Subject: Emergency<br>Emergency: General | | Date Effective<br>07/13/2004 | Standard Number<br>1500 |
|---|---|---|---|
| Supersedes<br>Standard: 1500 | Dated<br>07/01/2002 | Prepared By<br>M. Baruth | Approved<br>Committee |

## 1.0 Scope

The purpose of this standard is to describe the minimum requirements of Northwestern Energy's policies concerning general emergency procedures. These procedures are intended to comply with the minimum requirements as set by the Department of Transportation CFR 49 part 192.615, 192.616 and 192.617.

## 2.0 Statement of Policy Concerning Emergency Procedures

2.1 This Procedure has been prepared to provide company employees with guidelines in a gas emergency. ("Emergency" means a situation in which human life or property is in jeopardy and prompt summoning of aid is essential).

2.2 All Area Leadership and Operating Personnel are furnished a copy of these procedures, and shall utilize them as required. The Area Leadership shall require that an annual review of these procedures be conducted. Further review will be conducted with employees following an emergency to determine if these procedures are effective. Any corrections, deletions, amendments, or proposals to this manual should be submitted to the O&M Standards Committee by letter.

## 3.0 Receiving, Identifying and Classifying Notices of Events Which Require Immediate Response

3.1 The person taking the call shall obtain as much information as is readily available from the party calling. Questions that can be used to identify and classify the event are as follows:

3.1.1 What is your name?

3.1.2 What is your address (location)?

3.1.3 Note the time of call

3.1.4 About the event:

- How strong is the gas smell
- Do you hear gas blowing (hissing sound)?
- Are there any gas line breaks?
- Are your pilot lites out
- Is there any construction in the Area
- Fire
- Explosion

3.2 The person taking the call shall advise the caller to take the following actions when there is Gas Blowing, Strong Gas Smell, or Line Break.

3.2.1 Evacuate and clear the area.

3.2.2 Warn

- Don't use switches
- Don't light match
- Don't re-enter

3.3 Dispatch a technician to the location.

3.4 Notify Area Leadership if the information gathered about the event indicates an emergency.

3.5 Call Fire Department, Police or other appropriate official agencies, if required.

## 4.0 Response to Emergency Calls

4.1 Procedure for investigating reported leaks inside or near a building.

4.1.1 Gas leaks can vary from a pilot out on a range to a broken main or service. It is necessary to get enough information to determine if an emergency exists.

4.1.2 Persons responding to a leak call shall be equipped with at least a combustible gas indicator, leak detection solution, wrench for shutting off gas supply and an explosion proof flashlight and a fire extinguisher.

4.1.3 When a leak call is investigated, (either inside or outside leak), it shall first be determined if a hazard from combustible gas exists within the building or buildings.

a) Combustible gas indicator must be zero prior to entering the hazard area to ensure a clean atmosphere.

b) Sample the atmosphere with the combustible gas indicator in such areas as the top of the stairwell, ceiling of the basement or other confined areas.

c) If a combustion hazard exists evacuate the building.

d) Hotels, Auditoriums etc. may require additional help for evacuation.

e) Shut off the gas supply to building if readily accessible.

f) Check adjacent buildings for combustion hazard and evacuate, if necessary.

g) Call for assistance - company, fire department, and police, if necessary.

h) In some cases ventilation of the building is appropriate, in other cases once all the people are absent, the electric supply should be discontinued to reduce ignition sources before ventilation is attempted.

i) If no combustion hazard exists inside the building, check for combustible readings at the service entrance and continue out to the main and along the main in the immediate area; all sanitary and storm sewers should be checked in the immediate area.

j) If no combustion hazard is found, then the call will be treated as a routine investigation.

4.2 Fire and/or Explosion

4.2.1 In the many communities where NorthWestern Energy employees are members of the fire department, prompt company representation at the site is assured. If there is any indication that natural gas is involved, the Area Leadership should be promptly contacted.

4.2.2 In other communities Fire and Police officials shall be provided with appropriate telephone numbers for contacting NorthWestern Energy.

4.2.3 Nearby buildings shall be checked for combustible hazards, and evacuated if necessary.

4.2.4 Turn off service cock, if conditions permit, or cut service.

4.2.5 If a wide spread concentration is found, shut off appropriate emergency valves.

4.2.6 Begin repair procedures.

4.3 Natural Disaster

4.3.1 The complexity and variety of natural disasters prohibits the formulation of a procedure that will fit every circumstance. The evaluation of the disaster will determine what parts of this manual will be put into effect, for example:

a) Fire and explosion
b) Procedures for investigating gas leaks
c) Shut down of sections with emergency valves
d) Complete system shut down and re-lite.

4.3.2 NorthWestern Energy efforts must be coordinated with the appropriate Fire, Police or Civil Defense agencies.

4.4

4.4.1 All personnel normally taking customer service requests should have available a rubber stamp printed with the words "GAS LEAK" in capital letters approximately 3/8 inch high. This rubber stamp shall be stamped "GAS LEAK" across the top face of the Trouble Order, so that it is clearly visible to all personnel handling the Trouble Order.

4.4.2 Gas leakage control is always the first order of business, and two-way radio equipment or cellular telephones should be utilized to promptly dispatch qualified personnel to leak investigation. The person taking the leakage report is responsible for contacting personnel for leak investigation.

4.4.3 When a leakage report is received, the hour received should be carefully noted on the Trouble Order and the "Originated by", "Dispatched by", "Date" and "Hour - AM or PM" should be carefully noted by the person receiving the leakage report. The person or persons handling the investigation and repair of the leakage report should carefully complete "Completed by "," Date, Hour - AM or PM and a complete description of the investigation.

4.4.4 Leakage reports must always be promptly investigated, and leakage controlled as quickly and efficiently as humanly possible.

## 5.0 Guidelines for Handling Leak Calls

5.1 Listed on the following page are some guidelines for handling leak calls. Each Area should develop a similar list to review with the men and women who handle leak calls at each Area location.

5.2 The steps below make up our emergency plan in regards to handling gas leaks.

5.2.1 Prompt dispatching of leak tickets. Remember we never know how serious a leak may be and must get someone there as soon as possible. In the event the dispatcher uses the (any unit) call any employee regardless of whether he is in service department or construction department should answer this call.

5.2.2 Once on the scene, determine if an explosive mixture is present in or around the suspect building.

5.2.3 If an explosive mixture is present in the building, evacuate the building and shut off the gas supply to the building.

5.2.4 Take steps necessary to ventilate the building.

5.2.5 Check adjacent buildings and follow steps 3 and 4 as necessary.

5.2.6 Request additional help as needed.

5.2.7 Work with fire department, police, etc. to get the electricity shut off outside the building to remove possible sources of ignition.

5.2.8 Prior to any digging, all underground utilities will be located.

5.2.9 If high concentrations of gas are found outside the building, ventilate around the foundation by digging holes.

5.2.10 Pin point the leak, dig up, and repair, if possible, or shut the gas supply off upstream from the leak.

5.2.11 Consider the possibility of the gas getting into sewers, either sanitary or storm. Check available manholes to be sure.

5.2.12 Be sure that only one leak is involved. The CGI readings should drop fairly soon after the leak is vented. Continued high reading would indicate that further investigation is in order.

5.2.13 In the case of damage due to excavation, it is possible that other portions of the line may be leaking due to the damage. All parts of the system adjacent to the damage must be checked with leak detection instruments to insure there are no other leaks. This shall include checking for gas accumulations in nearby buildings. If necessary, steps shall be taken to promptly stop the flow of gas.

5.2.14 Acquaint appropriate o perating and maintenance employees with the procedures.

5.3 Special circumstances may arise about leak calls where the customer calls for example, on Wednesday but wants to wait until Friday to have someone come out.

The following should be done:

5.3.1 The only good solution is to convince the customer that leak calls must be handled promptly. Since the odor level does not necessarily indicate the danger level. Natural gas odor can be diluted by filtration through the soil when the actual leak is below ground.

5.3.2 If this fails, the customer will be advised the gas will be shut off until NorthWestern is able to investigate the leak. Create a service order to dispatch a technician to take a series of leak tests outside the house and also shut off the gas to the home.

5.3.3 Tag the customer's door to indicate that a possible gas leak was reported at this location. Since a complete check could not be performed the gas has been disconnected until a leak investigation can be completed. If a customer has multiple entrances to the home, all entrances should be tagged if the main entrance used by the customer is unclear, to ensure the tag is clearly identified by the customer.

5.3.4 Write a good record on the work ticket of the action taken.

5.3.5 Always make up a ticket on a leak or odor call, do not ask them to call back later.

| Gas Standards Subject: Emergency<br>Emergency: General | | Date Effective<br>07/13/2004 | Standard Number<br>1500 |
|---|---|---|---|
| Supersedes<br>Standard: 1500 | Dated<br>07/01/2002 | Prepared By<br>M. Baruth | Approved<br>Committee |

## 6.0 Establishing and Maintaining Communications With Appropriate Fire, Police Agencies, News Media and the Public

6.1 Communications with Fire, Police and Public Officials

6.1.1 Telephone

In Appendix C is a listing of telephone contacts for fire, police and other public official contacts specific to each community and county.

6.1.2 Meetings

6.1.2a On a bi-annual basis NorthWestern will offer to conduct informational meetings with appropriate fire, police and other public officials to:

- Learn the responsibility and resources of each government organization that may respond to a gas pipeline emergency.
- Acquaint the officials with the Company's ability to respond to a gas pipeline emergency.
- Identify the types of gas pipeline emergencies of which the Company notifies the officials.
- Discuss mutual assistance to minimize hazards to life and property.

6.1.2b Reference material such as videos, handouts, brochures, etc will be available for area use by contacting the DOT coordinator, communications or safety department.

6.1.2c Meetings with fire, police or other public officials will be documented and submitted to the DOT coordinator. A standard form is available in the Form tab to document the meetings.

6.2 Communications with News Media

The Area Leadership shall clear all statements, either written or verbal, that are made to the news media that reflect company policy or procedure.

6.3 Public Education (192.616)

6.3.1 Each operator shall establish a continuing educational program to enable customers, the public, appropriate government organizations and persons engaged in excavation related activities to recognize a gas pipeline emergency for the purpose of reporting it to the operator or to appropriate public officials.

6.3.2 The program and the media used must be as comprehensive as necessary to reach all areas in which the operator transports gas. The program must be conducted in English and in other languages commonly understood by a significant number and concentration of the non-English speaking population in the operator's area.

6.3.2.1 Significant number and concentration being defined by non-English speaking business signs being prominent in a operator's area, or

6.3.2.2 US Census population records indicate a concentration of non-English speaking population in the operator's area greater than the national average.

6.3.3 The general public located in the area of the gas system will be provided with brochures and/or phone stickers that indicate an emergency phone number to call if they smell natural gas.

## 7.0 Equipment, Tools and Material

7.1 In the event of an emergency, equipment, tools and material will be drawn from existing company resources or acquired as needed.

7.2 Emergency tools such as valve wrenches, stop-off equipment, plastic squeeze-off tools, etc. shall be readily available to qualified employees. A list of emergency tools for each area is located in Appendix C.

7.3 The Area Leadership shall be responsible for seeing that these tools are kept in their assigned location.

7.4 Help and/or equipment required from other than Area resources shall be acquired by the Area Leadership.

7.5 Other equipment such as various warning tags, flashlights, screwdrivers, vise-grips, and match holders, will be kept in token amounts at the Area Office. The major stockpile of these materials will be stored at Kearney, Nebraska, and Huron, South Dakota. Matches and flashlight batteries should be purchased locally as soon as possible after the "no gas" develops.

## 8.0 Protection of Life and Property

8.1 Follow the previously outlined procedures in protecting life first, then property.

8.2 If necessary, utilize emergency shut down valves to isolate an area in order to minimize damage to that area. Valve Sectionalizing maps can be accessed in the area office.

8.3 Prior to any digging, all underground utilities will be located.

8.4 If the leak cannot be promptly pinpointed, protect property by digging vent holes between the suspected leak area and adjacent buildings.

8.5 Repair the leak according to standard construction practices.

## 9.0 Investigation of Failures (192.617)

Any pipeline failure or accident damage shall be investigated as soon as possible according to O&M standard 1065.

| Gas Standards Subject: Emergency<br>Emergency: General | | Date Effective<br>07/13/2004 | Standard Number<br>1500 |
|---|---|---|---|
| Supersedes<br>Standard: 1500 | Dated<br>07/01/2002 | Prepared By<br>M. Baruth | Approved<br>Committee |

| Gas Standards Subject: General Investigation of Failures | | Date Effective 05/01/2006 | Standard Number 1065 |
|---|---|---|---|
| Supersedes 1065 | Dated 07/13/2004 | Prepared By B. Hitt | Approved Committee |

## 1.0 Scope

These procedures are intended to comply with the minimum requirements as set by the Department of Transportation 49 CFR part 192.617.

## 2.0 Investigation of Failures (192.617)

2.1 General

As soon as practical after the end of an emergency, if applicable, an investigation shall be conducted for analyzing accidents and failures. Data on all failures and accidental damage will be compiled using the guidance of O&M Standard 1015, continuing surveillance (192.613). The information for completing a DOT 30-day incident report form contained in Part 191 (O&M Standard 1060) may constitute an adequate analysis of a failure or accident. A detailed analysis, especially of repeated occurrences, should be made when the analysis could be useful in minimizing a recurrence of the failure.

2.2 Response to Incident

If a detailed analysis is to be made, rapid response is important for preserving the integrity of the specimens and gathering information.

2.3 Incident Data Collection

When a detailed analysis is to be made, a NorthWestern Energy representative at the scene of the incident will be designated to coordinate the investigation. That person's responsibilities may include the following:

2.3.1 Acting as a coordinator for all field investigation personnel.

2.3.2 Maintaining a log of the personnel, equipment, and witnesses.

2.3.3 Recording in chronological order the events as they take place.

2.3.4 Ensuring that photographs are taken of the incident and surrounding areas.

2.3.5 Ensuring the notification of all appropriate governmental authorities.

2.3.6 Ensuring the preservation of evidence. Samples removed for laboratory analysis should be stored in a secure location at the local office or service center.

2.4 Investigation

When a detailed analysis is to be made by a NorthWestern Energy representative. The investigation should include the following:

2.4.1 Determination of the probable cause of the incident.

2.4.2 Evaluation of the initial response to the incident.

2.4.3 The need for system improvements if necessary.

2.4.4 The need for improvements in response, management and investigation of incidents.

2.5 Specimens

Where appropriate, the investigation will include the selection of samples of the failed facility or equipment for laboratory examination for the purpose of determining the causes of the failure and minimizing the possibility of a recurrence. The material must be tagged, with a tag that contains all pertinent data, and preserved in a designated location until all incident investigations are completed.

2.5.1 Pipe, Weld, or Fusion Failure

A section of pipe that has a defect should be removed with a minimum of 12" of good pipe on each end.

2.5.2 Material Failure - Steel or Cast Iron Valves

An inoperable, cracked or broken flanged valve should be cut out of the the line with the flanges, bolts and gaskets intact if practicable. Welded valves that are found to be broken or inoperable should be removed with special attention paid to the amount of pipe movement when the line is cut. Photographs and measurements can be used to record the shifting of the pipe.

2.5.3 Equipment Failure

Where feasible, meter and regulator sets or other equipment should be removed as a unit without dismantling the piping and kept intact by cutting the piping on both the inlet and outlet of the meter set. If the service has been disconnected at the main or cut, pipe should be cut off up stream of the meter service valve so that the valve remains with the set.

2.5.4 Other Failures

Failures not specifically covered by the foregoing should be referred to Engineering Department for direction on selection of samples of failed facilities and/or equipment for laboratory analysis.

2.6 Testing and Analysis

2.6.1 Standard destructive and non-destructive techniques are the preferred means to examine test specimens. The testing methods used will be suited to the particular material being tested, and be pertinent to the failure investigation.

2.6.2 Analysis and date on failures will be compiled and reviewed. The need for continuing surveillance of pipeline facilities will be determined using the guidelines outlined in O&M Standard 1015.