



The Commonwealth of Massachusetts

DEPARTMENT OF PUBLIC UTILITIES

INCIDENT REPORT

1415 Osterville Road, West Barnstable, Massachusetts

Cape Cod Animal Hospital

March 9, 2009

PIPELINE ENGINEERING AND SAFETY DIVISION

Accident File

Location: West Barnstable, Massachusetts

Date of Accident: March 9, 2009

Gas Company: National Grid

Estimated Property Damage: \$350,000*

Injuries: 0

Report Issued: July 14, 2010

*Estimated by National Grid

Table of Contents

I.	Introduction.....	1
A.	Scope of this Investigation	1
B.	Overview of Incident.....	2
II.	The Department Investigation	3
A.	Description of the Site	3
B.	National Grid	4
1.	National Grid Response.....	4
2.	Odorization	4
3.	National Grid Facilities	5
4.	National Grid Leakage Surveys	5
5.	Other Facilities	6
C.	Department of State Police, Fire and Explosion Investigation Section.....	6
III.	Findings and Conclusions.....	7
A.	Findings	7
B.	Conclusions	8

I. INTRODUCTION

A. Scope of this Investigation

The Massachusetts Department of Public Utilities (“Department”), Pipeline Engineering and Safety Division (“Division”), pursuant to G.L. c. 164, § 105A and a Federal Certification Agreement as provided for in 49 U.S.C. § 60105, has investigated a natural gas (“gas”) release at 1415 Osterville Road, West Barnstable, that occurred on March 9, 2009 (“Incident”).¹

As part of the Department’s annual certification process by the United States Department of Transportation (“U.S. DOT”), the Department must report to the US DOT

each accident or incident . . . involving a fatality, personal injury requiring hospitalization, or property damage or loss of more than an amount the Secretary establishes...and any other accident the [Department] of the cause and circumstances surrounding the accident or incident.
49 U.S.C. § 60105(c).

The Department has established procedures for determining the nature and extent of violations of codes and regulations pertaining to safety of pipeline facilities and the transportation of gas, including but not limited to, 220 C.M.R. §§ 101.00 through 113.00. See 220 C.M.R. § 69.00 et seq. The Division also enforces the U.S. DOT safety standards

¹ Incident means any of the following events:

1. An event that involves a release of gas from a pipeline or liquefied natural gas or gas from an LNG facility and,
 - a. A death, or personal injury necessitating in-patient hospitalization; or
 - b. Estimated property damage, including cost of gas lost, of the operator or others, or both, of \$50,000 or more.
2. An event that results in an emergency shutdown of an LNG facility.
3. An event that is significant in the judgment of the operator, even though it did not meet the criteria of paragraphs (1) or (2). 49 C.F.R. Part 191, § 191.3.

for gas pipeline systems as set forth in 49 C.F.R. Part 192 (“Part 192”). G.L. c. 164, § 105A.

B. Overview of Incident

At approximately 8:04 p.m., on March 9, 2009, the Centerville Osterville Marstons Mills Fire Department received a report of an explosion and fire at the Cape Cod Animal Hospital, located at 1415 Osterville Road, West Barnstable (Exh. 1).

The operator of the natural gas system is Colonial Gas Company, d\l\l a National Grid Company (“National Grid” or “Operator”). At approximately 10:06 p.m., National Grid reported the Incident to the Division (Exh. 2).²

On March 10, 2009, the Department sent two investigators to the scene (Exh. 3). The Cape Cod Animal Hospital (“Animal Hospital”) had an apartment above, and was a wood frame structure with an asphalt shingle roof. The structure received substantial damage (Exh. 4). There were no injuries, but three cats and one dog died (Exh. 1).

Heat from an electrical failure in the underground electrical service line apparently melted the plastic gas service line.³ Gas was released into the Animal Hospital and was ignited by an undetermined source (Exh. 5).

² In a letter to all operators, the Director of the Division has requested that operators inform the Department of any incident promptly, but no more than two hours after the incident.

³ A distribution line transports gas from a common source of supply to an individual customer, or two adjacent or adjoining residential or small commercial customers, or to multiple residential or small commercial customers served through a meter header or manifold. A service line ends at the outlet of the meter or at the connection to a customer’ piping, whichever is further downstream, or at the connection to customer piping if there is not a meter.

II. THE DEPARTMENT INVESTIGATION

A. Description of the Site

The property at 1415 Osterville Road consists of a residential home close to the street (Exh. 3). Behind this home, and across a driveway, is the Animal Hospital, which has an apartment above (id.). The Animal Hospital consisted of offices, examination rooms and boarding facilities (id.). The building was two story wood frame construction, with an asphalt shingle roof and a partial basement (id.). It appears that there was a main building, with other buildings as wings, all were attached.

In 1972, the Operator installed a four inch coated steel gas main⁴ under Osterville Road (Exh. 6). The Animal Hospital property had two gas services (id.). One service was for the residential home, and the other service was for the Animal Hospital (id.). The Animal Hospital service was one inch plastic pipe installed in 1997 (Exh. 7). National Grid's equipment, meters, regulators and valves were located outside, at the front of the building.⁵ The distribution system was high pressure⁶ and on March 9, 2009, the system pressure was operating at approximately 54 psig (Exh. 8).⁷

⁴ A main is a distribution line that serves as a common source of supply for more than one service line. Part 192, § 192.3.

⁵ A service regulator is a valve which reduces the pressure in the service line from the pressure in the main to the pressure provided to the customer.

⁶ A high pressure system is where the pressure in the main is higher than the pressure provided to the customer. Part 192, § 192.3.

⁷ Pounds per square inch gauge refer to the pressure expressed in pounds exerted on one square inch of surface area. The designation "gauge," indicates the readings are already adjusted to ignore the surrounding atmospheric pressure, which is 14.7 psi at

The investigators from the Division were at the scene along with representatives of the West Barnstable Police and Fire Departments, National Grid, CNA (the homeowners insurance company), the State Fire Marshall, and his electrical consultant.

The Division investigators observed that the main portion of the building had been completely destroyed. The roof, the second and first floors had collapsed in the front left portion of the main building. Windows had been blown out and were approximately 75 feet from the building (Exh. 9). National Grid estimated the damage to be \$350,000 (Exh. 10).

B. National Grid

1. National Grid Response

On March 9, 2009, at 8:12 p.m., the West Barnstable Fire Department requested National Grid to assist with a working fire at 1415 Osterville Road (Exh. 2). The Operator dispatched a technician who arrived at the scene at 8:22 p.m. (id.). The on call supervisor was notified at 8:49 p.m. and arrived at the scene at 10:00 p.m. (Exh. 11). The area manager arrived on scene between 10:45 and 11:00 p.m. (id.). The Operator shut off the gas at approximately 9:30 p.m. (id.).

2. Odorization

The state regulation, 220 C.M.R. § 101.06(20), requires operators to odorize gas in their distribution systems. Gas must be “readily perceptible to the normal or average olfactory senses of a person coming from fresh uncontaminated air into a closed room containing 0.15 percent gas and air.” This regulation also requires operators to conduct periodic sampling of odorant concentrations throughout their system.

sea level. If psig gauge were not connected to any pressure source, it would read zero even though it is actually sensing 14.7 psi at sea level.

National Grid conducts odorant sampling throughout its system on a monthly basis. On March 10, 2009, the Operator conducted two odorant tests at two locations in West Barnstable (Exh. 12). The results (in percent gas and air) are as follows:

1. 1415 Osterville Road West Barnstable: Reading actual 0.09; 0.09; 0.10
2. 2160 Meetinghouse Way West Barnstable: Reading actual 0.07; 0.07; 0.06

The odor detection levels, which ranged from 0.06 percent to 0.10 percent gas in air, indicates that the odorant was within the limit prescribed by the state regulation. The odorant level also met the federal pipeline safety requirement, contained in Part 192, § 192.625, which requires that gas be odorized so that it can be detected at a level of one percent gas and air.

3. National Grid Facilities

National Grid installed a four inch coated steel main under Osterville Road in 1972 (Exh. 8). The main has a maximum allowable operating pressure of 60 psig (pounds per square inch gauge) and on March 9, 2009, the main was operating at 54 psig (id.). There were no reports of leaks in the street around this area within the past two years (id.).

The service to the front building was a $\frac{3}{4}$ inch plastic service installed in 1993 (Exh. 6). The service to the Animal Hospital was a one inch plastic service the Operator installed in December 1997 (id.). There were no leakage reports for either service for the past five years (Exh. 13).

4. National Grid Leakage Surveys

After the Incident, National Grid conducted a leak survey of the main under Osterville Road 1,000 feet in each direction of the incident location (Exh. 3). The Operator also leak surveyed the service to the front house (id.). Both surveys were negative (id.). The Operator

could not leak survey the service to the Animal Hospital because it was shut off at the curb valve near the street on March 9, 2009, the date of the Incident.

The Operator had previously conducted a leak survey of the gas main and services on September 22, 2008, and no leaks were discovered (Exh. 14).

5. Other Facilities

National Grid provided copies of the Town of Barnstable permit documents (Exh. 15). The permit documents state that the electric service to the Animal Hospital was replaced in 2005 (id.).

National Grid installed the gas service line to the Animal Hospital in 1997 (Exh.7). The Operator's Operation & Maintenance manual (O&M) states that normally, pipe shall have a minimum clearance of six inches from other underground facilities. (Exh. 16)

C. Department of State Police, Fire and Explosion Investigation Section

The Fire and Explosion Investigation Section of the State Fire Marshal's Office ("SFM") excavated where the Operator found the leakage (Exh. 17). The excavation revealed that a number of utilities entered the building in the same area (id.). The telecommunication conduits, the electrical service line, and the gas service line intersected in this area (Exh. 18). The telecommunication conduits, which were located above the electric line, were burned through on the bottom (id.). The gas service line, which was located in close proximity and below the electric line, was burnt through on the top (id.).

The SFM electrical consultant evaluated the electric service (Exh. 5). The consultant determined that an electrical failure in the electric service cables created excessive heat (id.). He also determined that the heat could have damaged the other conduits and the gas service

line (id.). The SFM stated that the explosion and fire was caused by melting of the gas service by the electrical service feed (Exh. 5). The natural gas subsequently ignited inside the building (id.). The SFM could not determine the cause of the ignition.

III. FINDINGS AND CONCLUSIONS

A. Findings

1. A four inch steel main was laid under Osterville Road, West Barnstable in 1972.
2. The operating pressure in the main on March 9, 2009 was approximately 54 psig.
3. A one inch plastic service line to the Animal Hospital at 1415 Osterville Road was installed in 1997.
4. National Grid responded to the report of a working fire and was at the scene at 8:22 p.m. on March 9, 2009.
5. National Grid's records indicate that the gas was odorized to meet the state and federal requirements.
6. Leakage surveys prior to and after the explosion were negative.
7. The electric service to the Animal Hospital at 1415 Osterville Road was replaced in 2005.
8. A portion of the electric line was buried above, and in close proximity to the gas service line.
9. An electrical failure in the electric line caused excessive heat.
10. The plastic gas service line near the failed electric service line was burnt.
11. The gas service line failed at the burnt point and released gas.
12. Gas most likely flowed into the building through the melted conduits or the basement window.
13. Gas accumulated in the building and was ignited by an unknown source in the building.

B. Conclusions

The SFM consultant's conclusion that the plastic gas service failed due to excessive heat is reasonable and based upon substantial and specific evidence. A likely source of the heat was an electrical failure in the electric service line. The excessive heat from this failure caused the melting of the plastic gas service and the telecommunication conduits. The gas most likely flowed into the building through the melted conduits, or a poorly sealed window, and was ignited by an unknown source in the building or the electric generator.