PIPELINE ENGINEERING AND SAFETY DIVISION

INCIDENT REPORT

47 Chestnut Street, Waltham, Massachusetts
January 15, 2010

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Boston Gas Company, Colonial Gas Company,
Essex Gas Company each d/b/a National Grid

Estimated Property Damage: Over $500,000*

Injuries: One person

Report Issued – April 20, 2012

* Estimated by National Grid

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I. INTRODUCTION

A. Scope of 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 47 Chestnut Street, Waltham on January 15, 2010 ("Incident").[1] The release of gas contributed to a fire and over $500,000 in property damage to the dwelling, as estimated by the operator of the natural gas facilities, Boston Gas Company, Essex Gas Company, and Colonial Gas Company each d/b/a National Grid ("National Grid" or "Operator") (Exh. 1, at 5). One person received medical attention due to the incident.

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 U.S. 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] considers

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[1] "Incident, "means any of the following events:
(1) An event that involves a release of gas from a pipeline, or of liquefied natural gas, liquefied petroleum gas, refrigerant gas, or gas from an LNG facility, and that results in one or more of the following consequences:
(i) A death, or personal injury necessitating in-patient hospitalization;
(ii) Estimated property damage of $50,000 or more, including loss to the operator and others, or both, but excluding cost of gas lost;
(iii) Unintentional estimated gas loss of three million cubic feet or more;
(2) An event that results in an emergency shutdown of an LNG facility. Activation of an emergency shutdown system for reasons other than an actual emergency does not constitute an incident.
(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) of this definition.

49 C.F.R. Part 191, § 191.3

> significant, and a summary of the investigation by the [Department] of the cause and circumstances surrounding the accident or incident.

49 U.S.C. § 60105(c).

The purpose of this report is to inform the U.S. DOT as to the cause and circumstances surrounding the Incident. 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 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

On January 15, 2010, at approximately 11:10 a.m., the Department received notice from National Grid of a house fire and evacuation of 20 persons at 47 Chestnut Street, Waltham (Exh. 2). The Department dispatched an investigator to the scene who arrived at approximately 12:40 p.m. (Exh. 3). The investigator reported to the Waltham Fire Department, and the Massachusetts State Police Fire and Explosion Investigation Officer, to provide assistance in the investigation of the Incident (id.).

The investigator met with the Operator's management personnel to review the conditions and the actions being taken as a result of the Incident (id.). National Grid personnel were in the process of isolating the gas service to four units that had been damaged by the fire, and restoring gas service to three units in the complex that had not sustained damage (id.).

Investigators from the Waltham Fire Department ("Waltham FD") and National Grid determined that the fire was caused by a National Grid technician not turning off the shut off valve on the gas service as he was changing the gas meter (Exhs. 2 and 4).

C. Description of the Site and Gas Facilities

Chestnut Street is located in a residential area of Waltham. The building at 47 Chestnut Street contains seven attached condominium units; each unit is three-stories tall (Exh. 5). At each unit, a garage and utility room are located on the first floor. Contained within the utility room are a gas-fired house heater and water heater (Exh. 5).

In 1916, the Operator installed a three-inch diametercast iron gas main under Chestnut Street, Waltham (Exh. 6).[2] Subsequently, the Operator replaced several segments of the cast iron gas main with plastic (id.). In 2003, the Operator installed a 45 foot section of three-inch diameter plastic pipe in the area of 47 Chestnut Street (id.).

In May, 2002, National Grid installed 1-¼ inch diameter plastic gas service lines[3] for each unit at 47 Chestnut Street (Exh. 6). The operating pressure of the gas main at the time of the Incident was 0.3 pounds per square inch gauge ("psig")(id.).[4] The Operator placed the gas

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2 "Main," means a distribution line that serves as a common source of supply for more than one service line.

3 "Service line," means a distribution line that transports gas from a common source of supply to an individual customer, to 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 customer meter or at the connection to a customer's piping, whichever is further downstream, or at the connection to customer piping if there is no meter. 49 C.F.R. Part 192, § 192.3.

4 "psig," refers 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

meters at the rear of each unit (id.). The gas services and shut off valves were located underneath stairs leading to decks of each unit. (Exhs. 3 and 5).

D. Description of the Incident Scene

On January 15, 2010, at approximately 9:01 a.m., the Waltham FD received notification of a fire at 47 Chestnut Street, Waltham (Exh. 4). Upon arrival, the Waltham FD found that fire and smoke was enveloping the building in the area of unit six, and that the fire was lapping up the side from ground level and entering the attic (id.). Fire around the meter area at unit six was allowed to burn until National Grid shut off the gas (Exhs. 3 and 4). The Waltham FD reported that the National Grid meter service technician at the Incident went to the hospital prior to the fire department arrival (Exh. 4).

E. The National Grid Meter Service Technician

1. Actions at the Scene of the Incident

On January 15, 2010, National Grid assigned a technician work orders to change gas meters at units six and seven of 47 Chestnut Street (Exhs. 3 and 4).[5] On this date the technician began by changing the gas meter to unit six (Exhs. 3 and 4). The technician stated to the Division investigator that he found that the shut off valve was partially blocked by the stairs for the deck (Exhs. 3, 4 and 5). National Grid reported that the stairs were added after

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the surrounding atmospheric pressure, which is 14.7 psi at 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.

5 "Gas meter," means a device used to measures the transfer of gas from an operator to a consumer.

the meter was set (Exh. 2). The technician did not turn off the shut off valve, before he removed the old gas meter (Exhs. 2, 3 and 4).

The house heater at unit six is of a direct vent design (Exhs 3, 4 and 5).[6] Two house heater vents terminate outside the building - one vent is for combustion air intake, and the other is an exhaust vent. (Exhs. 3, 4 and 5). The combustion air intake and exhaust vents were approximately 33 inches away from the meter set assembly. (Exhs. 3, 4 and 5).

As the technician was installing the new gas meter, he reported that he heard a "pop," saw a "flame," then fire around the gas meter and deck stairs (Exhs. 3 and 4). The Waltham FD determined that the home furnace combustion air intake sucked in the gas escaping from the open gas line (Exh. 4). The Waltham FD also determined that the heating system was the source of the ignition (id.). The technician stated that he ran to the front of the building, evacuated the residents that were home, and called the fire department for assistance (Exhs. 3 and 4).

2. Training, Qualification and Relevant Procedures

National Grid hired the employee as a Leak Survey Technician on July 24, 2006, and he held the position until he resigned on August 25, 2007 (Exh. 7). On April 28, 2008, the Operator rehired him as a Leak Survey Technician (id.). The technician performed leak survey work relative to walking surveys, mobile patrol and pinpointing of gas leaks (id.). On April 20, 2009, the Operator promoted the technician to a Meter Service Technician C (id.).

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6 "Direct vent heater, "- means a heating unit that uses outside air to support combustion when a flue or chimney is not available, or cannot be used.

National Grid provided the technician training that covered multiple tasks (Exh. 8). The training courses the technician attended that are relevant to this Incident cover: (1) the basics of piping and valves; (2) meter work procedures; and (3) leaks (id.). The training requirements specify that the technician turn off the gas at the meter fit or inside shut off valve when changing a gas meter (id.).

National Grid provided NGA Operator Qualification records for the Service Technician (Exh. 9). The technician was qualified to perform his duties as a meter service technician (id.). Following the Incident, the Operator had the technician tested for drugs and alcohol (Exh 10). The technician tested negative (id.).

The Operator provided the Division relevant company procedures for each task the National Grid employee was expected to perform. One procedure is - CUST-5250: Changing Gas Meters, another is CUST-5240: Meter Turn-On/Turn Off procedures and a third is CUST-5165: New Meter/Regulator Installation - Setup and Inspection (Exh. 11).

CUST-5250 specifies the documentation technicians must complete to change a meter, and does not specify the required steps technicians must take when performing a meter change (id.). The other procedures, CUST 5240 and CUST 5165 specifically require the technician to shut off the riser valves prior to changing new gas meters.

F. Records of Odorization

In accordance with 220 C.M.R. § 101.06(20), an operator must odorize the gas in its distribution system of sufficient intensity so that the gas is 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 in air. An operator must also conduct periodic sampling of the gas to assure the proper concentration of odorant throughout its system.

On January 22, 2010, National Grid personnel performed odorant measurements at two separate locations in Waltham (Exh. 12). Both Threshold and Distinct Odor Level testing demonstrated that the odorant levels met state odorization requirements (id.).

II. FINDINGS AND CONCLUSIONS

A. Findings

1. The building at 47 Chestnut Street, Waltham contains seven attached condominium units.
2. In May 2002, the Operator installed 1-¼ inch diameter plastic gas services to supply the units at 47 Chestnut Street, Waltham.
3. On January 15, 2010, a National Grid meter service technician was assigned work orders to change gas meters to units six and seven at 47 Chestnut Street, Waltham.
4. The meter service technician was trained and qualified to change gas meters.
5. The post incident drug and alcohol test results for the meter service technician were negative, and were based upon accepted standards.
6. National Grid training requires that a meter service technician turn off the shut off valve before removing the gas meter.
7. The technician did not turn off the shut off valve to the meter for unit six before he began to remove the gas meter.
8. Combustion air intake and exhaust vents for the unit six house heater were approximately 33 inches away from the meter set assembly.
9. The technician removed the gas meter to unit six while the shut off valve was in the open position.
10. While the technician was installing the new meter, gas was escaping into the atmosphere.

11. The Waltham FD report that the home furnace combustion air intake sucked in the gas escaping from the open gas line, and caused the ignition, is reasonable, and supported by substantial evidence.

B. Conclusions

The cause of the release of gas was human error. National Grid adequately trained and qualified the meter service technician. The meter service technician did not follow his training when he did not shut off the gas service valve before he removed the gas meter. It is reasonable to conclude that the escaping gas was sucked in by the house heater combustion air intake which was located less than three feet away from the meter set, and that the ignition source for the gas was the house heater turning on.

III. OPERATOR CORRECTIVE ACTIONS

The Department concluded an enforcement action with the Operator regarding this Incident. Boston Gas Company, Essex Gas Company, and Colonial Gas Company each d/b/a National Grid, D.P.U. 10-PL-13. National Grid agreed to review amend relevant portions of its operating and maintenance procedures to ensure that technicians are informed of all the specific steps required to perform a meter change.

The Operator followed its procedures for analyzing accidents and failures for the purpose of determining the causes of the failure, and minimizing the possibility of a recurrence of this incident (Exh.2). The Operator established an action plan that recommended a number of changes (id.).

The Operator checked the rest of the units at 47 Chestnut Street to ensure accessibility to the meter service shut off valves (id.). The Operator communicated details of its findings on this Incident to all of its employees, and reminded them to follow procedures, and to call

their supervisors when field conditions arise (id.). National Grid discussed the Incident with the local building inspector to discuss ways to prevent structures from interfering with gas facilities (id.). The Operator is reviewing its training and testing requirements to focus on incidents that have occurred due to making the wrong decision or not following procedures (id.).