PIPELINE ENGINEERING AND SAFETY DIVISION

INCIDENT REPORT

47 Chestnut Street, Waltham, Massachusetts
January 15, 2010

PIPELINE ENGINEERING AND SAFETY DIVISION

47 Chestnut Street, Waltham, Massachusetts

January 15, 2010

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.).

Exhibit 1

National Grid Incident Report to the U.S. D.O.T.

nationalgrid

Christopher Aronson
Senior Counsel

Via Facsimile 202-366-4566
Confirmatory Copy by U.S. Mail

February 12, 2010

DOT/PHMSA Office of Pipeline Safety
Information Resource Manager
1200 New Jersey Avenue., SE
East Building 2nd Floor (PHP-10),
Room E22-321
Washington, DC 20590

Re: 47 Chestnut Street, Waltham, Massachusetts

Dear Information Resource Manager:

Enclosed please find Incident Report-Gas Distribution System regarding the above-captioned matter.

Very truly yours,

Christopher S. Aronson

CSA
Enclosure

40 Sylvan Road, Waltham, MA 02451
T: 781-907-1854 ■ F: 781-907-5701 ■ christopher.aronson@us.ngrid.com

NOTICE: This report is required by 49 CFR Part 191. Failure to report can result in a civil penalty not to exceed $100,000 for each violation for each day that such violation persists except that the maximum civil penalty shall not exceed $1,000,000 as provided in 49 USC 60122.

OMB NO: 2137-0522
EXPIRATION DATE: 01/31/2013

U.S. Department of Transportation
Pipeline and Hazardous Materials Safety Administration

INCIDENT REPORT – GAS DISTRIBUTION SYSTEM

Report Date
No.
(DOT Use Only)

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2137-0522. Public reporting for this collection of information is estimated to be approximately 10 hours per response, including the time for reviewing instructions, gathering the data needed, and completing and reviewing the collection of information. All responses to this collection of information are mandatory. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: Information Collection Clearance Officer, PHMSA, Office of Pipeline Safety (PHP-30) 1200 New Jersey Avenue, SE, Washington, D.C. 20590.

INSTRUCTIONS

Important: Please read the separate instructions for completing this form before you begin. They clarify the information requested and provide specific examples. If you do not have a copy of the instructions, you can obtain one from the PHMSA Pipeline Safety Community Web Page at http://www.phmsa.dot.gov/pipeline

PART A – KEY REPORT INFORMATION

**"Report Type: *(select all that apply)* X Original ❑ Supplemental ❑ Final

"1. Operator's OPS-issued Operator Identification Number (OPID): 1 6 4 0

"2. Name of Operator: Boston Gas Company

"3. Address of Operator:

3.a 40 Sylvan Road
(Street Address)

3.b Waltham
(City)

3.c State: MA

3.d Zip Code: 02454

"4. Local time *(24-hr clock)* and date of the Incident:
Hour: 09:06 Month: 01 Day: 15 Year: 2010

"5. Location of Incident:

5.a 47 Chestnut Street
(Street Address or location description)

5.b Waltham
(City)

5.c Middlesex
(County or Parish)

5.d State: MA

5.e Zip Code: 02451

5.f Latitude:

Longitude: -

"6. National Response Center Report Number :
09/28/68/8/8

"7. Local time *(24-hr clock)* and date of initial telephonic report to the National Response Center:
Hour: 14:00 Month: 01 Day: 15 Year: 2010

"8. Incident resulted from:

- X Unintentional release of gas
- ❑ Intentional release of gas
- ❑ Reasons other than release of gas

"9. Gas released :

- X Natural Gas
- ❑ Propane Gas
- ❑ Other Gas E:> Name:

"10. Estimated volume of gas released: / / / Thousand Cubic Feet (

**11. Were there fatalities? ○ Yes X No If Yes, specify the number in each category:		**12. Were there injuries requiring inpatient hospitalization? ○ Yes X○ No If Yes, specify the number in each category:	
11.a Operator employees	/ / / / /	12.a Operator employees	/ / / / 0/
11.b Contractor employees working for the Operator	/ / / / /	12.b Contractor employees working for the Operator	/ / / / 0/
11.c Non-Operator emergency responders	/ / / / /	12.c Non-Operator emergency responders	/ / / / 0 /
11.d Workers working on the right-of-way, but NOT associated with this Operator	/ / / / /	12.d Workers working on the right-of-way, but NOT associated with this Operator	/ / / / 0/
11.e General public	/ / / / /	12.e General public	/ / / / 0/
11.f Total fatalities (sum of above)	/ / / / 0/	12.f Total injuries (sum of above)	/ / / / 0/

**13. Was the pipeline/facility shut down due to the incident?

○ Yes X○ No ○ Explain: _____

If Yes, complete Questions 13.a and 13.b: *(use local time, 24-hr clock)*

13.a Local time and date of shutdown / / / / / (Hour) / / / (Month) / / / (Day) / / / (Year)

13.b Local time pipeline/facility restarted / / / / / (Hour) / / / (Month) / / / (Day) / / / (Year) ○ Still shut down* *(*Supplemental Report required)*

**14. Did the gas ignite? X Yes ○ No

**15. Did the gas explode? ○ Yes X No

16. Number of general public evacuated: / / /,/ / 2/ 0/

17. Time sequence *(use local time, 24-hour clock)*:

17.a Local time operator identified Incident /0/ 9/ /06 / (Hour) / 0/ 1/ (Month) / 1/5/ (Day) 2/0/1 /0 (Year)

17.b Local time operator resources arrived on site / 0/ 9/ 0 6/ / / 0/ 1/ (Hour) / 1/ 5/2/ (Month) 0/ 1/0 (Day/Year)

PART B – ADDITIONAL LOCATION INFORMATION

1. Was the Incident on Federal land? ○ Yes X No

*2. Location of Incident: *(select only one)*

- ☐ Operator-controlled property
- ☐ Public property
- X Private property
- ☐ Utility Right-of-Way / Easement

**3. Area of Incident: *(select only one)*

- ☐ Underground Specify: ○ Under soil ○ Under a building ○ Under pavement
  ○ Exposed due to excavation ○ In underground enclosed space (e.g., vault)
  ○ Other _____
  Depth-of-Cover (in): /__/,/__/__/__/__/
- X Aboveground Specify: X Typical aboveground facility piping or appurtenance (e.g. valve or regulator station, outdoor meter set)
  ○ Overhead crossing
  ○ In or spanning an open ditch ○ Inside a building
  ○ In other enclosed space ○ Other _____
- ☐ Transition Area Specify: ○ Soil/air interface ○ Wall sleeve ○ Pipe support or other close contact area
  ○ Other

**4. Did Incident occur in a crossing? ○ Yes X No

If Yes, specify type below:

- ☐ Bridge crossing ▷ Specify: ○ Cased ○ Uncased
- ☐ Railroad crossing ▷ *(Select all that apply)* ○ Cased ○ Uncased ○ Bored/drilled
- ☐ Road crossing ▷ *(Select all that apply)* ○ Cased ○ Uncased ○ Bored/drilled
- ☐ Water crossing ▷ *(Select all that apply)* ○ Cased ○ Uncased ○ Bored/drilled

Name of body of water (If commonly known): _____

Approx. water depth (ft): /__/,/__/__/__/

PART C – ADDITIONAL FACILITY INFORMATION

**1. Indicate the type of pipeline system:

X Natural Gas Distribution, privately owned

☐ Natural Gas Distribution, municipally owned

☐ Petroleum Gas Distribution

☐ Other – Specify: _____

**2. Part of system involved in Incident: *(select only one)* ○ Main ○ Service ○ Service Riser X Outside Meter/Regulator set ☐ Inside Meter/Regulator set ○ Farm Tap Meter/Regulator set ☐ District Regulator/Metering Station ○ Valve ☐ Other

2.a. Year "Part of system involved in Incident" was installed: /2/0/0/2/ or ○ Unknown

3. When "Main" or "Service" is selected as the "Part of system involved in Incident" (from PART C, Question 2), provide the following:

3.a Nominal diameter of pipe (in): / / / / / / / /

3.b Pipe specification (e.g., API 5L, ASTM D2513): _____

3.c Pipe manufacturer: _____ or ○ Unknown

3.d Year of manufacture: / / / / / or ○ Unknown

4. Material involved in Incident: ○ Steel ○ Cast/Wrought Iron ○ Ductile Iron ○ Copper ○ Plastic ○ Unknown

☐ _____ Other ○ Specify:

4.a. If Steel – Specify seam type: _____ or ○ None or ○ Unknown

4.b. If Steel – Specify wall thickness *(inches)*: / /./ / / / or ○ Unknown

4.c. If Plastic – Specify type: ○ Polyvinyl Chloride (PVC) ○ Polyethylene (PE) ○ Cross-linked Polyethylene (PEX) ○ Polybutylene (PB) ○ Polypropylene (PP) ○ Acrylonitrile Butadiene Styrene (ABS) ○ Polyamide (PA) ○ Cellulose Acetate Butyrate (CAB) ○ Other _____ ○ Unknown

4.d. If Plastic – Specify Standard Dimension Ratio (SDR): / / / / / or wall thickness: / /./ / / / or ○ Unknown

4.e. If Polyethylene (PE) is selected as the type of plastic in PART C, Question 4.c – Specify PE Pipe Material Designation Code (i.e., 2406, 3408, etc.) PE / / / / / or ○ Unknown

5. Type of release involved: *(select only one)*

☐ Mechanical Puncture ▷ Approx. size: /__/__/__/__/./__/in. (axial) by /__/__/__/__/./__/in. (circumferential)

☐ Leak ▷ Select Type: ○ Pinhole ○ Crack ○ Connection Failure ○ Seal or Packing X Other

☐ Rupture ▷ Select Orientation: ○ Circumferential ○ Longitudinal_____ ○ Other _____

Approx. size: /__/__/__/__/./__/ in. (widest opening) by / / / / /./__/in. (length circumferentially or axially)

☐ Other ▷ Describe: *Meter technician was in process of performing meter change when flash fire occurred.*

PART D – ADDITIONAL CONSEQUENCE INFORMATION

**1. Class Location of Incident: *(select only one)*

- ☐ Class 1 Location
- ☐ Class 2 Location
- X Class 3 Location
- ☐ Class 4

**2. Estimated cost to Operator :

2.a Estimated cost of public and non-Operator private property damage paid/reimbursed by the Operator	$500,000
2.b Estimated cost of gas released	
2.c Estimated cost of Operator's property damage & repairs	
2.d Estimated cost of Operator's emergency response	
2.e Estimated other costs Describe:	
2.f Estimated total costs (sum of above)	$500,000

3. Estimated number of customers out of service:

- 3.a Commercial entities
- 3.b Industrial entities
- 3.c Residences

PART E – ADDITIONAL OPERATING INFORMATION

**1. Estimated pressure at the point and time of the Incident (psig): /.13 13 9 12

**2. Normal operating pressure at the point and time of the Incident (psig): / / 10 .5 /

*3. Maximum Allowable Operating Pressure (MAOP) at the point and time of the Incident (psig): / / 0/. /5 /

**4. Describe the pressure on the system relating to the Incident: *(select only one)*

X Pressure did not exceed MAOP

☐ Pressure exceeded MAOP, but did not exceed 110% of MAOP

☐ Pressure exceeded 110% of MAOP

5. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the Incident?

☐ No

X Yes ▷ 5.a Was it operating at the time of the Incident? X Yes ○ No

5.b Was it fully functional at the time of the Incident? X Yes ○ No

5.c Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume or pack calculations) assist with the detection of the Incident? ○ Yes X No

5.d Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Incident? ○ Yes X No

6. How was the Incident initially identified for the Operator? *(select only one)*

☐ SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume or pack calculations)

☐ Static Shut-in Test or Other Pressure or Leak Test

☐ Controller

☐ Air Patrol

☐ Notification from Public

☐ Notification from Third Party that caused the Incident

X Local Operating Personnel, including contractors

○ Ground Patrol by Operator or its contractor

○ Notification from Emergency Responder

○ Other _____

6.a If 'Controller', 'Local Operating Personnel, including contractors', 'Air Patrol', or 'Ground Patrol by Operator or its contractor' is selected in Question 6, specify the following: *(select only one)*

X Operator employee ○ Contractor working for the Operator

Was an investigation initiated into whether or not the controller(s) or control room issues were the cause of or a contributing factor to the Incident? *(select only one)*

☐ Yes, but the investigation of the control room and/or controller actions has not yet been completed by the operator *(Supplemental Report required)*

☐ No, the facility was not monitored by a controller(s) at the time of the Incident

X No, the operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: *(provide an explanation for why the operator did not investigate)* *Meter technician was in process of performing meter change when flash fire occurred.*

☐ Yes, Specify investigation result(s): *(select all that apply)*

○ Investigation reviewed work schedule rotations, continuous hours of service (while working for the Operator) and other factors associated with fatigue

○ Investigation did NOT review work schedule rotations, continuous hours of service (while working for the Operator) and other factors associated with fatigue *(provide an explanation for why not)*

○ Investigation identified no control room issues

○ Investigation identified no controller issues

○ Investigation identified incorrect controller action or controller error

○ Investigation identified that fatigue may have affected the controller(s) involved or impacted the involved controller(s) response

○ Investigation identified incorrect procedures

○ Investigation identified incorrect control room equipment operation

○ Investigation identified maintenance activities that affected control room operations, procedures, and/or controller response

○ Investigation identified areas other than those above ▷ Describe: _____

PART F – DRUG & ALCOHOL TESTING INFORMATION

**1. As a result of this Incident, were any Operator employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?

O No

X Yes b 1.a Specify how many were tested: / / 1/

1.b Specify how many failed: / / 0/

**2. As a result of this Incident, were any Operator contractor employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?

X No

O Yes b 2.a Specify how many were tested: / / /

2.b Specify how many failed: / / /

PART G – APPARENT CAUSE	*Select only one box from PART G in the shaded column on the left representing the APPARENT Cause of the Incident, and answer the questions on the right. Describe secondary, contributing, or root causes of the Incident in the narrative (PART H).*
G1 – Corrosion Failure – **only one **sub-cause** can be picked from shaded left-hand column	
◦ **External Corrosion**	**1. Results of visual examination: ◦ Localized Pitting ◦ General Corrosion ◦ Other
	2. Type of corrosion: *(select all that apply)* ◦ Galvanic ◦ Atmospheric ◦ Stray Current ◦ Microbiological ◦ Selective Seam ◦ Other
	3. The type(s) of corrosion selected in Question 2 is based on the following: *(select all that apply)* ◦ Field examination ◦ Determined by metallurgical analysis ◦ Other
	**4. Was the failed item buried under the ground? ◦ Yes ◦ 4.a Was failed item considered to be under cathodic protection at the time of the incident? ◦ Yes ◦ Year protection started: / / / / /
	◦ No 4.b Was shielding, tenting, or disbonding of coating evident at the point of the incident? ◦ Yes ◦ No 4.c Has one or more Cathodic Protection Survey been conducted at the point of the incident? ◦ Yes, CP Annual Survey ◦ Most recent year conducted: / / / / /
	◦ Yes, Close Interval Survey ◦ Most recent year conducted: / / / / /
	◦ Yes, Other CP Survey ◦ Most recent year conducted: / / / / /
	◦ No ◦ No ◦ 4.d Was the failed item externally coated or painted? ◦ Yes ◦ No
	5. Was there observable damage to the coating or paint in the vicinity of the corrosion? ◦ Yes ◦ No
	6. Pipeline coating type, if steel pipe is involved: *(select only one)* ◦ Fusion Bonded Epoxy ◦ Coal Tar ◦ Asphalt ◦ Polyolefin ◦ Extruded Polyethylene ◦ Field Applied Epoxy ◦ Cold Applied Tape ◦ Paint ◦ Composite ◦ None ◦ Other
	◦ Unknown

☐ **Internal Corrosion**	**7. Results of visual examination: ○ Localized Pitting ○ General Corrosion ○ Not cut open ○ Other
	8. Cause of corrosion: *(select all that apply)* ○ Corrosive Commodity ○ Water drop-out/Acid ○ Microbiological ○ Erosion ○ Other
	9. The cause(s) of corrosion selected in Question 8 is based on the following; *(select all that apply)* ○ Field examination ○ Determined by metallurgical analysis ○ Other
	10. Location of corrosion: *(select all that apply)* ○ Low point in pipe ○ Elbow ○ Drop-out ○ Other
	**11. Was the gas/fluid treated with corrosion inhibitors or biocides? ○ Yes ○ No 12. Were any liquids found in the distribution system where the Incident occurred? ○ Yes ○ No

Complete the following if any Corrosion Failure sub-cause is selected AND the "Part of system involved in Incident" (from PART Question 2) is Main, Service, or Service Riser.

**13. Date of the most recent Leak Survey conducted: C, / / / / / / / / /
Month Day Year

**14. Has one or more pressure test been conducted since original construction at the point of the Incident?
/ / / / Test pressure (psig): / / / / / /
○ No

G2 – Natural Force Damage – **only one **sub-cause** can be picked from shaded left-handed column

☐ **Earth Movement, NOT due to Heavy Rains/Floods**	**1. Specify: ○ Earthquake ○ Subsidence ○ Landslide ○ Other
☐ **Heavy Rains/Floods**	2. Specify: ○ Washouts/Scouring ○ Flotation ○ Mudslide ○ Other
☐ **Lightning**	3. Specify: ○ Direct hit ○ Secondary impact such as resulting nearby fires
☐ **Temperature**	**4. Specify: ○ Thermal Stress ○ Frost Heave ○ Frozen Components ○ Other
☐ **High Winds**	
☐ **Other Natural Force Damage**	**5. Describe:

Complete the following if any Natural Force Damage sub-cause is selected.

**6. Were the natural forces causing the Incident generated in conjunction with an extreme weather event? ○ Yes ○ No

6.a. If Yes, specify: *(select all that apply)* ○ Hurricane ○ Tropical Storm ○ Tornado
○ Other

G3 – Excavation Damage – ""only one sub-cause can be picked from shaded left-hand column

☐ **Excavation Damage by Operator (First Party)**	
☐ **Excavation Damage by Operator's Contractor (Second Party)**	
☐ **Excavation Damage by Third Party**	
☐ **Previous Damage due to Excavation Activity**	**Complete the following ONLY IF the "Part of system involved in Incident" (from PART C, Question 2) is Main, Service, or Service Riser.** ""1. Date of the most recent Leak Survey conducted: / / / / / / / / / / Month Day Year ""2. Has one or more pressure test been conducted since original construction at the point of the Incident? ○ Yes ○ Most recent year tested: / / / / / Test pressure (psig): / / / / / / ○ No

Complete the following if Excavation Damage by Third Party is selected.

""3. Did the operator get prior notification of the excavation activity? ○ Yes ○ No

3.a If Yes, Notification received from: *(select all that apply)* ○ One-Call System ○ Excavator ○ Contractor ○ Landowner

Complete the following mandatory CGA-DIRT Program questions if any Excavation Damage sub-cause is selected.

""4. Do you want PHMSA to upload the following information to CGA-DIRT (www.cga-dirt.com)? ○ Yes ○ No

""5. Right-of-Way where event occurred: *(select all that apply)*

- ☐ Public ○ Specify: ○ City Street ○ State Highway ○ County Road ○ Interstate Highway ○ Other
- ☐ Private ○ Specify: ○ Private Landowner ○ Private Business ○ Private Easement
- ☐ Pipeline Property/Easement
- ☐ Power/Transmission Line
- ☐ Railroad
- ☐ Dedicated Public Utility Easement
- ☐ Federal Land
- ☐ Data not collected
- ☐ Unknown/Other

""6. Type of excavator: *(select only one)*

○ Contractor ○ County ○ Developer ○ Farmer ○ Municipality ○ Occupant
○ Railroad ○ State ○ Utility ○ Data not collected ○ Unknown/Other

""7. Type of excavation equipment: *(select only one)*

○ Auger ○ Backhoe/Trackhoe ○ Boring ○ Drilling ○ Directional Drilling
○ Explosives ○ Farm Equipment ○ Grader/Scraper ○ Hand Tools ○ Milling Equipment
○ Probing Device ○ Trencher ○ Vacuum Equipment ○ Data not collected ○ Unknown/Other

""8. Type of work performed: *(select only one)*

○ Agriculture ○ Cable TV ○ Curb/Sidewalk ○ Building Construction ○ Building Demolition
○ Drainage ○ Driveway ○ Electric ○ Engineering/Surveying ○ Fencing
○ Grading ○ Irrigation ○ Landscaping ○ Liquid Pipeline ○ Milling
○ Natural Gas ○ Pole ○ Public Transit Authority ○ Railroad Maintenance ○ Road Work
○ Sewer (Sanitary/Storm) ○ Site Development ○ Steam ○ Storm Drain/Culvert ○ Street Light
○ Telecommunications ○ Traffic Signal ○ Traffic Sign ○ Water ○ Waterway Improvement
○ Data not collected ○ Unknown/Other

(This CGA-DIRT section continued on next page with Question 9.)

""9. Was the One-Call Center notified? ◦ Yes ◦ No

9.a If Yes, specify ticket number: /////////////////////

9.b If this is a State where more than a single One-Call Center exists, list the name of the One-Call Center notified:

_____

""10. Type of Locator: ◦ Utility Owner ◦ Contractor Locator ◦ Data not collected ◦ Unknown/Other

""11. Were facility locate marks visible in the area of excavation? ◦ No ◦ Yes ◦ Data not collected ◦ Unknown/Other

12. Were facilities marked correctly? ◦ No ◦ Yes ◦ Data not collected ◦ Unknown/Other

""13. Did the damage cause an interruption in service? ◦ No ◦ Yes ◦ Data not collected ◦ Unknown/Other

13.a If Yes, specify duration of the interruption: /___/___/___/___/ hours

14. Description of the CGA-DIRT Root Cause *(select only the one predominant first level CGA-DIRT Root Cause and then, where available as a choice, the one predominant second level CGA-DIRT Root Cause as well)*:

☐ One-Call Notification Practices Not Sufficient: *(select only one)*

- ◦ No notification made to the One-Call Center
- ◦ Notification to One-Call Center made, but not sufficient
- ◦ Wrong information provided

☐ Locating Practices Not Sufficient: *(select only one)*

- ◦ Facility could not be found/located
- ◦ Facility marking or location not sufficient ◦ Facility was not located or marked
- ◦ Incorrect facility records/maps

☐ Excavation Practices Not Sufficient: *(select only one)*

- ◦ Excavation practices not sufficient (other)
- ◦ Failure to maintain clearance
- ◦ Failure to maintain the marks
- ◦ Failure to support exposed facilities
- ◦ Failure to use hand tools where required
- ◦ Failure to verify location by test-hole (pot-holing)
- ◦ Improper backfilling

_____

☐ One-Call Notification Center Error

☐ Abandoned Facility

☐ Deteriorated Facility

☐ Previous Damage

☐ Data Not Collected

☐ Other / None of the Above *(explain)* _____

_____

_____

G4 – Other Outside Force Damage – **only one sub-cause can be selected from the shaded left-hand column

☐ Nearby Industrial, Man-made, or Other Fire/Explosion as Primary Cause of Incident	
☐ Damage by Car, Truck, or Other Motorized Vehicle/Equipment NOT Engaged in Excavation	**1. Vehicle/Equipment operated by: *(select only one)* ◦ Operator ◦ Operator's Contractor ◦ Third Party
☐ Damage by Boats, Barges, Drilling Rigs, or Other Maritime Equipment or Vessels Set Adrift or Which Have Otherwise Lost Their Mooring	**2. Select one or more of the following IF an extreme weather event was a factor: ◦ Hurricane ◦ Tropical Storm ◦ Tornado ◦ Heavy Rains/Flood ◦ Other
☐ Routine or Normal Fishing or Other Maritime Activity NOT Engaged in Excavation	
☐ Electrical Arcing from Other Equipment or Facility	
☐ Previous Mechanical Damage NOT Related to Excavation	Complete the following ONLY IF the "Part of system involved in Incident" (from PART C, Question 2) is Main, Service, or Service Riser. **3. Date of the most recent Leak Survey conducted: / / / / / / / / / Month Day Year **4. Has one or more pressure test been conducted since original construction at the point of the incident? ◦ Yes ▷ Most recent year tested: / / / / / Test pressure (psig): / / / / / / ◦ No
☐ Intentional Damage	5. Specify: ◦ Vandalism ◦ Terrorism ◦ Theft of transported commodity ◦ Theft of equipment ◦ Other
☐ Other Outside Force Damage	**6. Describe:

G5 – Pipe, Weld, or Joint Failure – **only one sub-cause can be selected from the shaded left-hand column

☐ **Body of Pipe**	1. Specify: ◦ Dent ◦ Gouge ◦ Bend ◦ Arc Burn ◦ Crack ◦ Other
☐ **Butt Weld**	2. Specify: ◦ Pipe ◦ Fabrication ◦ Other
☐ **Fillet Weld**	3. Specify: ◦ Branch ◦ Hot Tap ◦ Fitting ◦ Repair Sleeve ◦ Other
☐ **Pipe Seam**	4. Specify: ◦ LF ERW ◦ DSAW ◦ Flash Weld ◦ HF ERW ◦ SAW ◦ Spiral ◦ Other
☐ **Threaded Metallic Pipe**	
☐ **Mechanical Fitting**	5. Specify the mechanical fitting involved: ◦ Stab type fitting ◦ Nut follower type fitting ◦ Bolted type fitting ◦ Other
	6. Specify the type of mechanical fitting: ◦ Service Tee ◦ Coupling ◦ Service Head Adapter ◦ Basement Adapter ◦ Riser ◦ Elbow ◦ Other
	7. Manufacturer:
	8. Year manufactured: / / / / /
	9. Year installed: / / / / /
	10. Other attributes:
	11. Specify the two materials being joined: 11.a First material being jointed: ☐ Steel ◦ Cast/Wrought Iron ☐ Ductile Iron ◦ Copper ◦ Plastic ☐ Unknown ☐ Other – Specify:
	11.b If Plastic ▷ Specify: ◦ Polyvinyl Chloride (PVC) ◦ Polyethylene (PE) ◦ Cross-linked Polyethylene (PEX) ◦ Polybutylene (PB) ◦ Polypropylene (PP) ◦ Acrylonitrile Butadiene Styrene (ABS) ◦ Polyamide (PA) ◦ Cellulose Acetate Butyrate (CAB) ◦ Other – Specify:
	11.c Second material being joined: ☐ Steel ◦ Cast/Wrought Iron ☐ Ductile Iron ◦ Copper ◦ Plastic ☐ Unknown ☐ Other – Specify:
	11.d If Plastic ▷ Specify: ◦ Polyvinyl Chloride (PVC) ◦ Polyethylene (PE) ◦ Cross-linked Polyethylene (PEX) ◦ Polybutylene (PB) ◦ Polypropylene (PP) ◦ Acrylonitrile Butadiene Styrene (ABS) ◦ Polyamide (PA) ◦ Cellulose Acetate Butyrate (CAB) ◦ Other – Specify:
	12. If used on plastic pipe, did the fitting – as designed by the manufacturer – include restraint? ◦ Yes ◦ No ◦ Unknown 12.a If Yes, specify: ◦ Cat. I ◦ Cat. II ◦ Cat. III ◦ DOT 192.283

Complete the following if any Pipe, Weld, or Joint Failure sub-cause is selected.

24. Additional Factors: *(select all that apply)* ○ Dent ○ Gouge ○ Pipe Bend ○ Arc Burn ○ Crack ○ Lack of Fusion ○ Lamination ○ Buckle ○ Wrinkle ○ Misalignment ○ Burnt Steel ○ Other

25. Was the Incident a result of:

- Construction defect, specify: ○ Po workmanship ○ Procedure not followed ○ Poor construction/installation procedures
- Material defect, specify: ○ Long s ○ Other
- Design defect
- Previous damage

26. Has one or more pressure test been conducted since original construction at the point of the Incident?

○ Yes ○ Most recent year tested: / / / / / Test pressure (psig): / / / / / /

○ No

G6 – Equipment Failure – **only one sub-cause can be selected from the shaded left-hand column

• **Malfunction of Control/Relief Equipment**	**1. Specify: *(select all that apply)* ○ Control Valve ○ Instrumentation ○ SCADA ○ Communications ○ Block Valve ○ Check Valve ○ Relief Valve ○ Power Failure ○ Stopple/Control Fitting ○ Pressure Regulator ○ Other
• **Threaded Connection Failure**	**2. Specify: ○ Pipe Nipple ○ Valve Threads ○ Threaded Pipe Collar ○ Threaded Fitting ○ Other
• **Non-threaded Connection Failure**	**3. Specify: ○ O-Ring ○ Gasket ○ Other Seal or Packing ○ Other
• **Valve**	4. Specify: ○ Manufacturing defect ○ Other 5.a Valve type: 5.b Manufactured by: 5.c Year manufactured: / / / /
• **Other Equipment Failure**	**5. Describe:

G7 – Incorrect Operation – **only one sub-cause can be selected from the shaded left-hand column

☐ Damage by Operator or Operator's Contractor NOT Related to Excavation and NOT due to Motorized Vehicle/Equipment Damage	
☐ Valve Left or Placed in Wrong Position, but NOT Resulting in an Overpressure	
☐ Pipeline or Equipment Overpressured	
☐ Equipment Not Installed Properly	
☐ Wrong Equipment Specified or Installed	
X Other Incorrect Operation	**1. Describe: *Meter technician was in process of performing meter change when flash fire occurred*

Complete the following if any Incorrect Operation sub-cause is selected.

2. Was this Incident related to: *(select all that apply)*
   - ○ Inadequate procedure
   - ○ No procedure established
   - X Failure to follow procedure

**3. What category type was the activity that caused the Incident:
   - ○ Construction
   - ○ Commissioning
   - ○ Decommissioning
   - ○ Right-of-Way activities
   - x Routine maintenance
   - ○ Other maintenance
   - ○ Normal operating conditions
   - ○ Non-routine operating conditions (abnormal operations or emergencies)

4. Was the task(s) that led to the Incident identified as a covered task in your Operator Qualification Program? X Yes ○ No

   4.a If Yes, were the individuals performing the task(s) qualified for the task(s)?
   - ○ X Yes, they were qualified for the task(s)
   - ○ No, but they were performing the task(s) under the direction and observation of a qualified individual
   - ○ No, they were not qualified for the task(s) nor were they performing the task(s) under the direction and observation of a qualified individual

G8 – Other Incident Cause – only one sub-cause can be selected from the shaded left-hand column

☐ Miscellaneous	**1. Describe:
☐ Unknown	**2. Specify: ○ Investigation complete, cause of Incident unknown ○ Still under investigation, cause of Incident to be determined *(Supplemental Report required)*

PART H – NARRATIVE DESCRIPTION OF THE INCIDENT *(Attach additional sheets as necessary)*

****PART I – PREPARER AND AUTHORIZED SIGNATURE**

Christopher S. Aronson
Preparer's Name (type or print)

781-907-1854
Preparer's Telephone Number

Senior Counsel
Preparer's Title (type or print)

christopher.aronson@us.ngrid.com
Preparer's E-mail Address

781-907-5701
Preparer's Facsimile Number

Authorized Signature

2/12/10
Date

781-907-1854
Authorized Signature Telephone Number

Christopher Aronson
Authorized Signature's Name (type or print)

Christopher Aronson / LER
Authorized Signature's Title (type or

christopher.aronson@us.ngrid.com
Authorized Signature's E-mail Address

Exhibit 2

National Grid Sequence of Events and Incident Analysis Report

Information Request PL 1-2

Respondent: William MyCroft

Request: Provide a sequence of events and a description of the Incident. Include all records that demonstrate: (1) the time National Grid was notified of the Incident; and (2) when Dispatch notified the leak responder, crew and supervisor(s) to report to the Incident. Include in your response documentation on their arrival times; and when National Grid initiated an Emergency Notification to staff.

Response:

January 15, 2010.

09:06 - Dispatch contacted by Supervisor S. Morganto about the incident. Technician performing meter change had contacted S Morganto directly. Morganto was not available to respond so he contacted B. Laferriere and M. Verrell. Morganto requests MSF Crew immediately to locate and clear gate.

09:06 - 09:08 - MSF Crew P. Mullen dispatched and MSF supervisor J. Levy notified. Laferriere and M, Verrell dispatched to the scene.

09:22 – Emergency notification goes out to Staff- *Working Fire - 47 Chestnut St, Waltham MA Malden C&M Crew Arrives on scene and secures gate box*

09:45 – CMS Supervisor Mike Verrell arrives on scene

10:15 – CMS Manager Bill Laferriere arrives on scene

11:10 – Massachusetts Department of Utilities.

14:00-Department of Transportation Notified.

Incident Analysis Report

nationalgrid

ıcident ID: **56980**

Incident Summary

Incident Type:	Injury/Illness, Public Incident		
Employee Name:	Salamone, Christopher	**Incident Date/Time:**	1/15/2010 9:00 AM
Incident Location:	47 Chestnut Street, Waltham MA		
What Happened:	Employee was conducting a meter change when a fire began. Employee was transported to Newton Wellesley Hospital with singed eyebrows and smoke inhalation.		
Additional Notes:	CMS Technician was performing a meter exchange. With the gas shutoff valve in the open position, he disconnected the old meter, when he lifted the new meter into place, the flash occurred and the outside of the building caught fire.		

(NOTE: This IA has attachment(s).)

Incident Analysis

Investigation Status:	Open Action Items	**Due Date:**	02/22/2010	**Complete Date:**	02/18/2010

Incident ID: 56980

Contributing Factors & Action Plan

Contributing Factors	Action Item	Responsible Manager	Due Date	Complete Date	Notes
Human Factors - Communication issues - Unclear expectations	Communicate this event via the Weekly Safety Brief to remind employees to follow procedures and call their supervisors when field condition questions arise.	Knott,Michael G	1/26/10	1/26/10	A brief was sent out to all Gas employees discussing this event on 1/26
Engineering Factors - Inadequate or poor design	We need to examine the remaining units at the property and determine if any other meters have access issues	Bennett,Gary W	2/8/10	2/8/10	The stairs being added to the structure after the meter was set contributed to inability to control gas
Engineering Factors - Inadequate or poor design	Discuss event with local building inspector to determine how construction progress can hinder our access after we set a meter.	Bennett,Gary W	2/12/10	2/12/10	Stairs were built after we set meter. This can be prevented in final building inspection
* Human Factors - Did not follow procedures/work practices/instructions/rules Golden Rule Violations - Safety Protection Systems and Devices	Discuss proper procedure for exchanging meter with employee with emphasis on controlling gas before meter is removed	Laferriere,William R	2/12/10	2/2/10	Employee violated procedures for exchanging meter despite thorough training. He removed meter despite not being able to shut gas off
Human Factors - Communication issues - Unclear expectations	Ask Gas Safety Review team to re-visit Compliance Assessment requirements. This is thought to be a difference in culture between Legacy companies.	Enright Jr,Richard	2/26/10		Field presence has been identified by employees who have seen culture changes in the past.
Human Factors - Did not follow procedures/work practices/instructions/rules - Inattention to detail	Technical Bulletin created and reviewed on location of a meter with CMS Field personnel- Bulletin on meter location which identifies all possible sources of ignition and distances from sources of ignition.	Kearney,David C	3/4/10		
Human Factors - Did not follow procedures/work practices/instructions/rules	CMS and QA/QC to develop ad-hoc committee to develop methodology to document employees are following procedures in field.	Shapiro,Arthur A.	3/18/10		
Human Factors - Inadequate knowledge/training - Inadequate content of training	Change the culture - Review the possibility of a road show testimonials with actual survivors of gas industry incidents with Gas Safety Reveiw Committee.	Knott,Michael G	4/24/10		Testimonials from National Grid or industry employees can be significant in changing the culture.
Human Factors - Inadequate knowledge/training - Insufficient practice or hands-on experience	Review training and testing requirements across all areas for best practice - Safety Training for Gas and Electric, AET Training - Adding a section to the training which focuses on incidents which have occured due to "making the wrong decision " / Not following procedure.	Frasier,Chris E	5/22/10		
Engineering Factors - Inadequate or poor design	Examine the need for Flow valves and fire valves throughout our gas distribution system.	Kearney,David C	5/31/10		As a process safety step, we need to ensure we have done a thorough job of examining this engineering control.
Human Factors - Did not follow procedures/work practices/instructions/rules Human Factors - Did not follow procedures/work practices/instructions/rules - Order was not followed	Codes and Standards to develop one system wide procedure for meter exchange utilizing best practices of legacy companies	Kearney,David C	6/1/10		Employee was trained on several procedures that constituted a meter exchange

* Primary Factor

Lessons Learned

Human Factors played the largest roll in the incident. Procedures and training are in place so we can perform the task safely. When we consciously ignore them just to get the job completed we put ourselves along with our customers saftey at risk. Need to continue to focus on changing the culture so it is aligned with the Company objectives - Safety is first and foremost.

Incident Analysis Team

Type	Name	Title	Phone
IA Team Leader	Enright, Richard	Director	781-907-2751
IA Team Member	Aronson, Christopher	Senior Counsel I	781-907-1854
IA Team Member	Bennett, Gary	Director	781-907-2755
IA Team Member	Burnham, Michael	Sr Safety Rep	401-335-8680
IA Team Member	Conlon, Christopher	Director	631-755-4705
IA Team Member	Frasier, Chris	Manager	978-556-1301
IA Team Member	Gatherum, John	Senior Investigator	781-907-2315
IA Team Member	Kearney, David	Principal Engineer	781-907-2791
IA Team Member	Knott, Michael	Manager	978-725-1355
IA Team Member	Laferriere, William	Manager	781-388-5500
IA Team Member	Shapiro, Arthur	Principal Engineer	516-545-3837

Incident ID: 56980

Departments/Areas for Communication Purposes

- [ ] All Departments
- [ ] Construction & Maintenance Services
- [ ] Facilities
- [X] Gas
- [X] Meter
- [ ] OH
- [ ] Stores
- [ ] Substation
- [ ] Transmission
- [ ] Transportation
- [ ] UG

Team Self Evaluation

Review the analysis and improvement action plan and ask the following:

Communication	Do communication plans clearly indicate who will communicate, what will be communicated, and how it will be communicated?
Clarity	Is the root cause/contributing factors clearly identified?
Root Cause	Does the improvement plan identify and address the root cause of the incident?
Risk Reduction	How effective will the implementation of the action items be in reducing the risk of recurrence?
Responsibility	Are the individual action plans properly assigned?
Retraining	Is the employee involved in the incident receiving appropriate retraining, if applicable?
Due Dates	Are the action item due dates reasonable? How will follow-up before the due date be performed to ensure the item can and will be addressed?

Incident ID: 56980

Appendix - List of Available Contributing Factors

- [ ] Engineering Factors
  - [ ] Drawing/specification or data error
  - [ ] Error in equipment or material selection
  - [ ] Inadequate or poor design
- [ ] Equipment/Tools/Materials Factors
  - [ ] Defective or failed part/material
  - [ ] Error by manufacturer in shipping/marking
  - [ ] Inadequate inspection and maintenance
  - [ ] Incorrect selection
  - [ ] Incorrect use
  - [ ] Poor condition
- [ ] Golden Rule Violations
  - [ ] Fall Prevention
  - [ ] Operation of Vehicles
  - [ ] Permits and Authorizations
  - [ ] Personal Protective Equipment
  - [ ] Safety Protection Systems and Devices
  - [ ] Underground Services
  - [ ] Work Area Control
- [ ] Human Factors
  - [ ] Communication issues
    - [ ] Job brief/risk assessment
    - [ ] Unclear expectations
    - [ ] Verbal communication problem
    - [ ] Work area protection (signs/tags/demarcation etc.)
  - [ ] Data Issues
    - [ ] EMS update
    - [ ] Mapping error
  - [ ] Did not follow procedures/work practices/instructions/rules
    - [ ] Accepted practice caused a failure to follow procedure or instruction
    - [ ] Improper switching order
    - [ ] Inadvertent error
    - [ ] Inattention to detail
    - [ ] Incomplete research
    - [ ] Misinterpretation
    - [ ] Operated wrong device
    - [ ] Order was not followed
  - [ ] Fatigue/Illness

- [ ] Inadequate knowledge/training
  - [ ] Inadequate content of training
  - [ ] Insufficient practice or hands-on experience
  - [ ] Insufficient refresher training
  - [ ] No training provided
- [ ] Inadequate PPE
  - [ ] Body - Fire retardant clothing
  - [ ] Body - High visibility clothing
  - [ ] Eyes
  - [ ] Fall protection
  - [ ] Feet
  - [ ] Hands
  - [ ] Head
  - [ ] Hearing
  - [ ] Respiratory protection
  - [ ] Rubber gloves/sleeves
- [ ] Management issues
  - [ ] Company culture/leadership issues
  - [ ] Improper resource allocation
  - [ ] Inadequate administrative controls (procedures/policies/standards)
  - [ ] Inadequate communication of procedures/policies/standards/priorities
  - [ ] Inadequate employee selection/placement/qualifications
  - [ ] Inadequate supervision - Experience/development
  - [ ] Inadequate supervision - Knowledge/training
  - [ ] Inadequate supervision - Leadership
  - [ ] Inadequate supervision - Time/resources
  - [ ] Work organization or planning deficiencies
- [ ] Motor Vehicle/Equipment Operation
  - [ ] Avoidance of another vehicle or object
  - [ ] Driving/traffic rules not followed
  - [ ] Encroachment of minimum approach distances
  - [ ] Inadequately secured load
  - [ ] Inappropriate operation of equipment
  - [ ] Inattention/distraction
  - [ ] Unawareness of changing weather and road/driving conditions
- [ ] Poor body positioning

- [ ] Work Environment Factors
  - [ ] Controlled
    - [ ] Housekeeping
    - [ ] Inadequate work area protection
    - [ ] Incorrect management of hazardous substances/atmospheres
    - [ ] Site preparation
    - [ ] Work pace

Incident ID: 56980

- [ ] Uncontrolled
  - [ ] Condition of terrain
  - [ ] Dense population
  - [ ] Other (describe below)
  - [ ] Proximity to other utilities
  - [ ] Weather conditions

Exhibit 3

Public Utility Inspector's Report on the Incident (Jan. 19, 2010)

To: Chris Bourne

From: Jorge Santi

Re: 47 Chestnut St. Waltham, Mass.

Date: January 19, 2009

On Friday January 15, 2010 I received a call from Chris Bourne regarding an incident that had been reported by National Grid at the address noted. Mr. Bourne provided information regarding the incident and asked me to report to this address to investigate the occurrence.

I arrived onsite at approximately 1240 hrs. and introduced myself to the Waltham Fire Chief Rick Cardillo. He showed me to the rear of the building where I met State Fire Marshall Trooper Donald R. Bossi. The trooper was investigating the cause of the fire and we spoke and reviewed his findings.

I was told that the National Grid technician had arrived to change the gas meters for units 6 &7 and that as he was changing the gas meter for unit 6 the house heater came on and as a result of gas being sucked into the air intake vent a delayed ignition occurred that ignited the meter assembly, rear stairs and the vinyl siding of the property.

The shut off cock on the 1¼ service riser were located under the stairs at the base and the shut off faced the stairs and was partially blocked by a cross member on the stair stringers. The Trooper had been told that the technician had attempted to "jump" the meter as the riser cock was still on and the curb cock had been shut off to isolate the service.

The heater intake and exhaust vents were at the 1 O'clock position relative to the meter bar assembly and approximately 33" away. On the ground were the technician's tools, CGI machine and two burnt gas meters the original gas meter and the replacement gas meter that the technician was attempting to install.

The PVC tubing for the heater vents that at one extended outside the building were no longer visible and only the holes in the plywood where they exited the building were present. An A/C compressor was in close proximity to the meter assembly, approximately 17" away and the heater vent holes terminated approximately 26" above the A/C unit.

The 1¼" Serviseal riser was installed at 12" from the bottom of the cock to the finished grade, it was supported by a metal support that was driven into the ground and secured to a stair stringer.

Inside the garage in a closet the house heater and water heater were installed. The exhaust pipe on the heater had been burnt, deformed and displaced as a result of the heat. The air intake pipe was intact and connected to the heater.

While on site, I spoke with National Grid Director Gary Bennett, Manager Bill Laferriere, Supervisors Steve Morganto, Mike Verrel, Attorney Chris Aronson and investigator John Gatherum. I asked Gary Bennet to secure the gas meters at their Wilmington facility.

I reminded Gary Bennet and Bill Laferriere to be sure that Drug and Alcohol tests be administered to the technician. They ensured me that both tests were being taken. I also reminded Mr. Bennet and Mr. Aronson that they needed to file a report with the Federal Government within two hours as the damage far exceeded the $50,000 dollar amount. Mr. Aronson responded that he would do so.

Trooper Bossi told me that an interview with the technician would be performed later that afternoon, after the technician had completed the Drug and Alcohol testing. The interview was to occur at the National Grid Newton St. Waltham location and he asked me to participate.

At approximately 1450 hrs. Trooper Bossi, Waltham Police Department Detective John Comeau, Waltham Fire Department Deputy Chief Clifford D. Richardson and I met with National Grid Management and Union representatives to interview Mr. Chris Salamoni the technician who was onsite at Chestnut St. Waltham when the fire ignited.

Trooper Bossi asked Mr. Salamoni to review with us his activities that morning prior to the incident. Mr. Salamoni stated that:

- He arrived at approximately 0838 hrs as this was his first job of the day
- He introduced himself to the customers at units 6 & 7 who had appointments to have their gas meters changed
- He said that he parked his company van in front of the customers garages
- His first actions were to write out new meter stickers organize his tools, retrieve a CGI machine, soap and meter washers
- He went to the rear of the building and placed a meter in front of the meter assembly for unit 7
- He decided to change the meter to unit 6 first
- He found that the meter riser cock was blocked by the stairs
- As a result he could not turn the cock and tried several times with different wrenches
- He noted that he has had other appointments when the work could not be performed and customers were very unhappy
- He knew that this was a low pressure meter assembly and he decided to change the meter without shutting off the gas

- He stated that he was able to take the old meter down, block the gas and change the washers
- Then he was able to thread the nut onto the inlet side of the meter
- He also stated that the meter dropped from his hands
- Then as he was trying to catch the outlet side of the meter he had to use two hands and removed his hand from the meter and that's when he saw the gas ignite
- He said that he didn't hear any sounds or noises but recalled hearing a "pop" and then a "big flame"
- He also stated that it was only a couple of minutes that had gone by when he was working on the meter before the fire started

Trooper Bossi asked me if I had any questions to ask and I apologized to Mr. Salamoni but asked if we could recount his actions that he had just described. I told him that I understood that the cock could not be turned by him and asked what wrenches he had used.

Mr. Salamoni responded that he had tried using a 12" pipe wrench as well as a smaller wrench that he could not recall the size of and said that he was able to get the smaller wrench on the cock but could not turn it.

I asked him to continue describing his actions and he noted that:

- He was able to change the washers
- That he tried catching the inlet side of the meter first, but needed to push with both hands
- He said that gas was coming out of the outlet side of the meter as it was not blocked
- I asked him what level he was and he said that he was a "Service Technician C"
- I asked how long he had been at this level and he said for 5 months
- I asked him what he had done prior to becoming a technician and he said that he had been in leak survey and was hired in 2007
- He attended the service technician training in August 2009 for two weeks
- I asked if in training the Procedure for changing meters had been reviewed and he said "yes"
- I asked what other training he received and he said that he was taught how to check for gas leaks inside and outside premises and lighting appliances
- I asked if he had been told or taught to jump meters
- He stated that jumping gas meters was not taught or allowed
- I asked if he had been told to ask for assistance when he encountered difficult or unknown situations and he said that he had been

I then asked Mr. Salamoni to further describe the actions that he had taken and he explained that the fire first started around the meter and stairs and that he checked again to see

if there was any other way to shut off the gas, but there was none so he ran to the front of the building and told people to get out.

He stated that he called 911 to report the fire and ask for help then called his supervisor Steve Morganto and then dispatch, requesting a crew to assist.

I asked him if he had a gate box key and he said that he did but that he did not know where the curb valve was located. He also noted that training in the use of gate box valves is by books and not hands on.

I then asked Mr. Salamoni to review the process of changing a gas meter when the cock is able to be shut off and he said that he:

- Shuts off the gas
- Changes the meter
- Checks the meter and fittings for tightness
- Turns on the gas
- Checks for leaks
- Lights appliances

I asked Mr. Salamoni how long he had been changing meters for and he said that he has been changing meters since August when he attended the training. I asked him if he had been changing meters on a regular basis and he said that he has.

He was asked if he recalled what time the incident occurred at and he thought it was approximately 0850 hrs.

Supervisors were asked when the gas was finally able to be shut off and they stated that it took approximately 25 minutes to shut off the gas to the building. Mr. Salamoni was apologetic and was told that at least no personal injuries had occurred and that he had taken good actions by ensuring that customers vacated their homes.

The meeting adjourned.

Exhibit 4

Waltham Fire Department Report on the Incident (Jan. 19, 2010)

WALTHAM FIRE DEPARTMENT
WALTHAM, MA

NFIRS Incident #10000286

FDID	State	Incident Date	Station	Incident Number	Exposure	Report Status
17308	MA	01/15/2010		10000286	0	APPROVED

Address

Location Type	STREET ADDRESS		Census Tract	
St. Prefix	St. Number	St. Name	St. Type	St. Suffix
	47	CHESTNUT ST		
Apt. Number	Cross Street or Directions			
	City		State	Zip
	WALTHAM		MA	02453

Incident Details

C: Incident Type	E1: Dates & Times		E2: Shifts & Alarms		
111 BUILDING FIRE	Date/Time		Shift/Platoon	Alarms	District
D: Aid Given/Received	(mm/dd/yyyy hh:mm:ss)		4	3	1
	Alarm	01/15/2010 09:01:37	Special Study ID#		Special Study Value
Mutual Aid (FDID) Agency - State	Arrival	01/15/2010 09:04:46			
( ) -	Controlled		Incident Under Investigation		N
	Last Unit Cleared	01/15/2010 14:01:24			

E: Actions Taken

Primary Action
11 EXTINGUISH
Additional Action -1
12 SALVAGE & OVERHAUL
Additional Action - 2
75 PROVIDE EQUIPMENT

G1: Resources

	Apparatus	Personnel
Suppression	12	36
EMS	2	4
Other	2	4

G2: Estimated Dollar Losses & Values

LOSSES:	
Property $	900000
Contents $	75000
PRE-INCIDENT VALUE:	
Property $	
Contents $	

H1: Casualties

	Deaths	Injuries
Fire Service	0	0
Civilian	0	1

H3: Hazardous Materials Release

H2: Detector
1 DETECTOR ALERTED OCCUPANTS
I: Mixed Use Property
J: Property Use
429 MULTIFAMILY DWELLINGS

K1: Person/Entity Involved

Person/Entity #: 1				
Business Name			Phone Number	
Prefix	First Name	MI	Last Name	Suffix
	St. Num	St.Name	St. Type	
	47	CHESTNUT ST		
	Apt. Number	P.O.Box		
	6			
	City		State	Zip
	WALTHAM		MA	02453

Notes:

MOST DAMAGE AND AT HOME

K2: Owner

Business Name			Phone Number	
Prefix	First Name	MI	Last Name	Suffix
St. Prefix	St. Num	St.Name	St. Type	St. Suffix
	Apt. Number	P.O.Box		
	City		State	Zip
			MA	

L: Remarks

Fire and smoke showing "C" side of building on Car Two's arrival. Gas Company service tech. working to change the gas meter on "C" side of building left scene and went to hospital prior to Fire Departments arrival with smoke inhalation. He notified all residents to evacuate the complex and called 911. Found to be a natural gas fed fire From open gas line lapping up the "C" side of building from ground level and entering the attic at eave level through soffit area. Heavy fire around meter allowed to burn until gas shutoff with smoke

puffing out at cave level. Companies forced entry to units 6 and 7 through kitchen glass patio door to gain access and search for fire. On request from Car Two gas to building shutoff in Street by other gas Company representatives. Heavy fire entered attic in units five and six and was extremely hard to get at so wall between units was breached. Roof opened up "A" side and "C" side with trench cuts made both sides to stop fire extension. One attack line committed to each of the most damaged units (5,6,&7) and another crew pulling ceilings and making inspection holes in walls in all rooms in rear ("C" side) of the three units. Two sprinkler heads operated and sprinklers were shut down as soon as possible to minimize water damage. An attempt was made at salvage and tarps were placed. Electricity shutoff by Fire Department personnel

Damage: Units 1, 2, & 3 exterior front doors forced open for search
unit 4: Water damage second floor and exterior wall "c" side attic area opened up to check for extension
unit 5: Third floor heavy fire, water, soot, and smoke damage , cathedral ceiling and roof "c" side burned through, 2nd floor 2 rear bedrooms ceilings opened up and two windows removed
1st floor rear kitchen sliding glass door damaged with water damage throughout.
unit 6: Heavy fire, water, soot, and smoke damage "C" side roof and cathedral ceiling burned through rooms 2nd floor rear opened up for extinguishment and checking for extension
first floor rear sliding glass door damaged as well as rear deck and stairs water damage throughout
unit 7: Floor three attic area opened up Fire smoke and water damage throughout Heavy fire damage laundry area with ceiling and roof burned through fire also burned through to unit 6
Owners' unit 7 t home commerce ins.
uni 5 commerce ins
unit 4 commerce ins
unit 3 commerce ins
unit 2
unit 1
Condo Preservers insurance mason & mason 781-447-5531
Waltham C-1, C-3, C-4, C-6 Waltham police and a Detective Keyspan Energy representatives Waltham Wires Dept. inspector locked out electrical service Trooper Donald Bossi from State Police investigated Waltham Auxiliary Air Supply and lighting Plant Amr ambulances Red Cross Reps all on scene
Keyspan Tech Chris Salomone (50 Adele Ave.Haverhill 781-589-0549) injured and went to hospital whare he was interviewed By Trooper Bossi and Dep. Richardson He Stated he couldn't shut the gas cock because the exterior stairs were in the way, so he attempted to change the meter without shutting off the gas feed. The home furnace intake sucked in the gas and caused the ignition. Building turned over to Condominium Association representatives and board up company on scene before Fire Departments departure.

M: Authorization

Approved By	Approver Name	Position	Assignment	Date
3851	TURNER, S	DEP CH		01/19/2010 16:43:13
Officer in-Charge	**Officer Name**	**Position**	**Assignment**	**Date**
3851	TURNER, S	DEP CH	C2	01/15/2010 13:45:36

	No

Actions Taken
86 INVESTIGATE

Equipment Used			
Type	Qty.	Measurement	Notes

Company Members Responding				
ID	Name	Rank	Acting	Actions Taken
3384	RICHARDSON, C	DEP CH	No	
2808	JOHNSON, R	LT	No	
4889	QUARANTO, P	LT	No	

Report Narrative
Responded to 47 Chestnut St on 2nd alarm to assist. C-3 took coverage of the city while on scene. Lt Quaranto and Lt Johnson assited working companies in opening doors and walls. After the fire was extinguished, I assisted in the investigation in conjunction with the Waltham PD and The State Fire Marshalls office. We interviewed Chris Salamone, a service technician, from National grid. He stated that he was changing out a gas meter and could not shut the gas off due to inadequate clearance to the gas valve. He attempted to make the change anyway and there wa a leak and subsequent ignition. He could not shut off the gas due to flame impingement on the shutoff. He notified and evacuated residents and called 911.

Filed By	
Member ID	Member Name
3384	RICHARDSON, C

Agency	Incident Number	Exposure	Unit ID	Report Number
WAL-FD	10000286	0	C6	1

Apparatus	
Apparatus Type	Apparatus Use
(60) SUPPORT APPARATUS, OTHER	(1) SUPPRESSION

Response Address				
St. Prefix	St. Num	St. Name	St. Type	St. Suffix
		CHESTNUT		

Exhibit 5

Photographs of 47 Chestnut Street, Waltham, and the Incident

PHOTOGRAPH-NO. 1

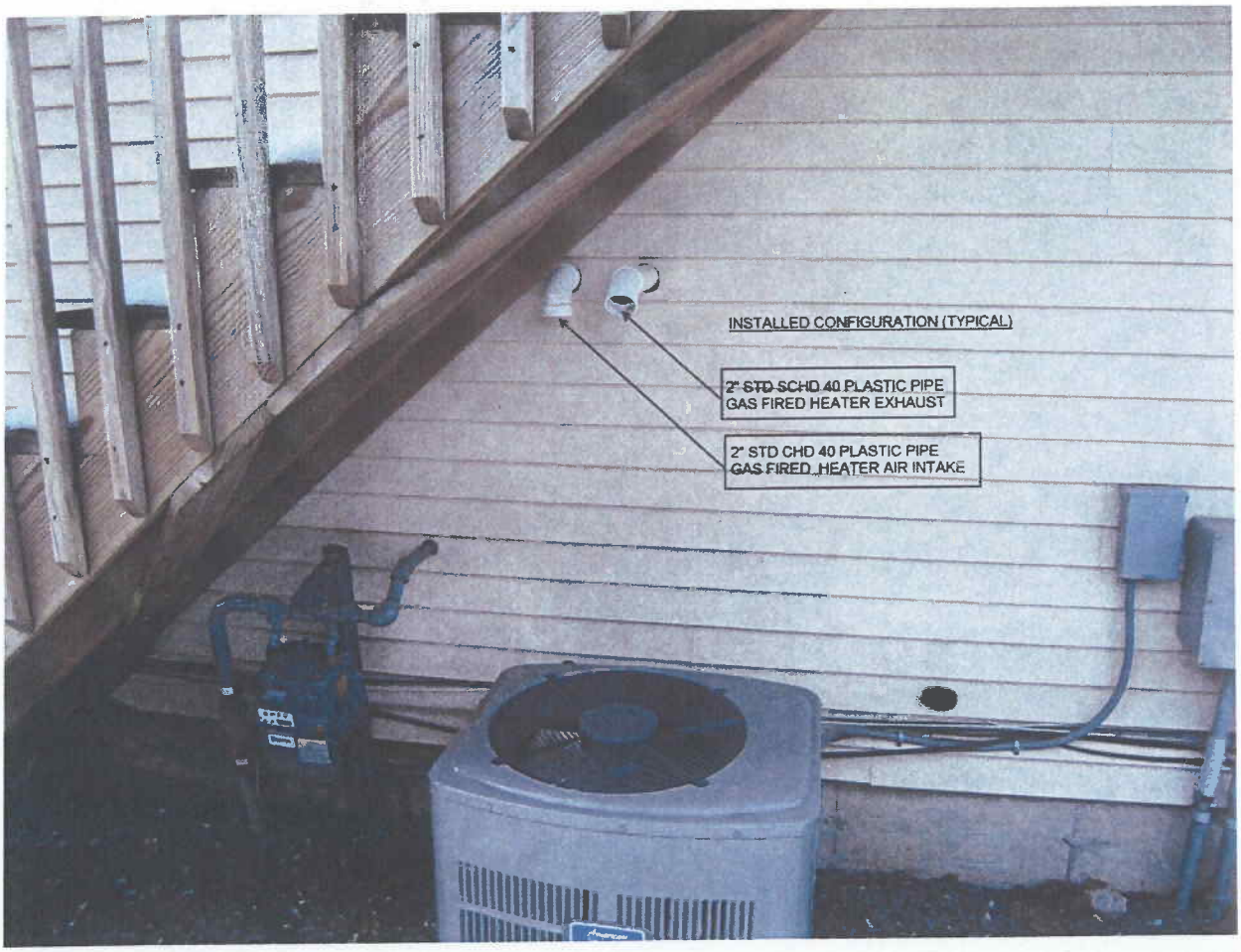
47 Chestnut Street, Waltham (Jan. 15, 2010)

Photo courtesy of State Fire Marshal's Office

PHOTOGRAPH-NO. 2

Fire damage to unit 6, and other units, at 47 Chestnut Street, Waltham (Jan. 15, 2010)

Photo courtesy of State Fire Marshal's Office



PHOTOGRAPH-NO. 3

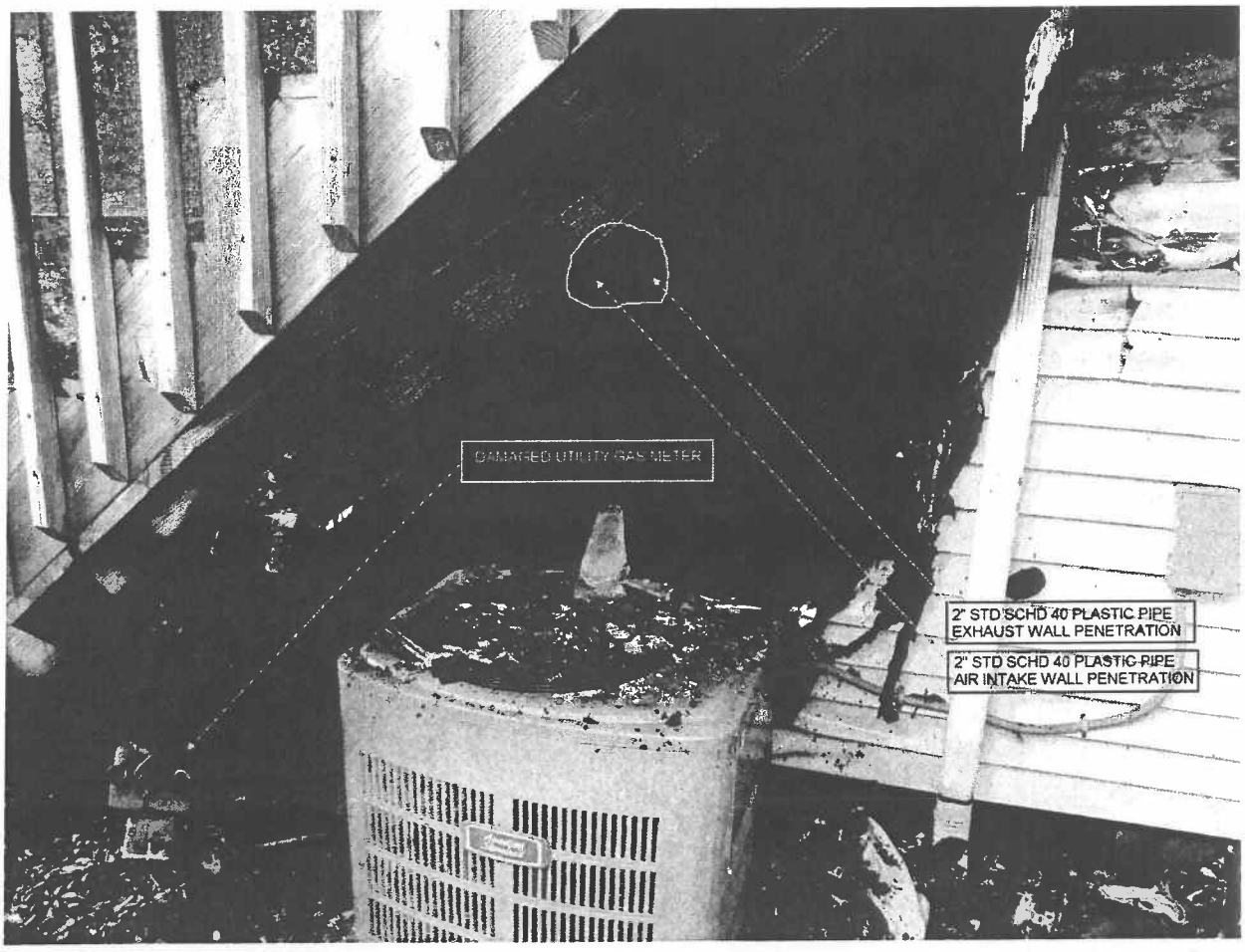
47 Chestnut Street, Waltham – sample of undamaged meter configuration (Jan. 15, 2010)

Photo courtesy of State Fire Marshal's Office

PHOTOGRAPH-NO. 4

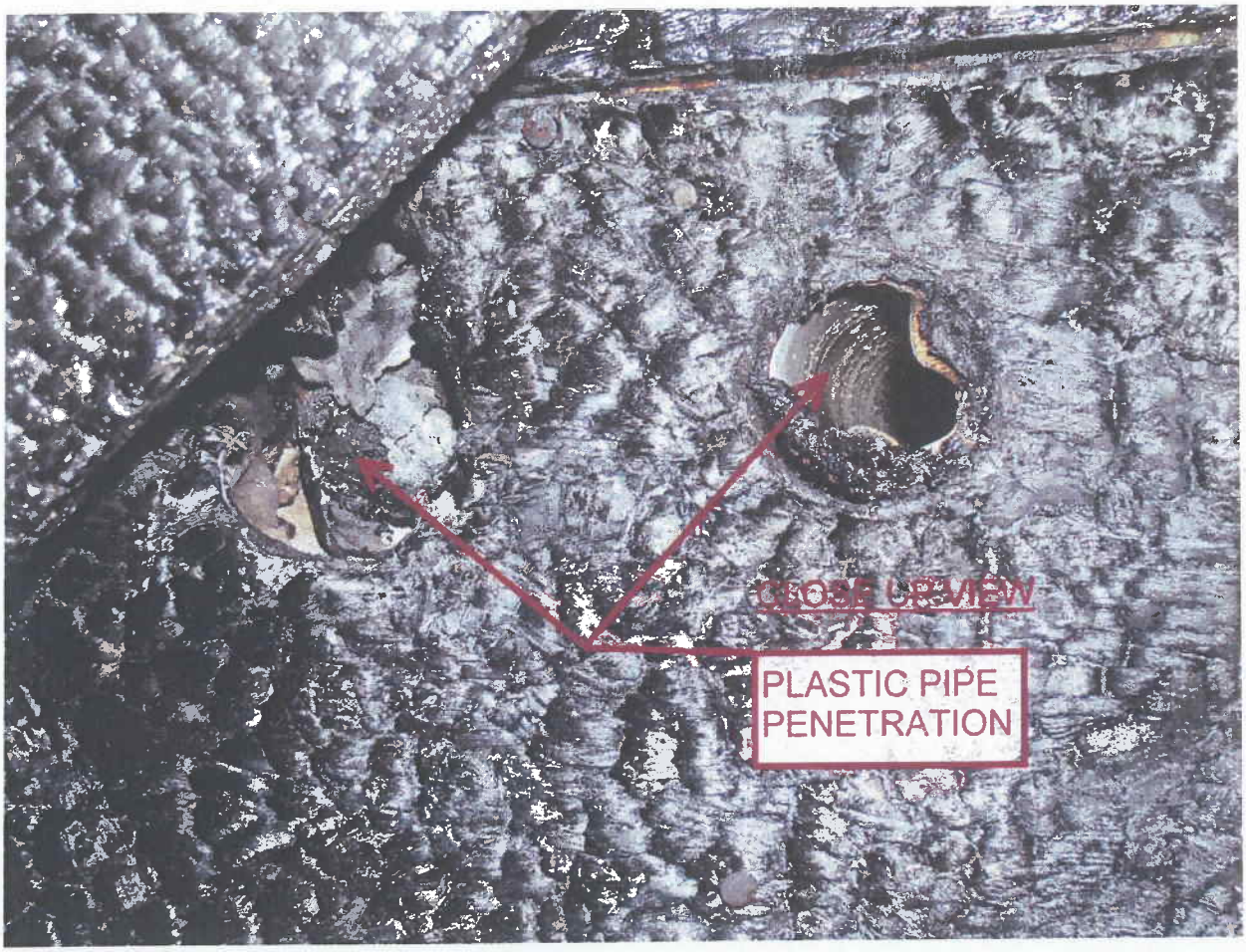
47 Chestnut Street, Waltham, unit 6 – gas shut-off valve in open position (Jan. 15, 2010)

Photo courtesy of State Fire Marshal's Office



PHOTOGRAPH-NO. 5 - 47 Chestnut Street, Waltham - damage to unit 6 (Jan. 15, 2010)

Photo courtesy of State Fire Marshal's Office



PHOTOGRAPH-NO. 6 – 47 Chestnut Street, Waltham, unit six – close up view of home furnace combustion air intake and exhasut openings (Jan. 15, 2010)

Photo courtesy of State Fire Marshal's Office

PHOTOGRAPH-NO. 7 – 47 Chestnut Street, Waltham, unit six – damaged platic piping to gas fired furnace (Jan. 15, 2010)

Photo courtesy of State Fire Marshal's Office

Exhibit 6

Service Records for Main and Services Serving
47 Chestnut Street

Information Request PL 1-12

Respondent: James Hughes

Request: Provide records of the gas services for the units at 47 Chestnut Street, Waltham including but not limited to, installation date, MAOP, operating pressure and leak history from January 1, 2007 to January 15, 2010.

Response: The service line was installed on May 8, 2002 and has MAOP of 0.5 PSIG with operating pressure of 0.3 PSIG. There is no leak history on this service since its installation date.

Information Request PL 1-13

Respondent: Kevin Souza

Request: Provide records for any maintenance or replacement work performed on the gas services at 47 Chestnut Street, Waltham from January 1, 2005 to January 15, 2010.

Response: There has been no maintenance or replacement work on gas service to 47 Chestnut Street. Waltham from January 1, 2005 to January 15, 2010.

Exhibit 7

Work History of Meter Service Technician

Information Request PL 1-4

Respondent: William R. Laferriere

Request: Provide the work history for Mr. Salamoni detailing the responsibilities at each grade level attained.

Response:

Mr. Salamoni was hired as Leak Survey Technician on July 24, 2006 and stayed in that position until he resigned on August 25, 2007. He was rehired as Leak Survey Technician on April 28, 2008 and was promoted to a Meter Service Technician C on April 20, 2009. Below please find summaries of each position:

Leak Survey Technician

- Various types of leak survey work such as walking survey, mobile patrol and pinpointing.
- Other duties as assigned

Meter Service Technician C

- Emergency Response (i.e. Gas Leaks, CO, No gas)
- Leak Investigation
- Turn on and off
- Change/remove/set meter
- Inspect Regulator
- Residential and Commercial Fitting work up to and including meter size 1000 and associated regulator work
- Customer High Bill Investigation
- Clear gas service freeze ups and blockages
- Storm restoration
- Perform and duties of lower classifications

Exhibit 8

Portion of Meter Service Technician Technical Training Program

New Window | Help

Student Training Summary

Christopher Salamone

Person ID: 14472

Training Summary

Session | Status

Customize | Find | View All | First 1-5 of 5 Last

Course	Title	Session #	Start Date	End Date
OQ1004	OP Qual Testing - 4 Hours	0353	09/16/2009	09/16/2009
SHE005	See Something Say Something	0006	09/04/2009	09/04/2009
GMS045	Meter Service Technician	0001	07/27/2009	08/07/2009
NE1049	Leak Investigation Coding	0020	12/15/2006	12/15/2006
NE1022	Leak Survey Training	0006	07/31/2006	08/03/2006

Return to Search | Next in List

CMS

APPRENTICE

TECHNICIAN

SCHOOL

NATIONAL GRID ENERGY DELIVERY
CMS TRAINING PROGRAM
APPRENTICE TECHNICIAN SCHOOL

Table of Contents

Module 7: Basics of Piping

Objectives:

8.1 Understand terminology related to piping (e.g., inside/outside service; gate valve).
8.2 Understand the uses, maintenance, repair and operation of pipes and valve in the company's distribution system
8.3 Understand the purpose and components of Company, Customer, and appliance piping (e.g., service riser, meter bar, various fittings).
8.4 Know typical outside and inside piping sizes and the relationship between size of pipe, gas pressure, and gas volume.
8.5 Recognize the types and purposes of tools typically used by Fitters and Technicians.
8.6 Know the indicators of service pressure levels and pressure problems.
8.7 Be aware of the proper procedure to remove and dispose of mercury regulators.

Instructional Plan:

Materials:

1. Outside service (OSS)

A. Responsibility of MSF
- leak repairs
- inserting service
- clearing stoppage
- laying of new service

B. Responsibility of Fitters'
- wiring of service
- repair leaks at OSS and street tee or service cock

C. Gate valve
- shut off located on OSS
- controls leaking gas
- MSF maintains gate
- used to stop flow of gas when maintaining or repairing ISS

- emergency shut off
- Most turn ¼ turn clockwise to close
- Multi turn
- Full port

D. Critical valves

1. Are vital parts of the company's distribution system
2. Should always be accessible
3. Never shut off
4. If found off notify dispatch
5. Most turn ¼ turn clockwise to close
6. Used to isolate & control
7. Inspected once a year

To inspect; partially close then open

VSUR-5010

OQ45

E. Maintenance and repair (critical valves)

16. Updated location
17. Access needed for emergency
18. More efficient than squeezing
19. Use bubbles

F. Lubricating

- Know the type of valve
- Know the manufacture recommendations
- Know the recommended amount

G. Testing

- Slowly turn slightly closed, then full open
- Always left in original state (critical valves)
- If found close, call dispatch (critical valves)

H. Minor Repairing

- If leaking try lubricant first
- Tightening bolts or replacing housing

I Locating

- Two measurements
- May have been covered, dirt or pavement
- Tree growth
- Broken or missing box

J. Plastic Valves

- Require not lubrication
- Easily damaged

K. Service boxes

- Protect Valve
- I.D valve locations
- Appliances should be off be for service is turned on
- Only shut off as last resort/emergency
- Located on customers property or property line
- Needs to be straight to receive wrench

2. Company piping and its components Ends at the outlet of the meter

ISS mock-up

A. PFR/Fitter's responsibility

- repairing of leaks
- maintaining

B. Inside service (ISS)

5 diagrams of ISS (T)

- starts at street tee
- ends at meter bar shut off
- If regulator is inside, must be vented

C. Fittings used on ISS

ISS mock-up

- street tee (service tee)
- nipple and cap
  —provides access to wire OSS
- service cock (shut off)
  —provides a central shut off point for the building
  —if high pressure, first fitting used on OSS in place of street tee
- coupling
  —joins two similar pipe sizes — 3/4" to 3/4"
- reducing coupling
  —joins two dissimilar pipe sizes — 1-1/4" to 1"
- insulated union
  —provides electrical insulation
  —breaks the flow of current
- Elbows (90° – 45°)
  —provide change of direction
- Reducing elbow (90°)
  —provides change of direction
  —provides reduction in pipe size — 1" to 3/4"
- Check Valves; allow gas flow in one direction

D. Meter bar

meter fit

- provides installation of meter
- assists final interconnection

E. Fittings used with meter fit
- meter cock (meter shut off)
- —provides shut off to just one customer
- —provides locking point
- fire valve
  —provides meter bar to meter connection
  —stops the flow of gas in case of high temperature/fire
  —always located on meter inlet
  —must be used when meter fit is located inside; not needed when meter fit is on the outside.
- swivel and nut (two-piece fitting)
  —provides meter bar to meter connection
  —always on meter outlet side when fire valve is used
  —two swivels are used when meter fit is located on the outside

Fire valve
Meter (to size fire valve)
lead melts, ball drops restricting flow of gas

Swivel and nut
Meter (to size swivel and nut)

F. Hangers
- purpose
  —provides support to meter fit and ISS
- Fitter's responsibility

H. Piping depths
- Street Main: State 24" NG 36"
- Branch main: State 18" NG 24"
- Service: State 12" NG 18"

3. Customer's piping

A. Definition
- begins at the outlet of meter bar
- ends at appliance

B. Composition: long runs of piping, elbows, unions, couplings, etc.

C. Responsibility of customer (plumber)

D. BGC role in temporary / permanent repairs
- temporary leak repairs made by BGC
- permanent repairs by BGC depends on ease of repair and skill/judgment of Tech

E. **Concealed Piping: Piping that goes into are area of the house that is not accessible by the tech.**

F. **Suspected Leaks in concealed piping**
- **Shut off at the meter**
- **Notify dispatch**
- **Red Tag and notify customer**

G. How to detect a leak in concealed piping
- Shut off all known appl.
- If meter test dial moves as gas is turned on, it may be flowing into concealed piping area

Schematic: Company vs. Customer piping (T)

4. Appliance piping

A. Definition
- Customer's property & responsibility

B. PFR will make piping repairs or alterations in process of repairing appl.

C. Types of shut-offs
- ball cock
- A-cock
- square-head cock (plug-head)

D. Types of connectors
- unions (most common)
- right and left couplings
- flexible connectors

5. How piping is sized

A. Relationship to amount of gas used
   - total BTU content of all appliances
   - meaning of BTU

B. Relationship to length of pipe
   - pressure drops as length increases

C. Relationship to gas pressure
   - higher the pressure the smaller the pipe,

Water bottle/BTU (T)
Pipe sizing charts
Class labs

6. Determining level of OSS gas pressure

A. Knowing the territories
B. Indicators
   - Size of OSS
   - Presence/absence of service regulator
   - Piping size of service regulator
     —3/4" x 1" high pressure
     —1" x 1" intermittent pressure

8. Pressure problems (poor pressure)

A. Definition: not enough gas pressure being supplied to safely operate appliances

B. Possible causes
   - malfunctioning District or service regulator
   - saturated area (too high of a demand)
   - restriction in Distribution system or house piping
     —rust inside or outside service or customer piping
     —water in the main (could carry over to inside piping)
     —gas cocks not opened fully
     —dropped fire valve

wire or vacuum

method used to clear rust blockage

C. Possible signs
   - **Low pilots**
   - **Pilot outages**

9. Gas outages

EP: b-20 (T)
Issue:
OQ 23 &24 – 41,42,43 & 46

Module 9: Meter Work Procedures

Objectives:

11.1 Be able to turn gas on, purge meter and customer piping, and relight appliances.
11.2 Be able to turn gas off, lock meter fit, and plug inlet of meter.
11.3 Be able to remove a gas meter, lock plug meter fit, and cap or plug customer piping.
11.4 Be able to size, set a meter, and do a flow check on a new meter set.
11.5 Be able to change a meter and breakdown meter fit, if necessary.
11.6 Be able to fill out all forms and use CAD screens for all types of meter work.
11.7 Know how to turn on and turn off a meter and be aware of related safety issues.
11.8 Know how to remove, set, and change a meter.
11.9 Know the information required to complete a verify meter order.
11.10 Know when meter protection is required.

Instructional Plan:	**Materials:**
1. Procedure for completing a "Found-on order" A. Read meter B. Record information on Form 1250 C. Verify all appliances on and operating properly D. Complete necessary CAD screens	Form 1250 Meter fit
2. Sizing of Meters A. Determine rating input of all appliances to be supplied • rating plate on appliances • appliances rated in BTU's per hour • meaning of BTU • 1 cu. ft. of gas needed per 1000 BTU's **B. Formula** • **total input of house heater and water heater** • **plus 1/2 input of all other appliances** **C. Exception to rule: pool heater installation** • **outside pool: total of pool heater and 1/2 input of all other appliances** • **inside pool: total of pool heater & house heater and 1/2 input of all other appliances**	Power point Meter sizing Class lab

3. Turning a meter on

CUST-5165
CUST-5240

A. Purposes
- on for new customer
- transfer on
- after off for non payment
- after meter change
- RGO (ready for gas on after Co. work done on service or meter fit)

B. Requirements
- proper work order
- verify meter number – right meter
- **working appliance on line**
- no code violations
- access to all appliances
- meter information recorded
- meter sticker form 1250 filled out and placed on meter — Form #1250 (T)
- meter and customer piping purged of any air and all pilots relit — covered in Mod #12
- recycling locks and collars

C. Demonstration of procedure using mock up meter fit — ISS mock-up
- how to use a meter lock key
- how to use pipe wrench to turn on meter cock
- **how to replace washers (both) any time fit is open**
- importance of soaping —soap what you disturb

D. Safety issues
- safe handling of pipe wrench
- using two wrenches to turn on gas when service regulator is present
- service cock must be turned on slowly (for high or intermediate service)
- **must be vented outside**
  If leaking: Shut off, call dispatch
- check test dial for movement

D. Purging
- **Start lighting furthest appl. (range)**
- **Eliminate all sources of ignition**
- **Run hose and purge outside**

4. Turning a meter off

A. Purposes
- off for customer moving
- off seasonal (going south for winter)
- off for non payment
- emergency off (poor pressure, over pressure)

B. Requirements
- proper work order
- follow Co. and DPU procedure outlined in CUST-5240
- winter policy (gas heating as only means of heat)
- meter information recorded

C. Demonstration of procedure using mock up
ISS mock-up meter fit
- disc & lock – replace inlet washer

5. Setting a meter CUST-5165

CUST-5165

A. Purposes
- new account
- previous meter removed (not in use-NIU, after fire, leak in customer's piping, etc.)
- new construction

B. Requirements
- city approval of job (explain)
- proper work order
- meter control card (T)
- other requirements same as for turn-on
- flow check on new elevated pressure meter set — See Module 6

C. Demonstration of procedure using mock up — ISS mock-up & outside meter mock-up
- clock meter to check for leak
- proper size of meter

J. Regulator Tagging Procedure **CUST-5175** — **CUST-5175**

6. Removing a meter CUST-5260

CUST-5260

A. Purposes
- close out account (NIU)
- after fire
- warning notice left (no temporary repair made)
- per Legal Department

B. Requirements
- proper work order
- follow Co. and DTE procedures as outlined
- meter control card
- meter information recorded
- recycling fire valves and swivels

C. Demonstration of procedure using mock up — ISS mock-up
- how to use the lock plug
- plugging or capping outlet side of meter fit

7. Changing a meter CUST-5250

CUST-5250

A. Purposes (causes for change)
- leaking
- too small
- too big
- non registering
- Company test
- State test
- periodic change (per DTE every 7 years)

B. Requirements
- gas turned off at meter fit or inside service cock
- other requirements same as for turn-on — replace both washers
- meter information recorded for both new and old meter

C. Demonstration of procedure using mock up — ISS mock-up

8. Miscellaneous meter information work order

A. Information required off 1250 sticker
   - remove read
   - set read
   - old meter number
   - date

B. Information off meter
   - meter number
   - ERT number
   - number of dials

C. Meter location

9. How to break down a meter fit

ISS Mock-up

A. Purpose
B. Tools and stock needed
C. Procedure

10. Meter protection requirements

CUST-5232

11. Completing meter orders on CAD

A. CAD screens
B. Practice various types of meter orders on the MDT

Module 15: Leak on Customer's Premise

Objectives:

15.1 Recognize that the primary function of the Operations Department is to respond to all gas related emergencies as promptly and efficiently as possible.
15.2 Know the basic procedures that must be adhered to when investigating a leak on customer's premise.
15.3 Understand the different methods of finding inside leaks.
15.4 Know where to look for inside leaks.
15.5 Know how to make safe an inside leak when found.

Instructional Plan:

1. Responding to emergency calls

A. Definition of emergency
B. Importance of quick response time
C. Purpose of CAD Man Ack Key

2. Methods of finding inside leaks

A. Listening to customer
   - check area where odor is most noticeable
   - always assume customer smells gas even when you cannot

B. Leak detecting fluid (soap solution)
   - how it works
   - use on all exposed connections and pipe fittings
   - meter seams and dial face

C. CGI machine
   - must be used for FDW check in the case of basement or leak-throughout odor complaints

D. Gas tracker
   - how it operates
   - high sensitivity
   - used to detect leaks that cannot be found with soap

E. Smell
   - helps locate area of leaking gas
   - not a determining factor
   - verify with other methods

Materials:

F. Meter test dial
- used to check for leak in concealed piping
- shut off all appliances
- mark location of meter test dial
- use chart and procedure in Service Manual
- wait allotted time

3. Where to look for inside leaks

A. Odors in basement
- inside service including service tee
- meter fit and connections
- meter
- house piping
- appliances located in basement
- foundation wall (FDW)
  —any opening at FDW gas service, water service, electrical conduits, cracks
  —above the FDW foundation sill area
  —basement floor sewage drains, floor drains, cracks

B. Appliances
- fittings and connectors used to install appliance
- appliance cock and regulator
- valves and appliance piping
- pilots and pilot tubing with connectors

C. Other locations
- electrical light fixtures previously converted from gas
- house piping passing through levels of a home

D. Sources of odors other than natural gas
- gasoline-operated equipment
- gasoline storage cans
- paint and paint thinners

4. Repair of inside leaks

A. Permanent repairs
- Keyspan responsible for Company piping
- tightening loose fittings
- replacing defective fittings
- greasing a valve
- retesting after making repairs

Cock grease
Gas cock

B. Temporary repairs • shut off and isolate • permagum and tape • warning notice	Permagum tape
C. Meter off and locked • when inside leak cannot be isolated • meter fit locked off • warning notice • City approval needed for Set • Dispatch notified • repairs made on house piping by contractor • contractor applies for City approval before gas can be restored	City OK
D. CAD screens	MDT terminal

NOTE: A Leak Investigation Test is to be administered at least one full day after completion of this module. The test should be administered in the morning to enable trainees to do their best on it.

NOTE: The final Knowledge Test and Performance Test are to be administered at the end of the course. The Time Management Plans allows sufficient time to administer these tests within the 10-day school.

Exhibit 9

Service Technician Operator Qualification Record

HISTORY OF EMPLOYEE QUALIFICATIONS

01/20/10 **National Grid - New England**

Employee ID: 14472 **First Name:** Christopher **Last:** Salamone
Title: 8466 8807 Meter Service Representative (12003) **Phone:**
Company: National Grid - New England
Company: CSV **State:** MA
Location: WLTHM_52
Department: Work Planning
Union Code: US3

QUALIFICATIONS

Task ID	Name	Rev	Seq	Qualified	Next Date	Revoked
NGA-006	Inspecting for atmospheric corrosion	1	2	08/02/06	08/02/11	
NGA-006	Inspecting for atmospheric corrosion	1	0	07/28/09	07/28/14	
NGA-008	Visually inspecting for internal corrosion	1	2	08/02/06	08/02/11	
NGA-008	Visually inspecting for internal corrosion	1	0	07/28/09	07/28/14	
NGA-011	Applying pipe coating in the field	1	0	09/16/09	09/16/14	
NGA-012	Cleaning and either coating or jacketing pipe for	1	0	09/16/09	09/16/14	
NGA-017B	Repair coating on steel pipelines	1	0	09/16/09	09/16/14	
NGA-018	Conducting gas leakage surveys	1	0	08/01/06	08/01/11	
NGA-019	Patrolling and inspecting pipeline	1	0	08/01/06	08/01/11	
NGA-020	Investigating leak/odor complaints	1	2	08/02/06	08/02/09	
NGA-020	Investigating leak/odor complaints	1	0	09/16/09	09/15/12	
NGA-020B	Investigating leak/odor complaints	1	0	09/16/09	09/15/12	
NGA-022	Inspection of 3rd party excavations for damage	1	0	09/16/09	09/16/14	
NGA-023	Inspecting the condition of exposed pipe or pipe coating	1	0	09/16/09	09/16/14	
NGA-024	Inspect pipe for damage	1	0	09/16/09	09/16/14	
NGA-041	Inspect and operate valves	1	0	07/28/09	07/28/14	
NGA-042	Repair and maintain distribution line valves	1	0	07/28/09	07/28/14	
NGA-043	Lubricate distribution line valves	1	0	07/28/09	07/28/14	
NGA-045	Restore service	1	0	09/16/09	09/16/14	
NGA-070	Properties of natural gas and abnormal operating	1	2	08/01/06	08/01/09	
NGA-070	Properties of natural gas and abnormal operating	1	0	07/28/09	07/27/12	
NGA-072	Installation of Customer Meters and Regulators	1	0	07/28/09	07/28/14	

Exhibit 10

Post-Incident Drug and Alcohol Test Results

Information Request PL 1-18

Respondent: William R. Laferriere

Request: Provide the results of the post incident drug and alcohol test results for Mr. Salamoni.

Response: The results for both the drug and alcohol tests were negative.

Exhibit 11

National Grid Procedures on Changing Meters

CUST-5250: CHANGING GAS METERS

Date:	02/01/2007	Filed:	Yes	Application:	MA
		Review:	Annual	Lead Org:	Field Ops

Revision:

Location	From	To
Procedure 1.	Meter changes due to periodic change requirement or cause shall be initiated by a Form 1249 Service Work Order or CAD generated Meter Change Order.	Meter changes due to periodic change requirement or cause shall be initiated by a CAD generated "Meter Change Order".
Procedure 3.	Procedure 5500. The representative changing out a meter with an Instrument shall note "Instrument" under the Comments section of the Work Order.	Renumbered as step Procedure 4. Procedure CUST-5500, "Unmetered Gas and/or Tampering With Meter and Regulators". The Revenue Protection Form 1687, "Report of Unmetered Gas and/or Tampering", shall be completed as required.
Procedure 4.	Form 2257, "Instrument Replacement Card," shall also be completed. A notation shall be made on the Form 2257 when the meter has AMR transmitting equipment attached (e.g., ERT, Metretek).	Renumbered as step Procedure 3.
Procedure 5.	The Form 1249 and the Form 2257 shall be turned into the Field Operations Supervisor with the daily paper work. Revenue Protection form 1687 shall be turned into the Field Operations Supervisor. The Field Operations Supervisor shall forward the Form 2257 to the Manager Meter Operations, or designee.	The Form 2257, "Instrument Replacement Card," and the Revenue Protection Form 1687, "Report of Unmetered Gas and/or Tampering", shall be turned into the Field Operations Supervisor. The Field Operations Supervisor shall forward the Form 2257 to the Manager Meter Operations, or designee. The Form 1687 shall be forward to Revenue Protection.

DESCRIPTION

This procedure is to be used for gas meter change outs.

PROCEDURE

1. **Meter changes due to periodic change requirement or cause shall be initiated by a CAD generated "Meter Change Order".**

2. On instrumented metering, the order should include indication that the metering is instrumented.

3. On instrumented meters a Form 2257, "Instrument Replacement Card," shall be completed. A notation shall be made on the Form 2257 when the meter has AMR transmitting equipment attached (e.g., ERT, Metretek).

4. Prior to changing the meter, the field representative shall perform a check of the meter set. Evidence of tampering shall be addressed in accordance with Procedure CUST-5500, "Unmetered Gas and/or Tampering With Meter and Regulators". The Revenue Protection Form 1687, "Report of Unmetered Gas and/or Tampering", shall be completed as required.

5. The Form 2257, "Instrument Replacement Card," and the Revenue Protection Form 1687, "Report of Unmetered Gas and/or Tampering", shall be turned into the Field Operations Supervisor with the daily paper work. The Field Operations Supervisor shall forward the Form 2257 to the Manager Meter Operations, or designee. The Form 1687 shall be forward to Revenue Protection.

6. The meter and instrument removed shall be returned to the reporting location for return to Meter Operations.

7. The Manager Meter Operations, or designee, shall schedule the installation of an Instrument within seven days of receipt of Form 2257. The Instrument shall be installed and calibrated as required. Meters with Instruments, which are returned to Meter Operations, shall be checked against the instrument file to verify that the replacement Instrument has been installed.

8. If a Form 2257 has not been received for an instrumented meter returned to Meter Operations, the Manager Meter Operations, or designee, shall notify the appropriate Field Operations Supervisor and Revenue Accounting, and shall immediately schedule the inspection of the meter site and installation of the Instrument, as necessary. The Instrument, if needed, shall be installed and calibrated as required.

(End CUST-5250)

CUST-5240: METER TURN-ON / TURN-OFF PROCEDURES

Date Revised:	12/31/2006	**Filed:**	Yes	**Application:**	MA-NH
		Review:	Annual	**Lead Org:**	Field Operations

Revision:		
Location:	From:	To:
General	MA application	Expanded scope to include NH.
Section A.1.b	Added	...or approving authority
Section D	Added	Regulator Replacement or Repair 1. Whenever a regulator is repaired or replaced and the set pressure to the customer exceeds 13.5" W.C. all appliances will be inspected to verify that the appliance regulators or appliances are rated for that pressure. 2. Emergency Dispatch shall be called to verify the set pressure is on the Customer Elevated Pressure List. The Supervisor shall be notified when the set pressure is not on the Customer Elevated Pressure List. 3. Yearly Revenue Protection shall provide, to Emergency Dispatch, a current Customer Elevated Pressure List.

DESCRIPTION

This section describes the procedure that shall be followed by field personnel when turning on the gas or re-setting a meter for an existing Customer. (The procedure for meter sets for new customers is contained in CUST-5165.)

PROCEDURE

A. Meter On/Meter Set Procedure

1. Work orders to turn on the gas or set a meter shall only be executed after the following has been confirmed:
    a. Access to all connected appliances is assured.
    b. All necessary permits and approvals have been obtained from the municipal gas inspector or approving authority.
    c. At least one of the connected appliances is operative.
2. An inside leakage survey shall be performed in accordance with Field Operations Procedures.
3. Meter connections shall be soap tested for leaks.
4. The gas shall be turned on and the operation of the meter test dial confirmed. Once operation is confirmed, the meter test dial shall be observed for movement.
5. If any of the actions taken indicate gas leakage, appropriate action shall be taken.
6. Fuel lines shall be purged in accordance with CUST-5120
7. Pilots shall be lit on all existing appliances that are equipped with standing pilots.
8. All flue connections shall be checked for proper operation.
9. All appliances should be left in operation. The manufacturer's installation and operating instructions shall be left with the appliance(s). In addition, the customer should be informed of the importance of becoming familiar with this information.

B. Meter Turn Offs - General

1. This section describes the procedure for meter turn offs and meter removes.
2. "Off if Vacant" orders shall be thoroughly investigated in order to be certain that the customer no longer uses gas. If the gas is in use by the previous tenant or a new residential customer and that person requests the gas to be left on, the "Off" order shall be completed with the meter reading noting "Off-See Found On". In addition, the person's name, social security number, and the original on-date shall be obtained and noted, when possible.
3. During the heating season (i.e., November 15 through March 15) no gas heating account shall be shut off unless "S/O SURE OWNER AWARE POSS FRZ UP - STL WNTS OFF" (i.e., shut off and be sure owner is aware of possible freeze-up and still wants off) appears in the comment section of the "Off" order. Discretion shall be used when shutting off a meter when gas is the only means of heat.

C. Meter Turn Off - Procedure

1. The meter cock shall be shut off.
2. On applicable meters, a "pie plate" disk and a new washer shall be installed in the inlet meter cone.
3. A barrel-style lock shall be installed through the wings of the rigid connection meter cock. If the lock cannot be installed on the cock, a lock collar and a barrel-style lock shall be installed around the inlet meter nut.
4. If the meter is not locked and disked, the reason for failing to do so shall be noted on the order.

D. Regulator Replacement or Repair

1. Whenever a regulator is repaired or replaced and the set pressure to the customer exceeds 13.5" W.C. all appliances will be inspected to verify that the appliance regulators or appliances are rated for that pressure.
2. Emergency Dispatch shall be called to verify the set pressure is on the Customer Elevated Pressure List. The Supervisor shall be notified when the set pressure is not on Customer Elevated Pressure List. The Supervisor shall be notified when the set pressure is not on the Customer Elevated Pressure List
3. Yearly Revenue Protection shall provide, to Emergency Dispatch, a current Customer Elevated Pressure List.

(End CUST-5240)

CUST-5165: New Meter / Regulator Installation – Setup and Inspection

Date Revised:	12/01/2007	**Filed:**	Yes	**Application:**	MA-NH
		Review:	Annual	**Lead Org:**	Field Operations
Revision:					
Location:	From:			To:	
Application	MA			MA-NH	
DESCRIPTION	The intent of this procedure is to provide instructions for set-up and inspection of newly installed meters and meter bar sets. No meter will be installed until the gas inspection is completed and the inspection tag is on site			The intent of this procedure is to provide instructions for set-up and inspection of newly installed meters and meter bar sets. No meter will be installed, except large meters per Section E, until the gas inspection is completed and the inspection tag is on site	
A. 3.	This procedure will be followed for residential and commercial meter sets sized up to , and including, 630 CFH.			This procedure will be followed for residential and commercial meter sets.	
B. 3.	Connect Flow and Lock-up Test Assembly to inlet swivel connection of meter bar. Perform Run & Lock-Up (Flow & No-Flow) procedure and record pressure reading.			On meter installation sized up to 630 CFH connect Flow and Lock-up Test Assembly to inlet swivel connection of meter bar. Perform Run & Lock-Up (Flow & No- Flow) procedure and record pressure reading.	
E.	New section			E. Large Commercial/Industrial Meter Set - Customer Piping Connected or Not Connected to Outlet of Meter or Meter Bar – Inspection Tag Not On Site 1. Install meter. 2. Make sure all open piping ends are capped and/or all connected appliance valves are in the off position or install threaded plug into outlet of meter bar. 3. Remove riser lock. 4. Turn riser valve on. Riser valve should be turned slowly if there is an EFV on the line. 5. Soap test all live gas connections of Company piping for leaks. If leak is found, take appropriate action. 6. Turn riser valve off.	

		7. Reinstall riser lock. 8. Install Tag on the Meter Set with a warning: "Do not turn on without City OK". 9. Hang notice on door to notify the customer that the meter is set and City approval is required. 10. Call the Phone Reps and have note put on the Account stating "Meter is Set do not turn on without a City OK".

DESCRIPTION

The intent of this procedure is to provide instructions for set-up and inspection of newly installed meters and meter bar sets. No meter will be installed, except large meters per Section E, until the gas inspection is completed and the inspection tag is on site

PROCEDURE

A. This procedure applies to:

1. New meter sets
2. This procedure will be followed for all delivery pressures.
3. This procedure will be followed for residential and commercial meter sets

B. Initial Steps

1. Verify inspection tag is on site
2. Verify meter assembly is supported and protected properly from damage. Take appropriate actions as needed.
3. On meter installation sized up to 630 CFH connect Flow and Lock-up Test Assembly to inlet swivel connection of meter bar. Perform Run & Lock-Up (Flow & No- Flow) procedure and record pressure reading.

C. Meter Set - Customer Piping Connected to Outlet of Meter Bar – Inspection Tag On Site

1. Install meter.
2. Make sure all open piping ends are capped and/or all connected appliance valves are in the off position.
3. Remove riser lock.
4. Turn riser valve on. The riser valve should be turned slowly, since there may be an EFV or a regulator involved. This will ensure a smooth activation..
5. Check meter dial for movement. Soap test all live gas connections of Company piping for leaks. If leak is found, take appropriate action on Company piping.
6. For leaks on customer-owned piping, remove meter, lock off riser and leave Warning Notice.
7. Leave appliance valves on all new heating equipment in the off position and either notify installer to light or notify customer to have installer return to light up new heating equipment. If accessible, light other non-heating equipment.

8. If there is no equipment connected, purge lines in accordance with CUST-5120 to appliance valves and leave all appliance valves off and capped.

D. Meter Set - Customer Piping Not Connected to Outlet of Meter Bar – Inspection Tag On Site – (MA only)

1. Install meter.
2. Install threaded plug into outlet of meter bar.
3. Remove riser lock.
4. Turn riser valve on. Riser valve should be turned slowly if there is an EFV on the line.
5. Soap test all live gas connections of Company piping for leaks. If leak is found, take appropriate action.
6. Hang notice on door to notify the customer that the meter is set. This completes the Company's work. A licensed installer can now complete the installation.

E. Large Commercial/Industrial Meter Set - Customer Piping Connected or Not Connected to Outlet of Meter or Meter Bar – Inspection Tag Not On Site

1. Install meter.
2. Make sure all open piping ends are capped and/or all connected appliance valves are in the off position or install threaded plug into outlet of meter bar.
3. Remove riser lock.
4. Turn riser valve on. Riser valve should be turned slowly if there is an EFV on the line.
5. Soap test all live gas connections of Company piping for leaks. If leak is found, take appropriate action.
6. Turn riser valve off.
7. Reinstall riser lock.
8. Install Tag on the Meter Set with a warning: "Do not turn on without City OK".
9. Hang notice on door to notify the customer that the meter is set and City approval is required.
10. Call the Phone Reps and have note put on the Account stating "Meter is Set do not turn on without a City OK".

(End CUST-5165)

Exhibit 12

National Grid Odorant Test Results

DISTINCT ODOR LEVEL TESTS

Route 2

LOCATION	Distribution System Tested	Test Conducted By	Test Date	Odorator Serial #	Odorator Calibration Date Performed	Odorator Threshold Reading	# Gas Converted Threshold	Odorator Distinct Reading	% Gas Converted Distinct	REMARKS:
#5 E. Boston Fire Station Prescott St. E. Boston	Central	RH	2/10/10	3239-5	1/22/10	06	065	.10	.10	
#7 Somerville Court House Middlsx Ave @ Fellsway Somerville	Central	RH	2/10/10	3239-5	1/22/10	05	06	.10	.10	
#12 Milton Fire Station 515 Canton Ave. Milton	Central	RH	2/10/10	3239-5	1/22/10	06	065	09	.09	
#11 Watertown Fire Station 564 Mt. Auburn St. Watertown	Central	RH	2/10/10	3239-5	1/22/10	07	07	.11	.11	
#9 Chelsea Fire Station Chestnut @ Broadway Chelsea	Central	RH	2/10/10	3239-5	1/22/10	06	065	09	09	
#13 Newton Fire Station 31 Willow St. Newton	Central	RH	2/10/10	3239-5	1/22/10	07	07	.10	.10	
#21 Waltham Fire Station Prospect St. Waltham	West	RH	2/10/10	3239-5	1/22/10	04	05	.08	08	
#14 Brandies College South St. (Epstein Bldg.) Waltham	West	RH	2/10/10	3239-5	1/22/10	05	06	09	.09	

IF THE DISTINCT READING IS LESS THAN .03 OR GREATER THAN .15, NOTIFY YOUR SUPERVISOR IMMEDIATEY

DISTINCT ( )R LEVEL TESTS

Route #2

Performed by: Propane & Gas Conditioning Group (South)

LOCATION	Distribution System Tested	Test Conducted By	Test Date	Odorator Serial #	Odorator Calibration Date Performed	Odorator Threshold Reading	% Gas Converted Threshold	Odorator Distinct Reading	% Gas Converted Distinct	REMARKS:
#5 E. Boston Fire Station Prescott St. E. Boston	Central	PMC	12-3-09	813	2-4-09	.07	.07	.09	.09	
#7 Somerville Court House Middlsx Ave&Fellsway Somerville	Central	PMC	12-3-09	813	2-4-09	.05	.06	.07	.07	
#12 Milton Fire Station 515 Canton Ave. Milton	Central	PMC	12-3-09	813	2-4-09	.05	.06	.07	.07	
#11 Watertown Fire Station 564 Mt. Auburn St. Watertown	Central	PMC	12-3-09	813	2-4-09	.05	.06	.07	.07	
#9 Chelsea Fire Station Chestnut @ Broadway Chelsea	Central	PMC	12-3-09	813	2-4-09	.06	.065	.08	.08	
#13 Newton Fire Station 31 Willow St. Newton	Central	PMC	12-3-09	813	2-4-09	.05	.06	.07	.07	
#21 Waltham Fire Station Prospect St. Waltham Waltham	West	PMC	12-3-09	813	2-4-09	.06	.065	.08	.08	
#14 Brandies College South St. (Epstein Bldg) Waltham	West	PMC	12-3-09	813	2-4-09	.07	.07	.09	.09	